CANNON FALLS WATER/WASTEWATER CAPACITY EVALUATION

Executive Summary for City Staff Meeting – May 29, 2025

The City of Cannon Falls and its consulting engineer, WHKS & Co., have completed capacity evaluations of Cannon Falls' water and wastewater systems to determine the unallocated capacity that can be available for the potential Tract Development.

The City currently serves a population of 4,220 people and four Significant Industrial Users (SIUs): Lorentz Meats, Gemini, Inc. and Cannon Equipment, LLC (two locations). Copies of SIU agreements are not available. Based on discussions with City staff, it is unclear whether formal agreements exist for Gemini or Cannon Equipment, but conversations regarding usage have occurred. There have been no recent conversations with Lorentz Meats about usage. The City plans to pursue formal agreements with these industries in the future. For this evaluation, the industrial data is derived from water usage records rather than allocated agreements. See attached spreadsheet for water usage records of the top 10 users over the past ten years.

Based on discussions with City staff, this analysis utilizes a 2045 population equivalent value of 6,000. This is a conservative approach that provides flexibility as the City grows. Six of the top water users were excluded from growth projections as their usage is independent of the commercial growth that is typically associated with domestic growth. These users are highlighted on the attached spreadsheet referenced previously.

The water and wastewater systems were evaluated with the assumption that Tract Development would connect to the distribution/collection systems on the north side of town. The capacities of the following items were evaluated:

- North Water Reservoir
  - 500,000 gallons
- South Water Tower
  - 1,000,000 gallons
- Three Wells (1 pump each)
  - Well #3 → 1,100 gpm
  - Well #4 → 1,200 gpm
  - Well #5 → 1,200 gpm
- Water Distribution Piping
- North Booster Station
  - Pump #1 → 600 gpm
  - Pump #2 → 1,500 gpm
  - Pump #3 → 2,000 gpm
- Wastewater Treatment Plant
  - Rated Average Dry Weather → 0.84 MGD
  - Rated Average Wet Weather → 0.92 MGD
  - Rated Peak Hourly Wet Weather → 3.27 MGD
- Wastewater Collection Piping
- Wastewater North Lift Station
  - Firm capacity → 900 gpm

Water System

The following table summarizes pertinent water parameters for the capacity evaluation. Projected usage from City growth is over the next twenty years.

	EXISTING CAPACITY	CURRENT USAGE	INDUSTRIAL GROWTH[L]	DOMESTIC /COMMERCIAL GROWTH	AVAILABLE CAPACITY
Tower / Reservoir MGD	1.5[A]	0.41[B]	0	0.16[C]	**0.93**
Well Pump MGD	3.31 (firm) 5.04 (total)[D]	1.16 [E]	0	0.44[F]	**1.71 (firm)**
Fire Flow	N/A	N/A	N/A	N/A	**1,800 GPM[G]**
Max Flow – with New 1MG Tower	N/A	N/A	N/A	N/A	**7,800 GPM[G] (2,700 GPM fire flow)**
North Booster Station GPM	Pump 1 =600 Pump 2 = 1,500 Pump 3 = 2,000	N/A	N/A	N/A	**1,500 GPM (firm) – North industrial usage**
Groundwater Appropriation	250 MGY[H]	149 MGY (Average)[I] 165.1 MGY (Peak)	0	57 MGY[J]	**44 MGY[K]**

A. Capacity is based on physical volume of the existing tower and reservoir.
B. Usage is based on the historical average daily demand over the past 10 years.
C. Projected growth uses the 2045 population equivalent value excluding the average usage of the top six industrial users.
D. Capacity is based on rated capacities of existing pumps.
E. Usage is based on the historical peak day demand over past 10 years
F. Projected growth is based on applying the historical peaking factor to projected average usage.
    a. 0.16 x 2.79 = 0.44
G. Available capacity is a based on a fire flow simulation in the water distribution model based on largest (2,000 GPM) booster pump operating.
H. Existing capacity is based on the City's groundwater appropriation permit.
I. Current usage is based on well usage data over the past 10 years.
J. Domestic/commercial growth is projected based on City's population goal of 6,000 people by 2045.
K. Additional capacity could be applied for through the Minnesota Department of Natural Resources.
L. Existing industries are not currently planning for any major upgrades, and no future allocations are included.

There is an existing irrigation well at the proposed Tract Development site. It has a permitted groundwater appropriation of 40 million GPY. City and consultant staff met with the Minnesota Department of Natural Resources on June 12, 2025 to discuss options for this well. Further discussions are necessary to determine opportunities associated with this well.

Wastewater System

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 following table indicates the current usage of the WWTP within its permitted capacity, as well as projected usage based on anticipated City growth over the next twenty years.

	EXISTING CAPACITY[A]	CURRENT USAGE	INDUSTRIAL GROWTH[C]	DOMESTIC /COMMERCIAL GROWTH	AVAILABLE CAPACITY
Average Dry Weather (ADW) MGD	0.84	0.28[B]	0	0.14[D]	**0.42**
Average Daily Flow (ADF) MGD	N/A	0.32[B]	0	0.16[D]	**N/A**
Average Wet Weather (AWW) MGD	0.92 (Permitted) 1.08 (Design)[F]	0.40[B]	0	0.20[D]	**0.32 (Permitted) 0.48 (Design)**
Max Wet Weather (MWW) MGD	N/A (Permitted) 2.18 (Design)	1.03[B]	0	0.50[D]	**N/A (Permitted) 0.65 (Design)**
Peak Hourly Wet Weather (PHWW)	3.27 MGD / 2,270 gpm	1.09 MGD / 760 gpm[E]	0	0.53 MGD / 370 gpm[D]	**1.65 MGD / 1,150 gpm**
BOD PPD	1,918 (AWW Permit Value) 4,545 (Max Day Design)	1,417 (Average) 7,508 (Max)[B]	0	302[G]	**199 (Average) -3,265 (Max)**
TSS PPD	1,918 (AWW Permit Value) 4,545 (Max Day Design)	1,209 (Average) 7,537 (Max)[B]	0	356[G]	**353 (Average) -3,348 (Max)**
TP PPD	54 (AWW Permit Value) 127 (Max Day Design)	29 (Average) 255 (Max)[B]	0	8.9[G]	**16 (Average) -137 (Max)**

A. Capacity is based on existing NPDES permitted rating values or plant design values, if noted as such.
B. Current usage is based on the maximum values extracted from City monitoring data from 2015-2024.
C. Existing industries are not currently planning for any major upgrades, and no future allocations are included.
D. Projected growth is based on an average usage population equivalent, excluding the average usage of the top 6 users (Appendix A.1).
    a. (6000-4,200) * 86.93 (PE) = Projected Growth
E. Peak values cannot be measured at the plant. This is based off a 3.4 peaking factor of ADF according to 10 State Standards.

F. Requires re-rating and reclassification of the plant as a major facility.
G. Based on typical loadings per capita for BOD/TSS/TP of 0.17PPD/0.20PPD/0.005PPD.

In addition to the WWTP capacity, a brief evaluation of the collection system was completed and summarized in memo to City staff dated April 24, 2025, which is included in Appendix A.4. To evaluate capacity for potential development in the north industrial park, the evaluation considered existing pipe capacities and lift station:

- Collection System Pipes
  - Multiple sections of pipe may need to be upsized to meet any additional flow. Additional field surveys will be required to determine pipe slope once actual requested flows are known.
- Lift Station
  - Current capacity is 900 gpm (1.3 MGD)
  - Current estimated average use of 200 gpm (0.29 MGD)
  - Potential increase to 2,000 gpm (2.88 MGD) if pumps are upgraded

Summary of Capacity Limits

The following table describes the required system upgrades at certain flow demands requested by Tract Development.

Upgrade	FLOW	ASSOCIATED TRACT EXCEEDING DEMANDS
New Well Needed	1.71 MGD Peak Daily Flow - Water	2031 Demand (Interim)
Booster Station Upgrade[A]	1,500 gpm Peak Hourly Flow - Water	2031 Demand (Interim)
New Water Tower (1 MG)[B]	0.93 MGD Average Day Flow - Water	2034 Demand (Full Buildout)
Request Additional Groundwater Appropriations[C]	44 MGY Annual Use - Water	2034 Demand (Full Buildout)
WWTP Upgrades	0.32 MGD AWW 0.65 MGD MWW 1.65 MGD PHWW - Wastewater	Scenario 2 – 2031 MWW Demand (Interim)
Lift Station Upgrade	700 gpm Peak Hourly Flow - Wastewater	Scenario 2 – 2031 MWW Demand (Interim)
Collection System Upgrades[D]	550 gpm Peak Hourly Flow - Wastewater	Scenario 2 – 2031 MWW Demand (Interim)

A. Booster Station upgrades would not be required if a new water tower is constructed.
B. New water tower would serve as an alternative to upgrading the booster station for peak hourly demand and fire flow requirements.
C. This item is subject to change after the meeting with the IDNR on June 12th.
D. Survey data is required to determine actual pipe capacities.

To meet the MWW demands of the Tract Development's Scenario 2 interim demand, the following WWTP elements would need to be upgraded: Raw wastewater pumps, final clarifier, and UV

disinfection. A hydraulic analysis of the plant's piping and tank elevations was not a part of this scope. Increasing the plant's hydraulic capacity requires further hydraulic analysis.

To meet the interim and full buildout PHWW demands of Tract Development's Scenario 2, the development would need to construct a flow retention basin. The existing collection system and WWTP cannot support the peak demands without a complete overhaul of the plant and replacement of all collection piping to convey wastewater from the development.

Based on these capacity findings, City Staff, WHKS, and Tract Development need to discuss the required system upgrades to meet Tract Development's usage demands.