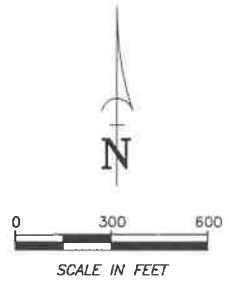
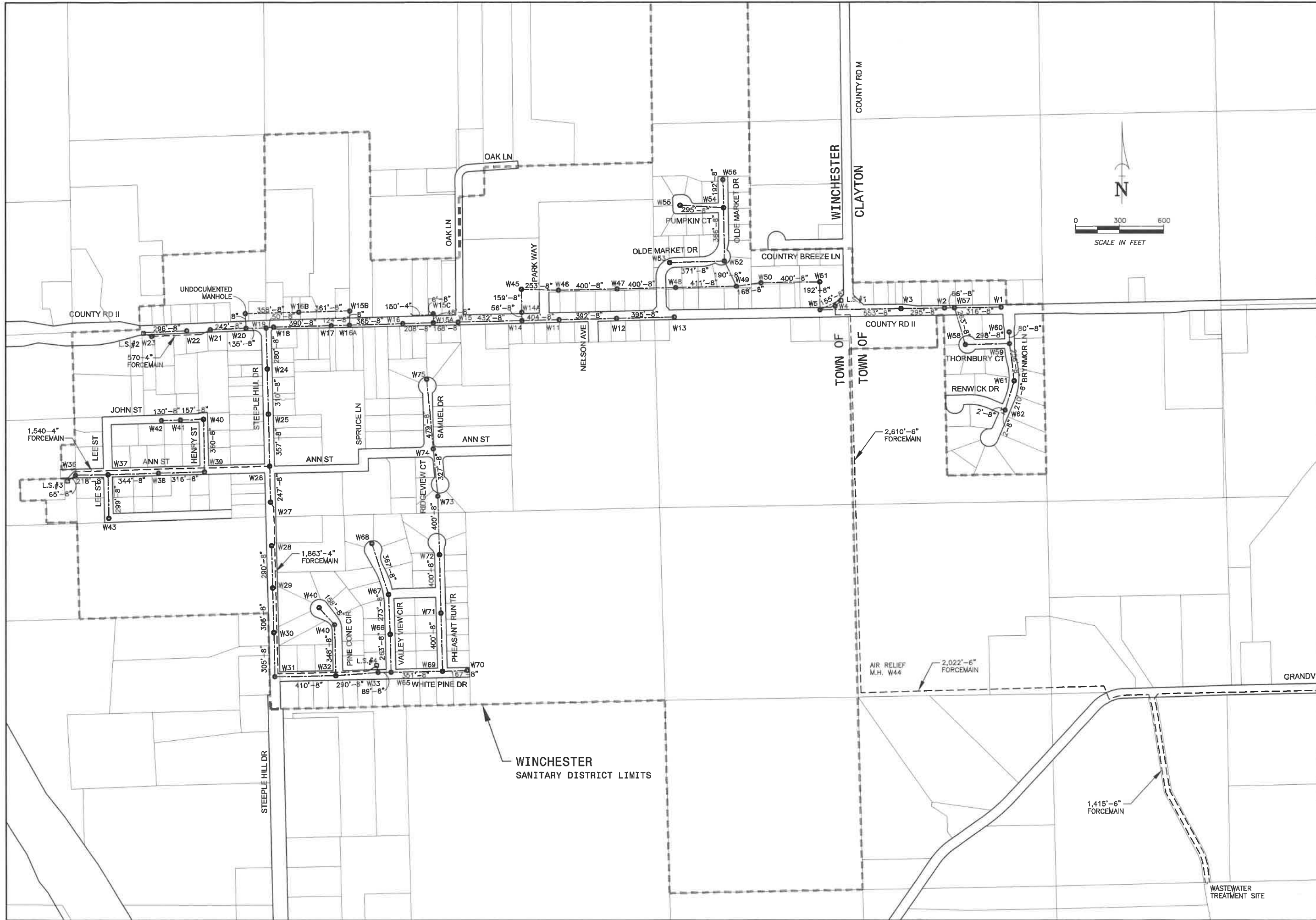


# **APPENDIX A**

## **LWSD System Mapping And Original Lagoon System Plans**



**Martenson & Eisele, Inc.**  
 Planning  
 Environmental  
 Surveying  
 Engineering  
 Architecture  
 1377 Midway Road  
 Menasha, WI 54952  
 www.martenson-eisele.com  
 info@martenson-eisele.com  
 920.731.0381 1.800.236.0381

DRAWN BY		CHECKED		APPROVED		FIELDWORK	
CRC		M/M		M/M		M/M	
** REFER TO COVER SHEET FOR REVISION DESCRIPTIONS **							
NO.	DATE	NO.	DATE	NO.	DATE	NO.	DATE
1	04-08-2021						

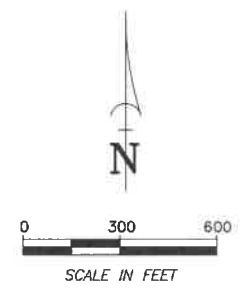
**WINCHESTER DISTRICT  
 SANITARY SEWER SYSTEM MAP**  
 WINNEBAGO COUNTY, WISCONSIN

SCALE	DATE
BAR SCALE	07-29-2016
COMPUTER FILE	
1-0049-012\System Map	

DRAWING NO.  
1-0049-012



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 Planning  
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 1377 Midway Road  
 Menasha, WI 54952  
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 920.751.0381 1.800.236.0381

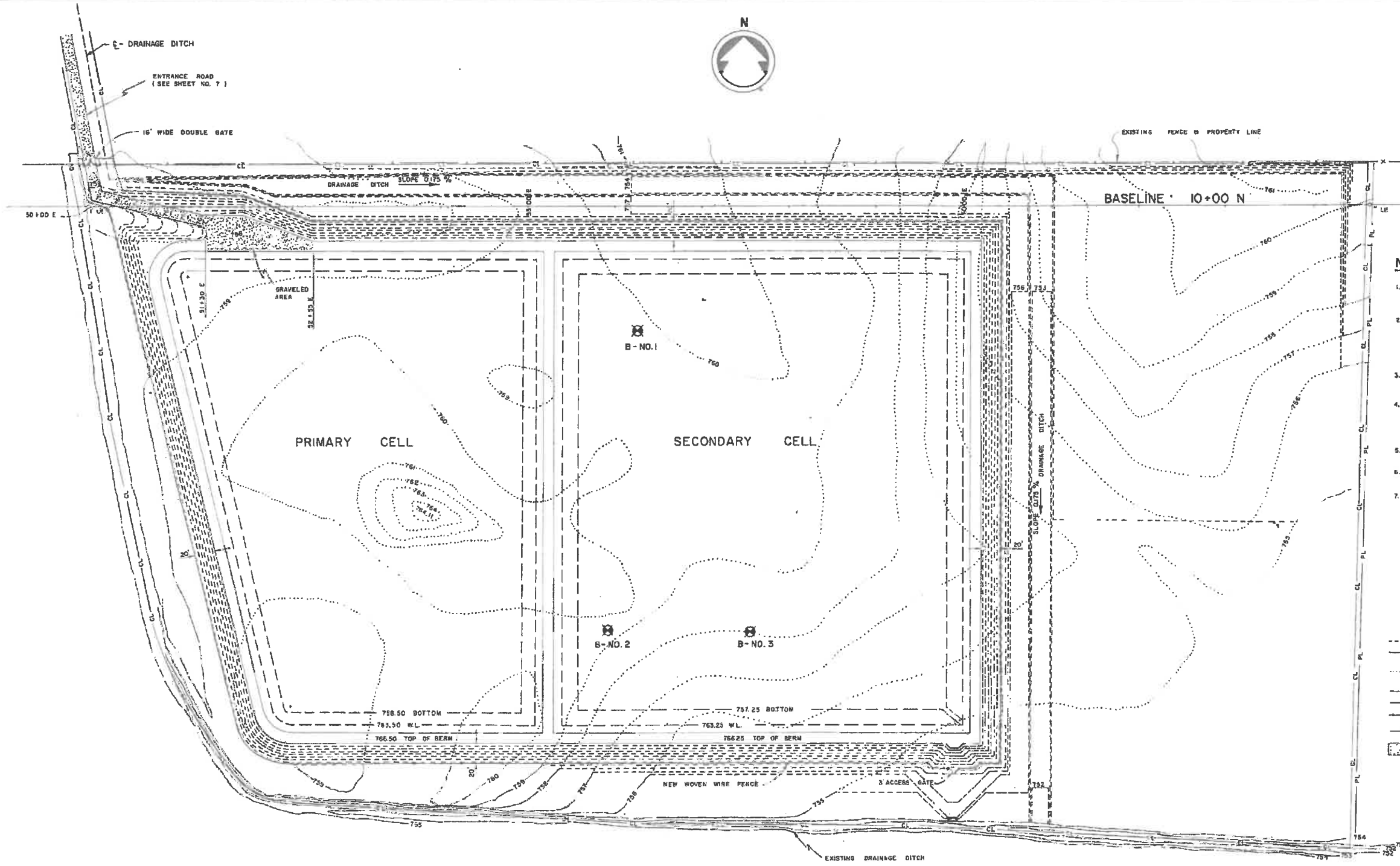


DRAWN BY		CHECKED		APPROVED		FIELDWORK	
NO.	DATE	NO.	DATE	NO.	DATE	NO.	DATE
1	04-09-2021						

**LARSEN DISTRICT  
 SANITARY SEWER SYSTEM MAP**  
 WINNEBAGO COUNTY, WISCONSIN

SCALE	DATE
BAR SCALE	07-29-2016
COMPUTER FILE	
1-0049-012\System Map	

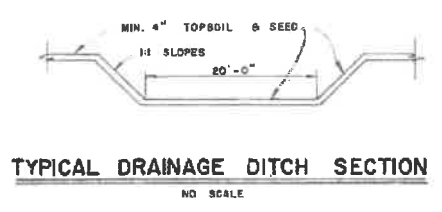
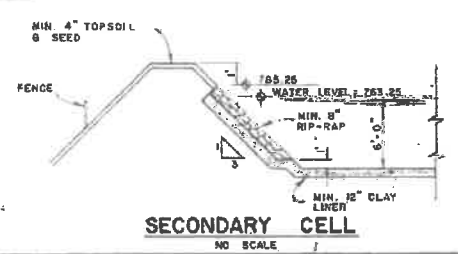
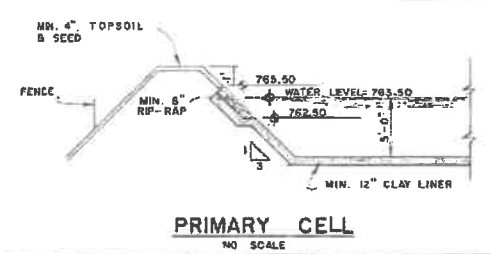
DRAWING NO.  
1-0049-012



- NOTES:**
- CONSTRUCTION LIMITS FOR PLANT SITE AND ENTRANCE ROAD ARE WITHIN THE PROPERTY LINES AS SHOWN ON THIS PLAN.
  - ALL DISTURBED AREAS WITHIN CONSTRUCTION LIMITS NOT COVERED WITH GRAVEL TO HAVE 4" TOPSOIL AND SEED, WITH THE FOLLOWING EXCEPTIONS:  
 PRIMARY CELL - 4" TOPSOIL & SEED ONLY DOWN TO ELEV. 785.50.  
 SECONDARY CELL - 4" TOPSOIL & SEED ONLY DOWN TO ELEV. 785.25.
  - GRAVEL SURFACING SHALL BE CRUSHED AGGREGATE BASE COURSE, COMPACTED TO MIN. 8" THICKNESS. (SEE SPECIFICATIONS)
  - BENCH MARKS -  
 NO. 1 - TOP OF 1" IRON PIPE AT STA. 50+00 E ON BASELINE 10+00 N. ELEV. +785.50 (UGSS DATUM)  
 NO. 2 - SPIKE IN 30" OAK TREE AT STA. 88+00 E ON BASELINE 10+00 N. ELEV. +786.89 (UGSS DATUM)
  - CONTOURS SHOWN ARE AT ONE FOOT INTERVALS UNLESS OTHERWISE INDICATED.
  - ALL SLOPES SHALL BE 3 FT. HORIZONTAL TO 1 FT. VERTICAL FOR THE BERMS.
  - THE DRAINAGE DITCH BANKS SHALL BE SLOPED AT 1 FT. HORIZONTAL TO 1 FT. VERTICAL.

- LEGEND**
- - - 700 - - - CONTOUR LINES INDICATING FINAL GRADE
  - - - 700 - - - CONTOUR LINES INDICATING EXISTING GRADE TO BE RETAINED
  - - - 700 - - - CONTOUR LINES INDICATING EXISTING GRADE TO BE REGRADED
  - - - PL - - - PROPERTY LINE
  - - - CL - - - CONSTRUCTION LIMITS
  - - - W - - - WOVEN WIRE FENCE (NEW) - SEE SPECIFICATIONS FOR DETAILS
  - - - F - - - EXISTING FENCE (RETAIN)
  - [Hatched Area] GRAVELED AREA (SEE NOTE NO. 3)
  - [Symbol] SOIL BORING LOCATIONS

**TYPICAL CELL DETAILS**  
SCALE 1" = 80'



**FOTH & VAN DYKE**  
and Associates, Inc.  
Consulting Engineers  
Green Bay, Wisconsin

**GRADING PLAN**

LARSEN - WINCHESTER SANITARY DISTRICT  
WASTEWATER STABILIZATION LAGOON

NO.	DATE	BY	DESIGNED BY	SCALE	AS SHOWN	DRAWING NO.
1			P.E.D.		AS SHOWN	2
2			EAL		MAY 1978	

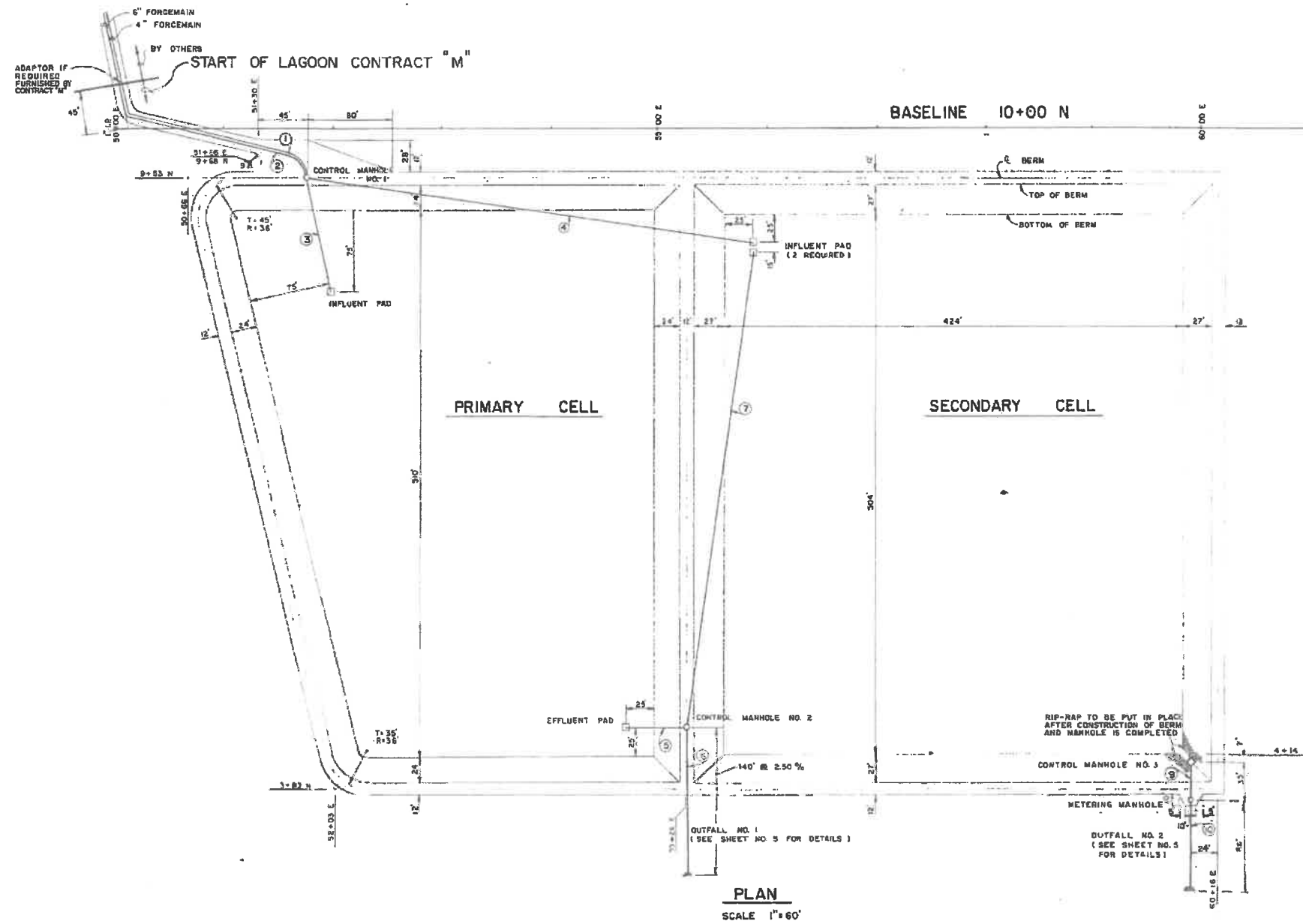




EXTERIOR PLANT PIPING SCHEDULE							
PIPE LINE NO.	SIZE OF PIPE	TYPE OF PIPE	CLASS OF PIPE	BEDDING	TYPE OF JOINT	FROM	TO
①	4"	DUCTILE IRON	S4	B	MECK OR PUSH ON	LARSEN LIFT STATION	CONTR. MH. NO. 1
②	6"	"	"	"	"	WINCHESTER LIFT STATION	CONTR. MH. NO. 1
③	8"	"	"	"	"	CONTR. MH. NO. 1	PRIM. INFL. PAD
④	8"	"	"	"	"	CONTR. MH. NO. 1	SECOND. INFL. PAD
⑤	8"	"	"	"	"	PRIM. EFFL. PAD	CONTR. MH. NO. 2
⑥	8"	"	"	"	"	CONTR. MH. NO. 2	OUTFALL NO. 1
⑦	8"	"	"	"	"	CONTR. MH. NO. 2	SECOND. INFL. PAD
⑧	10"	"	"	"	"	CONTR. MH. NO. 3	METERING MH.
⑩	10"	"	"	"	"	METERING MH.	OUTFALL NO. 2

NOTE: ALL PIPE IN CONTROL MANHOLES SHALL BE FLANGED

NOTE: ALL STATIONING SHOWN IS REFERENCED TO EAST-WEST BASELINE (10+00 N).



PLAN  
SCALE 1" = 60'

**FOTH & VAN DYKE**  
and Associates, Inc.  
Consulting Engineers  
Green Bay, Wisconsin

6					
5					
4					
3					
2					
1					
NO.	DATE	BY	DESIGNED BY	SCALE	DRAWING NO.
			P.E.G.	AS SHOWN	3
REVISIONS	DATE	BY	DATE	JUNE 1979	

**APPENDIX B**  
**Current WPDES Permit**

**State of Wisconsin**  
**DEPARTMENT OF NATURAL RESOURCES**  
Northeast Region Headquarters  
2984 Shawano Avenue  
Green Bay, WI 54313-6727

Scott Walker, Governor  
Cathy Stepp, Secretary  
Jean Romback-Bartels, Regional Director  
Telephone (920) 662-5100  
FAX (920) 662-5159  
TDD (920) 662-5413



August 2, 2017

Mike Pfankuch, President  
Larsen Winchester Sanitary District  
4556 Grandview Rd  
Larsen, WI 54947

**SUBJECT:** WPDES Permit Reissuance No. WI-0031925-06-0  
Larsen Winchester SD WWTF, SE ¼ of the SW ¼, Section 19, T20N, R16E, Town of  
Clayton, Winnebago County, Wisconsin

Dear Mr. Pfankuch:

The reissued Wisconsin Pollutant Discharge Elimination System (WPDES) Permit for the Larsen Winchester Sanitary District Wastewater Treatment Facility is enclosed. The conditions of the enclosed permit reissuance were determined using the permit application, information from the WPDES permit file, other information available to the Department, comments received during the public notice period, and applicable Wisconsin Administrative Codes. All discharges from this facility and actions or reports relating thereto shall be in accordance with the terms and conditions of the enclosed permit.

This enclosed permit requires you to submit monitoring results to the Department on a periodic basis. Monitoring forms, which must be submitted electronically, are available on the Department's web page. Go to the DNR Switchboard page at <http://dnr.wi.gov/topic/switchboard/> to log in and access your monitoring forms. For your convenience, there is a 'Summary of Reports Due' at the end of the enclosed permit that shows a synopsis of the required reports and monitoring forms.

The WPDES permit program has been approved by the Administrator of the U.S. Environmental Protection Agency pursuant to Section 402(b) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1342 (b)). The terms and conditions of the enclosed permit are accordingly subject to enforcement under ss. 283.89 and 283.91, Stats., and Section 309 of the Federal Act (33 U.S.C. Section 1319).

The Department has the authority under chs. 160 and 283, Wis. Stats., to establish effluent limitations, monitoring requirements, and other permit conditions for discharges to groundwater and surface waters of the State. The Department also has the authority to issue, reissue, modify, terminate, or revoke and reissue WPDES permits under ch. 283, Wis. Stats.

The enclosed permit contains water quality-based effluent limitations that are necessary to ensure the water quality standards for the Arrowhead River are met. You may apply for a variance from the water quality standard used to derive the limitations pursuant to s. 283.15, Stats., by submitting an application to the Director of the Bureau of Water Quality, P.O. Box 7921, Madison, Wisconsin 53707 within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). This statute also allows the permittee to apply for a variance to the water quality standard when applying for reissuance of the permit. Subchapter III of ch. NR 200, Wis. Adm. Code, specifies the procedures that must be followed and the information that must be included when submitting an application for a variance.

This permit contains a stringent Water Quality Based Effluent Limit for Phosphorus and there is a Compliance Schedule requirement to complete a Phosphorus Operational Evaluation and Optimization Report. To streamline the Report preparation and review process the Department has prepared a Worksheet which should be used to develop the report. The worksheet may be found at: <http://dnr.wi.gov/topic/surfacewater/phosphorus.html>

This permit contains requirements to conduct activities under your Chloride Source Reduction Plan and submit annual reports on those activities. To facilitate report preparation the Department has prepared a "Pollutant Minimization Program/Source Reduction Annual Report" template which is recommended to be used to develop those annual reports. The report template is included in DNR's guidance document on pollutant minimization plans and source reduction measures, entitled, "DNR's Recommendations for PMPs and SRMs for Arsenic, Chloride, Copper, and Mercury Variances," which can be found at: <http://dnr.wi.gov/topic/Wastewater/documents/SignedPMPSRMguidance.pdf>

To challenge the reasonableness of or necessity for any term or condition of the enclosed permit, s. 283.63, Stats., and ch. NR 203, Wis. Adm. Code, require that you file a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). For permit-related decisions that are not reviewable pursuant to s. 283.63, Stats., it may be possible for permittees or other persons to obtain an administrative review pursuant to s. 227.42, Stats., and s. NR 2.05(5), Wis. Adm. Code, or a judicial review pursuant to s. 227.52, Stats. If you choose to pursue one of these options, you should know that Wisconsin Statutes and Administrative Code establish time periods within which requests to review Department decisions must be filed.

Sincerely,



Kelley O'Connor  
Wastewater Supervisor, Northeast Region

Dated: August 2, 2017

Enclosures: WPDES Permit Reissuance No. WI-0031925-06-0  
Notice of Final Determination to Reissue a WPDES Permit

cc: Legal Permit File  
Watershed File – Cyndi Barr, WT/3 (electronic copy via email)  
U.S. Fish and Wildlife Service (electronic copy via email)  
Barti Oumarou, Basin Engineer – DNR, Oshkosh Service Center (electronic copy via email)

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES

NOTICE OF FINAL DETERMINATION TO REISSUE WISCONSIN POLLUTANT DISCHARGE  
ELIMINATION SYSTEM (WPDES) PERMIT No. WI-0031925-06-0

Permittee: Larsen Winchester Sanitary District, P O Box 85, Larsen, WI, 54947

Facility Where Discharge Occurs: Larsen Winchester SD WWTF, SE1/4 of the SW1/4, Section 19, T20N, R16E,  
Town of Clayton, Winnebago County Wisconsin

Receiving Water and Location: Unnamed tributary to the Arrowhead River in Winnebago County

Brief Facility Description: The Larsen Winchester Sanitary District owns and operates a two-cell stabilization pond WWTF that receives primarily domestic wastewater from the unincorporated communities of Larsen and Winchester in north central Winnebago County. The WWTF is designed to treat an average daily flow of 48,300 gallons per day (gpd) and currently receives about 45,000 gpd on average. The WWTF is operated to discharge on a fill-and-draw basis. The discharge flow rate is limited to a daily maximum of 1.186 million gallons per day (MGD); discharge occurs each spring and fall with an average daily flow of 0.685 MGD, with discharge periods lasting about two weeks in duration. Removal of the solids that accumulate in the ponds is not expected during the permit term, although in the event removal is necessary the permittee plans to dispose of the solids by land applying them to agricultural fields.

Permit Drafter's Name, Address and Phone: Richard Sachs, DNR, 2984 Shawano Avenue, Green Bay, WI, 54313-6727, (920) 662-5176

Basin Engineer's Name, Address, and Phone: Barti Oumarou, 625 E County Road Y, Suite 700, Oshkosh, WI 54901, (920) 424-4013

Date Permit Signed/Issued: August 2, 2017

Date of Effectiveness: October 1, 2017

Date of Expiration: September 30, 2022

Public Informational Hearing Held On: April 13, 2017

Following the public notice period and public informational hearing the Department has made a final determination to reissue the WPDES permit for the above-named permittee for this existing discharge. The permit application information from the WPDES permit file, comments received on the proposed permit and applicable Wis. Adm. Codes were used as a basis for this final determination.

The Department has the authority to issue, modify, suspend, revoke and reissue or terminate WPDES permits and to establish effluent limitations and permit conditions under ch. 283, Stats.

Following is a summary of significant comments and any significant changes which have been made in the terms and conditions set forth in the draft permit:

Comments Received from the Applicant, Individuals or Groups and Any Permit Changes as Applicable  
**The Winchester Town Board submitted the following comment on the public noticed permit:**

1. **Comment:** The Winchester Town Board supports reissuing the WPDES Permit Number WI-0031925-06-0 with a chloride variance for the Larsen Winchester Sanitary District. The Larsen Winchester Sanitary District provides essential wastewater collection and processing for the communities of Larsen and Winchester. The Town Board is of the opinion that the proposed changes and conditions of the permit, as public noticed, will sufficiently protect surface water in the community and surrounding areas.

**Response:** No changes were made to the permit as a result of this comment.

Comments Received from EPA or Other Government Agencies and Any Permit Changes as Applicable  
No comments received.

July 27, 2017 EPA approved a chloride variance for the duration of the permit term.

As provided by s. 283.63, Stats., and ch. 203, Wis. Adm. Code, persons desiring further adjudicative review of this final determination may request a public adjudicatory hearing. A request shall be made by filing a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date the permit was signed (see permit signature date above). Further information regarding the conduct and nature of public adjudicatory hearings may be found by reviewing ch. NR 203, Wis. Adm. Code, s. 283.63 Stats., and other applicable law, including s. 227.42, Stats.

Information on file for this permit action may be inspected and copied at either the above named permit drafter's address or the above named basin engineer's address, Monday through Friday (except holidays), between 9:00 a.m. and 3:30 p.m. Information on this permit action may also be obtained by calling the permit drafter at (920) 662-5176 or by writing to the Department. Reasonable costs (usually 20 cents per page) will be charged for copies of information in the file other than the public notice and fact sheet. Pursuant to the Americans with Disabilities Act, reasonable accommodation, including the provision of informational material in an alternative format, will be made to qualified individuals upon request.



# WPDES PERMIT

*STATE OF WISCONSIN*  
*DEPARTMENT OF NATURAL RESOURCES*  
**PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE  
ELIMINATION SYSTEM**

**Larsen Winchester Sanitary District**

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility  
located in

SE ¼ of the SW ¼, Section 19, T20N, R16E, Town of Clayton, Winnebago County, Wisconsin  
to

**an unnamed tributary (Water Body Identification Code number 242200) of the Arrowhead River, in the  
Arrowhead River and Daggets Creek Watershed (WR01) of the Wolf River Basin**

in accordance with the effluent limitations, monitoring requirements and other conditions set  
forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after  
this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis.  
Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources  
For the Secretary

By Kelley O'Connor  
Kelley O'Connor  
Wastewater Supervisor, Northeast Region

August 2, 2017  
Date Permit Signed/Issued

**PERMIT TERM: EFFECTIVE DATE - October 01, 2017**

**EXPIRATION DATE - September 30, 2022**

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# 1 Influent Requirements

## 1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
701	Influent - Representative influent samples shall be collected from the manhole just prior to the primary stabilization cell.

## 1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

### 1.2.1 Sampling Point 701 - Influent

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD <sub>5</sub> , Total		mg/L	2/Month	3-Hr Comp See Section 1.2.1.1	
Suspended Solids, Total		mg/L	2/Month	3-Hr Comp See Section 1.2.1.1	

#### 1.2.1.1 3-Grab Comp Sample Type

A sample type of 3-Grab Comp requires that three discrete grab samples, each of equal volume and collected on the same day at intervals of not less than one hour, be combined for analysis.

## 2 Surface Water Requirements

### 2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
001	Effluent - Samples taken prior to commencing discharge shall be collected directly from the secondary cell of the stabilization pond system. Representative samples of the discharge shall be collected from the control structure overflow.

### 2.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

#### 2.2.1 Sampling Point (Outfall) 001 - Effluent

Monitoring Requirements and Effluent Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate	Daily Max	1.186 MGD	Daily	Total Daily	See Section 2.2.1.2
BOD <sub>5</sub> , Total	Weekly Avg	45 mg/L	3/Week	Grab	See Section 5.4.7 for percent removal requirement
	Monthly Avg	30 mg/L	See Section 2.2.1.3		
Suspended Solids, Total	Monthly Avg	60 mg/L	3/Week	Grab	See Section 2.2.1.5
			See Section 2.2.1.3		
Dissolved Oxygen	Daily Min	4.0 mg/L	3/Week See Section 2.2.1.3	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	See Section 2.2.1.10
	Daily Max	9.0 su			
Fecal Coliform		#/100 mL	2/Discharge See Section 2.2.1.4	Grab	Monitoring only May -- September, 2020
Chloride	Weekly Avg	570 mg/L	2/Discharge See Section 2.2.1.4	Grab	Interim limit; see Section 2.2.1.6

Monitoring Requirements and Effluent Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Total	Monthly Avg	5.4 mg/L	2/Discharge	Grab	Interim limit  The final effluent limits are 0.075 mg/L as a 6-month average, 0.225 mg/L as a monthly average and 11 lb/year annual total; see Sections 2.2.1.7, 2.2.1.8 and 2.2.1.9  The schedule for achieving final compliance is found in Section 4.2
			See Section 2.2.1.4		
Nitrogen, Ammonia (NH <sub>3</sub> -N) Total	Daily Max - Variable	mg/L	2/Discharge	Grab	See Section 2.2.1.10
			See Section 2.2.1.4		
	Weekly Avg	31 mg/L 5.6 mg/L 6.4 mg/L	2/Discharge	Grab	Applies October – March Applies April – May Applies June - September
			See Section 2.2.1.4		
			2/Discharge		
	Monthly Avg	12 mg/L 2.2 mg/L 2.5 mg/L	2/Discharge	Grab	Applies October – March Applies April – May Applies June - September
			See Section 2.2.1.4		
See Section 2.2.1.4					

**2.2.1.1 Average Annual Design Flow**

The average annual design flow of the permittee’s wastewater treatment facility is 0.048 MGD.

**2.2.1.2 Fill-and-Draw Discharge**

The maximum daily flow rate for fill-and-draw operation shall not exceed 1.186 MGD. The discharge periods are limited to spring and fall. See Standard Requirements Section 5.3.3 for additional requirements.

**2.2.1.3 Sample Frequency – 3/Week**

A sample frequency of 3/Week requires that at least three distinct samples be collected each week during discharge events lasting 7 days or longer. When a discharge is less than one week in duration, sampling for BOD<sub>5</sub>, suspended solids, and dissolved oxygen shall be done daily for up to three days.

**2.2.1.4 Sample Frequency – 2/Discharge**

A sample frequency of 2/Discharge requires that at least two distinct samples be collected during each discharge period. The interval between sampling events shall not be less than three days.

**2.2.1.5 Total Suspended Solids Variance**

The permittee has been granted a variance for the Total Suspended Solids limit in accordance with NR 210.07 (2).

**2.2.1.6 Chloride Variance – Implement Source Reduction Measures**

This permit contains a variance to the water quality-based effluent limit (WQBEL) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code. As conditions of this variance the permittee shall (a) Maintain effluent quality at or below the interim effluent limitation specified in the table above; (b) Perform the actions listed in the

compliance schedule (See the Schedules section herein.); (c) follow the approved Source Reduction Plan; and (d) Implement the chloride source reduction measures specified below:

1. Identify any new or additional sources of chloride to the sewer system.
2. Continue to educate homeowners on the impact of chloride from residential softeners, discuss options available for increasing softener salt efficiency, and request voluntary reductions.
3. Continue to educate licensed installers and self-installers of softeners on providing optional hard water that has not been softened for outside faucets for residences.
4. Conduct an inventory of water softeners in use in the District to collect information about the age, type of regeneration control unit and when each was last tuned-up.
5. Mandate through District ordinance a DIR and high salt efficiency standard for new residential softeners.
6. Mandate through District ordinance participation in an every-other-year residential softener tune-up program involving qualified servicing to ensure proper control settings and adjustments.
7. Implement aggressive inflow and infiltration reduction measures to reduce the amount of winter road deicers entering the sanitary sewer system.
8. Evaluate the feasibility, in terms of both the technical and economic aspects, of installing a municipal water system with lime softening technology, and submit these findings in the final chloride report.

### **2.2.1.7 Phosphorus Water Quality Based Effluent Limitation(s)**

Interim Phosphorus Limitation: The interim effluent limitation for phosphorus is 5.4 mg/L as a monthly average.

The final water quality based effluent limits for phosphorus are 0.075 mg/L as a 6-month average\*, 0.225 mg/L as a monthly average and 11 lbs/year annual total, and will take effect per the Compliance Schedule unless:

(A) As part of the application for the next reissuance, or prior to filing the application, the permittee submits either:

- 1) A watershed adaptive management plan and a completed Watershed Adaptive Management Request Form 3200-139; or
- 2) An application for water quality trading; or
- 3) An application for a variance; or
- 4) New information or additional data that supports a recalculation of the numeric limitation;

and,

(B) The Department modifies, revokes and reissues, or reissues the permit to incorporate a revised limitation before the expiration of the compliance schedule\*\*.

\* The applicable averaging periods for 6-month average Total Phosphorus effluent limits are May through October and November through April.

\*\* The Department will prioritize reissuances and revocations, modifications, and reissuances of permits to allow permittees the opportunity to implement adaptive management or nutrient trading in a timely and effective manner.

If Adaptive Management or Water Quality Trading is approved as part of the permit application for the next reissuance or as part of an application for a modification or revocation and reissuance, the plan and specifications submittal, construction, and final effective dates for compliance with the total phosphorus WQBELs may change in the reissued or modified permit. In addition, the numeric value of the water quality based effluent limit may change based on new information (e.g., a TMDL – see Section 2.2.1.11) or additional data.

If a variance is approved for the next reissuance, interim limits and conditions will be imposed in the reissued permit in accordance with s. 283.15, Stats., and applicable regulations. A permittee may apply for a variance to the phosphorus WQBEL at the next reissuance even if the permittee did not apply for a phosphorus variance as part of this permit reissuance.

Note: If a water quality based effluent limit has taken effect in a permit, any increase in the limit is subject to s. NR 102.05(1) and ch. NR 207, Wis. Adm. Code.

### 2.2.1.8 Alternative Approaches to Phosphorus WQBEL Compliance

Rather than upgrading its wastewater treatment facility to comply with WQBELs for total phosphorus, the permittee may use Water Quality Trading or the Watershed Adaptive Management Option, to achieve compliance under ch. NR 217, Wis. Adm. Code, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach.

The permittee may also implement an upgrade to its wastewater treatment facility in combination with Water Quality Trading or the Watershed Adaptive Management Option to achieve compliance, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach.

If the Final Compliance Alternatives Plan concludes that a variance will be pursued, the Plan shall provide information regarding the basis for the variance.

### 2.2.1.9 Submittal of Permit Application for Next Reissuance and Adaptive Management or Pollutant Trading Plan or Variance Application

The permittee shall submit the permit application for the next reissuance at least 6 months prior to expiration of this permit.

If the permittee intends to pursue adaptive management to achieve compliance with the phosphorus water quality based effluent limitation, the permittee shall submit with the application for the next reissuance: a completed Watershed Adaptive Management Request Form 3200-139, the completed Adaptive Management Plan and final plans for any system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.

If the permittee intends to pursue pollutant trading to achieve compliance, the permittee shall submit an application for water quality trading with the application for the next reissuance.

If system upgrades will be used in combination with pollutant trading to achieve compliance with the final water quality-based limit, the reissued permit will specify a schedule for the necessary upgrades.

If the permittee intends to seek a variance, the permittee shall submit an application for a variance with the application for the next reissuance.

### 2.2.1.10 Daily Maximum Ammonia Nitrogen (NH<sub>3</sub>-N) Limits

The daily maximum ammonia nitrogen effluent limit is a variable limit, dependent upon the effluent pH. Presented below is a table of daily maximum ammonia nitrogen effluent limits corresponding to various effluent pH values. Measurement of effluent pH is required on the same days as the collection of samples for ammonia analysis.

Effluent pH - su	NH <sub>3</sub> -N Limit - mg/L	Effluent pH - su	NH <sub>3</sub> -N Limit - mg/L
pH ≤ 8.0	>21	8.5 < pH ≤ 8.6	8.2
8.0 < pH ≤ 8.1	21	8.6 < pH ≤ 8.7	6.8
8.1 < pH ≤ 8.2	18	8.7 < pH ≤ 8.8	5.7
8.2 < pH ≤ 8.3	15	8.8 < pH ≤ 8.9	4.8
8.3 < pH ≤ 8.4	12	8.9 < pH ≤ 9.0	4.1
8.4 < pH ≤ 8.5	9.9		

For each day that the effluent is monitored for ammonia, report the measured ammonia concentration in the Ammonia column of the Discharge Monitoring Report (DMR) and the applicable variable limit (from the table above) in the Ammonia Variable Limit column of the DMR. If a limit does not apply for a particular day, report the variable limit using the 'greater than' (>) sign, specifically:

- If the pH is less than or equal to 8.0, report the Ammonia Variable Limit as > 21 mg/L.

#### **2.2.1.11 Total Maximum Daily Load (TMDL) Limitations**

**TMDL Under Development:** A Total Maximum Daily Load (TMDL) is being developed for the Upper Fox and Wolf River Basins to address water quality impairments from phosphorus and suspended solids within the TMDL area. This TMDL will likely result in limitations for phosphorus and total suspended solids that must be included in WPDES permits, which may be different than those calculated for this permit reissuance. TMDL-derived limits may be included in lieu of, or in addition to, the calculated limits upon permit reissuance or modification once the TMDL has been approved by U.S. EPA, according to s. NR 217.16, Wis. Adm. Code.

### 3 Land Application Requirements

#### 3.1 Sampling Point(s)

The discharge(s) shall be limited to land application of the waste type(s) designated for the listed sampling point(s) on Department approved land spreading sites or by hauling to another facility.

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
002	Pond Sludge - Liquid sludge that accumulates in the primary and secondary cells of the stabilization ponds. Representative samples shall be composited for analysis.

#### 3.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

##### 3.2.1 Sampling Point (Outfall) 002 - Pond Sludge

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Once	Composite	List 1 parameters; see Section 3.2.1.1
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
	Ceiling	75 mg/kg			
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
	Ceiling	85 mg/kg			
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
	Ceiling	4,300 mg/kg			
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
	Ceiling	840 mg/kg			
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
	Ceiling	57 mg/kg			
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
	Ceiling	420 mg/kg			
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
	Ceiling	100 mg/kg			
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
	Ceiling	7,500 mg/kg			
Nitrogen, Total Kjeldahl		Percent	Per Occurrence	Composite	List 2 parameters – monitoring required only if sludge is land applied; see Section 3.2.1.2
Nitrogen, Ammonium (NH <sub>4</sub> -N) Total		Percent	Per Occurrence	Composite	
Phosphorus, Total		Percent	Per Occurrence	Composite	



Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Water Extractable		% of Tot P	Per Occurrence	Composite	List 2 parameters -- monitoring required only if sludge is land applied; see Section 3.2.1.2
Potassium, Total Recoverable		Percent	Per Occurrence	Composite	
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Analysis required in 2018; see Sections 3.2.1.1, 3.2.1.5 and 5.5.6 for PCB monitoring requirements.
	Ceiling	50 mg/kg			

Other Sludge Requirements	
Sludge Requirements	Sample Frequency
<b>List 3 Requirements – Pathogen Control:</b> The requirements in List 3 shall be met prior to land application of sludge.	Required only if sludge is land applied
<b>List 4 Requirements – Vector Attraction Reduction:</b> The vector attraction reduction shall be satisfied prior to, or at the time of land application as specified in List 4.	Required only if sludge is land applied

### 3.2.1.1 Requirements for Potential and/or Unscheduled Land Application of Sludge

Monitoring for List 1 and PCBs shall occur in the fourth calendar year of the permit (2018), unless a sludge removal date has been established which would occur within the permit term, but in a different year. In that case, monitoring for Lists 1, 2, 3 & 4 and PCBs shall occur in the year of, but prior to, land application of the removed sludge. Monitoring must be done and compliance assured prior to land application, in addition to all other requirements specified herein and in ch. NR 204, Wis. Adm. Code. The permittee shall notify the Department prior to such land application. If sludge removal and land application are necessary after the monitoring for List 1 in year 4 of the permit, monitoring for Lists 1, 2, 3, & 4 shall be done in the year of and prior to land application

### 3.2.1.2 List 2 Analysis

The monitoring for List 2 parameters is required prior to land application of sludge.

### 3.2.1.3 Changes in Feed Sludge Characteristics

If a change in feed sludge characteristics, treatment process, or operational procedures occurs which may result in a significant shift in sludge characteristics, the permittee shall reanalyze the sludge for List 1, 2, 3 and 4 parameters each time such change occurs.

### 3.2.1.4 Sludge Which Exceeds the High Quality Limit

Cumulative pollutant loading records shall be kept for all bulk land application of sludge which does not meet the high quality limit for any parameter. This requirement applies for the entire calendar year in which any exceedance of Table 3 of s. NR 204.07(5)(c), is experienced. Such loading records shall be kept for all List 1 parameters for each site land applied in that calendar year. The formula to be used for calculating cumulative loading is as follows:

$$[(\text{Pollutant concentration (mg/kg)} \times \text{dry tons applied/ac}) \div 500] + \text{previous loading (lbs/acre)} = \text{cumulative lbs pollutant per acre}$$

When a site reaches 90% of the allowable cumulative loading for any metal established in Table 2 of s. NR 204.07(5)(b), the Department shall be so notified through letter or in the comment section of the annual land application report (3400-55).

### 3.2.1.5 Sludge Analysis for PCBs

The permittee shall analyze the sludge for Total PCBs one time during 2018. The results shall be reported as "PCB Total Dry Wt". Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with Table EM in s. NR 219.04, Wis. Adm. Code and the conditions specified in Standard Requirements of this permit. PCB results shall be submitted by January 31, following the specified year of analysis.

### 3.2.1.6 Lists 1, 2, 3, and 4

List 1 TOTAL SOLIDS AND METALS
See the Monitoring Requirements and Limitations table above for monitoring frequency and limitations for the List 1 parameters
Solids, Total (percent)
Arsenic, mg/kg (dry weight)
Cadmium, mg/kg (dry weight)
Copper, mg/kg (dry weight)
Lead, mg/kg (dry weight)
Mercury, mg/kg (dry weight)
Molybdenum, mg/kg (dry weight)
Nickel, mg/kg (dry weight)
Selenium, mg/kg (dry weight)
Zinc, mg/kg (dry weight)

List 2 NUTRIENTS
See the Monitoring Requirements and Limitations table above for monitoring frequency for the List 2 parameters
Solids, Total (percent)
Nitrogen Total Kjeldahl (percent)
Nitrogen Ammonium (NH <sub>4</sub> -N) Total (percent)
Phosphorus Total as P (percent)
Phosphorus, Water Extractable (as percent of Total P)
Potassium Total Recoverable (percent)

<b>List 3</b>		
<b>PATHOGEN CONTROL FOR CLASS B SLUDGE</b>		
The permittee shall implement pathogen control as listed in List 3. The Department shall be notified of the pathogen control utilized and shall be notified when the permittee decides to utilize alternative pathogen control.		
The following requirements shall be met prior to land application of sludge.		
Parameter	Unit	Limit
Fecal Coliform*	MPN/gTS or CFU/gTS	2,000,000
<b>OR, ONE OF THE FOLLOWING PROCESS OPTIONS</b>		
Aerobic Digestion		Air Drying
Anaerobic Digestion		Composting
Alkaline Stabilization		PSRP Equivalent Process
* The Fecal Coliform limit shall be reported as the geometric mean of 7 discrete samples on a dry weight basis.		

<b>List 4</b>		
<b>VECTOR ATTRACTION REDUCTION</b>		
The permittee shall implement any one of the vector attraction reduction options specified in List 4. The Department shall be notified of the option utilized and shall be notified when the permittee decides to utilize an alternative option.		
One of the following shall be satisfied prior to, or at the time of land application as specified in List 4.		
Option	Limit	Where/When it Shall be Met
Volatile Solids Reduction	≥38%	Across the process
Specific Oxygen Uptake Rate	≤1.5 mg O <sub>2</sub> /hr/g TS	On aerobic stabilized sludge
Anaerobic bench-scale test	<17 % VS reduction	On anaerobic digested sludge
Aerobic bench-scale test	<15 % VS reduction	On aerobic digested sludge
Aerobic Process	>14 days, Temp >40°C and Avg. Temp > 45°C	On composted sludge
pH adjustment	>12 S.U. (for 2 hours) and >11.5 (for an additional 22 hours)	During the process
Drying without primary solids	>75 % TS	When applied or bagged
Drying with primary solids	>90 % TS	When applied or bagged
Equivalent Process	Approved by the Department	Varies with process
Injection	-	When applied
Incorporation	-	Within 6 hours of application

### 3.2.1.7 Daily Land Application Log

Daily Land Application Log		
Discharge Monitoring Requirements and Limitations		
<p>The permittee shall maintain a daily land application log for biosolids land applied each day when land application occurs. The following minimum records must be kept, in addition to all analytical results for the biosolids land applied. The log book records shall form the basis for the annual land application report requirements.</p>		
Parameters	Units	Sample Frequency
DNR Site Number(s)	Number	Daily as used
Outfall number applied	Number	Daily as used
Acres applied	Acres	Daily as used
Amount applied	As appropriate * /day	Daily as used
Application rate per acre	unit */acre	Daily as used
Nitrogen applied per acre	lb/acre	Daily as used
Method of Application	Injection, Incorporation, or surface applied	Daily as used

\* gallons, cubic yards, dry US Tons or dry Metric Tons

## 4 Schedules

### 4.1 Chloride Target Value

As a condition of the variance to the water quality based effluent limitations for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
<p><b>Annual Chloride Progress Report:</b> Submit an annual chloride progress report. The annual chloride progress report shall:</p> <p>Summarize activities that have been conducted for each of the chloride source reduction measures listed in the approved Source Reduction Plan;</p> <p>Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data; and</p> <p>Include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride.</p> <p>Note that the interim limitation of 570 mg/L remains enforceable until new enforceable limits are established in the next permit issuance. The first annual chloride progress report is to be submitted by the Date Due.</p>	03/31/2018
<p><b>Annual Chloride Progress Report #2:</b> Submit a chloride progress report.</p>	03/31/2019
<p><b>Annual Chloride Progress Report #3:</b> Submit a chloride progress report.</p>	03/31/2020
<p><b>Annual Chloride Progress Report #4:</b> Submit a chloride progress report.</p>	03/31/2021
<p><b>Final Chloride Report:</b> Submit the final chloride report documenting the success in meeting the chloride target value of 510 mg/L, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. The report shall summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the approved Source Reduction Plan were not pursued and why. The report shall include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the current permit term. The report shall also include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride such as loads from industries or road salt intrusion into the collection system. The report shall also document the findings of the feasibility evaluation of installing a municipal water softening system using upon lime softening technology.</p> <p>Additionally the report shall include proposed target values and source reduction measures for negotiations with the department if the permittee intends to seek a renewed chloride variance per s. NR 106.83, Wis. Adm. Code, for the reissued permit.</p> <p>Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures, but is not an enforceable limitation under the terms of this permit.</p>	03/31/2022
<p><b>Annual Chloride Reports After Permit Expiration:</b> In the event that this permit is not reissued on time, the permittee shall continue to submit annual chloride reports each year covering source reduction measures implemented and chloride concentration and mass discharge trends.</p>	

## 4.2 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 30 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
<p><b>Operational Evaluation Report:</b> The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by September 30, 2020. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than September 30, 2020 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p> <p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by September 30, 2020 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p><b>Study of Feasible Alternatives:</b> If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than September 30, 2026.</p>	09/30/2018
<p><b>Compliance Alternatives, Source Reduction, Improvements and Modifications Status:</b> The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.</p>	09/30/2019
<p><b>Preliminary Compliance Alternatives Plan:</b> The permittee shall submit a preliminary compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report.</p> <p>If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.</p> <p>If water quality trading will be undertaken, the plan must state that trading will be pursued.</p>	09/30/2020

<p><b>Final Compliance Alternatives Plan:</b> The permittee shall submit a final compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code.</p> <p>If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.</p> <p>If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	09/30/2021
<p><b>Progress Report on Plans &amp; Specifications:</b> Submit progress report regarding the progress of preparing final plans and specifications.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	09/30/2022
<p><b>Final Plans and Specifications:</b> Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.)</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	09/30/2023
<p><b>Treatment Plant Upgrade to Meet WQBELs:</b> The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	12/31/2023
<p><b>Construction Upgrade Progress Report #1:</b> The permittee shall submit a progress report on construction upgrades.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	12/31/2024
<p><b>Construction Upgrade Progress Report #2:</b> The permittee shall submit a progress report on construction upgrades.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	12/31/2025
<p><b>Complete Construction:</b> The permittee shall complete construction of wastewater treatment system upgrades.</p>	09/30/2026

Note: See 'Alternative Approaches to Phosphorus QBEL Compliance' in the Surface Water section of this permit.	
<b>QBELs Effective:</b> The permittee shall achieve compliance with final phosphorus QBELs. Note: See 'Alternative Approaches to Phosphorus QBEL Compliance' in the Surface Water section of this permit.	10/01/2026



## 5 Standard Requirements

**NR 205, Wisconsin Administrative Code:** The conditions in ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(2).

### 5.1 Reporting and Monitoring Requirements

#### 5.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

Monitoring results shall be reported on an electronic discharge monitoring report (eDMR). The eDMR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

#### 5.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

#### 5.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

### 5.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.
- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.
- For purposes of calculating NR 101 fees, the 2 mg/l lower reporting limits for BOD<sub>5</sub> and Total Suspended Solids shall be considered to be limits of quantitation.
- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

### 5.1.5 Compliance Maintenance Annual Reports

Compliance Maintenance Annual Reports (CMAR) shall be completed using information obtained over each calendar year regarding the wastewater conveyance and treatment system. The CMAR shall be submitted and certified by the permittee in accordance with ch. NR 208, Wis. Adm. Code, by June 30, each year on an electronic report form provided by the Department.

In the case of a publicly owned treatment works, a resolution shall be passed by the governing body and submitted as part of the CMAR, verifying its review of the report and providing responses as required. Private owners of wastewater treatment works are not required to pass a resolution; but they must provide an Owner Statement and responses as required, as part of the CMAR submittal.

The CMAR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The certification verifies that the electronic report is true, accurate and complete.

### 5.1.6 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application. All pertinent sludge information, including permit application information and other documents specified in this permit or s. NR 204.06(9), Wis. Adm. Code shall be retained for a minimum of 5 years.

### 5.1.7 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

### 5.1.8 Reporting Requirements – Alterations or Additions

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

- The alteration or addition to the permitted facility may meet one of the criteria for determining whether a facility is a new source.
- The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification requirement applies to pollutants which are not subject to effluent limitations in the existing permit.
- The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use of disposal sites not reported during the permit application process nor reported pursuant to an approved land application plan. Additional sites may not be used for the land application of sludge until department approval is received.

## 5.2 System Operating Requirements

### 5.2.1 Noncompliance Reporting

Sanitary sewer overflows and sewage treatment facility overflows shall be reported according to the 'Sanitary Sewer Overflows and Sewage Treatment Facility Overflows' section of this permit.

The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance:

- any noncompliance which may endanger health or the environment;
- any violation of an effluent limitation resulting from a bypass;
- any violation of an effluent limitation resulting from an upset; and
- any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit, either for effluent or sludge.

A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

A scheduled bypass approved by the Department under the 'Scheduled Bypass' section of this permit shall not be subject to the reporting required under this section.

**NOTE:** Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources immediately of any discharge not authorized by the permit. **The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at 1-800-943-0003.**

## 5.2.2 Flow Meters

Flow meters shall be calibrated annually, as per s. NR 218.06, Wis. Adm. Code.

## 5.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler is located in Wisconsin, then they shall be licensed under chs. NR 500-536, Wis. Adm. Code.

## 5.2.4 Sludge Management

All sludge management activities shall be conducted in compliance with ch. NR 204 "Domestic Sewage Sludge Management", Wis. Adm. Code.

## 5.2.5 Prohibited Wastes

Under no circumstances may the introduction of wastes prohibited by s. NR 211.10, Wis. Adm. Code, be allowed into the waste treatment system. Prohibited wastes include those:

- which create a fire or explosion hazard in the treatment work;
- which will cause corrosive structural damage to the treatment work;
- solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment work;
- wastewaters at a flow rate or pollutant loading which are excessive over relatively short time periods so as to cause a loss of treatment efficiency; and
- changes in discharge volume or composition from contributing industries which overload the treatment works or cause a loss of treatment efficiency.

## 5.2.6 Bypass

This condition applies only to bypassing at a sewage treatment facility that is not a scheduled bypass, approved blending as a specific condition of this permit, a sewage treatment facility overflow or a controlled diversion as provided in the sections titled 'Scheduled Bypass', 'Blending' (if approved), 'SSO's and Sewage Treatment Facility Overflows' and 'Controlled Diversions' of this permit. Any other bypass at the sewage treatment facility is prohibited and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats. The Department may approve a bypass if the permittee demonstrates all the following conditions apply:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance. When evaluating feasibility of alternatives, the department may consider factors such as technical achievability, costs and affordability of implementation and risks to public health, the environment and, where the permittee is a municipality, the welfare of the community served; and
- The bypass was reported in accordance with the Noncompliance Reporting section of this permit.

## 5.2.7 Scheduled Bypass

Whenever the permittee anticipates the need to bypass for purposes of efficient operations and maintenance and the permittee may not meet the conditions for controlled diversions in the 'Controlled Diversions' section of this permit, the permittee shall obtain prior written approval from the Department for the scheduled bypass. A permittee's written request for Department approval of a scheduled bypass shall demonstrate that the conditions for bypassing specified in the above section titled 'Bypass' are met and include the proposed date and reason for the bypass, estimated volume and duration of the bypass, alternatives to bypassing and measures to mitigate environmental harm caused by the bypass. The department may require the permittee to provide public notification for a scheduled bypass if it is determined there is significant public interest in the proposed action and may recommend mitigation measures to minimize the impact of such bypass.

## 5.2.8 Controlled Diversions

Controlled diversions are allowed only when necessary for essential maintenance to assure efficient operation. Sewage treatment facilities that have multiple treatment units to treat variable or seasonal loading conditions may shut down redundant treatment units when necessary for efficient operation. The following requirements shall be met during controlled diversions:

- Effluent from the sewage treatment facility shall meet the effluent limitations established in the permit. Wastewater that is diverted around a treatment unit or treatment process during a controlled diversion shall be recombined with wastewater that is not diverted prior to the effluent sampling location and prior to effluent discharge;
- A controlled diversion does not include blending as defined in s. NR 210.03(2e), Wis. Adm. Code, and as may only be approved under s. NR 210.12. A controlled diversion may not occur during periods of excessive flow or other abnormal wastewater characteristics;
- A controlled diversion may not result in a wastewater treatment facility overflow; and
- All instances of controlled diversions shall be documented in sewage treatment facility records and such records shall be available to the department on request.

## 5.2.9 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

## 5.3 Sewage Collection Systems

### 5.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

#### 5.3.1.1 Overflows Prohibited

Any overflow or discharge of wastewater from the sewage collection system or at the sewage treatment facility, other than from permitted outfalls, is prohibited. The permittee shall provide information on whether any of the following conditions existed when an overflow occurred:

- The sanitary sewer overflow or sewage treatment facility overflow was unavoidable to prevent loss of life, personal injury or severe property damage;
- There were no feasible alternatives to the sanitary sewer overflow or sewage treatment facility overflow such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or preventative maintenance activities;
- The sanitary sewer overflow or the sewage treatment facility overflow was caused by unusual or severe weather related conditions such as large or successive precipitation events, snowmelt, saturated soil conditions, or severe weather occurring in the area served by the sewage collection system or sewage treatment facility; and
- The sanitary sewer overflow or the sewage treatment facility overflow was unintentional, temporary, and caused by an accident or other factors beyond the reasonable control of the permittee.

### **5.3.1.2 Permittee Response to Overflows**

Whenever a sanitary sewer overflow or sewage treatment facility overflow occurs, the permittee shall take all feasible steps to control or limit the volume of untreated or partially treated wastewater discharged, and terminate the discharge as soon as practicable. Remedial actions, including those in NR 210.21 (3), Wis. Adm. Code, shall be implemented consistent with an emergency response plan developed under the CMOM program.

### **5.3.1.3 Permittee Reporting**

Permittees shall report all sanitary sewer overflows and sewage treatment overflows as follows:

- The permittee shall notify the department by telephone, fax or email as soon as practicable, but no later than 24 hours from the time the permittee becomes aware of the overflow;
- The permittee shall, no later than five days from the time the permittee becomes aware of the overflow, provide to the department the information identified in this paragraph using department form number 3400-184. If an overflow lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow. At a minimum, the following information shall be included in the report:
  - The date and location of the overflow;
  - The surface water to which the discharge occurred, if any;
  - The duration of the overflow and an estimate of the volume of the overflow;
  - A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe;
  - The estimated date and time when the overflow began and stopped or will be stopped;
  - The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information;
  - Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
  - A description of the actual or potential for human exposure and contact with the wastewater from the overflow;
  - Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps;

- To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred concurrently with the sanitary sewer overflow and that were within the same area of the sewage collection system as the sanitary sewer overflow; and
- The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow.

NOTE: A copy of form 3400-184 for reporting sanitary sewer overflows and sewage treatment facility overflows may be obtained from the department or accessed on the department's web site at <http://dnr.wi.gov/topic/wastewater/SSOreport.html>. As indicated on the form, additional information may be submitted to supplement the information required by the form.

- The permittee shall identify each specific location and each day on which a sanitary sewer overflow or sewage treatment facility overflow occurs as a discrete sanitary sewer overflow or sewage treatment facility overflow occurrence. An occurrence may be more than one day if the circumstances causing the sanitary sewer overflow or sewage treatment facility overflow results in a discharge duration of greater than 24 hours. If there is a stop and restart of the overflow at the same location within 24 hours and the overflow is caused by the same circumstance, it may be reported as one occurrence. Sanitary sewer overflow occurrences at a specific location that are separated by more than 24 hours shall be reported as separate occurrences; and
- A permittee that is required to submit wastewater discharge monitoring reports under NR 205.07 (1) (r) shall also report all sanitary sewer overflows and sewage treatment facility overflows on that report.

#### 5.3.1.4 Public Notification

The permittee shall notify the public of any sanitary sewer and sewage treatment facility overflows consistent with its emergency response plan required under the CMOM (Capacity, Management, Operation and Maintenance) section of this permit and s. NR 210.23 (4) (f), Wis. Adm. Code. Such public notification shall occur promptly following any overflow event using the most effective and efficient communications available in the community. At minimum, a daily newspaper of general circulation in the county(s) and municipality whose waters may be affected by the overflow shall be notified by written or electronic communication.

#### 5.3.2 Capacity, Management, Operation and Maintenance (CMOM) Program

- The permittee shall develop and maintain written documentation of the CMOM program components in accordance with s. NR 210.23, Wis. Adm. Code. Such documentation shall be available for Department review upon request. The Department may request that the permittee provide this documentation or prepare a summary of the permittee's CMOM program at the time of application for reissuance of the WPDES permit.
- The permittee shall at least annually conduct a self-audit of activities conducted under the permittee's CMOM program to ensure CMOM components are being implemented as necessary to meet the general standards of s. NR 210.23(3), Wis. Adm. Code.

#### 5.3.3 Sewer Cleaning Debris and Materials

All debris and material removed from cleaning sanitary sewers shall be managed to prevent nuisances, run-off, ground infiltration or prohibited discharges.

- Debris and solid waste shall be dewatered, dried and then disposed of at a licensed solid waste facility.

- Liquid waste from the cleaning and dewatering operations shall be collected and disposed of at a permitted wastewater treatment facility.
- Combination waste including liquid waste along with debris and solid waste may be disposed of at a licensed solid waste facility or wastewater treatment facility willing to accept the waste.

## 5.4 Surface Water Requirements

### 5.4.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

### 5.4.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average concentration limits and mass limits and total load limits:

**Weekly/Monthly/Six-Month/Annual Average Concentration** = the sum of all daily results for that week/month/six-month/year, divided by the number of results during that time period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

**Weekly Average Mass Discharge (lbs/day):** Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

**Monthly Average Mass Discharge (lbs/day):** Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

**Six-Month Average Mass Discharge (lbs/day):** Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the six-month period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

**Annual Average Mass Discharge (lbs/day):** Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the entire year.

**Total Monthly Discharge:** = monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

**Total Annual Discharge:** = sum of total monthly discharges for the calendar year.

**12-Month Rolling Sum of Total Monthly Discharge:** = the sum of the most recent 12 consecutive months of Total Monthly Discharges.

### 5.4.3 Effluent Temperature Requirements

**Weekly Average Temperature** – The permittee shall use the following formula for calculating effluent results to determine compliance with the weekly average temperature limit (as applicable): Weekly Average Temperature = the sum of all daily maximum results for that week divided by the number of daily maximum results during that time period.

**Cold Shock Standard** – Water temperatures of the discharge shall be controlled in a manner as to protect fish and aquatic life uses from the deleterious effects of cold shock. ‘Cold Shock’ means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavior or physiological performance and may lead to death.



**Rate of Temperature Change Standard** – Temperature of a water of the state or discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or aquatic life of the water of the state.

#### **5.4.4 Fill and Draw Systems**

The permittee shall notify the Department at least 7 days prior to an anticipated discharge from a fill and draw system. The pond contents shall be sampled prior to any discharge to assure that adequate stabilization has taken place.

#### **5.4.5 Visible Foam or Floating Solids**

There shall be no discharge of floating solids or visible foam in other than trace amounts.

#### **5.4.6 Surface Water Uses and Criteria**

In accordance with NR 102.04, Wis. Adm. Code, surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone meet the following conditions at all times and under all flow and water level conditions:

- a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state.
- b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.
- c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.
- d) Substances in concentrations or in combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

#### **5.4.7 Percent Removal**

During any 30 consecutive days, the average effluent concentrations of BOD<sub>5</sub> and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

#### **5.4.8 Reopener Clause**

Pursuant to s. 283.53(2)(b), Wis. Adm. Code and 40 CFR 132 Appendix F Procedure 2F, the Department may modify or revoke and reissue this permit if, through the triennial standard review process, the Department determines that the terms and conditions of this permit need to be updated to reflect the highest attainable condition for chloride.

### **5.5 Land Application Requirements**

#### **5.5.1 Sludge Management Program Standards and Requirements Based Upon Federally Promulgated Regulations**

In the event that new federal sludge standards or regulations are promulgated, the permittee shall comply with the new sludge requirements by the dates established in the regulations, if required by federal law, even if the permit has not yet been modified to incorporate the new federal regulations.

### 5.5.2 General Sludge Management Information

The General Sludge Management Form 3400-48 shall be completed and submitted prior to any significant sludge management changes.

### 5.5.3 Sludge Samples

All sludge samples shall be collected at a point and in a manner which will yield sample results which are representative of the sludge being tested, and collected at the time which is appropriate for the specific test.

### 5.5.4 Land Application Characteristic Report

Each report shall consist of a Characteristic Form 3400-49 and Lab Report. The Characteristic Report Form 3400-49 shall be submitted electronically by January 31 following each year of analysis.

Following submittal of the electronic Characteristic Report Form 3400-49, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report is true, accurate and complete. The Lab Report must be sent directly to the facility's DNR sludge representative or basin engineer unless approval for not submitting the lab reports has been given.

The permittee shall use the following convention when reporting sludge monitoring results: Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 1.0 mg/kg, report the pollutant concentration as < 1.0 mg/kg .

All results shall be reported on a dry weight basis.

### 5.5.5 Calculation of Water Extractable Phosphorus

When sludge analysis for Water Extractable Phosphorus is required by this permit, the permittee shall use the following formula to calculate and report Water Extractable Phosphorus:

$$\text{Water Extractable Phosphorus (\% of Total P)} = \frac{[\text{Water Extractable Phosphorus (mg/kg, dry wt)} \div \text{Total Phosphorus (mg/kg, dry wt)}] \times 100$$

### 5.5.6 Monitoring and Calculating PCB Concentrations in Sludge

When sludge analysis for "PCB, Total Dry Wt" is required by this permit, the PCB concentration in the sludge shall be determined as follows.

Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with the following provisions and Table EM in s. NR 219.04, Wis. Adm. Code.

- EPA Method 1668 may be used to test for all PCB congeners. If this method is employed, all PCB congeners shall be delineated. Non-detects shall be treated as zero. The values that are between the limit of detection and the limit of quantitation shall be used when calculating the total value of all congeners. All results shall be added together and the total PCB concentration by dry weight reported. Note: It is recognized that a number of the congeners will co-elute with others, so there will not be 209 results to sum.
- EPA Method 8082A shall be used for PCB-Aroclor analysis and may be used for congener specific analysis as well. If congener specific analysis is performed using Method 8082A, the list of congeners tested shall include at least congener numbers 5, 18, 31, 44, 52, 66, 87, 101, 110, 138, 141, 151, 153, 170, 180, 183, 187, and 206 plus any other additional congeners which might be reasonably expected to occur

in the particular sample. For either type of analysis, the sample shall be extracted using the Soxhlet extraction (EPA Method 3540C) (or the Soxhlet Dean-Stark modification) or the pressurized fluid extraction (EPA Method 3545A). If Aroclor analysis is performed using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.11 mg/kg as possible. Reporting protocol, consistent with s. NR 106.07(6)(e), should be as follows: If all Aroclors are less than the LOD, then the Total PCB Dry Wt result should be reported as less than the highest LOD. If a single Aroclor is detected then that is what should be reported for the Total PCB result. If multiple Aroclors are detected, they should be summed and reported as Total PCBs. If congener specific analysis is done using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.003 mg/kg as possible for each congener. If the aforementioned limits of detection cannot be achieved after using the appropriate clean up techniques, a reporting limit that is achievable for the Aroclors or each congener for the sample shall be determined. This reporting limit shall be reported and qualified indicating the presence of an interference. The lab conducting the analysis shall perform as many of the following methods as necessary to remove interference:

3620C – Florisil	3611B - Alumina
3640A - Gel Permeation	3660B - Sulfur Clean Up (using copper shot instead of powder)
3630C - Silica Gel	3665A - Sulfuric Acid Clean Up

### 5.5.7 Annual Land Application Report

Land Application Report Form 3400-55 shall be submitted electronically by January 31, each year whether or not non-exceptional quality sludge is land applied. Non-exceptional quality sludge is defined in s. NR 204.07(4), Wis. Adm. Code. Following submittal of the electronic Annual Land Application Report Form 3400-55, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

### 5.5.8 Other Methods of Disposal or Distribution Report

The permittee shall submit electronically the Other Methods of Disposal or Distribution Report Form 3400-52 by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied. Following submittal of the electronic Report Form 3400-52, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

### 5.5.9 Approval to Land Apply

Bulk non-exceptional quality sludge as defined in s. NR 204.07(4), Wis. Adm. Code, may not be applied to land without a written approval letter or Form 3400-122 from the Department unless the Permittee has obtained permission from the Department to self-approve sites in accordance with s. NR 204.06 (6), Wis. Adm. Code. Analysis of sludge characteristics is required prior to land application. Application on frozen or snow covered ground is restricted to the extent specified in s. NR 204.07(3) (l), Wis. Adm. Code.

### 5.5.10 Soil Analysis Requirements

Each site requested for approval for land application must have the soil tested prior to use. Each approved site used for land application must subsequently be soil tested such that there is at least one valid soil test in the four years prior to land application. All soil sampling and submittal of information to the testing laboratory shall be done in

accordance with UW Extension Bulletin A-2100. The testing shall be done by the UW Soils Lab in Madison or Marshfield, WI or at a lab approved by UW. The test results including the crop recommendations shall be submitted to the DNR contact listed for this permit, as they are available. Application rates shall be determined based on the crop nitrogen recommendations and with consideration for other sources of nitrogen applied to the site.

### 5.5.11 Land Application Site Evaluation

For non-exceptional quality sludge, as defined in s. NR 204.07(4), Wis. Adm. Code, a Land Application Site Request Form 3400-053 shall be submitted to the Department for the proposed land application site. The Department will evaluate the proposed site for acceptability and will either approve or deny use of the proposed site. The permittee may obtain permission to approve its own sites in accordance with s. NR 204.06(6), Wis. Adm. Code.

### 5.5.12 Class B Sludge: Fecal Coliform Limitation

Compliance with the fecal coliform limitation for Class B sludge shall be demonstrated by calculating the geometric mean of at least 7 separate samples. (Note that a Total Solids analysis must be done on each sample). The geometric mean shall be less than 2,000,000 MPN or CFU/g TS. Calculation of the geometric mean can be done using one of the following 2 methods.

Method 1:

$$\text{Geometric Mean} = (X_1 \times X_2 \times X_3 \dots \times X_n)^{1/n}$$

Where X = Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Method 2:

$$\text{Geometric Mean} = \text{antilog}[(X_1 + X_2 + X_3 \dots + X_n) \div n]$$

Where X =  $\log_{10}$  of Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Example for Method 2

Sample Number	Coliform Density of Sludge Sample	$\log_{10}$
1	$6.0 \times 10^5$	5.78
2	$4.2 \times 10^6$	6.62
3	$1.6 \times 10^6$	6.20
4	$9.0 \times 10^5$	5.95
5	$4.0 \times 10^5$	5.60
6	$1.0 \times 10^6$	6.00
7	$5.1 \times 10^5$	5.71

The geometric mean for the seven samples is determined by averaging the  $\log_{10}$  values of the coliform density and taking the antilog of that value.

$$(5.78 + 6.62 + 6.20 + 5.95 + 5.60 + 6.00 + 5.71) \div 7 = 5.98$$

$$\text{The antilog of } 5.98 = 9.5 \times 10^5$$

### 5.5.13 Class B Sludge - Vector Control: Incorporation

Class B sludge shall be incorporated within 6 hours of surface application, or as approved by the Department.

## 6 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Chloride Target Value -Annual Chloride Progress Report	March 31, 2018	12
Chloride Target Value -Annual Chloride Progress Report #2	March 31, 2019	12
Chloride Target Value -Annual Chloride Progress Report #3	March 31, 2020	12
Chloride Target Value -Annual Chloride Progress Report #4	March 31, 2021	12
Chloride Target Value -Final Chloride Report	March 31, 2022	12
Chloride Target Value -Annual Chloride Reports After Permit Expiration	See Permit	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Operational Evaluation Report	September 30, 2018	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Compliance Alternatives, Source Reduction, Improvements and Modifications Status	September 30, 2019	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Preliminary Compliance Alternatives Plan	September 30, 2020	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Compliance Alternatives Plan	September 30, 2021	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Progress Report on Plans & Specifications	September 30, 2022	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Plans and Specifications	September 30, 2023	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Treatment Plant Upgrade to Meet WQBELs	December 31, 2023	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #1	December 31, 2024	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #2	December 31, 2025	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Complete Construction	September 30, 2026	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - WQBELs Effective	October 1, 2026	15
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	17
General Sludge Management Form 3400-48	prior to any significant sludge management changes	25
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	25

Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	26
Report Form 3400-52	by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied	26
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	16

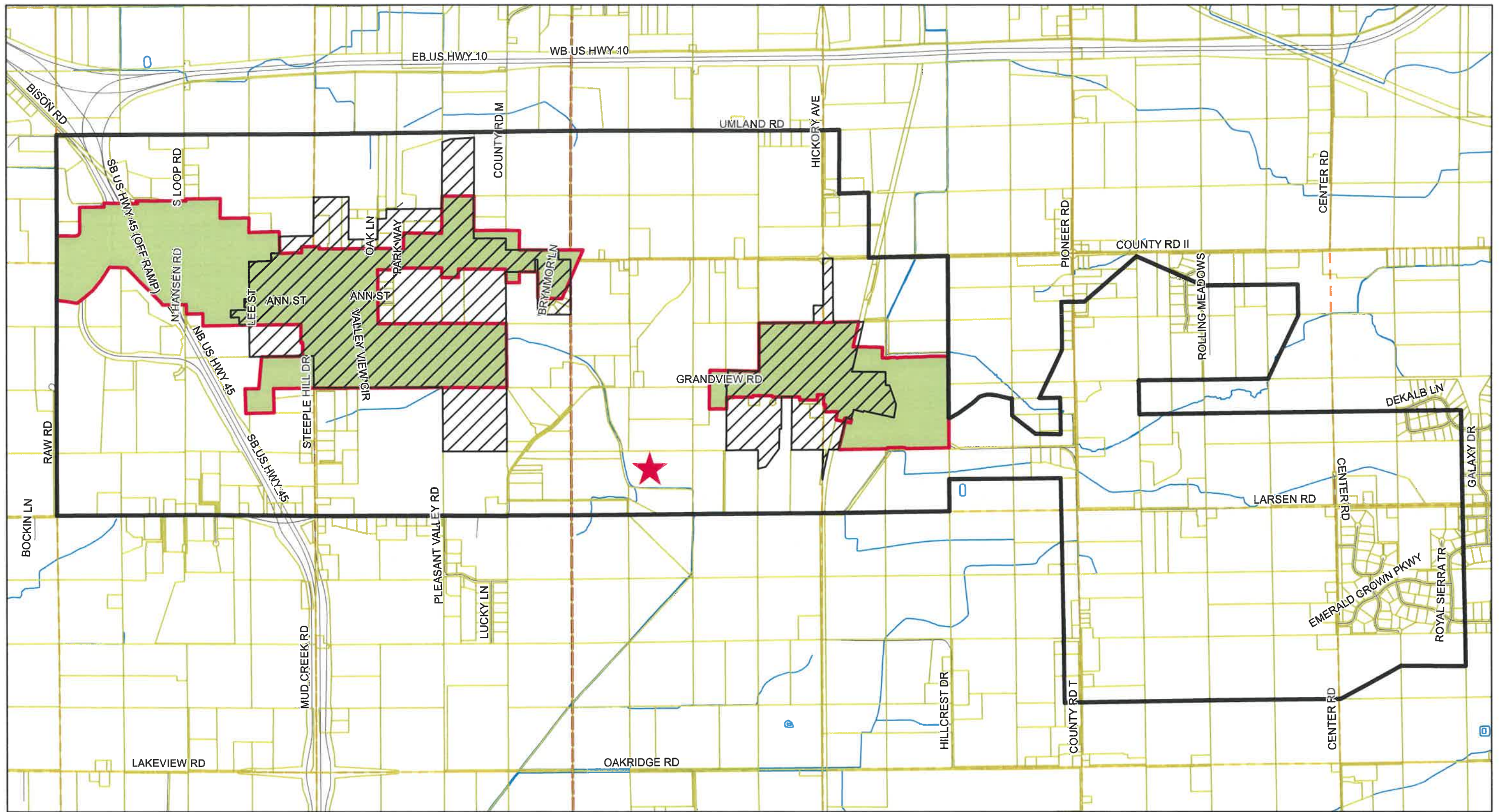
Report forms shall be submitted to the address printed on the report form. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non-industrial wastewater systems shall be submitted to the Bureau of Watershed Management, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:

Northeast Region - Oshkosh, 625 E. CTY RD Y, Suite 700, Oshkosh, WI 54901

## **APPENDIX C**

### **Current LWSD District Boundaries and ECWRPC Sewer Service Area And Planning Boundaries**





This base map information was obtained from Winnebago County Geographic Information System files and is intended to be used as a reference. They assume no liability for the accuracy of this map or its use or misuse.

**Martenson & Eisele, Inc.**

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Scale 1" = 2,000'



**Legend**

-  Current Sanitary District Boundary
-  Existing LWSD Wastewater Treatment Facility
-  ECWRPC 2020 Sewer Service Area
-  Parcel Lines
-  ECWRPC Planning Area
-  Navigable Waterways



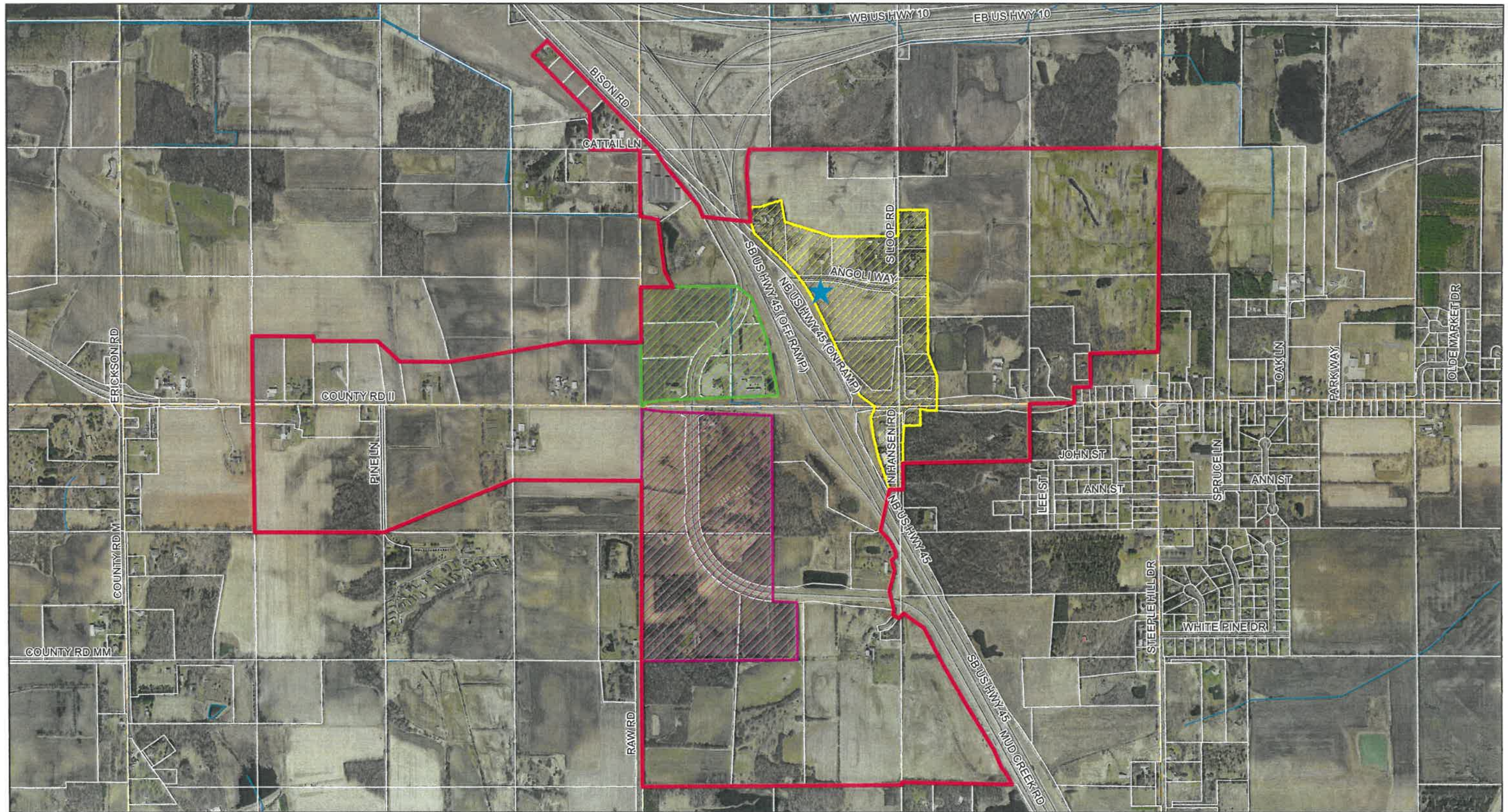
**Appendix C**  
**Larsen-Winchester Sanitary District**  
**Planning Boundaries**  
Winnebago County, Wisconsin



## **APPENDIX D**

### **Year 2045 Growth Areas Near USH 45 and CTH II Interchange**





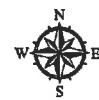
This base map information was obtained from Winnebago County Geographic Information System files and is intended to be used as a reference. They assume no liability for the accuracy of this map or its use or misuse.

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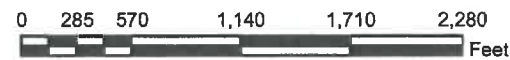
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Scale 1" = 1,000'



**Legend**

- Proposed Lift Station Service Area
- 20-Year Growth Area 1
- 20-Year Growth Area 2
- 20-Year Growth Area 3

- Proposed Lift Station to Facilitate Growth Near USH 45 and CTH II Interchange
- Parcel Lines
- Navigable Waterways

**Appendix D**

Larsen-Winchester Sanitary District  
West Side Growth Areas  
USH 45 and CTH II Interchange Area  
Served by Proposed Lift Station

Winnebago County, Wisconsin



## **APPENDIX E**

### **Year 2045 and Year 2065 Wastewater Flow Calculations**

Larsen Winchester Sanitary District Facility Planning Projected Wastewater Flows Years 2045 and 2065									
	Parameter	Average Daily Design Flow MGD	Maximum Month Design Flow MGD Peak Factor 1.6	Maximum Daily Design Flow MGD Peak Factor 2.3	Maximum Hour Design Flow MGD Peak Factor 4.0	Maximum Hour Design Flow Gallons Per Minute Peak Factor 4.0			
Current District Service Area									
Current Households	299								
Proposed Households Year 2045 (ECWRPC)	324								
Persons Per Household (ECWRPC)	2.6								
Current Estimated Population 2021	777								
Projected Population 2045	842								
Percent Increase in Projected Population	8.36%								
Current Average Flow MGD	0.0474								
Current Gallons Per Capita Per Day GPCD	61								
Proposed Gallons Per Capita Per Day GPCD	61								
Proposed Flow Current District Boundary/SSA		0.0514	0.0822	0.1181	0.2055	143			
Larsen/Winchester Breakdown									
Larsen Flows (23%)		0.0118	0.0189	0.0272	0.0473	33			
Winchester Flows (77%)		0.0395	0.0633	0.0910	0.1582	110			
Total Proposed Flows 20 Year SSA		0.0514	0.0822	0.1181	0.2055	143			
Commercial Development West Side Winchester									
Commercial Acres Area 1	33								
20-Year Development Area 1 (50%)	16.5								
Commercial Acres Area 2	19								
20-Year Development Area 2 (50%)	9.5								
Commercial Acres Area 3	81								
20-Year Development Area 3 (50%)	40.5								
Total Commercial Acres Developed	66.5								
Gallons Per Day Per Acre	1000								
Proposed Commercial Flow		0.0665	0.1064	0.15295	0.266	185			
Existing Residential Hook-ups W Side Winchester									
Existing Residences Areas 1, 2 and 3	14								
Existing Residential Hook-ups in 20-Years (50%)	7								
Persons Per Household	2.6								
Existing Residential Population	18								
Gallons Per Capita Per Day	61								
Proposed Residential Flow Existing Residential Hook-Ups		0.0011	0.0018	0.0026	0.0044	3			
<b>TOTAL PROPOSED FLOWS DESIGN YEAR 2045</b>		<b>0.1190</b>	<b>0.1904</b>	<b>0.2736</b>	<b>0.4759</b>	<b>330</b>			
<b>TOTAL EXISTING FLOWS 2016-2020</b>		<b>0.0474</b>	<b>0.0758</b>	<b>0.1090</b>	<b>0.1896</b>	<b>132</b>			
Larsen/Winchester Breakdown 2045									
Larsen Flows SSA		0.0118	0.0189	0.0272	0.0473	33			
Winchester Flows - Angoli LS		0.0676	0.1082	0.1555	0.2704	188			
Winchester Flows SSA		0.0895	0.0633	0.0910	0.1582	110			
Winchester Flows - Total		0.1072	0.1715	0.2465	0.4286	298			
<b>TOTAL PROPOSED FLOWS DESIGN YEAR 2045</b>		<b>0.1190</b>	<b>0.1904</b>	<b>0.2736</b>	<b>0.4759</b>	<b>330</b>			
40 Year Projections - Angoli LS									
Residential Acres Expected to Develop (20%)	79.4								
Households Per Acre	2								
Persons Per Household	2.6								
Estimated Residential Population Growth	413								
Gallons Per Capita Per Day	61								
Proposed Residential Flows MGD		0.0252	0.0403	0.0579	0.1007	70			
Commercial Acres Expected to Develop (GA1+20% Elsewhere)	86.4								
Gallons Per Day Per Commercial Acre	1000								
Proposed Commercial Flow MGD		0.0864	0.1382	0.1987	0.3456	240			
Total 40 Year Flow Projections Angoli LS MGD		0.1116	0.1785	0.2566	0.4463	310			
40 Year Projections - Existing SSA 2065									
Proposed Households Year 2065 (ECWRPC)	344								
Persons Per Household (ECWRPC)	2.6								
Current Estimated Population 2021	777								
Projected Population 2065	894								
Percent Increase in Projected Population	15.11%								
Current Average Flow MGD	0.0474								
Current Gallons Per Capita Per Day GPCD	61								
Proposed Gallons Per Capita Per Day GPCD	61								
Proposed Flow Current District Boundary/SSA		0.0546	0.0873	0.1255	0.2182	152			
Total 40 Year Flow Projections Existing SSA MGD		0.0546	0.0873	0.1255	0.2182	152			
Larsen/Winchester SSA Breakdown - 40 Year Projections 2065									
Larsen Flows (23%)		0.0125	0.0201	0.0289	0.0502	35			
Winchester Flows (77%)		0.0420	0.0672	0.0966	0.1681	117			
Total Proposed Flows SSA 40-Years		0.0546	0.0873	0.1255	0.2182	152			
<b>TOTAL PROPOSED FLOWS DESIGN YEAR 2065</b>		<b>0.1661</b>	<b>0.2658</b>	<b>0.3821</b>	<b>0.6646</b>	<b>462</b>			
Larsen/Winchester Total Breakdown 2065									
Larsen Flows		0.0125	0.0201	0.0289	0.0502	35			
Winchester Flows - Angoli LS		0.1116	0.1785	0.2566	0.4463	310			
Winchester Flows SSA		0.0420	0.0672	0.0966	0.1681	117			
Winchester Flows - Total		0.1536	0.2458	0.3533	0.6144	427			
<b>TOTAL PROPOSED FLOWS DESIGN YEAR 2045</b>		<b>0.1661</b>	<b>0.2658</b>	<b>0.3821</b>	<b>0.6646</b>	<b>462</b>			

**CORRESPONDENCE/MEMORANDUM**

DATE: 04/21/2021  
 TO: Ashley Brechlin – WY/3  
 FROM: Nicole Krueger – SER *Nicole Krueger*  
 SUBJECT: Water Quality-Based Effluent Limitations for the Larsen Winchester Sanitary District  
 WPDES Permit No. WI-003195-06

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using Chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Larsen Winchester Sanitary District in Fond du Lac County who have requested a planning limits memo for their updated design flows. The current annual average design flow of 0.0474 MGD is proposed to increase to 0.119 MGD for the year 2045. Currently, the discharge is from a fill-and-draw lagoon. This planning limits memo evaluates 4 scenarios: keeping the outfall at the current location for both a continuous and noncontinuous discharge or moving the outfall directly to the Arrowhead River for both a continuous and noncontinuous discharge.

This municipal wastewater treatment facility (WWTF) discharges to an unnamed tributary to the Arrowhead River, located in the Arrowhead River and Daggests Creek Watershed in the Wolf River Basin. This discharge is included in the Upper Fox Wolf River Basin TMDL as approved by EPA in February 2020. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

*Current discharge scenario (noncontinuous to the Unnamed Tributary to the Arrowhead River)*

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Annual Average	Footnotes
Flow Rate	1.186 MGD					1
BOD <sub>5</sub>			45 mg/L	30 mg/L		
TSS TMDL				60 mg/L	2,940 lbs/day	2
Dissolved Oxygen		4.0 mg/L				1
pH	9.0 s.u.	6.0 s.u.				1
Fecal Coliform May – September						1,3
Chloride			500 mg/L			4
Phosphorus Interim TMDL				4.7 mg/L	25 lbs	2
Ammonia Nitrogen April – May June – September October – March			6.9 mg/L 5.4 mg/L 9.3 mg/L	3.7 mg/L 3.4 mg/L 4.3 mg/L		5
Nitrite + Nitrate						3,6
Nitrogen, Total Kjeldahl						3,6



Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Annual Average	Footnotes
Total Nitrogen						3,6

Footnotes:

1. No changes from the current permit.
2. The phosphorus and TSS mass limits are based on the Total Maximum Daily Load (TMDL) for the Upper Fox and Wolf River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020.
3. Monitoring only.
4. This is an interim limit for chloride based on currently available data if a variance is approved. If not, the weekly average chloride limit would equal to the WQBEL of 400 mg/L.
5. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

6. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen (total kjeldahl nitrogen and nitrate/nitrite) monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total kjeldahl nitrogen (all expressed as N).

**Alternative discharge scenarios limits**

Larsen Winchester is considering three other scenarios besides the current treatment facility discharging noncontinuously to the unnamed tributary to the Arrowhead River. The alternative scenarios are listed below. The limits are the same as in the table listed above except those differences listed under each of the alternative discharge scenarios below.

*Continuous discharge to the Unnamed Tributary to the Arrowhead River*

If the facility upgrades to a continuous discharge to the Unnamed Tributary to the Arrowhead River:

- No daily maximum flow rate would be needed.
- The weekly average and monthly average limits for BOD<sub>5</sub> and TSS would be 30 mg/L and 20 mg/L.
- The weekly average and monthly average TMDL-derived limits for TSS would be 16.6 lbs/day and 11.8 lbs/day.
- Bacteria limits would apply for May – September. No more than 10 percent of E. coli bacteria samples collected in any calendar month may exceed 410 count/100 mL.

Interim Limit Fecal Coliform	400 #/100 mL geometric mean
Final Limit <i>E. coli</i>	126 #/100 mL geometric mean

- The monthly average and six-month average TMDL-derived limits for phosphorus would be 0.267 lbs/day and 0.089 lbs/day.
- The following ammonia limits are recommended:

	Weekly Average mg/L	Monthly Average mg/L
April & May	5.6	2.2
June – September	6.4	2.5
October – March	9.9	5.4

*Noncontinuous Discharge to the Arrowhead River*

If the facility moves the outfall directly to the Arrowhead River, but continues the noncontinuous schedule of discharge:

- There would be no interim phosphorus limit. The TMDL-based phosphorus limit of 25 lbs as an annual average would be effective immediately if the discharge moves to the Arrowhead River.
- The following ammonia limits would be:

Daily maximum:

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	167	7.0 < pH ≤ 7.1	101	8.0 < pH ≤ 8.1	21
6.1 < pH ≤ 6.2	164	7.1 < pH ≤ 7.2	91	8.1 < pH ≤ 8.2	18
6.2 < pH ≤ 6.3	160	7.2 < pH ≤ 7.3	81	8.2 < pH ≤ 8.3	15
6.3 < pH ≤ 6.4	156	7.3 < pH ≤ 7.4	71	8.3 < pH ≤ 8.4	12
6.4 < pH ≤ 6.5	150	7.4 < pH ≤ 7.5	61	8.4 < pH ≤ 8.5	9.9
6.5 < pH ≤ 6.6	144	7.5 < pH ≤ 7.6	53	8.5 < pH ≤ 8.6	8.2
6.6 < pH ≤ 6.7	137	7.6 < pH ≤ 7.7	45	8.6 < pH ≤ 8.7	6.8
6.7 < pH ≤ 6.8	129	7.7 < pH ≤ 7.8	37	8.7 < pH ≤ 8.8	5.7
6.8 < pH ≤ 6.9	121	7.8 < pH ≤ 7.9	31	8.8 < pH ≤ 8.9	4.8
6.9 < pH ≤ 7.0	111	7.9 < pH ≤ 8.0	26	8.9 < pH ≤ 9.0	4.1

Weekly and monthly average:

	Weekly Average mg/L	Monthly Average mg/L
April & May	5.6	2.2
June – September	5.3	2.5
October – March	9.2	4.3

*Continuous Discharge to the Arrowhead River*

If the facility moves the outfall directly to the Arrowhead River and upgrades to a continuous discharge:

- No daily maximum flow rate would be needed.
- If the facility upgrades to a continuous discharge, the weekly average and monthly average limits for BOD<sub>5</sub> and TSS would be 30 mg/L and 20 mg/L.
- If the facility upgrades to a continuous discharge, the weekly average and monthly average TMDL-derived limits for TSS would be 16.6 lbs/day and 11.8 lbs/day.
- Bacteria limits would apply for May – September: the geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.

- The monthly average and six-month average TMDL-derived limits for phosphorus would be 0.267 lbs/day and 0.089 lbs/day.
- The following ammonia limits would be:  
Daily maximum:

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	167	7.0 < pH ≤ 7.1	101	8.0 < pH ≤ 8.1	21
6.1 < pH ≤ 6.2	164	7.1 < pH ≤ 7.2	91	8.1 < pH ≤ 8.2	18
6.2 < pH ≤ 6.3	160	7.2 < pH ≤ 7.3	81	8.2 < pH ≤ 8.3	15
6.3 < pH ≤ 6.4	156	7.3 < pH ≤ 7.4	71	8.3 < pH ≤ 8.4	12
6.4 < pH ≤ 6.5	150	7.4 < pH ≤ 7.5	61	8.4 < pH ≤ 8.5	9.9
6.5 < pH ≤ 6.6	144	7.5 < pH ≤ 7.6	53	8.5 < pH ≤ 8.6	8.2
6.6 < pH ≤ 6.7	137	7.6 < pH ≤ 7.7	45	8.6 < pH ≤ 8.7	6.8
6.7 < pH ≤ 6.8	129	7.7 < pH ≤ 7.8	37	8.7 < pH ≤ 8.8	5.7
6.8 < pH ≤ 6.9	121	7.8 < pH ≤ 7.9	31	8.8 < pH ≤ 8.9	4.8
6.9 < pH ≤ 7.0	111	7.9 < pH ≤ 8.0	26	8.9 < pH ≤ 9.0	4.1

Weekly and monthly average:

	Weekly Average mg/L	Monthly Average mg/L
April & May	5.6	2.2
June – September	6.4	2.5
October – March	9.8	5.3

Because this is an existing discharge, the test for antidegradation is whether any of the effluent limitations is an increased discharge as defined in ch. NR 207, Wis. Adm Code. “Increased discharge” means any change in concentration, level or loading of a substance which would exceed an effluent limitation specified in a current WPDES permit. No effluent limitations outlined above would constitute an increased discharge as defined in ch. NR 207 as they are equal to or less than the existing permit limitations or are the first-time imposition of the limit. Therefore, the limits do not change due to this consideration.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at [Nicole.Krueger@wisconsin.gov](mailto:Nicole.Krueger@wisconsin.gov) or Diane Figiel at [Diane.Figiel@wisconsin.gov](mailto:Diane.Figiel@wisconsin.gov).

Attachments (2) – Narrative & Outfall Map

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Mark Stanek, Wastewater Engineer – NER  
Heidi Schmitt Marquez, Regional Wastewater Supervisor – NER  
Diane Figiel, Water Resources Engineer – WY/3



Attachment #1  
**Water Quality-Based Effluent Limitations for  
 Larsen Winchester Sanitary District**

**WPDES Permit No. WI-0031925-06**

Prepared by: Nicole Krueger

**PART 1 – BACKGROUND INFORMATION**

**Facility Description:**

The wastewater treatment facility (WWTF) is a fill and draw stabilization pond system with primary and polishing ponds serving the unincorporated rural residential population centers of Larsen and Winchester. Discharge occurs in spring and fall.

Disinfection of the effluent is not required based on the conditions of s. NR 210.06(3), Wis. Adm. Code. It should be noted that recreational use surveys may be re-evaluated in the future to ensure the conditions are being met. This re-evaluation could result in requiring disinfection of the effluent at that time.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

**Existing Permit Limitations:** The current permit, expiring on 09/30/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	1.186 MGD					
BOD <sub>5</sub>			45 mg/L	30 mg/L		
TSS				60 mg/L		
Dissolved Oxygen		4.0 mg/L				
pH	9.0 s.u.	6.0 s.u.				1
Fecal Coliform May – September						2
Chloride			570 mg/L			
Phosphorus Interim Final				5.4 mg/L 0.225 mg/L	0.075 mg/L	3
Ammonia Nitrogen October – March April – May June – September			31 mg/L 5.6 mg/L 6.4 mg/L	12 mg/L 2.2 mg/L 2.5 mg/L		4

**Footnotes:**

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Monitoring only.
3. A compliance schedule is in the current permit to meet the final WQBEL by 09/30/2026.

Attachment #1

4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values is included in the permit in place of the single limit. These limits apply year-round.

Effluent pH - su	NH <sub>3</sub> -N Limit – mg/L	Effluent pH - su	NH <sub>3</sub> -N Limit – mg/L
pH ≤ 8.0	>21	8.5 < pH ≤ 8.6	8.2
8.0 < pH ≤ 8.1	21	8.6 < pH ≤ 8.7	6.8
8.1 < pH ≤ 8.2	18	8.7 < pH ≤ 8.8	5.7
8.2 < pH ≤ 8.3	15	8.8 < pH ≤ 8.9	4.8
8.3 < pH ≤ 8.4	12	8.9 < pH ≤ 9.0	4.1
8.4 < pH ≤ 8.5	9.9		

**Receiving Water Information:**

- Name: Unnamed tributary to the Arrowhead River
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: The Arrowhead River is classified as limited aquatic life (LAL) from upstream of Outfall 001 to STH 110 (currently STH 45). The classification changes from LAL to limited forage fish (LFF) from STH 45 to CTH M.
- Low Flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are approximated where Outfall 001 is located due to the noncontinuous nature of the tributary:

7-Q<sub>10</sub> = 0 cfs (cubic feet per second)

7-Q<sub>2</sub> = 0 cfs

The approximate low flows for the Arrowhead River (0.2 miles downstream of outfall 001) approximately where the proposed new discharge is:

7-Q<sub>10</sub> = 0.04 cfs

7-Q<sub>2</sub> = 0.23 cfs

**If the outfall is moved directly to the Arrowhead River, it is recommended that low flows be obtained from USGS so that the calculated limits are more accurate.**

The approximate low flows for the Arrowhead River where the classification changes from LFF to warmwater sport fish (approximately 4.5 miles downstream of Outfall 001):

7-Q<sub>10</sub> = 0.09 cfs

7-Q<sub>2</sub> = 0.46 cfs

- % of low flow used to calculate limits in accordance with s. NR 106.06 (4) (c) 5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.]
- Multiple dischargers: None.
- Impaired water status: The Arrowhead River is 303(d) listed as impaired for total phosphorus.

**Effluent Information:**

- Design Flow Rate(s):

	Current Design Flows (MGD)	2045 Design Flows (MGD)
Annual Average*	0.0474	0.1190
Peak Monthly	0.0758	0.1904
Peak Weekly**	0.1090	0.2736
Peak Daily	0.1896	0.4759

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\*The annual average design flow of 0.1190 MGD is used in this memo to calculate limits for the proposed option to upgrade to a continuous flow facility.

\*\*The peak weekly flow rate of 0.2736 MGD is used because this discharge only occurs for approximately 15 consecutive days twice per year. The annual average design flow is used in this memo to calculate limits for the proposed option to upgrade to a continuous flow facility.

Where the receiving water low flow is zero, the limits will not change due to differences in design flows because there is no available dilution.

- Acute dilution factor used in accordance with s. NR 106.06 (3) (c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water Source: Domestic wastewater with water supply from wells

**PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS  
FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN**

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99<sup>th</sup> percentile (or P<sub>99</sub>) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

**Acute Limits based on 1-Q<sub>10</sub>**

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Adm. Code (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q<sub>10</sub> receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards.

$$\text{Limitation} = \frac{(\text{WQC}) \cdot (Q_s + (1-f) Q_e) - (Q_s - f Q_e) \cdot (C_s)}{Q_e}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105

Q<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)

if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C<sub>s</sub> = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q<sub>10</sub> method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Larsen Winchester.

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The following tables list the calculated water quality-based effluent limitations for this discharge along with the results of effluent sampling for chloride which is in mg/L in the tables below.

*Tributary to Arrowhead River – noncontinuous and continuous*

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	ATC	MAX. EFFL. LIMIT*	1-day P <sub>99</sub>	1-day MAX. CONC.
Chloride (mg/L)	757	757	602	532

\* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q<sub>10</sub> flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	CTC	WEEKLY AVE. LIMIT	4-day P <sub>99</sub>
Chloride (mg/L)	395	395	500

*Arrowhead River – noncontinuous (peak weekly design flow = 0.2736 MGD)*

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 0.03 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06 (3) (bm), Wis. Adm. Code.

SUBSTANCE	ATC	MAX. EFFL. LIMIT*	1-day P <sub>99</sub>	1-day MAX. CONC.
Chloride (mg/L)	757	889	600	532

\* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q<sub>10</sub> flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0.0100 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06 (4) (c), Wis. Adm. Code

SUBSTANCE	CTC	WEEKLY AVE. LIMIT	4-day P <sub>99</sub>
Chloride (mg/L)	395	416	500

*Arrowhead River – continuous (annual average design flow = 0.1190 MGD)*

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 0.03 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06 (3) (bm), Wis. Adm. Code.

SUBSTANCE	ATC	MAX. EFFL. LIMIT*	1-day P <sub>99</sub>	1-day MAX. CONC.
Chloride (mg/L)	757	814	600	532

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\* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q<sub>10</sub> flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0.0100 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06 (4) (c), Wis. Adm. Code

SUBSTANCE	CTC	WEEKLY AVE. LIMIT	4-day P <sub>99</sub>
Chloride (mg/L)	395	404	500

**Conclusions and Recommendations:** Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for chloride.

Chloride – Considering available effluent data from the current permit term (11/17/2016 to 11/09/2020), the 1-day P<sub>99</sub> chloride concentration is 602 mg/L, and the 4-day P<sub>99</sub> of effluent data is 500 mg/L.

Because the 4-day P<sub>99</sub> exceeds the calculated weekly average WQBEL, an effluent limit is needed in accordance with s. NR 106.05(4)(b) Wis. Adm. Code. The current permit has a chloride variance and interim chloride limit of 570 mg/L which was based on 105% of the highest weekly average from 05/14/2012 to 11/22/2016.

If a variance is allowed at the next permit reissuance, a new interim limit would need to be determined. Using the current available data, the interim limit may be 500 mg/L which is equal to the 4-day P<sub>99</sub>. At the next permit reissuance, after a full permit term of chloride data is available, the need variance and interim chloride limit will be reevaluated.

**PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD<sub>5</sub>, DO, AND TSS**

The current permit has biological oxygen demand (BOD<sub>5</sub>) limits of 45 mg/L as a weekly average and 30 mg/L as a monthly average. Because this discharge is to a limited aquatic life community, limits for BOD<sub>5</sub>, dissolved oxygen (DO), and total suspended solids (TSS) per NR 104.02(3)(b) Wis. Adm. Code apply.

*Noncontinuous discharge*

Because this is a fill-and-draw lagoon, NR 104.02(4)(c) Wis. Adm. Code which allows the limits to vary from the limitations specified in NR 104.02(3) Wis. Adm. Code, may apply if the following conditions are met:

1. The discharge occurs only during the spring and fall of the year when the flow in the receiving water is normally high, and the temperature is low. The rate of discharge shall not exceed that specified in a permit under s. 283.31, Stats., or where no rate is indicated, the allowable discharge quantities shall be determined by the department based upon current evaluation of the receiving water.
2. In lieu of the previous conditions, the discharge from a fill- and-draw lagoon may occur at any time provided the rate does not exceed the assimilative capacity of the receiving water as specified in a permit under s. 283.31, Stats.
3. The dissolved oxygen in the effluent is maintained at a level greater than or equal to 4 mg/L, and the permitted rate of discharge shall be such that the dissolved oxygen and ammonia nitrogen

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criteria necessary to sustain fish and aquatic life are maintained in the stream during the period of discharge.

4. The effluent limitations do not exceed those established under ss. 283.13 and 283.19, Stats.

**The current BOD<sub>5</sub> limits of 45 mg/L as a weekly average and 30 mg/L as a monthly average and current monthly average TSS limit were recommended because the facility meets these 4 requirements. These limits would be recommended to continue in future reissuances as these conditions are met. In order to maintain adequate dissolved oxygen level in the receiving water, a dissolved oxygen limit of 4.0 mg/L daily minimum is recommended.**

*Continuous discharge*

Based on the receiving water classification of limited aquatic life, **the recommended limitations for BOD<sub>5</sub> and TSS are 30 mg/L weekly average and 20 mg/L monthly average.** In order to maintain adequate dissolved oxygen in the receiving water, **a dissolved oxygen limit of 4.0 mg/L daily minimum is recommended.**

Please see the phosphorus and TSS section in this memo for additional limits.

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS  
FOR AMMONIA NITROGEN**

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- The maximum expected effluent pH has changed

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC):**

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation.

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and  
A = 0.633 and B = 90.0 for Limited Aquatic Life, and  
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 111 sample results were reported from 11/16/2016 to 11/15/2020. The maximum reported value was 9.6 s.u. (Standard pH Units). The effluent pH was 9.6 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 9.5 s.u. and the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 9.4 s.u. Because the daily maximum pH limit is 9.0 s.u., a value of 9.0 s.u. is believed to represent the maximum

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reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 9.0 s.u. into the equation above yields an ATC = 2.0 mg/L.

**Potential changes to daily maximum Ammonia Nitrogen effluent limitations:**

Subchapter IV of ch. NR 106, Wis. Adm. Code (effective September 1, 2016) specifies methods for the use of the 1-Q<sub>10</sub> receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q<sub>10</sub> (estimated as 80 % of 7-Q<sub>10</sub>) and the 2×ATC approach are shown below.

	Ammonia Nitrogen Limit mg/L
2×ATC	4.0
1-Q <sub>10</sub>	2.0

The 1-Q<sub>10</sub> method yields the most stringent limits for Larsen Winchester.

The current permit has variable daily maximum effluent limits based on effluent pH. Presented below is a table of daily maximum limitations corresponding to various effluent pH values.

**Daily Maximum Ammonia Nitrogen Limits – Unnamed Tributary (LAL, 1Q10 = 0 cfs)**

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

**Daily Maximum Ammonia Nitrogen Limits – Arrowhead River (LAL 1Q10 = 0.032 cfs)**

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	167	7.0 < pH ≤ 7.1	101	8.0 < pH ≤ 8.1	21
6.1 < pH ≤ 6.2	164	7.1 < pH ≤ 7.2	91	8.1 < pH ≤ 8.2	18
6.2 < pH ≤ 6.3	160	7.2 < pH ≤ 7.3	81	8.2 < pH ≤ 8.3	15
6.3 < pH ≤ 6.4	156	7.3 < pH ≤ 7.4	71	8.3 < pH ≤ 8.4	12
6.4 < pH ≤ 6.5	150	7.4 < pH ≤ 7.5	61	8.4 < pH ≤ 8.5	9.9
6.5 < pH ≤ 6.6	144	7.5 < pH ≤ 7.6	53	8.5 < pH ≤ 8.6	8.2
6.6 < pH ≤ 6.7	137	7.6 < pH ≤ 7.7	45	8.6 < pH ≤ 8.7	6.8

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Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.7 < pH ≤ 6.8	129	7.7 < pH ≤ 7.8	37	8.7 < pH ≤ 8.8	5.7
6.8 < pH ≤ 6.9	121	7.8 < pH ≤ 7.9	31	8.8 < pH ≤ 8.9	4.8
6.9 < pH ≤ 7.0	111	7.9 < pH ≤ 8.0	26	8.9 < pH ≤ 9.0	4.1

Section NR 106.33(2), Wis. Adm. Code, was updated effective September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, the table has been expanded from the table in the current permit to include ammonia nitrogen limits throughout the pH range.

*Unnamed Tributary*

**Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

- pH = the pH (s.u.) of the receiving water,
- E = 1.0,
- C =  $8.09 \times 10^{(0.028 \times (25 - T))}$
- T = the temperature of the receiving (°C)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

Limited aquatic life		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
<b>Effluent Flow</b>	Q <sub>e</sub> (MGD)	0.119/0.2736	0.119/0.2736	0.119/0.2736
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0	0	0
	7-Q <sub>2</sub> (cfs)	0	0	0
	Ammonia (mg/L)	0.04	0.03	0.07
	Average Temperature (°C)	12	19	4



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Limited aquatic life		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
	Maximum Temperature (°C)	14	21	10
	pH (s.u.)	8.06	8.08	7.99
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0	0	0
<b>Criteria</b> <b>mg/L</b>	4-day Chronic	36.6	23.9	54.0
	30-day Chronic	14.6	9.57	21.6
<b>Effluent Limits</b> <b>mg/L</b>	Weekly Average	36.6	23.9	54.0
	Monthly Average	14.6	9.57	21.6

The immediate receiving water is classified as LAL, so limits need to be established to protect downstream uses, according to s. NR 106.32 (1) (b), Wis. Adm. Code. Approximately 4.5 miles downstream of the current discharge location to the unnamed tributary, the classification changes to warm water sport fish.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Present), or

C =  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Arrowhead River, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warmwater sport fish classification.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

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Warmwater sport fishery		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
<b>Effluent Flow</b>	Qe (MGD)	0.119/0.2736	0.119/0.2736	0.119/0.2736
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0.09	0.09	0.09
	7-Q <sub>2</sub> (cfs)	0.46	0.46	0.46
	Ammonia (mg/L)	0.04	0.03	0.07
	Average Temperature (°C)	12	19	4
	Maximum Temperature (°C)	14	21	10
	pH (s.u.)	8.06	8.08	7.99
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0.045	0.09	0.0225
	Reference Monthly Flow (cfs)	0.1955	0.391	0.09775
<b>Criteria mg/L</b>	4-day Chronic			
	Early Life Stages Present	5.57	3.66	
	Early Life Stages Absent			8.26
	30-day Chronic			
	Early Life Stages Present	2.23	1.46	
Early Life Stages Absent			3.30	
<b>Effluent Limitations mg/L continuous (0.119 MGD)</b>	Weekly Average			
	Early Life Stages Present	6.92	5.44	
	Early Life Stages Absent			9.26
	Monthly Average			
	Early Life Stages Present	4.55	4.51	
Early Life Stages Absent			5.02	
<b>Effluent Limitations mg/L noncontinuous (0.2736 MGD)</b>	Weekly Average			
	Early Life Stages Present	6.16	4.43	
	Early Life Stages Absent			8.69
	Monthly Average			
	Early Life Stages Present	3.24	2.79	
Early Life Stages Absent			4.05	

**Ammonia Decay:** The Department must establish limits to protect downstream uses, according to s. NR 106.32 (1) (b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32 (4) (c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day<sup>-1</sup> at 20°C has been suggested as a default rate. A temperature correction factor of  $\theta = 1.08$  is  $(k_t = k_{20} \theta^{(T-20)})$ .

$$N_{\text{Limit}} = \left( \frac{N_{\text{down}}}{\text{EXP}(-k_t T)} \right)$$

Where:  $N_{\text{Limit}}$  = Ammonia limit needed to protect downstream use (mg/L)  
 $N_{\text{down}}$  = Ammonia limit calculated based on downstream classification and flow (mg/L)  
 $-k_t$  = Ammonia decay rate at background stream temperature (day<sup>-1</sup>)

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T = Travel time from outfall to downstream use (day)

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 4.5 miles for a travel time of 0.9 days. This equation shows that at the location where the classification change, 82% to 95% of the ammonia is remaining during the year. After decay, the limits are increased as shown in the following table.

Continuous	LAL		WWSF		After decay		Current Limits	
	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
April – May	37	15	6.9	4.6	7.8	5.1	5.6	2.2
June – Sept	24	9.6	5.4	4.5	6.7	5.5	6.4	2.5
Oct – March	54	22	9.3	5.0	9.9	5.4	31	12

Noncontinuous	LAL		WWSF		After decay		Current Limits	
	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
April – May	37	15	6.2	3.2	6.9	3.7	5.6	2.2
June – Sept	24	9.6	4.4	2.8	5.4	3.4	6.4	2.5
Oct – March	54	22	8.7	4.1	9.3	4.3	31	12

*Arrowhead River Discharge*

**Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 1.0,

C =  $8.09 \times 10^{(0.028 \times (25 - T))}$

T = the temperature of the receiving (°C)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the

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flow is used if the Temperature  $\geq 16$  °C, 25% of the flow is used if the Temperature  $< 11$  °C, and 50% of the flow is used if the Temperature  $\geq 11$  °C but  $< 16$  °C.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

Limited aquatic life		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
<b>Effluent Flow</b>	Qe (MGD)	0.119/0.2736	0.119/0.2736	0.119/0.2736
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0.04	0.04	0.04
	7-Q <sub>2</sub> (cfs)	0.23	0.23	0.23
	Ammonia (mg/L)	0.04	0.03	0.07
	Average Temperature (°C)	12	19	4
	Maximum Temperature (°C)	14	21	10
	pH (s.u.)	8.06	8.08	7.99
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0.02	0.04	0.01
	Reference Monthly Flow (cfs)	0.09775	0.1955	0.048875
	<b>Criteria mg/L</b>	4-day Chronic	36.6	23.9
30-day Chronic		14.6	9.57	21.6
<b>Effluent Limits mg/L continuous (0.119 MGD)</b>	Weekly Average	40.5	29.1	56.9
	Monthly Average	22.4	19.7	27.3
<b>Effluent Limits mg/L noncontinuous (0.2736 MGD)</b>	Weekly Average	38.3	26.2	55.2
	Monthly Average	18.0	14.0	24.1

The immediate receiving water of the proposed new outfall location is classified as LAL, so limits need to be established to protect downstream uses, according to s. NR 106.32 (1) (b), Wis. Adm. Code. Approximately 4 miles downstream of the proposed discharge location to the Arrowhead River, the classification changes to warm water sport fish.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Present), or

C =  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

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The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Arrowhead River, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warmwater sport fish classification.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

Warmwater sport fishery		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
<b>Effluent Flow</b>	Q <sub>e</sub> (MGD)	0.119/0.2736	0.119/0.2736	0.119/0.2736
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	0.09	0.09	0.09
	7-Q <sub>2</sub> (cfs)	0.46	0.46	0.46
	Ammonia (mg/L)	0.04	0.03	0.07
	Average Temperature (°C)	12	19	4
	Maximum Temperature (°C)	14	21	10
	pH (s.u.)	8.06	8.08	7.99
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0.045	0.09	0.0225
	Reference Monthly Flow (cfs)	0.1955	0.391	0.09775
<b>Criteria mg/L</b>	4-day Chronic			
	Early Life Stages Present	5.57	3.66	
	Early Life Stages Absent			8.26
	30-day Chronic			
	Early Life Stages Present	2.23	1.46	
	Early Life Stages Absent			3.30
<b>Effluent Limitations mg/L continuous (0.119 MGD)</b>	Weekly Average			
	Early Life Stages Present	6.92	5.44	
	Early Life Stages Absent			9.26
	Monthly Average			
	Early Life Stages Present	4.55	4.51	
	Early Life Stages Absent			5.02
<b>Effluent Limitations mg/L noncontinuous (0.2736 MGD)</b>	Weekly Average			
	Early Life Stages Present	6.16	4.43	
	Early Life Stages Absent			8.69
	Monthly Average			
	Early Life Stages Present	3.24	2.79	
	Early Life Stages Absent			4.05

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**Ammonia Decay:** The Department must establish limits to protect downstream uses, according to s. NR 106.32 (1) (b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32 (4) (c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day<sup>-1</sup> at 20°C has been suggested as a default rate. A temperature correction factor of  $\theta = 1.08$  is ( $k_t = k_{20} \theta^{(T-20)}$ ).

$$N_{\text{Limit}} = \left( \frac{N_{\text{down}}}{\text{EXP}(-k_t T)} \right)$$

- Where:  $N_{\text{Limit}}$  = Ammonia limit needed to protect downstream use (mg/L)  
 $N_{\text{down}}$  = Ammonia limit calculated based on downstream classification and flow (mg/L)  
 $-k_t$  = Ammonia decay rate at background stream temperature (day<sup>-1</sup>)  
 $T$  = Travel time from outfall to downstream use (day)

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 4 miles for a travel time of 0.9 days. Note: because the exact proposed discharge location is unknown at this time, this distance may change and change the final ammonia limits slightly. This equation shows that at the location where the classification change, 82% to 94% of the ammonia is remaining during the year. After decay, the limits are increased as shown in the following table.

Continuous	LAL		WWSF		After decay		Current Limits	
	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
Months Applicable								
April – May	41	22	6.9	4.6	7.7	5.1	5.6	2.2
June – Sept	29	20	5.4	4.5	6.5	5.4	6.4	2.5
Oct – March	57	27	9.3	5.0	9.8	5.3	31	12

Noncontinuous	LAL		WWSF		After decay		Current Limits	
	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
Months Applicable								
April – May	38	18	6.2	3.2	6.8	3.6	5.6	2.2
June – Sept	26	14	4.4	2.8	5.3	3.3	6.4	2.5
Oct – March	55	24	8.7	4.1	9.2	4.3	31	12

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from 11/17/2016 to 11/09/2020. Data is only available during the months of April and November due to the noncontinuous nature of the discharge.

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	Ammonia Nitrogen mg/L
1-day P <sub>99</sub>	24.6
4-day P <sub>99</sub>	15.0
30-day P <sub>99</sub>	10.2
Mean	8.0
Std	4.72
Sample size	21
Range	1.2 – 17

\*Values lower than the level of detection were substituted with a zero

The permit currently has weekly and monthly average limits year-round. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

(b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

**Antidegradation:**

The calculated weekly and monthly average limits for the months of April – May and June – September are less restrictive than the limits in the current permit for a continuous flow situation. The calculated weekly and monthly average limits for the months of April – May and the monthly average limit for June – September are less restrictive than the limits in the current permit for a noncontinuous flow situation. If the facility would like to receive the higher limits, a demonstration of need for the higher limits would need to be made in accordance with s. NR 207.04 Wis. Adm. Code.

In order to receive limits that would prevent significant lowering of water quality (SLOWQ), the permittee shall demonstrate the need for higher limits consistent with s. NR 207.04(1)(a) and 207.04(1)(c) Wis. Adm. Code. Following this demonstration, limits based on 1/3<sup>rd</sup> of the assimilative capacity (AC) may be recommended. Limits based on the full AC will only apply if the permittee demonstrates that SLOWQ cannot be prevented according to s. NR 207.04(1)(d) Wis. Adm. Code. For the months that have calculated limits that are more restrictive than the current limits, the calculated limits will not increase.

The following equation is used to calculate limits based on 1/3<sup>rd</sup> of the assimilative capacity:

$$\frac{1}{3} AC WQBEL = \frac{Calculated\ WQBEL - Current\ Limit}{3} + Current\ Limit$$

The tables below summarize the higher limits based on full AC and 1/3<sup>rd</sup> AC for each discharge scenario. Demonstrations per s. NR 207.04 Wis. Adm. Code shall be made to receive these higher limits.

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*Unnamed Tributary*

Continuous flow		Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Full AC limits	April & May	Variable	5.6	2.2
	June – September	Variable	6.4	2.5
	October – March	Variable	9.9	5.4
1/3 AC limits	April & May	Variable	6.3	3.2
	June – September	Variable	6.5	3.5
	October – March	Variable	9.9	5.4

Noncontinuous flow		Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Full AC limits	April & May	Variable	6.9	3.7
	June – September	Variable	5.4	3.4
	October – March	Variable	9.3	4.3
1/3 AC limits	April & May	Variable	6.0	2.7
	June – September	Variable	5.4	2.8
	October – March	Variable	9.3	4.3

*Arrowhead River Discharge*

Continuous flow		Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Full AC limits	April & May	Variable	5.6	2.2
	June – September	Variable	6.4	2.5
	October – March	Variable	9.8	5.3
1/3 AC limits	April & May	Variable	6.3	3.2
	June – September	Variable	6.4	3.5
	October – March	Variable	9.8	5.3

Noncontinuous flow		Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Full AC limits	April & May	Variable	5.6	2.2
	June – September	Variable	5.3	2.5
	October – March	Variable	9.2	4.3
1/3 AC limits	April & May	Variable	6.0	2.7
	June – September	Variable	5.3	2.8
	October – March	Variable	9.2	4.3

Data is only available for April and November. Based on the limited data available, the facility may be able to demonstrate need for the higher limits in accordance to s. NR 207.04 Wis. Adm. Code. Larsen Winchester could collect samples when they are not discharging to demonstrate need in other months that data is not available for.



Attachment #1

No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

**PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS  
FOR BACTERIA**

Disinfection of the effluent is not required in the current permit. Since the receiving water is designated as recreational use, disinfection would be required per s. NR 102.04(5)(a) Wis. Adm. Code. The Department is reevaluating the factors listed in s. NR 210.06(3) Wis. Adm. Code and is drafting guidance for these evaluations.

Noncontinuous

Because the detention time for the facility is at least 180 days due to the noncontinuous nature of the discharge, disinfection would likely not be required per s. NR 210.06(3)(h) Wis. Adm. Code. Fecal coliform is currently required to be monitored and if that data shows that disinfection is not needed to meet the bacteria limits, then Larsen Winchester will be exempt.

Continuous

If the facility is upgraded to a continuous discharge, disinfection will be required.

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Code became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

These limits would be required during May through September for the recreational season.

A compliance schedule may be given to allow for time to investigate options and meet the bacteria limits as soon as possible per NR 106.117(3), Wis. Adm. Code if the discharge remains at the unnamed tributary.

Because this would be considered a new discharger to the Arrowhead River, there would not be a compliance schedule and interim limit per s. NR 106.117(1)(b) Wis. Adm. Code if the discharge moves to the Arrowhead River.

**PART 6 – PHOSPHORUS AND TOTAL SUSPENDED SOLIDS**

**Technology Based Phosphorus Limit – Phosphorus**

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Larsen Winchester does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. Because the facility discharges over two months a year, the data

Attachment #1

demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04 (1) (a) 1, Wis. Adm. Code, and therefore no technology-based limit is required.

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Jan 2020	-	-	0
Feb 2020	-	-	0
Mar 2020	-	-	0
Apr 2020	-	-	0
May 2020	2.85	9.84	234
Jun 2020	-	-	0
Jul 2020	-	-	0
Aug 2020	-	-	0
Sept 2020	1.15	7.21	69.2
Oct 2020	-	-	0
Nov 2020	-	-	0
Dec 2020	-	-	0
Average			25.3

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)  
 Where total flow is the sum of the actual (not design) flow (in MGD) for that month

**TMDL Limits – Phosphorus**

Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. This WLA found in Appendix H of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf River Basins (UFWRB TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year).

*Noncontinuous Discharge*

Because Larsen Winchester is a non-continuous discharger, there is no valid statistical basis for transforming annual WLAs into shorter term limits, so the phosphorus limit should be expressed as a total annual discharge. Therefore, **it is recommended that the phosphorus limit be 25 lbs/year.**

*Continuous Discharge*

$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{WLA} \div (\text{365 days/yr} * \text{Flow Rate} * \text{Conversion Factor}) \\ &= 25 \text{ lbs/yr} \div (\text{365 days/yr} * \text{0.1190 MGD} * \text{8.34}) \\ &= \text{0.069 mg/L} \end{aligned}$$

Since this value is less than 0.3 mg/L, both a six-month average mass limit and a monthly average mass limit are applicable for total phosphorus. The monthly average limit is set equal to three times the six-month average limit.

$$\begin{aligned} \text{TP 6-Month Average Permit Limit} &= \text{WLA} \div \text{365 days/yr} * \text{multiplier} \\ &= (25 \text{ lbs/yr} \div \text{365 days/yr}) * \text{1.30} \\ &= \text{0.089 lbs/day} \end{aligned}$$

$$\begin{aligned}
 & \text{Attachment \#1} \\
 \text{TP Monthly Average Permit Limit} &= \text{TP 6-Month Average Permit Limit} * 3 \\
 &= 0.089 \text{ lbs/day} * 3 \\
 &= 0.267 \text{ lbs/day}
 \end{aligned}$$

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation of 0.6 is used because it is the maximum anticipated CV for municipalities meeting the TMDL-derived WLAs and there is little information on what the future variability would be if the facility was upgraded to a continuous discharge. This value, along with monitoring frequency, is used to select the multiplier. Should the facility be upgraded to a continuous discharge, a monitoring frequency of no less than weekly as recommended by EPA; if a different monitoring frequency is used, the stated limits should be reevaluated.

Six-month average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 0.090 mg/L as a six-month average and 0.27 mg/L as a monthly average at the facility design (maximum annual average for industries) flow of 0.1190 MGD.

The UFW TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Upper Fox and Wolf River. Therefore, WLA-based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TP. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

**Interim Limit – Phosphorus**

If the discharge continues to be to the unnamed tributary, an interim limit is needed when a compliance schedule is included in the permit to meet the TMDL limits. This limit should reflect a value which the facility is able to currently meet; however, it should also consider the receiving water quality, keeping the water from further impairment. It's recommended that the interim limit be set equal to 4.7 mg/L, expressed as a monthly average. This value reflects the 4-day P<sub>99</sub> concentration of 4.7 mg/L from the past five years. This value is recommended instead of the 30-day P<sub>99</sub> concentration of 3.4 mg/L to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities, which often consist of trial and error. The following table lists the statistics for effluent phosphorus levels from 11/17/2016 to 11/09/2020.

<b>Total Phosphorus Statistics, mg/L</b>		
	<b>Concentration (mg/L)</b>	<b>Mass Discharge (lbs/day)</b>
1-day P <sub>99</sub>	7.20	44.0
4-day P <sub>99</sub>	4.70	27.4
30-day P <sub>99</sub>	3.38	19.0
Mean	2.77	15.1
Std	1.33	8.35
Sample Size	21	21
Range	1.1 – 6.1	3.44 – 30.5

Attachment #1

If the discharge moves to the Arrowhead River, there would not be a compliance schedule and interim limit per s. NR 217.17(4) Wis. Adm. Code and the TMDLs limit would be effective immediately upon discharge.

**TMDL Limits – Total Suspended Solids**

Total Suspended Solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020). This WLAs found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year).

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits to contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

*Noncontinuous Discharge*

Because Larsen Winchester is a non-continuous discharger, there is no valid statistical basis for transforming annual WLAs into shorter term limits, so the phosphorus limit should be expressed as a total annual discharge. Therefore, **it is recommended that the TSS limit be 2,940 lbs/year.**

*Continuous Discharge*

Larsen Winchester is a municipal treatment facility and is therefore subject to weekly average and monthly average TSS limits derived from TSS annual WLAs.

$$\begin{aligned} \text{TSS Weekly Average Permit Limit} &= \text{Daily WLA} * \text{Weekly multiplier} \\ &= 8 \text{ lbs/day} * 2.07 \\ &= 16.6 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TSS Monthly Average Permit Limit} &= \text{Daily WLA} * \text{Monthly multiplier} \\ &= 8 \text{ lbs/day} * 1.47 \\ &= 11.8 \text{ lbs/day} \end{aligned}$$

The multiplier used in the weekly average and monthly average average calculation was determined according to implementation guidance. A coefficient of variation of 0.6 is used because it is the maximum anticipated CV for municipalities meeting the TMDL-derived WLAs and there is little information on what the future variability would be if the facility was upgraded to a continuous discharge. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 3/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

**Effluent Data – TSS**

The following table lists the statistics for effluent TSS levels from 11/17/2016 to 11/09/2020 for informational purposes.

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Total Suspended Solids Statistics		
	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P <sub>99</sub>	262	1470
4-day P <sub>99</sub>	143	802
30-day P <sub>99</sub>	68.4	383
Mean	38.1	213
Std	56.7	317
Sample Size	60	60
Range	2.4 – 336	9.05 – 1821

**PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS  
FOR THERMAL**

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 [s. NR 106.55(2), Wis. Adm. Code] which has a daily maximum effluent temperature limitation of 120 °F. The daily maximum effluent temperature limitation of 86°F applies to Larsen Winchester’s discharge. There is no temperature data available for this discharge.

*Noncontinuous discharge*

Because this facility provides hydraulic detention times of approximately six-months, elevated effluent temperatures are unlikely and discharge temperatures are expected to be similar to ambient conditions. The facility uses a fill and draw method of operation with effluent discharges occurring only during the cool weather periods in spring and fall when ambient temperatures are less than 65 deg. F.

*Continuous discharge*

Section NR 106.59(2)(b), Wis. Adm. Code, allows the use of temperature effluent data, on a case-by-case basis, from at least two other POTWs within a 100-mile radius that utilize similar wastewater treatment technology and have a similar ratio of domestic to industrial waste stream composition, or representative data of the POTW.

- Poygan Poy Sippi Sanitary District is a lagoon system facility that discharges to Lake Poygan approximately 10 miles away from Larsen Winchester. The highest maximum daily temperature reported from this facility was 83°F in July 2011.
- Sherwood Wastewater Treatment is a lagoon system facility that discharges to an unnamed tributary to the Kankapot Creek approximately 20 miles away from Larsen Winchester. The highest maximum daily temperature reported from this facility was 76°F in July 2012.

Using data from the two other POTWs, there is not reasonable potential for Larsen Winchester to exceed the daily maximum limit of 86°F. Therefore, no limits are recommended.

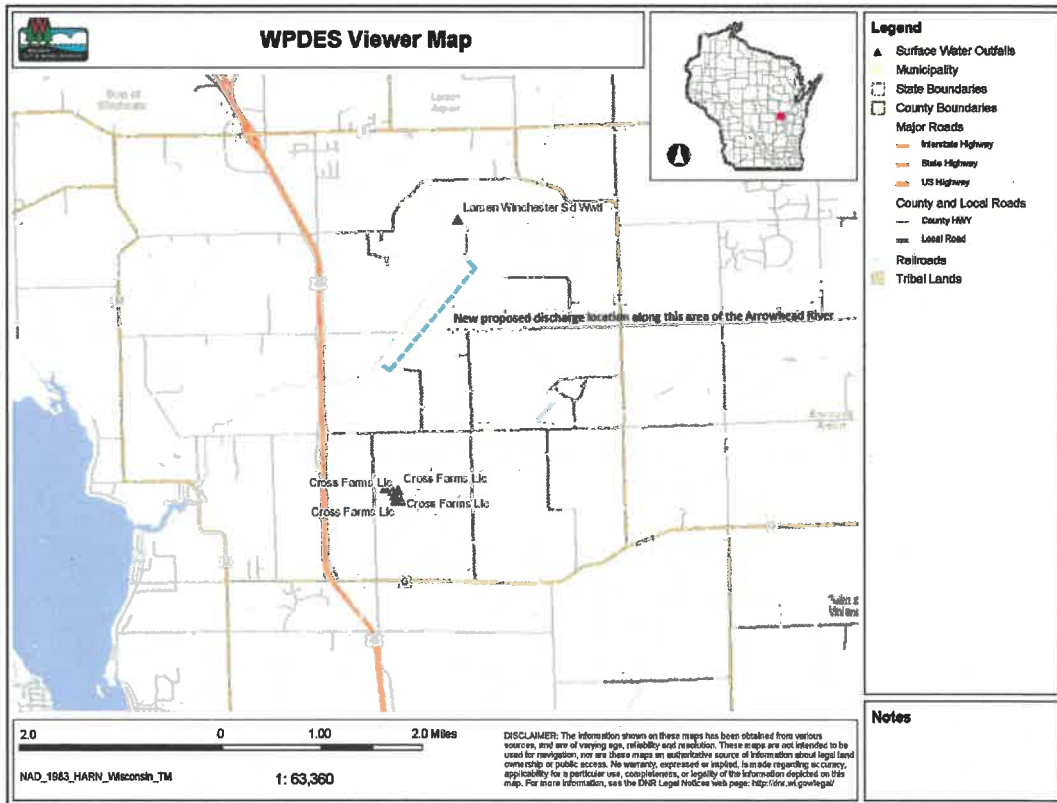
Attachment #1

**PART 8 – WHOLE EFFLUENT TOXICITY (WET)**

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the WET Program Guidance Document (October 29, 2019).

The need for WET testing was not evaluated for this planning limits memo. It will be evaluated in the next permit reissuance. The facility is currently exempt from WET testing because they are a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern. This is following the recommendations of Chapter 1.11 of the WET Guidance Document.

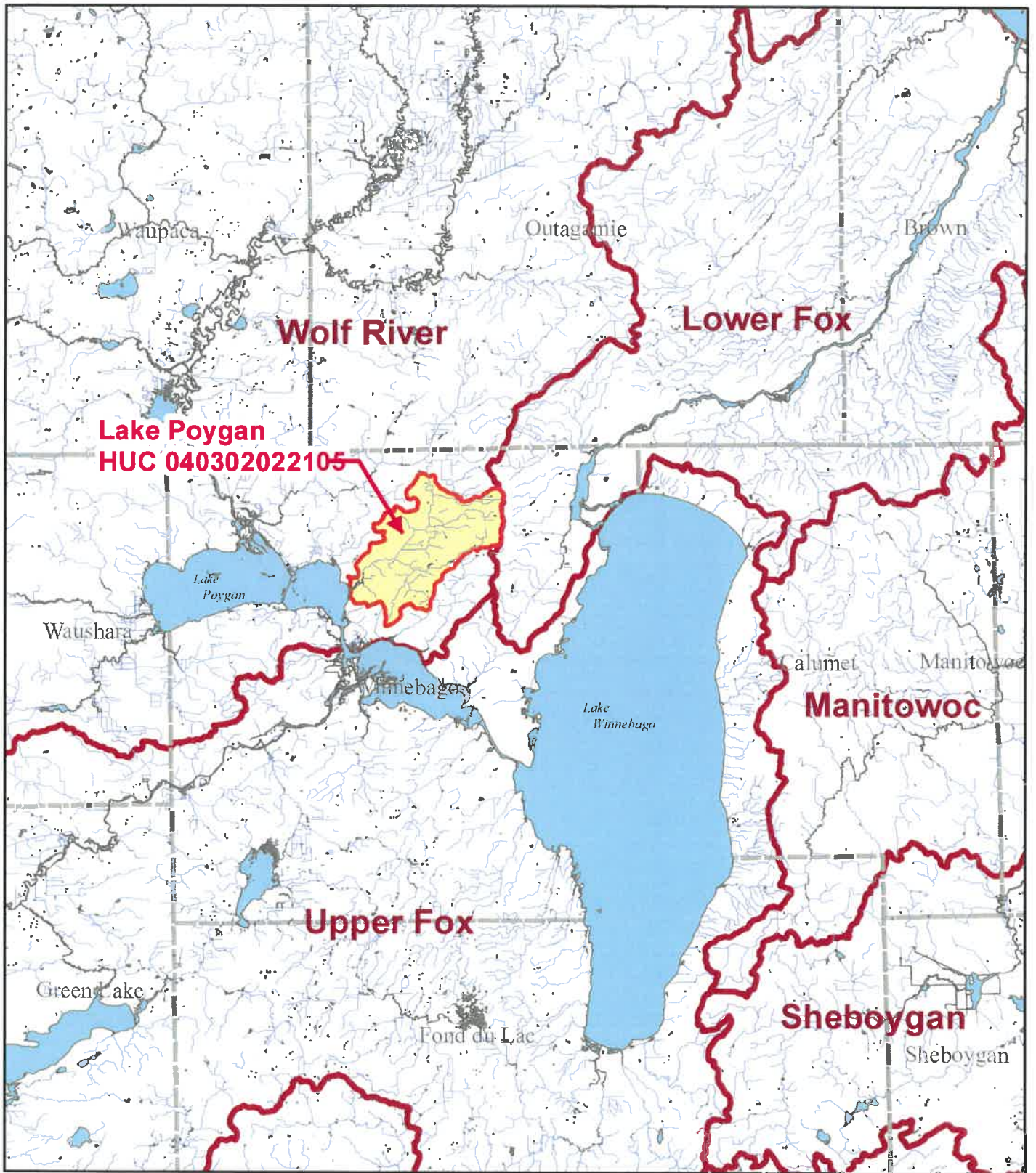
Attachment #2






# **APPENDIX G**

## **Watershed Mapping**





**Legend**

-  12 Digit (Subwatershed)
-  Water Management Units
-  WI County Boundaries



**WI DNR Water Management Units**

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Info@martenson-eisele.com  
920.731.0381 1.800.236.0381

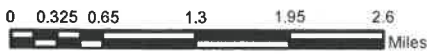
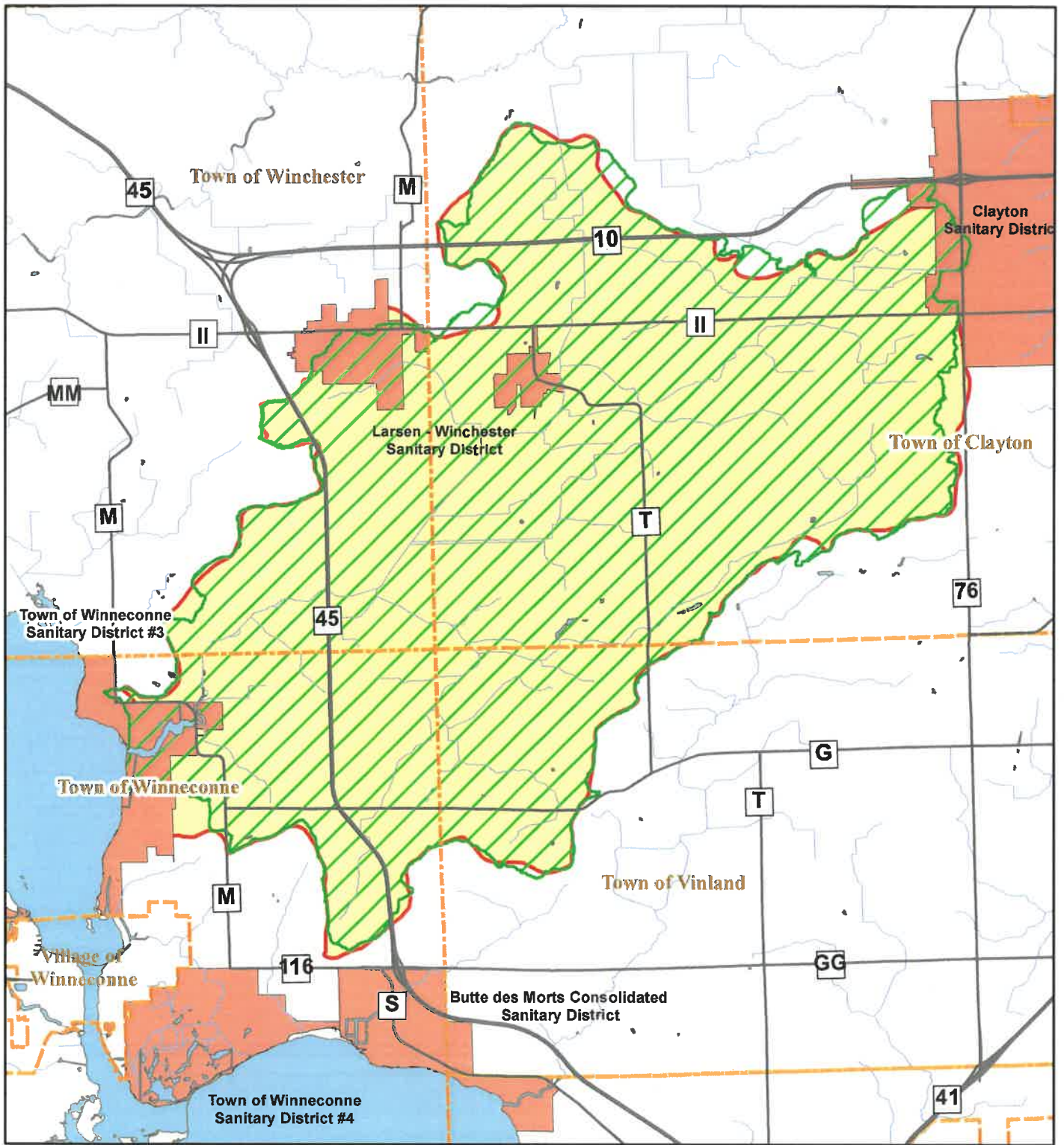
Planning  
Environmental  
Surveying  
Engineering  
Architecture

arcgis\_wdnr\_data.mxd\_03/31/2021









The base map was created with data from the WI DNR Open Data website, who in no event assumes any liability regarding fitness of use of the information and any application by others, is the responsibility of the user.





**Legend**

-  Sanitary Districts
-  Subbasin
-  12 Digit (Subwatershed)
-  Streams/Rivers
-  Major Roads
-  Municipal Boundaries

**Lake Poygan  
12 Digit Subwatershed  
HUC 040302022105**

**Subbasin No. 51 -  
Arowhead River**

Winnebago County, WI

The base map was created with data from the WI DNR Open Data website, who in no event assumes any liability regarding fitness of use of the information and any application by others, is the responsibility of the user.

**Martenson & Eisele, Inc.**



1377 Midway Road  
Menasha, WI 54952  
www.martenson-eisele.com  
info@martenson-eisele.com  
920.731.0381 1.800.236.0381

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Surveying  
Engineering  
Architecture

arcgis\_wdnr\_data.mxd\_03/31/2021

**APPENDIX H**

**Geotechnical Investigation**



## **VISUAL SOIL CLASSIFICATION**

Larsen Winchester Sanitary  
District Project

South Side of Grandview Road  
Approximately 1.6 miles West of  
the Intersection with CTH T

Town of Clayton, Wisconsin

Prepared for:

Martenson & Eisele, Inc.

1377 Midway Road

Menasha, Wisconsin 54952

October 13, 2021

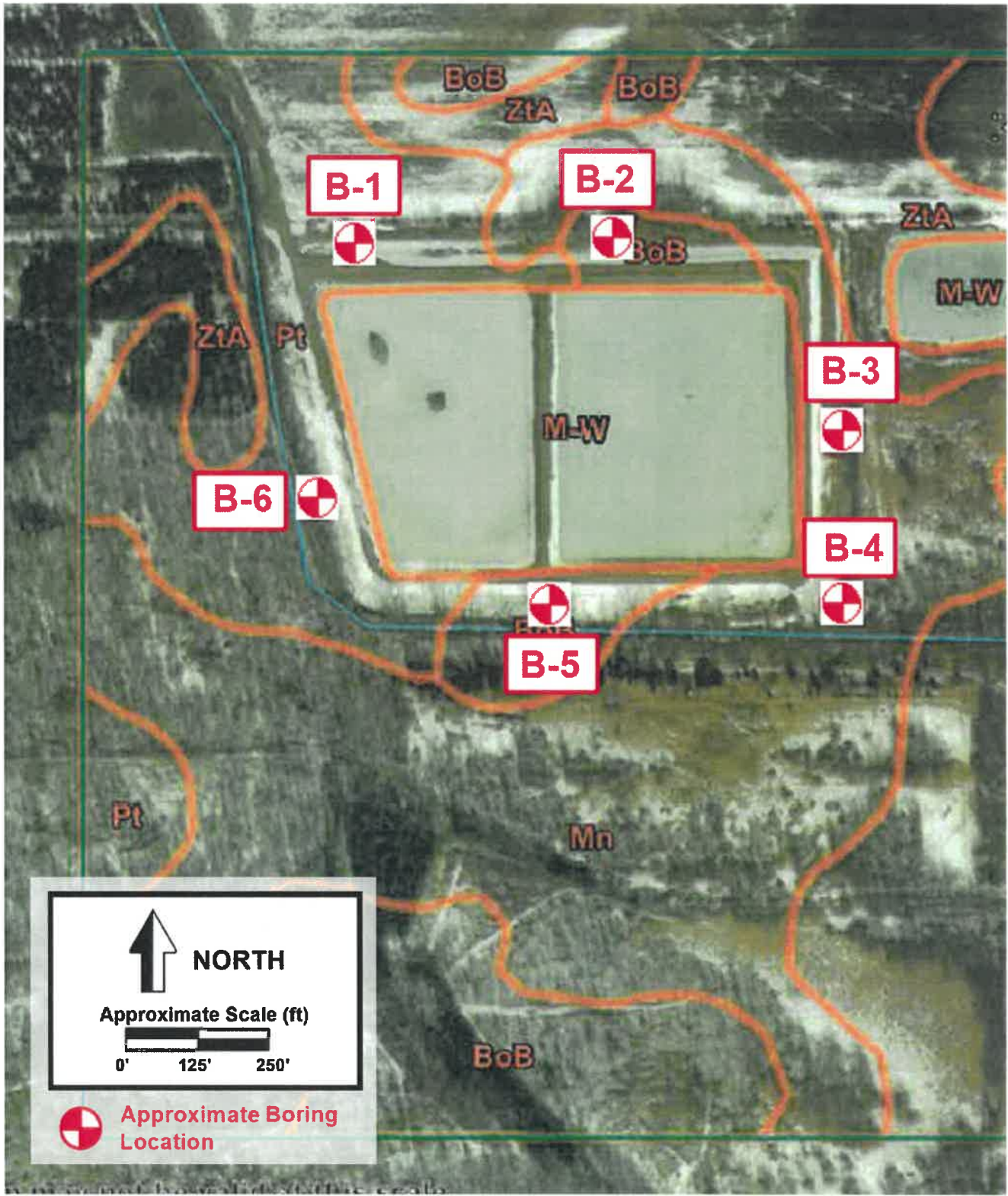
PSI Project No. 00941526







# APPENDIX

Figure 1 - Boring Location Plan  
Soil Boring Logs  
Storm Forms  
General Notes





 **NORTH**  
 Approximate Scale (ft)  
  
 0' 125' 250'  
 **Approximate Boring Location**

	Larsen Winchester Sanitary District Project South of Grandview Road Town of Clayton, Wisconsin	<b>SCALE: SHOWN ABOVE</b> <b>PROJECT NO: 00941526</b>
	<b>FIGURE 1: Boring Location Plan</b>	<b>PAGE 1 OF 1</b> <b>10/12/2021</b>



## SOIL BORING LOG: B - 1

**Project:** Larsen Winchester Sanitary District Project

**Project No.:** 941526

**Location:** South of Grandview Road  
Town of Clayton, Wisconsin

**Drill Date:** October 1, 2021  
**Drilled By:** KD/MD

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	<b>GROUND SURFACE ELEVATION: 766.0</b>						
1	765.0 0 - 18" 10YR 3/1 Very dark gray CLAY, roots (1,f), 2, sbk (TOPSOIL)	1-SS	8	2.5	-	27	
2	764.0 2.5YR 4/3 Reddish brown CLAY, 0, m(vfi), moist						
3	763.0	2-SS	12	1.5	1.2	25	
4	762.0						
5	761.0 5YR 4/2 Dark reddish brown SANDY CLAY, 1, bk - sbk, m(vfi), moist	3-SS	10	1.25	1.2	20	
6	760.0						
7	759.0 GLEYS 2 5/1 Bluish gray CLAY, 0, with 10YR 2/1 Black (c,2,p) clumps, m(vfi), damp to moist	4-SS	15	2.25	1.4	29	
8	758.0						
9	757.0 10YR 5/3 Brown fine LOAMY SAND, 0, gr, m(vfr), moist	5-SS	11	-	-	18	
10	756.0						
11	755.0 5YR 4/4 Reddish brown CLAY LOAM, 0, m(fr), moist	6-SS	18	-	-	21	
12	754.0						
13	753.0 2.5 YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, abk, m(vfi), moist <15% Rock	7-SS	10	3.5	2.5	27	
14	752.0						
15	751.0	8-SS	11	3.5	2.2	34	
16	750.0						
17	749.0	9-SS	10	2.0	1.4	16	
18	748.0						
19	747.0	10-SS	11	3.0	2.5	12	
20	746.0						
21	745.0 5YR 4/2 Dark reddish brown SANDY CLAY, 2, sbk, m(vfi), damp <30% Rock	11-SS	9	2.5	1.8	13	↓
22	744.0						
23	743.0	12-SS	12	4.5+	3.7	16	
24	742.0						
25	741.0	13-SS	13	4.0	-	15	
26	740.0						
<b>END OF BORING @ 26± FEET</b>							
<b>FIELD OBSERVATIONS:</b>			<b>ADDITIONAL COMMENTS:</b>				
Water Level during drilling: Not Encountered <span style="float: right;">↓</span> Water Level upon completion: Not Present <span style="float: right;">↓</span> Caved at upon completion: 21 ± feet below existing grade (EL. 745.0±) <span style="float: right;">↓</span> Delay Time: hr(s) <span style="float: right;">↓</span> Water Level delayed: N/A <span style="float: right;">↓</span> Caved at delayed: N/A							

**Note:** Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.



## SOIL BORING LOG: B - 2

**Project:** Larsen Winchester Sanitary District Project

**Project No.:** 941526

**Location:** South of Grandview Road  
Town of Clayton, Wisconsin

**Drill Date:** October 1, 2021  
**Drilled By:** KD/MD

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS	
	<b>GROUND SURFACE ELEVATION: 757.8</b>							
1	756.6	0 - 30" 10YR 3/1 Very dark gray CLAY, roots (1.f), 2, sbk (TOPSOIL)						
2	755.6	1-SS	8	2.0	1.3	26		
3	754.6	5YR 4/4 Reddish brown CLAY LOAM, 0, with thin 5YR 5/3 Reddish brown fine LOAMY SAND seams, m(fr), damp to moist						
4	753.6	2-SS	9	-	0.6	18		
5	752.6	2.5YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, sbk - abk, m(vfi)						
6	751.6	3-SS	9	2.5	2.7	27		
7	750.8	4-SS	6	1.25	2.1	34		
8	749.6							
9	748.6	5-SS	7	2.5	2.3	34		
10	747.6							
11	746.6	6-SS	7	2.5	2.8	37		
12	745.6							
13	744.6	7-SS	7	1.5	1.7	34		
14	743.6							
15	742.6	8-SS	6	2.0	1.2	30		
16	741.6							
17	740.6	5YR 5/3 Reddish brown SANDY CLAY LOAM, 1, cr - abk, m(efi), damp to moist <30% Rock						
18	739.6	9-SS	50/S3"	0.75	-	13		
19	738.6	10-SS	46	4.5+	-	7		
20	737.6							
21	736.6	11-SS	50/3"	-	-	6		
22	735.6							
23	734.6	12-SS	50/S2"	-	-	8		
24	733.6							
25	732.6	13-SS*	50/S1"	-	-	-		
26	731.6	END OF BORING @ 26± FEET						
<b>FIELD OBSERVATIONS:</b> Water Level during drilling: Not Encountered Water Level upon completion: Not Present Caved at upon completion: 16.5 ± feet below existing grade (EL. 741.1±) Delay Time: hr(s) Water Level delayed: N/A Caved at delayed: N/A			<b>ADDITIONAL COMMENTS:</b>  * No Sample Recovery - possible cobbles and/or boulders					

**Note:** Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.





## SOIL BORING LOG: B - 3

**Project:** Larsen Winchester Sanitary District Project

**Project No.:** 941526

**Location:** South of Grandview Road  
Town of Clayton, Wisconsin

**Drill Date:** October 4, 2021  
**Drilled By:** KD/MD

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 757.3	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS		
1 756.3	0 - 24" 10YR 3/1 Very dark gray CLAY, roots (1,f), 2, sbk (TOPSOIL)	1-SS	9	2.0	-	29			
2 755.3		7.5YR 4/3 Brown CLAY, 1, sbk - abk, m(fr), moist	2-SS	7	1.5	-	24		
3 754.3			3-SS	7	1.5	-	22		
4 753.3	2.5YR 4/2 Weak red SANDY CLAY LOAM, 0, m(vfr), moist		4-SS	5	0.25	-	24		
5 752.3		5-SS	6	0.25	-	27			
6 751.3		2.5YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, sbk - abk, m(vfi), moist	6-SS	10	1.75	1.5	31		
7 750.3	7-SS		7	1.75	1.6	37			
8 749.3	8-SS		12	1.5	1.8	35			
9 748.3	9-SS		17	2.5	2.5	34			
10 747.3	10-SS		10	2.25	1.8	31			
11 746.3	11-SS		8	1.5	0.9	26			
12 745.3	5YR 5/3 Reddish brown SANDY CLAY, 1, sbk, m(efi), damp to moist <30% Rock		12-SS	12	3.5	2.9	14		
13 744.3			13-SS	14	1.5	1.1	19		
14 743.3			END OF BORING @ 26± FEET						
15 742.3									
16 741.3									
17 740.3									
18 739.3									
19 738.3									
20 737.3									
21 736.3									
22 735.3									
23 734.3									
24 733.3									
25 732.3									
26 731.3									

<b>FIELD OBSERVATIONS:</b> Water Level during drilling: Not Encountered <span style="float: right;">↓</span> Water Level upon completion: Not Present <span style="float: right;">↓</span> Caved at upon completion: 17 ± feet below existing grade (EL. 740.3±) <span style="float: right;">↓</span> Delay Time: hr(s) Water Level delayed: N/A <span style="float: right;">✘</span> Caved at delayed: N/A	<b>ADDITIONAL COMMENTS:</b>    
---	---

**Note:** Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.



# SOIL BORING LOG: B - 4

**Project:** Larsen Winchester Sanitary District Project

**Project No.:** 941526

**Location:** South of Grandview Road  
Town of Clayton, Wisconsin

**Drill Date:** October 4, 2021  
**Drilled By:** KD/MD

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
	<b>GROUND SURFACE ELEVATION: 755.6</b>						
1	754.6	0 - 6" 10YR 3/1 Very dark gray CLAY, roots (1,f), 2, sbk (TOPSOIL)					
2	753.6	1-SS	5	0.5	-	27	
3	752.6	7.5YR 7/1 Light gray CLAY, 0, with 7.5YR 5/6 Strong brown (vm, f, d) spots, m(fi), moist					
4	751.6	2-SS	10	1.75	0.9	53	
5	750.6	10YR 4/2 Dark grayish brown SILTY CLAY, roots (1,vf), 0, m(vfr), moist					
6	749.6	3-SS	7	1.5	-	21	
7	748.6	10YR 4/2 Dark grayish brown SANDY CLAY LOAM, 0, m(vfr), moist					▼
8	747.6	4-SS	7	-	-	21	
9	746.6	5YR 4/2 Dark reddish brown CLAY, bk, m(fr), moist to wet					
10	745.6	5-SS	10	2.0	1.5	25	▼
11	744.6	6-SS	8	2.25	1.2	25	
12	743.6	5YR 4/2 Dark reddish brown CLAY, 2, bk - pt, with thin 7.5YR 5/4 Brown very fine sand seams, m(vfr), moist to very moist					
13	742.6	7-SS	8	1.25	1.2	23	
14	741.6	5YR 4/2 Dark reddish brown CLAY, bk, m(fr), moist to wet					
15	740.6	8-SS	7	0.75	1.2	23	↓
16	739.6	5YR 4/2 Dark reddish brown CLAY, bk, m(fr), moist to wet					
17	738.6	9-SS	10	3.0	2.1	25	
18	737.6	2.5YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, abk, m(vfi), moist					
19	736.6	10-SS	8	1.75	2.6	26	
20	735.6	2.5YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, abk, m(vfi), moist					
21	734.6	11-SS	10	1.5	1.6	42	
22	733.6	2.5YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, abk, m(vfi), moist					
23	732.6	12-SS	7	1.25	1.5	36	
24	731.6	2.5YR 4/4 Reddish brown and 5/3 Weak red CLAY, 2, abk, m(vfi), moist					
25	730.6	13-SS	10	2.5	2.5	33	
26	729.6	END OF BORING @ 26± FEET					
<b>FIELD OBSERVATIONS:</b>			<b>ADDITIONAL COMMENTS:</b>				
Water Level during drilling: 6 ± feet below existing grade (EL. 749.6±) ▼							
Water Level upon completion: 10 ± feet below existing grade (EL. 745.6±) ▼							
Caved at upon completion: 14.5 ± feet below existing grade (EL. 741.1±) ↓							
Delay Time: hr(s)							
Water Level delayed: N/A ▼							
Caved at delayed: N/A							

**Note:** Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.



## SOIL BORING LOG: B - 5

**Project:** Larsen Winchester Sanitary District Project

**Project No.:** 941526

**Location:** South of Grandview Road  
Town of Clayton, Wisconsin

**Drill Date:** October 4, 2021  
**Drilled By:** KD/MD

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 762.4	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS		
1	761.4	0 - 18" 10YR 3/1 Very dark gray CLAY, roots (1.f), 2, sbk (TOPSOIL)		1-SS	6	1.5	0.7	41	v v ↓
2	760.4	7.5YR 4/2 Brown SANDY CLAY LOAM, 1, cr, m(fr), moist		2-SS	10	2.0	-	19	
3	759.4								
4	758.4	7.5YR 4/2 Brown and 3/1 Very dark gray SANDY CLAY, 1, bk, m(fi), moist		3-SS	6	2.0	-	26	
5	757.4								
6	756.4	7.5YR 5/1 Gray and 5/3 Brown CLAY, 1, bk - abk, m(fr), moist		4-SS	10	1.0	0.6	20	
7	755.4								
8	754.4	7.5YR 4/2 Brown very fine LOAMY SAND, 0, sg, m(vfr), wet		5-SS	19	-	-	24	
9	753.4								
10	752.4			6-SS	21	-	-	21	
11	751.4								
12	750.4	5YR 4/3 Reddish brown CLAY, 2, sbk - abk, m(fi)		7-SS	9	1.25	1.1	25	
13	749.4								
14	748.4			8-SS	6	0.75	0.6	26	
15	747.4								
16	746.4	5YR 4/3 Reddish brown SILTY CLAY, 2, bk - pt, m(fi)		9-SS	7	1.75	1.0	24	
17	745.4								
18	744.4			10-SS	14	1.0	0.7	24	
19	743.4								
20	742.4			11-SS	8	2.25	2.1	25	
21	741.4								
22	740.4			12-SS	9	0.75	1.0	35	
23	739.4								
24	738.4			13-SS	7	1.0	1.0	37	
25	737.4								
26	736.4	END OF BORING @ 26± FEET							
<b>FIELD OBSERVATIONS:</b> Water Level during drilling: 8 ± feet below existing grade (EL. 754.4±) <span style="float: right;">v</span> Water Level upon completion: 8 ± feet below existing grade (EL. 754.4±) <span style="float: right;">v</span> Caved at upon completion: 10 ± feet below existing grade (EL. 752.4±) <span style="float: right;">↓</span> Delay Time: hr(s) Water Level delayed: N/A <span style="float: right;">*</span> Caved at delayed: N/A				<b>ADDITIONAL COMMENTS:</b>					

**Note:** Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.



## SOIL BORING LOG: B - 6

**Project:** Larsen Winchester Sanitary District Project

**Project No.:** 941526

**Location:** South of Grandview Road  
Town of Clayton, Wisconsin

**Drill Date:** October 1, 2021  
**Drilled By:** KD/MD

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 763.6	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1	762.6 0 - 12" 10YR 3/1 Very dark gray CLAY, roots (1.f), 2, sbk (TOPSOIL)	1-SS	6	-	-	29	
2	761.6 10YR 2/1 Black SANDY CLAY LOAM, 2, bk, m(fi), damp						
3	760.6	2-SS	9	-	-	31	
4	759.6						
5	758.6	3-SS	12	-	-	28	
6	757.6						
7	756.6 7.5YR 4/4 Brown and 4/6 Strong brown CLAY, 2, bk - sbk, m(fi), moist	4-SS	8	2.25	1.8	18	
8	755.6						
9	754.6	5-SS	13	2.75	-	22	
10	753.6						
11	752.6	6-SS	10	1.75	1.2	25	
12	751.6						
13	750.6 7.5YR 4/3 Brown LOAM, 0, m(vfr), wet	7-SS	11	1.0	0.2	22	↓
14	749.6						
15	748.6 2.5YR 4/2 Dark reddish brown and 5/2 Weak red CLAY, 2, sbk - pt, m(fi), moist	8-SS	11	2.0	2.5	33	↓
16	747.6						
17	746.6	9-SS	10	1.5	2.1	37	↓
18	745.6						
19	744.6	10-SS	14	1.5	1.8	35	
20	743.6						
21	742.6	11-SS	10	1.5	2.2	31	
22	741.6						
23	740.6	12-SS	5	1.25	0.8	25	
24	739.6						
25	738.6	13-SS	9	1.75	2.1	16	
26	737.6						
END OF BORING @ 26± FEET							
<b>FIELD OBSERVATIONS:</b>				<b>ADDITIONAL COMMENTS:</b>			
Water Level during drilling: 13 ± feet below existing grade (EL. 750.6±) <span style="float: right;">↓</span> Water Level upon completion: 15.5 ± feet below existing grade (EL. 748.1±) <span style="float: right;">↓</span> Caved at upon completion: 17 ± feet below existing grade (EL. 746.6±) <span style="float: right;">↓</span> Delay Time: hr(s) Water Level delayed: N/A <span style="float: right;">✘</span> Caved at delayed: N/A							

**Note:** Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual. Dashed lines are indicative of potentially erratic or unknown transitions, such as fill-to-natural soil zone transitions.

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

**Please print all information.**

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

County <b>Winnebago</b>	
Parcel I.D.	<b>006051501</b>
Reviewed by	Date

Property Owner <b>Larsen Winchester Sanitary District</b>				Property Location Govt. Lot <b>1/4 SW 1/4 S 19 T 20 N R 16 E E (or) W</b>			
Property Owner's Mailing Address <b>PO Box 85</b>				Lot #	Block #	Subd. Name or CSM#	
City <b>Larsen</b>	State <b>WI</b>	Zip Code <b>54947</b>	Phone Number <b>(920) 243 3175</b>	<input type="checkbox"/> City	<input type="checkbox"/> Village	<input checked="" type="checkbox"/> Town	Nearest Road <b>Grandview Road</b>

Drainage area _____ <input type="checkbox"/> sq. ft. <input type="checkbox"/> acres	Hydraulic Application Test Method:  <input type="checkbox"/> Morphological Evaluation <input type="checkbox"/> Double-Ring Infiltrometer <input type="checkbox"/> Other (specify) _____
Optional: Test Site Suitable for (check all that apply) <input type="checkbox"/> Irrigation <input type="checkbox"/> Bioretention trench <input type="checkbox"/> Trench(es) <input type="checkbox"/> Rain garden <input type="checkbox"/> Grassed swale <input type="checkbox"/> Reuse <input type="checkbox"/> Infiltration trench <input type="checkbox"/> SDS (> 15' wide) <input type="checkbox"/> Other _____	

**1** Obs. #  Boring  Pit      Ground surface elev. 765.96 ft.      Depth to limiting factor 72 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
	0-18"	10YR 3/1		Clay	2, sbk	m(vf)			0.07
	18-48"	2.5YR 4/3		Clay	c	m(vf)			0.07
	48-72"	5YR 4/2		Sandy clay	1, bh-sbk	m(vfr)			0.04
	72-96"	6.5Y 2.5/1	10YR 2/1 (c, z, p)	Clay	0	m(vf)			0.07
	96-132"	10YR 5/3		Loamy sand	0, yf	m(vf)			1.63
	132-144"	5YR 4/4		Clay loam	0	m(fr)			0.03
	144-200"	2.5YR 4/4		Clay	2, abk	m(vf)	<15%		0.07

**1** Obs. #  Boring  Pit      Ground surface elev. 765.96 ft.      Depth to limiting factor 72 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
	24-32"	5YR 4/2		Sandy clay	2, sbk	m(vf)		<30%	0.07

CST/PSS Name (Please Print) <b>Logan Forb</b>	Signature <i>[Signature]</i>	CST/PSS Number <b>SP-072000014</b>
Address <b>12834 30<sup>th</sup> Avenue, Suite A Chippewa Falls, WI 54729</b>	Date Evaluation Conducted <b>10/8/2021</b>	Telephone Number <b>715-732-2770</b>

2 Obs. #  Boring  
 Pit Ground surface elev. 757.55 ft. Depth to limiting factor \_\_\_\_\_ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
	0-36"	10YR 3/1		CLAY	2, sbk	m(vFi)			0.07
	30-60	5YR 4/4		CLAY	0	m(Fr)			0.03
	60-108"	2.5YR 4/4		CLAY	2, sbk	m(vFi)			0.07
	108-210"	5YR 5/3		SCL	1, cr-abk	m(vFi)			0.11

3 Obs. #  Boring  
 Pit Ground surface elev. 757.25 ft. Depth to limiting factor \_\_\_\_\_ in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
	0-24"	10YR 3/1		CLAY	2, sbk	m(vFi)			0.07
	24-72"	7.5YR 4/3		CLAY	1, sbk-abk	m(Fr)			0.07
	72-120"	2.5YR 4/2		SCL	0	m(vFi)			0.11
	120-264"	2.5YR 4/4		CLAY	2, sbk-abk	m(vFi)			0.07
	264-312"	5YR 5/3		Sandy CLAY	1, sbk	m(vFi)		50%	0.04

4 Obs. #  Boring  
 Pit Ground surface elev. 755.60 ft. Depth to limiting factor 72 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
	0-6"	10YR 3/1		CLAY	2, sbk	m(vFi)			0.07
	6"-36"	7.5YR 3/1	7.5S/6 (vm, Fi, d)	CLAY	0	m(Fi)			0.07
	36-72"	10YR 4/2		Silty CLAY	0	m(vFi)			0.07
	72-102"	10YR 4/2		SCL	0	m(vFi)			0.04
	102-144"	5YR 4/2		CLAY	2, sbk	m(Fr)			0.07
	144-192"	5YR 4/2		CLAY	2, sbk-pt	m(vFi)			0.07
	192-240"	5YR 4/2		CLAY	2, sbk	m(Fr)			0.07





# GENERAL NOTES

## SAMPLE IDENTIFICATION

- Information on each log is a compilation of subsurface conditions, based on visual soil classifications of soil samples obtained from the field as assigned by a soils engineer, as well as from laboratory testing of samples, if performed. The strata lines on the logs may be approximate or the transition between the strata may be gradual rather than distinct. Water level measurements refer only to those observed at the times and locations indicated, and may vary with time, geologic condition and construction activity.
- Unified Soil Classification System (USCS) designations are based on visual soil classification estimates on the basis of textural and particle size categorization and various soil behavior characteristics. If laboratory tests were performed to classify the soil, the USCS designation is shown in parenthesis.

## USCS SOIL PARTICLE SIZE CLASSES

U.S. Std. Sieve		#200	#40	#10	#4	3/4"	3"	12"	
Soil Type	Clay	Silt	Sand			Gravel		Cobbles	Boulders
			Fine	Medium	Coarse	Fine	Coarse		
Millimeters	0.002	0.074	0.42	2	4.8	19	76	300	

## UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487-00)

Criteria for assigning group symbols and group names using laboratory tests <sup>A</sup>				Soil Classification	
				Group Symbol	Group Name <sup>B</sup>
COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean gravels w/ < 5% fines <sup>E</sup>	$Cu \geq 4$ and $1 \leq Cc \leq 3$ <sup>C</sup>	GW	Well-graded gravel <sup>D</sup>
			$Cu < 4$ and/or $1 > Cc > 3$ <sup>C</sup>	GP	Poorly graded gravel <sup>D</sup>
		Gravels w/ > 12% fines <sup>E</sup>	Fines classify as ML or MH	GM	Silty gravel <sup>D,F,G</sup>
			Fines classify as CL or CH	GC	Clayey gravel <sup>D,F,G</sup>
	Sands (More than 50% of coarse fraction passes the No. 4 sieve)	Clean sands w/ < 5% fines <sup>I</sup>	$Cu \geq 6$ and $1 \leq Cc \leq 3$ <sup>C</sup>	SW	Well-graded sand <sup>H</sup>
			$Cu < 6$ and/or $1 > Cc > 3$ <sup>C</sup>	SP	Poorly graded sand <sup>H</sup>
		Sands w/ > 12% fines <sup>I</sup>	Fines classify as ML or MH	SM	Silty sand <sup>F,G,H</sup>
			Fines classify as CL or CH	SC	Clayey sand <sup>F,G,H</sup>
FINE-GRAINED SOILS (More than 50% passes the No. 200 sieve)	Sils and clays w/ liquid limit (LL) < 50	Inorganic	PI > 7 and plots on or above "A" line <sup>J</sup>	CL	Lean clay <sup>K,L,M</sup>
			PI < 4 and plots below "A" line <sup>J</sup>	ML	Silt <sup>K,L,M</sup>
		Organic	LL (Oven dried) / LL (Not dried) < 0.75	OL	Organic clay <sup>K,L,M,N</sup>
				OL	Organic silt <sup>K,L,M,O</sup>
	Sils and clays w/ liquid limit (LL) ≥ 50	Inorganic	PI plots on or above "A" line	CH	Fat clay <sup>K,L,M</sup>
			PI plots below "A" line	MH	Elastic silt <sup>K,L,M</sup>
		Organic	LL (Oven dried) / LL (Not dried) < 0.75	OH	Organic clay <sup>K,L,M,P</sup>
				OH	Organic silt <sup>K,L,M,Q</sup>
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor			PT	Peat

<sup>A</sup> Based on the material passing the 3-inch (75 mm) sieve

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name

<sup>C</sup>  $Cu = D_{60}/D_{10}$ ;  $Cc = (D_{30})^2 / D_{10} \times D_{60}$

<sup>D</sup> If soil contains ≥ 15% sand, add "with sand" to group name

<sup>E</sup> Gravels with 5 to 12% fines require dual symbols:

GW-GM well-graded gravel with silt  
 GW-GC well-graded gravel with clay  
 GP-GM poorly graded gravel with silt  
 GP-GC poorly graded gravel with clay

<sup>F</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM

<sup>G</sup> If fines are organic, add "with organic fines" to group name

<sup>H</sup> If soil contains ≥ 15% gravel, add "with gravel" to group name

<sup>I</sup> Sands with 5 - 12% fines require dual symbols:

SW-SM well-graded sand with silt  
 SW-SC well-graded sand with clay  
 SP-SM poorly graded sand with silt  
 SP-SC poorly graded sand with clay

<sup>J</sup> If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay

<sup>K</sup> If soil contains 15 - 29% plus No. 200, add "with sand" or "with gravel"

<sup>L</sup> If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name

<sup>M</sup> If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name

<sup>N</sup> PI ≥ 4 and plots on or above "A" line

<sup>O</sup> PI < 4 or plots below "A" line

<sup>P</sup> PI plots on or above "A" line

<sup>Q</sup> PI below "A" line

## RELATIVE SOIL COMPOSITION

Trace - 0 - 15% of sample  
 With - 15 - 35% of sample  
 Soil modifier - > 35% of sample (i.e. sandy, silty, clayey, gravelly)



## **DRILLING & SAMPLING SYMBOLS**

- |                                 |   |
|---------------------------------|---|
| AU - Auger sample from cuttings | SS - Split spoon sample (2" O.D. by 1½" I.D.) |
| BS - Bag sample                 | ST - Shelby Tube sample (2" or 3" O.D.)       |
| HA - Hand auger sample          | WS - Wash sample from wash water return       |

## **SOIL PROPERTY SYMBOLS**

- N - N-value (blow count) is the standard penetration resistance based on the total number of blows required to advance a split spoon sampler one (1) foot, using a 140 lb. hammer with a 30 inch free fall. To avoid damage to sampling tools, driving is typically limited to 50 blows during any 6 inch interval. Additional description is provided below:

<u>N-value (bpf)</u>	<u>Description</u>
HW	Sampler penetrated soil under weight of hammer and rods; no driving required
25	25 blows to advance sampler 12 inches after initial 6 inches of seating
75/10"	75 blows to advance sampler 10 inches after initial 6 inches of seating
50/S3"	50 blows to advance sampler 3 inches during initial 6 inch seating interval

MC - Moisture content, %	LL - Liquid limit, % (ASTM D4318)
Qu - Unconfined compressive strength, tons per square foot (tsf)	PL - Plastic limit, % (ASTM D4318)
Qp - Calibrated hand penetrometer resistance, tsf	PI - Plasticity index, % (ASTM D4318)
γ <sub>d</sub> - Dry density, pounds per cubic foot (pcf)	%P200 - Percent of sample passing the No. 200 sieve

RQD - Rock quality designation of NX-size core sample  
RMR - Rock mass rating, as developed by Z.T. Bieniawski  
PID - Photoionization detector (Hnu meter) volatile vapor level, ppm

## **SOIL RELATIVE DENSITY & CONSISTENCY CLASSIFICATION**

NON-COHESIVE SOILS		COHESIVE SOILS		
Density	N-Value Range	Consistency	Qu Range (tsf)	Approximate N-value Range
Very loose	0 - 3	Very soft	0 - 0.25	0 - 2
Loose	3 - 7	Soft	0.25 - 0.5	2 - 5
Medium dense	7 - 15	Medium stiff	0.5 - 1.0	5 - 10
Dense	15 - 38	Stiff	1.0 - 2.0	10 - 14
Very dense	38+	Very Stiff	2.0 - 4.0	14 - 32
		Hard	4.0+	32+

## **SOIL STRUCTURE TERMINOLOGY**

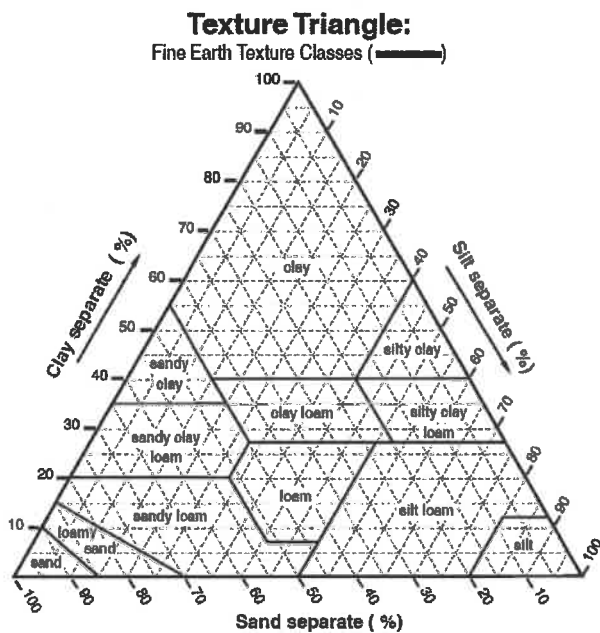
- |   |   |
|---|---|
| Interlayered - Alternating layers of different soil types | Intermixed - Pockets of different soil types, no layering       |
| Layer - Inclusion greater than 3 inches thick             | Pocket - Inclusion of material of different texture             |
| Seam - Inclusion ½ to 3 inches thick                      | Varved - Alternating layers or seams of sand, silt, and/or clay |
| Laminated - Alternating seams of different soil type      |   |

## **GROUNDWATER & MOISTURE CONDITIONS**

- |  |  |
|--|--|
| √ - Approximate groundwater level as noted during drilling and sampling            | Dry - Absence of moisture, dry to the touch                    |
| ▽ - Groundwater level as noted within the open borehole upon removal of the augers | Moist - Damp, but no visible water                             |
| ⌘ - Delayed groundwater level within open borehole                                 | Wet - Visible free water, saturated, usually below water table |

NOTE: General Notes have been adapted from and incorporate portions of ASTM D2487 "Classification of Soils for Engineering Purposes (Unified Soil Classification System)" and ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)."

# USDA SOIL CLASSIFICATION SYSTEM\*



**NOTE:** Soil Texture encompasses only the fine earth fraction ( $\leq 2$  mm). Particle Size Distribution (PSD) encompasses the whole soil, including both the fine earth fraction ( $\leq 2$  mm; weight %) and rock fragments ( $> 2$  mm; volume %).

## TEXTURE CLASS

Texture Class or Subclass	Code	
	Conv.	NASIS
Coarse Sand	cos	COS
Sand	s	S
Fine Sand	fs	FS
Very Fine Sand	vfs	VFS
Loamy Coarse Sand	loco	LOOS
Loamy Sand	ls	LS
Loamy Fine Sand	lfs	LFS
Loamy Very Fine Sand	lvfs	LVFS
Coarse Sandy Loam	cosl	COSL
Sandy Loam	sl	SL
Fine Sandy Loam	fsl	FSL
Very Fine Sandy Loam	vfsl	VFSL
Loam	l	L
Silt Loam	sil	SIL
Silt	sl	SI
Sandy Clay Loam	scl	SCL
Clay Loam	cl	CL
Silty Clay Loam	sicl	SICL
Sandy Clay	sc	SC
Silty Clay	sic	SIC
Clay	c	C

**TEXTURE MODIFIERS** - Conventions for using "Rock Fragment Texture Modifiers" and for using textural adjectives that convey the "% volume" ranges for Rock Fragments - Size and Quantity.

Fragment Content % By Volume	Rock Fragment Modifier Usage
< 15	No texture adjective is used (noun only; e.g., loam).
15 to < 35	Use adjective for appropriate size; e.g., gravelly.
35 to < 60	Use "very" with the appropriate size adjective; e.g., very gravelly.
60 to < 90	Use "extremely" with the appropriate size adjective; e.g., extremely gravelly.
$\geq 90$	No adjective or modifier. If $\leq 10\%$ fine earth, use the appropriate noun for the dominant size class; e.g., gravel. Use Terms in Lieu of Texture.

## TEXTURE MODIFIERS - (adjectives)

ROCK FRAGMENTS: Size & Quantity <sup>1</sup>	Code		Criteria: Percent (By Volume) of Total Rock Fragments and Dominated By (name size): <sup>1</sup>
	Conv.	PDP/ NASIS	
<b>ROCK FRAGMENTS (<math>&gt; 2</math> mm; <math>\geq</math> Strongly Cemented)</b>			
Gravelly	GR	GR	$\geq 15\%$ but < 35% gravel
Fine Gravelly	FGR	GRF	$\geq 15\%$ but < 35% fine gravel
Medium Gravelly	MGR	GRM	$\geq 15\%$ but < 35% med. gravel
Coarse Gravelly	CGR	GRC	$\geq 15\%$ but < 35% coarse gravel
Very Gravelly	VGR	GRV	$\geq 35\%$ but < 60% gravel
Extremely Gravelly	XGR	GRX	$\geq 60\%$ but < 90% gravel
Cobbly	CB	CB	$\geq 15\%$ but < 35% cobbles
Very Cobbly	VCB	CBV	$\geq 35\%$ but < 60% cobbles
Extremely Cobbly	XCB	CBX	$\geq 60\%$ but < 90% cobbles
Stony	ST	ST	$\geq 15\%$ but < 35% stones
Very Stony	VST	STV	$\geq 35\%$ but < 60% stones
Extremely Stony	XST	STX	$\geq 60\%$ but < 90% stones
Bouldery	BY	BY	$\geq 15\%$ but < 35% boulders
Very Bouldery	VBY	BYV	$\geq 35\%$ but < 60% boulders
Extremely Bouldery	XBY	BYX	$\geq 60\%$ but < 90% boulders
Channery	CN	CN	$\geq 15\%$ but < 35% channers
Very Channery	VCN	CNV	$\geq 35\%$ but < 60% channers
Extremely Channery	XCN	CNX	$\geq 60\%$ but < 90% channers
Flaggy	FL	FL	$\geq 15\%$ but < 35% flagstones
Very Flaggy	VFL	FLV	$\geq 35\%$ but < 60% flagstones
Extremely Flaggy	XFL	FLX	$\geq 60\%$ but < 90% flagstones

\* As outlined in the NRCS Field Book for Describing and Sampling Soils, Version 2.0 (2002).

# **APPENDIX I**

## **Cost Estimate Spreadsheets**

**Larsen Winchester Sanitary District Facility Planning  
Cost Effective Analysis  
Capital Cost Estimate**

**Alternative No. 1**

**Regionalization with Fox West WWTP**

<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total Cost</b>
New Angoli Way Lift Station	LS	1	\$350,000	\$350,000
Gas to Angoli LS Site	LS	1	\$18,000	\$18,000
6-inch Forcemain, Angoli LS to Steeple Hill	LF	5,100	\$45	\$229,500
Improvements to Winchester LS#1	LS	1	\$150,000	\$150,000
6-inch Forcemain, Winchester LS#1 to East of Hickory Ave.	LF	5,200	\$40	\$208,000
8" Gravity Sewer, East of Hickory Ave. to Wiouwash LS	LF	2,800	\$50	\$140,000
Improvements to Larsen LS#5	LS	1	\$100,000	\$100,000
4-inch Forcemain, Larsen LS#5 to Wiouwash LS	LF	4,100	\$35	\$143,500
New Wiouwash Lift Station	LS	1	\$500,000	\$500,000
Electric and Gas to Wiouwash LS Site	LS	1	\$210,500	\$210,500
10-inch Forcemain to STH 76	LF	20,100	\$50	\$1,005,000
12" Gravity Sewer, STH 76 to KC	LF	8,200	\$58	\$475,600
Boring Under Highways	LF	600	\$600	\$360,000
Surface Restoration	SY	60,667	\$3.0	\$182,000
Erosion Control	LS	1	\$75,000	\$75,000
Mobilization and Traffic Control	LS	1	\$125,000	\$125,000
Metering Station	LS	1	\$200,000	\$200,000
Sludge Removal from Lagoon System	Gallons	3,433,320	\$0.04	\$137,333
Fox West WWTP Joinder Fee	LS	1	\$700,000	\$700,000
Village Fox Crossing Intermunicipal Agreement	LS	1	\$1,000,000	\$1,000,000
<b>Subtotal</b>				<b>\$6,309,433</b>
Contingencies 20%				\$1,261,887
<b>Subtotal</b>				<b>\$7,571,319</b>
Engineering, Legal and Funding Administration 15%				\$1,135,698
<b>TOTAL</b>				<b>\$8,707,017</b>

**Larsen Winchester Sanitary District Facility Planning**

**Cost Effective Analysis**

**Capital Cost Estimate**

**Alternative No. 2**

**Mechanical WWTP**

<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total Cost</b>
New Angoli Way Lift Station	LS	1	\$350,000	\$350,000
Gas to Angoli LS Site	LS	1	\$18,000	\$18,000
6-inch Forcemain, Angoli LS to Steeple Hill	LF	5,100	\$45	\$229,500
Improvements to Winchester LS#1	LS	1	\$125,000	\$125,000
Electric and Gas to WWTP Site	LS	1	\$225,000	\$225,000
Sludge Removal	Gallons	3,433,320	\$0.04	\$137,333
Site Work	LS	1	\$805,000	\$805,000
Orbal Oxidation Ditch	LS	1	\$507,800	\$507,800
Clarifier	LS	1	\$504,500	\$504,500
Sludge Holding Tank	LS	1	\$208,300	\$208,300
Sludge Storage Tank	LS	1	\$238,300	\$238,300
Control Building	LS	1	\$650,000	\$650,000
UV Disinfection Channel	LS	1	\$135,000	\$135,000
Generator	LS	1	\$70,000	\$70,000
Electrical, Controls, Flow Metering	LS	1	\$794,000	\$794,000
Mobilization, Traffic Control	LS	1	\$75,000	\$75,000
Phosphorus Improvements to Ponds w Pumping & Bldg	LS	1	\$1,000,000	\$1,000,000
<b>Subtotal</b>				<b>\$6,072,733</b>
Contingencies 20%				\$1,214,547
<b>Subtotal</b>				<b>\$7,287,279</b>
Engineering, Legal and Funding Administration 15%				\$1,093,092
<b>TOTAL</b>				<b>\$8,380,371</b>

**Larsen Winchester Sanitary District Facility Planning  
Cost Effective Analysis  
Capital Cost Estimate**

**Alternative No. 3**

**LemTec System**

<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total Cost</b>
New Angoli Way Lift Station	LS	1	\$350,000	\$350,000
Gas to Angoli LS Site	LS	1	\$18,000	\$18,000
6-inch Forcemain, Angoli LS to Steeple Hill	LF	5,100	\$45	\$229,500
Improvements to Winchester LS#1	LS	1	\$125,000	\$125,000
Electric and Gas to WWTP Site	LS	1	\$225,000	\$225,000
Sludge Removal	Gallons	3,433,320	\$0.04	\$137,333
Building for Blowers and Chemical Feed	LS	1	\$250,000	\$250,000
Chemical Feed Tank and Accessories	LS	1	\$60,000	\$60,000
Pond Excavation	CY	35,000	\$10	\$350,000
LemTec Components	LS	1	\$500,000	\$500,000
Concrete LPR Structure	CY	60	\$700	\$42,000
Installation of TemTec Components	LS	1	\$100,000	\$100,000
Phosphorus Improvements to Ponds w Pumping & Bldg	LS	1	\$1,100,000	\$1,100,000
Piping and Structure Improvements	LS	1	\$150,000	\$150,000
Sitework and Gravel	LS	1	\$50,000	\$50,000
Electrical, Controls, Flow Metering	LS	1	\$250,000	\$250,000
UV Disinfection Channel	LS	1	\$135,000	\$135,000
Generator	LS	1	\$70,000	\$70,000
Surface Restoration	LS	1	\$125,000	\$125,000
Erosion Control	LS	1	\$60,000	\$60,000
Mobilization and Traffic Control	LS	1	\$75,000	\$75,000
<b>Subtotal</b>				<b>\$4,401,833</b>
Contingencies 20%				\$880,367
<b>Subtotal</b>				<b>\$5,282,199</b>
Engineering, Legal and Funding Administration 15%				\$792,330
<b>TOTAL</b>				<b>\$6,074,529</b>

**Larsen Winchester Sanitary District Facility Planning  
Cost Effective Analysis  
Capital Cost Estimate**

**Alternative No. 4**

**Modify Existing Wastewater Lagoon System**

<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total Cost</b>
New Angoli Way Lift Station	LS	1	\$350,000	\$350,000
Gas to Angoli LS Site	LS	1	\$18,000	\$18,000
6-inch Forcemain, Angoli LS to Steeple Hill	LF	5,100	\$45	\$229,500
Improvements to Winchester LS#1	LS	1	\$125,000	\$125,000
Electric and Gas to WWTP Site	LS	1	\$225,000	\$225,000
Sludge Removal	Gallons	3,433,320	\$0.04	\$137,333
Building for Blowers and Chemical Feed	LS	1	\$250,000	\$250,000
Chemical Feed Tank, Pumps and Accessories	LS	1	\$80,000	\$80,000
Pond Excavation	CY	20,000	\$10	\$200,000
Baffle	LS	1	\$25,000	\$25,000
Aeration Improvements	LS	1	\$400,000	\$400,000
Ammonia Improvements to Ponds	LS	1	\$500,000	\$500,000
Phosphorus Improvements to Ponds w Pumping & Bldg	LS	1	\$1,100,000	\$1,100,000
Piping and Structure Improvements	LS	1	\$160,000	\$160,000
Sitework and Gravel	LS	1	\$30,000	\$30,000
Electrical, Controls, Flow Metering	LS	1	\$250,000	\$250,000
UV Disinfection Channel	LS	1	\$135,000	\$135,000
Generator	LS	1	\$70,000	\$70,000
Surface Restoration	LS	1	\$30,000	\$30,000
Erosion Control	LS	1	\$25,000	\$25,000
Mobilization and Traffic Control	LS	1	\$75,000	\$75,000
<b>Subtotal</b>				<b>\$4,414,833</b>
Contingencies 20%				\$882,967
<b>Subtotal</b>				<b>\$5,297,799</b>
Engineering, Legal and Funding Administration 15%				\$794,670
<b>TOTAL</b>				<b>\$6,092,469</b>

Larsen Winchester Sanitary District Facility Planning Cost Effective Analysis Annual Operation and Maintenance Costs	
Alternative No. 1	
Regionalization with Fox West WWTP	
Annual Operation and Maintenance Costs	
Salaries and Billing	\$60,000
Utilities	\$23,000
Maintenance and Testing	\$75,000
Office Expenses and Fees	\$2,500
Insurance	\$9,500
Engineering, Legal and Accounting	\$20,000
Larsen Drainage District Tax	\$2,000
Village Fox Crossing Conveyance Fees \$0.46 per 1000 gal	\$20,000
Fox West WWTP Treatment Costs 1.3% of O&M	\$45,000
<b>Total Annual O&amp;M Costs</b>	<b>\$257,000</b>

Larsen Winchester Sanitary District Facility Planning Cost Effective Analysis Annual Operation and Maintenance Costs	
Alternative No. 2	
Mechanical WWTP	
Annual Operation and Maintenance Costs	
Salaries and Billing	\$100,000
Utilities	\$28,000
Maintenance and Testing	\$85,000
Office Expenses and Fees	\$2,500
Insurance	\$12,000
Engineering, Legal and Accounting	\$20,000
Larsen Drainage District Tax	\$2,000
Sludge Handling	\$4,000
Chemicals	\$5,000
<b>Total Annual O&amp;M Costs</b>	<b>\$258,500</b>

Larsen Winchester Sanitary District Facility Planning Cost Effective Analysis Annual Operation and Maintenance Costs	
Alternative No. 3	
LemTec System - Scenario 1	
Annual Operation and Maintenance Costs	
Salaries and Billing	\$65,000
Utilities	\$34,000
Maintenance and Testing	\$75,000
Office Expenses and Fees	\$2,500
Insurance	\$10,000
Engineering, Legal and Accounting	\$20,000
Larsen Drainage District Tax	\$2,000
Sludge Handling	\$2,500
Chemicals	\$5,000
<b>Total Annual O&amp;M Costs</b>	<b>\$216,000</b>

Larsen Winchester Sanitary District Facility Planning Cost Effective Analysis Annual Operation and Maintenance Costs	
Alternative No. 4	
Modify Existing Wastewater Lagoon System	
Annual Operation and Maintenance Costs	
Salaries and Billing	\$65,000
Utilities	\$37,000
Maintenance and Testing	\$75,000
Office Expenses and Fees	\$2,500
Insurance	\$10,000
Engineering, Legal and Accounting	\$20,000
Larsen Drainage District Tax	\$2,000
Sludge Handling	\$2,000
Chemicals	\$5,000
<b>Total Annual O&amp;M Costs</b>	<b>\$218,500</b>



Larsen Winchester Sanitary District Facility Planning				
Cost Effective Analysis				
Equivalent Annual Cost				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Regionalization	Mechanical Plant	LemTech	Pond Modifications
Capital Cost	\$8,707,017	\$8,380,371	\$6,074,529	\$6,092,469
Equivalent Annual Cost	\$592,077	\$569,865	\$413,068	\$414,288
OM&R Cost	\$257,000	\$258,500	\$216,000	\$218,500
<b>Total Annual Cost</b>	<b>\$849,077</b>	<b>\$828,365</b>	<b>\$629,068</b>	<b>\$632,788</b>

(A/P, i%, n) Factor, i=3.125, n=20 years

0.068

Larsen Winchester Sanitary District Facility Planning				
Cost Effective Analysis				
Equivalent Annual Cost				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Regionalization	Mechanical Plant	LemTech	Pond Modifications
Capital Cost	\$2,000,000 plus 15% PF \$5,400,965	15% PF \$7,123,316	15% PF \$5,163,350	15% PF \$5,178,599
Equivalent Annual Cost	\$314,336	\$414,577	\$300,507	\$301,394
OM&R Cost	\$257,000	\$258,500	\$216,000	\$218,500
<b>Total Annual Cost</b>	<b>\$571,336</b>	<b>\$673,077</b>	<b>\$516,507</b>	<b>\$519,894</b>

(A/P, i%, n) Factor, i=1.5, n=20 years

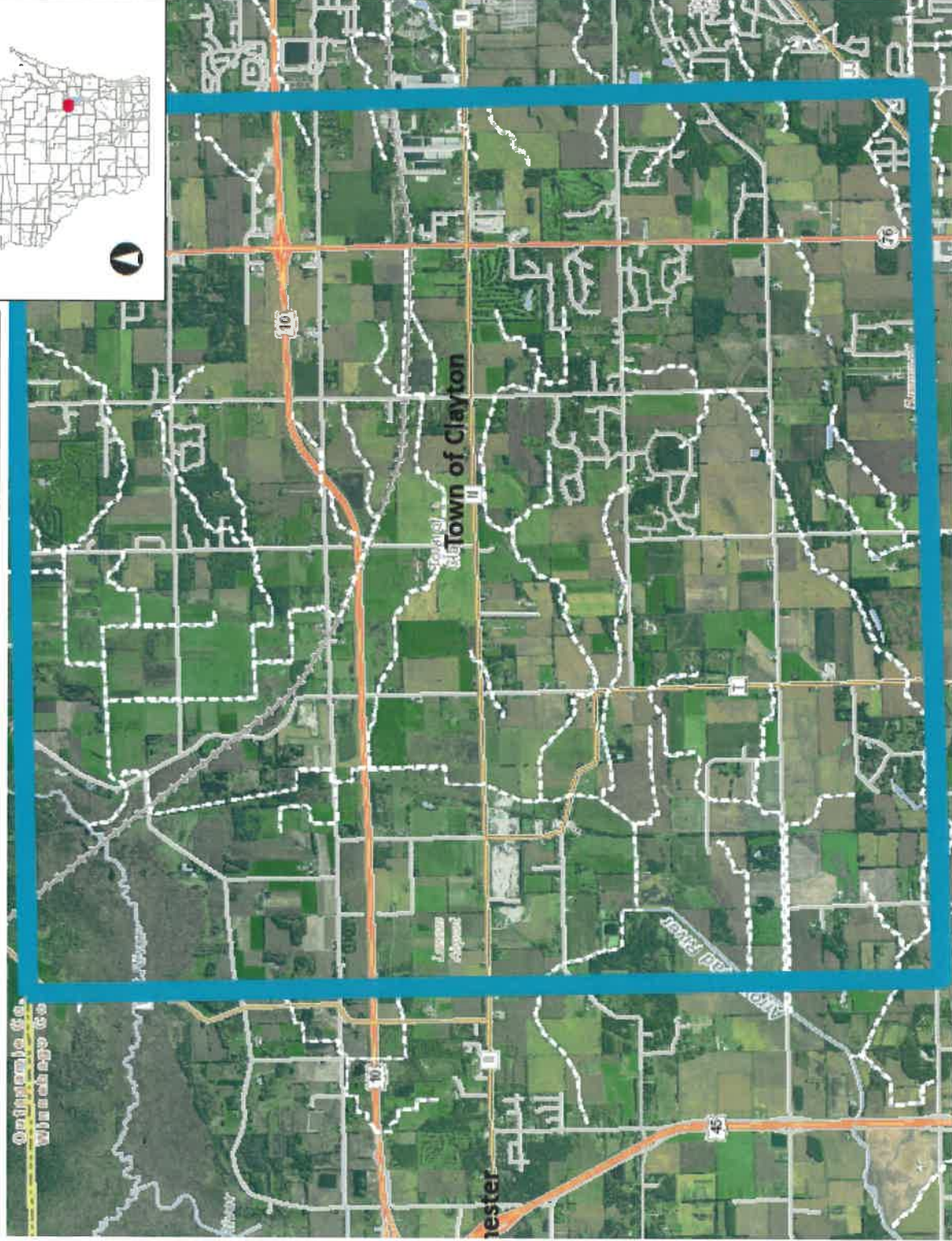
0.0582

## **APPENDIX J**

### **Mapping for Environmental Considerations**



# Surface Water Town of Clayton



## Legend

- 2D Water Surface Elevation Grid
  - High : 937.629
  - Low : 853.184
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

## Notes

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2.0 1.00 0 2.0 Miles

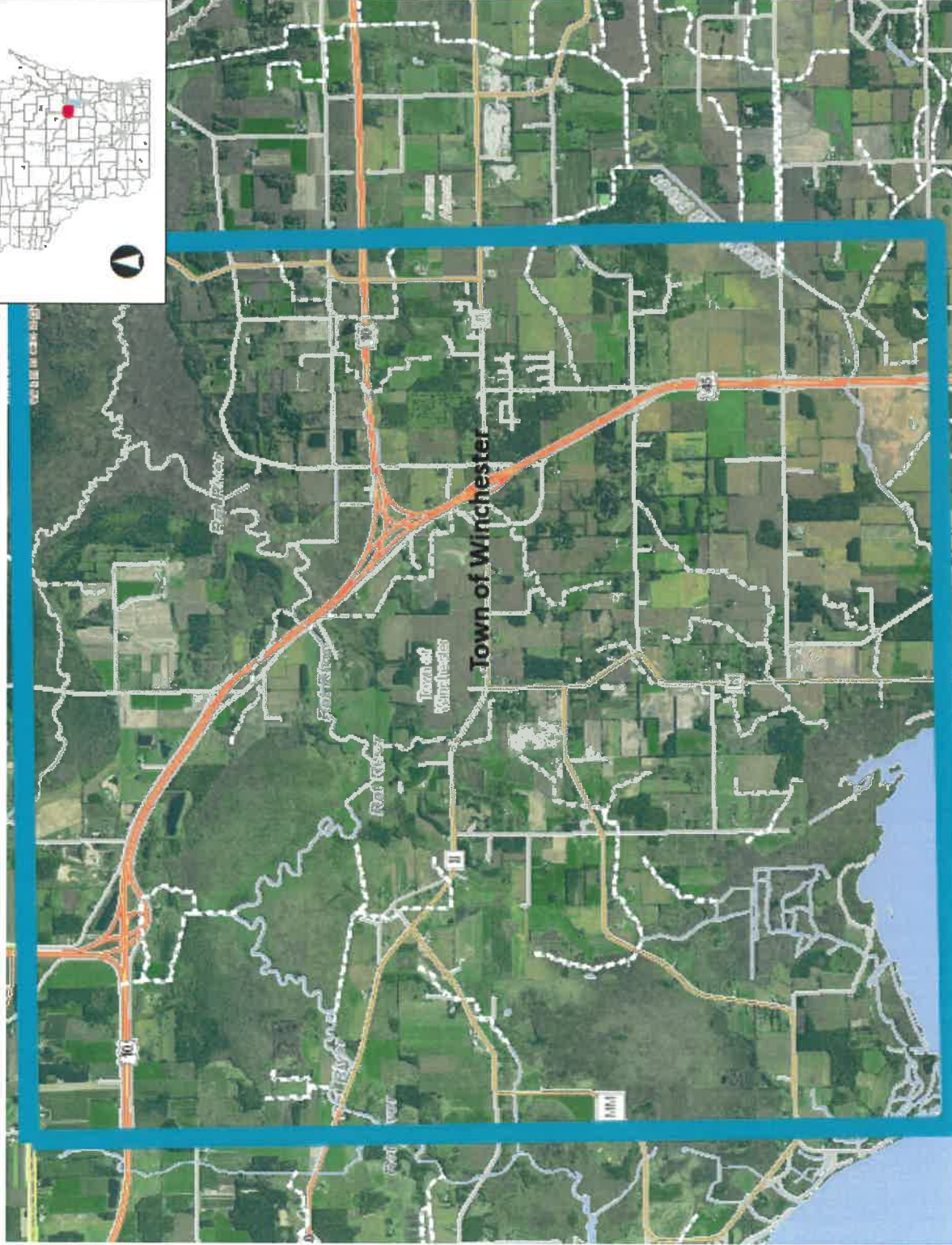
1: 63,360

NAD\_1983\_HARN\_Wisconsin\_TM





# Surface Water Town of Winchester



## Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water



## Notes

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2.0 Miles

1.00

0

2.0

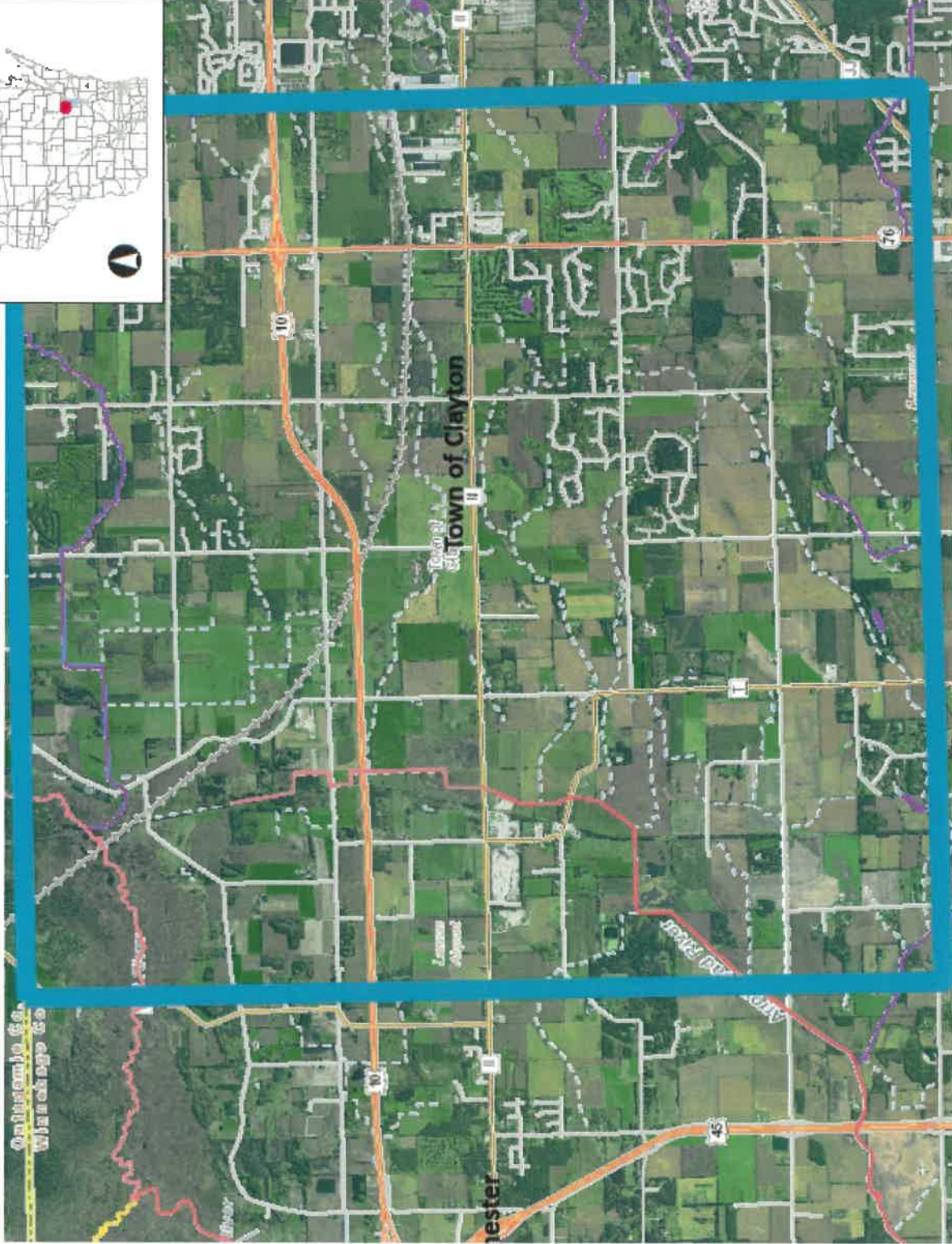
1: 63,360

NAD\_1983\_HARN\_Wisconsin\_TM





# Clean Water Designations Town of Clayton



## Legend

### WADRS FAL Designated Use Lines

- Other, unknown or not assessed
- Cold
- FAL Coldwater
- Default FAL
- FAL Warmwater
- WWSF
- WWFF
- LFF
- LAL
- FAL

### WADRS FAL Designated Use Areas

- Other, unknown or not assessed
- Cold
- FAL Coldwater
- Default FAL
- FAL Warmwater
- WWSF
- WWFF
- LFF
- LAL
- FAL

### Outstanding and Exceptional Streams

- Exceptional
- Outstanding

### Outstanding and Exceptional Lakes

- Exceptional
- Outstanding

### Municipality

### State Boundaries

### County Boundaries

## Notes

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2.0 Miles

1.00

0

2.0

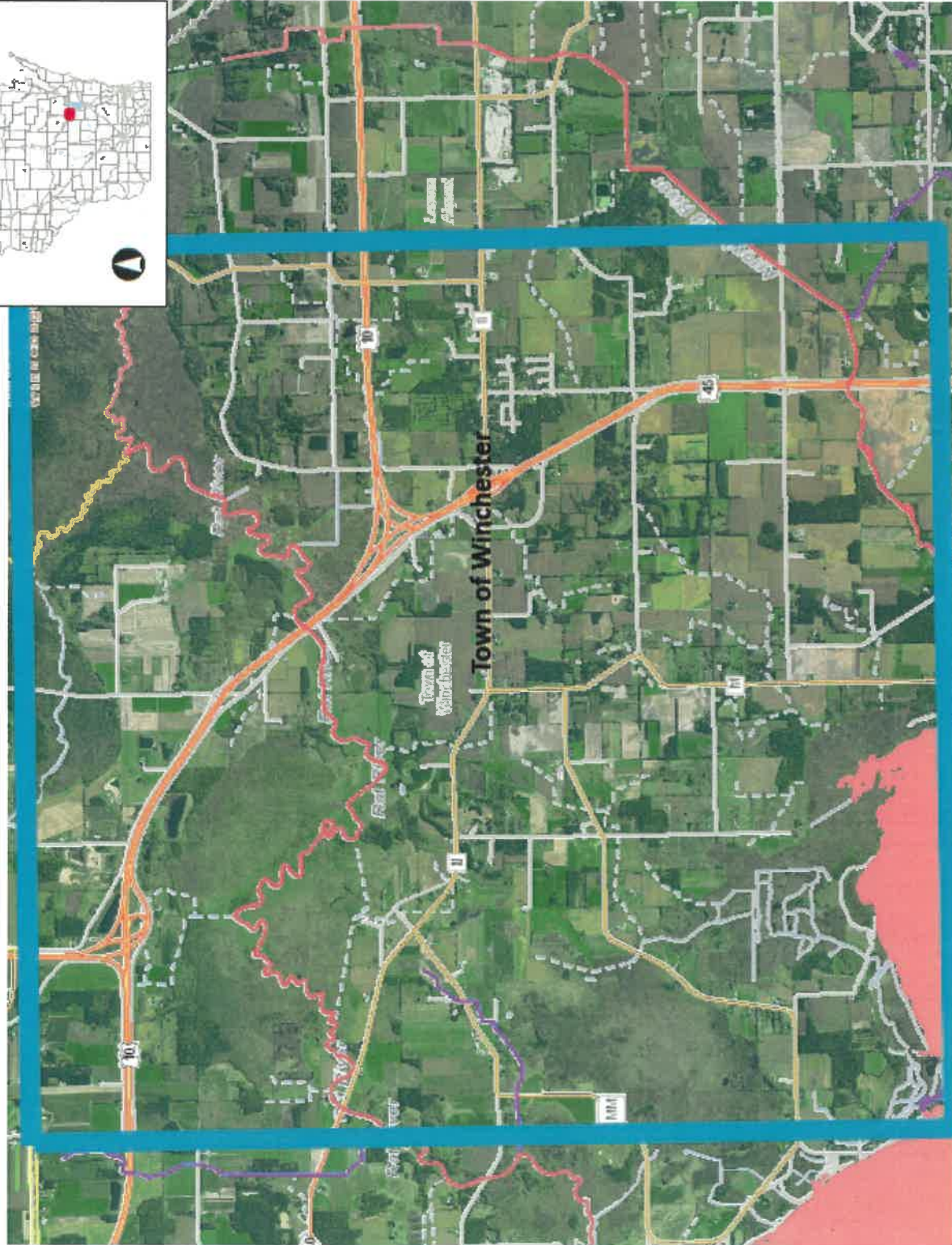
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# Clean Water Act Designations Winchester



## Legend

- 2D Water Surface Elevation Grid**
  - High : 937.629
  - Low : 853.184
- WADRS FAL Designated Use Lines**
  - Other, unknown or not assessed
  - Cold
  - FAL Coldwater
  - Default FAL
  - FAL Warmwater
  - WWSF
  - WWFF
  - LFF
  - LAL
  - FAL
- WADRS FAL Designated Use Areas**
  - Other, unknown or not assessed
  - Cold
  - FAL Coldwater
  - Default FAL
  - FAL Warmwater
  - WWSF
  - WWFF
  - LFF
  - LAL
  - FAL
- Outstanding and Exceptional Streams**
  - Exceptional
  - Outstanding
- Outstanding and Exceptional Lakes**
  - Exceptional

## Notes

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2.0 0 1.00 2.0 Miles

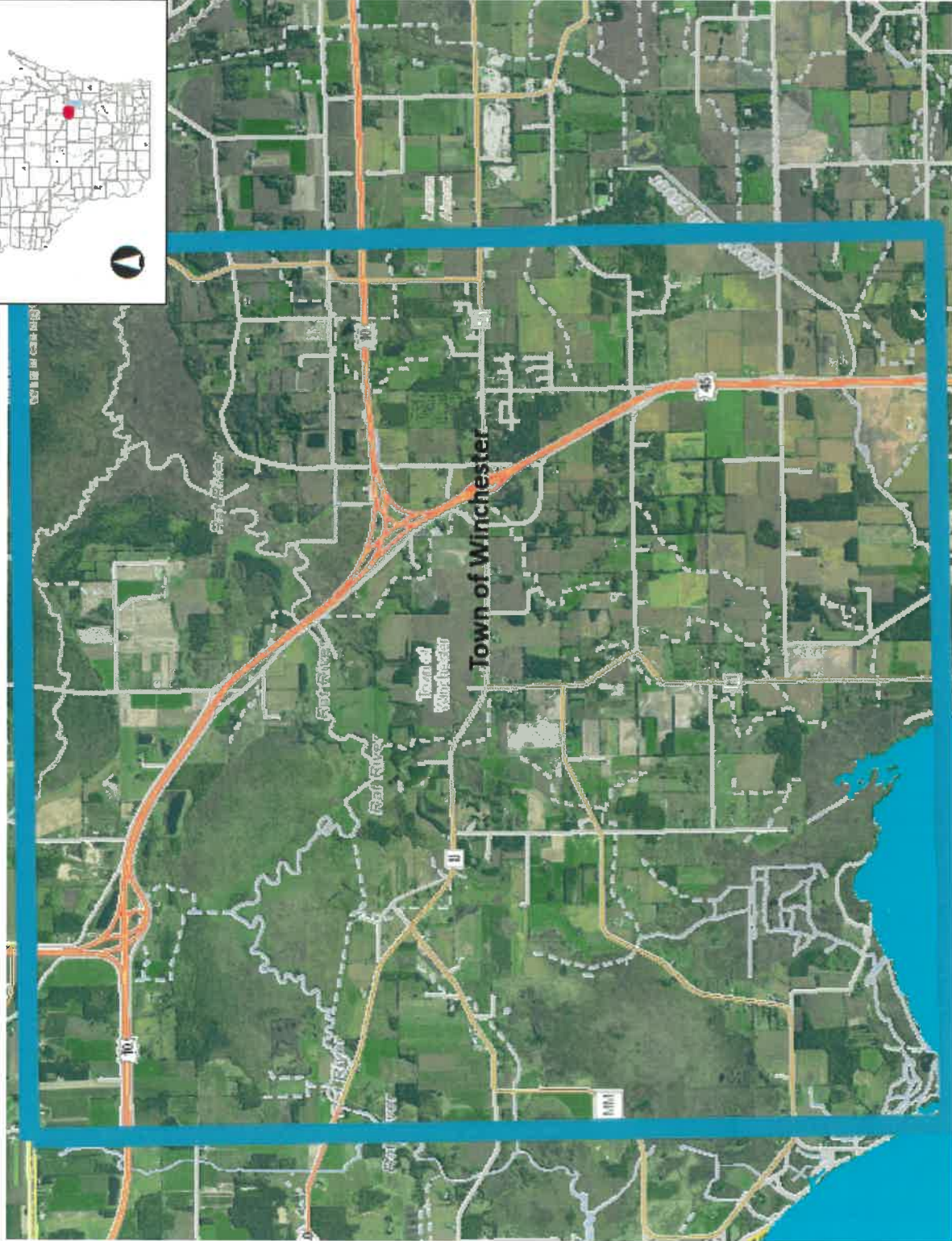
1: 63,360

NAD\_1983\_HARN\_Wisconsin\_TM





# Fisheries Management T. Winchester



## Legend

2D Water Surface Elevation Grid

- High : 837.629
- Low : 853.184

### Musky Streams

- Natural Reproduction (Cat 1)
- Natural Reproduction Plus Stocking (Cat 2)
- Reproduction Unknown, Stocking Occurs (Cat 0)

### Musky Areas

- Natural Reproduction (Cat 1)
- Natural Reproduction Plus Stocking (Cat 2)
- Reproduction Unknown, Stocking Occurs (Cat 0)

### Sturgeon Streams

- Sturgeon Areas

### Smallmouth Bass Streams

- Non-Wadable Coarse Substrate
- Non-Wadable Fine Substrate
- Wadable Cool Water
- Wadable Nursery Waters
- Wadable Warm Water

### Walleye Waters

- Natural Reproduction Only
- Natural Reproduction and Stocking Equal
- Stocking Plus Natural Reproduction

### Trout Stream Lines

- Class 1
- Class 2
- Class 3

### Trout Spring Ponds

- Class 1
- Class 2

## Notes

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2.0 Miles

1.00

0

2.0

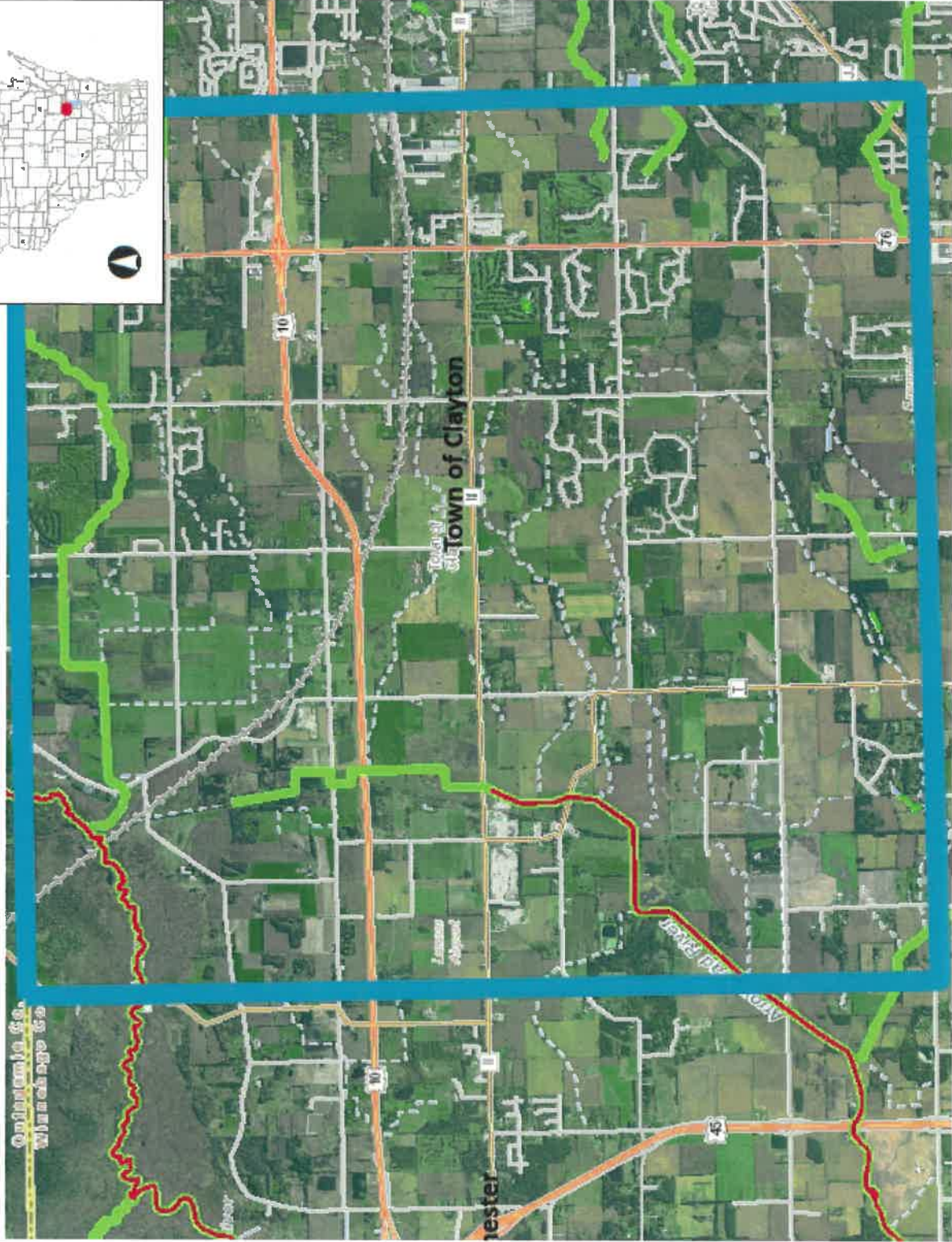
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# Impaired Waterways Town of Clayton



## Legend

- Impaired Rivers and Streams
- Impaired Lakes
- Stream Assessments
- Lake Assessments
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

## Notes

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2.0 Miles

1.00

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2.0

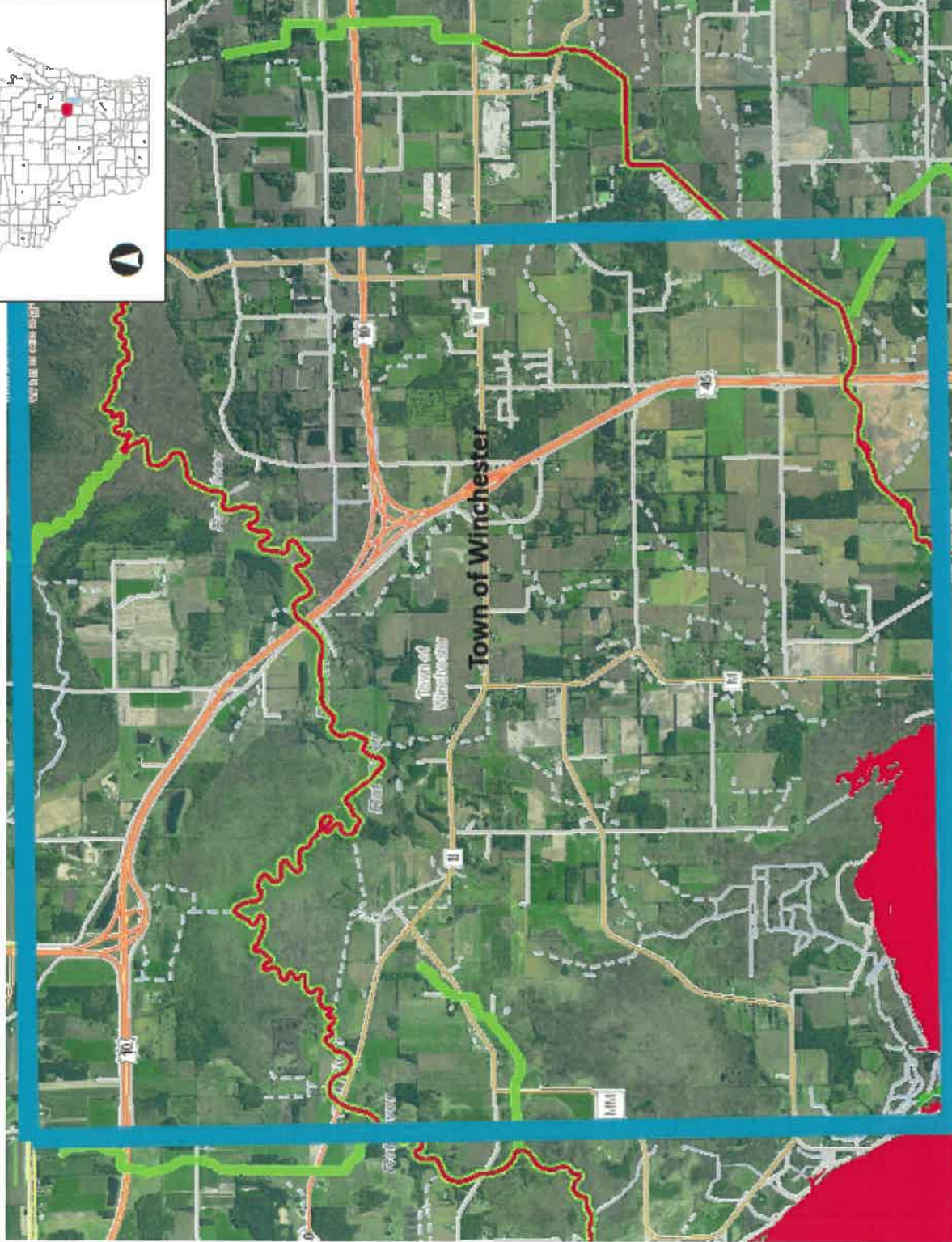
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# Impaired Waterways Winchester



## Legend

- 2D Water Surface Elevation Grid
  - High : 937.629
  - Low : 853.184
- Impaired Rivers and Streams
- Impaired Lakes
- Stream Assessments
- Lake Assessments
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water



## Notes

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2.0 Miles

1.00

0

2.0

NAD\_1983\_HARN\_Wisconsin\_TM

1 : 63,360





# Surface Water LWSD WWTP Site



## Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

## Notes

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0.3 Miles

0 0.13

0

0.3

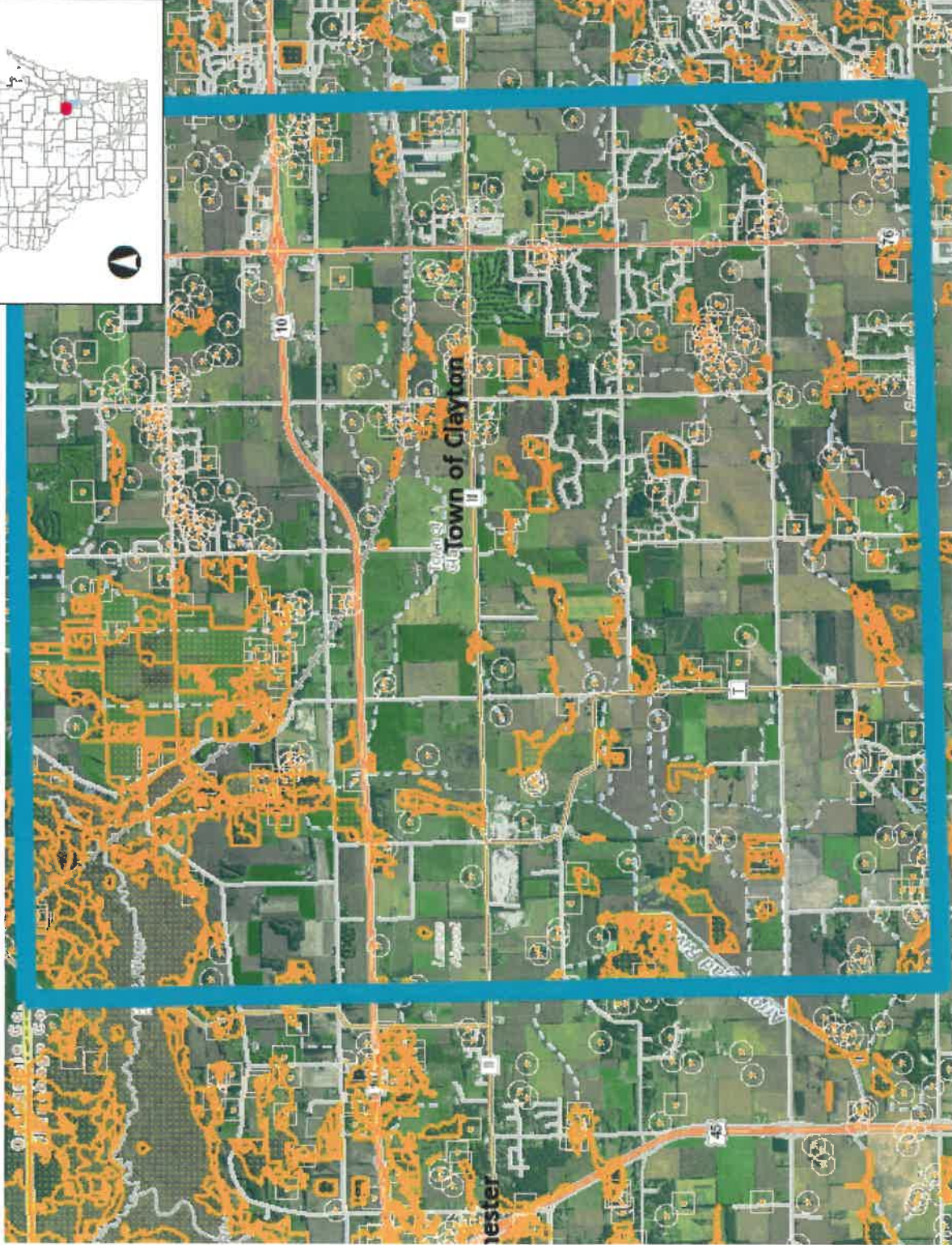
1: 7,920

NAD\_1983\_HARN\_Wisconsin\_TM





# Mapped Wetlands Town of Clayton



## Legend

- Wetland Class Points**
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/draind wetland
  - Wetland too small to delineate
- Filled Points**
- Wetland Class Areas**
  - Wetland
  - Upland
- Filled Areas**
- Municipality**
- State Boundaries**
- County Boundaries**
- Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads**
  - County HWY
  - Local Road
- Railroads**
- Tribal Lands**
- Rivers and Streams**
- Intermittent Streams**
- Lakes and Open water**

## Notes

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2.0 Miles

0 1.00

2.0

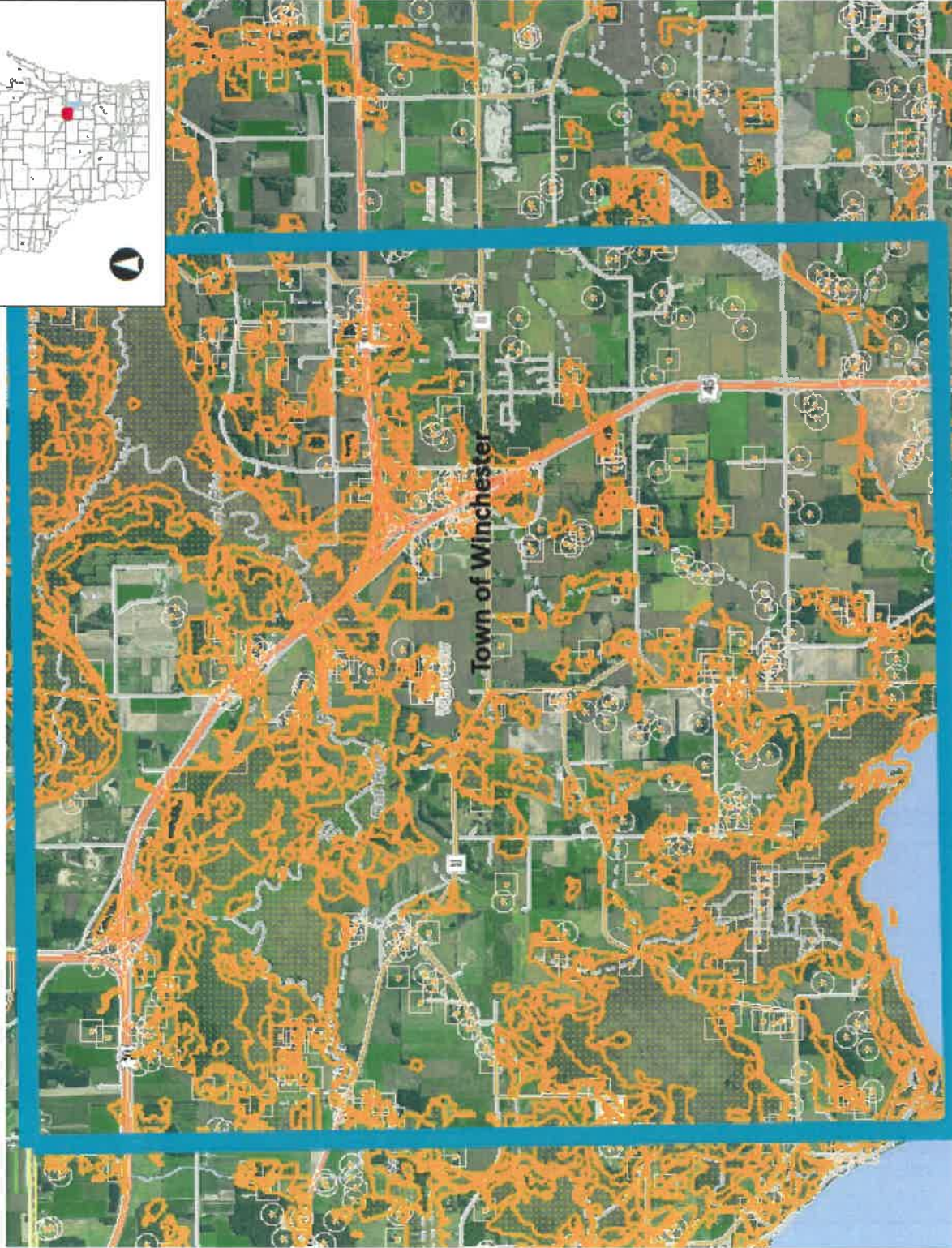
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# Mapped Wetlands T. Winchester



## Legend

- 2D Water Surface Elevation Grid**
  - High : 937.629
  - Low : 853.184
- Wetland Class Points**
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/draind wetland
  - Wetland too small to delineate
- Filled Points**
- Wetland Class Areas**
  - Wetland
  - Upland
- Filled Areas**
- Municipality**
- State Boundaries**
- County Boundaries**
- Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads**
  - County HWY
  - Local Road
- Railroads**
- Tribal Lands**
- Rivers and Streams**
- Intermittent Streams**
- Lakes and Open water**

## Notes

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2.0 Miles

1.00

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2.0

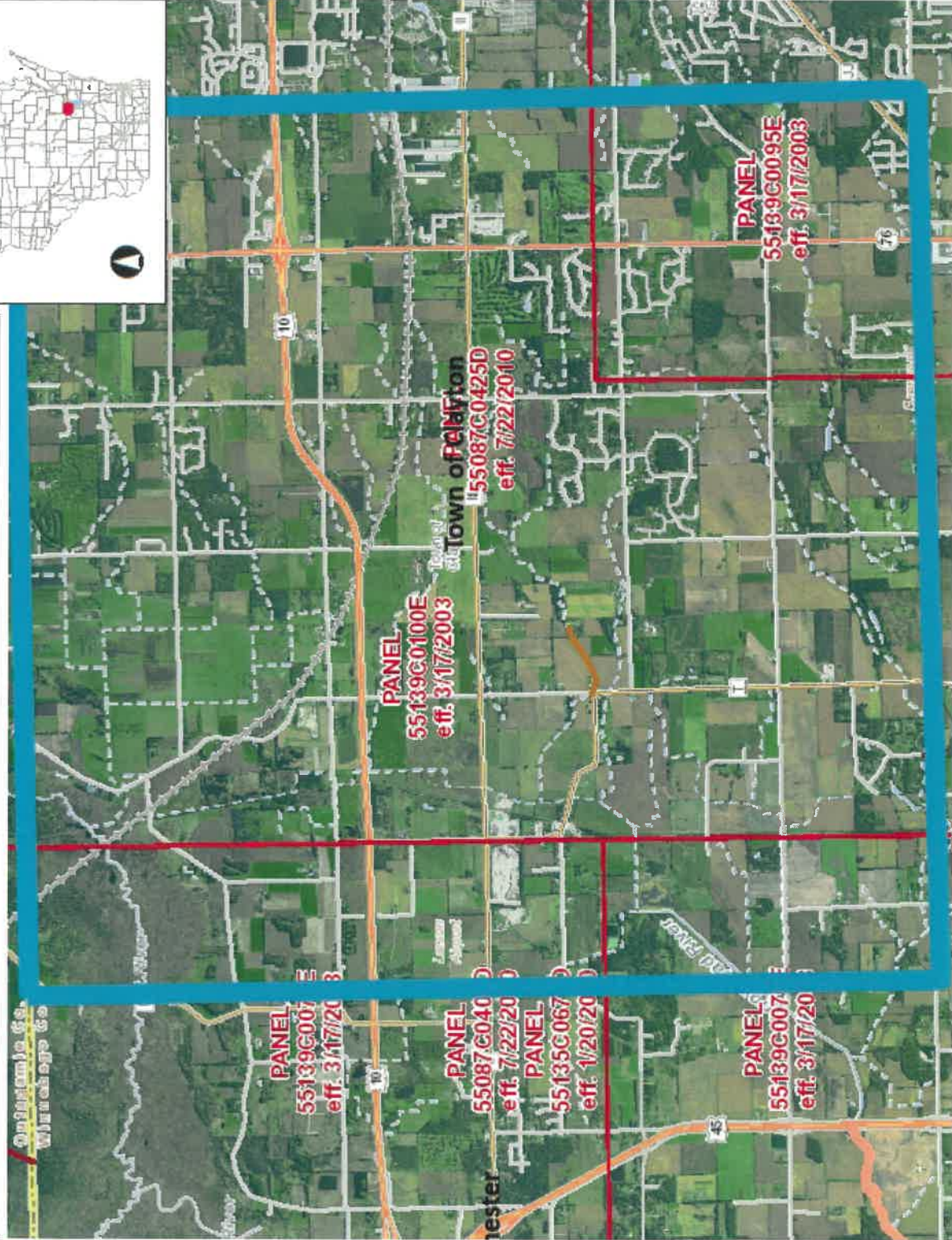
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# FIRM Town of Clayton



- Legend**
- 2D Water Surface Elevation Grid
    - High : 937.629
    - Low : 853.184
  - Analysis Lines
    - Other
    - Flood Insurance Study
    - Letter of Map Revision
    - Case By Case Analysis
    - Bridge
  - Analysis Points
    - Other
    - Flood Insurance Study
    - Letter of Map Revision
    - Case By Case Analysis
    - Bridge
  - Analysis Catchments
  - Statewide Paper FIRM Index
  - FIRM Panels
  - Municipality
  - State Boundaries
  - County Boundaries
  - Major Roads
    - Interstate Highway
    - State Highway
    - US Highway
  - County and Local Roads
    - County HWY
    - Local Road
  - Railroads
  - Tribal Lands
  - Rivers and Streams
  - Intermittent Streams

## Notes

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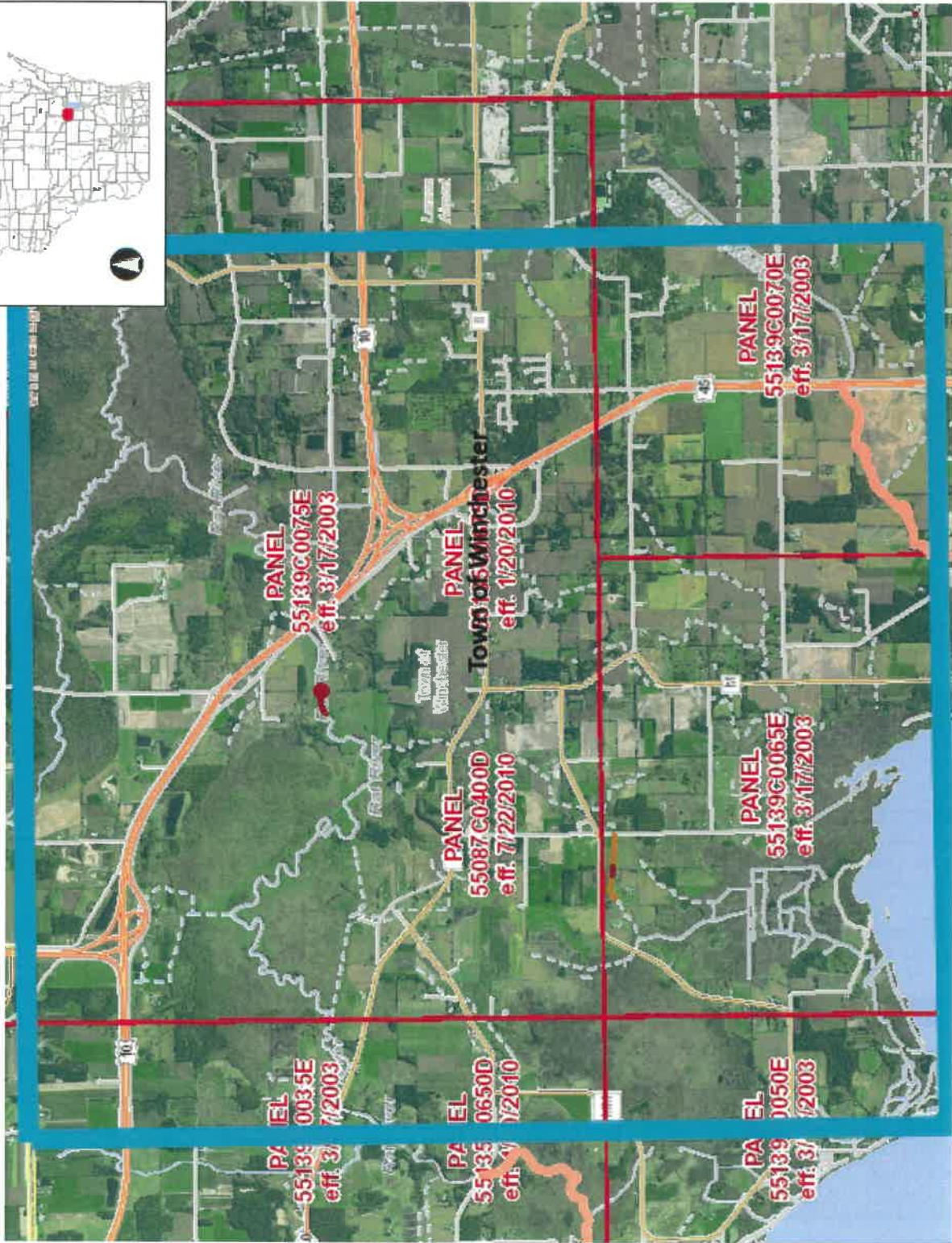
2.0 Miles







# FIRM Mapping Town of Winchester



## Legend

2D Water Surface Elevation Grid



Analysis Lines



Analysis Points



Analysis Catchments



Statewide Paper FIRM Index



FIRM Panels



Municipality



State Boundaries



County Boundaries



Major Roads



Interstate Highway



State Highway



US Highway



County and Local Roads



Railroads



Tribal Lands



Rivers and Streams



Intermittent Streams



## Notes

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2.0 Miles

1.00 Miles

0



1 : 63,360

NAD\_1983\_HARN\_Wisconsin\_TM



**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or Floodway Data have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

General Base Flood Elevations shown on this map apply only landward of 0.0 National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The projections used in the preparation of this map were Universal Transverse Mercator (UTM) zone 16. The horizontal datum was NAD 83, Clark 1986 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov) or contact the National Geodetic Survey at the following address:

Spatial Reference System Division  
National Geodetic Survey, NOAA  
Silver Spring Metro Center  
1215 East-West Highway  
Silver Spring, Maryland 20910  
(301) 713-0181

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-9248, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

Base map information shown on this FIRM was provided in digital format by the Wisconsin Department of Natural Resources. This information was photogrammetrically compiled by the Winnebago County Land Information System at a scale of 1:2400 from aerial photography dated 1981. Additional information may have been derived from other sources.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel dimensions that differ from what is shown on this map.

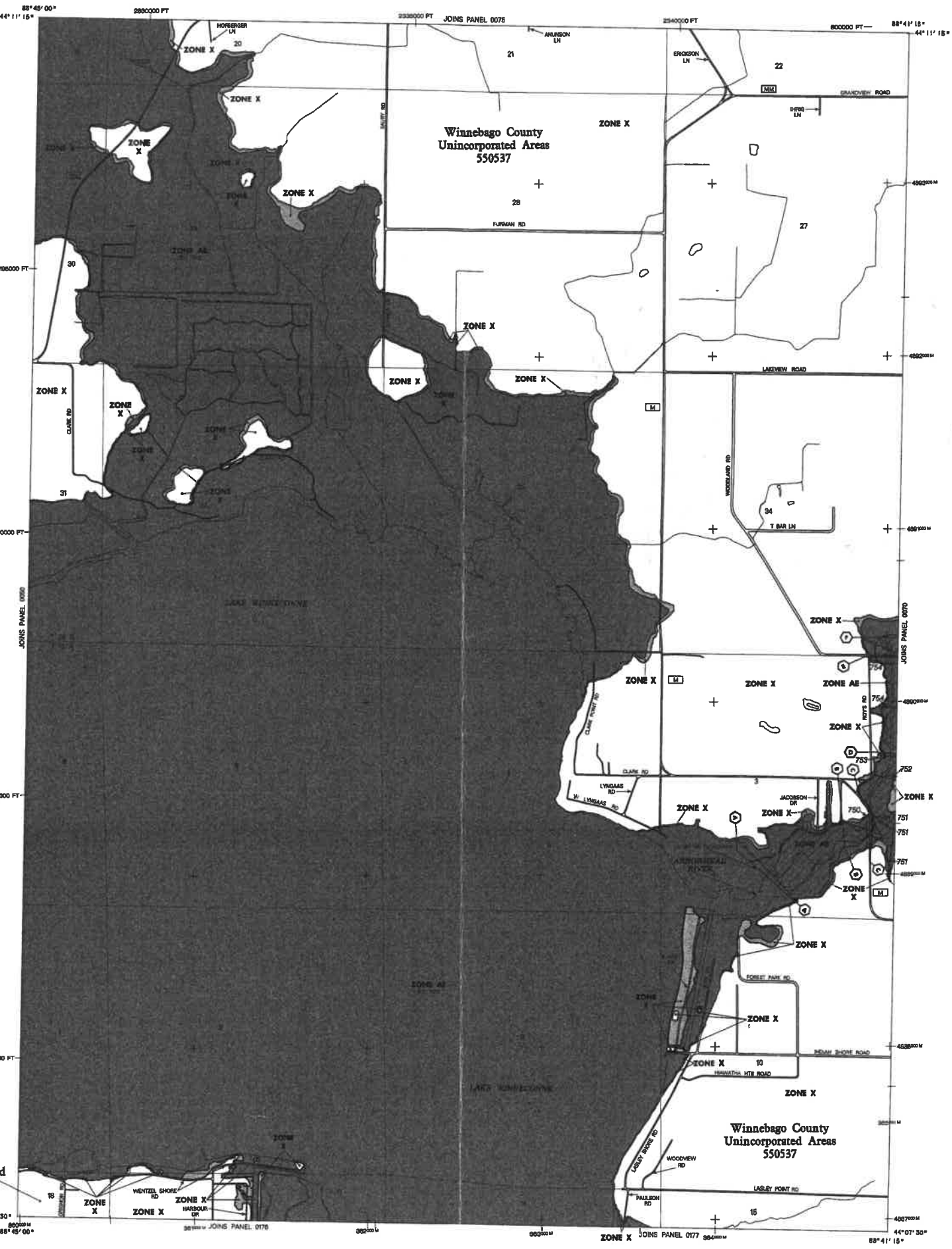
Separate labels shown on this map are based on the best data available at the time of publication. Because changes due to renovations or de-renovations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities with National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-368-0616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by fax at 1-800-368-0620 and their website at [www.fema.gov/msc](http://www.fema.gov/msc).

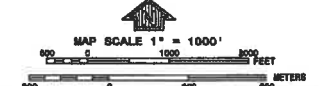
If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-Map (1-877-368-2627) or visit the FEMA website at [www.fema.gov](http://www.fema.gov).

Winnebago County  
Unincorporated Areas  
550537



**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHA) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, AV, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
  - ZONE AE** Base Flood Elevations determined.
  - ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
  - ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
  - ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decommissioned. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
  - ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
  - ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
  - ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Area of 0.2% annual chance flood; area of 1% annual chance flood with average depths of less than 1 foot, or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
  - OTHER AREAS**
  - ZONE Y** Area determined to be outside the 0.2% annual chance floodplain.
  - ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
  - Floodway boundary
  - Zone D boundary
  - CBRS and OPA boundary
  - Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
  - Base Flood Elevation line and value; elevation in feet
  - (EL. 807)
  - Base Flood Elevation value where uniform within zone; elevation in feet
  - \*Referenced to the National Geodetic Vertical Datum of 1929
  - Cross section line
  - Transect line
  - Geographic coordinates referenced to the North American Datum of 1927 (NAD 27)
  - 427900M
  - 1000-meter Universal Transverse Mercator grid values, zone 16
  - 600000 FT
  - 5000-foot grid ticks; Wisconsin State Plane coordinates system, scale zone (FIPSZONE 4803), Lambert Conformal Conic projection
  - D16510 X
  - Bench mark (see explanation in Notes to Users section of this FIRM panel)
  - M15
  - River Mile
- MAP REPOSITORY**
- Refer to Listing of Map Repositories on Map Index.
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**  
March 17, 2003
- EFFECTIVE DATES OF REVISIONS TO THIS PANEL**
- For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.
- To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-435-6620.



**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0085 E**

**FIRM FLOOD INSURANCE RATE MAP WINNEBAGO COUNTY, WISCONSIN AND INCORPORATED AREAS**

PANEL 05 OF 365  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

COMMUNITY	NUMBER	PANEL	SUFFIX
WINNEBAGO COUNTY	00007	0008	E

Notes to User: The map number shown below should be used when making rate returns. The Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER 55138C0085E**

**EFFECTIVE DATE MARCH 17, 2003**

Federal Emergency Management Agency

**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or Floodways have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only to landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the Floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by Flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The horizontal datum was NAD 27, Clark 1866 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov), or contact the National Geodetic Survey at the following address:

Spatial Reference System Division  
National Geodetic Survey, NOAA  
Silver Spring Metro Center  
1315 East-West Highway  
Silver Spring, Maryland 20910  
(301) 713-3131

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (801) 713-8348, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

Base map information shown on this FIRM was provided in digital format by the Wisconsin Department of Natural Resources. This information was photogrammetrically compiled by the Winnebago County Land Information System at a scale of 1:2400 from aerial photography dated 1991. Additional information may have been derived from other sources.

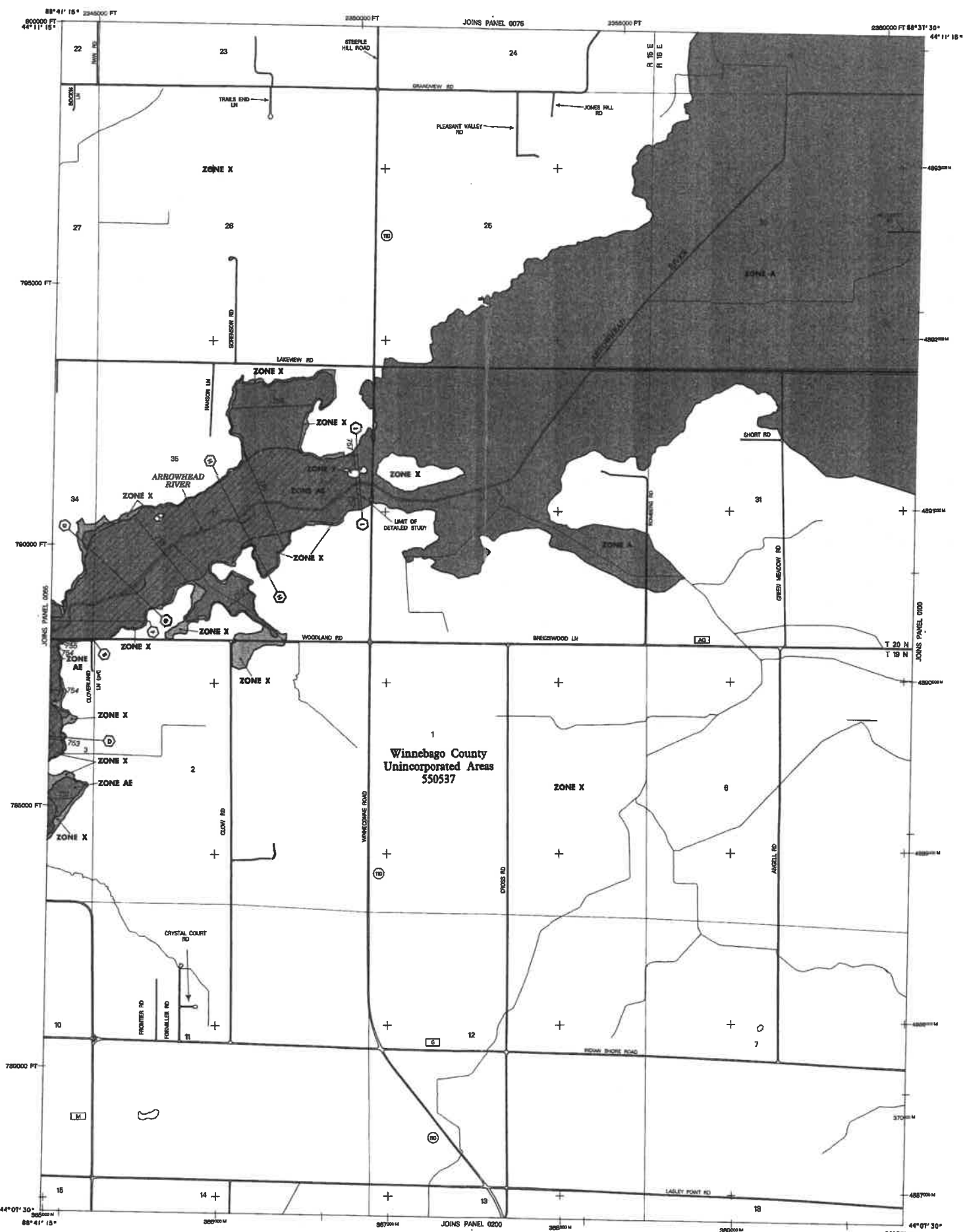
This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Separate Limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-368-6616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-368-6620 and their website at [www.fema.gov/mfc](http://www.fema.gov/mfc).

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-BAP (1-877-368-2627) or visit the FEMA website at [www.fema.gov](http://www.fema.gov).



**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AM** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of shallow fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decommissioned. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE APF** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VI** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE I** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet (EL 1007)
- Base Flood Elevation value where uniform within zone; elevation in feet
- Referenced to the National Geodetic Vertical Datum of 1929
- Cross section line
- Traverse line
- Geographic coordinates referenced to the North American Datum of 1927 (NAD 27)
- 1000-meter Universal Transverse Mercator grid values, zone 16
- 3000-foot grid ticks; Wisconsin State Plane coordinate system, south zone (SPSZONE 4803), Lambert Conformal Conic projection
- Bench mark see explanation in Notes to Users section of this FIRM panel
- River Mile

**MAP REPOSITORY**  
Refer to listing of Map Repositories on Map Index

**EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**  
March 17, 2003

**EFFECTIVE DATES OF REVISIONS TO THIS PANEL**

For community map revision history prior to countywide mapping refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-438-6620.

**MAP SCALE 1" = 1000'**

**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0070 E**

**FIRM FLOOD INSURANCE RATE MAP WINNEBAGO COUNTY, WISCONSIN AND INCORPORATED AREAS**

**PANEL 70 OF 385**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

<b>CONTAINS:</b>	<b>NUMBER</b>	<b>PANEL</b>	<b>SUFFIX</b>
<b>COMMUNITY</b>	80007	0070	E
<b>WINNEBAGO COUNTY</b>			

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER 5519C0070E**

**EFFECTIVE DATE MARCH 17, 2003**

Federal Emergency Management Agency



**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or Floodways have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The horizontal datum was NAD 27, Clark 1866 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov) or contact the National Geodetic Survey at the following address:

Spatial Reference System Division  
National Geodetic Survey, NOAA  
Silver Spring Metro Center  
1215 East-West Highway  
Silver Spring, Maryland 20910  
(301) 713-3781

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (801) 713-8242, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

Base map information shown on this FIRM was provided in digital format by the Wisconsin Department of Natural Resources. This information was photogrammetrically compiled by the Winnebago County Land Information System at a scale of 1:2400 from aerial photography dated 1981. Additional information may have been derived from other sources.

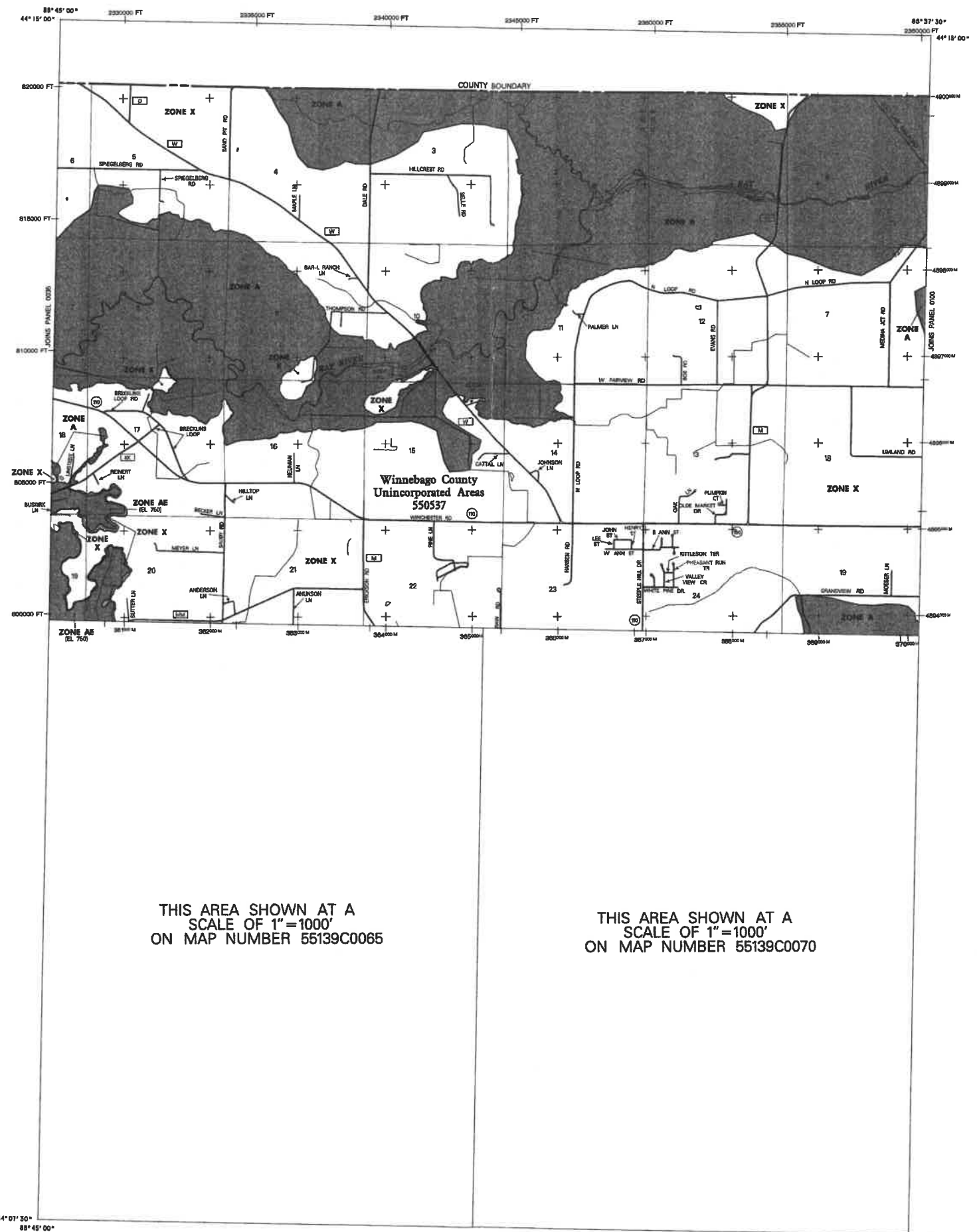
This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a Listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-368-6016 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-368-6820 and their website at [www.fema.gov/nsc](http://www.fema.gov/nsc).

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA Map (1-877-368-2627) or visit the FEMA website at [www.fema.gov](http://www.fema.gov).



THIS AREA SHOWN AT A  
SCALE OF 1"=1000'  
ON MAP NUMBER 55139C0065

THIS AREA SHOWN AT A  
SCALE OF 1"=1000'  
ON MAP NUMBER 55139C0070

**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AV, AP, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of shallow fan flooding velocities also determined.
- ZONE AP** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently abandoned. Zone AP indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE AV** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and valley elevation in feet\*
- (EL 607) Base Flood Elevation values where uniform within zones; elevation in feet
- \*Referenced to the National Geodetic Vertical Datum of 1929
- Cross section line
- Transsect line
- Geographic coordinates referenced to the North American Datum of 1927 (NAD 27)
- 1000-meter Universal Transverse Mercator grid values, zone 16
- 5000-foot grid ticks; Wisconsin State Plane coordinate system, south zone (SPSZONE 4803), Lambert Conformal Conic projection
- Bench mark see explanation in Notes to Users section of this FIRM panel
- River Mile

MAP REPOSITORY  
Refer to Listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP  
March 17, 2003

EFFECTIVE DATES OF REVISIONS TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-438-6420.

MAP SCALE 1" = 2000'  
1000 0 2000 4000 FEET  
800 0 800 1200 METERS

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0075 E

**FIRM**  
FLOOD INSURANCE RATE MAP  
WINNEBAGO COUNTY,  
WISCONSIN  
AND INCORPORATED AREAS

PANEL 75 OF 365  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY NUMBER PANEL SURF  
WINNEBAGO COUNTY 00087 0075 E

Refer to User's Map Number above to be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
55139C0075E

**EFFECTIVE DATE**  
MARCH 17, 2003

Federal Emergency Management Agency

**NOTES TO USERS**

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Coastal Base Flood Elevations shown on this map apply only landward of 0.7 National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the Floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent Floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The horizontal datum was NAD 27, Clark 1866 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov) or contact the National Geodetic Survey at the following address:

Spatial Reference System Division  
National Geodetic Survey, NOAA  
Silver Spring Metro Center  
326 East-West Highway  
Silver Spring, Maryland 20910  
(301) 719-3181

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 719-3242, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

Base map information shown on this FIRM was provided in digital format by the Wisconsin Department of Natural Resources. This information was photogrammetrically compiled by the Winnebago County Land Information System at a scale of 1:2400 from aerial photography dated 1981. Additional information may have been derived from other sources.

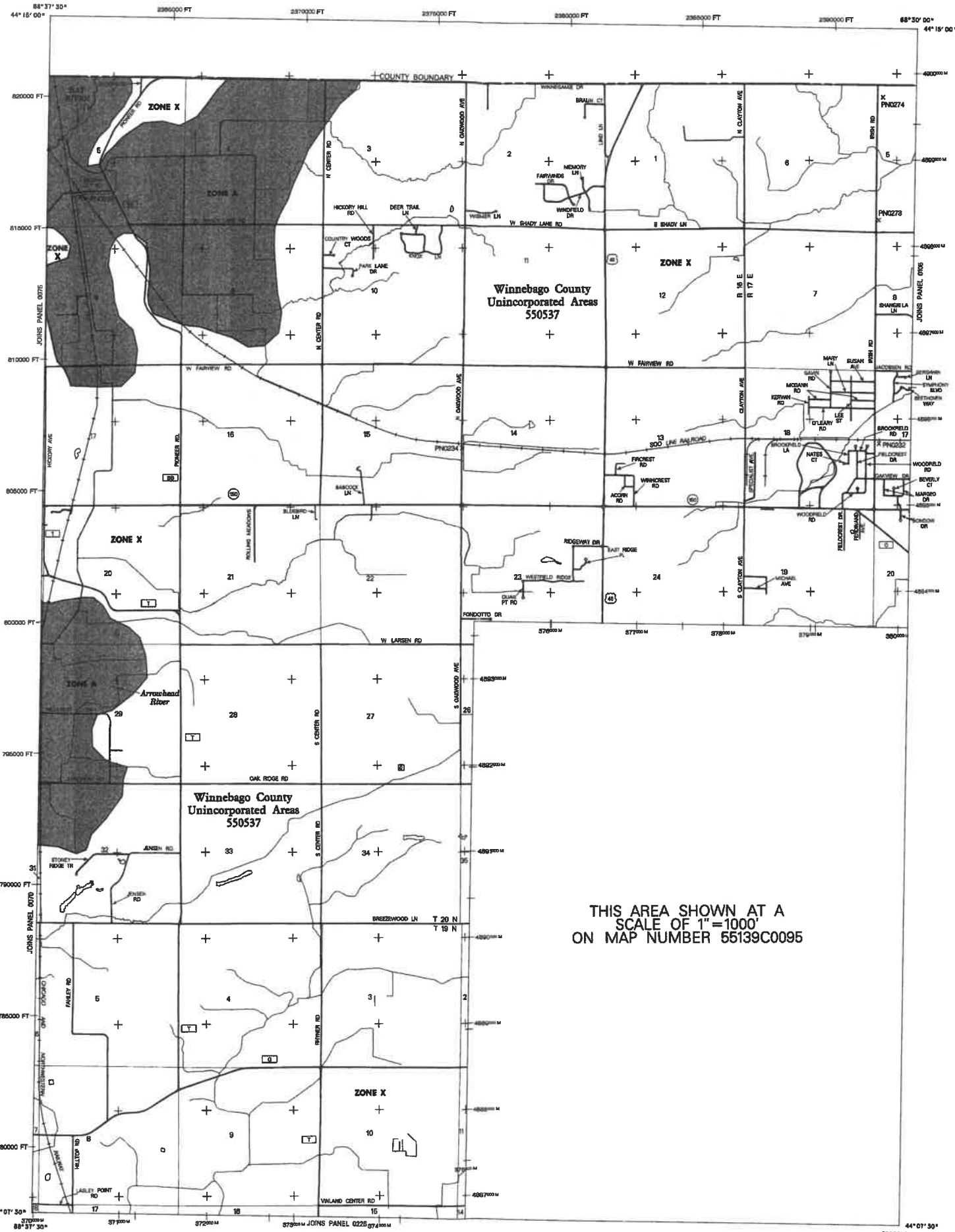
This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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Contact the FEMA Map Service Center at 1-800-368-6868 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-368-6620 and their website at [www.fema.gov/mis](http://www.fema.gov/mis).

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at [www.fema.gov](http://www.fema.gov).



THIS AREA SHOWN AT A SCALE OF 1"=1000' ON MAP NUMBER 55139C0095

**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHA) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
  - ZONE A** No Base Flood Elevations determined.
  - ZONE AE** Base Flood Elevations determined.
  - ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
  - ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
  - ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently destroyed. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
  - ZONE APF** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
  - ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
  - ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
  - The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
  - ZONE D** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
  - ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
  - ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPA)**
  - CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
  - Floodplain boundary
  - Floodway boundary
  - Zone D boundary
  - CBRS and OPA boundary
  - Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, Flood depths or flood velocities.
  - Base Flood Elevation line and value; elevation in feet\*
    - (EL. 587)
  - Base Flood Elevation value where uniform within zone; elevation in feet\*
  - \*Referenced to the National Geodetic Vertical Datum of 1929
  - Cross section line
  - Traverse line
  - Geographic coordinates referenced to the North American Datum of 1927 (NAD 27)
    - 427° 30' W
    - 80° 00' 00" FT
    - DWG 010 X
  - Bench mark (see explanation in Notes to Users section of this FIRM panel)
  - INLS
  - River Mile

**MAP REPOSITORY**  
Refer to Listing of Map Repositories on Map Index

**EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**  
March 17, 2003

**EFFECTIVE DATES OF REVISIONS TO THIS PANEL**

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-438-6620.

**MAP SCALE = 1" = 2000'**

1000 0 2000 4000 FEET

0 0 600 1200 METERS

**NFIP NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0100 E**

**FIRM FLOOD INSURANCE RATE MAP WINNEBAGO COUNTY, WISCONSIN AND INCORPORATED AREAS**

**PANEL 100 OF 365**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

COMMUNITY	NUMBER	PANEL	SUFFIX
WINNEBAGO COUNTY	550537	000	E

Notes to Users: The Map Number shown below should be used when quoting map orders. The Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER 55139C0100E**

**EFFECTIVE DATE MARCH 17, 2003**

Federal Emergency Management Agency



**NOTES TO USERS**

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0 National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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Spatial Reference System Division  
National Geodetic Survey, NOAA  
Silver Spring Metro Center  
1315 East-West Highway  
Silver Spring, Maryland 20910  
(301) 713-3791

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3848, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

Base map information shown on this FIRM was provided in digital format by the Wisconsin Department of Natural Resources. This information was photogrammetrically compiled by the Winnebago County Land Information System at a scale of 1:2400 from aerial photography dated 1991. Additional information may have been derived from other sources.

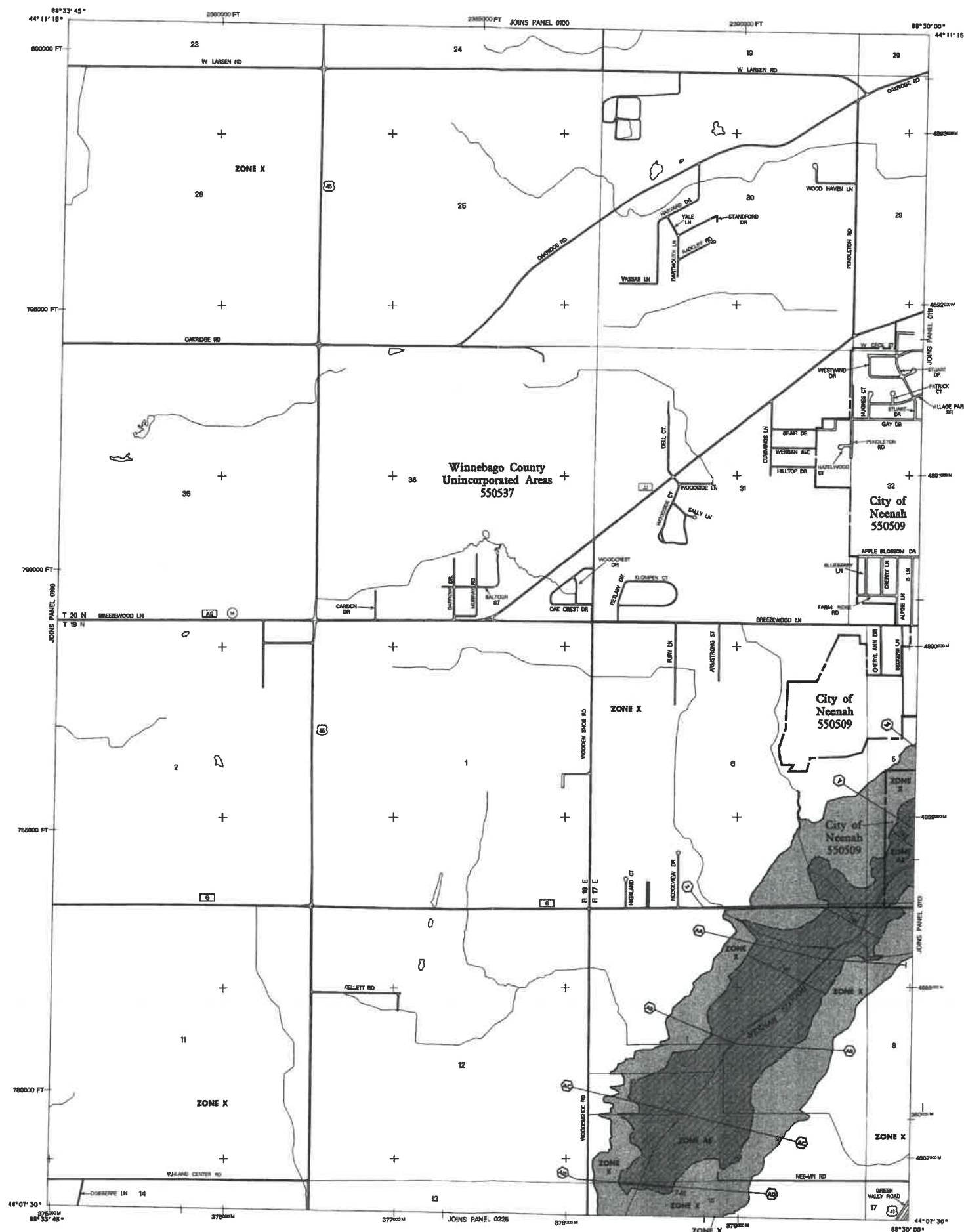
This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contain authoritative hydrologic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-368-6868 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-368-6620 and their website at [www.fema.gov/mssc](http://www.fema.gov/mssc).

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-368-6277) or visit the FEMA website at [www.fema.gov](http://www.fema.gov).



**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHA) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AD, AR, APF, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AD** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently determined to be inadequate. Zone AR indicates that the former flood control system is being removed to provide protection from the 1% annual chance or greater flood.
- ZONE APF** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPA)**
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary**
- Floodway boundary**
- Zone D boundary**
- CBRS and OPA boundary**
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, Flood depths or flood velocities.**
- Base Flood Elevation line and value; elevation in feet\***
- Base Flood Elevation value where uniform within zone; elevation in feet\***
- \*Referenced to the National Geodetic Vertical Datum of 1929
- Cross section line**
- Transect line**
- Geographic coordinates referenced to the North American Datum of 1927 (NAD 27)**
- 427000M**
- 1000-meter Universal Transverse Mercator grid values, zone 16**
- 800000 FT**
- 5000-foot grid ticks: Wisconsin State Plane coordinate system, south zone (FIPSZONE 4603), Lambert Conformal Conic projection**
- Bench mark base explanation in Notes to Users section of this FIRM panel**
- M15**
- River Mile**

MAP REPOSITORY  
Refer to Listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP  
March 17, 2003

EFFECTIVE DATES OF REVISIONS TO THIS PANEL

For community map revision history prior to countywide mapping refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-639-6620.

MAP SCALE 1" = 1000'

800 0 800 2000 FEET

800 0 800 2000 METERS

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0095 E

**FIRM FLOOD INSURANCE RATE MAP WINNEBAGO COUNTY, WISCONSIN AND INCORPORATED AREAS**

PANEL 95 OF 365  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WINNEBAGO COUNTY	60000	0095	E
NEENAH, CITY OF	80000	0095	E

Notes to Users: The Map Number shown below should be used when checking map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 55139C0095E

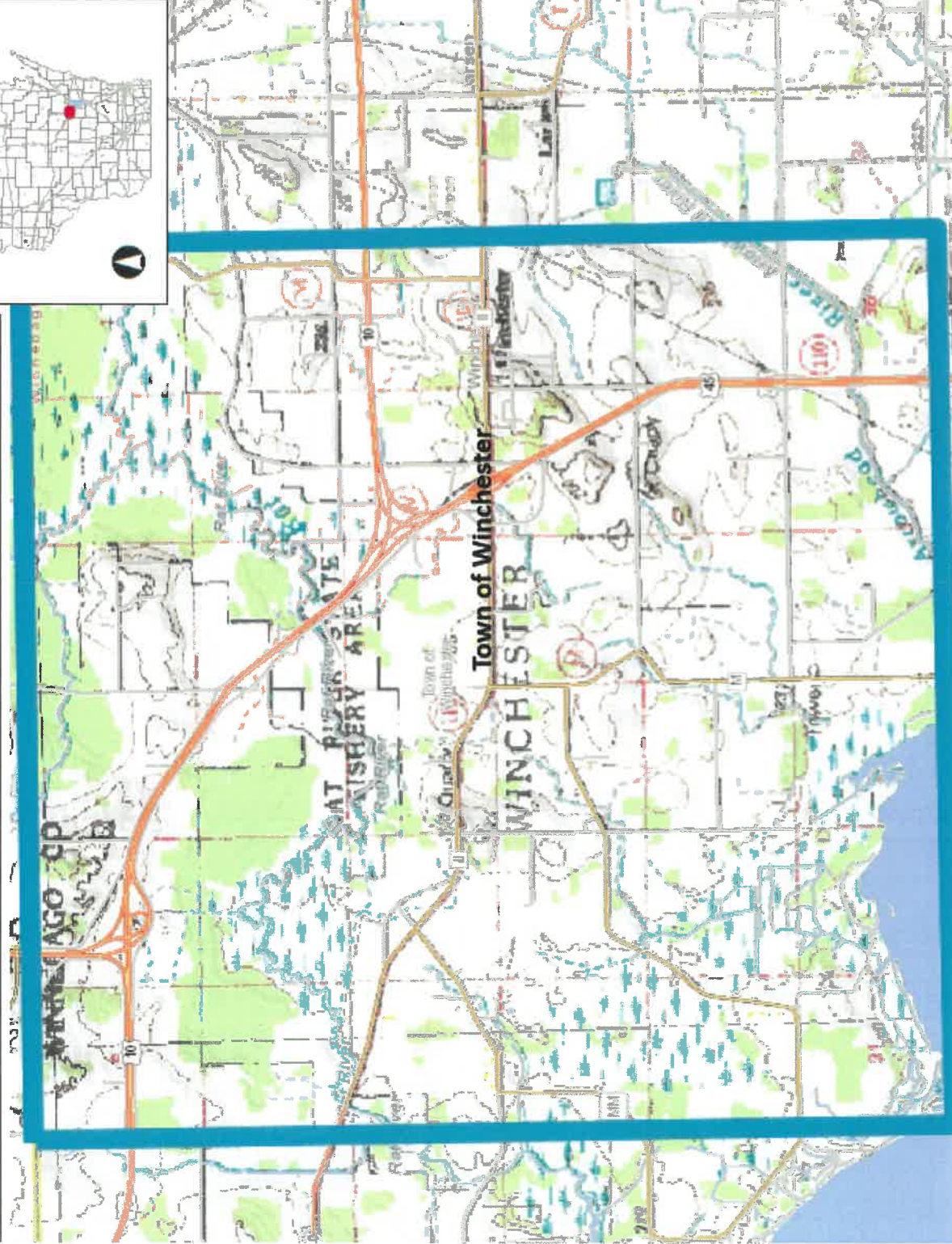
EFFECTIVE DATE MARCH 17, 2003

Federal Emergency Management Agency





# USGS Topo T. Winchester



## Legend

2D Water Surface Elevation Grid

High : 937.629

Low : 853.184

Municipality

State Boundaries

County Boundaries

Major Roads

Interstate Highway

State Highway

US Highway

County and Local Roads

County HWY

Local Road

Railroads

Tribal Lands

Rivers and Streams

Intermittent Streams

Lakes and Open water

24K USGS Quad Index - Level 7 - 16



## Notes

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/legal/>

2.0 Miles

1.00

0

2.0

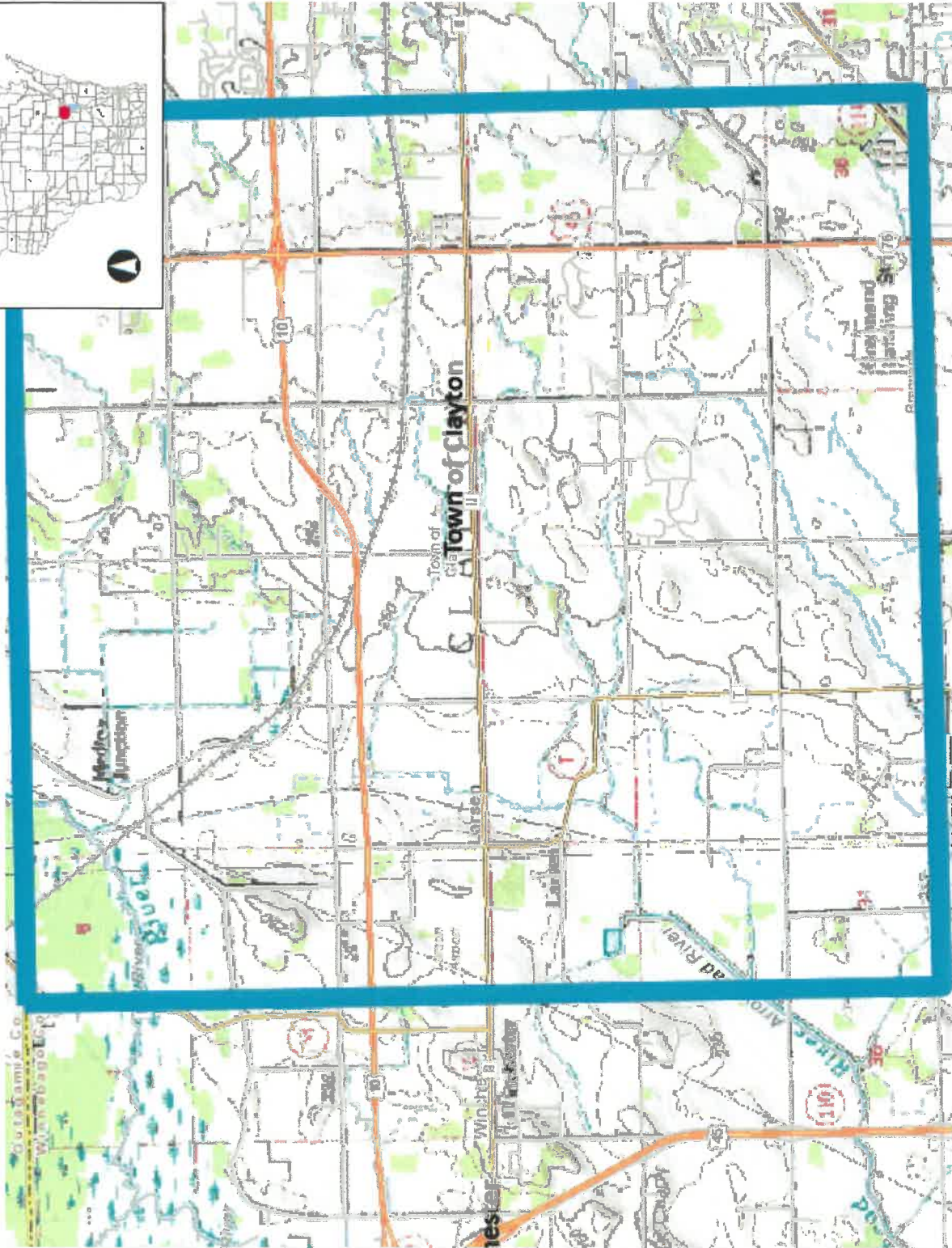
NAD\_1983\_HARN\_Wisconsin\_TM

1 : 63,360





# Topo Map Town of Clayton



## Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- 24K USGS Quad Index - Level 7 - 16

## Notes

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2.0 Miles

1.00

0

2.0

1 : 63,360

NAD\_1983\_HARN\_Wisconsin\_TM





# Topography - Town of Clayton



## Legend

- Township
- Section
- County Boundary
- Cities, Towns & Villages
  - City
  - Village
  - Civil Town
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
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## Notes

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2.0 Miles

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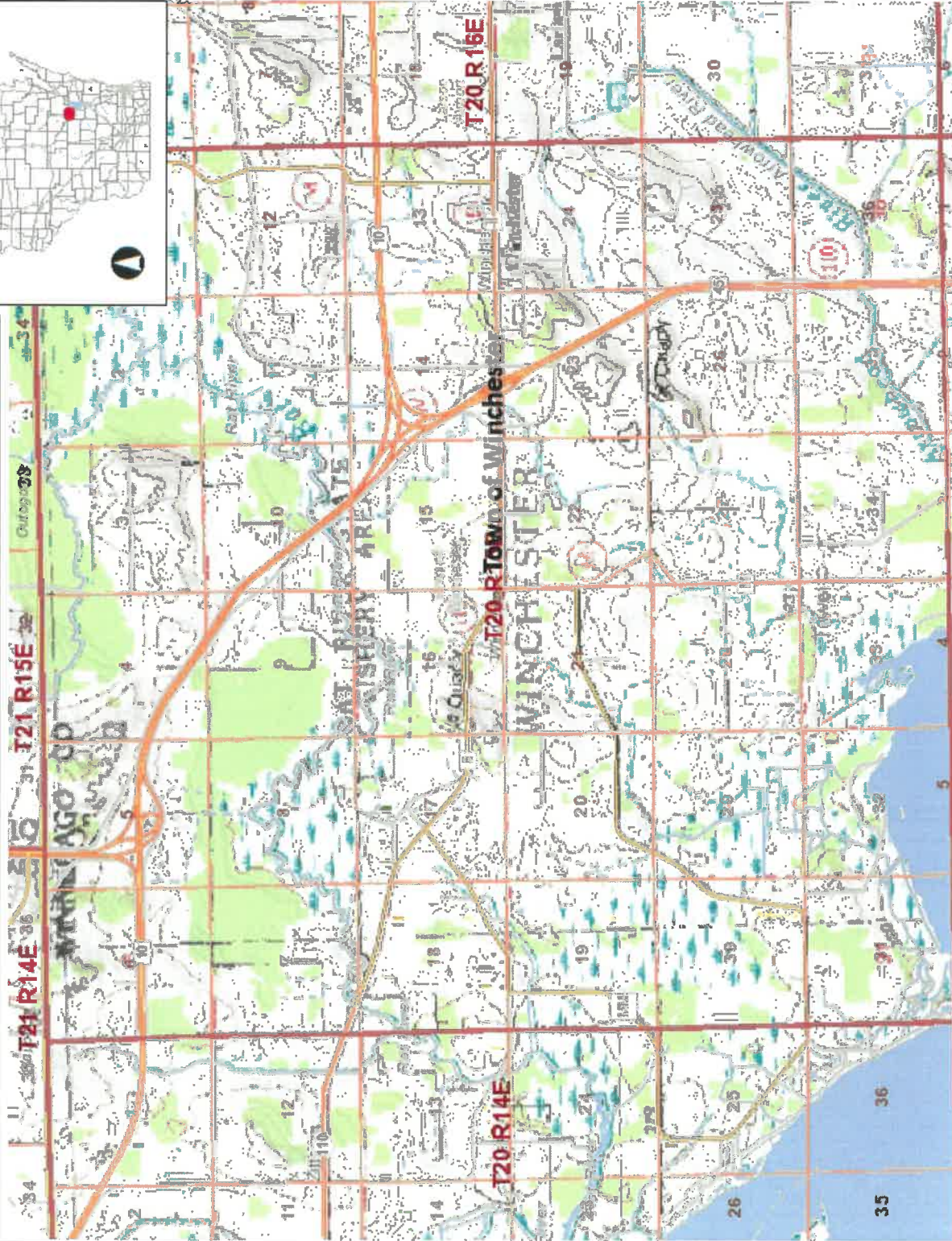
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# Topography - Town of Winchester



## Legend

- Township
- Section
- County Boundary
- Cities, Towns & Villages
- City
- Village
- Civil Town
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
- Interstate Highway
- State Highway
- US Highway
- County and Local Roads
- County HWY
- Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- 24K USGS Quad Index - Level 7 - 16

## Notes

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2.0 0 1.00 2.0 Miles



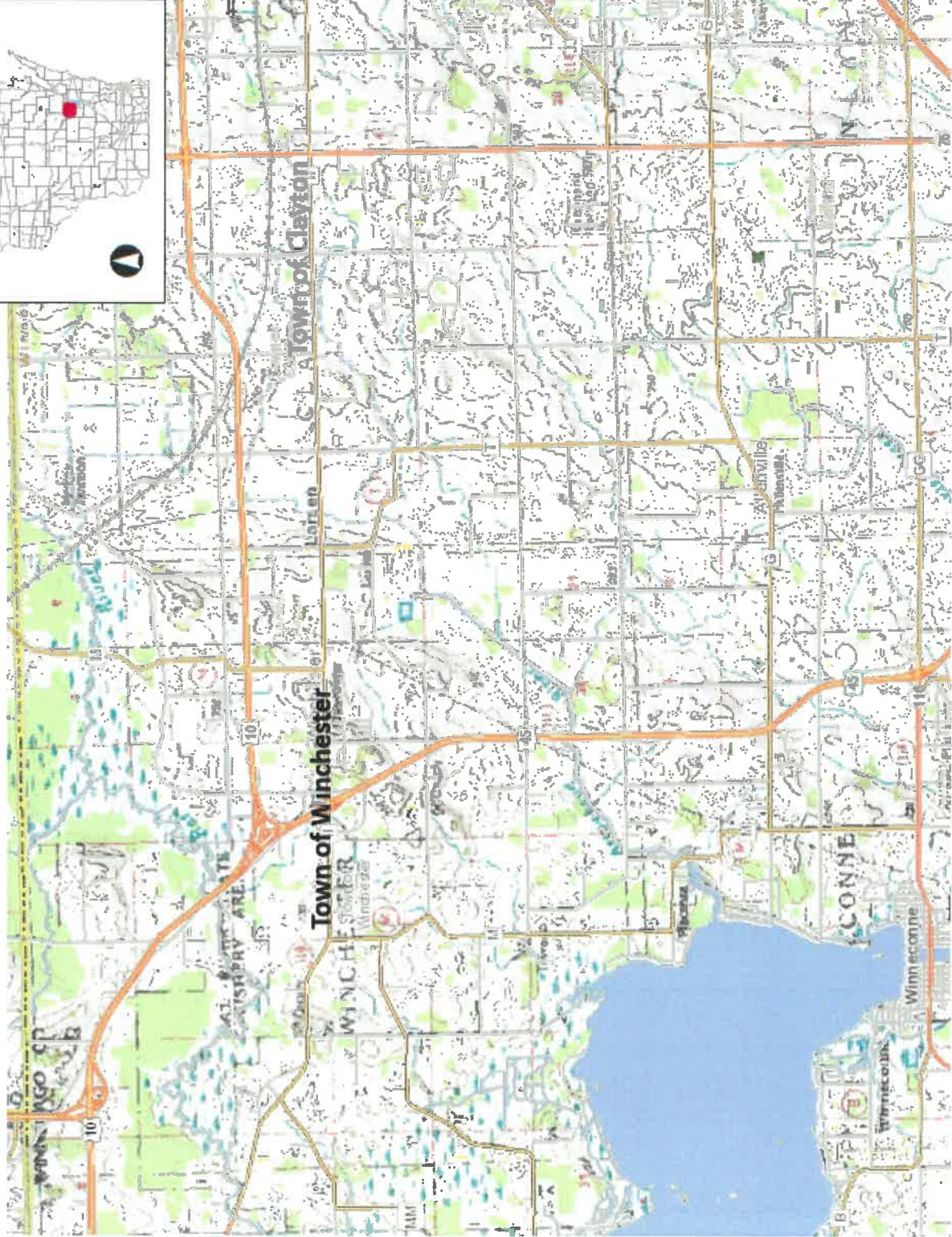
NAD\_1983\_HARN\_Wisconsin\_TM

1: 63,360





# Topography - Towns of Winchester and Clayton



## Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- 24K USGS Quad Index - Level 7 - 16



## Notes

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3.0 Miles

1.50

0

NAD\_1983\_HARN\_Wisconsin\_TM

1: 95,040



**LOWER WOLF RIVER BOTTOMLANDS NRA  
RAT RIVER WILDLIFE AREA**

**WINNEBAGO COUNTY**

**PLEASE RESPECT LANDOWNERS' RIGHTS AND  
OBSERVE ALL PROPERTY POSTINGS**  
See map legend for the activities allowed on the property  
or contact the DNR Service Center for more property  
information.

For more information:  
**PROPERTY MANAGER  
C/O SHAWANO RANGER STATION  
647 LAKELAND RD  
SHAWANO, WI 54166  
715-526-4226**

**DNR Managed Land**  
Open DNR Wildlife Land  
Other DNR Land

**Easement Use**

- Hunting and Fishing
- Fishing Only
- Hunting Only
- Open, No Hunting or Fishing
- Seasonally Closed
- Ice Age Trail
- State Trail

- Boat Access - Ramp
- Boat Access - Carry In
- Parking Area



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Wisconsin Department of Natural Resources

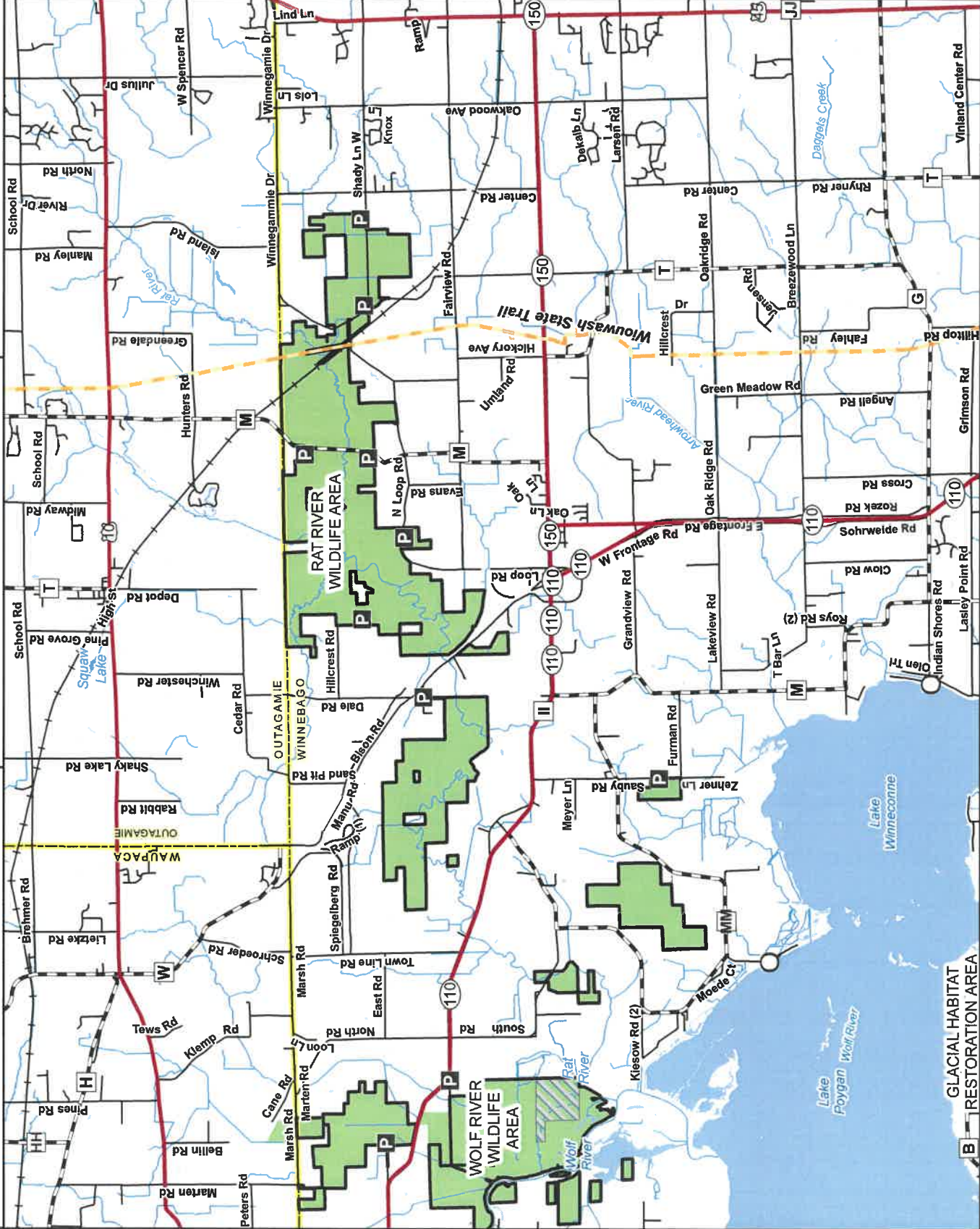


Featured property funded in part by  
**Knowles-Nelson Stewardship Fund**

WM-8275 taf

Last Revision Date: September 18, 2015

[dnr.wi.gov](http://dnr.wi.gov)



**GLACIAL HABITAT  
RESTORATION AREA**

# Lower Wolf River Bottomlands Natural Resources Area

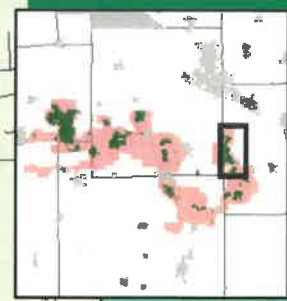
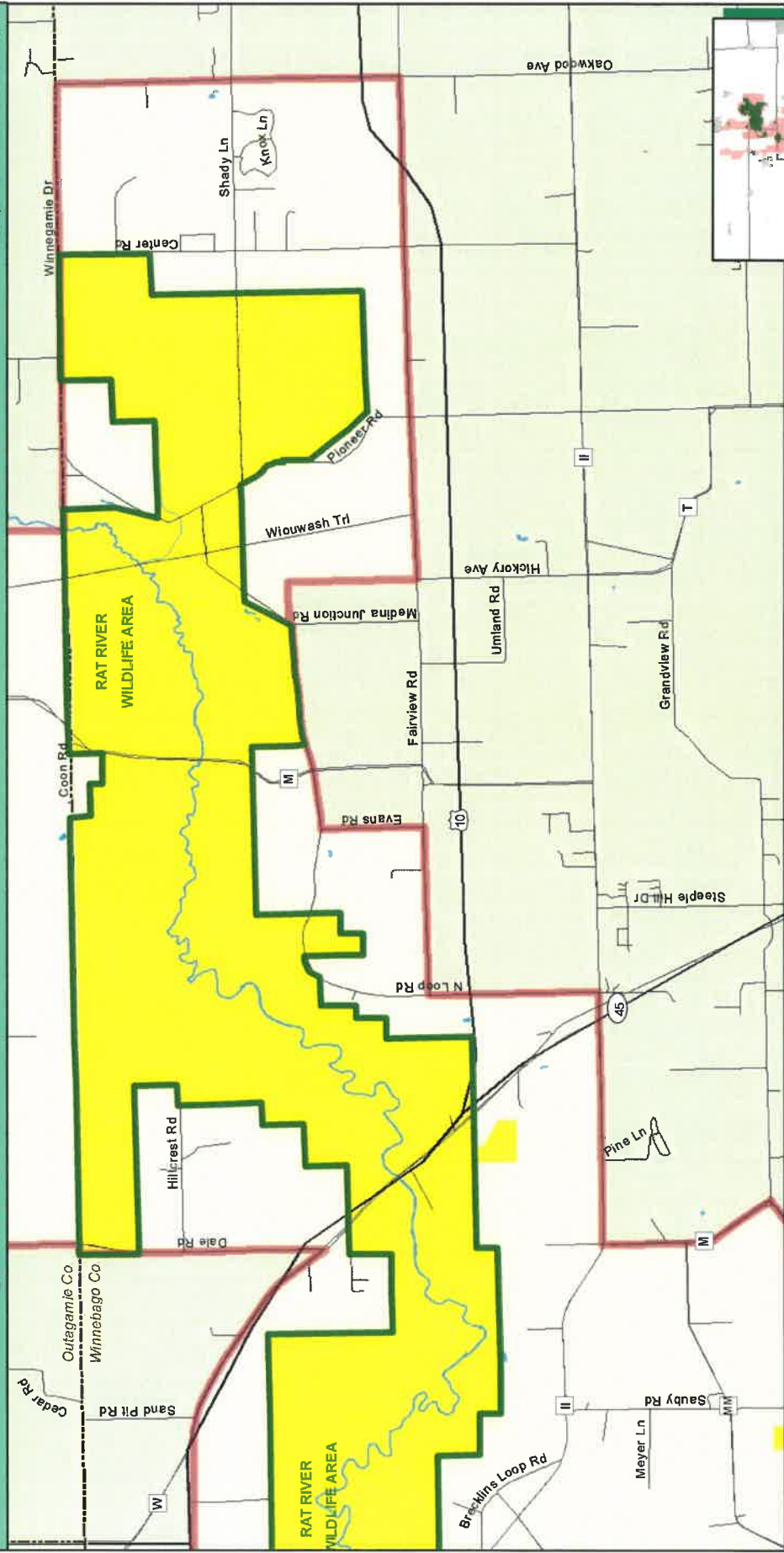
## Rat River Wildlife Area-East

### NR44 Land Management Classification



WISCONSIN DEPARTMENT  
OF NATURAL RESOURCES  
Bureau of Facilities and Lands

WM-LWRB-MP-8275-D10 act  
Map Updated: November 02, 2012



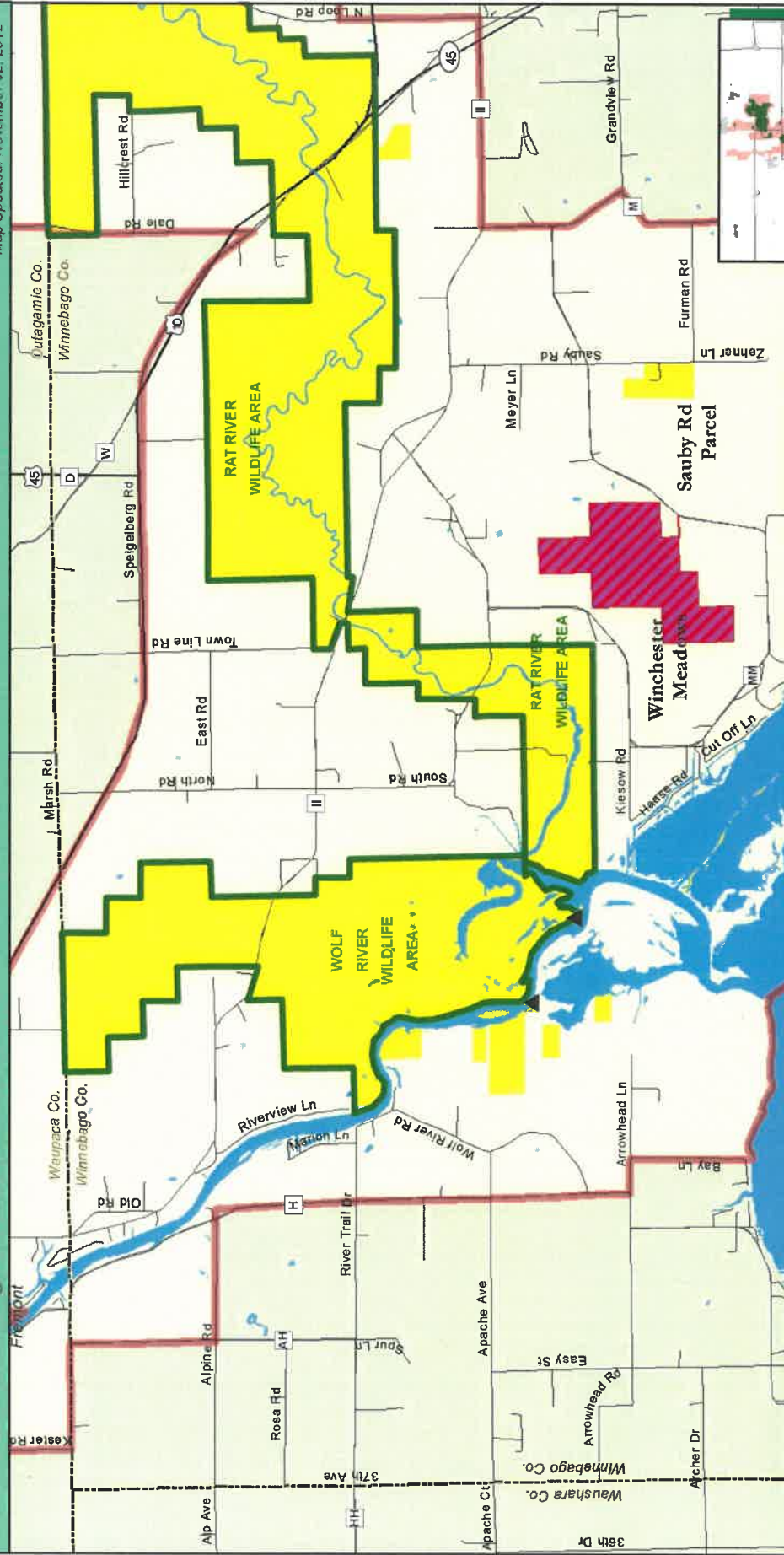
- Habitat Management Area
- Native Community Management Area
- Social Management Area
- Lower Wolf River Corridor (NCMA)
- New State Natural Area
- Existing State Natural Area
- Sturgeon Spawning Sites
- Walleye Spawning Sites

MAP D-10



# Lower Wolf River Bottomlands Natural Resources Area Wolf River & Rat River WA--West & Winchester Meadows NR44 Land Management Classification

WISCONSIN DEPARTMENT  
 OF NATURAL RESOURCES  
 Bureau of Facilities and Lands  
 WM-LWRB-MP-8905/8275-D9 act  
 Map Updated: November 02, 2012



**MAP D-9**

- Habitat Management Area
- Native Community Management Area
- Special Management Area
- Lower Wolf River Corridor (NCMA)
- Sturgeon Spawning Sites
- Walleye Spawning Sites
- New State Natural Area
- Existing State Natural Area



## Endangered Resources Preliminary Assessment

Created on **5/27/2021**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

### Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

**Further actions are required to ensure compliance** with Wisconsin's Endangered Species Law (s. 29.604 Wis. Stats.) and the Federal Endangered Species Act (16 USC ss 1531-43).

One or more of the following situations apply:

- The species recorded are state or federal threatened or endangered animals.
- The species recorded are state threatened or endangered plants on public land.
- The species recorded are federal threatened or endangered plants on federal land or involve federal funds or a federal permit.
- The project site overlaps the Karner Blue Butterfly High Potential Range.
- The project overlaps the Rusty Patched Bumble Bee High Potential Zone.

Therefore you should request an Endangered Resources Review <https://dnr.wi.gov/topic/ERRReview/Review.html>. An ER Review is the mechanism to ensure compliance with Wisconsin's Endangered Species Law (s. 29.604 Wis. Stats.) and the Federal Endangered Species Act (16 USC ss 1531-43). The ER Review will list the endangered resources that have been recorded within the vicinity of the project area and follow-up actions may be necessary.

*A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.*

### Project Information

Landowner name	Town of Clayton
Project address	Town of Clayton
Project description	LWSD Facility Planning

### Project Questions

Does the project involve a public property?	Yes
Is there any federal involvement with the project?	No
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	Yes
Is the project property in Managed Forest Law or Managed Forest Tax Law?	No
Project involves tree removal?	Yes
Is project near (within 300 ft) a waterbody or a shoreline?	Yes

Public Portal ID: **yXOurhzc**

5/27/2021, 2:34:04 PM

Is project within a waterbody or along the shoreline?

Yes

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

Urban/residential

No

Manicured lawn

No

Artificial/paved surface

No

Agricultural land

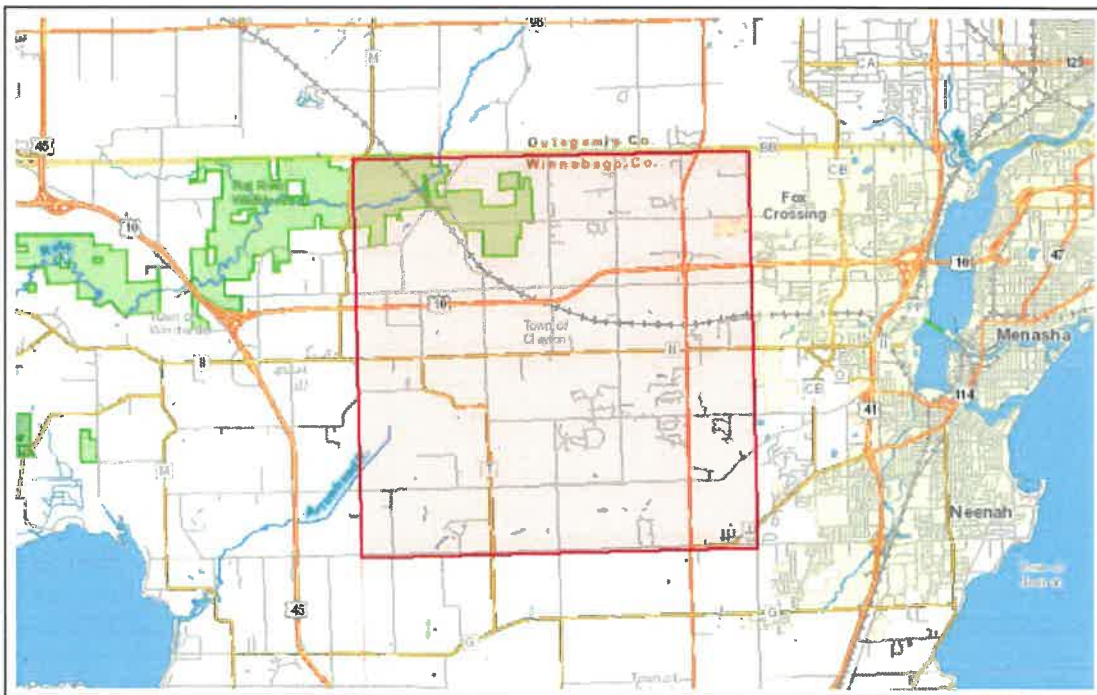
No

Areas covered in crushed stone or gravel

No



**Project Area Maps**



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<https://dnr.wisconsin.gov/nhiportal/public>

101 S. Webster Street . PO Box 7921 . Madison, Wisconsin 53707-7921



## Endangered Resources Preliminary Assessment

Created on **5/27/2021**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

### Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

**Further actions are required to ensure compliance** with Wisconsin's Endangered Species Law (s. 29.604 Wis. Stats.) and the Federal Endangered Species Act (16 USC ss 1531-43).

One or more of the following situations apply:

- The species recorded are state or federal threatened or endangered animals.
- The species recorded are state threatened or endangered plants on public land.
- The species recorded are federal threatened or endangered plants on federal land or involve federal funds or a federal permit.
- The project site overlaps the Karner Blue Butterfly High Potential Range.
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*A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.*

### Project Information

Landowner name	Town of Winchester
Project address	Town of Winchester
Project description	LWSD Facility Planning

### Project Questions

Does the project involve a public property?	Yes
Is there any federal involvement with the project?	No
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	Yes
Is the project property in Managed Forest Law or Managed Forest Tax Law?	No
Project involves tree removal?	Yes
Is project near (within 300 ft) a waterbody or a shoreline?	Yes

Public Portal ID: **kOUUjyVXR**

5/27/2021, 2:29:05 PM

Is project within a waterbody or along the shoreline?

Yes

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

Urban/residential

No

Manicured lawn

No

Artificial/paved surface

No

Agricultural land

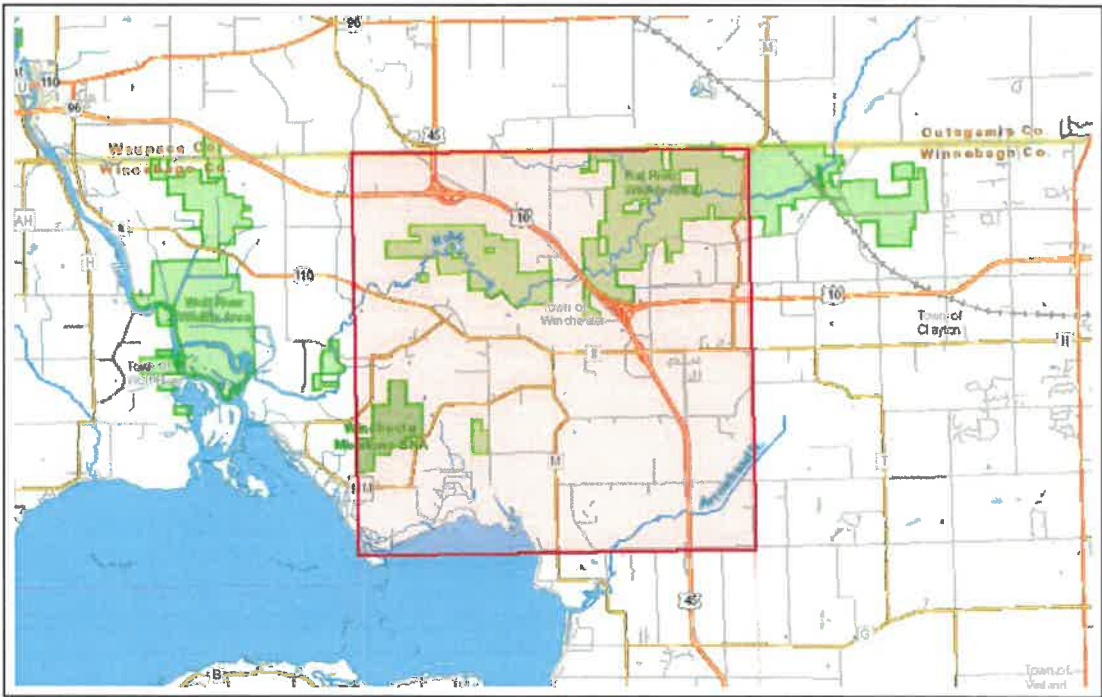
No

Areas covered in crushed stone or gravel

No



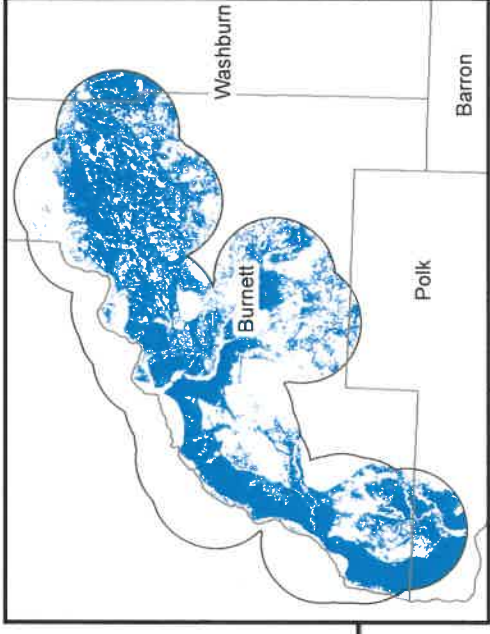
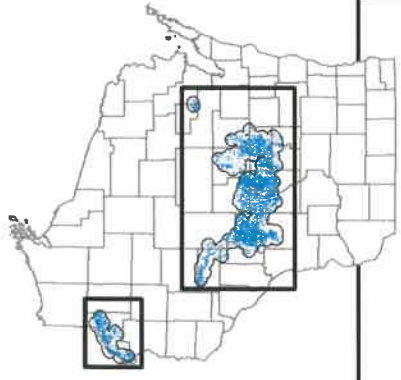
Project Area Maps



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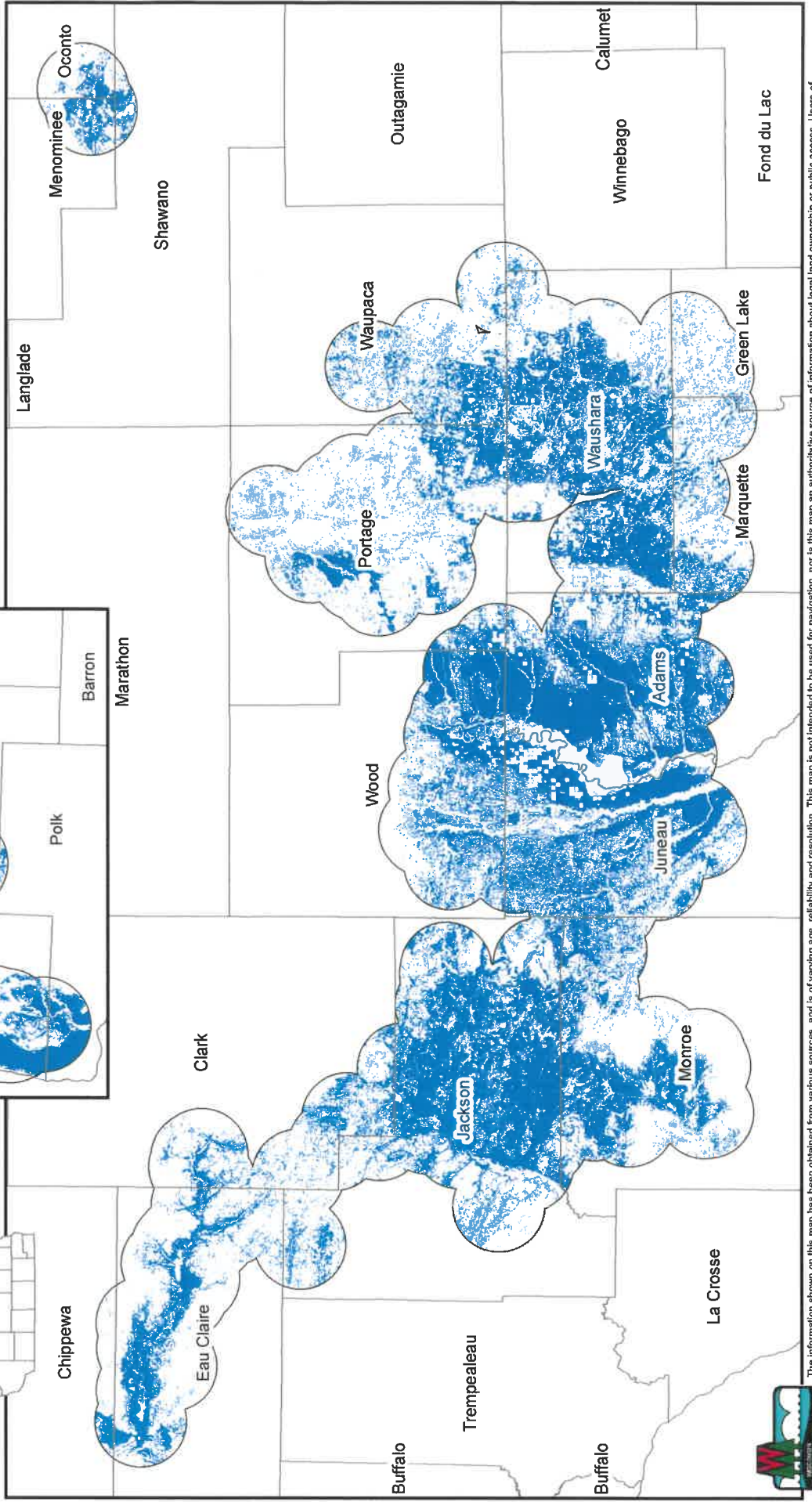
<https://dnrx.wisconsin.gov/nhiportal/public>

101 S. Webster Street . PO Box 7921 . Madison, Wisconsin 53707-7921



### Karner Blue Butterfly High Potential Range 2019

High Potential Range  
 5 mile buffer around sites



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# **APPENDIX K**

## **Sewer User Rate Evaluation**

Larsen Winchester Sanitary District Facility Planning						
Cost Effective Analysis						
Capital Cost Estimate						
Alternative No. 3						
LemTec System						
Item	Unit	Quantity	Unit Cost	Total Cost	Scenario 2	Scenario 3
New Angoli Way Lift Station	LS	1	\$350,000	\$350,000	\$350,000	
Gas to Angoli LS Site	LS	1	\$18,000	\$18,000	\$18,000	
6-inch Forcemain, Angoli LS to Streeple Hill	LF	5,100	\$45	\$229,500	\$229,500	
Improvements to Winchester LS#1	LS	1	\$125,000	\$125,000	\$125,000	
Electric and Gas to WWTP Site	LS	1	\$225,000	\$225,000	\$225,000	\$225,000
Sludge Removal	Gallons	3,433,320	\$0.04	\$137,333	\$137,333	\$137,333
Building for Blowers and Chemical Feed	LS	1	\$250,000	\$250,000	\$250,000	\$250,000
Chemical Feed Tank and Accessories	LS	1	\$60,000	\$60,000	\$60,000	\$60,000
Pond Excavation	CY	35,000	\$10	\$350,000	\$350,000	\$350,000
LemTec Components	LS	1	\$500,000	\$500,000	\$500,000	\$500,000
Concrete LPR Structure	CY	60	\$700	\$42,000	\$42,000	\$42,000
Installation of LemTec Components	LS	1	\$100,000	\$100,000	\$100,000	\$100,000
Phosphorus Improvements to Ponds w Pumping & Bldg	LS	1	\$1,100,000	\$1,100,000	\$150,000	\$150,000
Piping and Structure Improvements	LS	1	\$150,000	\$150,000	\$50,000	\$50,000
Sitework and Gravel	LS	1	\$50,000	\$50,000	\$250,000	\$250,000
Electrical, Controls, Flow Metering	LS	1	\$250,000	\$250,000	\$135,000	\$135,000
UV Disinfection Channel	LS	1	\$135,000	\$135,000	\$70,000	\$70,000
Generator	LS	1	\$70,000	\$70,000	\$125,000	\$90,000
Surface Restoration	LS	1	\$125,000	\$125,000	\$60,000	\$40,000
Erosion Control	LS	1	\$60,000	\$60,000	\$75,000	\$60,000
Mobilization and Traffic Control	LS	1	\$75,000	\$75,000	\$3,301,833	\$2,509,333
<b>Subtotal</b>				<b>\$4,401,833</b>	<b>\$660,367</b>	<b>\$501,867</b>
Contingencies 20%				\$880,367		
<b>Subtotal</b>				<b>\$5,282,199</b>	<b>\$3,962,199</b>	<b>\$3,011,199</b>
Engineering, Legal and Funding Administration 15%				\$792,330	\$594,330	\$451,680
<b>TOTAL</b>				<b>\$6,074,529</b>	<b>\$4,556,529</b>	<b>\$3,462,879</b>

Scenario 2	Scenario 3
LemTec and Angoli	LemTec Only
Total Cost	Total Cost
\$350,000	
\$18,000	
\$229,500	
\$125,000	
\$225,000	\$225,000
\$137,333	\$137,333
\$250,000	\$250,000
\$60,000	\$60,000
\$350,000	\$350,000
\$500,000	\$500,000
\$42,000	\$42,000
\$100,000	\$100,000
\$150,000	\$150,000
\$50,000	\$50,000
\$250,000	\$250,000
\$135,000	\$135,000
\$70,000	\$70,000
\$125,000	\$90,000
\$60,000	\$40,000
\$75,000	\$60,000
<b>\$3,301,833</b>	<b>\$2,509,333</b>
\$660,367	\$501,867
<b>\$3,962,199</b>	<b>\$3,011,199</b>
\$594,330	\$451,680
<b>\$4,556,529</b>	<b>\$3,462,879</b>



<b>Alternative No. 3</b>	
<b>LemTec System w/o Phosphorus - Scenario 2</b>	
<b>Annual Operation and Maintenance Costs</b>	
Salaries and Billing	\$65,000
Utilities	\$30,000
Maintenance and Testing	\$65,000
Office Expenses and Fees	\$2,500
Insurance	\$10,000
Engineering, Legal and Accounting	\$20,000
Larsen Drainage District Tax	\$2,000
Sludge Handling	\$2,500
Chemicals	\$4,000
<b>Total Annual O&amp;M Costs</b>	<b>\$201,000</b>

<b>Alternative No. 3</b>	
<b>LemTec System w/o Phos and Angoli - Scenario 3</b>	
<b>Annual Operation and Maintenance Costs</b>	
Salaries and Billing	\$65,000
Utilities	\$24,000
Maintenance and Testing	\$65,000
Office Expenses and Fees	\$2,500
Insurance	\$10,000
Engineering, Legal and Accounting	\$20,000
Larsen Drainage District Tax	\$2,000
Sludge Handling	\$2,500
Chemicals	\$4,000
<b>Total Annual O&amp;M Costs</b>	<b>\$195,000</b>

**Larsen Winchester Sanitary District Equipment Replacement Fund**  
December 2021

Item	Remaining Service Life	Installation Cost	Scenario 1		Scenario 2		Scenario 3	
			* Annual Deposit	w/o Phosphorus	w/o Phosphorus	w/o Phos and Angoli		
<b>Collection System</b>								
Lift Station 1 - Main Winchester	10	\$35,000	\$3,500	\$3,500	\$3,500	\$3,500	\$3,500	\$3,500
Lift Station 2	8	\$20,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Lift Station 3	8	\$20,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Lift Station 4	8	\$20,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Lift Station 5 - Main Larsen	10	\$20,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
Lift Station 6 - Angoli Way	10	\$35,000	\$3,500	\$3,500	\$3,500	\$3,500		
Four Emergency Generators	15	\$200,000	\$13,333	\$13,333	\$13,333	\$13,333	\$10,000.00	
Portable Pump	15	\$30,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
<b>Wastewater Treatment Plant</b>								
Aeration Blowers	20	\$50,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Aeration Diffusers	20	\$50,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Baffle Walls	20	\$50,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Covers	20	\$80,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
Chemical Feed Equipment	20	\$35,000	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750	\$1,750
Polishing Reactor Equipment	20	\$40,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
Disinfection Equipment	20	\$50,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Phosphorus Equipment	20	\$250,000	\$12,500	\$12,500	\$12,500	\$12,500		
Electrical and Controls	25	\$200,000	\$8,000	\$8,000	\$8,000	\$6,000	\$6,000	\$6,000
<b>Total</b>		<b>\$1,185,000</b>	<b>\$70,083</b>	<b>\$70,083</b>	<b>\$55,583</b>	<b>\$55,583</b>	<b>\$48,750</b>	<b>\$48,750</b>

**\*Cost Divided by Service Life**

LARSEN WINCHESTER SANITARY DISTRICT  
PARALLEL COST PERCENTAGE  
December 2021

Alternative No. 3 LemTec System		Scenario 1				Scenario 2				Scenario 3			
		Unit	Quantity	Unit Cost	Total Cost	Reduced Cost	Parallel Percentage	Reduced Cost	Parallel Percentage	Reduced Cost	Parallel Percentage	Reduced Cost	Parallel Percentage
New Angoli Way Lift Station	LS	1	\$350,000	\$350,000									
Gas to Angoli LS Site	LS	1	\$18,000	\$18,000									
6-inch Forcemain, Angoli LS to Steeple Hill	LF	5,100	\$45	\$229,500									
Improvements to Winchester LS#1	LS	1	\$125,000	\$125,000									
Electric and Gas to WWTP Site	LS	1	\$225,000	\$225,000	\$225,000			\$225,000			\$225,000		
Sludge Removal	Gallons	3,433,320	\$0	\$137,333	\$137,333			\$137,333			\$137,333		
Building for Blowers and Chemical Feed	LS	1	\$250,000	\$250,000	\$250,000			\$250,000			\$250,000		
Chemical Feed Tank and Accessories	LS	1	\$60,000	\$60,000	\$60,000			\$60,000			\$60,000		
Pond Excavation	CY	35,000	\$10	\$350,000	\$325,000			\$325,000			\$325,000		
LemTec Components	LS	1	\$500,000	\$500,000	\$350,000			\$350,000			\$350,000		
Concrete LPR Structure	CY	60	\$700	\$42,000	\$42,000			\$42,000			\$42,000		
Installation of LemTec Components	LS	1	\$100,000	\$100,000	\$90,000			\$90,000			\$90,000		
Phosphorus Improvements to Ponds w Pumping & Bldg	LS	1	\$1,100,000	\$1,100,000	\$900,000			\$900,000			\$900,000		
Piping and Structure Improvements	LS	1	\$150,000	\$150,000	\$150,000			\$150,000			\$150,000		
Sitework and Gravel	LS	1	\$50,000	\$50,000	\$50,000			\$50,000			\$50,000		
Electrical, Controls, Flow Metering	LS	1	\$250,000	\$250,000	\$250,000			\$250,000			\$250,000		
UV Disinfection Channel	LS	1	\$135,000	\$135,000	\$135,000			\$135,000			\$135,000		
Generator	LS	1	\$70,000	\$70,000	\$70,000			\$70,000			\$70,000		
Surface Restoration	LS	1	\$125,000	\$125,000	\$90,000			\$90,000			\$90,000		
Erosion Control	LS	1	\$60,000	\$60,000	\$40,000			\$40,000			\$40,000		
Mobilization and Traffic Control	LS	1	\$75,000	\$75,000	\$60,000			\$60,000			\$60,000		
<b>Subtotal</b>				<b>\$4,401,833</b>	<b>\$3,224,333</b>			<b>\$3,224,333</b>			<b>\$2,324,333</b>		
Contingencies 20%				\$880,367	\$644,867			\$644,867			\$464,867		
<b>Subtotal</b>				<b>\$5,282,199</b>	<b>\$3,869,199</b>			<b>\$3,869,199</b>			<b>\$2,789,199</b>		
Engineering, Legal and Funding Administration 15%				\$792,350	\$580,380			\$580,380			\$418,380		
<b>TOTAL</b>				<b>\$6,074,529</b>	<b>\$4,449,579</b>			<b>\$4,449,579</b>			<b>\$3,207,579</b>		
													92.63%

DESCRIPTION OF SCENARIOS	
Scenario 1	Full Project
Scenario 2	Project without Phosphorus Tertiary Treatment
Scenario 3	Project without Phosphorus Tertiary Treatment and Angoli Lift Sta.

LARSEN WINCHESTER SANITARY DISTRICT  
SEWER USER RATE ANALYSIS - 100% Loan Funds for Project  
December 2021

CURRENT RATE STRUCTURE	
Quarterly Fixed Fee (Meter Fee) 5/8" Residential	\$15.00
Quarterly Fixed Fee (Meter Fee) 1-1/4" Commercial	\$24.00
Quarterly Fixed Fee (Meter Fee) 2" Commercial	\$45.00
Sewer Usage Fee	\$5.00 Per 1,000 Gallons Discharged
Annual Late Charge (Beyond 30 days of Invoice Date)	18.00% of Total Amount Due

DESCRIPTION OF SCENARIOS

Scenario 1	Full Project
Scenario 2	Project without Phosphorus Tertiary Treatment
Scenario 3	Project without Phosphorus Tertiary Treatment and Angoli Lift Station

ESTIMATED DEBT RETIREMENT - 100% LOAN FOR PROJECT 15% PF										
	Estimated Project Cost	Eligible for CWF	Low Int. Cost w/ 15% CWF	Low Interest Rate	Years	Estimated Annual Debt Retirement	Eligible for CWF	Market Interest Rate	Years	Total Estimated Annual Debt Retirement
Scenario 1	\$6,074,529	\$4,449,579	\$3,782,142	1.50%	20	\$220,121	\$1,624,950	2.7%	20	\$106,272
Scenario 2	\$4,556,529	\$3,207,579	\$2,726,442	1.50%	20	\$158,679	\$1,348,950	2.7%	20	\$88,221
Scenario 3	\$3,462,879	\$3,207,579	\$2,726,442	1.50%	20	\$158,679	\$255,300	2.7%	20	\$16,697
Scenario 1										\$326,392
Scenario 2										\$246,900
Scenario 3										\$175,376

ESTIMATED DEBT RETIREMENT - 100% LOAN FOR PROJECT 30% PF										
	Estimated Project Cost	Eligible for CWF	Low Int. Cost w/ 30% CWF	Low Interest Rate	Years	Estimated Annual Debt Retirement	Eligible for CWF	Market Interest Rate	Years	Total Estimated Annual Debt Retirement
Scenario 1	\$6,074,529	\$4,449,579	\$3,114,705	1.50%	20	\$181,276	\$1,624,950	2.7%	20	\$106,272
Scenario 2	\$4,556,529	\$3,207,579	\$2,245,305	1.50%	20	\$130,677	\$1,348,950	2.7%	20	\$88,221
Scenario 3	\$3,462,879	\$3,207,579	\$2,245,305	1.50%	20	\$130,677	\$255,300	2.7%	20	\$16,697
Scenario 1										\$287,548
Scenario 2										\$218,898
Scenario 3										\$147,373

PROJECTED EXPENSES YEAR 2025 - 100% LOAN FOR PROJECT 15% PF			
	Scenario 1	Scenario 2	Scenario 3
Estimated O&M	\$216,000	\$201,000	\$195,000
Equipment Replacement Fund	\$70,083	\$55,583	\$48,750
Debt Retirement	\$326,392	\$246,900	\$175,376
<b>Total Expenses</b>	<b>\$612,476</b>	<b>\$503,484</b>	<b>\$419,126</b>

100% LOAN FOR PROJECT 30% PF			
	Scenario 1	Scenario 2	Scenario 3
Estimated O&M	\$216,000	\$201,000	\$195,000
Equipment Replacement Fund	\$70,083	\$55,583	\$48,750
Debt Retirement	\$287,548	\$218,898	\$147,373
<b>Total Expenses</b>	<b>\$573,631</b>	<b>\$475,481</b>	<b>\$391,123</b>

PROJECTED REQUIRED USER FEES - 100% LOAN 15% PF				
	Year 2020	Scenario 1	Scenario 2	Scenario 3
Total Expenses	\$166,500	\$612,476	\$503,484	\$419,126
Real Estate Levy	\$72,500	\$110,000	\$110,000	\$106,600
Other Income	\$20,200	\$12,000	\$12,000	\$12,000
<b>Required User Fee Income</b>	<b>\$73,800</b>	<b>\$490,476</b>	<b>\$381,484</b>	<b>\$300,526</b>

100% LOAN FOR PROJECT 30% PF				
	Year 2020	Scenario 1	Scenario 2	Scenario 3
Total Expenses	\$166,500	\$573,631	\$475,481	\$391,123
Real Estate Levy	\$72,500	\$110,000	\$110,000	\$106,600
Other Income	\$20,200	\$12,000	\$12,000	\$12,000
<b>Required User Fee Income</b>	<b>\$73,800</b>	<b>\$451,631</b>	<b>\$353,481</b>	<b>\$272,523</b>

REVENUE GENERATED BY METERED WATER USAGE

	Gallons of Water Used	Number of Users	Usage Per User Per Year	Usage Per User Per Day	Approximate Revenue Generated Per Month	Charges Per User Per Month
Year 2018	11,578,207	308	37,592	103	\$76,371	\$20.66
Year 2019	13,591,862	308	44,129	121	\$86,439	\$23.39
Year 2020	11,535,420	308	37,453	103	\$76,157	\$20.61
<b>Average</b>	<b>12,235,163</b>	<b>308</b>	<b>39,725</b>	<b>109</b>	<b>\$79,656</b>	<b>\$21.55</b>

RATES AND REVENUE - 100% LOAN FOR PROJECT 15% PF

**Users	Required User Fee Income Per Year	Required Income Per User Per Year	Required Income Per User Per Quarter	Required Income Per User Per Month	* Percent of Median Household Income
Current	308	\$73,800	\$239.61	\$59.90	0.30%
Scenario 1	323	\$490,476	\$1,516.62	\$379.16	1.92%
Scenario 2	323	\$381,484	\$1,179.60	\$294.90	1.49%
Scenario 3	308	\$300,526	\$975.73	\$243.93	1.23%

\*Median Household Income Based on Winchester CDP of \$79,167

\*\* Assumes a 5% immediate increase in users with construction of Angoli Lift Station

RATES AND REVENUE - 100% LOAN FOR PROJECT 30% PF

**Users	Required User Fee Income Per Year	Required Income Per User Per Year	Required Income Per User Per Quarter	Required Income Per User Per Month	* Percent of Median Household Income
Current	308	\$73,800	\$239.61	\$59.90	0.30%
Scenario 1	323	\$451,631	\$1,396.51	\$349.13	1.76%
Scenario 2	323	\$353,481	\$1,093.02	\$273.25	1.38%
Scenario 3	308	\$272,523	\$884.82	\$221.20	1.12%

\*Median Household Income Based on Winchester CDP of \$79,167

\*\* Assumes a 5% immediate increase in users with construction of Angoli Lift Station

MEDIAN HOUSEHOLD INCOME			
Current Users	Percent of Users	Median Household Income	
Town of Clayton	71	23%	\$88,846
Town of Winchester	237	77%	\$83,897
Winchester CDP			\$79,167
<b>Total</b>	<b>308</b>		



LARSEN WINCHESTER SANITARY DISTRICT  
SEWER USER RATE ANALYSIS - Project Funded with \$500,000 LWSD Funds and Remainder Loan  
December 2021

CURRENT RATE STRUCTURE	
Quarterly Fixed Fee (Meter Fee) 5/8" Residential	\$15.00
Quarterly Fixed Fee (Meter Fee) 1-1/4" Commercial	\$24.00
Quarterly Fixed Fee (Meter Fee) 2" Commercial	\$45.00
Sewer Usage Fee	\$5.00 Per 1,000 Gallons Discharged
Annual Late Charge (Beyond 30 days of Invoice Date)	18.00% of Total Amount Due

DESCRIPTION OF SCENARIOS	
Scenario 1	Full Project
Scenario 2	Project without Phosphorus Tertiary Treatment
Scenario 3	Project without Phosphorus Tertiary Treatment and Angoli Lift Station

ESTIMATED DEBT RETIREMENT - \$500,000 LWSD, REMAINDER LOAN 15% PF										
	Estimated Project Cost	Eligible for CWF	Low Int. Cost w/ 15% CWF PF	Low Interest Rate CWF	Years	Estimated Annual Debt Retirement	Eligible for CWF Market Rate	Market Interest Rate CWF	Years	Total Estimated Annual Debt Retirement
Scenario 1	\$6,074,529	\$4,449,579	\$3,282,142	1.50%	20	\$191,021	\$1,624,950	2.7%	20	\$106,272
Scenario 2	\$4,556,529	\$3,207,579	\$2,226,442	1.50%	20	\$129,579	\$1,348,950	2.7%	20	\$88,221
Scenario 3	\$3,462,879	\$3,207,579	\$2,226,442	1.50%	20	\$129,579	\$255,300	2.7%	20	\$16,697

ESTIMATED DEBT RETIREMENT - \$500,000 LWSD, REMAINDER LOAN 30% PF										
	Estimated Project Cost	Eligible for CWF	Low Int. Cost w/ 30% CWF PF	Low Interest Rate CWF	Years	Estimated Annual Debt Retirement	Eligible for CWF Market Rate	Market Interest Rate CWF	Years	Total Estimated Annual Debt Retirement
Scenario 1	\$6,074,529	\$4,449,579	\$2,614,705	1.50%	20	\$152,176	\$1,624,950	2.7%	20	\$106,272
Scenario 2	\$4,556,529	\$3,207,579	\$1,745,305	1.50%	20	\$101,577	\$1,348,950	2.7%	20	\$88,221
Scenario 3	\$3,462,879	\$3,207,579	\$1,745,305	1.50%	20	\$101,577	\$255,300	2.7%	20	\$16,697

PROJECTED EXPENSES YEAR 2025 - \$500,000 LWSD FUNDS, REMAINDER LOAN 15% PF			
	Scenario 1	Scenario 2	Scenario 3
Estimated O&M	\$216,000	\$201,000	\$195,000
Equipment Replacement Fund	\$70,083	\$55,583	\$48,750
Debt Retirement	\$297,292	\$217,800	\$146,276
<b>Total Expenses</b>	<b>\$583,376</b>	<b>\$474,384</b>	<b>\$390,026</b>

PROJECTED EXPENSES YEAR 2025 - \$500,000 LWSD FUNDS, REMAINDER LOAN 30% PF			
	Scenario 1	Scenario 2	Scenario 3
Estimated O&M	\$216,000	\$201,000	\$195,000
Equipment Replacement Fund	\$70,083	\$55,583	\$48,750
Debt Retirement	\$258,448	\$189,798	\$118,273
<b>Total Expenses</b>	<b>\$544,531</b>	<b>\$446,381</b>	<b>\$362,023</b>

PROJECTED REQUIRED USER FEES - \$500,000 LWSD, REMAINDER LOAN 15% PF				
	Year 2020	Scenario 1	Scenario 2	Scenario 3
Total Expenses	\$166,500	\$583,376	\$474,384	\$390,026
Real Estate Levy	\$72,500	\$110,000	\$110,000	\$106,600
Other Income	\$20,200	\$12,000	\$12,000	\$12,000
<b>Required User Fee Income</b>	<b>\$73,800</b>	<b>\$461,376</b>	<b>\$352,384</b>	<b>\$271,426</b>

PROJECTED REQUIRED USER FEES - \$500,000 LWSD, REMAINDER LOAN 30% PF				
	Year 2020	Scenario 1	Scenario 2	Scenario 3
Total Expenses	\$166,500	\$544,531	\$446,381	\$362,023
Real Estate Levy	\$72,500	\$110,000	\$110,000	\$106,600
Other Income	\$20,200	\$12,000	\$12,000	\$12,000
<b>Required User Fee Income</b>	<b>\$73,800</b>	<b>\$422,531</b>	<b>\$324,381</b>	<b>\$243,423</b>

REVENUE GENERATED BY METERED WATER USAGE						
	Gallons of Water Used	Number of Users	Usage Per User Per Year	Approximate Revenue Generated Per Month	Charges Per User Per Month	
Year 2018	11,578,207	308	37,592	\$76,371	\$20.66	
Year 2019	13,591,862	308	44,129	\$86,439	\$23.39	
Year 2020	11,535,420	308	37,453	\$76,157	\$20.61	
<b>Average</b>	<b>12,235,163</b>	<b>308</b>	<b>39,725</b>	<b>\$79,656</b>	<b>\$21.55</b>	

RATES AND REVENUE - \$500,000 LWSD, REMAINDER LOAN 15% PF						
**Users	Required	User Fee Income Per Year	Required Income Per User Per Year	Required Income Per Quarter	Required Income Per Month	*Percent of Median Household Income
Current	308	\$73,800	\$239.61	\$59.90	\$19.97	0.30%
Scenario 1	323	\$461,376	\$1,428.41	\$357.10	\$119.03	1.80%
Scenario 2	323	\$352,384	\$1,090.97	\$272.74	\$90.91	1.38%
Scenario 3	308	\$271,426	\$881.25	\$220.31	\$73.44	1.11%

\*Median Household Income Based on Winchester CDP of \$79,167  
\*\* Assumes a 5% immediate increase in users with construction of Angoli Lift Station

RATES AND REVENUE - \$500,000 LWSD, REMAINDER LOAN 30% PF						
**Users	Required	User Fee Income Per Year	Required Income Per User Per Year	Required Income Per Quarter	Required Income Per Month	*Percent of Median Household Income
Current	308	\$73,800	\$239.61	\$59.90	\$19.97	0.30%
Scenario 1	323	\$422,531	\$1,308.15	\$327.04	\$109.01	1.65%
Scenario 2	323	\$324,381	\$1,004.28	\$251.07	\$83.69	1.27%
Scenario 3	308	\$243,423	\$790.34	\$197.58	\$65.86	1.00%

\*Median Household Income Based on Winchester CDP of \$79,167  
\*\* Assumes a 5% immediate increase in users with construction of Angoli Lift Station

MEDIAN HOUSEHOLD INCOME			
	Current Users	Percent of Users	Median Household Income
Town of Clayton	71	23%	\$88,846
Town of Winchester	237	77%	\$83,897
Winchester CDP			\$79,167
<b>Total</b>	<b>308</b>		