WWTP HEADWORKS ENGINEER'S REPORT

CANNON FALLS, MN

NOVEMBER 2025

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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Emma G. Nollenberger, P.E.

Date 11/11/25 License No. 64473

whks

engineers + planners + land surveyors

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Background

The City of Cannon Falls and its consulting engineer, WHKS & Co., have completed an equipment evaluation at the Cannon Falls Wastewater Treatment Plant (WWTP). On April 2, 2025, WHKS personnel met with City of Cannon Falls staff to conduct an on-site review of the WWTP and observed existing conditions. During the site visit, City staff shared information about past and present operational items and WHKS evaluated the current pumping and treatment equipment. WHKS prepared an equipment evaluation report on June 20, 2025 which detailed the age and condition of the wastewater treatment equipment.

Using the information detailed in the equipment evaluation, this report identifies recommended improvement projects at the WWTP. The priority project identified is an upgrade of equipment in the headworks building of the WWTP. Other potential projects will be listed as well for planning purposes.

The Cannon Falls WWTP is in the NE part of Cannon Falls, Minnesota in Goodhue County, Minnesota. The Plant address is 825 Cannon River Avenue, Cannon Falls, MN 55009.

Cost Opinions

Preliminary opinions of probable construction cost have been prepared for the improvements discussed and recommended in this report. The opinions of probable cost include the costs associated with engineering and include a contingency allowance. The opinions of cost have been prepared to reflect anticipated costs during the 2026 construction season for projects let by competitive bidding unless noted otherwise. No attempt has been made to forecast any price increases or decreases. The opinions of probable cost are presented for planning purposes only, and are not a guarantee of the final project cost.

Future cost estimates should be adjusted to reflect cost changes from the time of this report. At the completion of design, a revised opinion of probable construction cost should be prepared for evaluation of the bids to be received. The City should plan to update projected costs on an annual basis to account for changes in the bidding climate as well as fast-paced cost increases for materials and labor currently being experienced within the construction industry.

System Information

Plant Description

The City of Cannon Falls owns and operates an activated sludge WWTP designed to meet the following effluent limits established by the Minnesota Pollution Control Agency (MPCA): Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and Total Phosphorus (TP). The WWTP is a Class B facility. The plant discharges to the Cannon River, which is classified as a 2Bg, 3, 4A, 4B, 5, 6, Water, Outstanding Resource Value Water.

System Components

The treatment process at Cannon Falls WWTP utilizes oxidation ditches for primary treatment and final clarification with alum-assisted phosphorus precipitation for secondary treatment. Major wastewater treatment components of the plant are described in the following table.

Table 1: Cannon Falls WWTP Process Equipment and Capacities

STRUCTURE/EQUIPMENT	QUANTITY	CAPACITY
Raw Wastewater Pump	4	3.27 MGD (Firm)
Mechanical Bar Screen	1	3.27 MGD
Manual Bar Screen	1	3.27 MGD
Degritter	1	4.00 MGD
Grit Pump	1	250 GPM
Grit Concentrator	1	250 GPM
Grit Dewatering	1	100 GPM
Mixing Basin	3	148,400 Gallons Total
Oxidation Ditch	2	2,273 PPD BOD (AWW) 4,545 PPD BOD (Peak)
Final Clarifier	2	3.27 MGD Surface Overflow Rate = 1,028 gpd/sq.ft
RAS Pump	3	1,140 GPM (Firm)
WAS Pump	2	120 GPM (Firm)
Chemical Feed Pump	3	30 GPH (Firm)
Chemical Feed Tank	1	4,990 Gallons
UV Disinfection	1	3.48 MGD
Aerated Solids Storage Tanks	2	1,579,000 Gallons Total

A. Million Gallons per Day (MGD), Gallons per Minute (GPM), Gallons per Hour (GPH), Pounds per Day (PPD).

A plan sheet of the existing WWTP site is included in Appendix A.1. A detailed equipment list is included in Appendix A.2.

Equipment Age and Condition

The following table is the recommended equipment replacement schedule based on the age and condition of the WWTP components from the equipment evaluation (Spring of 2025). The schedule is for planning purposes only and does not account for projected growth or additional industry. The headworks project and the two proposed future projects outlined later in this report are based on the information in Table 2.

Table 2: Equipment Condition Schedule

EQUIPMENT	YEAR INSTALLED	REPLACEMENT TIMEFRAME	CONDITION
Raw Wastewater Pump Station			
Raw Wastewater Pump No. 1	2022	10-20 years	Good
Raw Wastewater Pump No. 2	2022	10-20 years	Good
Raw Wastewater Pump No. 3	2022	10-20 years	Good
Raw Wastewater Pump No. 4	2001	0-5 years	Poor
Slide Gate	2022	10-20 years	Good
Slide Gate	2022	10-20 years	Good
Sluice Gate	2021	10-20 years	Good
Preliminary Treatment Building			
Grit Vortex (Degritter)	2001	5-10 years	Fair
Grit Dewatering Equipment	2001	0-5 years	Poor
Grit Pump	2001	0-5 years	Poor
Fine Screen	2001	5-10 years	Fair
Manual Bar Screen	2001	10-20 years	Fair
Screenings Compactor/Washer	2001	5-10 years	Fair
Level sensor	2022	10-20 years	Good
Mixing Basins			
Mixer No. 1	2001	5-10 years	Fair
Mixer No. 2	2001	5-10 years	Fair
Mixer No. 3	2001	5-10 years	Fair
Oxidation Ditches			
Mechanical Aerator No. 1	2001	5-10 years	Fair
Mechanical Aerator No. 2	2001	5-10 years	Fair
Final Clarifier Complex			
Alum Storage Tank	2001	5-10 years	Fair
Alum System No. 1	2001	5-10 years	Fair
Alum System No. 2	2001	0-5 years	Out of Service
Alum System No. 3	2001	0-5 years	Out of Service
Final Clarifier No. 1 Mechanism	2001	0-5 years	Poor
Final Clarifier No. 2 Mechanism	2001	0-5 years	Poor
WAS Pump No. 1	2001	0-5 years	Fair
WAS Pump No. 2	2001	0-5 years	Fair
RAS Pump No. 1	2001	0-5 years	Fair
RAS Pump No. 2	2001	0-5 years	Fair
RAS Pump No. 3	2001	0-5 years	Fair
Scum Pump	2001	0-5 years	Fair
RAS Flow Meter No. 1	2025	20 years	Good
RAS Flow Meter No. 2	2001	0-5 years	Fair
RAS Flow Meter No. 3	2001	0-5 years	Fair

WAS Flow Meter	2001	0-5 years	Fair
UV Disinfection Building			
Flow Meter	2001	0-5 years	Fair
UV System No. 1	2001	0-5 years	Fair
UV System No. 2	2001	0-5 years	Fair
Sampler	2020	10-20 years	Good
Sludge Storage Tank Structure			
Aeration Blower No. 1	2001	0-5 years	Fair
Aeration Blower No. 2	2001	0-5 years	Fair
Aeration Blower No. 3	2001	0-5 years	Fair
Aeration Blower No. 4	2001	0-5 years	Fair
Aeration Blower No. 5	2001	0-5 years	Fair
Truck Loading Pump No. 1	2001	0-5 years	Fair
Truck Loading Pump No. 2	2001	0-5 years	Fair
Generator	2001	5-10 years	Fair
Auto Transfer Switch	2001	5-10 years	Fair
Fuel Tank	2001	5-10 years	Fair
Fuel Pump	2001	5-10 years	Fair
Miscellaneous			
PLCs	2001	0-5 years	Fair
MCCs	2001	5-10 years	Fair
Sludge Storage Tank Building	2001	0-5 years	Poor

Headworks Project

Overview

During the equipment evaluation in the Spring of 2025, it was determined that the first WWTP improvements project should be an upgrade to the plant's headworks building. The equipment in this building was found to be in poor condition and significant corrosion was noted on some of the piping and building doors. Due to the corrosive nature of a headworks building from raw wastewater, it is normal for equipment, pipes, and building elements to have a shorter typical life than downstream elements of a treatment plant.

Since the WWTP is currently operating below its available capacity, with potential to accommodate and meet new demands, this project will not include any equipment upsizing. All improvements will be replacements in kind.

The scope of replacement for the headworks project includes the following:

- Mechanical Fine Screen & Compactor
- Grit Dewatering Screw Conveyor & Concentrator
- Grit Vortex Motor
- Grit Pump
- Water Piping and associated fittings, valves, insulation, and accessories as needed
- 6" Influent Raw Wastewater pipe and fittings
- Roll-up Garage Door
- Exterior Single Door
- Electrical equipment associated with treatment equipment as needed

A cost estimate and proposed project schedule are provided as City staff have indicated moving this project forward is a high priority.

Photos of the recommended replacements are included in Appendix A.3.

Cost Opinion

Table 3: Headworks Project Cost Opinion

Process	Quantity	Unit		Unit Cost	Cost
General Conditions/Mobilization/Bonds & Insurance	1	L.S.	@	$60,000	$60,000
Grit Vortex (Degritter)	1	L.S.	@	$110,000	$110,000
Grit Dewatering Screw Conveyor & Grit Concentrator	1	L.S.	@	$180,000	$180,000
Grit Pump	1	L.S.	@	$20,000	$20,000
Water Piping	1	L.S.	@	$40,000	$40,000
Influent RWW Pipe 6" Fittings	8	Each	@	$1,500	$12,000
Exterior People Door (West)	1	L.S.	@	$5,000	$5,000
Garage Door (West)	1	L.S.	@	$3,000	$3,000
Fine Screen & Screenings Compactor/Washer	1	L.S.	@	$240,000	$240,000
Electrical	1	L.S.	@	$50,000	$50,000
				Subtotal	**$720,000**
Contingencies			@	10%	$70,000
Engineering					$105,000
				Total	**$895,000**

Construction Schedule

Based on the condition of the existing equipment, pipes, and doors in the Headworks Building, it is recommended that their replacement is a priority. The following schedule is recommended to move forward with a project in the Headworks Building. This schedule could vary depending on City budget, although at the time of this report, the City is planning to use existing sewer funds to pay for the project.

Table 4: Headworks Project Schedule

Anticipated Tasks	Proposed Schedule
Execute Design Contract	December 2, 2025
Begin Design	Winter 2025
Complete Final Design	Summer 2026
Let Project for Bid and Award Project	Fall 2026
Shop Drawing Reviews	Fall 2026
Equipment Fabrication & Shipment	Winter 2026
*Begin Construction	Spring 2026
Project Completion	Fall 2027

*Construction start is based on anticipated lead times of equipment which is subject to vary. Typical lead times for this type of equipment have been 4-6 months after shop drawing submittal approval.

Future Projects

The City should also plan for replacement of the remaining equipment that was not included in the headworks project.

A typical intended useful life for mechanical equipment is 20 years. During the equipment evaluation site visit it was noted that much of the equipment is over 20 years old but appears to be in fair condition and has been well maintained which has extended the equipment past its expected useful life. City staff have been replacing equipment on an as needed basis; However, as the facility is now 24 years old, individual equipment failures and need for replacement will become more frequent. At this point it will be more economical for the City to plan major equipment replacement projects than to repeatedly hire contractors to replace equipment one by one.

The structures at this facility were all constructed in 2001 and the typical intended useful life for basins or structures is 50 years. The sludge storage tank building was included in this list for planning purposes even though it is not technically equipment. Structural defects were noted in the roof and the wall joints connecting the central room to the tanks. The City should plan to address this with their next equipment project. The condition of the other structures should be evaluated in 15-20 years.

Future equipment replacements have been broken down into two proposed projects. Future Project #1 should occur within 5 years from the date of this report and Future Project #2 should occur within 10 years from the date of this report. Cost opinions have been prepared for the recommended equipment replacements for each of these projects.

Scopes

Future Project #1 is primarily a pump replacement project. The other significant equipment replacements would be the final clarifier equipment and the UV modules. All of this equipment was listed as “Fair” or “Poor” in the equipment evaluation which is why the suggested project timeframe is within the next 5 years. This project also includes structural improvements to the sludge storage building.

Future Project #2 includes replacement of the biological nutrient removal equipment, the chemical feed system, and the generator/automatic transfer switch. This equipment was all listed as “Fair” during the equipment evaluation but has slightly longer expected useful lives than the “Fair” equipment slated for Future Project #1. These equipment replacements should occur in the next 5 to 10 years.

Associated PLCs and MCCs will be upgraded with each of these projects. This is accounted for under the “Electrical” lines in the cost tables below.

These two projects could potentially be combined if it is the City’s preference to have one major future equipment replacement project rather than two. It is currently recommended as two projects to utilize the anticipated longer lifespans of the equipment listed in Future Project #2.

Cost Opinions

Table 5: Future Project #1 (0-5 Year Range) Cost Opinion

Process	Quantity	Unit		Unit Cost	Cost
General Conditions/Mobilization/Bonds & Insurance	1	L.S.	@	$290,000	$290,000
Raw Wastewater Pump	1	Ea.	@	$60,000	$60,000
Alum Pump Systems	2	Ea.	@	$30,000	$60,000
Final Clarifier Equipment	2	Ea.	@	$390,000	$780,000
WAS Pumps	2	Ea.	@	$50,000	$100,000
RAS Pumps	3	Ea.	@	$50,000	$150,000
Scum Pump	1	Ea.	@	$50,000	$50,000
UV Modules	2	Ea.	@	$290,000	$580,000
Aeration Blowers	5	Ea.	@	$210,000	$1,050,000
Truck Loading Pump	2	Ea.	@	$50,000	$100,000
Electrical	1	L.S.	@	$540,000	$540,000
Sludge Storage Building Repairs	1	L.S.	@	$150,000	$150,000
				Subtotal	**$3,910,000**
Contingency			@	10%	$390,000
Engineering					$770,000
				Total	**$5,070,000**

Table 6: Future Project #2 (5-10 Year Range) Cost Opinion

Process	Quantity	Unit		Unit Cost	Cost
General Conditions/Mobilization/Bonds & Insurance	1	L.S.	@	$110,000	$110,000
BNR Mixers	3	Ea.	@	$50,000	$150,000
Ditch Aerators	2	Ea.	@	$270,000	$540,000
Alum Tank	2	Ea.	@	$30,000	$60,000
Alum Pump Systems	3	Ea.	@	$30,000	$90,000
Generator	1	Ea.	@	$270,000	$270,000
ATS	1	Ea.	@	$50,000	$50,000
Electrical	1	L.S.	@	$200,000	$200,000
				Subtotal	**$1,470,000**
Contingency			@	10%	$150,000
Engineering					$290,000
				Total	**$1,910,000**

Schedule

These proposed projects are for planning purposes. The exact design/construction time frames and the details of the scope will need to be further discussed with City staff. The timing/execution of these projects will be dependent on City finances and potential funding opportunities.

It is possible that a piece of equipment may fail prior to one of the proposed future projects and will need replacement earlier than anticipated. These project scopes are based on reasonable estimates of the equipment's useful lives based on their current condition, but the estimated equipment lifespan cannot be guaranteed.

Summary / Recommendations

In summary, the WWTP has been well maintained since its construction in 2001, but routine equipment replacement is still needed and three projects have been proposed to address this. They are outlined here in order of priority.

1. Headworks Project
    a. Scope: Replacement of pretreatment equipment and corroded piping and building elements.
    b. Cost Estimate: $895,000
    c. Funding Source: City Sewer Fund
    d. Summarized Schedule:
        i. Design in Winter of 2025/2026
        ii. Bid in Spring of 2026
        iii. 1 year of construction
2. Future Project #1
    a. Scope: Replacement of pumps, final clarifier equipment, UV equipment, some electrical, and sludge storage building structural improvements.
    b. Cost Estimate: $5,070,000
    c. Funding Source: TBD
    d. Summarized Schedule:
        i. Within next 5 years.
        ii. Dependent on chosen funding source.
3. Future Project #2
    a. Scope: Replacement of biological and chemical nutrient removal equipment, generator and automatic transfer switch, and some electrical.
    b. Cost Estimate: $1,910,000
    c. Funding Source: TBD
    d. Summarized Schedule:
        i. Within next 10 years.
        ii. Dependent on chosen funding source.

It is recommended that the City move forward with enacting the Headworks project per the schedule in Table 4. It is also recommended the City include the two proposed Future Projects in their planning work.

Appendix

A.1 : WWTP Site Plan

A.2 : Equipment List

Appendix A.1: WWTP Site Plan

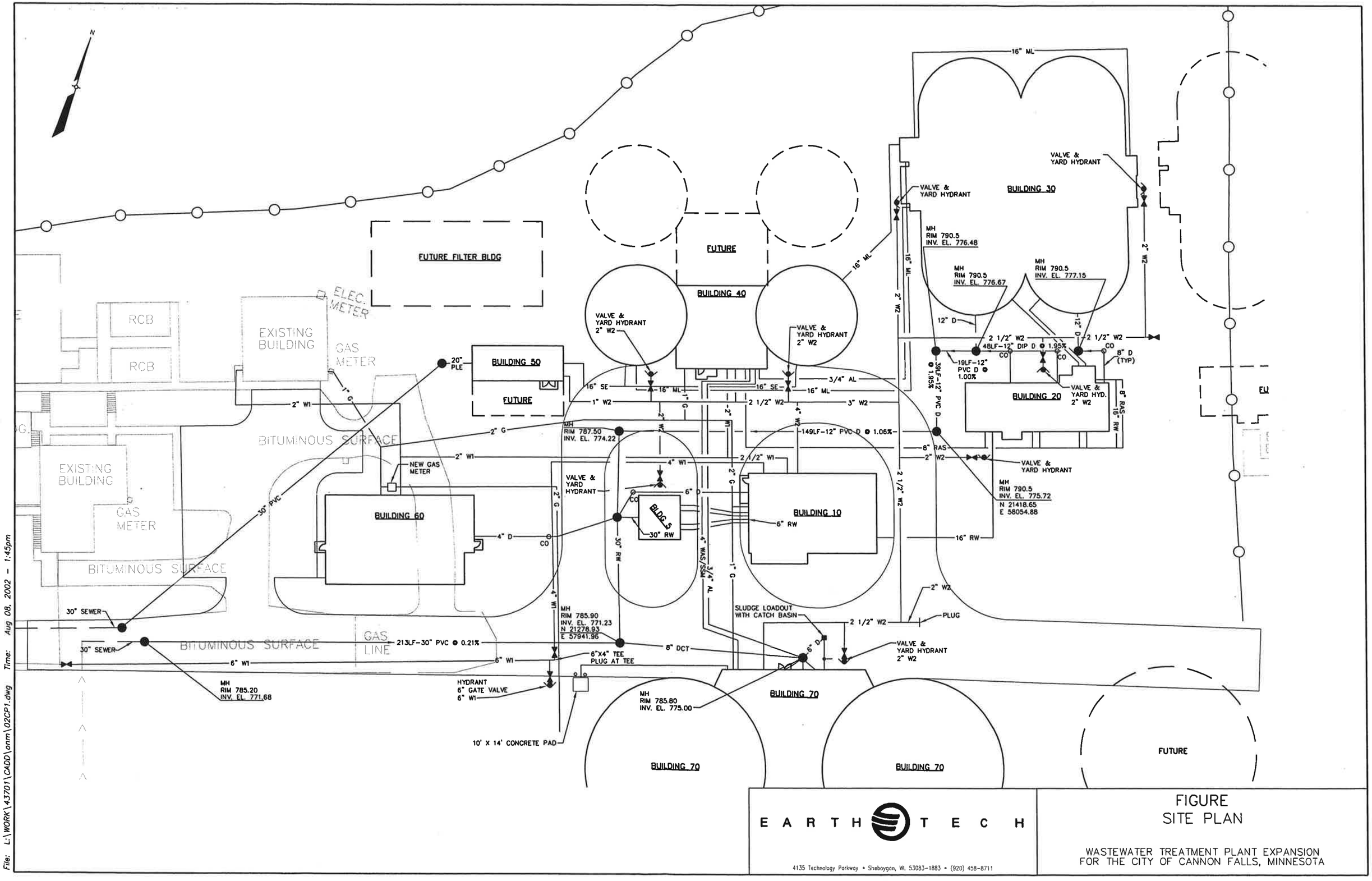

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FIGURE
SITE PLAN

WASTEWATER TREATMENT PLANT EXPANSION
FOR THE CITY OF CANNON FALLS, MINNESOTA

Appendix A.2: Equipment List

Cannon Falls WWTP
Updated 3/31/25

Process	Unit ID #	Exist. HP	Voltage /Phase	RPM	Drive Type	Seal Water	Controls	Dimensions	Existing Capacity	Exist. TDH	Year Inst.	Model/Notes	Comments/Condition
Raw Wastewater Pump Station													Concrete looks ok. Paint is corroding - needs recoating or lining. Baffled wet well, but self cleaning aspect does not seem to work. Run 2 pumps (alternate x6 months). Have used 4 pumps during peak flows.
Raw Wastewater Pump No. 1	P-1-1-1	15							760 gpm	41'	2022	Submersible - Flygt 6" CP3140-436	Original Drive. Clogs everyday.
Raw Wastewater Pump No. 2	P-1-1-2	15							760 gpm	41'	2022	Submersible - Flygt 6" CP3140-436	
Raw Wastewater Pump No. 3	P-1-1-3	15							760 gpm	41'	2022	Submersible - Flygt 6" CP3140-436	
Raw Wastewater Pump No. 4	P-1-1-4	15							760 gpm	41'	2001	Submersible - Flygt 6" CP3140-436	
Slide Gate	G-1-4-1										2022		
Slide Gate	G-1-4-2										2022		
Sluice Gate	G-1-4-3										2021		
Preliminary Treatment Building													Corrosion on potable water piping, garage door, and influent fittings. Handle on west exterior door is deformed. Influent channel has flooded in high flows. Channel corrosion is low. Replaced air unit.
Parshall Flume	FE-2-19-1							12" throat	5 MGD		2001		
Grit Vortex (Degritter)	M-2-14-1	1		20							2001		
Grit Dewatering Screw Conveyor	M-2-16-1	1									2001		Bottom of auger is corroded. Condition is poor.
Grit Concentrator	M-2-17-1										2001		
Grit Pump	P-2-15-1	10							250 gpm	17'	2001	Wemco	Poor condition
Fine Screen	M-2-3-1	0.5	3p/460v					18"x3' channel. 6mm openi	27 mgd. 12CF/hr		2001	Parkson Aquaguard	Gets clogged when 2 pumps run. Condition is fine.
Manual Bar Screen											2001		
Screenings Compactor/Washer	M-2-4-1	2	3p/460v								2001		
Level sensor											2022		
Sampler?			120V						3 ft/sec. 5 gal	26'			
Mixing Basins													Open air
Mixer No. 1	M-3-1-1	3	460/4.7/3	1,200				12" Impeller			2001	Aqua-Aerobic Floater FSS	New sheath over cords. Power cords are only thing that've been replaced.
Mixer No. 2	M-3-1-2	3	460/4.7/3	1,200				12" Impeller			2001	Aqua-Aerobic Floater FSS	
Mixer No. 3	M-3-1-3	3	460/4.7/3	1,200				12" Impeller			2001	Aqua-Aerobic Floater FSS	
Oxidation Ditches													Only run 1 ditch (alternate x5 years). Have spare gearbox/motor. One ditch is needed for 813 lbs BOD/day. Second ditch needed for 1600-2000 lbs BOD/day.
Mechanical Aerator No. 1	M-3-5-1	100	460/112/3					11'-6" Impeller	5,000 gal volume		2001	Eimco/Ovivo	Bearings replaced
Mechanical Aerator No. 2	M-3-5-2	100	460/112/3					11'-6" Impeller	5,000 gal volume		2001	Eimco/Ovivo	
Final Clarifier Complex													
Alum Storage Tank	T-7-4-1								4,990 gal		2001		1-1.5 years worth of storage (dose minimally). 1 line to decant and one line to RAS or ditches.
Alum System No. 1	M-7-1-1	0.25							0.15-15 gph		2001		Pump hooked to phosphate analyzer replaced last fall. All other accessories are original.
Alum System No. 2	M-7-1-2	0.25							0.15-15 gph		2001		Almost not working.
Alum System No. 3	M-7-1-3	0.25							0.15-15 gph		2001		Non Operational.
Final Clarifier No. 1 Mechanism	M-4-1-1	0.5	460/.8/3					1,590 sq.ft. SA / 14' SWD, 128.7' weir length			2001	Eimco/Ovivo	Rake arms are corroding. Never replaced squeegee or painted. Domes are good (powered vents on domes). O&M states if one ditch is in service, one clarifier is sufficient for plant flows of >0.8mgd.
Final Clarifier No. 2 Mechanism	M-4-1-2	0.5	460/.8/3					1,590 sq.ft. SA / 14' SWD, 128.7' weir length			2001	Eimco/Ovivo	Rake arms are corroding. Never replaced squeegee or painted. Domes are good (powered vents on domes). O&M states if one ditch is in service, one clarifier is sufficient for plant flows of >0.8mgd.
WAS Pump No. 1	P-4-9-1	1.5	460/_/3	870					120 gpm	18.9'	2001	Centrifugal Vanguard	Impellers are wearing.
WAS Pump No. 2	P-4-9-2	1.5	460/_/3	870					120 gpm	18.9'	2001	Centrifugal Vanguard	Impellers are wearing.
RAS Pump No. 1	P-4-3-1	7.5	460/9.4/3	1440					570 gpm	22'	2001	Centrifugal Vanguard	Impellers are wearing.
RAS Pump No. 2	P-4-3-2	7.5	460/9.4/3	1440					570 gpm	22'	2001	Centrifugal Vanguard	Impellers are wearing.
RAS Pump No. 3	P-4-3-3	7.5	460/9.4/3	1440					570 gpm	22'	2001	Centrifugal Vanguard	Impellers are wearing.
Scum Pump	P-4-2-1	5	460/_/3	1750					150 gpm		2001	Vaughn Centrifugal Vanguard	Impellers are wearing.
RAS Flow Meter No. 1											?		Replaced recently (writing this in April 2025).
RAS Flow Meter No. 2											2001		
RAS Flow Meter No. 3											2001		
WAS Flow Meter											2001		
UV Disinfection Building													
Flow Meter	FE-5-1-1							16"	0-5 mgd		2001		Oversized/inaccurate.
UV System No. 1	M-5-3-1								1.64 mgd		2001	Trojan Horizontal	Clean 1x /month. Replace bulbs every 2 years. Controller doesn't work. Replaced ballasts. Run 1 bank.
UV System No. 2	M-5-4-1								1.64 mgd		2001	Trojan Horizontal	
Sampler	M-5-2-1										2020	ISCO	

Administration Building													
													HVAC Issues
Sludge Storage Tank Structure													Membrane roof over generator room is cracking (no leaking noticed).
Aeration Blower No. 1	M-6-1-1	100	460/_/3	1800 (2693 rpm max)					1400 scfm @ 9 psig		2001		Wes starts blowers at night because of odor control issues.
Aeration Blower No. 2	M-6-1-2	100	460/_/3	1800 (2693 rpm max)					1400 scfm @ 9 psig		2001		
Aeration Blower No. 3	M-6-1-3	100	460/_/3	1800 (2693 rpm max)					1400 scfm @ 9 psig		2001		
Aeration Blower No. 4	M-6-1-4	100	460/_/3	1800 (2693 rpm max)					1400 scfm @ 9 psig		2001		
Aeration Blower No. 5	M-6-1-5	100	460/_/3	1800 (2693 rpm max)					1400 scfm @ 9 psig		2001		
Truck Loading Pump No. 1	P-6-2-1	10	460/_/3	1150					975 gpm	19'	2001	Vaughn. Centrifugal Vanguards	
Truck Loading Pump No. 2	P-6-2-2	10	460/_/3						975 gpm	19'	2001	Vaughn. Centrifugal Vanguards	
Generator											2001		
Auto Transfer Switch											2001		Control panel replaced.
Fuel Tank									400 gal		2001		
Fuel Pump											2001		
Tank 1								82' diameter	789,000 gal				Cleaned out tanks in April 2025 and unclogged air piping. Waste to one tank, thicken by decanting, send to second tank. Aerated with stainless coarse bubble diffusers. Phosphate coming back in decant. Achieve ~3% solids (desire to achieve that more efficiently).
Tank 2									789,000 gal				
Miscellaneous													Membrane roof over generator room is cracking (no leaking noticed).
SCADA											2001		Upgrade in 2022. Can control lift station remotely. PLCs & MCCs are all original.

Appendix A.3: Headworks Equipment Photos

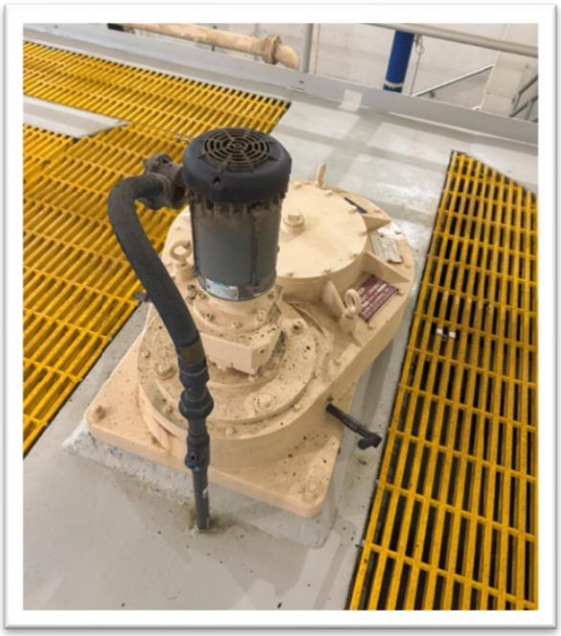

Photo 1: Grit Vortex (Degritter)

Photo 2: Grit Dewatering Screw Conveyor & Concentrator

Photos 3 & 4: Grit Pump & Associated Piping

Photo 5: Water Piping, Valves, & Accessories

Photo 6: Influent RWW Pipe 6” Fittings

Photo 7: Exterior People Door (West)

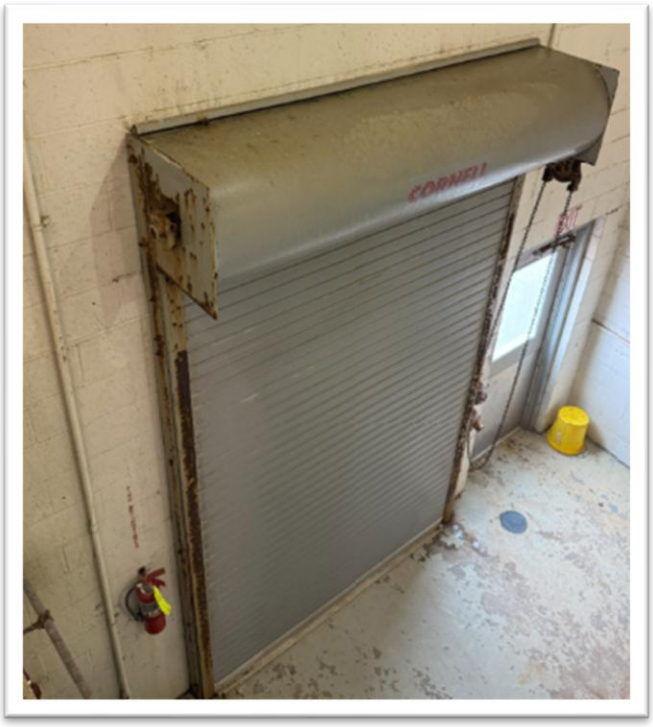

Photo 8: Garage Door (West)

Photos 9 & 10: Mechanical Fine Screen & Compactor