Preliminary Design Scope Document

Introduction

Purpose

This document describes the Wastewater Treatment Facility Improvements Project as defined at the time this document was prepared. It also describes the Preliminary Design Phase Scope of Services, and defines the associated Team, Schedule, and Compensation. This document is intended to be referenced by an Amendment between the City of La Crosse (Owner) and Donohue.

Abbreviations

AA	annual average
BOD	5-day biochemical oxygen demand
mgd	million gallons per day
mg/L	milligrams per liter
MD	maximum day
MM	maximum month
MW	maximum week
PDR	preliminary design report
PH	peak hour
ppd	pounds per day
TP	total phosphorus
TSS	total suspended solids
DNR	Department of Natural Resources
WWTF	wastewater treatment facility

The Project

Background

The Owner owns and operates the Isle La Plume WWTF. This Facility serves the City of La Crosse, as well as the City of Onalaska, the City of La Crescent (MN), the Town of Campbell, the Town of Onalaska, and two sanitary districts that serve parts of the Town of Shelby.

The WWTF was originally constructed circa 1936 and upgraded circa 1972. Several processes have been added and upgraded since the last major upgrade (circa 1972); however, the majority of the infrastructure and much of the equipment dates back to circa 1972.

WWTFs that discharge to Wisconsin water bodies are regulated by the DNR through the Wisconsin Pollutant Discharge Elimination System (WPDES). The current WPDES Permit includes a compliance schedule that ends with a 0.1 mg/L effluent total phosphorus (TP) limit. As it is currently configured, the WWTF cannot comply with that impending low-level phosphorus limit.

Responding to the ageing condition of the WWTF infrastructure and the impending low-level phosphorus requirement, the Owner retained Donohue strategic planning or Facility Planning. The purpose of Facility Planning is to develop a 20-year plan that addresses three major categories: A) safety, reliability, and performance concerns, B) capacity concerns, and C) regulatory compliance concerns. In addition to these required categories, Donohue collaborated with the Owner to address a fourth: D) resource recovery and sustainability, which is aimed largely at renewable energy production and recovery using the biofuel inherently produced by the anaerobic digestion process.

Donohue is an award-winning wastewater consulting firm that large Midwest clients repeatedly trust to deliver their most challenging wastewater improvement projects. This specialized firm has the intellectual capital and engineering disciplines, expertise, and experience to work with some of the largest clean water agencies safely convey wastewater; treat wastewater to produce permit-compliant clean water that protects the Nation's surface and ground water resources; and transition to Utilities of the Future by recovering valuable

nutrients, producing nutrient-rich soil amendments, extracting renewable energy, and using that energy to operate more cost-effectively and sustainably. Some of these large Midwest clients include Chicago (MWRDGC), IL; Minneapolis-St. Paul (MCES), MN; Milwaukee (MSD), WI; St. Louis (MSD), MO; Green Bay (NEW Water), WI; Duluth (WLSSD), MN; Evansville, IN; and Detroit, MI. A brief Statement of Qualifications for Donohue is provided in an Attachment.

The City retained Donohue to perform a comprehensive evaluation of alternatives that address issues, concerns, and opportunities associated with these four strategic planning categories. The evaluation considered a host of discrete Alternatives that were individually aimed at one or more issue, concern, or opportunity. Ultimately, the most favorable discrete alternatives were combined to form the Recommended Plan.

Recommended Plan

Population

The WWTF will have adequate capacity to treat wastewater produced by the anticipated Service Area population summarized below.

Entities	2040 Projection
Town of Campbell	4,315
Town of Onalaska	6,485
Town of Shelby	5,340
City of La Crosse	51,850
City of Onalaska	23,570
City of La Crescent	4,776
Growth Contingency	3,575
Total Municipal Population	**99,911**

Flows and Loadings

The WWTF will be sized to accept and treat the flows and loadings summarized below.

Parameter	Unit	AA	MM	MW	MD	PH
Flow	mgd	12.99	15.80	17.70	28.80	42.5
BOD	ppd	26,500	32,800	39,000	80,000	
TSS	ppd	44,000	56,700	70,000	126,000	
TP	ppd	770	800	950	1,900	

Treatment Scheme

The WWTF will possess the following liquid train unit processes: influent screening and screenings handling, raw wastewater pumping, grit removal, primary settling, activated sludge with enhanced biological phosphorus removal, secondary settling, low-level phosphorus chemical mixing and flocculation, low-level phosphorus effluent filtration, and ultraviolet light disinfection.

The WWTF will possess the following solids train unit processes: primary solids pumping, secondary solids pumping, pre-digestion thickening, temperature-phased anaerobic digestion, post-digestion thickening, post-digestion dewatering, liquid biosolids storage, biosolids drying, and dried biosolids storage. Biofuel produced by the digestion system will be converted to heat and electricity.

Structures

The figure below shows the structures that will be added, rehabilitated, and repurposed. The new structures will house low-level phosphorus filtration equipment, biosolids drying equipment, and hauled-in-waste receiving equipment. Enhancing the existing hauled-in-waste program promises to increase energy production.

Resource Recovery

The anaerobic digestion complex produces biofuel. This energy-rich gas is currently used to heat the digestion complex. Surplus biofuel is consistently flared. This project will add cogeneration equipment to convert the biofuel to electrical energy. The electrical energy production process produces a large quantity of waste heat. This waste heat will be recovered and used to heat the

digestion complex and potentially other campus buildings and processes.

The mesophilic anaerobic digestion process will be converted to a temperature-phased anaerobic digestion process, enhancing the rate of digestion, capacity, biofuel production, and energy production/recovery.

Equipment

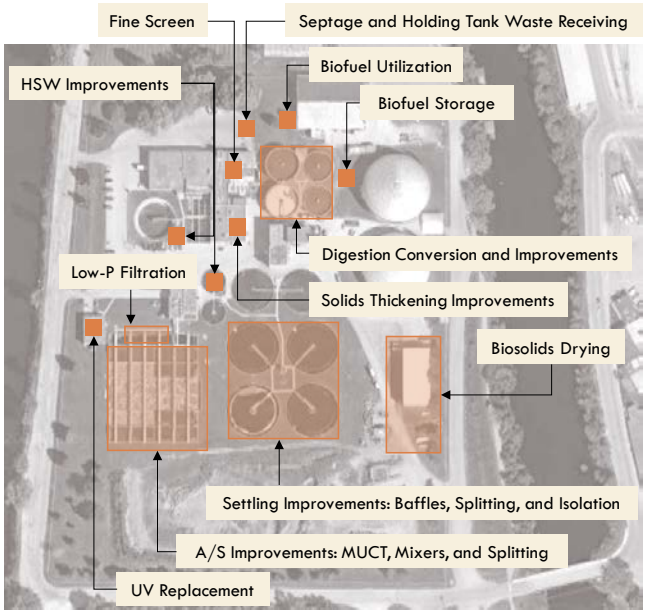
Ageing preliminary treatment, UV disinfection, and anaerobic digestion equipment at or near their reliable service lives will be replaced.

Support Systems

Modifications will enhance the capacity of the reclaimed effluent system and the reliability of the electrical and HVAC systems. Some electrical, HVAC, and space isolation improvements will enhance conformance with NFPA 820: Standard for Fire Protection in Wastewater Treatment and Collection Facilities. This Standard did not exist at the time of the last major upgrade.

Site Configuration

Site improvements will enhance flood protection with the goal of meeting the 500-year elevation, main entrance access, and access to equipment and processes. The figure below shows the anticipated WWTF configuration and the major process improvements.



Budget

At the time this document was prepared, the total capital budget for the Recommended Plan is $55.5M.

Preliminary Design Phase

Purpose

The primary purpose of the Preliminary Design Phase is to advance the concepts developed during the Planning Phase to enhance understanding of those concepts in terms of configuration (layout), functionality, performance, cost, and value. The secondary purpose is to refine concepts or consider others that might provide the necessary functionality and performance at a lower cost or greater value. The product of the Preliminary Design Phase is a Preliminary Design Report, which will be incorporated in the Final Facility Plan that is submitted to the DNR for review and approval.

Team

Donohue will serve as the Designer and Engineer, providing Civil, Structural, Process, Mechanical, Electrical and Controls design services. Survey and geotechnical services are not part of this Scope of Services. These services will be provided by others in a subsequent Design Phase.

Scope of Services

This Section outlines the Scope of Services for the Preliminary Design Phase.

General Matters

1. Provide monthly Status Reports. Topics of the Status Reports will include Activities This Period, Near-Term Activities, Outstanding Issues, Budget Position, and Schedule.
2. Provide Meeting Notes that document discussions, decisions, District comments, and District direction.
3. Submit District-review drawings in 11" x 17" reduced-scale format.
4. Perform quality reviews throughout the duration of the Project.
5. Submit a Clean Water Fund Intent to Apply on behalf of the Owner.
6. Geotechnical services will not be provided during this Preliminary Design Phase. If Donohue feels existing geotechnical information is inadequate to develop reliable cost opinions, the Donohue will notify the Owner of this concern.

Phase 100 – Project Development Step

1. Develop and submit a Request for Information. Work on site to help the Owner collect and provide the requested information. This information may include the following: recent historical wastewater data, effluent data, and/or treatment facility operating data; operating records; maintenance records; subsurface conditions information; hazardous materials information (e.g., paint and asbestos); and/or operation and maintenance manuals.
2. Develop AutoCAD drawings suitable for the Scope of Services associated with this Phase representing existing structures and the WWTF site using available record drawings and field measurements.
3. Perform a comprehensive site review to enhance the Design Team's understanding of existing conditions. All engineering disciplines will participate in this site review.
4. Develop a hydraulic profile model throughout the entire existing liquid train. If deemed necessary, perform limited field calibration of the hydraulic model to confirm it properly predicts water surface elevations. Calibration will involve discrete water surface elevations and corresponding flow measurements.
5. Develop an existing solids mass and energy balance. Use historical data to confirm the mass balance properly predicts solids production.
6. Develop process schematics for the liquid and solids trains. These schematics will be modified during the subsequent design Phases.
7. Visit other treatment facilities with the Owner to review candidate equipment and processes. These visits will provide the Owner an opportunity to discuss operating and maintenance performance directly with staff that operate and maintain the equipment.
8. Perform Quality Control reviews of works-in-progress.
9. Conduct informal conference calls with Owner to review progress, get direction, and enhance coordination in advance of Workshops.

Phase 200 – Process Design Step

1. Develop a Process Design Basis Memorandum that documents design flows, design loads, the exiting mass and energy balance, and the future mass and energy balance.
2. Select and size process equipment, piping, valves, and hydraulic control equipment (e.g., gates and weirs).
3. Define process equipment requirements: dimensions, weights, lifting requirements, access requirements, and utilities.

4. Develop process operating and control strategies.
5. Develop unit process flow sheets (schematics). Each flow sheet will be limited to a single unit process and reflect the Owner requirements and preferences provided previously.
6. Develop Civil, Structural, Controls, Electrical, and HVAC Concepts, and document those concepts in Technical Memorandums.
7. Develop a conceptual site plan showing new structures and vehicle access.
8. Develop a proposed hydraulic profile that reflects the proposed liquid train improvements.
9. Coordinate future WWTF requirements with electric, natural gas, and water utilities.
10. Produce a DRAFT Design Basis Report that includes the Process Design Basis Memorandum, Design Concepts Technical Memorandums, conceptual hydraulic profile, conceptual site plan, flow sheets, and equipment sizing information.
11. Workshop – Prepare for, conduct, and document a Workshop to review the DRAFT Design Basis Report.
    - ❖ Deliverables
      Meeting Materials
      Meeting Notes
12. Refine the DRAFT Design Basis Report to incorporate Owner comments.
13. Produce and submit the REVISED DRAFT Design Basis Report.
14. Perform Quality Control reviews of works-in-progress.
15. Conduct informal conference calls with Owner to review progress, get direction, and enhance coordination in advance of Workshops.

Phase 300 – Preliminary Layout Step

1. Prepare Conceptual Layout Drawings for structures affected by the Work of the Project. In general, these drawings will delineate:
   - Major removals (structural and equipment) within each existing structure;
   - Channels with dimensions;
   - Tanks with dimensions;
   - Basins with dimensions;
   - Buildings with dimensions;
   - Rooms on each floor like process rooms, electrical rooms, control rooms, mechanical rooms, maintenance rooms, storage rooms, office spaces, laboratories, and meeting rooms;
   - Cross sections with elevations,
   - Stairwells and doors;
   - Process equipment outlines consistent with the process equipment sized and selected during the Process Design Phase;
   - Equipment access requirements and provisions;
   - Site access requirements and provisions for each structure; and
   - Site plan showing all structures and major above-grade site features.
2. Using the process schematics and control strategies developed previously, prepare Conceptual Process and Instrumentation Diagrams (PIDs).
3. Workshop – Prepare for, conduct, and document a Workshop to review the Conceptual Layout Drawings.
   - ❖ Deliverables
     Meeting Materials
     Meeting Notes
4. Prepare Preliminary Layout Drawings for all structures affected by the Work of the Project. These drawings will incorporate Owner preferences and requirements provided during the previous Workshop, and be developed to a higher degree of completion than the Conceptual Layout Drawings. In general, these drawings will show the items listed below, which were not shown or provided on the Conceptual Layout Drawings:
   - Major structural features like wall thickness, slab thickness, beam sizes, and column sizes;
   - Major equipment access and removal devises like bridge cranes, monorails, and hoists;
   - Major electrical equipment like switchgear, emergency generators, MCCs, VFDs, transfer switches, and lighting panels;
   - Major controls equipment and panels;

- Major HVAC equipment like boilers, make-up air units, furnaces, and air conditioners;
- Site plan showing all structures, major above-grade site features, major buried process piping, and major buried utilities; and
- Overall electrical one-line diagram(s).

5. Prepare a Construction Cost Opinion based on the current version of the Preliminary Layout Drawings and PIDs. The construction cost opinion will be take-off based and organized by specification division (16-division format). Develop annual operating cost opinions for unit processes that differ from existing unit processes (e.g., low-level phosphorus removal and drying) or operating schemes that differ from existing operating schemes. Develop typical residential user rate opinions assuming Clean Water Fund financing. The user rate calculations will be similar to those developed during the Planning Phase.
6. Workshop – Prepare for, conduct, and document a Workshop to review the Preliminary Layout Drawings, PIDs, and Construction Cost Opinion. A primary focus of this Workshop will be the costs. At this Workshop, attendees, armed with the detailed cost opinion, will explore alternatives that provide the necessary performance and functionality at a lower cost or greater value. Attendees will develop a list of cost-reduction alternatives worthy of further investigation.
   ❖ Deliverables
   Meeting Materials
   Meeting Notes
7. Refine the Preliminary Layout Drawings and PIDs to reflect Owner preferences and requirements provided during the preceding Workshop.
8. Explore the performance and functionality associated with the list of cost-reduction design revisions produced during the previous Workshop. Understanding Owner requirements and preferences, Donohue may develop other alternatives after this Workshop. Where appropriate or necessary, develop refined layout drawings illustrating the implementation of the cost-reduction alternatives.
9. Update the Construction Cost Opinion reflecting the current version of the Preliminary Layout Drawings and PIDs.
10. Develop cost opinions for the cost-reduction alternatives advanced from preceding Workshop, and/or developed subsequently by Donohue, and found to sufficiently preserve the necessary performance and functionality.
11. Workshop – Prepare for, conduct, and document a Workshop. Attendees will review and discuss the refined Preliminary Layout drawings and PIDs. A major emphasis will be placed on a review of the refined and updated capital, annual, and user rate cost opinions. The purpose of this review is to select the cost-saving strategies that will be incorporated in the Project.
    ❖ Deliverables
    Meeting Materials
    Meeting Notes
12. Produce the final Preliminary Layout Drawings and PIDs that reflect the decisions made during the preceding Workshop.
13. Produce the final Preliminary Layout Cost Opinion consistent with the decisions made during the previous Workshop.
14. Produce a Preliminary Design Report (PDR) that incorporates the FINAL Design Basis Report, Preliminary Layout Drawings, Preliminary PIDs, operating strategies, and Construction Cost Opinion. A detailed and itemized cost opinion will be provided separately as a stand-alone PDR Cost Opinion.
    ❖ Deliverables
    Preliminary Design Report (PDR)
    PDR Cost Opinion
15. Produce and submit the FINAL Facility Plan to the Owner and DNR. Submit and present the Facility Plan to Council. Respond to DNR questions to obtain approval. The FINAL Facility Plan will incorporate the Preliminary Design Report and Cost Opinion.
    ❖ Deliverables
    FINAL Facility Plan
16. Perform Quality Control reviews of works-in-progress.
17. Conduct informal conference calls with Owner to review progress, get direction, and enhance coordination in advance of Workshops.

Phase 900 – Project Support

1. Develop a first-order cost-benefit analysis of one or two high-strength-waste diversion scenarios. These scenarios will be limited to wastes associated with City Brewery.
2. Collaboratively with the City, continue to explore using dried biosolids as a fuel source at the local Gunderson Lutheran facility.

Schedule and Compensation

Schedule

The Worksheet that follows this page shows the anticipated timing/duration for each Phase in the column on the far left side. That timing is summarized below.

Phase 100 – Project Development	4 Weeks
Phase 200 – Process Design	6 Weeks
Phase 300 – Preliminary Layout	8 Weeks

The FINAL Facility Plan will be submitted to the Owner and DNR in January 2020 after receiving and incorporating Owner comments/revisions.

Compensation

The Worksheet included as an Attachment delineates the estimated level of effort (2,280 hours) and compensation for the Scope of Services delineated above ($349,275).

The effort supplements the 1,710 hours Donohue has already devoted to working with the City to produce the Recommended Plan and understand the Facility: City sustainability objectives, impending regulatory requirements, historical flows and loadings, operating characteristics, operating performance, liquid train configuration and conditions, and solids train configuration and conditions.

Attachment
Level of Effort and Fee Worksheet

City of La Crosse
Wastewater Treatment Facility Improvements Project: Preliminary Design Phase
Fee Estimate Summary
Donohue & Associates, Inc.

Duration	Phases and Tasks	Project Principal Gerbitz $ 240	Project Manager Lynne $ 175	QA/QC Varies $ 210	Senior Operations Marten $ 210	Senior Process Lynne $ 175	Junior Process TBD $ 115	Senior Structural Schuenemann $ 160	Junior Structural TBD $ 115	Senior Electrical Berktold $ 190	Junior Electrical TBD $ 115	Senior Controls Goecks $ 175	Junior Controls TBD $ 115	Senior Mechanical Wills $ 190	Senior Civil Kimmler $ 160	Junior Civil TBD $ 115	Total Labor Hours	Total Labor Cost	Travel	Total Cost
4 Weeks	**100 - Project Development Phase**																**365**	**$ 59,875**	**$ 4,000**	**$ 63,875**
	Conduct Process Equipment Site Visits to Guide Equipment Selection		25		25		5										55	$ 10,200	$ 2,000	$ 12,200
	Perform Site Reconnaissance and Documentation	5			15	15		15		15		15		15	15		110	$ 20,100	$ 2,000	$ 22,100
	Develop Structure-by-Structure Condition Assessment and Improvements		5		5	5		5		5		5		5	5		40	$ 7,175		$ 7,175
	Develop Existing Site Plan [No Site Topographic Survey]															20	20	$ 2,300		$ 2,300
	Develop Existing Hydraulic Profile					10	25										35	$ 4,625		$ 4,625
	Develop Existing Mass and Energy (GHG) Balance Process Model		5		10	10	40										65	$ 9,325		$ 9,325
	Develop Existing Plant-Wide Liquid Schematic				5	5	10										20	$ 3,075		$ 3,075
	Develop Existing Plant-Wide Solids Schematic				5	5	10										20	$ 3,075		$ 3,075
6 Weeks	**200 - Process Design Phase**																**720**	**$ 110,675**	**$ 500**	**$ 111,175**
	Develop Process Design Basis Memorandum	5		5	10	10	20										50	$ 8,400		$ 8,400
	Develop Proposed Mass and Energy (GHG) Balance Process Model			5	15	5	40										65	$ 9,675		$ 9,675
	Select and Size Process Equipment		5	5	10	25	120							20			185	$ 26,000		$ 26,000
	Develop Process Operating Strategies			5	10	20	60							10			105	$ 15,450		$ 15,450
	Develop Unit Process Flow Sheets (Schematics)		5		10	20	60							10			105	$ 15,275		$ 15,275
	Develop Civil, Strutural, Controls, Electrical, and HVAC Concepts							10		10		10		10	10		50	$ 8,750		$ 8,750
	Develop Proposed Site Plan [No Site Topographic Survey]														5	10	15	$ 1,950		$ 1,950
	Develop Proposed Hydraulic Profile					5	20										25	$ 3,175		$ 3,175
	Develop Utility Requirements and Coordinate with Utilities		5							5				5			15	$ 2,775		$ 2,775
	Develop DRAFT Design Basis Report		20	5	5												30	$ 5,600		$ 5,600
	Workshop	5			10	10	10										35	$ 6,200	$ 500	$ 6,700
	Develop Revised DRAFT Design Basis Report		5	5	5	5				5		5		5	5		40	$ 7,425		$ 7,425
8 Weeks	**300 - Preliminary Layout Phase**																**1,155**	**$ 165,975**	**$ 1,500**	**$ 167,475**
	Prepare Conceptual Layout Drawings: Removals, Rehabilitation, New	5	10			10	60	10	120	10	40	5	5	20	15	10	320	$ 42,300		$ 42,300
	Prepare Conceptual Process and Instrumentation Drawings (PIDs)				10	10	20					10	80	5			135	$ 18,050		$ 18,050
	Workshop	10			10	10	10										40	$ 7,400	$ 500	$ 7,900
	Prepare Preliminary Layout Drawings: Removals, Rehabilitation, New	5	10	5		5	40	5	80	5	10	5	5	5	10	5	195	$ 26,150		$ 26,150
	Prepare Preliminary Process and Instrumentation Drawings (PIDs)			5	10	10	15					5	40	5			90	$ 13,050		$ 13,050
	Prepare Detailed Construction Cost Opinion	5				5	10	5	10	10	10	5	10	10	10		90	$ 13,750		$ 13,750
	Workshop	10				10	10										30	$ 5,300	$ 500	$ 5,800
	Perform Cost-Reduction Analysis and Develop Cost-Reduction Alternatives	5				5	10		5		5				5		35	$ 5,175		$ 5,175
	Produce Detailed Construction Cost Opinion for Cost-Reduction Alternatives	5				5	10		5		5		5	5	5		45	$ 6,700		$ 6,700
	Workshop	10				10	10										30	$ 5,300	$ 500	$ 5,800
	Produce and Submit Preliminary Design Report (PDR)	5	20	5	10		40			5		5		5			95	$ 15,225		$ 15,225
	Produce and Submit FINAL Facility Plan to Owner and WDNR	5	20				25										50	$ 7,575		$ 7,575
	900 - Project Support																**40**	**$ 6,750**	**$ -**	**$ 6,750**
	Coordinate High-Strength Waste Segregation Opportunity				10	10	10										30	$ 5,000		$ 5,000
	Coordinate Biosolids-as-Fuel Opportunity		10														10	$ 1,750		$ 1,750
	Total	80	145	45	190	240	690	50	220	70	70	70	145	135	85	45	2,280	$ 343,275	$ 6,000	**$ 349,275**
	Total Labor Dollars by Labor Class	$19,200	$25,375	$ 9,450	$ 39,900	$42,000	$79,350	$ 8,000	$25,300	$13,300	$ 8,050	$12,250	$16,675	$ 25,650	$13,600	$ 5,175				

Current Anticipated Construction Cost	**$48,000,000**

Labor Fee Breakdown by Discipline for Phases 100, 200, 300, and 900		**% of Total**
PM	$44,575	13%
QA/QC	$9,450	3%
Process	$161,250	47%
Structural	$33,300	10%
Electrical	$21,350	6%
Controls	$28,925	8%
Mechanical	$25,650	7%
Civil	$18,775	5%
Total for Preliminary Design Phases	**$343,275**	100%

Preliminary Design Labor Fee as a % of Anticipated Construction Cost **0.72%**

Attachment
Brief Statement of Qualifications

Statement of Qualifications

Wastewater Engineering Design Services

City of La Crosse, WI | August 9, 2019

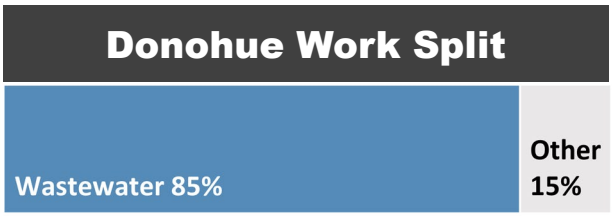
DONOHUE

3311 Weeden Creek Road | Sheboygan, WI 53081
920.208.0296 | donohue-associates.com

Firm Overview

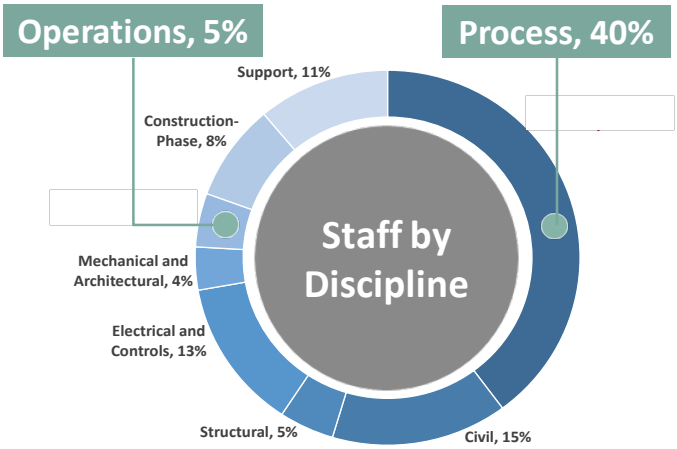
Wastewater-Focused Firm

Donohue & Associates, Inc. is an award-winning, employee-owned wastewater specialty firm that large Midwest clients repeatedly trust to deliver their most challenging wastewater improvement projects. We have worked on over 2,600 wastewater projects for more than 300 Midwest clients since forming in 1997. We currently have over100 employees in 11 offices in Wisconsin, Illinois, Minnesota, Michigan, Indiana, and Missouri. Nearly half of our employees are located in our Milwaukee and Sheboygan offices.



Our impressive track record of successfully delivering complex projects is attributed to the technical excellence of our project managers and engineers, our acute attention to detail, our adherence to our rigorous Quality Control program, and our collaborative culture that demands we listen to and work closely with all of our clients' departments: management, engineering, operations, and maintenance.

We have all the required engineering design disciplines in-house; however, our relatively high percentage of Process Engineers and design-focused Operations Specialists reveals our focus and commitment to wastewater treatment. All of our wastewater treatment design teams include Operations Specialists. Their design role is essential to our ability to produce safe, practical, operable, and flexible solutions. The figure below is our staffing by discipline, expressed as a percent of our total.



References

Nothing speaks louder about our performance than the feedback from our clients. The following are recent Donohue testimonials and references. We encourage you to contact these references so you can hear their thoughts first-hand.

Wisconsin DNR
Clean Water Fund

"I want to let you know that your Clean Water Fund application is one of the most complete and well-organized applications I've ever reviewed. Thank you!"

Jeanne Cargill
Wisconsin DNR
Community Financial Assistance
Clean Water Fund Loan Specialist
608-267-7587
Jeanne.Cargill@Wisconsin.gov

WLSSD - Duluth, MN
Energy Master Plan

"The Workshops provided a wealth of clear, concise information that helped our staff make decisions and establish priorities. The Energy Roadmap provided the District clear near-term direction and the justifications needed to break through the historical barriers to capital projects that enhance energy efficiency and recovery."

Caroline Clement, Principal Engineer
Western Lake Superior Sanitary District
218-740-4782
Caroline.clement@wlssd.duluth.mn.us

Superior, WI
Facility Planning and Wet Weather Optimization

"During the rain event yesterday the main plant flow target was increased to a point where our target is 9.0 mgd. I am pleased to report that the main WWTP handled that amount of flow without appearing challenged in any way and that we are looking forward to pushing that number even higher!

Prior to the improvements recommended by Donohue, the main plant flow target was approximately 6 mgd so this represents achieving a milestone of an apparent effective capacity increase of 50% or more through the wet weather optimization improvements. The intended capacity resulting from the improvements appears well within sight and I am confident they will be achieved.
Similarly, several of our most senior Operators have also noted that they have never seen the plant operating like this."

Steve Roberts, Director - Environmental Services
Division of Public Works, City of Superior
715-394-0392 | robertss@ci.superior.wi.us

St. Cloud, MN – Nutrient Recovery & Reuse (NR2) Design

"The NR2 Workshop went GREAT today. Both Brian and I wanted to let you know we think Jeff [Wills], Allen [Williams], Nathan [Cassity] and Jeremy [Cramer] are all absolutely fantastic. It was so great to get together and go through all the details again and being able to ask questions with everyone being in the same room. As a team, St. Cloud and Donohue have spent several hundred hours and then some working on this project thus far, and it's exciting to be at the stage of where it is at now; equipment being delivered in the next few weeks, installed and we will be operating this all very soon!

Your team is exceptionally brilliant, knowledgeable, professional and respectful. We truly enjoy working with all you freaky smart people!

Tracy Hodel, Assistant Public Utilities Director, City of St. Cloud | 320-420-1163
thodel@ci.stcloud.mn.us

Eau Claire, WI
Facility Plan and Design

"When we selected Donohue & Associates for our Facility Plan and Design for our Phase 1 and 2 we did so because of their expertise and commitment to Wastewater Treatment. The Engineers and Technicians at Donohue are the best in their field, and the final product that we received is proof of that passion and expertise."

Jeff Pippenger, Utilities Administrator
City of Eau Claire | 715-839-4920
Jeff.Pippenger@eauclairewi.gov

Willmar, MN
Wastewater Program

"The City of Willmar selected Donohue & Associates to lead this complex 5-year program, which included program management and the planning, design, and construction of $80 million worth of wastewater-related infrastructure. The end result was a program that was delivered on time and under budget, with systems performing as expected. Because of Donohue's dedication and performance, this project was a tremendous success."

Michael Schmit, Retired City Administrator
Colleen Thompson, Former Treatment Superintendent, City of Willmar
320-796-4523
Colleen.Thompson@kcmn.us

Joliet, IL
Wastewater Planning and Design

"I have complete trust in Donohue's design team due to the quality of their work, their ability to listen to and implement our comments and ideas, and the responsiveness of their project managers."

Allison Swisher, PE, Project Engineer
City of Joliet | 815-724-4222
aswisher@jolietcity.org

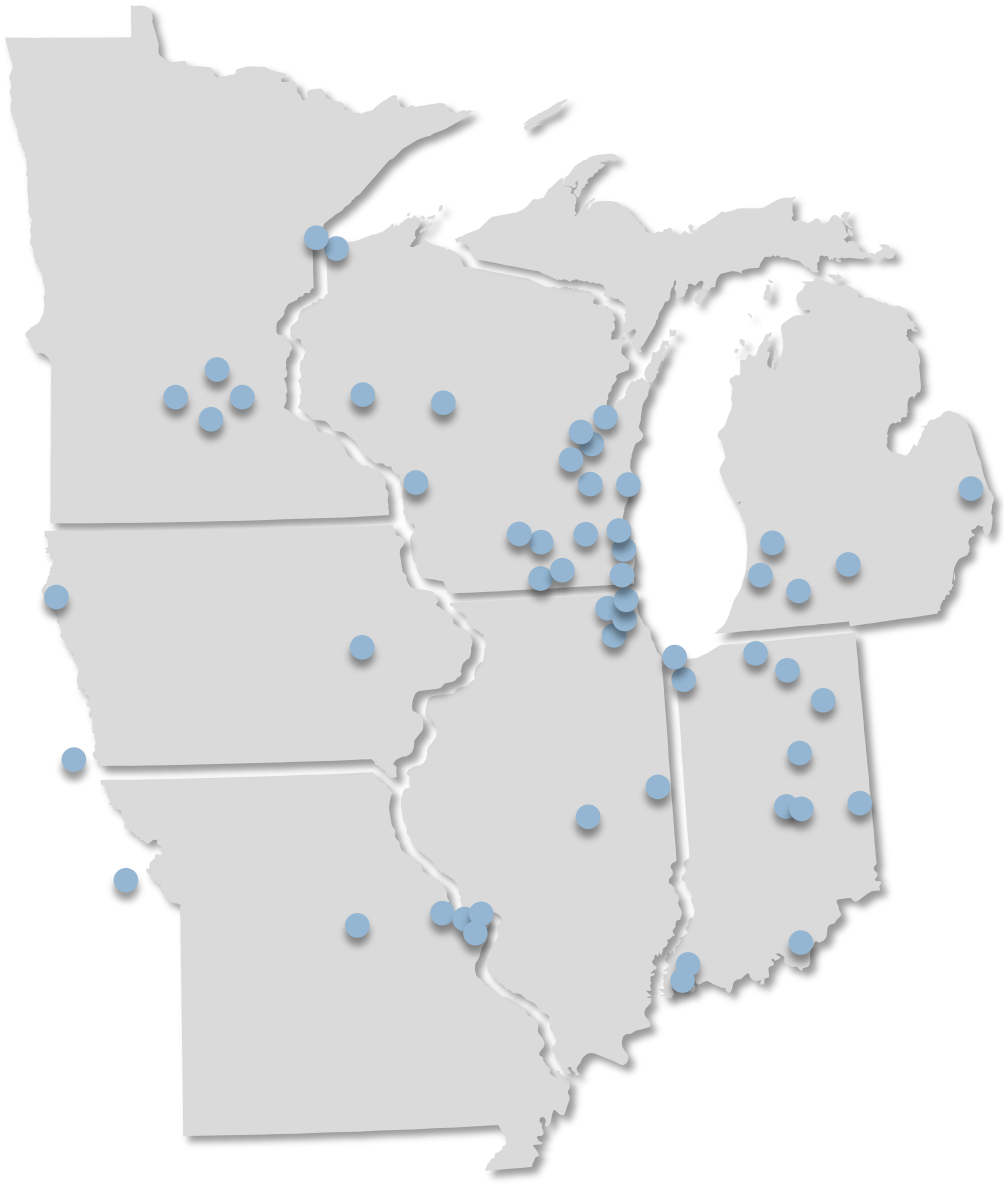
Fort Wayne, IN – Wet Weather Pump Station

"Donohue provided exceptional design and construction phase services for the City's 850 mgd wet weather pump station; a pump station that needed to remain in operation during construction. The City also selected their proposal to perform systems integration and programming services during construction. The utility benefited greatly from their attention to detail and efficient communication on this complex project. If given the chance to do this over, I would absolutely select Donohue & Associates again."

Andrew Schipper, PE, Program Manager, City of Fort Wayne | 260-427-5234
andrew.schipper@cityoffortwayne.org

DONOHUE

Firm Experience: Major Wastewater Clients



Location	Peak (mgd)	Location	Peak (mgd)	Location	Peak (mgd)	Location	Peak (mgd)
GLWA, Detroit, MI	1,700	Appleton, WI	100	Fond du Lac, WI	50	Highland Park, IL (NSWRD)	28
MRWD, Stickney, IL	1,440	Fort Wayne, IN	100	Gurnee, IL (NSWRD)	47	Willmar, MN	27
Milwaukee, WI-Jones Island	390	Omaha, NE	100	Battle Creek, MI	46	WalCoMet, Delavan, WI	26
St. Louis SD, MO: Bissell	300	Joliet, IL	82	Waukegan, IL (NSWRD)	44	Danville SD, IL	24
Lemay	340	South Bend, IN	77	La Crosse, WI	42	Topeka, KS	24
Coldwater Creek	75	Hammond, IN	72	Wyoming, MI	42	Wausau, WI	22
Milwaukee, WI-South Shore	300	New Albany, IN	66	Evansville, IN (Eastside)	40	Goshen, IN	21
NEW Water, Green Bay, WI	160	Naperville, IL (South)	63	St. Cloud, MN	40	Oshkosh, WI	20
WLSSD, Duluth, MN	160	Jefferson City, MO	60	Janesville, WI	40	Beloit, WI	20
Cedar Rapids, IA	140	HOVMSD, Kaukauna, WI	60	Richmond, IN	36	Sun Prairie, WI	17
Decatur, IL	125	Evansville, IN (Northside)	60	St. Charles, MO	36	Marion, IN	17
Gary, IN	120	Sheboygan, WI	56	Eau Claire, WI	30	Hutchinson, MN	15
Kenosha, WI	100	Brookfield, WI	50	Sioux City, IA	29	Superior, WI	15
Madison, WI	100						

Firm Experience: Wisconsin Clients

Location
Appleton
Beloit, City of
Beloit, Town of
Berlin
Brookfield
Bush Brothers (Augusta)
Cassville
Cleveland
Clinton
Durand
Eau Claire
Fond du Lac
Fort Atkinson
Fountain City
Gibbsville SD
Grafton
Hatley
Howards Grove
Independence
Janesville
JOTS-Barron
Kenosha
HOVMSD, Kaukauna, WI
Kewaunee
Kiel
Knapp
La Crosse
Lakeland College
Madison
Manitowoc
Mayville
Medford
Mercer
Milwaukee, WI-Jones Island
Milwaukee, WI-South Shore
New Holstein
New London
NEW Water, Green Bay, WI
Onion River Water Comm.
Oshkosh
Sheboygan
Somerset
St. Croix Falls
Stevens Point
Sun Prairie
Superior
Two Rivers
Waldo
WalCoMet, Delavan
Waukesha
Waupun
Wausau
Whitewater

Project Team and Resumes

Mike Gerbitz, PE

29 Years of Experience

- Mike is a senior process engineer for complex, multi-discipline wastewater planning and design projects for wastewater treatment plants up to 390 mgd capacity: Brookfield, WI Facility Plan and Various Upgrades; Fond du lac, WI Low Level Phosphorus Compliance and Resource Recovery Planning; Wausau, WI Facility Plan and WWTP Upgrade; St. Cloud, MN Nutrient Recovery and Reuse; Eau Claire, WI Phase II Planning/Design; Oshkosh, WI Digester System Upgrades; WLSSD, Duluth, MN Energy Master Plan, Oxygen Supply Facility Plan/Design, and Preliminary Treatment Planning/Design; Faribault, MN Facilities Planning/Design; Willmar, MN New WWTP and Collection System Planning/Design; and East Lansing, MI Biosolids Master Plan
- Project Manager of the project that won the 2018 Best of State Award from ACEC Minnesota" "A Utility of the Future > Making St. Cloud GREATER." April 11, 2017 will forever be known as "Energy Independence Day;" the first day the wastewater treatment facility produced 100% of its required energy and achieved Net Zero Energy status. The first in Minnesota. The facility produces more than 90% of its required electricity on average annually. To capture this renewable energy, efficient biofuel conditioning equipment and a biofuel-driven engine generator convert the biofuel to electricity and heat.
- 2008 recipient of WEF's prestigious George Bradley Gascoigne Medal for *Research in Wastewater Treatment Plant Operational Improvement*

"The Workshop went GREAT today…It was so great to get together and go through all the details again and being able to ask questions with everyone being in the same room. As a team, St. Cloud and Donohue have spent several hundred hours and then some working on this project thus far, and it's exciting to be at the stage of where it is at now; equipment being delivered in the next few weeks, installed and we will be operating this all very soon!

Your team is exceptionally brilliant, knowledgeable, professional and respectful. We truly enjoy working with all you freaky smart people."

Tracy Hodel, Assistant Utilities Director, City of St. Cloud | Email to Mike Gerbitz 04/05/2018

Eric Lynne, PE

12 Years of Experience

- Eric has developed a strong role as a lead wastewater process engineer, working closely with owners to ensure that his projects meet the community's needs both in terms of performance and cost
- His work efforts focus on the planning, processing modeling, design and operation of wastewater infrastructure facilities. He provides cradle-to-grave project continuity working on studies, developing designs, managing construction administration, and system startup
- His efforts specifically at Fort Atkinson involve project manager and lead process engineer for the 2018 WWTP Facility Plan, 2016 Dewatering Centrifuge Replacement Project, and was a project manager during the 2017 Sanitary Sewer Evaluation Study.
- Has also served as process engineer for wastewater conveyance and treatment projects in Stevens Point, Sun Prairie, Fond du Lac, Superior, La Crosse, New London, Kiel, Medford, and Onion River WWC; WI; North Shore Sanitary District-Gurnee, and Decatur SD, IL; and St. Cloud, MN.
- With a desire to give back to the wastewater industry, Eric has received awards as the result of his dedicated service to Central States WEA: WEA Service Award, WI Section Service Award, Young Professional of the Year, and 7S membership.

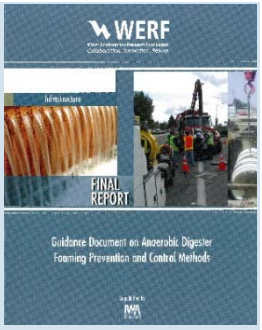
Bill Marten, PE

40 Years of Experience

- Bill's expertise includes researching, planning, designing, starting up, analyzing, and troubleshooting wastewater treatment systems. He is Donohue's Practice Leader for Wastewater Biological Processes and Nutrient Removal
- Bill has been an operator, a wastewater utility engineer, and has managed a 15-mgd activated sludge plant, giving him a "real world" perspective on every project. In addition, he emphasizes training and learning including providing tools to help staff understand, control and optimize all of their plant processes.
- He has significant facility-wide and focused (e.g., nutrient removal, biosolids treatment and handling, capacity assessment, operations assistance, new technology evaluation) experience, including locations such as La Crosse, Beloit, Milwaukee, Sheboygan, Brookfield, Eau Claire, Superior and Sun Prairie, WI; Fort Wayne and Gary, IN; North Shore WRD, Decatur, Champaign, and Rantoul, IL; Marquette, MI; and Faribault, Willmar, and Becker, MN. His industrial wastewater experience includes projects for Hormel, Frito Lay, and Bush Brothers.
- A certified wastewater treatment plant operator, professional engineer and board certified environmental engineer, he has conducted process/operations reviews to help solve problems at numerous wastewater treatment plants
- Bill has made giving back and information sharing a key element throughout his career, including professional organization service and regularly contributing professional papers and presentations. In recognition, he has been awarded WEF's notable George Bradley Gascoigne Medal for Research in Wastewater Treatment Plant Operational Improvement, WWOA's prestigious Koby Crabtree Award, and CSWEA's Academic Excellence Award and 7S Society membership.

BILL'S NATIONAL ANAEROBIC DIGESTER INVOLVEMENT

Bill Marten was a key team member of the WERF Project Subcommittee for INFR1SG10 ***Wastewater Treatment Anaerobic Digester Foaming Prevention and Control Methods***. This significant research effort was aimed at reviewing the extent of anaerobic digester foaming across the country, coupled with a comprehensive survey of facilities with foaming histories, and focused studies at four facilities. His role was to review work plans, individual task order (research phase) results and the overall study report. In this role Bill instilled practical comments to improve each phase of the work, offered his own operational, process and trouble-shooting experiences from numerous plants, coupled with collaborative discussions with professional associates both within and outside of Donohue. The Final Report was issued in 2014.



Jeff Wills, PE

25 Years of Experience

- Donohue's Practice Leader for Mechanical Systems and Energy Recovery.
- Senior Mechanical Engineer whose professional activities have included planning, design and construction administration as well as project management on a large variety of biosolids handling, anaerobic digestion, biosolids drying, biofuel conditioning, biofuel utilization, combined heat and power (CHP) projects, and water/wastewater campus heating systems.
- Lead engineer for all Donohue CHP study, design, and construction projects (see chart below). Jeff recently designed a large biofuel conditioning and utilization system for the 40-mgd WLSSD (Duluth, MN) Water Resource Recovery Facility. Electrical Engineer Joe Berktold worked alongside Jeff on the majority of these projects
- Recent digester project work includes:
  - Digestion enhancements and energy recovery at Fort Wayne, IN
  - Digestion enhancements, energy recovery, and resource recovery at St. Cloud, MN
  - Biogas conditioning, biogas CHP, and campus heating system improvement for WLSSD, Duluth, MN
  - Digestion enhancements and energy recovery for Faribault, MN
  - Digestion enhancements and energy recovery for Eau Claire, WI
  - Biofuel conditioning and utilization for Milwaukee Metropolitan Sewerage District
  - Digester Mixing and Gas Utilization for Stevens Point, WI
  - Digester Mixing Improvements, Oshkosh, WI

JEFF WILLS' SELECTED CHP EXPERIENCE

COMMUNITY/SANITARY DISTRICT	Number of Engines Installed	Engine Size (KW)	Number of Turbines Installed	Turbine Size (KW)	Biogas Handling	Biogas Utilization	Fuel
Bush Brothers Co. – Augusta, WI	1	633			■	■	Biogas
Fort Wayne, OH	2	400			■	■	Biogas
Kenosha, WI	2	375			■	■	Biogas
Eau Claire, WI	2	600			■	■	Biogas
Marquette, MI	2	100			■	■	Biogas
Milwaukee MSD – S. Shore, WI	4	925				■	Biogas
St. Cloud, MN	2	650			■	■	Biogas
Sheboygan, WI (Micro Turbines)			2	200	■	■	Biogas
Sheboygan, WI (Micro Turbines)			10	30	■	■	Biogas
Stevens Point, WI	1	330			■	■	Biogas
Western Lake Superior SD, Duluth, MN	3	825			■	■	Biogas
Willmar, MN	2	1750					Diesel
Illinois American Water - East St. Louis, IL	2	2250					Diesel
IDOT - Chicago, IL	1	1500					Diesel
Auburn, IN	1	1500					Diesel
Fond du Lac, WI	2	400					Diesel
Faribault, MN	1	1000					Diesel
Eau Claire, WI	2	600					Diesel
O'Fallon, MO	1	500					Diesel
Chatham, IL	1	1000					Diesel

Joe Berktold, PE

Electrical

31 Years of Experience

- Joe has 31 years of progressive experience designing electrical systems for water and wastewater treatment facilities
- He is Donohue's Practice Leader for Electrical Systems. He has given numerous presentations at the national and regional level regarding electrical systems and safety issues related to water and wastewater facilities. This includes arc flash hazards, identifying hazardous classified locations using NFPA 820, and testing plant electrical systems without impacting operations.
- He serves on the National Fire Protection Association's NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities technical committee as the WEF representative. Thus, he is very knowledgeable on NFPA compliance and changes made to the standard in the new 2020 version released on May 18, 2019.
- Representative projects include: Class A Biosolids Improvements at Kenosha Water Utility, WI; Resource Recovery and Renewable Energy Production at St Cloud, MN; Biogas Conditioning and Utilization for WLSSD, Duluth, MN. Other projects for Milwaukee (MSD), WI; Chicago (MWRDGC), IL; Waterloo, IA; Evansville, IN; and Fort Wayne, IN.

Sandy Kimmler, PE
Civil/Site

30 Years of Experience

- Highly experienced civil engineer with expertise in planning, design, and construction management for collection system studies, I/I reduction programs, design of sanitary and storm sewers, force mains, and pump stations
- Recent project experience includes:
  - Leader for planning, design, and permitting for $22M collection system projects in Willmar, MN and civil/site layout for $40M new wastewater treatment facility
  - Lead Civil Engineer for Wilmette and Evanston Pump Stations Rehabilitation, Metropolitan Water Reclamation District of Greater Chicago, Illinois
  - Technical Support and Quality Control Reviewer for Pump Station Vulnerability and Risk Assessment Study, Metropolitan Water Reclamation District of Greater Chicago, Illinois
  - Senior Civil Engineer for Cole Junction Pump Station and Force Main, Jefferson, City , Missouri
  - Lead Civil Engineer for wastewater collection system master planning throughout the NEW Water (Green Bay), WI service area
  - Lead Civil Engineer for multiple project for City of Waukesha, WI including:
    - Greenmeadow Sanitary Infrastructure Improvements
    - Sanitary Sewer System Master Plan
    - E. Moreland Blvd (USH 18) Flood Mitigation
    - SWMM Modeling – Summit Avenue Improvements

Dave Goecks
SCADA/Controls

30 Years of Experience

- Highly experienced control systems engineer in the design, specification/documentation, and programming of relay and automated power and control systems utilizing PLCs, HMIs, and VFDs, including application software programming, and commissioning and field services, ranging from existing system evaluation and condition assessment, and software development through startup and training
- Water and wastewater facility upgrades include Milwaukee (MSD), WI; Eau Claire, WI; Joliet, IL; St. Cloud, MN; Brookfield, WI; Rushville, IN; NEW Water (Green Bay), WI; Jeffersonville, IN; Stevens Point, WI; Kiel, WI; New London, WI; WLSSD (Duluth), MN; Wausau, WI; Superior, WI; St. Louis (MSD), MO; Fisher, IL; Topeka, KS; and Grafton, WI

Craig Schuenemann, PE, LEED AP BD+C
Structural

22 Years of Experience

- Structural design engineer with over 20 years of experience in the planning and design of water, wastewater, and stormwater structures. Leads the Donohue structural engineering discipline.
- He has led structural designs for St. Cloud, MN; Oshkosh, WI; Joliet, IL; Kenosha, WI; Janesville, WI; NEW Water (Green Bay), WI; Fort Worth, TX; Racine, WI; Gary, IN; Mankato, MN; Manitowoc, WI; Menasha, WI; Hutchinson, MN; Marietta, GA; Baltimore, MD; and Waterloo, IA.
- As LEED AP certified, Craig has an up-to-date understanding of the most current green building principles and practices

DONOHUE

MICHAEL W. GERBITZ, PE

PROFESSIONAL ENGINEER
Wisconsin: 32259
Michigan: 6201064285
Minnesota: 53781

YEARS OF EXPERIENCE
29

EDUCATION
Master of Science
Civil Engineering
Southern Illinois University
1992

Bachelor of Science
Aerospace Engineering and Mechanics
University of Minnesota
1990

PROFESSIONAL ASSOCIATIONS
Central States Water Environment
Water Environment Federation
NACWA

AWARDS
2018 ACEC Minnesota Engineering Excellence Grand Award, Project Manager/Lead Process Engineer: A Utility of the Future > Making St. Cloud GREATER, St. Cloud Minnesota

2017 ACEC Wisconsin Engineering Excellence Best of State Award, Project Manager: Eau Claire WWTF-Resilient, Robust, Sustainable, Eau Claire, Wisconsin

2013 ACEC Wisconsin Engineering Excellence Grand Award, Project Manager: Sheboygan Regional WWTP Achieves Net Zero Energy, Sheboygan, Wisconsin

2012 ACEC Minnesota Engineering Excellence Honor Award, Lead Project Manager/Lead Process Engineer: New Wastewater Treatment Facility, Willmar, Minnesota

2008 George Bradley Gascoigne Medal, Water Environment Federation

2007 ACEC Engineering Excellence Grand Award/National Finalist, Project Manager: Wastewater Treatment Facility at Chatfield, Minnesota

PAPERS
"Sheboygan WWTF Achieves Net Zero Energy," The Clarifier, Wisconsin Wastewater Operators' Association, December 2013

"You've got grit-slurry problems. Now what?" Water Environment & Technology Magazine, September 2013

"Best from the Inside Out, A change in direction eliminated filamentous bulking at a Wisconsin slaughterhouse," Industrial Wastewater, February/March 2007, Water Environment Federation Magazine

Facility Planning, La Crosse, Wisconsin. Process Engineer: Evaluated solids handling system, biogas-to-energy, aeration-efficiency enhancement, and phosphorus removal alternatives as part of a facility-wide planning effort for this 20-mgd average-flow wastewater treatment facility. The treatment facility consists of preliminary treatment, primary treatment, enhanced phosphorus removal activated sludge, final clarification, UV disinfection, anaerobic digestion, solids thickening, and liquid biosolids storage. The facility planning effort included a two-day alternatives brainstorming workshop with two internationally-recognized wastewater experts (Stensel and Lue-Hing). The brainstorming workshop generated more than 50 alternatives worthy of further detailed evaluation.

Energy Efficiency and Resource Recovery (R2E2) Study, St. Cloud, Minnesota. Project Manager: Donohue was retained to perform a comprehensive assessment of energy efficiency alternatives and resource recovery alternatives relevant to their 17-mgd advanced wastewater treatment facility. The objective was to develop a plan to enhance the cost effectiveness and longevity of the biosolids land application program and reduce energy purchases. The City established a goal to reduce energy purchases by 25% in 5 years, 50% in 10 years, and 75% in 20 years. Alternatives focused on biosolids stabilization and land application strategies, activated sludge and aeration strategies, sidestream treatment strategies, biogas utilization strategies, high-strength waste receiving and digestion strategies, struvite harvesting, and solar energy. Specific biosolids alternatives included Lystek biosolids stabilization (Class A), in-vessel composting, heating drying, dewatering (centrifuge, screw press, and belt press), and biosolids thickening (rotary drum and gravity belt). Biogas utilization alternatives included biogas conditioning, engine generators, microturbines, and compressed natural gas (from biogas). Struvite harvesting alternatives included Multiform Harvest, Ostara, and AirPrex.

Energy Efficiency and Biofuel Project, St. Cloud, Minnesota. Project Manager/Principal/Client Advocate: Donohue designed a biofuel conditioning and utilization system for this 17-mgd advanced wastewater treatment facility. The system was sized and designed to work alongside a 250-kW solar garden and accommodate additional biofuel from hauled-in high-strength waste.

Nutrient Recovery and Reuse Project (NR2), St. Cloud, Minnesota. Project Principal/Client Advocate: The City of St. Cloud retained Donohue to complete design services for a biosolids upgrade and nutrient recovery project (NR2). Biosolids processing at the St. Cloud WWTF currently includes sludge thickening and digestion. The NR2 project will add increased biogas storage, biosolids dewatering, biosolids cell lysis and sidestream struvite recovery. Struvite recovery reduces recycle phosphorus loading and produces a slow-release fertilizer product. Construction is anticipated to start in the fall of 2017.

Treatment Facility and Pump Stations, Willmar, Minnesota. Project Manager: Donohue served as program manager for the design of $70M of wastewater system improvements. These improvements consisted of a new 5-mgd average day flow treatment facility, 6 miles of 48- and 54-inch gravity interceptor, two raw wastewater pump stations, and several miles of raw wastewater force main. The new 5-mgd treatment facility consists of a screw pump raw wastewater pump station, a centrifugal submersible raw wastewater pump station, fine screening, screenings washing/compacting, grit removal, anoxic selector, oxidation ditch activated sludge, secondary settling, UV disinfection, final aeration, chemical phosphorus removal, gravity belt WAS thickening, liquid sludge storage, hypochlorite filament control, and reclaimed effluent pumping and distribution. The design phase included a 30%-complete design submittal with cost opinion, a 75%-complete design submittal and cost opinion, and a 95%-complete design submittal and cost opinion. The 30%-complete cost opinion exceeded the program budget, prompting a value engineering effort. Value engineering, performed in cooperation with the City, reduced the project cost opinion to the budget.

Treatment Facilities Upgrade, Eau Claire, Wisconsin. Project Engineer:. The project involved a major upgrade ($40M) to the entire wastewater treatment facility. The existing rotating biological contactors were replaced with a biological phosphorus

PAPERS (continued)

"Nutrient Removal: One Size Does Not Fit All," Water Environment & Technology, October 2004

PUBLICATIONS (peer reviewer)

"Moving Towards Resource Recovery Facilities," Water Environment Federation 2013

PRESENTATIONS

"Wastewater Today: Saving Energy, Producing Energy, and Recovering Nutrients," MWOA Section Meeting, Willmar, Minnesota, June 2017

"Energy Reduction Projects at WWTPs – Goal Towards Net Zero," MPCA Wastewater Operations Conference, March 2017

"Affordable and Unconventional Clean Water Act Compliance for Willmar, MN: A 'Salty Discharge' Case Study Illustrating the Benefits of EPA's Prioritized and Integrated Strategy for Clean Water Act Compliance," CSWEA Annual Conference, May 2016

"Energy Production and Dramatically Moving the Energy/Cost Needle," MWEA Energy Workshop, East Lansing, Michigan, October 2014

"One Size Does Not Fit All: Site Specific Conditions and Nutrient Removal Configurations," IAWEA Annual Meeting, June 2014

"Overcoming the Barriers for Energy Recovery: Developing WLSSD's Energy Vision," CSWEA Annual Conference, May 2014

"Achieving Energy Independence: Water Resource Recovery Facilities Can Achieve It," MWEA Annual Biosolids Conference, March 2014

"Overcoming the Barriers for Energy Recovery: Developing WLSSD's Energy Vision," WATERCON, March 2014

"Overcoming the Barriers for Energy Recovery: Developing WLSSD's Energy Vision," CSWEA Environment Conference, November 2013

"Sheboygan Heat Drying Biosolids," CSWEA Wisconsin Annual Spring Biosolids Symposium, March 2013

"You've Got Grit Slurry: Now What? Three Case Studies of Grit Slurry Serving Large Combined Sewer Systems," WEFTEC, October 2012

"LM Digester Mixers and More Micro-Turbines Enhance Sheboygan's Ability to Produce Energy and Go off the Grid," Central States WEA Annual Meeting, May 2012

removal activated sludge system with high-efficiency turbo-blowers. The project also included primary sludge screening, primary clarifier improvements, secondary clarifier improvements, anaerobic digestion system improvements (linear motion mixers, nozzle mixing, digester covers, biogas storage, and digester gallery piping), solids thickening, biogas conditioning, biogas utilization for heat and electricity production, an automation system to minimize operator requirements, odor control, alkalinity storage and feed systems, water and wastewater laboratory improvements, updated sludge pumping improvements, and emergency electricity generation, and ventilation and electrical system improvements to meet NFPA code. The project used BioWin process modeling to evaluate multiple process configurations for the nitrifying activated sludge (NAS) facility with biological phosphorus removal. The BioWin process model was used to estimate annual operations costs, nutrient removal performance, and chemical requirements. Designed control strategies to limit alkalinity addition and maximize energy savings. Evaluated digestion alternatives and the feasibility of a nutrient harvesting system for phosphorus control.

Preliminary Treatment Improvements, Western Lake Superior Sanitary District, Duluth, Minnesota. Project Engineer: Designed preliminary treatment improvements at this 40-mgd average/155-mgd peak flow facility. The purpose of this project was to address condition- and performance-related deficiencies within two preliminary treatment processes: screening and grit removal. Improvements included screen influent channel modifications, three ¼-inch opening bar screens, screenings washing/compacting, a screening bypass channel, grit removal basin enhancements, grit slurry pumping enhancements, grit dewatering/washing equipment, material handling enhancements, and HVAC enhancements.

Headworks Modifications, NEW Water, Green Bay, Wisconsin. Lead Process Engineer: Design of headworks fine screening, screenings washing/compacting, screenings conveyance, grit dewatering, and grit conveyance equipment at the District's 40-mgd (160-mgd peak) wastewater treatment plant. The headworks system includes four escalator-style fine screens with ¼-inch openings. The existing channels were modified to accommodate two screens per channel. The wet screenings are discharged from the screens to a screw conveyor system and one of two agitator-style washer/compactors. Washed and compacted screenings are discharged through the floor to a screw conveyor system on the lower level. Screenings are discharged to the 20-yard roll-off containers by a reversing shuttle conveyor. The shuttle conveyor provides full container coverage throughout its length. Grit generated by the previously existing vortex grit removal system is conveyed up a variable speed, intermittent screw conveyor to remove free water. The grit screw conveyor discharges grit through the floor to the reversing shuttle conveyor on the lower level.

Clarifier Mechanism Upgrade, Milwaukee Metropolitan Sewerage District, Wisconsin. Quality Control Reviewer: Clarifier Mechanism Upgrade project at the Milwaukee Metropolitan Sewerage District's South Shore Reclamation Facility. This treatment facility consists of 24 peripheral-feed secondary clarifiers arranged in six batteries, four clarifiers per battery. Batteries 1 through 4 were constructed in the 1970s and Batteries 5 and 6 were constructed in the mid-80s. This project was separated into smaller projects: Secondary Clarifiers in Batteries 1 through 4, and Secondary Clarifiers in Batteries 5 and 6. In Batteries 1 through 4, the design included replacing the existing clarifier mechanisms and drives, improvements to the scum handling system, repairing concrete around the outside of the clarifiers, replacing all handrails around the clarifiers, improvements to the electrical and instrumentation and control systems, and replacing the RAS/WAS flowmeters and flow control valves. In Batteries 5 and 6, the design included rehabilitating or replacing the existing clarifier drives, replacing the existing "unitube" sludge collection headers, replacing the target baffles under the influent orifices, improvements to the scum handling system, and replacing the RAS/WAS flowmeters and flow control valves.

Facility Planning, Madison Metropolitan Sewerage District, Wisconsin. Process Engineer: Assisted with the evaluation of anaerobic digester capacity/process improvements including conventional mesophilic digestion, temperature-phased anaerobic digestion (TPAD), acid-methane phased digestion, pre-pasteurization, aerothermal

pretreatment (ATP), and pre-autothermal thermophilic aerobic digestion (pre-ATAD). Facility plan focused on solids handling and energy utilization at the District's 50-mgd Nine Springs wastewater treatment plant. It provided the District with a comprehensive, visionary roadmap for a 20-year planning period.

Water Pollution Control Plant Improvements, Fort Wayne, Indiana. Process Engineer: Donohue designed and provided construction-related services during Preliminary and Secondary Treatment Facilities improvements at the Fort Wayne Water Pollution Control Plant, including preparation of plans and specifications. This project was Phase 1 of a proposed 7-phase upgrade plan. The Phase 1 project consisted of new preliminary treatment facilities, new septage receiving facilities, modifications to the influent interceptor sewers, modifications to the secondary treatment facilities, expansion of the site power distribution system, and new flood control facilities. The preliminary treatment facilities included fine screening in three 5 feet wide, 40 feet deep influent channels, a 4-pump, 60-mgd raw wastewater pump station (expandable to a 6-pump 100-mgd pump station), two vortex grit removal basins, and grit handling equipment. The fine screen system includes washing, compacting, and conveyance of screenings. Secondary treatment facility modifications include replacement of four clarifier drives and mechanisms, replacement of the RAS pumping system, clarifier influent launder improvements to increase hydraulic capacity, and RAS and WAS metering replacement.

Preliminary Treatment Facilities Upgrade, Evansville, Indiana. Process Engineer: Assisted with the design of a preliminary treatment facilities upgrade at the Eastside municipal wastewater treatment facility. The upgrade included fine screening, screenings washing/compacting, screenings conveyance, raw wastewater pumping, vortex grit removal, grit dewatering, and grit conveyance. The raw wastewater pumping station was designed to be 3-pump, 22-mgd firm capacity station at start-up, expandable to a 4-pump, 40-mgd firm capacity station.

Northside Water Pollution Control Facility, Evansville, Indiana. Lead Process Engineer: Design of the new Northside water pollution control facility for Evansville, Indiana. The new facility, which treats wastewater from the Utility's northern drainage basins, has an 8-mgd average day and 30-mgd peak hourly flow capacity. The Northside WPCF is the third treatment facility within the Evansville Water and Sewer Utility's service area. The Northside WPCF includes the following: raw wastewater pumping, fine screening, grit removal, preliminary effluent flow splitting, extended aeration activated sludge, secondary settling, UV disinfection, effluent aeration, effluent pumping, stormwater pumping, and WAS pumping to the Eastside WPCF for thickening, anaerobic digestion, and dewatering.

Excess Flow Disinfection, North Shore Water Reclamation District, Illinois. Principal-in-Charge: The North Shore Water Reclamation District owns and operates three large excess flow storage basins. In the event wet-weather flows exceed the storage capacity, these basins provide disinfection and before allowing a discharge to their respective receiving waters. The purpose of this evaluation was to evaluate standard operating procedures and improvements to enhance disinfection performance.

Aeration Efficiency and Nutrient Removal Evaluation, North Shore Water Reclamation District, Illinois. Principal-in-Charge: The NSWRD owns and operates three sewage treatment plants with nominal capacities of 20 mgd: Clavey Road, Gurnee, and Waukegan. This project evaluated alternatives to enhance the energy efficiency of their existing two-stage activated sludge treatment processes and implement biological phosphorus removal. The comprehensive evaluations used BioWin modeling to assess the performance and energy benefits various configuration changes. The evaluation considered diffuser technologies, blower technologies, blower control strategies, and aeration basin configurations. The evaluation determined that biological phosphorus removal could be implemented in a manner that reduces aeration and chemical costs. The novel approaches at all three facilities offered significant paybacks.

DONOHUE

ERIC J. LYNNE, PE

PROFESSIONAL ENGINEER
Minnesota: 54373
Wisconsin: 42739
Illinois: 62066969

YEARS OF EXPERIENCE
12

EDUCATION
Master of Science
Civil and Environmental Engineering
South Dakota State University
2009

Bachelor of Science
Civil and Environmental Engineering
South Dakota State University
2007

PROFESSIONAL ASSOCIATIONS
Water Environment Federation-Central States WEA

Wisconsin Wastewater Operators Association

Sentral States Select Society of Sanitary Sludge Shovelers (7S)

SPECIAL TRAINING
BioWin Designer Training:
- Introductory Topics
- Advanced Topics

AWARDS
2016 ACEC Wisconsin Engineering Excellence State Finalist Award, Project Manager: Stevens Point-Brewing a Better Future Together, Stevens Point, Wisconsin

2016 ACEC Missouri Engineering Excellence Grand Award, Process Engineer: Jefferson City-Cole Junction Pump Station and Force Main

2014 Central States WEA:
- WEA Service Award
- WI Section Service Award
- Young Professional of the Year

2014 ACEC Missouri Engineering Excellence Honor Award, Process Engineer: Inline Storage Optimizes Existing Riverside Pump Station, Jefferson City, Missouri

2011 ACEC Wisconsin Engineering Excellence Best of State, Process Engineer: Facility Planning to Meet Permit Limits, Superior, Wisconsin

PAPERS
"Challenging the limits of technology," Water Environment & Technology Magazine, January 2015, Vol. 27, No. 1

WEF 2008 Poster Session

"Effective Removal of Pharmaceuticals and Personal Care Products in Wastewater Treatment Plants"

Mr. Lynne is a process engineer experienced in the design and operation of water and wastewater treatment facilities. He has experience in construction supervision and surveying, which combined with his WWTP operator and laboratory experience, form the basis for a conscientious design engineer. Mr. Lynne provides quality process knowledge for conceptual and full-scale designs, as well as troubleshooting for treatment optimization. He utilizes BioWin and GPS-X process modeling software to perform evaluations of many biological treatment scenarios.

Strategic Planning Engineering Services for Wastewater Treatment. La Crosse, Wisconsin. Client Advocate/Project Manager/Process Engineer: This project initiated as a wastewater facility re-rate, but after uncovering major capacity restrictions to the biosolids handling process – a strategic facility plan process was stimulated. Mr. Lynne championed the project team to provide a whole-plant perspective towards improvements and inspired the Owner to identify additional local methods for reuse of dried wastewater biosolids. Mr. Lynne assembled and explained key differences to the regional and industrial contributor contracts, such that the City can begin implementing a common contract for equitable distribution of facility capacity.

WWTF Main Lift Station Rehabilitation, Study, Design, and Construction, St. Cloud, Minnesota. Project Manager/Process Engineer: Project consisted of larger pumps, replacement valves, piping, controls, HVAC, and electrical gear including a standby generator. The crucial pump station discharges up to 34 mgd into two force mains which acts as either gravity or pressurized pipes depending on the flow. To avoid overly conservative designs, Mr. Lynne provided onsite testing with Owner staff to verify pump curve and system curve hydraulics. Detailed construction sequencing was provided to educate the project team and bidders to mitigate risk and ensure reliable treatment. Major equipment items were procured in advance of bidding to provide facilitate tax savings and minimize the construction schedule.

Wastewater Treatment Plant Master Plan, Stevens Point, Wisconsin. Process Engineer/ Project Manager: Wastewater treatment master plan for the City's 4.5-mgd average day (12-mgd peak) flow facility. The existing enhanced biological phosphorus removal facility was calibrated with waste fractionation data to generate a BioWin process model. The model was used to identify the facility's capacity, which when compared to the current and future loadings identified critical areas for capital projects. The model was also used to conceptually identify and evaluate low level nitrogen and phosphorus removal alternatives maximizing use of existing tankage. Eric and the Project Team identified facility wide alternatives, evaluated and sorted by each near-, mid-, and long-term implementation needs.

Primary Digester System Improvements, Sanitary District of Decatur, Illinois. Process Engineer: Lead designer to improve mixing in four 100-foot diameter anaerobic digesters and reduce concerns with the biogas. Linear motion mixing technology was selected to minimize cost and energy use. Excess biogas condensate issues were addressed using automatic draining drip-traps, and waste gas flare odors were mitigated using an enclosed high-efficiency flare. The associated improvements also fixed code-related safety concerns.

Biosolids Facility Planning, Sanitary District of Decatur, Illinois. Process Engineer/ Project Manager: Biosolids facility planning to update the District's 41-mgd average day (125-mgd peak) flow facility. The existing solids facility had not been updated since construction, and several pieces of equipment were nearing the end of useful life. The master plan evaluated 54 potential alternatives concerning equipment replacement, process enhancement, and regulatory changes. The recommended alternatives were prioritized in an implementation schedule, which allowed the District to allocate budgets and justify rate changes. The implementation schedule enabled phased construction to maximize the life of many existing facilities. Mr. Lynne also assisted with project meetings and monitored project team correspondence to ensure the project was delivered on time and within budget.

PRESENTATIONS

"WWTP Effluent Phosphorus Filtration for Point-O-Seven-Five," CSWA Conference, May 2019

"Phosphorus Trading: A Real WWTP to WWTP Solution," WWOA, October 2018

"Activated Sludge and BNR Process Control: Hands-On in the Real World," WEFTEC, October 2017, October 2018

"Real Improvements to the Dewaterability of Bio-P Sludge," Iowa WEA Conference, June 2017

"Struvite Mitigation for Improved Bio-P Dewaterability," CSWEA Conference, May 2017

"Real Improvements to the Dewaterability of Bio-P Sludge," Minnesota Conference on the Environment, November 2016

"Activated Sludge and BNR Process Control: Hands-On in the Real World: Alkalinity at East Bank WWTP, Jefferson Parish," WEFTEC, September 2016

"Fond du Lac WWTP Lab Experience," CSWEA Conference, May 2016

"Nitrification and Phosphorus Treatment Success Stories," MPCA Annual Wastewater Operators Conference, March 2016

"Waste Not, Want Not: Maximizing High Strength Waste Addition (Stevens Point, WI)," Minnesota Conference on the Environment, November 2015

"Waste Not, Want Not: Maximizing High Strength Waste Addition," WWOA Conference, October 2015; CSWEA Conference, May 2015

"Operator Tips & Tricks," WWOA Conference, October 2015

"Bringing Wastewater Treatment to a Rainforest Community in Costa Rica," WEFTEC, September 2015

"Oxidation Reduction Potential (ORP) & Alkalinity," Workshop, WEFTEC, September 2015

"Low Level Phosphorus Removal Fundamentals, Technologies, and Results," MPCA Annual Wastewater Operators Conference, March 2015

"Struvite Harvesting Technologies, Impacts, and Economics," MPCA Annual Wastewater Operators Conference, March 2015

"Need for Filtration or Equivalent? Demonstration Testing Prepares Communities for Low Level Phosphorus," WWOA Conference, October 2014: CSWEA Conference, May 2014

"Right Sizing of Low Level P Technologies in Wisconsin, WEFTEC, September 2014

Capacity Evaluation, Superior, Wisconsin. Process Engineer: Capacity evaluation to identify the true capacity of the 15-mgd peak hour flow facility. A hydraulic model was generated, followed by a calibration field survey to ensure accurate results. The goal of the model was to understand the maximum capacity of the main facility to ensure proper handling of CSO flows without hindering treatment performance substantially. Provided with proper wastewater characterization data, a BioWin process model was implemented to accurately identify system capacity under various steady-state and dynamic scenarios, including periods of good or poor settleability.

Anaerobic Digester Study, North Shore Water Reclamation District, Gurnee, Illinois. Process Engineer: Anaerobic digester study to identify District's decision to continue, modify, or discontinue digestion of primary and biological waste sludges. Historically, poor digester performance has been linked to overloaded condition. The facility's BioWin process model was utilized to evaluate sludge production records. Digestion alternatives to be evaluated include, increasing mesophilic digestion volume, baseloading the existing digesters, or incorporating an advanced high-rate digestion processes such as thermophilic or acid-phase digestion.

Aeration System Improvements, North Shore Water Reclamation District, Gurnee, Illinois. Process Engineer: Process modeling, conceptual evaluation, and design of aeration modifications for energy savings. Design included replacement aeration diffusers and high-efficiency blowers. Process modifications include conversion to pre-anoxic and anaerobic selector zones at all three District facilities. Energy savings were documented and presented to funding agencies, resulting in over $3 million in grants.

Anaerobic Digester Study, Milwaukee Metropolitan Sewerage District, Milwaukee, Wisconsin. Process Engineer: Ongoing anaerobic digester study to identify current digester utilization and develop alternatives to improve capacity and increase biogas production. With over 15 million gallons of digester volume, the South Shore treatment facility has significant potential to incorporate co-digestion. The subsequent evaluation included a conceptual analysis of high strength waste receiving facilities for various food and industrial wastes.

Operations Assistance, Superior, Wisconsin. Process Engineer: Ongoing review of City's operational data and biological data to provide assistance on process adjustments to minimize CSOs. Developed process calculators for waste activated sludge control based on sludge retention time, and for return activated sludge chlorination. These factors combined with training on microscopy and troubleshooting has led the facility to treat historically higher wet weather flow volumes. The resulting increased performance has allowed the operations staff to focus on other critical activities during wet weather.

Permit Compliance Planning Engineering Services for Wastewater Treatment. Fort Atkinson, Wisconsin. Client Advocate/Project Manager/Process Engineer: This ongoing project evolved from facilities planning and permit compliance to involve direct equipment replacement, biosolids demonstration testing, and sewer system modeling; then back to facilities planning to finalize the plan after systems had changed. These adaptations are indicative of the flexibility and consideration that Mr. Lynne provides to clients in an effort to obtain the right project at the lowest cost. Fort Atkinson was able to complete the planning stage and confidently move into design for increased firm capacity in their main lift station knowing that the costs for this work is much less cost and risk than strictly trying to minimize infiltration and inflow sources.

Phosphorous Removal Efficiency, Fort Wayne, Indiana. Process Engineer: Evaluated the efficiency of phosphorus removal throughout the 45-mgd average (60-mgd max) facility. Mr. Lynne compared existing phosphorus removal with the historic ferric chloride dosage and determined inconsistent dosing, which significantly impeded phosphorus removal in the primary clarifiers. Treatment plant specific operating guidelines were provided to aide operators and minimize chemical costs.

WILLIAM L. MARTEN, PE, BCEE

PROFESSIONAL ENGINEER
Wisconsin: 25191

PROFESSIONAL REGISTRATION
Board Certified Environmental Engineer – American Academy of Environmental Engineers (Water/Wastewater Engineering)

Wisconsin: Grade IV Certified Wastewater Operator #05552

YEARS OF EXPERIENCE
40

EDUCATION
Master of Science
Civil/Environmental Engineering University of Wisconsin - Madison
1984

Bachelor of Science
Civil/Environmental Engineering University of Wisconsin - Madison
1982

PROFESSIONAL ASSOCIATIONS
Water Environment Federation

- WERF Project Subcommittee QA/QC Reviewer: "Wastewater Treatment Anaerobic Digestion Foaming Prevention and Control Methods" (Current)
- WEF Plant Operations and Maintenance Committee
- Municipal Wastewater Treatment Design Committee Wet Weather Treatment Subcommittee

Central States Water Environment Association

- Ad Hoc Committee on Digester Foaming (2010, 2011, 2012)
- Presenter Foaming Challenges Case Studies Workshop (2011)
- Operations Workshop Ad Hoc Committee (Current)
- Spring Biosolids Symposium Committee (Wisconsin Section – Current)

Illinois Water Environment Association
Illinois Association of Wastewater Agencies
Indiana Water Environment Association
Wisconsin Wastewater Operators Association
American Society of Civil Engineers

AWARDS
2017 ACEC Wisconsin Engineering Excellence Best of State Award, Lead Process Engineer: Eau Claire WWTF-Resilient, Robust, Sustainable, Eau Claire, Wisconsin

2014 ACEC Wisconsin Engineering Excellence Best of State, Process Engineer: Wastewater Treatment and Energy Recovery Facility, Bush Brothers & Company, Augusta, Wisconsin

Mr. Marten's expertise includes planning, designing, starting up, analyzing, troubleshooting, and auditing wastewater treatment systems, and developing and delivering both training and operations and maintenance (O&M) manuals for such systems. He is Donohue's Practice Leader for Wastewater Biological Processes and Nutrient Removal. Mr. Marten has experience working in the municipal and industrial wastewater treatment fields. This experience includes the following:

- Managed and led planning, evaluation, design, startup, training and troubleshooting evaluations and services at small, medium and large wastewater treatment facilities,
- Managed capacity evaluations to confirm/change rated capacity at several wastewater treatment plants
- Conducted process and operations reviews to solve compliance problems at numerous municipal and industrial wastewater treatment plants
- Managed a 15-mgd wastewater treatment plant in Maine, operated a 50-mgd wastewater treatment plant in Wisconsin, and taught a wastewater treatment operator certification course in California

Phosphorus Compliance Facility Plan, La Crosse, Wisconsin. Project Manager and Lead Process Engineer: Facility planning to assist the City of La Crosse in planning to meet new stringent (0.1 mg/L) water quality based (WQBEL) effluent limits at its 20 mgd Isle la Plume wastewater treatment facility. The work involved historical data analysis, special sampling, pilot testing and BioWin modeling to assess treatment capabilities and develop strategies to optimize phosphorus removal performance of the existing facilities. The project then evaluated treatment and non-treatment (non-point source) alternatives to achieving compliance with the future limits, resulting in a recommended compliance plan for the City.

Facility Planning, La Crosse, Wisconsin. Lead Process Engineer: Facility planning for wastewater treatment plant upgrade including assessment of biosolids management/reuse program and processing alternatives, biological nutrient removal optimization, and potential nutrient recovery, along with general plant upgrades related to age of existing infrastructure. One key focus area involved evaluating the anaerobic digestion process to improve its performance, to control struvite formation, and to assess the ability to accept high strength wastes to boost gas production for potential use in co-generation.

Startup Assistance, Operator Training and Process Troubleshooting/Optimization, Eau Claire, Wisconsin. Lead Process Engineer: Development of startup plan and execution of training for this 11.5 mgd facility being converted from a rotating biological contactor (RBC) process to an advanced biological nutrient removal (BNR) activated sludge process. Activities included development of operating procedures and process control tools and ongoing process assistance as the plant staff have transitioned from a very simple, self-regulating RBC process to a complex and dynamic activated sludge system requiring significant monitoring and control.

Master Planning Study, Plant Capacity Assessment and Anaerobic Digestion Improvements, Stevens Point, Wisconsin. Lead Process Engineer: Projects led to anaerobic digestion improvements aimed at increasing the plant's ability to feed high strength waste to its anaerobic digesters to boost biogas generation for co-generation purposes. Also included were issues related to gas quality and struvite control.

Facility Planning and Design of Plant Improvements, Eau Claire, Wisconsin. Lead Process Engineer: Facility planning and design of wastewater pump station and treatment plant improvements. The plan developed a phased approach to help the City cost-effectively and reliably meet new effluent ammonia limits in the short term, while maintaining an aging RBC treatment system that is nearing its capacity and useful life limits, with a second phase aimed at replacing the RBCs with a nitrifying activated sludge system and performing anaerobic digestion and other facility upgrades several years down the road, allowing the City to fiscally plan for funding this major expansion. Mr. Marten led design of several key plant improvements including biological phosphorus removal activated sludge, anaerobic digestion heating and mixing improvements, and

AWARDS (continued)

Life Membership – Wisconsin Wastewater Operators Association, 2013

2011 ACEC Wisconsin Engineering Excellence Best of State, Lead Process Engineer: Facility Planning to Meet Permit Limits, Superior, Wisconsin

2011 ACEC Wisconsin Engineering Excellence State Finalist, Lead Process Engineer: Eau Claire Removes Toxicity and Improves Pumping, Eau Claire, Wisconsin

2010, 2008 & 2006 - Outstanding Leadership and Dedicated Service Awards – Wisconsin Section Central States Water Environment Association

2007 Outstanding Service Award – Technical Program Committee Chair, Central States Water Environment Association

2006 ACEC Engineering Excellence Best of State Award/National Finalist, Sr. Process Engineer: Wet Weather Capacity Improvements at Milwaukee MSD's Jones Island Wastewater Treatment Plant

2005 George Bradley Gascoigne Medal, Water Environment Federation

2005 Koby Crabtree Award for Research & Education, Wisconsin Wastewater Operators Association

2004 Outstanding Service Award, Central States Water Environment Association

2000 Sentral States Select Society of Sanitary Sludge Shovelers, CSWEA

1984 Academic Excellence Award, Central States Water Environment Association

PAPERS

"Low Cost Activated Sludge Optimization – A Superior Approach", The Clarifier, WWOA Quarterly Magazine, February 2016

"Challenging the limits of technology," Water Environment & Technology Magazine, January 2015, Vol. 27, No. 1

"What every Operator should know about Biological Nutrient Removal," Water & Technology Magazine, October 2014, Vol. 26, No. 10

"International Standard Units for Water and Wastewater Processes," WEF Manual of Practice No. 6, 2011

"Wastewater Treatment Plant Upgrades in Grafton, Wisconsin", Water Environment & Technology Magazine, May 2010, Vol. 22, No. 5

"Maximizing Wet Weather Treatment Capacity", a series of 5 articles published in sequential issues of The Clarifier, Wisconsin Wastewater Operators Association from late 2004 through early 2006

struvite mitigation provisions related to digestion and downstream solids handling processes. Mr. Marten then lead startup of the new facilities and has provided ongoing operational assistance.

South Shore Digester Gas/Blower Optimization, Milwaukee Metropolitan Sewerage District, Wisconsin. Lead Process Engineer: This project focused on evaluating the best use of gas produced from the South Shore WWTP anaerobic digesters for a 20-year planning period, including engine driven generators, engine driven blowers, microturbine generators, and other potential co-generation alternatives. Mr. Marten led evaluations of digester gas production, quality, and treatment, and performed senior review of gas utilization alternatives. Key aspects of the gas quality evaluations included sampling and testing for siloxanes, and evaluation of siloxanes and hydrogen sulfide removal alternatives. Mr. Marten then led the development of a gas treatment implementation plan to provide for siloxanes treatment and removal.

Facilities Planning, Sanitary District of Decatur, Illinois. Lead Process Engineer: Solids handling facility planning evaluation. The project involved evaluating and recommending needed improvements to solids handling/biosolids stabilization and reuse facilities as well as development/revision of solids handling standard operating procedures. Key elements included improving the performance of the anaerobic digestion process through mixing and heating improvements which increased digestion capacity to allow for acceptance of high strength wastes, and upgrades to co-generation equipment to better use the resulting increase in biogas being produced.

Facilities and Master Planning, Sheboygan, Wisconsin. Lead Process Engineer: Facility and master planning studies for the 40-mgd Sheboygan, Wisconsin wastewater treatment plant. These studies involved evaluation of existing facilities and options to upgrade them for a 20-year planning period. Key areas investigated included the anaerobic digestion and biological phosphorus removal activated sludge systems.

Facilities Planning and Design, Fort Wayne, Indiana. Lead Process Engineer: Led process engineering evaluation of several facilities at the 60-mgd water pollution control plant. Subsequent involvement in a number of plant upgrade projects including aeration upgrades and anaerobic digestion improvements. In the latter case, Mr. Marten developed a strategy for a phased conversion of the existing anaerobic digestion process to two-stage primary digesters in series process to simplify digester operations while improving performance, process control, and increasing capacity.

Wastewater Treatment Plant Modifications, Milwaukee Metropolitan Sewerage District, Wisconsin. Project Manager/Lead Process Engineer/Operations Specialist: Facility delivery, startup, certification, operator training, plant process/operational troubleshooting/modification at the 390-mgd Jones Island Wastewater Treatment Plant. Mr. Marten managed or served in a lead role on numerous projects, including:

- Startup of a new $200 million, 200-dry-ton-per-day, sludge dewatering and drying facility used to produce the commercial biosolids fertilizer Milorganite
- Startup and certification of a 200-dry-ton-per-day, sludge thickening and blending facility
- Startup and certification of a 390-mgd disinfection facility
- Development and oversight of full-scale, anaerobic digester loading and sludge dewatering studies

Key challenges were in coordinating construction activities and new facility startups within the constraints of an operating treatment plant while helping to maintain the plant's record of more than ten years without a monthly permit violation.

Master Plan, Metropolitan Council Environmental Services, Minneapolis, Minnesota. Lead Process Engineer: Master Plan development project for the Metro Wastewater Treatment Plant. Mr. Marten evaluated various treatment options as part of this Master Plan project. His primary areas of responsibility included evaluating historical operational experience, developing capacity ratings for existing processes, and identifying and evaluating new or expanded processes to meet the needs of a 50-year planning period.

DONOHUE

JEFFREY L. WILLS, PE

PROFESSIONAL ENGINEER
Wisconsin: 34491
Minnesota: 46817
Illinois: 62061503
Iowa: P24652

CERTIFICATIONS
2-Hour OSHA, 2017
Confined Space Entry

YEARS OF EXPERIENCE
25

EDUCATION
Bachelor of Science
Mechanical Engineering
University of Wisconsin - Madison
1994

AWARDS
2019 ACEC Missouri Engineering Excellence Honor Award, Lead Mechanical Engineer: Lemay Pump Station Electrical System Transformation, Metropolitan St. Louis Sewer District, St. Louis, Missouri

2018 ACEC Minnesota Engineering Excellence Grand Award, Energy Systems Engineer: A Utility of the Future > Making St. Cloud GREATER, St. Cloud Minnesota

2017 ACEC Engineering Excellence National Recognition, Mechanical Engineer: Kenosha WWTF Energy Optimized Resource Recovery, Kenosha, Wisconsin

2017 ACEC Wisconsin Engineering Excellence Grand Award, Mechanical Engineer: Kenosha WWTF Energy Optimized Resource Recovery, Kenosha, Wisconsin

2014 ACEC Wisconsin Engineering Excellence Best of State, Energy Recovery Engineer: Wastewater Treatment and Energy Recovery Facility, Bush Brothers & Company, Augusta, Wisconsin

2013 ACEC Wisconsin Engineering Excellence Grand Award, Energy Recovery Engineer: Sheboygan Regional WWTP Achieves Net Zero Energy, Sheboygan, Wisconsin

2012 ACEC Minnesota Engineering Excellence Honor Award, HVAC/Mechanical Engineer: New Wastewater Treatment Facility, Willmar, Minnesota

2011 ACEC Indiana Engineering Excellence Honor Award, Lead HVAC/Mechanical Engineer: North Pump Building and Electrical Building at Three Rivers Filtration Plant, Fort Wayne, Indiana

2011 ACEC Minnesota Engineering Excellence Honor Award, Lead HVAC/Mechanical Engineer: New Wastewater Treatment Facility at Willmar, Minnesota

Mr. Wills' professional activities have included planning, design and construction administration as well as project management on a wide variety of HVAC, plumbing and process engineering for water and wastewater treatment plants, aeration, anaerobic digestion, and biogas utilization systems, odor control, industrial ventilation, dust collection, office air conditioning, and laboratory ventilation. He is Donohue's Practice Leader for Energy Recovery and Mechanical Systems.

Energy Management Master Plan and Heating System Preliminary Design, Western Lake Superior Sanitary District, Duluth, Minnesota. Process Engineer: Assessed current and potential future digester gas generation rates to determine best future use of available gas. Utilization methods considered included: engine-generators, microturbine, compressed natural gas (CNG) for vehicle fueling and fuel cell. Hydrogen sulfide treatment options considered included replaceable media, biofiltration, and chemical addition to the digesters. Study recommended the installation of engine-generators with biofiltration for H2S removal.

Biogas Conditioning and Main Campus Heating System Improvement Project, Western Lake Superior Sanitary District, Duluth, Minnesota. Lead Process Engineer: Design of biogas treatment facilities for a future design flow rate of 1,000,000-CFD. These systems included biological treatment for H2S removal, chiller based cooling for moisture removal with heat recovery reheat, compression via rotary lobe blowers, and siloxane removal by regenerative polymeric media. Gas treatment system were designed to supply three, 7-MMBH biogas/natural gas boilers that were included in the installation design as well as future engine generators.

Digester Gas Utilization Study, Appleton, Wisconsin. Process Engineer: Completed a study to determine the most beneficial use of digester gas at the wastewater treatment plant. The study reviewed engine generators, microturbines, pipeline quality sales, and boilers. Since the plant previously flared all their gas, the study found that the most economical approach was installation of digester gas fired boilers. Following the study, Donohue was retained to provide digester cleaning, inspection, and improvements to its two egg-shaped digesters.

Anaerobic Reactor, Bush Brothers Company, Augusta, Wisconsin. Process Engineer: Design of gas handling and utilization equipment associated with new anaerobic reactor. Design including gas conditioning and compression, gas storage and gas utilization in the form of a 630-kW engine-generator. Gas conditioning system included a biological filter for hydrogen sulfide removal with a replaceable media filter for back-up. Waste heat from the engine-generator is recovered for use in building heating and heating the anaerobic reactor. Electricity is sold to the electric utility.

Wastewater Treatment Facilities Improvements – Phase 2, Eau Claire, Wisconsin. Process Engineer: Designed complete rehabilitation and replacement of anaerobic digestion facilities. Design included the removal of essentially all existing piping systems and equipment while maintaining functionality of the system. New digestion equipment installed includes linear motion digester mixing, pumped nozzle mixing equipment, fixed digester covers, floating gas holder digester covers, sludge pumping systems and new tube-in-tube heat exchangers for digester heating. System design included the beneficial use of digester gas via digester gas fired boilers and 280-kW engine-generators. Gas to be consumed by the generators was conditioned to remove H2S and siloxanes with replaceable media and moisture by mechanical cooling systems. Waste heat from the generators along with heat from the boilers is collected and distributed through a plant building and process heating system that serves the majority of the campus buildings. Donohue assisted in securing renewable energy funding from Focus on Energy for the project.

Blower Upgrade, Milwaukee Metropolitan Sewerage District, Wisconsin. Lead Mechanical Engineer/Process Engineer: Blower study project at Milwaukee Metropolitan Sewerage District's South Shore Wastewater Treatment Plant. The overall study evaluated engine alternatives including their existing support systems to replace the existing engines on their blowers. Assisted in generating the energy model of plant

AWARDS (continued)

2007 Lead Process Engineer: American Academy of Environmental Engineers, Superior Achievement Award, Sludge Drying/Melting Facilities, Zion, Illinois

2006 Assistant Process Engineer: Wisconsin Association of Consulting Engineers, Best of State Award, Milwaukee Metropolitan Sewerage District, Jones Island Wet Weather Capacity Improvements, Milwaukee, Wisconsin

2003 Lead Process Engineer: Wisconsin Association of Consulting Engineers, Honor Award, Gurnee Plant Odor Control Improvements, Gurnee, Illinois

2002 Wisconsin Association of Consulting Engineers, Honor Award, Assistant Process Engineer: UV Disinfection Conversion/Aeration Basin Conversion at the Two Rivers, Wisconsin, Wastewater Treatment Facility

PRESENTATIONS

"Odor Control At Gurnee STP," Central States Water Environment Association, May 2006

digester gas utilization and heat recovery systems to determine most cost effective way to use the energy contained in the digester gas. Completed preliminary engineering and recommendations and final design for the primary/secondary heat recovery and cooling systems associated with the existing blower engines and the proposed engine generators. Preliminary design and recommendation and final design of the HVAC systems, fire protection systems, and the blower air filtration.

Biosolids Master Plan, East Lansing, Michigan. Lead Mechanical Engineer: Performed condition assessment of HVAC, plumbing and NFPA 820 requirements at the City's Water Reclamation Facility. Provided input to complete the biosolids master plan, including design calculations for biogas equipment sizing, and heating requirements for anaerobic digestion, thermal hydrolysis processes and biosolids drying equipment.

Energy Study, Danville, Illinois. Lead Mechanical Engineer: Performed an energy study of existing Administration Building to determine methods to reduce energy consumption. Study compared various options including high efficiencies boilers, control modifications, and effluent heat pumps. Though the heat pump option offered the highest energy savings, the high cost of implementation lessened its favorability. Improvements were decided to be a two-part approach. First, the pneumatic controls would be replaced with digital controls that were designed and installed. The future work includes the installation of high efficiency boilers when the existing boilers are in need of replacement.

Plant Expansion, Marquette, Michigan. Lead Mechanical Engineer: Design of HVAC and plumbing systems for expansion of an existing plant. Systems included the expansion and interconnection of existing heating water facilities with a new boiler system that generates heat through combustion of biogas produced by anaerobic digestion. The project also included biogas handling, and digester heating, feed, and mixing improvements. After completion of the initial improvements, Donohue was retained to implement two 100kW engine generators and gas cleaning system onsite to generate electrical energy along with the heat energy already used at the facility.

Biogas Conditioning and Main Campus Heating System Improvement Project, Western Lake Superior Sanitary District, Duluth, Minnesota. Lead Mechanical Engineer: Designed replacement of existing steam boiler system with a hot water boiler system to allow greater flexibility for future heat recovery. New boiler was central system serving all buildings on the site and included six 5.4-MMBH natural gas/fuel boiler boilers and three 7-MMBH biogas/natural gas boilers with individual boiler pumps and primary circulation pumps. To protect the boilers from the internal corrosion within the aged plant hot water piping network, heat exchangers were installed to isolate the boiler loop from the distribution loop. Design also included HVAC upgrades for the Heating Buildings new Boiler Room, Gas Handling Room and Electrical Rooms along with minor modifications to existing systems. Equipment installed included over 20,000-cfm of glycol heated make-up air and the starting point for digital HVAC controls within the plant.

Wastewater Treatment Facilities Improvements – Phase 2, Eau Claire, Wisconsin. Lead Mechanical Engineer: Designed complete replacement central plant boiler system and piping serving six buildings at the plant. Designed HVAC systems replacements for three existing structures (Administration Building with Laboratory, Headworks Building and Digester Complex) along with new HVAC and plumbing systems serving four new structures on the site.

Mechanical Modifications, Milwaukee Metropolitan Sewerage District, Wisconsin. Lead Mechanical Engineer: Preliminary design, recommendations, and final design of the HVAC systems, fire protection systems, and the blower air filtration for the blower system replacement and new engine generators.

Microturbine Heat Recovery Systems, Sheboygan, Wisconsin. Lead Mechanical Engineer: Assisted the cogeneration supplier with design of heat recovery piping systems to transfer the heat recovered from the microturbine exhaust to the plant digester heating system. Provided design of HVAC systems for new gas handling room that housed that gas compression and treatment skid for the microturbines.

JOSEF A. BERKTOLD, PE

PROFESSIONAL ENGINEER
Wisconsin: 30282
Illinois: 62057671
Minnesota: 47475

YEARS OF EXPERIENCE
31

EDUCATION
Bachelor of Science
Electrical Engineering
Illinois Institute of Technology
1988

AWARDS
2019 ACEC Missouri Engineering Excellence Honor Award, Electrical Engineer: Lemay Pump Station Electrical System Transformation, Metropolitan St. Louis Sewer District, St. Louis, Missouri

2018 ACEC Minnesota Engineering Excellence Grand Award Lead Electrical Engineer: A Utility of the Future > Making St. Cloud GREATER, St. Cloud Minnesota

2011 ACEC Minnesota Engineering Excellence Honor Award, Electrical Engineer: New Wastewater Treatment Facility at Willmar, Minnesota

2011 ACEC Indiana Engineering Excellence Honor Award, Lead Electrical Engineer: North Pump Building and Electrical Building at Three Rivers Filtration Plant, Fort Wayne, Indiana

2007 Lead Electrical Engineer: American Academy of Environmental Engineers, Superior Achievement Award, Sludge Drying/Melting Facilities, Zion, Illinois

2003 Lead Electrical Engineer: Wisconsin Association of Consulting Engineers, Honor Award, Gurnee Plant Odor Control Improvements, Gurnee, Illinois

President's Award for Technical Excellence from Waste Management for the East Penn Manufacturing Wastewater Treatment Facilities, Lyon Station, Pennsylvania, Lead Electrical Engineer

PRESENTATIONS
"Understanding NFPA 820 Fire and Explosion Protection in Wastewater Treatment Facilities." Indiana WEA Conference, November 2012; Missouri WEA/ AWWA Joint Meeting, March 2017

"Understanding NFPA 820 Fire and Explosion Protection in Wastewater Treatment Facilities." Wisconsin Wastewater Operators Association Conference, October 2012

"Arc Flash Hazards in Plants – What are Arc Flash Hazards, How to Determine Arc Flash Hazards in Plants, and How to Protect Plant Staff," Wisconsin Wastewater Operators Association Annual Conference, October 2010

Mr. Berktold has 31 years of progressive experience designing electrical systems for water and wastewater treatment facilities. His areas of expertise include:

- Electrical Service and Power Distribution
- Emergency and Standby Electrical Power Systems
- Motor Control and Motor Control Center Design
- Voltage Drop and Short Circuit Analysis
- Lightning Protection and Grounding Design
- Lighting Design
- Code Interpretations and Applications
- Landfill Gas to Electrical Energy Cogeneration Projects
- QA/QC Reviews of Electrical Designs

Mr. Berktold is Donohue's Practice Leader for Electrical Systems. He has given numerous presentations at the national and regional level regarding electrical systems and safety issues related to water and wastewater facilities. This includes arc flash hazards, identifying hazardous classified locations using NFPA 820, and testing plant electrical systems without impacting operations.

He serves on the National Fire Protection Association's NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities technical committee as the WEF representative. Thus, he is very knowledgeable on NFPA compliance and changes made to the standard in the new 2020 version released on May 18, 2019.

Jones Island and South Shore WRF VFD Phase IV Replacement Project (J06057D01), Milwaukee Metropolitan Sewage District, Milwaukee, Wisconsin. (2014) Lead Electrical Engineer: Donohue designed the replacement of 23 Variable Frequency Drives (VFDs) at the two plants. Jones Island work took place at the RAS Pump Station, Effluent Pump Building, and Thickening Facility. Work included documenting existing Switchgear and Motor Control Centers, harmonics testing during design to determine a solution which meets IEEE 519, adding two surge protection devices to each Switchgear lineup, and doing final layouts and sizing of 15 new VFDs. The RAS Pump Station had three 125-hp VFDs and three 200-hp VFDs which had integral reduced voltage solid state bypass starters and integral passive harmonic filtering. The Effluent Pump Building had six 300-hp VFDs with integral passive harmonic filtering. The Thickening Facility had three 100-hp VFDs with external harmonic filtering. South Shore work included documenting motor control centers in the Aeration Buildings, harmonics testing during design to determine a solution which meets IEEE 519, adding surge protection devices to four MCCs and doing final layouts and sizing of eight new 200-hp VFDs which include integral reduced voltage solid state bypass, harmonic filtering, output dV/dt filtering.

Wastewater Treatment Plant Expansion, Eau Claire Wisconsin. Lead Electrical Engineer: Design of $45M of wastewater system improvements that are currently under design. These improvements consist of new aeration tanks and blower building, new dewatering building, digester cover replacement, digester building expansion with new biogas generators, and replacing the existing electrical distribution system. The electrical design consists of a new 12.47kV electric service, 12.47kV main switchgear, a 12.47kV distribution loop around the facility, two 12.47kV to 480V step-down padmount transformers at each building each capable of powering the entire building, two 600kW diesel standby generators, two 240kW biogas generators operating on digester gas to supplement the power requirements of the plant and reduce operating costs, main-tie-main configured motor control centers at each building, 480V power panels, 120/208V lighting panels, building lighting, and site lighting.

New Wastewater Treatment Plant, Willmar, Minnesota. Lead Electrical Engineer: Design of $70M of wastewater system improvements. These improvements consisted of a new 5-mgd average day flow treatment facility, six miles of 48- and 54-inch gravity interceptor, two raw wastewater pump stations, and several miles of raw wastewater force main. The new 5-mgd treatment facility consists of a screw pump raw wastewater pump station, a centrifugal submersible raw wastewater pump station, fine screening,

PRESENTATIONS (continued)

"Arc Flash Hazards and Safety: Training, Protection, and Related Issues," Webinar presentation for Water Environment Federation for the Safety, Security, and Occupational Health Committee (SSoHC) on February 24, 2010

"Arc Flash Hazards in Plants – What are Arc Flash Hazards, How to Determine Arc Flash Hazards in Plants, and How to Protect Plant Staff" Indiana Water Environment Association, November 2009

"What are Arc Flash Hazards, How to Determine Arc Flash Hazards in Plants, and How to Protect Plant Staff," Water Environment Federation, Orlando, Florida October 2009

"Arc Flash Hazards in Plants - Understanding NFPA 820 – Fire and Explosion Protection in Wastewater Treatment Facilities,"

Wisconsin Wastewater Operators Association Annual Conference, October 2009

"Identifying Hazardous Classified Locations in Wastewater Treatment Facilities Using NFPA 820," Indiana Water Environment Association, November 2008

"NFPA 820: Standard for Fire Protection in Wastewater Treatment and Collection Facilities,"

Water Environment Federation Annual Conference, Chicago, Illinois, October 2008

"Performing Preventative Maintenance and Testing Your Electrical System Without Shutting Down your Plant," Wisconsin Wastewater Operators Association Annual Conference, October 2008

"Testing Aging Electrical Systems Without Shutting Down Your Plant," Indiana Water Environment Association, November 2007

screenings washing/compacting, grit removal, anoxic selector, oxidation ditch activated sludge, secondary settling, UV disinfection, final aeration, chemical phosphorus removal, gravity belt WAS thickening, liquid sludge storage, hypochlorite filament control, and reclaimed effluent pumping and distribution. The electrical design consisted of new 12.47kV electric services, 12.47kV main paralleling switchgear with automatic transfer between electric services/standby generators, two 1,750kW diesel standby generators, two 12.47kV distribution loops around the facility, two 12.47kV to 480V step-down padmount transformers at each building each capable of powering the entire building, main-tie-main configured motor control centers at each building, 480V power panels, 120/208V lighting panels, building lighting, and site lighting.

Primary Clarifiers and Other Upgrades, Water Pollution Control Plant, Fort Wayne, Indiana. Lead Electrical Engineer: Designed, including preparation of plans and specifications, a new primary treatment facilities and demolition of existing facilities. The new primary treatment facilities include four circular primary clarifiers, primary sludge pumping, primary scum pumping, primary scum removal facilities, chemical facilities for phosphorus removal and new primary effluent conveyance facilities. The existing primary clarifiers, their equipment, and the chemical storage and feed facilities were demolished in this project. The electrical design included tying into the existing 480V distribution system, routing two 480V feeders to the new primary treatment facility, 480V switchgear with a main-tie-main arrangement, 480V motor control center, and lighting.

Blower and Engine Generator System Upgrade, Milwaukee Metropolitan Sewerage District, Wisconsin. Lead Electrical Engineer during Construction: The project included replacement of process air system blowers and provision for new engine generator sets. Blower work included replacement of four 30,000-scfm engine-driven blowers with new 1,500 hp electric motor-driven, high efficiency, dual-vane centrifugal blowers. The project included replacement of the plant's main 24.9kV switchgear, replacement of plant's step-down transformers, and new 4.16kV solid state reduce voltage starters (soft starters) for the new 1,500 hp blower motors. The project also included four new 4.16kV, 925 kW engine generator sets fueled by digester gas or natural gas to be used for peak shaving.

Jones Island Water Reclamation Facility, Milwaukee Metropolitan Sewerage District, Wisconsin. Lead Electrical Engineer during Construction: Project consisted of replacing four 4.16kV motor starters for the existing 5,500-hp, synchronous Process Air Compressor motors with new solid state (soft-start) starters. Project also includes refurbishing electronic positioners on the inlet guide vanes and surge valves.

Sludge Recycling Facility, North Shore Water Reclamation District, Zion, Illinois. Lead Electrical Engineer: Design of electrical distribution system for the Sludge Recycling Facility, including preparation of plans and specifications. The project consisted of a new 5kV electric service, 5kV outdoor switchgear, 5kV indoor switchgear, 5kV reduced voltage motor starter for a 5kV, 1,500 hp motor, a 480V switchboard, and 480V custom motor control centers. The 300-foot by 150-foot building had roof heights ranging from 14 to 80 feet. Distribution to the motors and 480V equipment inside the facility was through an extensive cable tray system, with a separate control and instrumentation cable tray system. A number of the 480V motors utilized variable frequency drives. The variable frequency drives consisted of one 400 hp variable frequency drive, two 100 hp variable frequency drives, one 75 hp variable frequency drive, and numerous smaller variable frequency drives. A small 480V emergency standby generator provided backup power to a recirculation pumping system and the lighting. The project also included coordinating with the electric utility to provide a new 5kV service to the facility.

Preliminary Treatment Facility, Evansville Water and Sewer Utility, Indiana. Lead Electrical Engineer: Design of preliminary treatment facility at the 25 mgd (125 mgd peak) advanced wastewater treatment facility. Facility includes screening, grit removal, and raw wastewater pumping ultimately for 40 mgd for an influent line located 30 feet below grade. The electrical design included tying into the existing 480V distribution system, new 480V motor control centers, and new variable frequency drives for three 200-hp raw wastewater pumps (expandable to four raw wastewater pumps).

DONOHUE

SANDRA J. KIMMLER, PE

PROFESSIONAL ENGINEER
Wisconsin: 33334

YEARS OF EXPERIENCE
30

EDUCATION
Bachelor of Science
Civil Engineering
University of Wisconsin - Milwaukee
1995

ADDITIONAL TRAINING
Using HEC-RAS to Compute Water Surface Profiles – University of Wisconsin-Madison

Meeting TMDL, LID, and MS4 Stormwater Requirements: Using WinSLAMM to Assess Quality and Volume Controls – University of Wisconsin-Madison

Fundamentals of Professional Practice – ASFE, Professional Firms Practicing in the Geosciences

PROFESSIONAL ASSOCIATIONS
American Public Works Association
Water Environment Federation

AWARDS
2016 ACEC Missouri Engineering Excellence Grand Award, Civil Engineer: Jefferson City-Cole Junction Pump Station and Force Main

2013 ACEC Wisconsin Engineering Excellence Best of State, Lead Civil Engineer: Innovative I/I Analysis Leads to Sustainability Program, Heart of the Valley MSD, Kaukauna, Wisconsin

2012 ACEC Minnesota Engineering Excellence Honor Award, Civil Engineer: New Wastewater Treatment Facility, Willmar, Minnesota

2009 ACEC Wisconsin Engineering Excellence State Finalist, Site Designer/Stormwater Engineer: New Reservoirs – Gateway to Sheboygan, Wisconsin

PRESENTATIONS
"Stevens Point Recycles, Reuses and Reaps the Benefits of Abandoned Infrastructure," Wisconsin Wastewater Operators Association, October 2010; Central States WEA, Madison, Wisconsin, May 2010

Ms. Kimmler's diverse technical and project management experience includes planning, design, and construction management for collection system studies, I/I reduction programs, site work and piping design for water and wastewater treatment facilities, and design of sanitary and storm sewers, force mains, and pump stations. Her duties include evaluating design concepts and alternatives; preparing planning reports; coordination with agencies, utility owners, and the public; and preparation of construction plans, specifications, permits, cost estimates, and bidding documents for a variety of municipal, commercial, private, and industrial clients. She has varied water resource experience including stormwater facility and collection system design, stormwater management plans, hydrologic/hydraulic analysis, floodplain analysis, and bridge/culvert hydraulic analysis.

Wastewater Treatment Plant Upgrades, North Shore Water Reclamation District, Gurnee, Illinois. Civil Engineer: This project included installing new scum handling equipment at each of the District's three wastewater treatment plants, installing new scum skimmers on the First Stage Clarifiers, installation of a new combined scum pumping station, installing new scum skimmers and baffles on the Final Settling Tanks, and modifying existing scum pump stations at the Waukegan STP. Work included re-routing of process piping through congested site areas and horizontal directional drilling to minimize disturbance of existing utilities and landscaping features.

Facilities Plan, Walworth County Metropolitan Sewerage District (WalCoMet). Delevan, Wisconsin. Lead Civil Engineer: WalCoMet serves a large, growing area with a variable service population that can increase significantly during summer and holiday seasons due to tourism and vacation residences. As part of facility planning for expansion of the treatment facility, Ms. Kimmler evaluated the future capacity and treatment needs for each of the 13 entities served by WalCoMet, along with potential future municipal and rural service areas. The project included meeting with each of the current and future dischargers to establish accurate future growth projections, project future wastewater flows, delineate the boundaries of future service areas, and identify current and future peak levels of clearwater inflow and infiltration. She worked with the regional planning commission to confirm the planning period growth, population, and service area projections.

Site Work and Permitting, Walworth County Metropolitan Sewerage District, Delavan, Wisconsin. Civil Engineer for Site Work and Permitting: Designed site improvements for upgrades to expand the existing treatment plant, including grading, erosion control, pavement design post-construction stormwater best management practices and yard piping. Prepared documentation and attended meetings to facilitate re-zoning the treatment plant property to allow for the current use. Prepared conditional use permits, wetland delineation and mitigation reports, coordinated with owner for removal of hazardous materials in several of the existing structures, and completed the county-wide stormwater management and erosion control permitting.

Wastewater Treatment Facility Improvements, Faribault, Minnesota. Civil Engineer for Site Work and Permitting: Designed site improvements for upgrades to the wastewater treatment facility, including grading, erosion control, pavement design, stormwater best management practices and yard piping. Building elevations and access were designed to meet flood regulation requirements. Prepared the Stormwater Pollution Prevention Plan and the MPCA General Stormwater Permit for Construction.

Upgrade of New Century Town WRC, Lake County Department of Public Works, Illinois. Permit Manager: Prepared site development, site capacity, and site plan review permits for a major plant expansion. Permits covered stormwater management, wetland and natural resource inventory, erosion control, signs, lighting and meeting the requirements of the Lake County Unified Development Ordinance. Duties included coordination with the State of Illinois, Lake County, Lake County Public Works, and the Town of Vernon Hills.

Upgrade of New Century Town WRC, Lake County Department of Public Works, Illinois. Civil Engineer: Upgrade of treatment facility from 4 to 6 mgd. Project included

extensive removal and abandonment of existing piping and structures, grading, paving, new yard piping, fencing, and stormwater management.

Outfall Sewer, Lake County Department of Public Works, Illinois. Civil Engineer: Designed 1,700 feet of 24- and 30-inch diameter reinforced concrete sewer to convey final treated water from the NCT WRC facility to the river. The sewer was sized to accommodate projected flows for the year 2040. Extreme space constraints were encountered along the outfall sewer route that traveled along a utility corridor and crossed under a town road and Illinois STH 12.

Wastewater Treatment Plant, Waupun, Wisconsin. Civil Engineer: Designed site improvements for upgrades to the existing treatment plant, including grading, erosion control, pavement design, and yard piping.

Wastewater Treatment Plant, Fort Atkinson, Wisconsin. Civil Engineer: Designed grading and storm sewer system to improve problem drainage areas in conjunction with upgrade of existing treatment plant.

Wastewater Treatment Plant, New Lennox, Illinois. Civil Engineer: Designed site improvements for a new wastewater treatment plant for an average flow of 3.6 mgd. The project included grading, paving, yard piping, erosion control measures, and 1,700 feet of outfall sewer. Prepared final contract documents and an estimate of probable construction cost.

Sewer Evaluation and Second Power Source at Wet Weather Diversion Sites, Milwaukee Metropolitan Sewerage District, Wisconsin. Project Engineer: Project involved evaluation of the condition of 60-inch diameter concrete sewer pipe and diversion structure located in an extremely corrosive atmosphere. The evaluation included a closed-circuit TV (CCTV) inspection of the sewer pipe, physical inspection, concrete integrity testing, and recommendations for rehabilitation.

Interceptor System Master Plan, NEW Water, Green Bay Wisconsin. Lead Civil Engineer: NEW Water, the brand name for the Green Bay Metropolitan Sewerage District, provides wastewater conveyance and treatment services to approximately 500,000 people over a 285-square-mile service area that includes all of Brown County and portions of Shawano, Kewanee, and Outagamie Counties. Each customer within the service area has its own local sewers that discharge into NEW Water's interceptor sewer system, which comprises approximately 78 miles of gravity sewer, 25 miles of force main, 13 lift stations, and three siphon river crossings. Donohue is performing a two-phase system-wide assessment of NEW Water's current and future needs. Phase 1 was completed in 2014 and culminates in a Master Plan that evaluates infrastructure condition and models current and future sanitary sewer flows. Phase 2 will include flow monitoring, developing and calibrating a hydraulic model, and developing and ranking collection system improvement alternatives to help guide NEW Water and stakeholders through a decision-making process in the preparation of a risk-based 20-year Capital Improvement Plan. This plan will serve as a basis for capacity allocations and as a roadmap for the future system improvements.

Infrastructure Management Program, Willmar, Minnesota. Project Manager and Lead Engineer: Donohue served as the program manager in developing an Infrastructure Management program, including preparation of CMOM and I/I reduction programs. Tasks included developing and implementing annual flow monitoring and sewer televising programs, inspection and condition assessment report for 26 lift stations, smoke testing, dyed water testing, and evaluating the collection system for areas with excessive flows. Donohue developed an oil and grease program and assisted in writing a new grease ordinance. Ms. Kimmler assisted the City in preparing capital improvement and maintenance budgets for the collection system and identifying collect system projects, analyzing risk, and developing a schedule and cost estimate for future projects.

DONOHUE

DAVID W. GOECKS

YEARS OF EXPERIENCE
30

EDUCATION
Bachelor of Science
Industrial Technology
University Wisconsin - Platteville
1989

AWARDS
2018 ACEC Indiana Merit Award, Controls Engineer: City of Rushville Utilities - Cloth-Media Disk Filters for CSO Treatment, Rushville, Indiana

2013 ACEC Indiana Engineering Excellence Honor Award, Controls System Engineer: Overflow Reduction through CSO Abatement Projects, Goshen, Indiana

Mr. Goecks has experience as a Control Systems Engineer in the Process Control environment, as well as experience as an Electrical Design Engineer in the Industrial environment. His experience includes the design, specification/documentation, and programming of relay and automated power and control systems utilizing PLCs, HMIs, and VFDs.

CHP Biogas Engine Generators and Siloxane Removal, Western Lake Superior Sanitary District, Duluth, Minnesota. Lead Control Systems Engineer: Design of major improvements for the District's power generation and distribution systems. The design included three 874KW biogas/natural gas generators, unit substation switchgear, siloxane removal, and H2S polishing. PLCs for the project included conformal coating by request of the Owner.

Wastewater Treatment Facility Project, Preliminary Design, Wausau, Wisconsin. Lead Control Systems Engineer: Preliminary planning and design of major equipment, capacity upgrades, and phosphorous removal for the entire facility. The capital budget for the recommended plan is $78.9 Million.

Eastside Wastewater Treatment Plant Phosphorus Removal and Improvements, Joliet, Illinois. Lead Control Systems Engineer: Design of mixed liquor selectors and modifications to twin existing aeration basins, two new GBTs, a new portable centrifuge that will be moved between three separate sites as needed, new TWAS Pumping and a new process drain pump station. Design included networking of 24 electric actuators for automating select aeration basin gates and valves, 12 DO and 12 ORP networked sensors, Ortho-Phosphate monitoring, and the addition of multiple new CompactLogix PLCs. The addition of a new administration building and main gate included security and access controls.

Redundant Sludge Acceptance Improvements, Bissell Point Wastewater Treatment Facility, St. Louis, Missouri. Lead Control Systems Engineer: design of redundant sludge cake receiving facility and equipment. Controls integrated into existing Foxboro DCS system.

Main Substation Replacement, Bissell Point Wastewater Treatment Facility, St. Louis, Missouri. Lead Control Systems Engineer: Replacement of Building 4 – MV Switchgear. Fiber optic communication and coordination with rest of plant via existing Foxboro DCS system.

Oakland Wastewater Treatment Plant Biosolids Handling and Energy Recovery, Topeka, Kansas. Lead Control Systems Engineer: Design of twin 20,000 gallon storage tanks and pump building for high strength waste and sludge receiving and digester feed equalization. Installation of twin Flottweg C7E centrifuges including support equipment (sludge pumps, chemical storage and feed, etc.), four replacement mesophilic digester heat exchangers, new ferric storage and feed to primary anaerobic digesters.

Oxygen Supply and CHP Switchgear Improvements Project, Western Lake Superior Sanitary District, Duluth, Minnesota. Lead Control Systems Engineer: Design of major improvements for the District's high purity oxygen generation system including twin 40TPD Vacuum Pressure Swing Adsorption oxygen generation systems located in a new structure, relocation of twin 25,000 gallon liquid oxygen storage tanks, and new ambient air vaporizers. Project included decommissioning and removal of the old Cryogenic production systems. Project also included 13.8kV switchgear and distribution system replacement.

RAS Pump Station Improvements, Brookfield, Wisconsin. Lead Control Systems Engineer: Design of seven RAS and two WAS flowmeter replacements. One additional RAS pump and two VFD replacements were also included in the project. Existing pipe profiles with limited up/down diameters made setup and calibration of the meters critical for accurate measurement and operation.

Influent Pump Station and Screen Replacement, Joliet, Illinois. Lead Control Systems Engineer: Design of new influent including redundant bar screens with common conveyor

and twin wet-wells. Project included twin 250-hp high flow pumps and twin 135-hp low flow pumps all controlled by VFDs. Future building security (door key-fobs and CCTVs) was planned and incorporated into the design. Project had an estimated cost of over $9 million.

Aux Sable Creek Basin and Westside Wastewater Treatment Plant's Phosphorus Removal and Expansion, Joliet, Illinois. Lead Control Systems Engineer: Design of second grit removal train, mixed liquor selectors, oxidation ditch modifications, two new final clarifiers, RAS pumping modifications, Biosolids storage tank, new chemical building, Ortho-Phosphate monitoring, and the addition of a new CompactLogix PLC. VFDs and smart MCCs supplied with DeviceNet communications.

Nutrient Recovery and Reuse Project, St. Cloud, Minnesota. Lead Control Systems Engineer: Design of biosolids processing including biogas storage, biosolids dewatering, Class A biosolids processing, biosolids storage and load-out pumping, waste activated sludge phosphorous release, and Struvite harvesting to include the replacement of two older PLCs with ControlLogix platform.

Disinfection System Upgrade, Brookfield, Wisconsin. Lead Control Systems Engineer: Preliminary engineering, design, and construction services for upgrading the existing gaseous chlorine/sulfur dioxide feed, storage, and mixing systems to chemical disinfection/de-chlorination feed, storage, and mixing systems for filtered secondary effluent up to 31.2 mgd and for combined filtered secondary effluent/primary effluent up to 50.1 mgd.

Wastewater Treatment Plant Improvements, Eau Claire, Wisconsin. Lead Control Systems Engineer: The wastewater treatment plant upgrades which included the addition of an extensive automated control system consisting of a redesigned SCADA control room, four redundant PLCs, integration of PLCs at 25 lift station locations, ten Cisco Ethernet switches on twin redundant GB fiber networks, 39 VFDs networked using Ring Topology, nine CCTVs, two automated plant gates utilizing IR technology, 33 door FOB readers, expanded telephone and paging systems, over 400 IP addresses, and over 1,400 hardwired PLC I/O points allowing the Plant to be run with minimal staff. Plant security (including CCTVs) was designed to be compatible with county-wide security platform and protocols. The project had a construction cost exceeding $40 million, with the controls portion being $2.3 million.

Biogas Conditioning and Main Campus Heating System Improvements, Western Lake Superior Sanitary District, Duluth, Minnesota. Lead Control Systems Engineer: Design of major improvements for the District's 40-mgd treatment plant main campus heating. Project included H2S removal via bio-filtration eliminating the need for chemicals, biogas compression, and moisture removal, siloxane removal with regeneration flare, nine boilers, and three heat exchangers all integrated into their existing GE Cimplicity SCADA System and plant PLCs. Project included early procurement of major equipment under separate District contract.

HMI Programming, Goshen, Indiana. Control Systems Engineer: This project included HMI programming of all control instrumentation for SCADA control of two entire water treatment facilities, nine well sites, two water towers, and a booster pump station using the Wonderware platform. Continuous input from the client through several on-site workshops assured few programming changes at time of deployment. The SCADA had to be capable of running the city wastewater treatment facility concurrently and seamlessly independent of the operator access location in the system topology. Consideration was also given to primary and redundant server locations such that if one facility or server suffered a catastrophic loss, the other facilities would remain fully operational without interruption.

Jones Island Pickle Liquor Feed System, Milwaukee Metropolitan Sewerage District, Wisconsin. Control Systems Engineer: This project included the oversight of the install, checkout, and functional testing of a pickle liquor feed system including four 30,000-gallon storage tanks, two chemical feed variable speed pumps, and a constant speed transfer pump with associated controls, PLC programming, and SCADA incorporation.

DONOHUE CRAIG L. SCHUENEMANN, PE, LEED AP BD+C

PROFESSIONAL ENGINEER
Wisconsin: 36528
Minnesota: 45060
Texas: 102594
Pennsylvania: PE079817
Missouri: 2015007443
Indiana: PE11500162

PROFESSIONAL CERTIFICATES
LEED AP BD+C: 10296741
2-Hour OSHA, 2017
Confined Space Entry
OSHA 10 Hour Construction Industry Outreach, 2018

YEARS OF EXPERIENCE
22

EDUCATION
Bachelor of Science
Civil Engineering
University of Wisconsin - Platteville
1997

PROFESSIONAL ASSOCIATIONS
American Society of Civil Engineers

PAPERS
"Sanitary Sewer Overflows: Big Prevention in a Small Footprint,"
Water Environment & Technology Magazine, July 2009

PRESENTATIONS
"Sanitary Sewer Overflows: Big Prevention in a Small Footprint,"
CSWEA Annual Meeting, May 2008

Mr. Schuenemann is a senior structural engineer with over 22 years of experience designing various water, wastewater, and stormwater structures. He is particularly skilled in evaluating existing facilities to determine structural integrity. As LEED AP certified, Craig has an up-to-date understanding of the most current green building principles and practices.

Return Activated Sludge/Waste Activated Sludge System Improvements, NEW Water, Green Bay, Wisconsin. Structural Engineer: Design for an electrical room additions, miscellaneous structure modifications, and waterproofing repairs to existing RAS/WAS treatment structures. Visual inspections of existing concrete tunnel structures.

Wastewater Conveyance, Intermediate Chemical Feed Building, NEW Water, Green Bay, Wisconsin. Structural Engineer: Design for a chemical building consisting of chemical room, electrical room, plumbing gallery, and lower level valve room.

Wastewater Treatment Facility Alterations and Additions, Monroe, Wisconsin. Structural Engineer: Designed a facility expansion. Project included new operations building, septage receiving station, headworks building with Parshall flume and degritters, splitter boxes, aeration tanks, RAS pump station, final clarifier, and cake storage building. Project also included modifications to the existing raw wastewater pump station, splitter boxes, equalization tanks, aeration tanks, blower building, final clarifier, sand filter complex, secondary effluent pump station, chemical building, solids processing building, and digesters building.

Equalization Basin Repair, Kenosha Water Utility, Wisconsin. Structural Engineer: Inspection of a 30-million-gallon equalization basin that needed structural rehabilitation. Recommended repairs included patching exposed rebar in walls, sealing leaking cracks in walls, replacing existing failed expansion joints, and repair of existing walkways and columns with spalling concrete.

Wastewater Treatment Plant Upgrade and Expansion, Janesville, Wisconsin. Structural Engineer: Design of a plant expansion and upgrade to accommodate continuing residential and industrial growth in the city. The project incorporates the latest energy-saving technologies. Design included the 7,600-square-foot administration building. Project challenges included a fast-tracked schedule to apply for stimulus funding.

Wastewater Treatment Facility Upgrades, Whiting, Wisconsin. Structural Engineer: Facility expansion, which included oxidation ditch, mixing basins, final clarifier, equipment storage building, and modifications to sludge beds, UV disinfection structure, digester structures, and service building. Visual inspection and evaluation of existing buildings and concrete structures for reuse and modifications.

Cambridge-Oakland Wastewater Treatment Plant, Cambridge, Wisconsin. Structural Engineer: Design of a new facility. Plant included process building with concrete treatment tanks, ultraviolet disinfection structure, sludge storage tank, and administration building. Project also included lift station with architectural treatments to match city park location.

Wastewater Treatment Facility, Waupun Public Utilities, Wisconsin. Structural Engineer: Site evaluation of existing concrete tank condition and required repairs.

Aux Sable Creek Basin and Westside WWTPs Phosphorus Removal and Expansion, Joliet, Illinois. Structural Designer: Project involves plant expansions at the Aux Sable and Westside WWTPs to meet new total phosphorus effluent limits. Performed the structural design for new structures and modifications to existing structures which include the addition of a second grit chamber at the existing preliminary treatment structure, modifications to multiple existing splitter boxes, new multiple cell selector tank, modifications to the existing oxidation ditch, two new circular final clarifiers, two new

chemical buildings, addition of an aluminum cover on the digester tank and a new biosolids storage tank.

Chickasaw Hills Water Reclamation Facility Regionalization – Phase 1, Homer Glen Service Area, Illinois American Water Company, Woodridge, Illinois. Structural Designer: Project involves the design of an upgrade to the Chickasaw Hills WRF to increase its treatment capacity from 1.00 mgd to 1.30 mgd and design it so that in the future it can accept future additional flows (i.e., via regionalization) from the Derby Meadows WRF and upgrade the Chickasaw Hills WRF to make it capable of biologically removing phosphorus down to 1.0 mg/l. Performed structural design for the following structures and upgrades: convert existing chlorine contact tank to UV disinfection, convert two existing tanks to final clarifiers, new aerobic digester tank, new aeration basin, new control building with laboratory, office, electrical and mechanical rooms and chemical storage and feed facilities.

Vernon Hills West Pump Station and Improvements, Lake County Department of Public Works, Illinois. Structural Designer: Design of concrete wet well and valve vault, miscellaneous equipment pads, and existing wet well modifications for pump station with pumping capacity of 8.5 mgd.

Des Plaines Wastewater Treatment Facility Plan, Lake County Department of Public Works, Illinois. Structural Designer: Design basis for plant expansion, which included evaluation of the existing structure and recommendations for reuse of tanks and building structures.

NCT Water Reclamation Facility Improvements, Lake County Department of Public Works, Illinois. Structural Designer: Design for a $17-million facility expansion, which included preliminary treatment building, aeration basins, pump station, splitter boxes, clarifiers, chemical buildings, contact tank, filter building, dewatering building, pump and blower building, sludge digester covers, and miscellaneous sludge and material storage structures. Included existing structure evaluation and rehabilitation for reuse of tanks.

Mill Creek WRF Expansion, Lake County Department of Public Works, Illinois. Structural Designer: Plant expansion, which included septage receiving station, splitter box, aeration tanks, secondary effluent access vault, filter bypass structure, solids handling building addition, alum feed building, drying beds, and modifications to the wastewater pumping building, secondary control building, filter building, and UV disinfection building.

Des Plaines River WRF Phase IIA Improvements, Lake County Department of Public Works, Illinois. Structural Designer: Plant expansion, which included evaluation of the existing structures and recommendations for repairs and reuse of tanks and building structures.

Des Plaines River WRF Battery A Rehab, Lake County Department of Public Works, Illinois. Structural Designer: Inspection of existing concrete tanks which needed structural rehabilitation. Recommended repairs included patching exposed rebar in walls, repair of deteriorated concrete, sealing leaking cracks in walls, and removal of existing deteriorated walkways.

Main Influent Pump Station, Phase 1 Pump Replacement, Rock River Water Reclamation District, Rockford, Illinois. Structural Designer: Pump station improvements and modifications associated with pump replacements.

Village Creek Wastewater Treatment Facility Improvement Measures, Fort Worth, Texas. Structural Engineer: Improvements for energy and water conservation measures at the Village Creek wastewater treatment plant.

Back River Wastewater Treatment Facility, Baltimore Department of Public Works, Maryland. Structural Designer: Structural study and cost estimate for egg-shaped sludge digester additions to wastewater treatment facility.

Donohue & Associates, Inc.

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Sheboygan, WI | Champaign, IL | Chicago, IL | Naperville, IL | St. Louis, MO | Minneapolis, MN

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Energy Production and Resource Recovery

Creating A Greater Future

Nutrient Reuse

Biogas to Renewable Electricity

Heat Recovery

Nutrient Recovery

Donohue is helping to shape the future of wastewater facilities as they transform from energy consumers to energy producers. Project Highlights:

- Third Net Zero Energy Facility in the Midwest
- First Lystek Municipal Installation in the United States producing exceptional nutrient rich soil amendment.
- First PONDUS Thermo-Chemical Hydrolysis System in North America
- 15 Biogas-To-Electricity Facilities producing 16 Megawatts of Biogas-Related Electricity
- 12 Resource Recovery Engineering Excellence Awards

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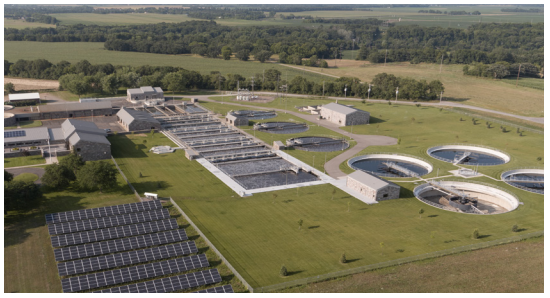
Energy Production and Resource Recovery

Creating A Greater Future

Resource Recovery & Energy Efficiency (R2E2) Master Plan in St. Cloud, MN: The R2E2 Master Plan developed sound energy practices, short- and long-term objectives, and implementation strategies related to energy efficiency and recovery for a 44-mgd peak flow wastewater facility. Evaluation efforts focused on energy benchmarking, efficiency, and production; resource recovery; and high-strength waste receiving program. After the evaluation, Donohue designed biogas conditioning, utilization, and storage system upgrades and biosolids program improvements including struvite harvesting, biosolids dewatering, Lystek biosolids processing, and liquid Class A biosolids storage. The Lystek process is the first municipal-owned installation in the U.S.



High Strength Waste and Energy Production/Efficiency Improvements in Stevens Point, WI: Stevens Point teamed with Donohue to implement new energy efficiencies and energy production systems at its wastewater treatment plant. Phase 1 of the project included a low-energy digester mixing and pumping system and a biogas-driven engine generator to convert biogas to electricity. Phase 2 entailed a new system for diverting high-strength waste from a local brewery to the treatment plant, and utilizing excess capacity in the anaerobic digester to accept additional high-strength waste from other sources. The result is increased operational efficiencies and significant energy savings to the point where it is routine to push excess power onto the grid, thereby meeting the facility's goal of net-zero energy usage. The project also restores excess

Renewable Energy Improvements in Fort Wayne, IN: Anaerobic digestion improvements include new digester covers, linear motion mixers, digester recirculation pumps and appurtenances, and changing from batch-feed to continuous-feed operation. Biogas improvements to produce renewable electricity and reclaim heat include biogas conditioning (H2S, moisture, and siloxane removal, and compression), two dual-fuel 400kW engine-driven generators, heat recovery, low-pressure compression for boilers, high-pressure compression for storage spheres, and new biogas piping. Donohue is collaborating with the City to develop a hauled-in high-strength waste receiving program with the objective to become a Net Zero facility.

Enhancing Biogas Production and Recovering Biosolids in Kenosha, WI: Aging infrastructure and the desire to combat ever-rising utility and landfill costs prompted the Kenosha Water Utility to make improvements and transform waste to energy while reducing their energy footprint and lower operating costs. The result was a facility that uses waste heat as the plant's main heat energy supply, a 30% increase in biogas production for conversion to electricity, and a Class A biosolids end product suitable for reuse instead of going to a landfill. Donohue's design integrated technologies never before used in North America, including a PONDUS thermo-chemical hydrolysis system.

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