HASTINGS WASTEWATER TREATMENT PLANT FACILITY PLAN

Adopted February 2022

METROPOLITAN COUNCIL

Hastings WWTP Facility Plan

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.

Heidi Hutter, P.E.
Registration Number 53082

Responsible for Executive Summary and all sections except those noted below.

Chad Davison, P.E.
Registration Number 44177

Responsible for sections 4.1.1, 4.1.2, and 5.

The Council's mission is to foster efficient and economic growth for a prosperous metropolitan region

Metropolitan Council Members

Charlie Zelle	Chair	Raymond Zeran	District 9
Judy Johnson	District 1	Peter Lindstrom	District 10
Reva Chamblis	District 2	Susan Vento	District 11
Christopher Ferguson	District 3	Francisco J. Gonzalez	District 12
Deb Barber	District 4	Chai Lee	District 13
Molly Cummings	District 5	Kris Fredson	District 14
Vacant	District 6	Phillip Sterner	District 15
Robert Lilligren	District 7	Wendy Wulff	District 16
Abdirahman Muse	District 8		

The Metropolitan Council is the regional planning organization for the seven-county Twin Cities area. The Council operates the regional bus and rail system, collects and treats wastewater, coordinates regional water resources, plans and helps fund regional parks, and administers federal funds that provide housing opportunities for low- and moderate-income individuals and families. The 17-member Council board is appointed by and serves at the pleasure of the governor.

On request, this publication will be made available in alternative formats to people with disabilities. Call Metropolitan Council information at 651-602-1140 or TTY 651-291-0904.

Table of Contents

List of Appendices

List of Tables

List of Figures

Executive Summary

This plan recommends relocating wastewater service provided by the existing Hastings Wastewater Treatment Plant located in downtown Hastings about 2 miles southeast to 2445 Ravenna Trail, Hastings MN 55033, property purchased by Metropolitan Council Environmental Services in 2005 for this purpose[1]. Figure ES-1 identifies the location of the new Hastings WWTP and overall sewer system modifications.

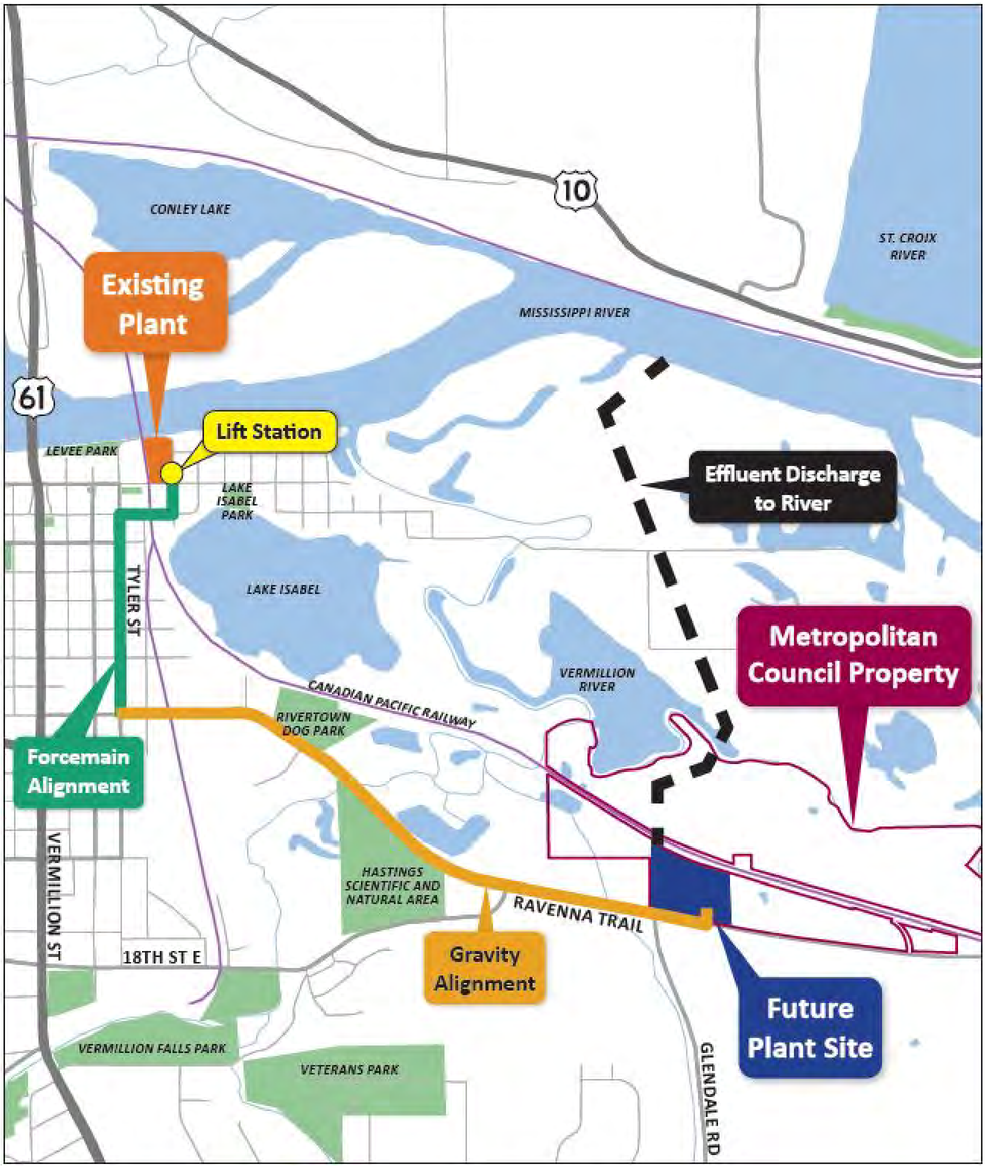


Figure ES-1 Location of New Hastings WWTP Site and Overall Sewer System Modifications

[1] The MCES 2040 Water Resources Policy Plan includes planned replacement of the Hastings WWTP to serve the long-term service area which may include land areas currently in Marshan, Nininger, and Vermillion Townships.

Prior to construction of the new plant 2024 through 2026, a modest ($2.5M) renewal of the existing plant will be completed under separate project to provide for continued reliable service until the new plant can be fully commissioned. This plan provides for continued reliable wastewater service for the Hastings service area and the capability to meet anticipated future regulatory requirements while maintaining reserve capacity for projected growth.

The existing Hastings WWTP site is physically constrained and presents challenges to major renewal, land use compatibility, and expandability in response to reliable service issues, growth, and changes in regulatory requirements.

The Hastings WWTP is projected to exceed its existing capacity of 2.34 million gallons per day (mgd) in 2050 due to growth within the service area. (See Table ES-1.) Nitrogen reduction at wastewater treatment plants will be required to achieve the state's goal of 45% reduction in nitrogen loads to the Mississippi River by 2040[2]. The anticipated future limit for total nitrogen of 10 mg/L or less would require additional land area beyond the existing site or, if existing tanks are used for nitrogen removal, plant capacity would have to be de-rated. De-rating plant capacity is not recommended because it expedites the need for facility expansion and further limits MCES' ability to respond to growth in the service area.

A 2020 condition assessment (Appendix 1-1) of the Hastings WWTP indicated that continued reliable service through 2040 would require an investment of approximately $26,000,000 (installed equipment cost only) and does not include costs for process control system upgrades or facility expansion necessary to accommodate growth or respond to changes in regulatory requirements. Relocation of Hastings WWTP service avoids major investment at a site that cannot meet long-term needs.

Table ES-1 Hastings Wastewater Treatment Plant Service Area: Population and Flow Projections

PARAMETER	2020	2030	2040	2050	ULTIMATE
Population, City of Hastings	22,800	25,500	28,300	31,100	-
Average Flow, mgd	1.56	1.84	2.09	2.35	10.0

[a]Existing wastewater treatment capacity of Hastings WWTP is 2.34 mgd.
[b]Existing Hastings WWTP is projected to reach its 20% reserve capacity of 1.88 mgd near 2030 (2.34 x80%). Reserve capacity is used in MCES planning to accommodate unanticipated growth in the service area from industrial sources.

[2] Nutrient Reduction Strategy (2014), State of Minnesota

The estimated total budgetary construction cost for relocation of Hastings WWTP service is $145M. The estimated capital cost including engineering and administration cost is $165M. Table ES-2 provides a summary of the recommended scope and cost for the work of this Facility Plan.

Table ES-2 Opinion of Probable Cost for Relocation of Hastings WWTP Service

MAJOR SCOPE ITEM	CONSTRUCTION COST
Lift Station	$980,000
Conveyance	$13,435,000
WWTP – Relocate BP Pipeline	$4,200,000
WWTP – Site Work	$6,966,000
WWTP – Preliminary Treatment	$15,360,000
WWTP – Secondary Treatment	$22,219,000
WWTP – UV Disinfection	$2,547,000
Outfall to Mississippi River	$12,421,000
WWTP – Solids Processing	$9,500,000
WWTP – Facility Support Systems	$12,788,000
Decommission Existing Facilities	$2,000,000
Subtotal	$102,416,000
30% Contingency	$30,725,000
Escalated Construction Cost (3% per year)	$11,983,000
Total Construction Cost	**$145,124,000**
Engineering and Admin (20%)	$20,483,000
Total Capital Cost	**$165,607,000**

The work of this facility plan is generally grouped into three categories outlined below based on sequence of construction activities required to relocate Hastings WWTP service.

Lift Station and Conveyance Systems

Figure ES-2 identifies the location of the new lift station and conveyance systems required to convey wastewater to the new WWTP.

Key scope items include:

- 0.2 mgd lift station located on the existing Hastings WWTP site
- 6-inch diameter forcemain from the lift station to the new gravity trunk sewer
- Gravity trunk sanitary sewer from the forcemain to the new plant site

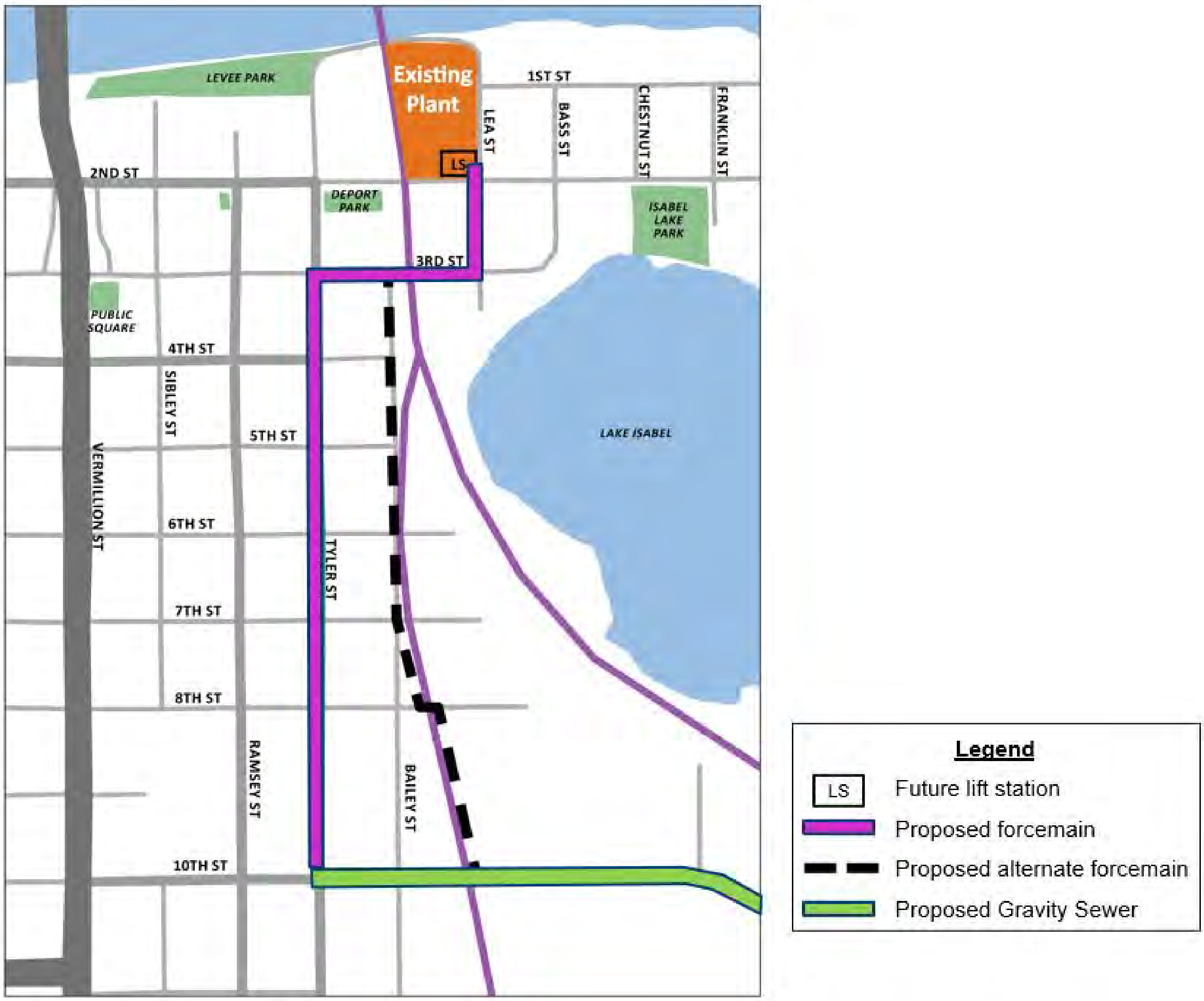


Figure ES-2 Recommended Lift Station Location and Conveyance System Route

Wastewater Treatment Plant and Outfall

Figure ES-3 is the recommended site layout for the new WWTP. Relocation of the 10-inch British Petroleum oil pipeline to the west property boundary allows the facility to be sited on about 10 acres of natural high ground and is the most efficient and sustainable use of the site. Utilizing the southwest corner of the site minimizes disruption to the natural landscape and the length and depth of the gravity sewer conveying waste to the facility. It also provides reliable, safe access to Highway 61 through an industrial park via Glendale Avenue and MN Trunk Highway 316. Space has been provided for primary clarifiers, expanded aeration tanks, and filtration should they be needed to meet future regulatory requirements.

Key scope items include:

- Relocation of the 10-inch BP oil line to the west property boundary
- Site access and security improvements including two driveways into the plant, access gates, and perimeter fencing
- Preliminary Treatment including wetwell/drywell influent pumping, mag meters, multi-rake bar screens, and grit removal and processing systems
- Secondary treatment systems including A/O EBPR system
- UV disinfection
- Solids processing including DAFTs, sludge storage, and sludge loadout facilities
- Odor control systems including high dispersion fans for the preliminary treatment building and activated carbon for solids handling facilities
- A combined administration and maintenance building including offices, meeting spaces, lunchroom, locker rooms, restrooms, and maintenance shop
- Facility support systems including power distribution, electrical instrumentation and controls, a Tier 4 generator for stand-by power generation, and HVAC and building automation systems
- 42-inch diameter outfall from the plant to the Mississippi River, about 7,200 linear ft

Decommission Existing Facilities

Figure ES-4 depicts the preliminary proposed limits of decommissioning. Exact limits will be determined in an intergovernmental agreement between MCES and the City of Hastings.

Key scope items include:

- Remove completely all buildings, tanks, piping, and appurtenances on the southern half of the existing plant site.
- Remove infrastructure located within the floodplain to a depth of 6 feet below existing grade.
- Return of land property to City of Hastings

Figure ES-5 is a program implementation schedule that includes planning and implementation steps for project delivery. The estimated completion of construction and commissioning for relocation of the Hastings WWTP is 2026 for Lift Station and Conveyance Systems; 2027 for Wastewater Treatment Plant and Outfall; and 2029 for Decommissioning of existing facilities.

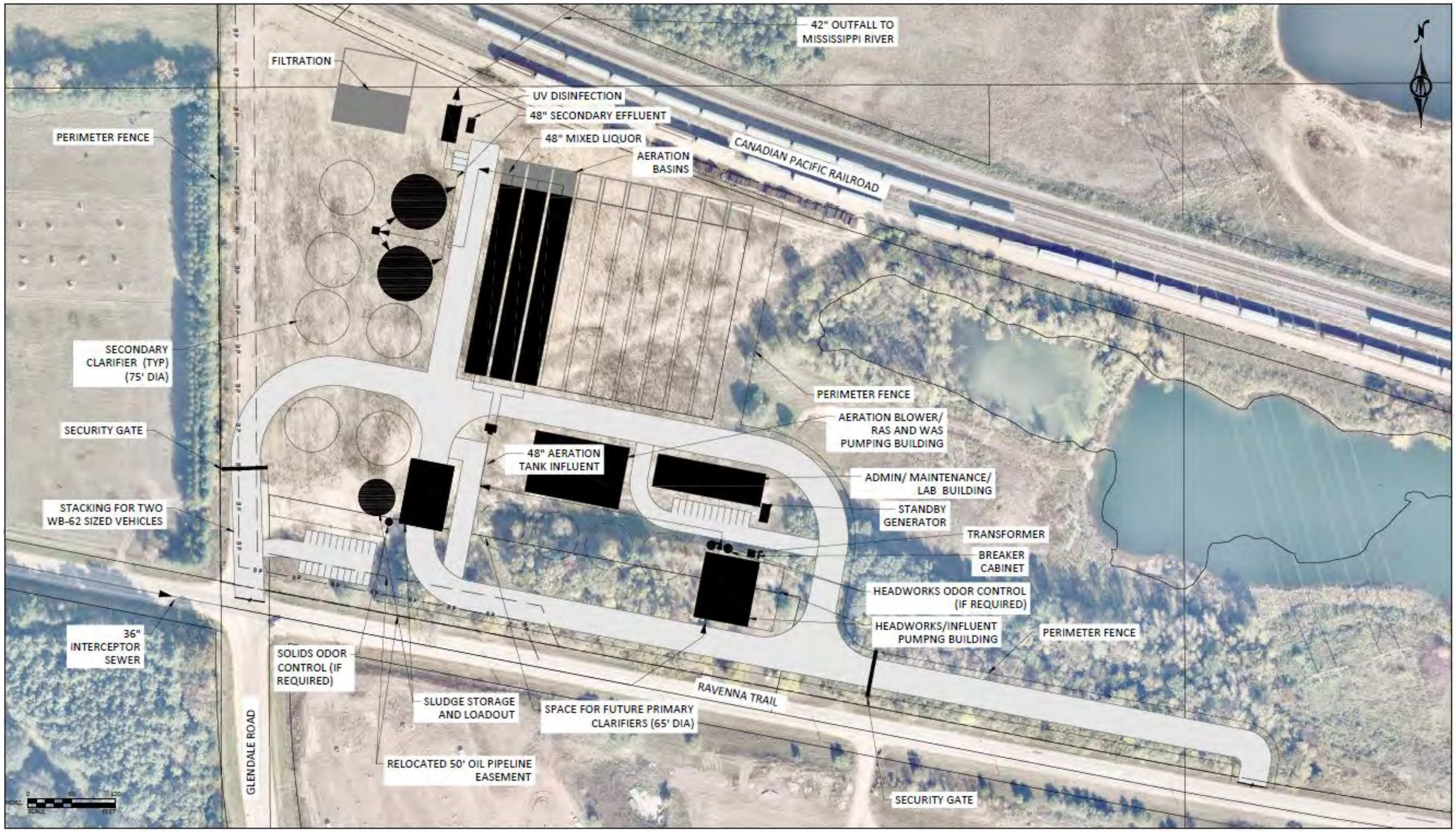


Figure ES-3 Recommended Hastings WWTP Site Layout

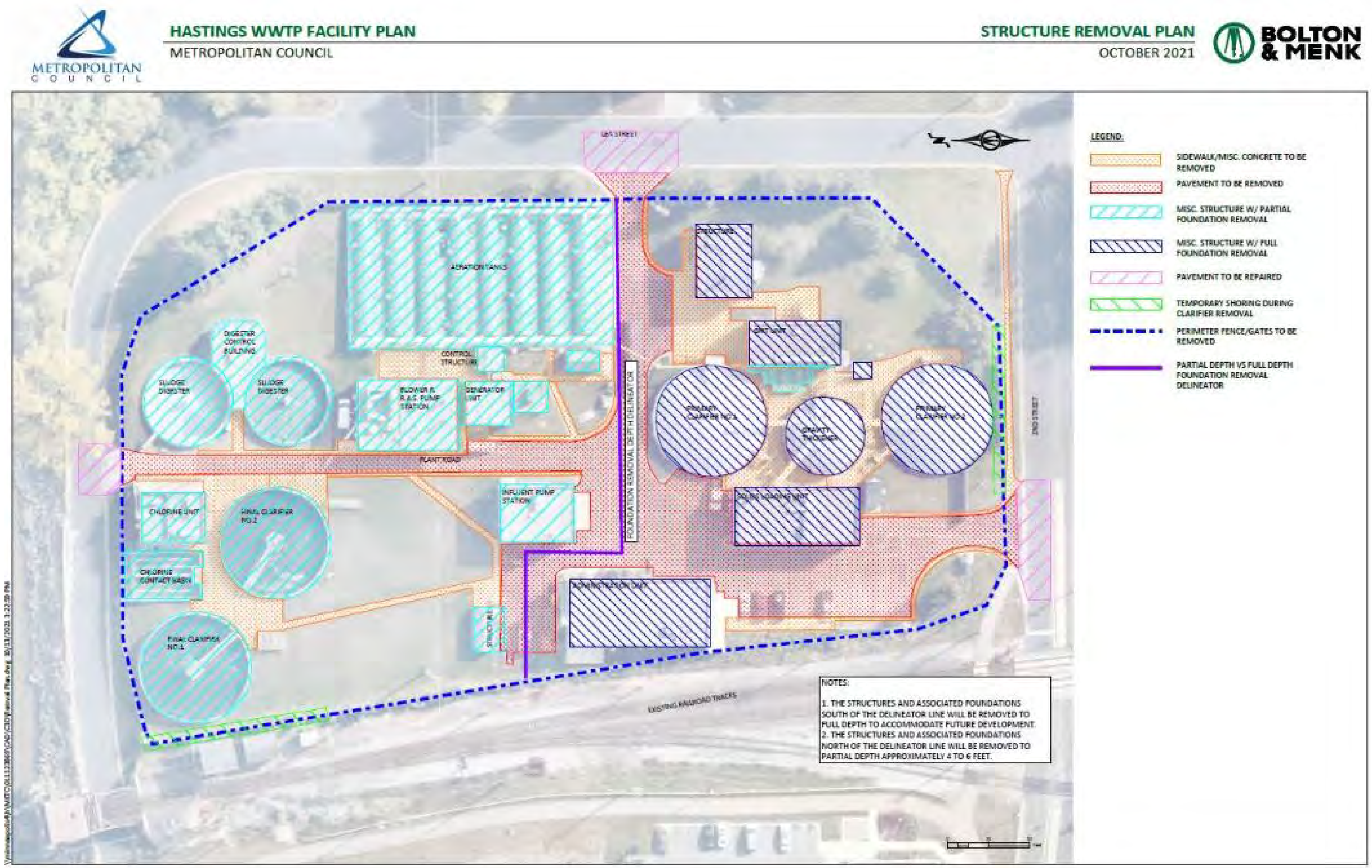


Figure ES-4 Preliminary Proposed Limits of Decommissioning for the Existing Hastings WWTP

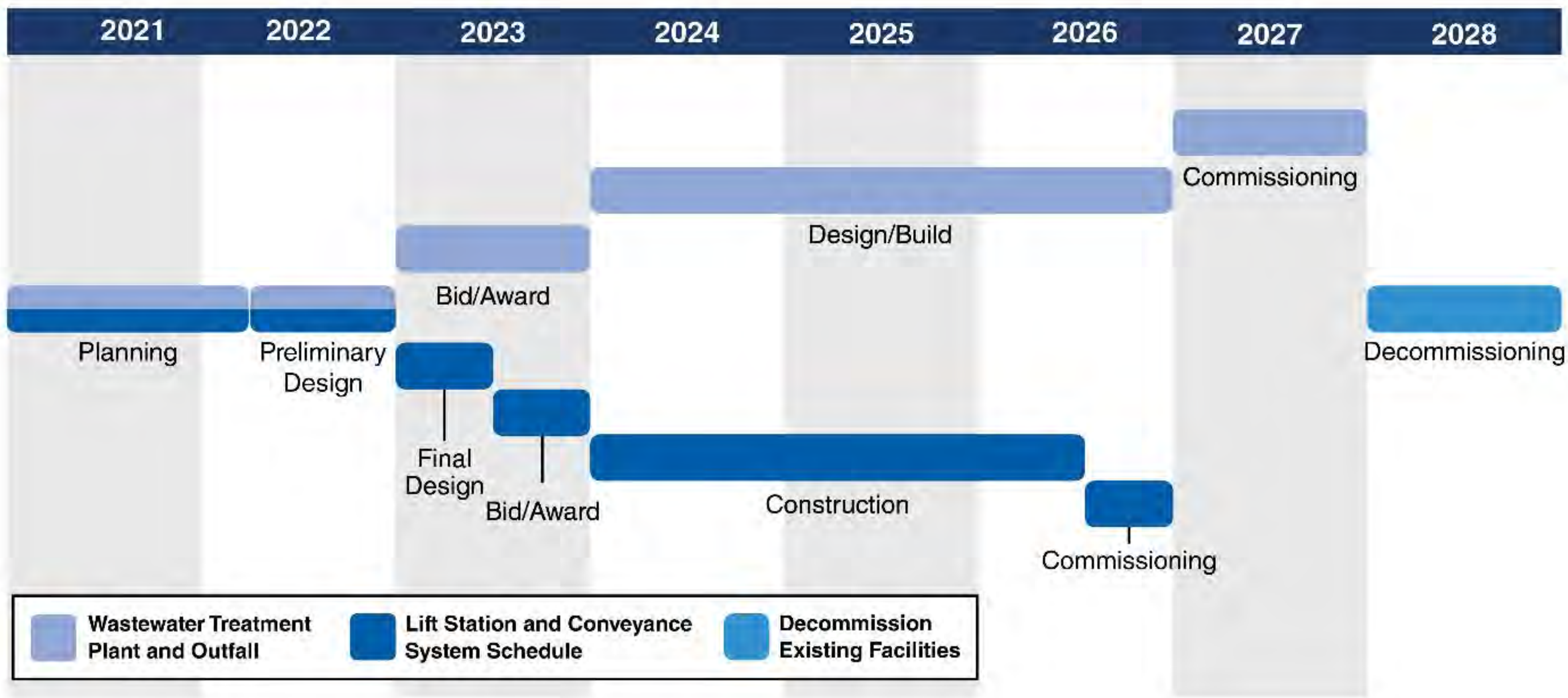


Figure ES-5 Program Schedule Overview Including Planning and Implementation Steps for Project Delivery

1. Introduction

1.1. *Objective*

This Facility Plan documents the planning activities conducted by Metropolitan Council Environmental Services (MCES) to evaluate and recommend relocation of Hastings Wastewater Treatment Plant (WWTP) service by 2026 to serve the long-term service area identified in the MCES 2040 Water Resources Policy Plan (WRPP). The objective of this Facility Plan is to provide a basis for a) MCES management decisions concerning the implementation of this Facility Plan and b) review by the Minnesota Pollution Control Agency (MPCA) in qualifying facility relocation and associated work for funding through the Minnesota Public Facilities Authority (PFA).

This Facility Plan includes recommendations for conveyance and treatment systems based on projected wastewater flows and loads and anticipated future treatment requirements. Lift station siting, a decommissioning plan, and budgetary capital costs for relocation of Hastings WWTP service are also included in this Facility Plan.

1.2. *Background*

The Metropolitan Council owns and operates the Hastings WWTP which provides service to approximately 23,000 people living in the City of Hastings. The facility is located at 100 Lea Street, Hastings, MN 55033 and currently treats an annual average of 1.56 million gallons of wastewater every day (2019). Located in downtown Hastings and situated amongst a densely developed residential area, the existing plant site presents challenges to major renewal, land use compatibility, and expandability in response to reliable service issues, growth, and changes in regulatory requirements.

The Hastings WWTP is a National Association of Clean Water Agencies (NACWA) Peak Performance award winning facility with 30 consecutive years of perfect permit compliance. Constructed in 1952, the WWTP utilizes a combination of biological, chemical, and physical treatment processes to remove pollutants from the raw wastewater. Liquid treatment facilities include screening and grit removal, primary clarifiers, chemical phosphorus removal, secondary treatment (aeration tanks and final clarifiers), and chemical disinfection. Solids are thickened in a gravity thickener prior to being hauled to the Metropolitan WWTP for incineration.

Hastings is operated by Class A wastewater treatment plant operators as are all MCES wastewater treatment plants. Maintenance of MCES wastewater treatment plant assets are managed using Oracle Work® and Asset Management (WAM) asset management software.

1.2.1. MCES 2040 Water Resources Policy Plan

The MCES 2040 Water Resources Policy Plan includes planned replacement of the Hastings WWTP to support long-term sewered development of the region which may include service to land areas of Marshan, Nininger, and Vermillion Townships. Existing capacity of the Hastings WWTP is 2.34 million gallons per day (mgd) on an average daily flow basis. The planned long-term capacity is 10 mgd (post 2040).

Figure 1-1 is a map of the Hastings WWTP current and long-term service area. Sewered population within the existing Hastings WWTP service area is expected to increase 24% from 22,800 in 2020 to 28,300 in 2040; employment is expected to increase 18% from 8,020 to 9,500 during this same time period. Wastewater flow is expected to increase 51% from

1.56 mgd to 2.35 mgd in 2050 based on a 1.6% increase in organic loading rates between 2010 and 2020.

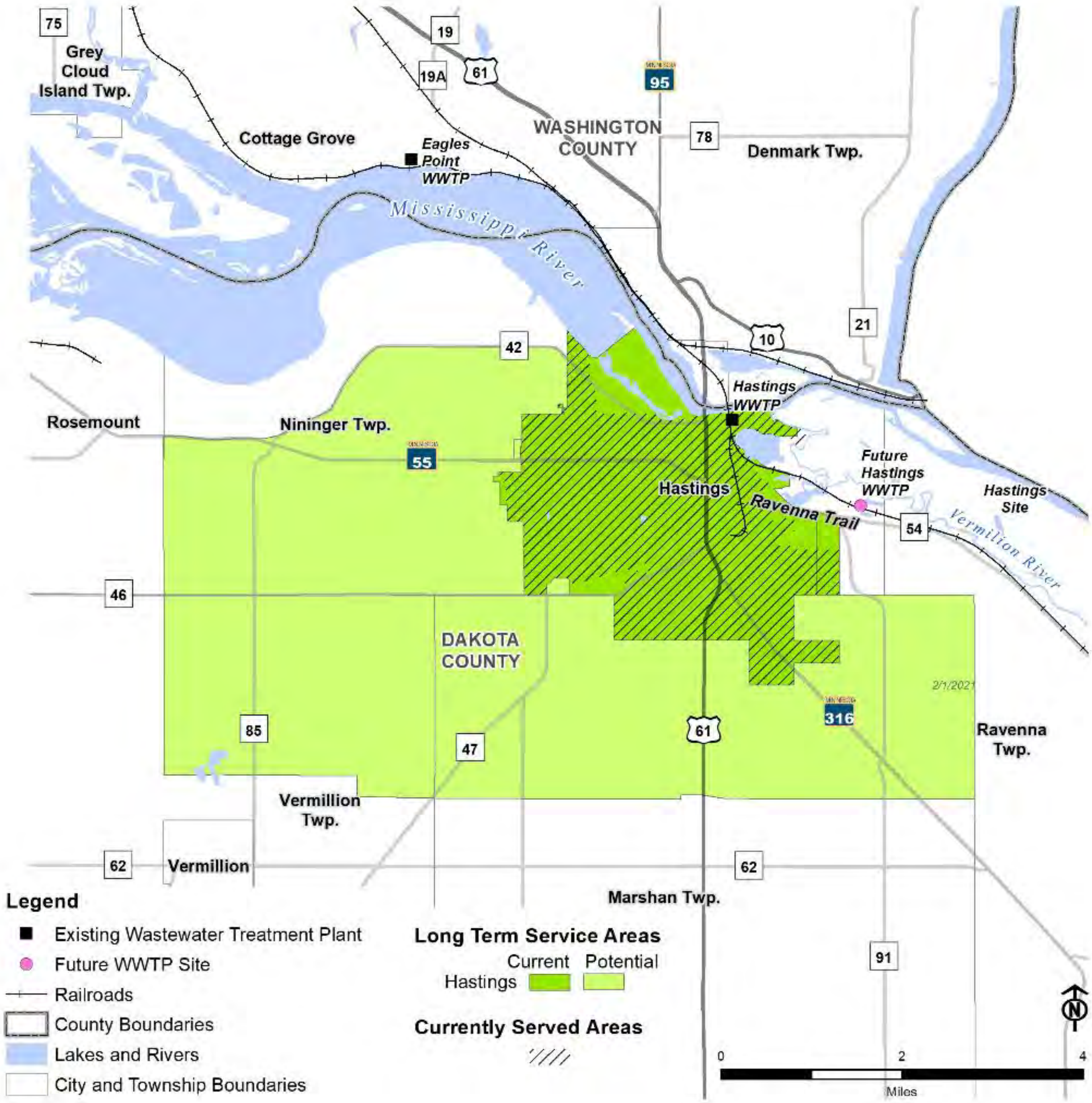


Figure 1-1 Hastings Wastewater Treatment Plant Service Area Map

1.2.2. Site Selection

In 2001, MCES began searching for suitable plant sites in anticipation of the need to relocate the existing Hastings WWTP. Three potential sites were identified with property area sufficient to site a 10 mgd facility and provide buffer from surrounding properties. The Tiller Property was selected and purchased in 2005 following an analysis of all potential sites for archeological and historical significance. Figure 1-2 identifies the 3 properties considered.

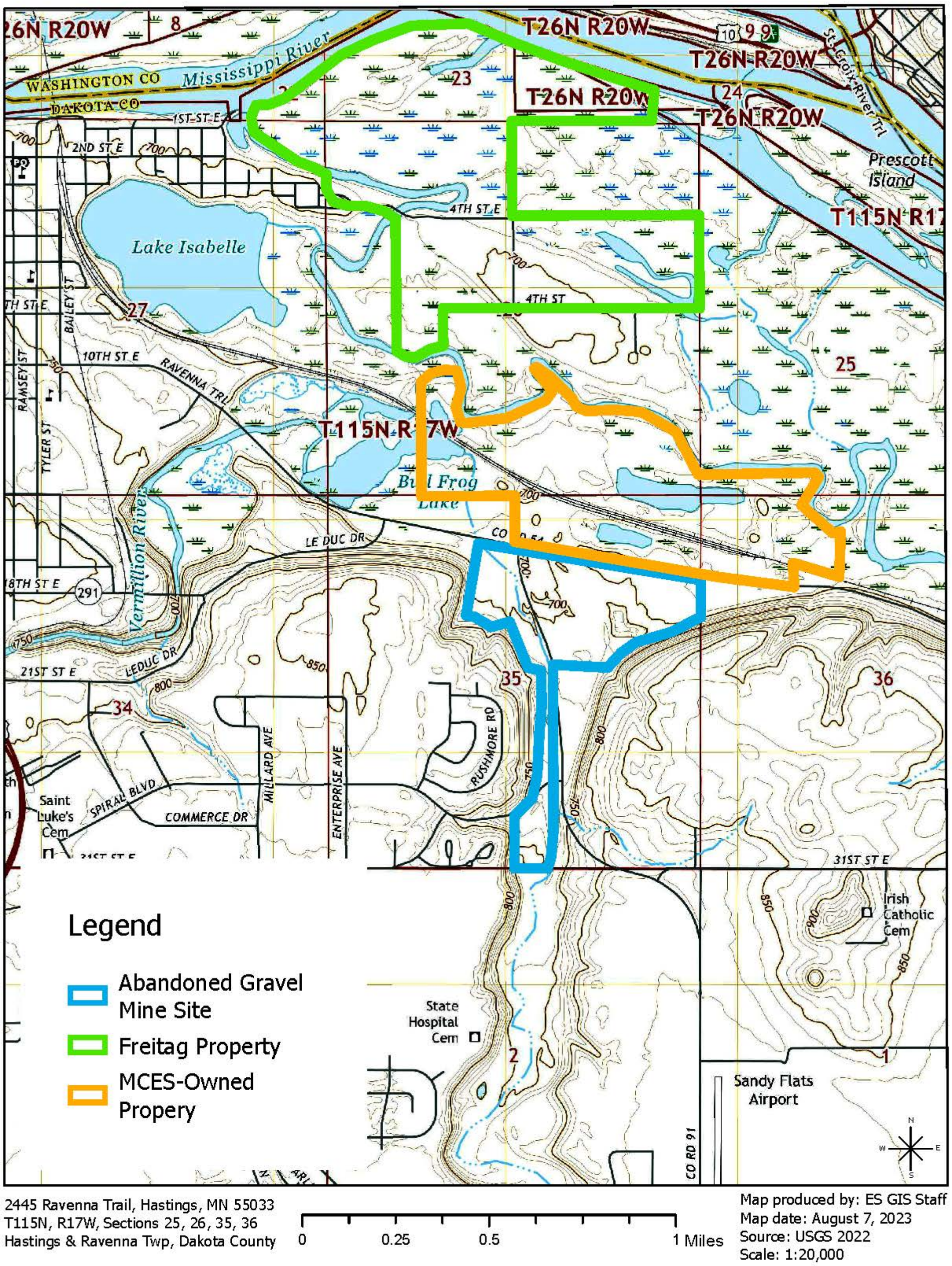


Figure 1-2 Potential Wastewater Treatment Plant Sites

Freitag Property

The Freitag Property was favorable due to its proximity to the Mississippi River. This site was ruled out as an option following completion of a Phase I and Phase II archeological study due to a high potential for containing intact archeological resources eligible for listing on the National Register of Historic Places and confirmed locations for intact and protected burial mounds.

Abandoned Gravel Mine Site

The Abandoned Gravel Mine Site exhibited low potential to contain intact archeological resources due to extensive gravel and sand extraction, housing and commercial development, and road construction activities in the area. The site was smaller than preferred considering the ultimate size of the new facility and need to provide buffer from surrounding properties. This site was furthest away from potential effluent discharge points and required the outfall alignment to cross Ravenna Trail (County Road 54).

Tiller Property – Selected Site

The Tiller Property was an active gravel mine site and bordered the Vermillion River with access to the Mississippi River through private easement. The site provided substantial buffer and a potential build site large enough to support the needs of the long-term service area. MCES purchased the Tiller Property in 2005 and continued the existing lease. Mining activities concluded in 2018 and the site was returned to MCES for maintenance and management. Figure 1-3 depicts the property boundaries and several key site features.

The site consists of 221 acres framed by the Vermillion River to the north, Ravenna Trail to the south, and bisected east to west by the Canadian Pacific Railway. The property is made up of parcels located in the City of Hastings and Ravenna Township and is encumbered by two existing utility easements. A 240-foot easement to Xcel Energy for overhead power bisects the site north to south and a 50-foot easement to British Petroleum encumbers the southwest corner of the property.

Access to the property is provided by two entrances off Ravenna Trail with additional access points created and abandoned during mining activities. Mining activity also created the two largest ponds contained within the property boundaries. Most of the site is located within the 100-yr and 500-yr floodplain with portions of Ravenna Trail east and west of the site seasonally inundated by flood waters.

Permanent easements obtained in 2008 provide 80% of the effluent discharge alignment for an outfall to the Mississippi River.

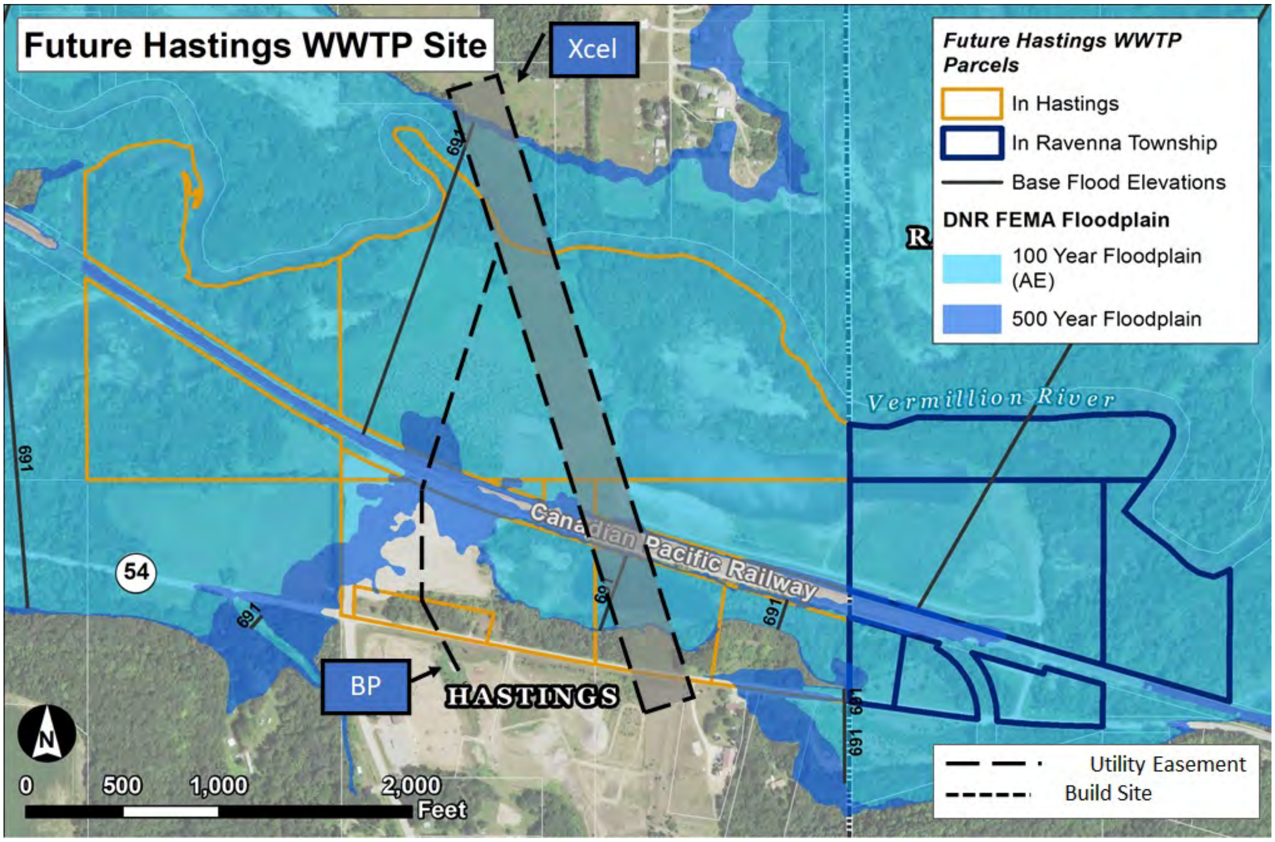


Figure 1-3 New Hastings WWTP Site and Key Features

1.2.3. The Minnesota Nutrient Reduction Strategy

In 2014 Minnesota adopted a statewide Nutrient Reduction Strategy (State of Minnesota, 2014) that calls for a 45 percent reduction in nitrogen loads to the Mississippi River by 2040. Nutrient load reductions from wastewater treatment plants will be required to achieve the milestones and goals identified in The Minnesota Nutrient Reduction Strategy. MPCA has adopted a “regulatory certainty” policy for WWTPs to accept an early total nitrogen limit that would remain fixed for up to 20 years. MPCA’s tabulation of preliminary effluent limits for the future Hastings WWTP include a total nitrogen limit of 10 mg/L, assuming MCES would accept this limit under the regulatory certainty policy (Appendix 3-1). The Hastings WWTP is in an area prioritized by the MPCA for future nutrient reduction. Plant expansion at the current Hastings WWTP would be required to achieve a 10 mg/L total nitrogen limit.

1.2.4. Hastings WWTP Condition Assessment

Based on a 2020 condition assessment, continued reliable service at the Hastings WWTP through 2040 would require an investment of approximately $26,000,000 (installed equipment cost only) and does not include costs for facility expansion or building systems upgrades. Relocation of Hastings WWTP service by 2026 avoids major investment at a site that cannot meet the long-term needs of the service area. See Appendix 1-1 for a summary of the 2020 condition assessment.

2. Design Conditions

2.1. *Existing Flows and Loadings*

This section provides an overview of the Hastings WWTP influent flows and loadings from January 1, 2016 through December 31, 2020, which serve as the basis of the flow and loading projections.

2.1.1. Influent Wastewater Flows and Loadings

The Hastings WWTP reported influent wastewater flows and selected baseline values for the last 5 years are presented in Table 2-1. Influent flows average approximately 1.47 mgd and increase 0.032 mgd/yr over the last 5 years. Flow data over the last 10 years indicates conflicting trends and the 2020 flow value appears to be impacted by COVID-19; therefore, the maximum annual average flow of 1.56 mgd (observed in 2019) is selected as the existing baseline. The maximum day flow of 2.83 mgd occurred on April 17, 2019, during which approximately 2-inches of rain fell over a 5-hour time period during high groundwater conditions. The existing baseline peak hour wet weather flow (PHWWF) of 5.6 mgd and peak instantaneous wet weather flow (PIWWF) of 7.3 mgd were determined using MPCA flow determination guidelines (see Appendix 2-1). Influent flow peaking factors indicated in Table 2-1 are typical of municipal facilities.

Table 2-2 through Table 2-6 summarize the plant influent organic and nutrient loadings. All loadings increase steadily over the last 5 years. The selected baseline is the highest annual average value over the last 5 years. In general, maximum month nutrient loadings are 9 to 23 percent higher than average loadings with yearly maximum month peaking factors ranging from 1.2 to 1.8; typical of separated municipal wastewater sewerage systems.

Figure 2-1 depicts reported Hastings WWTP influent temperatures from 2016 through 2020. There is a clear seasonal pattern with monthly temperatures ranging from 11 to 21 degrees Celsius (°C) on a 30-day rolling average. March and April are the coldest periods of the year while August and September are the warmest. The average temperature over the five-year period is 16°C. Planning efforts will use a minimum monthly temperature of 11°C for facility sizing.

Appendix 2-2 contains the reported flow and loadings on a daily and 30-day moving average with a general increasing loading trend over the last 5-year period.

Table 2-1 Hastings WWTP Historical Influent Flows

FLOW (MGD)	2016	2017	2018	2019	2020	EXISTING BASELINE	PEAKNIG FACTOR
Annual Average	1.39	1.38	1.45	1.56	1.55	1.56	-
Average Dry Weather	1.34	1.31	1.34	1.46	1.43	1.43	0.92
Average Wet Weather	1.45	1.52	1.67	1.76	1.68	1.76	1.15
Maximum Day	1.69	1.99	1.99	2.83	2.36	2.83	1.82
Peak Hour Wet Weather	-	-	-	-	-	5.60	-
Peak Instantaneous Wet Weather	-	-	-	-	-	7.30	-

Table 2-2 Hastings WWTP Reported Influent 5-day Carbonaceous Biochemical Oxygen Loadings

LOAD (LB/D)	2016	2017	2018	2019	2020	EXISTING BASELINE	PEAKING FACTOR
Annual Average	2,737	3,142	3,268	3,322	3,227	3,322	-
Maximum Month	3,138	3,826	4,102	3,597	3,596	4,102	1.25
Maximum Day	4,224	4,783	4,664	4,659	5,675	5,675	1.75

Table 2-3 Hastings WWTP Reported Influent Chemical Oxygen Demand Loadings

LOAD (LB/D)	2016	2017	2018	2019	2020	EXISTING BASELINE	PEAKING FACTOR
Annual Average	6,357	6,839	7,199	7,656	7,917	7,917	-
Maximum Month	7,095	7,778	8,465	8,490	8,877	8,877	1.25
Maximum Day	9,352	10,887	11,645	11,509	13,382	13,382	1.75

Table 2-4 Hastings WWTP Reported Influent Total Suspended Solids Loadings

LOAD (LB/D)	2016	2017	2018	2019	2020	EXISTING BASELINE	PEAKING FACTOR
Annual Average	3,463	3,283	3,600	3,723	3,826	3,826	-
Maximum Month	4,209	3,765	4,268	4,194	4,631	4,631	1.25

Table 2-5 Hastings WWTP Reported Influent Total Phosphorus Loadings

LOAD (LB/D)	2016	2017	2018	2019	2020	EXISTING BASELINE	PEAKING FACTOR
Annual Average	71	74	75	78	79	79	-
Maximum Month	77	80	81	82	87	87	1.15
Maximum Day	101	107	113	103	107	113	1.4

Table 2-6 Hastings WWTP Reported Influent Total Kjeldahl Nitrogen Loadings

LOAD (LB/D)	2016	2017	2018	2019	2020	EXISTING BASELINE	PEAKING FACTOR
Annual Average	524	549	568	590	580	590	-
Maximum Month	562	600	610	632	644	644	1.15
Maximum Day	748	738	799	740	721	799	1.4

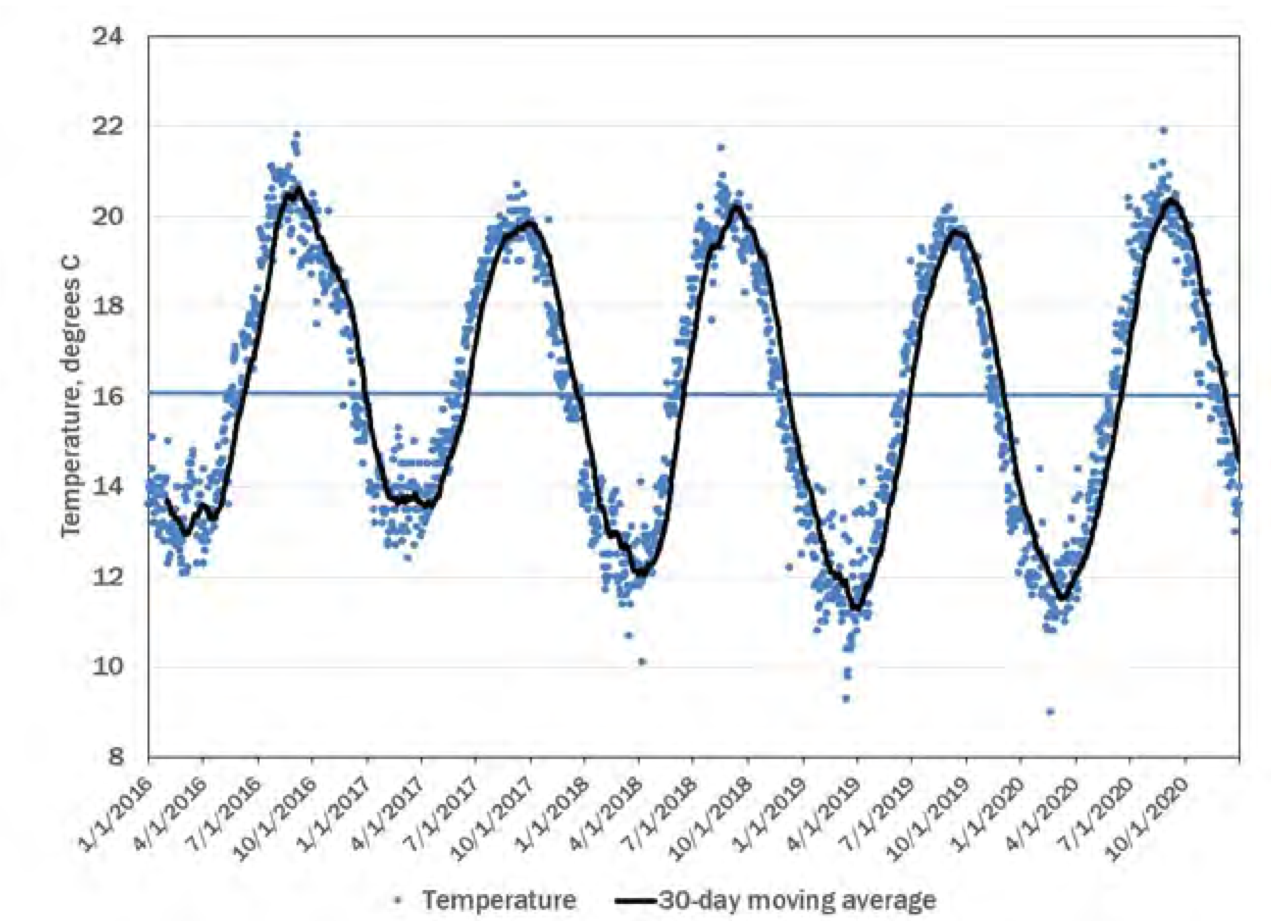


Figure 2-1 Hastings WWTP Reported Wastewater Temperature

2.1.2. Industrial Contributions

The Hastings WWTP has 5 industrial contributors permitted to discharge into the collection system served by the Hastings WWTP. Industrial wastewater enters the Hastings WWTP through the municipal sewer system. There is no liquid waste receiving at this facility.

Industrial discharge accounts for 9% of the COD load, 3% of the solids load, and 4% of the Total Phosphorus load (See Figure 2-2). The largest industrial discharger is Plainview Milk Products Cooperative (formerly Hastings Co-op Creamery), a milk bottling company. In 2019, approximately 92% of the overall COD loading, 72% of the solids loading, and 100% of the Total Phosphorus loading contributed by industry came from the creamery, as shown in Figure 2-3.

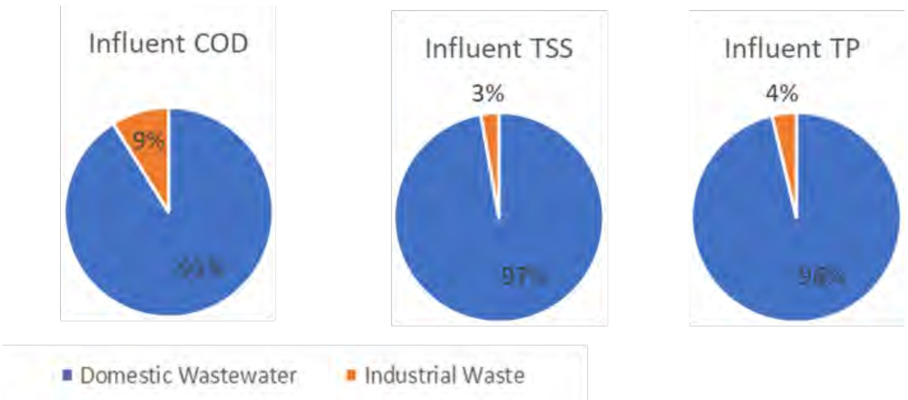


Figure 2-2 Hastings WWTP Influent Profile (2019)

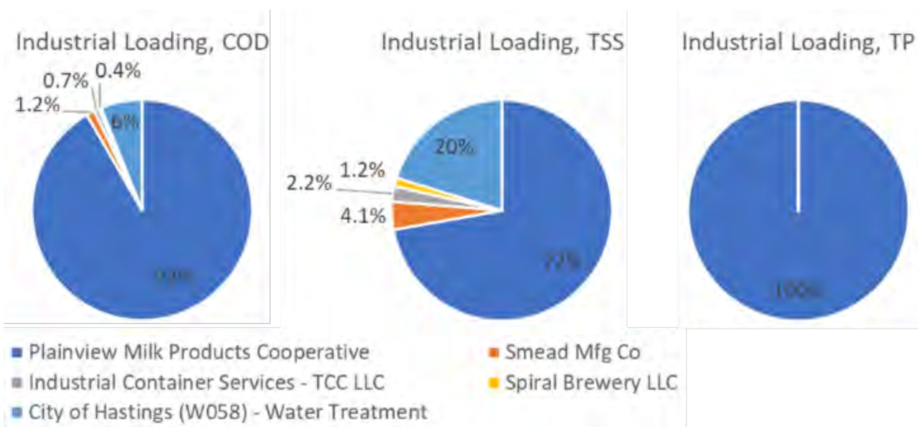


Figure 2-3 Hastings WWTP Industrial Contributors (2019)

The Hastings WWTP occasionally receives high slugs of fats, oils, and grease (FOG) from restaurants through the collection system which can impact operation of the wastewater treatment plant and supports nuisance filamentous bacteria growth in the aeration tanks. MCES Industrial Waste is working with the City of Hastings to reduce the amount of FOG discharged to the collection system. High FOG and management of filamentous bacteria will be considered during preliminary design.

2.2. *Projected Influent Flows and Loads*

2.2.1. Population and Influent Flow Projections

Future flows and loadings are based upon the maximum annual average flow (observed in 2019) and historic organic loading increases recorded at the facility over the last 10 years.

Figure 2-4 shows the population projections for the Hastings WWTP. Historical annual average influent flow and flow projections through 2050 for the two methods listed below are also shown.

- Method 1: WRPP Community Wastewater Flow Projections
  - This method uses the community wastewater flow projections for the City of Hastings identified in the WRPP. 2050 average flows were linearly extrapolated based on a 67 gpd/cap flow rate calculated from the WRPP wastewater flow projection data.
- Method 2: Historical Loading Increase (2010-2020)
  - This method uses the maximum annual average flow (observed in 2019) and increases flows 1.6% annually based on the average influent loading increase from 2010 through 2020 recorded at the WWTP. Projected growth is based on influent $cBOD_5$ and TSS loadings which are not influenced by flow.

Method 1 represents the lower bound of the flow projection envelope and equates to an annual average flow increase of 0.013 mgd/yr.

Water conservation efforts and I/I improvements have had a dampening effect on flow increases to MCES facilities. 91-97% of the influent organic and solids load to the Hastings WWTP comes from domestic sources (See Figure 2-2). Historic influent organic and solids loadings, independent of flow and negligibly impacted by industrial waste contributions, can be used to evaluate and project growth in the Hastings WWTP service area.

Method 2 represents the upper bound of the flow projection envelope. This method projects flow based on a 1.6% compounded annual historic organic loading increase recorded at the Hastings WWTP over the last 10 years. This results in an equivalent annual average flow increase of 0.025 mgd/yr and serves as the basis for flow projections used in the Facility Plan.

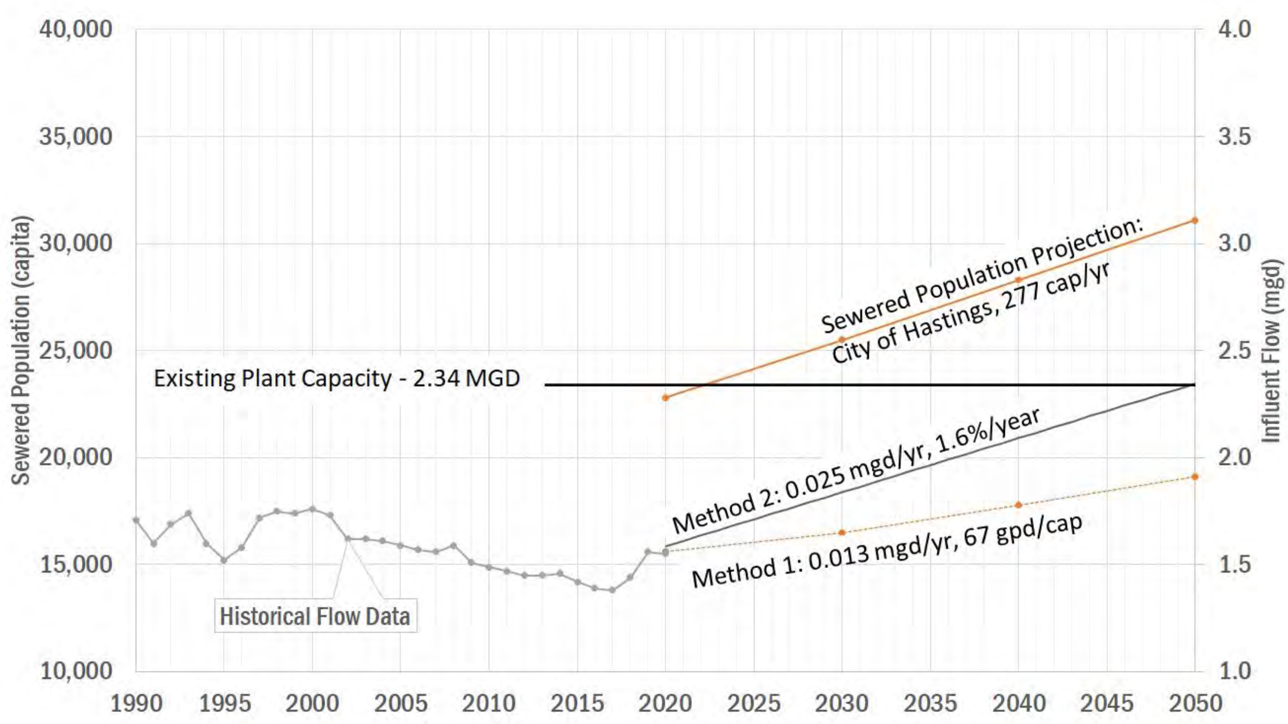


Figure 2-4 Population and Influent Flow Projections for Hastings WWTP Service Area

2.2.2. Future Growth Loading Rates

Future influent loading projections are based on the existing baseline loadings summarized in the above tables plus growth. Unit loading factors were developed based on the existing baseline loading and the per capita flow rate of 67 gpd/cap calculated from the WRPP wastewater flow projections. Per capita loading rates for $cBOD_5$, TSS, TKN, and TP are shown in Table 2-7. Baseline unit loading rates are 15 to 30 percent lower than recommended design unit loading rates found in 10-State Standards. Future growth loading rates are higher than existing baseline rates and represent the 10-State Standards design recommendations for systems where garbage grinders are commonly used.

Table 2-7 Hastings WWTP Average Annual Loading per Capita

	UNITS	EXISTING BASELINE	10-STATE RECOMMENDED STANDARD	FUTURE GROWTH LOADING RATES
Flow	gallons/capita-d	67	100	67
Carbonaceous Biochemical Oxygen Demand (5-day)	lb/capita-d	0.15	0.14 to 0.19[a]	0.19
Total Suspended Solids	lb/capita-d	0.17	0.2 to 0.25	0.25
Chemical Oxygen Demand	lb/capita-d	0.35	-	0.45[b]
Total Kjeldahl Nitrogen	lb/capita-d	0.026	0.036 to 0.046	0.046
Total Phosphorus	lb/capita-d	0.0035	-	0.0062[c]

a. *Assumes $cBOD_5$:BOD_5 of 0.85*
b. *Based upon existing baseline COD:$cBOD_5$ ratio of 2.33*
c. *Based upon existing TP:TKN ratio of 0.135*

2.2.3. Influent Flow and Loading Projections

Future flows and loadings are based on the following:

- Flows are projected to be directly proportional to the average annual historic organic loading increase between 2010 and 2020 recorded at the Hastings WWTP.
- Projected loadings are based on Thrive MSP 2040 population projections and loading factors defined in Table 2-7.
- Max month and day flows are calculated using the peaking factors in Table 2-1 and the projected annual average flows.
- Max month and day influent loadings are calculated using the peaking factors in Table 2-2 through Table 2-6 and the projected annual average loading.
- Future additional PHWWF and PIWWF flows are calculated as follows:
  - PHWWF (Year X) = Existing Baseline PHWWF + [Annual Average Flow (Year X) – 1.56 mgd] * (1) MCES Sewer Design Peak Hourly Flow Factor for Year X annual average flow
  - PIWWF (Year X) = Existing Baseline PIWWF + [Annual Average Flow (Year X) – 1.56 mgd] * (1) MCES Sewer Design Peak Hourly Flow Factor for Year X annual average flow
  - See Appendix 2-3 for MCES sewer design peak hourly flow factors
  - See Appendix 2-1 for MPCA design flow determination worksheet.

Table 2-8 through Table 2-15 summarizes the projected sewered population and influent flows and loadings for 2020, 2030, 2040, 2050 and ultimate planned capacity of 10 mgd annual average flow.

Table 2-8 Hastings WWTP Sewered System Projected Population Forecast

ITEM	2020	2030	2040	2050
Population, City of Hastings	22,800	25,500	28,300	31,100
Population, Long-Term Service Area	26,080	28,900	31,790	34,680

Table 2-9 Hastings WWTP Projected Influent Flows, mgd

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	1.56	2.03	2.32	2.60	10.0
Average Dry Weather	1.43	1.88	2.13	2.39	9.2
Average Wet Weather	1.76	2.35	2.67	2.99	11.5
Maximum Day	2.83	3.71	4.22	4.73	18.2
Peak Hour Wet Weather Flow	5.60	6.9	7.7	8.4	23.3
Peak Instantaneous Wet Weather Flow	7.30	8.6	9.4	10.1	25.0

Table 2-10 Hastings WWTP Projected Influent 5-day carbonaceous biochemical oxygen demand loadings, lb/d

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	3,322	4,700	5,500	6,200	26,800
Maximum Month	4,102	5,900	6,900	7,800	33,500
Maximum Day	5,675	8,200	9,600	10,900	46,900

Table 2-11 Hastings WWTP Projected Influent Chemical Oxygen Demand Loadings, lb/d

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	7,917	11,100	13,000	14,800	63,800
Maximum Month	8,877	13,900	16,300	18,500	79,800
Maximum Day	13,382	19,400	22,800	25,900	111,700

Table 2-12 Hastings WWTP Projected Influent Total Suspended Solids Loadings, lb/d

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	3,826	5,600	6,600	7,700	34,700
Maximum Month	4,631	7,000	8,300	9,600	43,400
Maximum Day	6,893	9,800	11,600	13,500	60,700

Table 2-13 Hastings WWTP Projected Influent Total Phosphorus Loadings, lb/d

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	79	120	150	170	840
Maximum Month	87	140	170	200	970
Maximum Day	113	170	210	240	1,180

Table 2-14 Hastings WWTP Projected Influent Total Kjeldahl Nitrogen Loadings, lb/d

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	590	920	1,110	1,290	6,270
Maximum Month	644	1,060	1,280	1,480	7,210
Maximum Day	799	1,290	1,550	1,810	8,780

Table 2-15 Hastings WWTP Projected Influent Ammonia-Nitrogen[a], lb/d

ITEM	EXISTING BASELINE	2030	2040	2050	ULTIMATE
Annual Average	368	570	690	810	3,890
Maximum Month	421	660	790	930	4,470
Maximum Day	501	800	970	1,130	5,450

a. *Influent ammonia based upon ammonia-N: TKN ration of 0.62*

3. Regulatory Review

This section identifies the current permits that regulate wastewater treatment and solids disposal at the Hastings WWTP. It summarizes the effluent limits that may be assigned to the new outfall, and also discusses the potential for future regulatory changes.

3.1. *Current Requirements*

Table 3-1 lists the permits that regulate wastewater treatment and solids disposal by the existing Hastings WWTP, and associated permits, licenses and approvals needed for legal plant operations. MCES is currently in the permit renewal cycle with the applicable responsible governmental unit for expired permits. Expired permits remain in effect until they are re-issued. MCES is in compliance with permit renewal requirements.

Table 3-1 List of Permits, Licenses, and Approvals for the Hastings WWTP

PERMIT/LICENSE APPROVAL	EFFECTIVE DATES	PERMIT NUMBER	RESPONSIBLE GOVERNMENTAL UNIT	NOTE
National Pollution Discharge Elimination System (NPDES) - Individual Permit	Sep 11, 2015 – Aug 31, 2020	MN0029955	Minnesota Pollution Control Agency (MPCA)	Includes industrial stormwater coverage
National Pollution Discharge Elimination System (NPDES) – Mississippi Basin Total Phosphorus Permit	Sep 11, 2015 – Aug 31, 2020 (Renewal in Process)	MN0070629	MPCA	Includes aggregate wasteload allocation for five MCES facilities
Water Appropriation Permit	Jul 23, 2020 – long term appropriation	1993-6152	Minnesota Department of Natural Resources (DNR)	Regulates groundwater withdrawal
Co-disposal of Wastewater Screening and Grit Approval	Sep 16, 2009 – Aug 6, 2012	L74Y911290 (BFI waste code #)	Dakota County	Provides for landfill disposal of wastewater solids collected from wastewater screenings and grit removal processes

The existing Hastings WWTP does not need coverage under Minnesota's Industrial Stormwater General Permit (MN050000) because their individual NPDES permit contains the necessary industrial stormwater requirements. The existing Hastings WWTP also does not need an air quality permit because the facility's emissions do not exceed the associated regulatory thresholds. Biosolids generated at this facility are thickened and hauled to the MCES

Metropolitan WWTP for further treatment and disposal; hence, the Hastings facility does not hold a permit for land application of biosolids.

The existing Hastings WWTP has one continuous discharge via a submerged outfall to the Mississippi River (Class 2B, 3B, 4A, 4B, 5, 6 water) at river mile 813.6 and is permitted to discharge an average daily flow of 2.34 mgd and an AWWF of up to 2.69 million gallons per day. The facility's concentration limits are summarized in Table 3-2.

Table 3-2 Current Numeric Limits at the Hastings WWTP (Outfall SD 001)

PARAMETER	LIMIT	UNITS	LIMIT TYPE
CBOD5	25	mg/L	Monthly avg.
CBOD5	40	mg/L	Weekly avg.
Chlorine, total residual	0.038	mg/L	Daily max.
Fecal coliform	200	#/100 mL	Daily max.
pH	6.0 – 9.0	s.u.	Monthly min./max.
Solids, total suspended (TSS)	30	mg/L	Monthly avg.
Solids, total suspended (TSS)	45	mg/L	Weekly avg.
Phosphorus, total (as P)	1.0	mg/L	12-month moving avg.

3.2. *Preliminary Effluent Limits*

Two outfall locations (Mississippi River and Vermillion River) were evaluated for the new Hastings WWTP. This section presents the preliminary NPDES effluent limits that would be expected for new outfalls to both locations and discusses the major regulatory requirements for these outfalls. The detailed alternative analysis of the effluent discharge options is presented in Section 4.1.1. Preliminary effluent limits are summarized below, citing ranges for some limits that could vary based on factors to be determined. See Appendix 3-1 for draft preliminary effluent limits for the Mississippi River and Vermillion River scenarios provided by the Minnesota Pollution Control Agency.

3.2.1. Mississippi River Outfall

Under this outfall alternative, effluent would be conveyed by a new pipeline about 1.4 miles north-northwest along a utility easement and be discharged to the Mississippi River about one mile downstream of the current discharge location as shown in Figure 3-1.

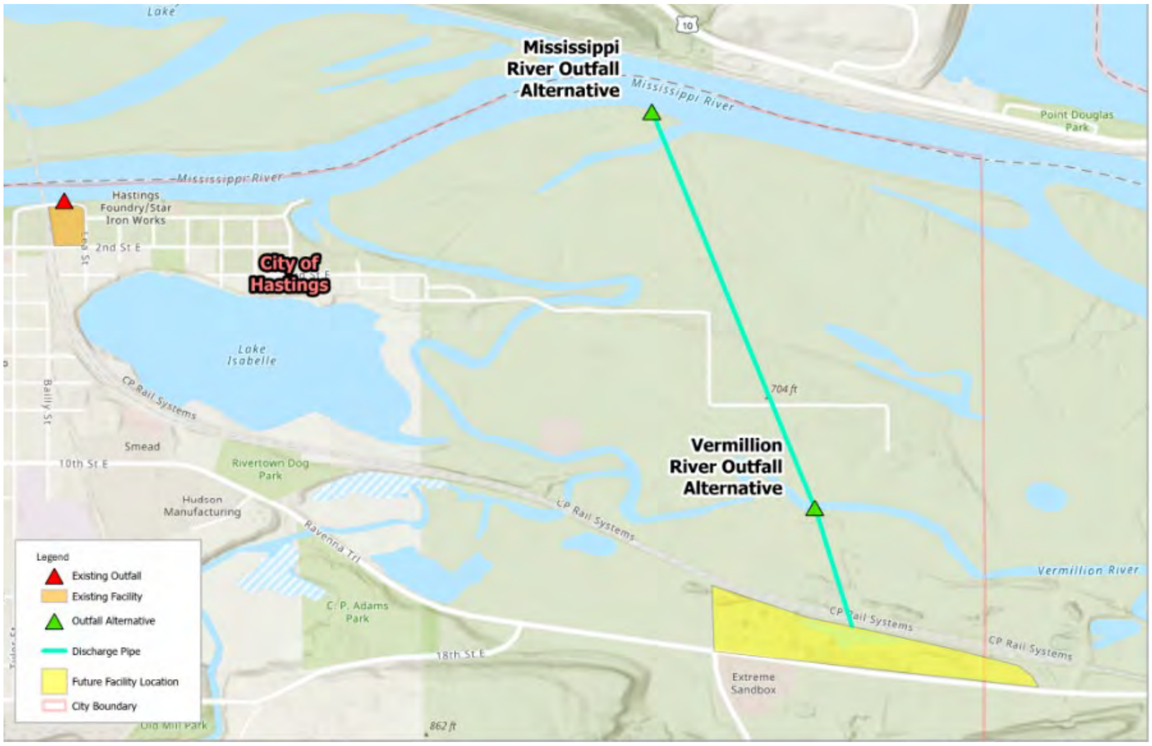


Figure 3-1 Location of Hastings WWTP existing Outfall and Outfall Alternatives

The NDPES permitting of a new Mississippi River outfall alternative would be similar to that of the existing Hastings WWTP disposal method, because MCES would continue to discharge to the same receiving stream. The large assimilative capacity of the Mississippi River would result in technology-based permit limits that are similar to those of the existing Hastings WWTP (Table 3-3). The limits would be expected to be the same for both the 2050 and ultimate effluent flows.

Table 3-3 Hastings WWTP Preliminary Limits for the Mississippi River Outfall Option

CONSTITUENT	CONCENTRATION LIMIT	MASS LIMIT
CBOD5	25 mg/L	254[a] / 284 kg/d
TSS	30 mg/L	205[b] / 341 kg/d
Fecal coliform[c]	200 / 100 mL	NA
pH	6.0 – 9.0	NA
Total residual chlorine[d]	0.038 mg/L	NA
Total nitrogen[e]	10 mg/L	114 kg/d
Total phosphorus (12-mon. avg.)	1.0 mg/L	Existing Mississippi Basin Total Phosphorus Permit[f]

General notes: Limits shown are monthly averages unless otherwise notes. NA = Not Applicable

a. *The first number would be the mass limit if the mass is frozen, in which case, CBOD5, would not need an antidegradation review.*

b. *The first number would be the mass limit if the mass is frozen, in which case, TSS would not need an antidegradation review. Neither would mercury.*

c. *Monthly geometric mean. Applicable April 1 through October 31 (Minn R. 7053.0215, subp.1).*

d. *Total residual chlorine (TRC) limits if the mechanical facility chlorinates. Dechlorination may be required.*

e. *Total nitrogen: Limit if the facility accepts regulatory certainty.*

f. *Annual mass requirements for Lake Pepin and the Mississippi River are included in the Met Council – Mississippi Basin Total Phosphorus Permit.*

A discharge to a new Mississippi River outfall would not be expected to require limits for metals, ammonia, or chloride. The phosphorus-related limits of the existing Hastings WWTP would transfer to a new Mississippi River outfall, including coverage under the MCES Mississippi Basin Total Phosphorus Permit.

The NPDES permitting process would include an antidegradation review unless MCES agreed to cap mass limits at levels equal to those of the existing Hastings WWTP. In addition to NPDES permitting, this alternative would require permitting, construction, and maintenance of the effluent pipeline. Related permitting requirements include:

- Environmental Assessment Worksheet (EAW)
- Joint Application Form for Activities Affecting Water Resources in Minnesota
- Clean Water Act (CWA) Section 10 permit: Likely the Nationwide Permit (NWP) 7 - Outfall Structures and Associated Intake Structures.
- CWA Section 404 permit: Likely the St Paul District Utility Regional General Permit (RGP)
- CWA Section 408 permission to occupy a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (Mississippi River navigational channel)
- CWA Section 401 certification
- An air quality permit, if the facility’s air emissions will exceed regulatory thresholds.

3.2.2. Vermillion River Outfall

Under this alternative, the new Hastings WWTP would discharge treated effluent to the lower Vermillion River about 0.3 miles to the north of the future site (Figure 3-1). The lower Vermillion River is hydraulically complex due to multiple connections to the Mississippi River and the effect of variable water levels within Navigational Pool 3. Streamflow monitoring would be required to verify critical streamflows used for permitting purposes. In the meantime, planning activities can assume the critical streamflows assumed by MCPA for calculation of preliminary effluent limits (Appendix 3-1).

Compared to the Mississippi River, the lower assimilative capacity of the lower Vermillion results in lower effluent limits for phosphorus and additional effluent limits for oxygen demanding substances and chloride (Table 3-4). CBOD5, ammonia limit, and dissolved oxygen (DO) would likely be linked to prevent excessive DO sag in the stream. The need for a chloride limit under the 2050 flow scenario is highly dependent upon resolving uncertainty in the critical streamflows. It is anticipated that lower critical streamflows or higher effluent flows could trigger the need for a chloride limit when discharging to the Vermillion.

Table 3-4 Hastings WWTP Preliminary Limits for the Vermillion River Outfall Option

CONSTITUENT	2050 FLOW CONCENTRATION LIMIT	2050 FLOW MASS LIMIT	ULTIMATE FLOW CONCENTRATION LIMIT	ULTIMATE FLOW MASS LIMIT
CBOD5	5[a] / 15 mg/L	57 / 170 kg/d	3-10 mg/L	250 – 378 kg/d
TSS	30 mg/L	341 kg/d	≤30 mg/L	1,135 kg/d
Fecal coliform[b]	200 /100 mL	NA	200 /100 mL	NA
pH	6.0 – 9.0	NA	6.0 – 9.0	NA
Total residual chlorine[c]	0.038 mg/L	NA	0.038 mg/L	NA
Ammonia nitrogen	7.3[d] / 3 mg/L (Jun-Sep)	83 / 34 kg/d (Jun-Sep)	1 – 4 mg/L	80 – 340 kg/d
Nitrate nitrogen[e]	15 – 23 mg/L	150 – 240 kg/d	9 – 12 mg/L	250 – 1,000 kg/d
Total nitrogen[f]	10 mg/L	114 kg/d	10 mg/L	380 kg/d
Dissolved oxygen	5 mg/L	NA	5-7 mg/L	NA
Chloride[g]	No limit – 690 mg/L	No limit – 7,100 kg/d	350-650 mg/L	13,000 – 25,000 kg/d
Total phosphorus Jun - Sept	0.15 – 0.4 mg/L	1.7 - 4.5 kg/d	0.15 – 0.4 mg/L	5.7 - 155 kg/d
Total phosphorus Jan-Dec	1.0	MCES Miss. Basin permit[h]	1.0	MCES Miss. Basin Permit[h]

General notes: Limits shown are monthly averages unless otherwise noted. NA = Not Applicable. Preliminary limits for 2050 conditions were provided by MPCA (Appendix 3-1) and correspond to an effluent flow of 3.0 mgd.

a. *The ammonia/CBODs linkage concept may be applied to this discharge. The first CBOD5/ammonia concentration applies if the facility does not accept the CBOD5 linkage option.*

b. *Monthly geometric mean. Applicable April 1 through October 31 (Minn R. 7053.0215, subp.1).*

c. *Total residual chlorine (TRC) limits if the mechanical facility chlorinates. Dechlorination may be required.*

d. *The ammonia/CBODs linkage concept may be applied to this discharge. The first CBODs/ammonia concentration applies if the facility does not accept the CBODs linkage option.*

e. *Based on expectation of future nitrate criterion for aquatic life protection.*

f. *Total nitrogen: Limit if the facility accepts regulatory certainty.*

g. *The need for chloride limits under 2050 effluent flow conditions is dependent upon assumptions regarding the critical streamflow (7Q10). MPCA did not project the need for a chloride limit under the 2050 effluent flow condition.*

h. *Annual mass requirements for Lake Pepin and the Mississippi River are included in the Met Council – Mississippi Basin Total Phosphorus Permit.*

River eutrophication standards for the Vermillion River trigger a seasonally low concentration limit for total phosphorus which would control phosphorus removal requirements. Upstream facilities included in the MCES Mississippi Basin Total Phosphorus Permit would have little to no impact on the Vermillion River at low flow and would not be able to reduce loads to allow for more loading from the Hastings WWTP during low flow conditions or to accommodate future potential growth. Phosphorus limits for the Vermillion River would need to be achieved by the Hastings WWTP alone to protect the Vermillion River. Continued inclusion in the MCES Mississippi Basin Total Phosphorus Permit would be evaluated further during final Total Phosphorus effluent limits determination if the Vermillion River outfall were selected as the final alternative.

A discharge to the Vermillion River would require the same permitting/regulatory requirements as identified for the Mississippi River outfall, with the exception of the CWA Section 408 permission. This option would be more likely than the Mississippi River outfall to require a full Environmental Impact Statement (EIS). Various studies might be required during the permitting stage to verify critical streamflows, mixing/dilution, dissolved oxygen dynamics, and ecological impacts. The Prairie Island Indian Community owns lands about nine miles down-stream on the Vermillion River and would be an important stakeholder for this alternative. Overall, the Vermillion River alternative would entail a more complex permitting process than the Mississippi River alternative.

3.3. *Potential for Regulatory Changes*

This section identifies future regulatory changes that might affect permit limits for either a new Mississippi River or a Vermillion River outfall.

3.3.1. Phosphorus

The Mississippi River and Lake Pepin are both currently listed as impaired for nutrients. MPCA is developing a TMDL for phosphorus to meet site-specific nutrient criteria in the Mississippi River and downstream Lake Pepin. That TMDL is currently in draft form (MPCA, 2021b). The MCES Mississippi Basin Total Phosphorus Permit already contains the phosphorus wasteload allocations necessary to protect the Mississippi River and Lake Pepin. Finalization of the TMDL is not expected to change phosphorus permit limits at the future Hastings WWTP. Phosphorus concentration limits for Vermillion River outfall would be controlled by the local river eutrophication standards that have already been adopted.

3.3.2. Nitrogen

MPCA is in the process of developing water quality standard for nitrate nitrogen, which is expected to be in the 7-10 mg/L range expressed as a chronic criterion. A relocated Mississippi River outfall would not be expected to require a limit for nitrate criterion. It is anticipated that a Vermillion River outfall would require a nitrate limit in the ranges shown in Table 3-4.

In 2014 Minnesota adopted a statewide Nutrient Reduction Strategy (State of Minnesota, 2014) that calls for a 45 percent reduction in nitrogen loads by 2040. MPCA encourages voluntary nitrogen reductions at WWTPs, and the regulatory framework might become more stringent in the future. MPCA has also adopted a “regulatory certainty” policy for WWTPs to accept an early total nitrogen limit. Under this policy, facilities that accept a total nitrogen limit receive assurance that the limit will remain fixed for up to 20 years. MPCA’s (2021b) tabulation of preliminary effluent limits for the future Hastings WWTP included a total nitrogen limit of 10 mg/L, assuming that MCES would accept such a limit under the regulatory certainty policy.

3.3.3. Chloride

MPCA did not project the need for an effluent limit for chloride under 2050 effluent flow conditions. However, this result was partly dependent upon assumptions related to critical streamflow (7Q10). If the critical streamflow was half of the value assumed by MPCA, the MPCA calculation method would indicate the reasonable potential to cause an exceedance of

Minnesota's chronic criterion of 230 mg/L, and a limit would be needed. Higher effluent flows would also trigger the need for a chloride limit. Hence, chloride could present a limit of the expandability of a discharge to the Vermillion River, regardless of the state's future direction on regulating salty parameters.

3.3.4. Per- and polyfluoroalkyl Substances (PFAS)

Both the Mississippi River and lower Vermillion River are listed as impaired for polychlorinated biphenyls (PCBs) in fish tissue, and the Mississippi River is listed as impaired for perfluorooctane sulfonic acid (PFOS). TMDLs have not yet been completed for these constituents. Over a long-term planning horizon, Minnesota might adopt criteria or regulatory policies for other categories of per- and polyfluoroalkyl Substances (PFAS) or emerging contaminants, such as pharmaceuticals, personal care products, endocrine disruptors, etc. Pending future evaluations, MCES expects that these substances may best be addressed by a combination of source control (e.g., industrial pretreatment and source control) and conventional treatment rather than installing treatment processes specifically to remove these substances.

4. Site Development

4.1. *Recommended Site Layout*

Typical site elevations range from 680 ft – 695 ft along the southern portion of the site, approaching elevation 700 ft along Ravenna Trail. The site slopes downward to the northern portion of the site that contains a stormwater retention pond and wetlands. Additionally, the site includes a 240-ft electrical easement running north-south across the middle of the site, and a 50-ft easement on the western portion of the site for a BP oil pipeline. Over half the site is located within the 100-year flood plain, mostly along the northern border.

Two potential plant layouts were evaluated, including a layout on the western portion of the site and a layout spanning the site from west-to-east. These areas were considered most favorable since they utilize the higher grade levels of the site and would require less fill material and disturbance of existing ponds and wetlands.

The layout spanning the site from west-to-east would not require relocation of the BP pipeline but results in a plant layout that is divided by the existing electrical lines. This results in long runs of pipes between the processes and a facility layout that was bifurcated. Relocation of the 10-inch British Petroleum oil pipeline to the west property boundary allows the facility to be sited on about 10 acres of natural high ground and is the most efficient and sustainable use of the site. Utilizing the southwest corner of the site minimizes disruption to the natural landscape and the length and depth of the gravity sewer conveying waste to the facility. It also provides reliable, safe access to Highway 61 through an industrial park via Glendale Avenue and MN Trunk Highway 316. See Figure 4-1 below.

The plant layouts utilizing the western portion of the site are presented in Figure 4-2 and Figure 4-3. Figure 4-2 presents the A/O process configuration (Bio-P) and Figure 4-3 presents the BIOCOS configuration. The layouts are based on 2050 flows and allow for ultimate expansion as well as for facilities for Treatment Level 2 for future nutrient requirements.

The wastewater treatment plant and all associated infrastructure will be constructed on parcels located in the City of Hastings. No wastewater treatment plant infrastructure will be constructed in Ravenna Township.

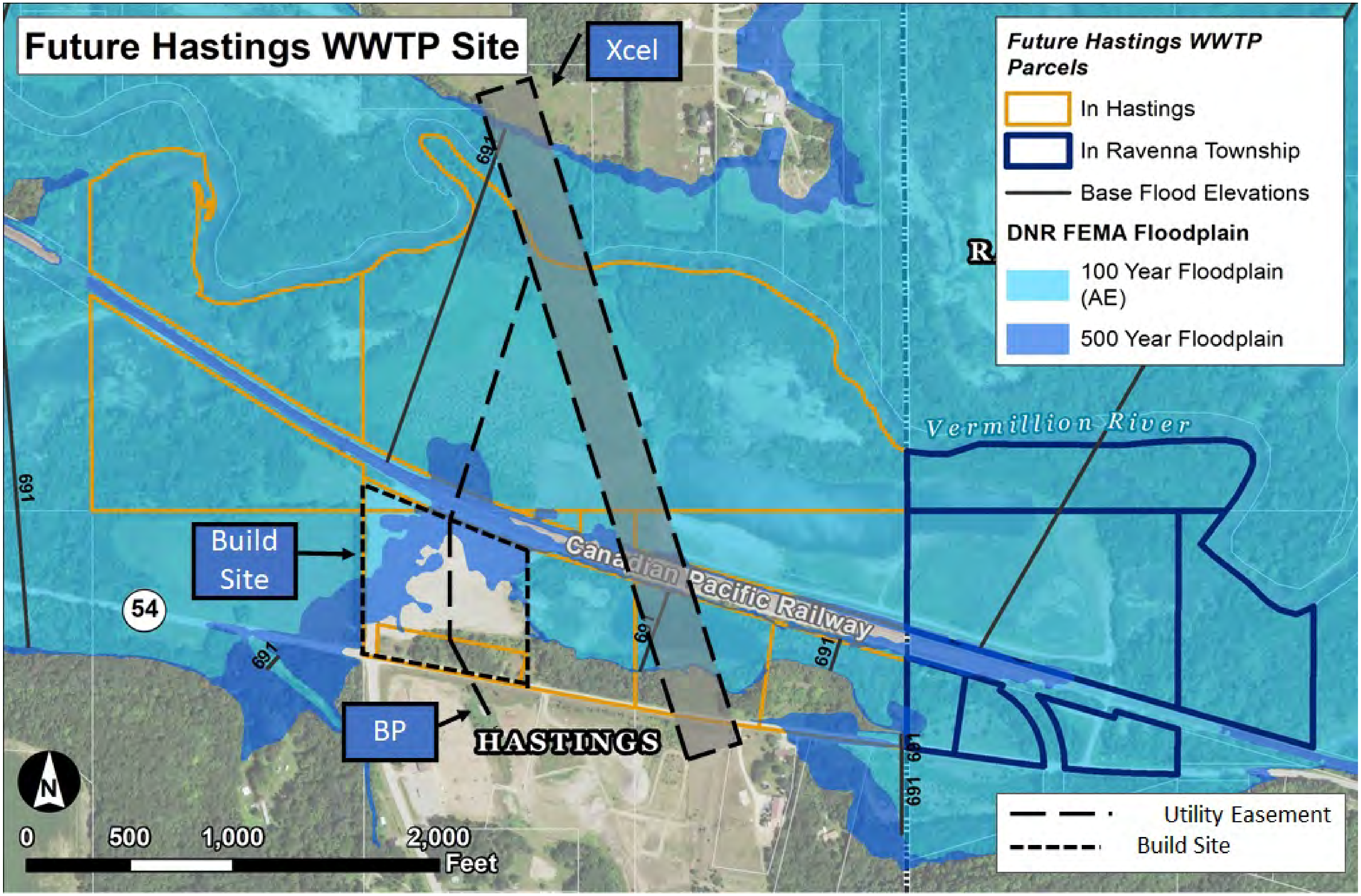


Figure 4-1 Future Hastings WWTP Site Key Features and Build Site

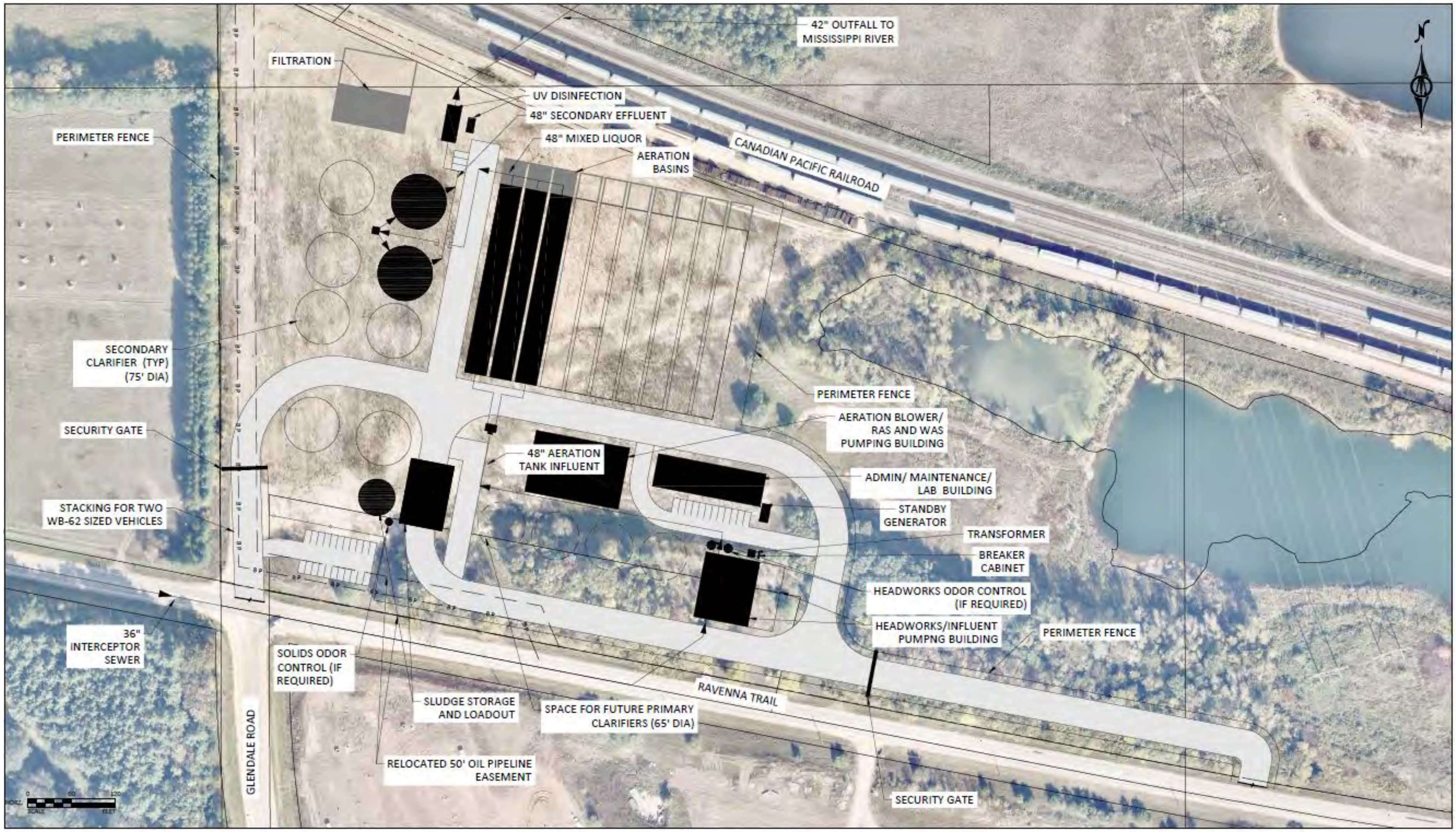


Figure 4-2 Hastings WWTP Site Layout for A/O Configuration

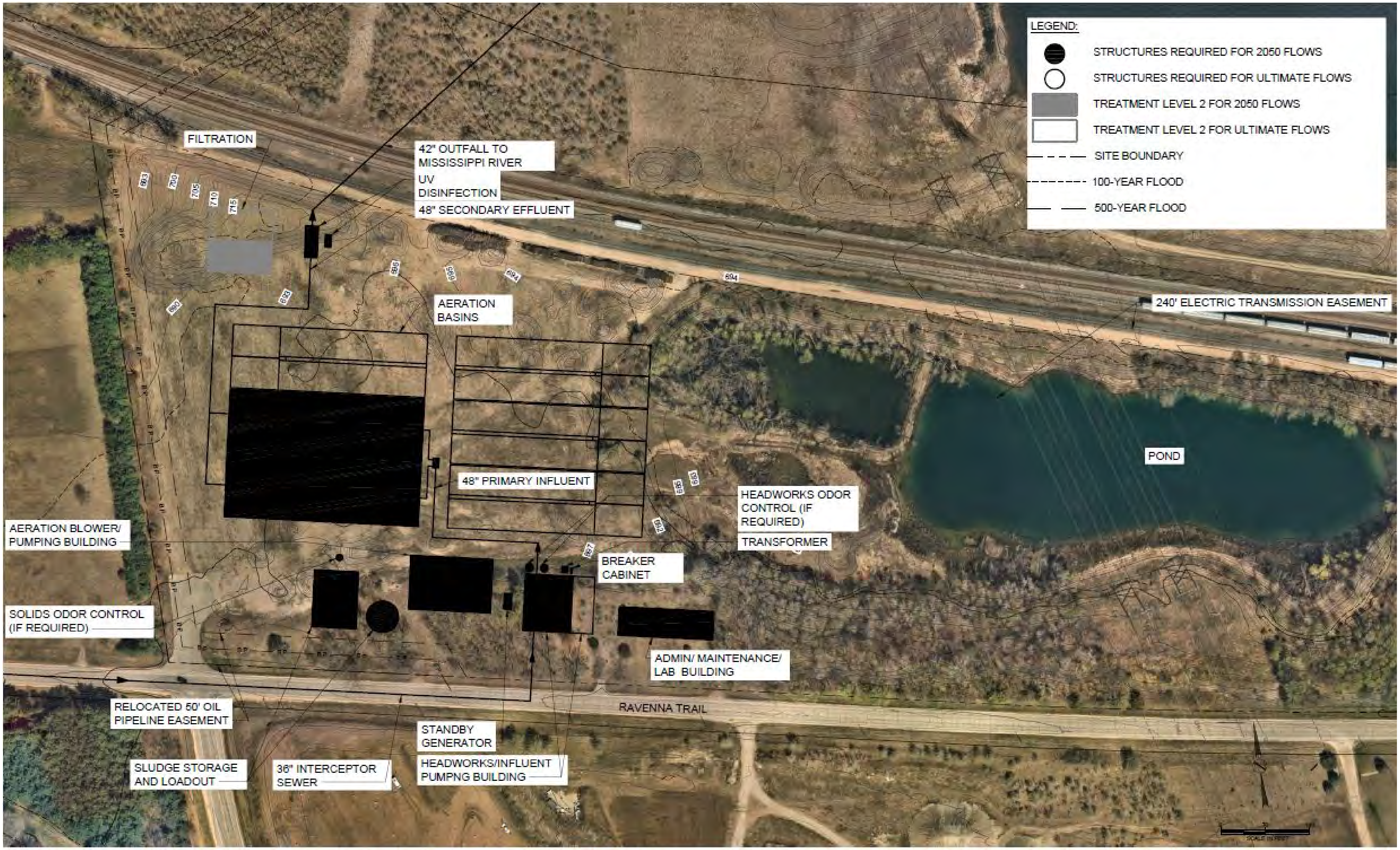


Figure 4-3 Hastings WWTP Site Layout for BIOCOS Configuration

The layout assumes the following structures will be located on the site:

- Headworks/Influent Pumping Building
- This building will also contain the main electrical equipment for the plant electrical distribution system
- Allows for expansion of screening and grit facilities for ultimate expansion
- Two 65'-Diameter Primary Clarifiers (if required)
- Allows for the ability to add two additional primary clarifiers for ultimate expansion
- Three Aeration Basins
- Allows for expansion for Treatment Level 2 and ultimate expansion
- Aeration Blower and Pumping Building
- Includes aeration blowers and return activated sludge (RAS), waste activated sludge (WAS) and secondary scum pumps
- Two 75'-Diameter Secondary Clarifiers
- Allows for the ability to add six additional secondary clarifiers for ultimate expansion
- UV Disinfection
- Administration/Laboratory/Maintenance Building
- Solids Storage and Loadout Building
- Includes dissolved air floatation thickener (DAFT), sludge storage tank mixing, and primary sludge and scum pumps
- Sludge Storage Tank (for hauling liquid sludge to the Metro WWTP)
- Odor Control
- Includes carbon absorbers for Solids Handling and Headworks (if required)
- Future Cloth Disk Filtration for Treatment Level 2

4.1.1. Driveway Improvements

Two driveways for plant operations are recommended for the WWTP. Site access is proposed from Ravenna Trail (County Road 54). The main entrance is proposed on the west end of the property, opposite the existing County Road 91 (Glendale Ave.). Matching the centerline of the MCES' main entrance with the centerline of Glendale Ave to the south will minimize the turning movement conflicts and improve vehicle safety.

A second driveway into the plant is recommended 1200 feet east of the main entrance. This second access would only be intended for use during emergencies or when construction within the plant limits access through the main entrance.

The existing access on the east end of the property is proposed to remain as is, with no current intended use by the WWTP operations.

4.1.2. Ravenna Trail Improvements

The trunk gravity sanitary sewer will require the removal of pavement on Ravenna Trail (County Road 54). The roadway is proposed to be reconstructed at the same typical section.

The planning team solicited a formal response from Dakota County to determine if turn lanes would be required. Current traffic volumes and the quantity of trips generated by the WWTP will not require the addition of turn lanes on Ravenna Trail. Right and left turn lanes north into the WWTP are not recommended at this time. However, they could be installed if preliminary design evaluations identify a need for them. A detailed summary of the traffic analysis is included in Appendix 4-1.

4.1.3. Site Security

Figure 4-2 depicts some of the site security features for the new WWTP. At a minimum site security will include:

- Perimeter fencing
- Staff parking outside the fence line
- Entire property signed “No Trespassing”
- Entry/Exit card readers at motorized gates with dedicated gate cameras
- Site monitoring cameras with both local and remote capabilities
- Vehicle gates at property entrances outside the secured WWTP area

4.1.4. Sustainable Landscaping

Sustainable landscaping is also an important consideration for the new WWTP site. In addition to potential vegetated stormwater management features (for example, infiltration basins and rain gardens), low-maintenance landscaping such as prairies can also be included in the final design. While sustainable landscaping may not necessarily have a large impact on stormwater management, it can serve important biological functions, such as providing habitat for birds and insects. It can also reduce maintenance costs by decreasing mowing requirements. Sustainable landscaping can also be aesthetically pleasing and can be used to limit sight lines for less attractive industrial activities. Other sustainable options could include cisterns designed to capture rainwater for use in irrigation later which can reduce water consumption and lower the WWTP’s carbon footprint.

4.2. *Effluent Discharge*

4.2.1. Recommendation

Alternative 1 - Mississippi River Outfall is recommended for the Hastings WWTP. Although the Mississippi River alternative requires the construction of a longer effluent pipeline, this option has lower permitting, capital, and O&M costs. Non-cost factors also support the recommendation of a Mississippi River outfall since it has the most straightforward permitting pathway and would support expanded flows. It also has the least potential for problems related to technical feasibility, environmental impacts, and stakeholder impacts/perception.

4.2.2. Alternatives Identification

Four treated plant effluent disposal options were evaluated:

- Outfall to the Mississippi River
- Outfall to the Vermillion River
- Rapid infiltration basins (RIBs)
- Deep injection wells.

4.2.3. Alternatives Analysis

Table 4-1 summarizes the effluent disposal assumptions and non-cost considerations.

Table 4-1 Hastings WWTP Effluent Disposal Alternatives Summary

ALTERNATIVE	KEY DISCHARGE LIMITS & ASSUMPTIONS FOR 2050 EFFLUENT FLOWS[1]	SUMMARY OF TREATMENT ASSUMPTIONS	KEY NON-COST CONSIDERATIONS
Mississippi River Outfall	• CBOD5 (25 mg/L) • TSS (30 mg/L) • Total phosphorus • 1 mg/L as 12-mo. avg. • Coverage under MCES Mississippi Basin Total Phosphorus Permit	• Secondary treatment • Disinfection • Effluent aeration (TBD)	• Not expected to be controversial with stakeholders • Temporary impacts to wetlands and tributaries along discharge pipeline
Vermillion River Outfall	• CBOD5 (5-15 mg/L) • TSS (≤30 mg/L) • Dissolved oxygen (5-7 mg/L) • Ammonia (3 - 8 mg/L as N) • Nitrate (15-23 mg/L) o Total phosphorus o ~0.15 mg/L (long-term summer avg.) • 0.2 – 0.3 mg/L (monthly avg.) • Chloride (690 mg/L to no limit needed)	• Tertiary filtration • Denitrification • Disinfection • Effluent aeration	• Permitting might require additional studies to evaluate streamflow, oxygen sag, sensitive resources, etc. • Need to engage regional stakeholders including Prairie Island Indian Community • Chloride presents challenges to expandability and need for limit is sensitive to critical streamflow assumptions.
Rapid Infiltration Basins	• Nitrate (~10 mg/L as N)	• Denitrification	• East Bethel provides permitting precedent • Large land area (~50 acres) needed for infiltration basins • Potential for impact on neighboring wells
Deep Injection Wells	• TSS (2-3 mg/L)	• Tertiary filtration	• Challenging permitting • Requires extensive pilot study to determine feasibility • Might require large wellfield area • Potential for frequent well rehabilitation to be necessary

Alternative 1 – Outfall to the Mississippi River

The new Mississippi River outfall alternative would be the most similar to that of the existing Hastings WWTP disposal method, because it would continue to discharge to the same receiving stream. After treatment, effluent would be conveyed by a new pipeline about 1.4 miles north-northwest along a utility easement and be discharged to the Mississippi River about one mile downstream of the current discharge location. This alternative would require permitting, construction, and maintenance of the effluent pipeline, and the pipeline easement would be seasonally inundated by waters of the Mississippi River. However, the large assimilative capacity of the Mississippi River would result in permit limits that are similar to those of the existing Hastings WWTP, and no major technical or permitting problems are anticipated.

Alternative 2 – Outfall to the Vermillion River

Under this alternative, the new Hastings WWTP would discharge treated effluent to the lower Vermillion River about 0.3 miles to the north of the future site. Although this alternative would avoid the need for an extended pipeline to the Mississippi River, the lower assimilative capacity of the lower Vermillion could result in stringent effluent limits for parameters such as oxygen demanding substances, phosphorus, and chloride. This alternative would likely require tertiary filtration and denitrification. Various studies might be required during the permitting stage to verify mixing/dilution, dissolved oxygen dynamics, or ecological impacts. The Prairie Island Indian Community owns lands about nine miles downstream on the Vermillion River and would be an important stakeholder for this alternative. The Vermillion River alternative would entail a more complex permitting process than the Mississippi River alternative and might require a full Environmental Impact Statement (EIS).

Alternative 3 – Rapid Infiltration Basins

Rapid infiltration or soil aquifer treatment is a process in which wastewater is treated by passing it through permeable soil or sand. The MCES East Bethel facility provides a useful precedent for how this alternative might be applied to Hastings WWTP and include operation throughout the winter. The permitting process would require extensive testing of soils and local hydrogeology. This alternative would likely require nitrification and denitrification to prevent elevated nitrate concentrations in groundwater. The 2050 effluent flow scenario would also require approximately 50 acres of land for the rapid infiltration basins.

Alternative 4 – Deep Injection Wells

Deep well injection of treated municipal wastewater is performed by pumping the waste fluids into deep, confined, rock formations via a well(s) that is constructed much deeper than the deepest drinking water aquifer. In Minnesota, injection well construction and operation are regulated by the USEPA. The USEPA recognizes 6 classifications of injection wells, Class I through Class VI. Industrial and municipal wastewater disposal wells are considered Class I wells. The US EPA website indicates that presently, “There are no Class I injection wells in Minnesota or Wisconsin”.

The subsurface beneath the proposed wastewater treatment plant can be divided into two broad categories: overlying glacial (predominantly sandstone) deposits and underlying bedrock. Local and regional subsurface investigations and documentation have been almost entirely confined to the overlying formations, which provide drinking water to multiple users. The Mt. Simon-Hinkley formation is the deepest high-yielding drinking water aquifer, is located above crystalline Precambrian bedrock, is comprised of fine to coarse-grained sandstone, and is currently used for some high volume industrial and municipal wells. The Mt. Simon-Hinkley formation ranges in depth from 600 to 1,200 feet below grade and is protected for future use with a restriction on new well drilling. An injection well system constructed at the proposed treatment plant site will likely be required to be completed below the Mt. Simon-Hinkley formation and at a depth that penetrates several hundred feet of bedrock.

The permitting process for deep well injection would be protracted and require a detailed pilot study to determine feasibility. Results from the pilot study would be used to determine the number of injection wells required, associated land requirements, and other design requirements. This alternative would likely require tertiary treatment to prevent well screening clogging and might require other types of advanced treatment.

4.2.4. Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-2.

Table 4-2 Hastings WWTP BCE Summary – Outfall

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	SALVAGE VALUE ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Outfall to Mississippi River **(Recommended)**	5,910,000	6,025,000	(2,308,000)	9,927,000
Alternative 2 – Outfall to Vermillion River	9,932,000	8,903,000	(2,223,000)	16,611,000
Alternative 3 – Rapid Infiltration Basin	14,645,000	28,937,000	(4,159,000)	39,424,000
Alternative 4 – Deep Injection wells	31,475,000	23,496,000	(7,384,000)	47,588,000

Alternative 1 has a longer outfall pipe to the Mississippi River, but this is more than offset by the lower permitting, O&M and capital costs for the other alternatives.

4.2.5. Basis of Design

The basis of design for the outfall to the Mississippi River is described below in Section 4.4.

4.3. *Hydraulics*

Hydraulic profiles and site layouts were generated for the proposed Hastings WWTP. Two process configurations were modeled: biological phosphorus removal (Bio-P) with the A/O process configuration and BIOCOS™ (as described Primary and Secondary Treatment section below)

As described further below, the following components were incorporated into the hydraulic profile:

- Effluent outfall design will accommodate gravity flow
- No weirs submerged during 100-year (1%) flood event (river elevation of 692.0)
- Hydraulic model includes the following process units in service:

- One ultraviolet (UV) channel
- One secondary clarifier
- Two aeration tanks
- One primary clarifier (if required)
- One vortex-type grit removal unit
- Bar screens are located upstream of the influent pumps and are not included in the hydraulic model
- Top of wall elevation will be set at elevation 697.0 or higher to protect the site from flood events. The walls of the primary clarifiers, aeration tanks, BIOCOS™ and secondary clarifiers will extend above finish grade.
- The influent pumps will discharge to the channel upstream of grit removal
- For the BIOCOS ™ configuration, the following modifications were made:
    - Primary and secondary clarifiers were removed
    - Aeration tanks were replaced with two BIOCOS™ tanks
    - The effluent weir downstream of UV disinfection is set at Elevation 695.00. This elevation provides freeboard during a 100-year (1%) flood event. During a 500-year (0.2%) event, this weir will be submerged, but the channel walls will be high enough to prevent an overflow.

The A/O process configuration is shown in Figure 4-4. The primary clarifiers are included in the model since they may be required in the future even if they are not initially installed. The BIOCOS hydraulic profile results in about 2.5 feet less water elevation in the grit tank influent channel and is shown in Figure 4-5.

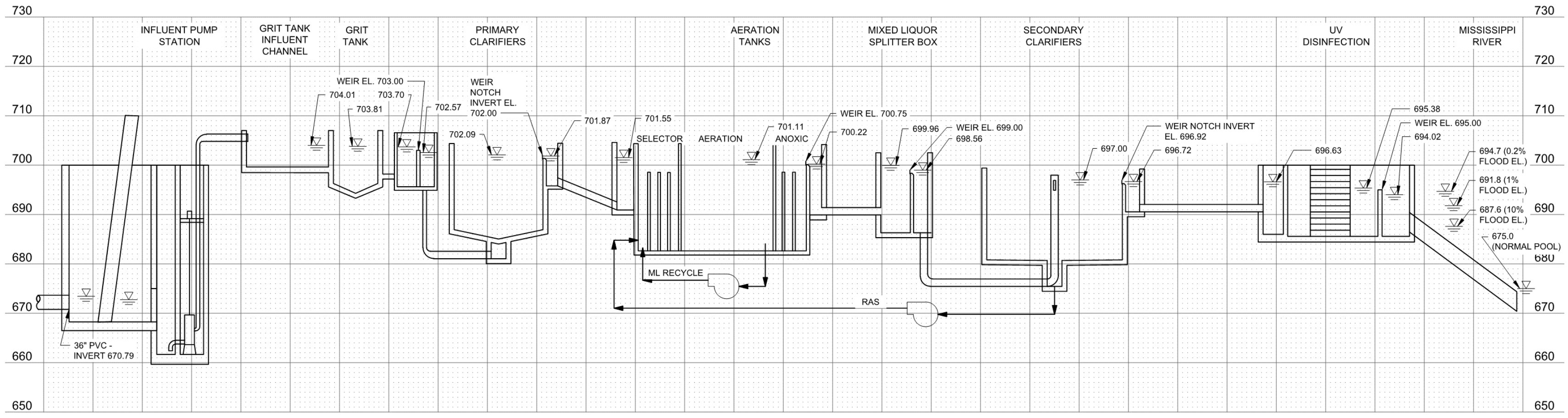


Figure 4-4 Hastings WWTP Hydraulic Profile for A/O Configuration

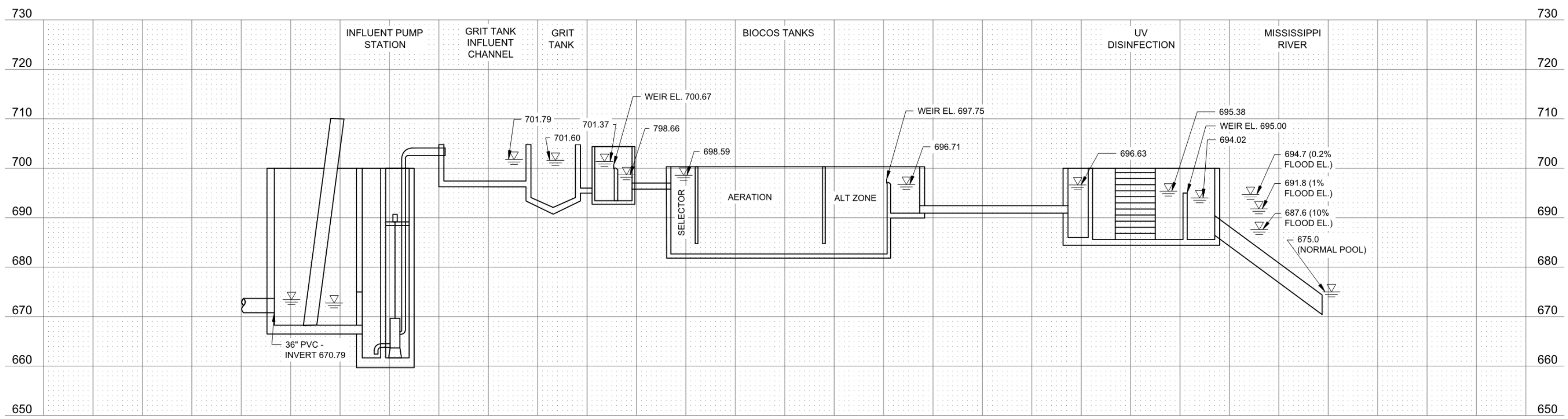


Figure 4-5 Hastings WWTP Hydraulic Profile for BIOCOS Configuration

4.3.1. Effluent Pumping/Aeration

Recommendation

Alternative 1 – Influent Pumping is recommended. The requires only an influent pumping station be provided at the Hastings WWTP that allows for gravity flow from the headworks to the Mississippi River, with no effluent pumping station. This recommendation only requires one pumping station at the plant, reducing capital, operations, and maintenance costs. The top of wall elevation for all structure elevations at the plant will be above the 500-year flood elevation to mitigate flood risk. This alternative will require additional rock excavation along a portion of the outfall, but the cost of rock excavation is more than offset by the elimination of the construction and O&M costs associated with an effluent pumping station.

At the normal river stage elevation, there will be nominally 7 feet of head available for cascade aeration. An additional cascade aeration system it not required to meet DO requirements in the Mississippi River.

Alternatives Identification

Two alternatives were evaluated for conveying flows from the influent sewer, through the plant, and out the effluent outfall pipe to the Mississippi River. Both alternatives require an influent pumping station as described above. Alternative 1 uses the influent pumps to provide a hydraulic grade line at the headworks that is sufficient to flow by gravity through the plant and out to the Mississippi River. Alternative 2 includes both influent and effluent pumping stations, which would reduce the head required at the influent pumps but require a portion of the outfall to be constructed as a forcemain.

Alternatives Analysis

Both alternatives assume that the influent pumping station will raise the hydraulic grade line high enough to protect the WWTP during a 500-year flood event. Over half of the new plant site lies within the 100-year flood plain and portions of the site are within the 500-year flood plain. The influent pumps will lift the flow high enough so that the top of wall for all structures is above the 500 -year flood elevation, to mitigate flooding concerns.

Alternative 1 – Influent Pumping

For Alternative 1, the influent pumping station would lift the flow high enough so that the UV disinfection effluent weirs at the downstream end of the plant would be above the hydraulic grade line in the effluent outfall during a 100-year flood. During a 500-year flood, these weirs will be submerged, but the tank walls would be high enough to prevent an overflow. This alternative assumes that the crown of the effluent outfall pipe does not exceed nominally 690.0 feet. Under normal pool elevations, the 42-inch outfall would flow full for most of its length, with the portion of the outfall at the high point in its alignment flowing partially full. The resulting profile of this outfall would require approximately 12,900 cubic yards of rock excavation through a hill along the alignment.

Alternative 2 –Effluent Pumping

Under Alternative 2, an effluent pumping station would be provided with a 30-inch forcemain to the top of the hill, reducing the need for rock excavation. The 30-inch forcemain pipe would transition to a 42-inch gravity outfall at the top of the hill. The addition of effluent pumping would reduce the head on the influent pumps, but influent pumping would still be required due to the depth of the influent sewer. While there would be some energy savings at the influent pump station, the increased head on the effluent pumps due to the length of the forcemain and the need to pump to the highpoint in the alignment more than offsets any energy savings at the influent pumps. The effluent pumping station would consist of five pumps, each rated at 2.5 mgd. Either submersible or vertical turbine pumps in a trench-type wet well downstream of the UV disinfection channel could be used. Pumps would be variable speed to match the plant flow rate.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-3.

Table 4-3 Hastings WWTP BCE Summary – Effluent Pumping/Aeration

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 - Only Influent Pumping (Recommended)	22,300,000	327,000	22,627,000
Alternative 2 - Influent and Effluent Pumping	29,113,000	3,500,000	32,613,000

Alternative 1 has a higher cost for the outfall due to additional rock excavation to accommodate gravity flow, but this is more than offset by the cost for construction of an effluent pumping station and the ongoing O&M costs associated with this second pumping station.

Basis of Design

Effluent pumping and aeration will not be required for this facility. The top of wall elevation for all structure elevations at the plant will be above the 500-year flood elevation to mitigate flood risk.

4.4. *Liquid Treatment Process Selections*

4.4.1. Septage Receiving

MCES provides septage receiving facilities for permitted liquid waste haulers at 3 of its 4 WWTPs with solids processing facilities. These facilities have an annual average flow greater than 10 mgd and 24/7 staffing. The Hastings WWTP is not staffed continuously and will continue hauling thickened sludge to the Metro WWTP for incineration. Septage receiving facilities at the Hastings WWTP would benefit a small subset of currently permitted haulers with capital and operating costs for new facilities passed on directly to haulers and rate payers through MCES rates. Accommodating septage receiving at the Hastings WWTP would require additional treatment capacity and triggers facility expansion following service relocation sooner than anticipated for the service area.

Septage receiving for the Hastings WWTP is not recommended at this time. It is recommended that septage receiving be reevaluated when annual average flows are between 5 and 10 mgd and Hastings WWTP becomes a solids processing facility or MCES-wide solids management practices change. Both the Empire WWTP and the Metro WWTP have septage receiving facilities serving permitted liquid waste haulers in the Dakota County area.

4.4.2. Preliminary Treatment

The preliminary treatment system at the Hastings WWTP will consist of screenings, grit removal, grit processing, influent pumping, and flow metering. All of this equipment would be located indoors in a common headworks building. NFPA 820 considerations for the facility, including ventilation and explosion proof equipment, will be required. A bridge crane or similar lifting device will need to be provided for the removal and movement of equipment.

4.4.3. Screening

Recommendation

Alternative 2 - Multi-Rake Bar Screens are recommended for screenings due to ease of maintenance, operator familiarity, and lower headloss. The screens would be located immediately downstream of the influent flow into the plant, and upstream of the influent pumping system and grit removal. Washer and compactors are also recommended for the screenings.

Alternatives Identification

Three screen alternatives were evaluated: perforated plate screens, multi-rake bar screens, and climber-type bar screens.

Alternatives Analysis

Alternative 1 – Perforated Plate Screens

Perforated plate screens are mechanically cleaned screens consisting of rotating perforated screening elements mounted on a conveying chain. At the upper turning point the perforated plates are continuously cleaned by a rotating brush. Two separate motors rotate the perforated plates and the brush. Perforated screening elements provide higher separation of solids compared to similar bar screen installations, at the expense of increased headloss. Although this alternative allows for high loading rates and screenings retention, perforated plate screens require spray water, have increased headloss compared to the other alternatives, and require relatively high maintenance due to the multiple mechanical systems.

Alternative 2 – Multi-Rake Bar Screens

Multi-rake screens are mechanically cleaned screens consisting of a stationary bar rack with multiple rakes mounted on a conveying chain. A motor drives the chain and attached rakes, continuously engaging the bar screen and removing screenings. The screenings are conveyed out of the water up to a discharge point where the screenings are captured for disposal. The motor is located at the top of the unit, providing ease of maintenance. Guide hubs or sprockets located at both the top and bottom of the screen are used to fix the drive chain and rakes to the screen face. Multi-rake screens allow for high loading rates, reduced frame height, low headloss, and do not require flush water for cleaning.

Alternative 3 – Climber-Type Bar Screens

Climber screens comprise long, vertical bars and a long single articulated raking mechanism. The rake is kept above the waterline until engaged and then enters the channel on the upstream side of the screen and removes debris trapped against the bars up and out of the water. When not removing debris, the moving parts are permanently out of the water. Climber screens typically require large frames that extend well above the discharge point to guide the rake mechanism through its full range of travel. As a result, climber screens may require taller building space depending on configuration and bridge crane layout. Climber screens have low maintenance and headloss requirements and do not require flush water however, they do have a reduced loading capacity and lower screening retention than the other two alternatives.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-4.

Table 4-4 Hastings WWTP BCE Summary - Screening

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Perforated Plate	820,000	1,680,000	2,500,000
Alternative 2 – Multi-Rake (Recommended)	880,000	1,560,000	2,440,000
Alternative 3 – Climber	1,050,00	1,865,000	2,920,000

Multi-rake bar screens are the recommended alternative for the Hastings WWTP based on ease of maintenance, operator familiarity, and lower headloss. Although the NPV for perforated plates is only slightly more than multi-rake bar screens, this system has two mechanical systems requiring maintenance, requirements for spray water, and increased head losses when compared to other alternatives.

Basis of Design

The screens will be designed in accordance with the following design criteria:

- Equipment redundancy
- N+1 screen redundancy will be provided (where N represents the number of screens required for plant operations) to allow for continued operations with one unit out of service.
- 1 duty screen, 1 standby screen, and 1 bypass channel.
- Flow velocity
- A minimum approach velocity of 1.25 feet per second (ft/sec) for a clean screen will be maintained per 10 States Standards to minimize settling upstream of the screen.
- A maximum approach velocity of 3 ft/sec for a clean screen will be maintained per 10 States Standards to prevent settling upstream of the screen.
- Orifice velocity will not exceed 6.5 ft/sec.
- Screens will be sloped between 45 and 90 degrees from horizontal per 10 States Standards.
- ¼-inch screen opening size
- An average of 8 cubic feet per day (ft^3/day) screening content/volume generated
- 4-ft channel width
- Two screenings washer compactors
- Conveyance to dumpster via the discharge pipe on each washer/compactor

4.4.4. Influent Pumping

Recommendation

Influent pumping is required due to the inceptor depth below grade flowing to the plant site. Initial concepts have the interceptor to be approximately 28 feet below grade at Ravenna Trail where it would enter the plant site. Since influent pumping is required due to site conditions, the pumps will be used to raise the hydraulic grade line high enough to allow for gravity flow through the treatment processes to the discharge location so effluent pumping is not required (see the Effluent Pumping/Aeration section below for the detailed analysis).

Alternative 2 - Wetwell/Drywell configuration is recommended due to greater familiarity with the configuration, ease of maintenance for pumping equipment, and the flexibility to add future pumps.

Alternatives Identification

Two alternatives were evaluated for influent pumping: a wetwell with submersible pumps and a wetwell/drywell pump station. For both alternatives, it is recommended to use variable speed drives to eliminate the pulsing of flows entering the treatment process.

A trench-style wetwell is recommended for each alternative to minimize grit deposition, which is a problem at the current Hastings headworks facility. For redundancy, two trench-style wetwells are considered for each of the alternatives. Providing two wetwells allows for temporary shutdown and maintenance to either of the wetwells and its pumps. It is also assumed that all the pumps will operate independently with a simple lift and discharge into a common channel.

Alternatives Analysis

Alternative 1 – Wetwell with Submersible Pumps

This alternative involves the construction of two trench-style wetwells with two submersible pumps installed in each, with room for an additional pump on each side. This alternative eliminated the need for lighting and ventilation in the dry well and the need for pump isolation valves. However, the pumps will need to be pulled for maintenance from the sewage, rather than be directly accessible in a drywell.

Alternative 2 – Wetwell/Drywell

This alternative involves the construction of two trench-style wetwells four pumps installed in a common dry well, with space to accommodate the installation of two additional pumps. Plug valves are recommended upstream of the pumps for individual pump isolation; however, it is still recommended to install two wetwells so one side can be removed from service for cleaning and inspection during dry weather. This alternative allows for ease of access for pump maintenance and local operator familiarity with the configuration. However, this alternative does require a larger building footprint and additional HVAC and lighting requirements.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-5. Differences in building layouts between the two alternatives were included in the costs below since the configurations greatly affected building size.

Table 4-5 Hastings WWTP BCE Summary – Influent Pumping

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Wetwell with Submersible Pumps	15,550,000	8,180,000	23,730,000
Alternative 2 – Wetwell/Drywell (Recommended)	17,125,000	8,320,000	25,440,000

Even though the wetwell with submersible pumps option is the lowest NPV, the wetwell/drywell option is the recommended alternative due to greater familiarity with a wetwell/drywell configuration, ease of maintenance for pumping equipment, and the flexibility to add future pumps.

Basis of Design

To pump the initial range of flows, four pumps, each rated at 2.5 mgd, are recommended. This configuration offers the flexibility to pump dry weather baseline flows within the preferred operation range up to firm capacity of 7.5 mgd. A fifth pump may be added in the future as necessary to provide firm capacity to meet a peak instantaneous flow of 10 mgd. Space will be provided for a total of 6 pumps. Two separate wet wells will be provided and sized to accommodate a total of six pumps.

4.4.5. Flow Metering

Recommendation

Alternative 2 - Magnetic Flow Meters are recommended for influent flow metering at the Hastings WWTP due to lower cost, proven reliability and high accuracy. The flow meters will be located downstream of the screens and influent pumping.

Alternatives Identification

Influent flow metering is required at the headworks facility to collect an accurate measurement of the flow into the treatment process. Two alternatives were evaluated for influent flow metering: Parshall flumes and magnetic flow meters.

Alternatives Analysis

Alternative 1 – Parshall Flume

Parshall flumes are commonly used for metering influent flow due to longevity and ease of operation. Parshall flumes are an open channel design with a standard hydraulic structure, typically located in a concrete channel. A sensor records depth of flow at a specified point, which corresponds to a flow rate. Parshall flumes require uniform approach conditions. A sufficient straight channel length will be required upstream of the flume to ensure proper approach conditions. Well-installed Parshall flumes can have accuracies around +/- 2.5 percent.

Alternative 2 – Magnetic Flow Meters

Magnetic flow meters are commonly used for pressurized flow metering. Magnetic flow meters can be installed in both the horizontal and vertical orientations and are flanged to the pump discharge piping. Due to their compact design, no additional building space is required for their use. Well installed magnetic flow meters can have accuracies around +/- 0.5 percent. Six flow meters would be recommended, one on each pump discharge. This assumes that the system would be a simple lift with discharge above the water surface, eliminating the need for check valves and isolation valves on the pump discharge piping.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-6.

Table 4-6 Hastings WWTP BCE Summary – Flow Metering

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Parshall Flume	83,000	146,000	229,000
Alternative 2 – Magnetic Flow Meters (Recommended)	80,000	141,000	221,000

Magnetic flow meters are recommended due to lower NPV, and proven reliability.

Basis of Design

The influent flow meter will be designed to accurately meter throughout the entire range of flows. Six flow meters would be required and would be installed in the headworks building.

4.4.6. Grit Removal and Processing

Grit Removal

Recommendation

Either Alternative 1 -Smith and Loveless PISTA Grit Chamber or Alternative 2 - Hydro International Headcell are recommended since either system can be configured to remove 95 percent of 106 micron grit. Additionally, both of these systems are proprietary. It is recommended that either unit can be provided for grit removal and should be chosen based on performance specifications during design/construction.

Alternatives Identification

Two alternatives for grit removal were evaluated: a vortex type, Smith and Loveless PISTA Grit Chamber, and a stacked tray system, Hydro International HeadCell.

Alternatives Analysis

Alternative 1 – Smith and Loveless PISTA Grit Chamber

The Smith and Loveless PISTA Grit Chamber removes grit with a vortex created by the water entering the chamber. As it enters the chamber it causes the water in the chamber to spin, and when water hits the outside wall then proceeds down along the outside wall to the floor. The centrifugal forces move the grit to the outside of the vortex and travels down the bottom of the upper chamber floor, finally settling in the bottom center storage chamber. An internal baffle controls water level within the unit and allows for increased velocities in the unit during low flow periods. Depending on the grit load, grit may be pumped either intermittently or continuously. A fluidization ring and air scour are typically provided to break up compacted grit for pumping. This alternative requires a small footprint and lower headloss, but the structure is more complex, requires a longer approach channel and the internal baffle requires additional maintenance associated with the motor and moving parts.

Alternative 2 – Hydro International HeadCell

The Hydro International HeadCell is an all-hydraulic grit concentrator, which uses vortex flow and a stacked tray design to efficiently capture and settle fine grit via large surface area and short settling distances. The unit is installed downstream of screening. The unit requires no external power source and has no internal moving parts. A concrete formed sump allows for collection of grit and a separate grit pump pulls grit from the bottom of the unit. The grit pump operates intermittently, which requires a fluidizing ring to resuspend settled grit more aggressively prior to pumping. A non-potable water supply is required. Grit could also be pumped continuously. This alternative has no moving parts and a simple structure, but requires a larger space and has a higher headloss through the unit.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-7.

Table 4-7 Hastings WWTP BCE Summary – Grit Removal

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Smith and Loveless Vortex	250,000	442,000	692,000
Alternative 2 – Hydro International HeadCell	331,000	587,000	917,000

Both the Smith and Loveless Vortex grit removal unit and the Hydro International Headcell, configured to remove 95 percent of 106 micron grit, are proprietary. It is recommended that either unit can be provided for grit removal and should be chosen based on performance specifications during design/construction.

Basis of Design

The grit removal system will be designed in accordance with the following design criteria:

- 95 percent capture of grit greater than 106 microns at peak hour flow.
- Pass instantaneous peak flow at reduced solids capture
- A single grit removal unit will be provided with a bypass channel to utilize for maintenance.
- An approach velocity between 2-3 ft/sec is desired and a 4-ft wide channel will be provided
- A dry-pit style grit pump will be provided.

Grit Processing

Recommendation

Either Alternative 1 - WEMCO Hydrogritter,II, Alternative 2 - Hydro International GritCleanse or Alternative 3 - Smith and Loveless GritWasher is recommended since all systems can be configured to capture 95% of fine (150 mesh/106 micron) grit at a specific gravity of 2.65. Additionally, all of these systems are proprietary. It is recommended that any of the units can be provided for grit processing and should be chosen based on performance specifications during design/construction.

Alternatives Identification

Three alternatives were evaluated for grit processing: a grit cyclone/classifier type, WEMCO Hydrogritter, a fluidized bed type, Hydro International GritCleanse, and a lamella plate type, Smith and Loveless Grit washer.

Alternatives Analysis

Alternative 1 – WEMCO Hydrogritter II

The WEMCO Hydrogritter II Grit Removal System is a combination grit cyclone and classifier. Grit slurry enters the cyclone where grit is captured and processed. The grit concentrate from the cyclone underflow discharges to the spiral classifier where the grit is allowed to settle. The settled grit travels up the spiral conveyor where it is de-watered and then discharged as a low moisture product ready for disposal. This alternative has a single motor and small footprint but the cyclone back-pressure increase grit pump energy.

Alternative 2 – Hydro International GritCleanse

The Hydro GritCleanse is a fluidized bed grit washing system. Flow is introduced tangentially into a conical clarifier that forces grit into the boundary layer located at the inside wall of the unit. Grit then settles to the bottom of the unit into a fluidized bed. Washing occurs in the fluidized bed as organic material attached to the grit particles is scrubbed away due to friction between particles, and higher density material descends to the bottom. The cleaned grit is then intermittently discharged and dewatered by means of a screw. This unit is designed to specifically operate with the Hydro International Head Cell grit removal unit and has a lager footprint and two motors, which may result in additional maintenance.

Alternative 3 – Smith and Loveless Grit Washer

The Smith and Loveless grit washer provides dewatering and retention of fine grit. Flow enters into a lamella parallel plate section for high-rate settling. Grit then continues up an inclined screw conveyor for dewatering. The classifier screw transports the clean grit up an inclined plane before discharge into a container. This unit has a single motor and smaller footprint but requires additional grit concentrator equipment, which may increase maintenance requirements.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-8.

Table 4-8 Hastings WWTP BCE Summary – Grit Processing

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – WEMCO Hydrogritter II	453,000	802,000	1,255,000
Alternative 2 – Hydro International GritCleanse	438,000	776,000	1,215,000
Alternative 3 – Smith and Loveless Grit Washer	174,000	308,000	482,000

All three alternatives are proprietary. Selection of an individual alternative would require a sole-source procurement. All alternatives can meet the design requirements for grit processing. It is recommended that an alternative be chosen based on performance specifications during design/construction.

Basis of Design

Grit processing will be designed in accordance with the following design criteria:

- 95 percent capture of grit greater than 106 microns at a specific gravity of 2.65.
- Less than 5 percent volatile solids and less than 10 percent water content in washed grit.
- A single grit train will be provided in conjunction with a single grit chamber, with space to accommodate the addition of a future unit will be provided.
- All units will discharge to a common chute that will drop into a dumpster. Truck access will be provided to access the dumpster for removal.

4.4.7. Primary and Secondary Treatment

Primary and Secondary Treatment for Preliminary Effluent Limits

The primary and secondary treatment processes focus on facility requirements to meet the preliminary effluent limits for discharge to the Mississippi River including monthly TP discharges of 1.0 mg/L and year-round nitrification.

Recommendation

Based upon review of the treatment alternatives and costs, it is recommended MCES proceed with Alternative 3 – A/O without Primary Clarifiers as it provides a proven, non-proprietary, and familiar Treatment Level 1 technology and provides a logical progression path for either 5-Stage BNR or Step A/SND for future TN reduction. Life cycle cost analysis shows reducing the quantity of solids generated/transported by eliminating the primary clarifiers is equal to or more cost effective than a system with primary clarifiers plus offers the advantage of simplified solids processing, reduced solids generation, and reduced odor control for solids storage.

It is recommended MCES evaluate the benefits of adding advanced aeration control with hydrocyclone based wasting to Alternative 3 during preliminary design. Preliminary analysis shows Alternative 4A’s energy usage could be decreased by roughly 20 to 25 percent which would offset the cost of the additional equipment and its associated operating costs, making Alternative 4A competitive with Alternative 5- BIOCOS from an energy perspective.

In addition, it is recommended MCES continue to monitor and collect performance data from existing BIOCOS facilities to assess its viability to reliably reduce TP levels biologically below 1 mg/L given its reduced reliance on mechanical equipment (pumping), minimalistic layout, reduced total inorganic nitrogen discharges of roughly 5 mg/L, and lower energy demands. Of critical importance is establishing a baseline of BIOCOS facilities demonstrating the ability to reduce monthly TP discharges below 1 mg/L without chemical addition since data available to date has shown only one facility in Spain achieving this level of treatment performance. If sufficient data can be provided demonstrating reliable TP reduction, this alternative should be re-visited for selection.

Alternatives Identification

The screening process reviewed 21 viable liquid stream technologies and selected six alternatives for more detailed evaluations.

- Alternative 1: Nitrifying Activated Sludge with Chemical Phosphorus Removal
- Alternative 2: A/O EBPR
- Alternative 3: A/O EBPR without Primary Clarifiers
- Alternative 4: A/SND
- Alternative 5: BIOCOS
- Alternative 6: Mobile Organic Biofilm (MOB)TM A/O

A brief overview of each alternative is provided below along with key process sizing and design data.

Alternatives Analysis

Facility sizing assumes all primary clarifiers, aeration tanks, and final clarifiers are in service during maximum month flow and loadings conditions which include peak wet weather flows and one clarifier or aeration basin can be out of service under annual average conditions.

Alternative 1: Nitrifying Activated Sludge with Chemical Phosphorus Removal

Alternative 1 is a nitrifying activated sludge system with alum addition to the primary clarifier influent for phosphorus removal. The system configuration consists of two 65-foot primary clarifiers, three 0.47 MG bioreactor trains and two 75-foot final clarifiers. Each bioreactor train includes an anoxic selector with 3.5 mgd mixed liquor recycle (MLR) pumping station for sludge quality control.

Alternative 2: A/O EBPR

Alternative 2 is a nitrifying A/O system consisting of two 65-foot primary clarifiers, three 0.54 MG bioreactor trains and two 75-foot final clarifiers. The bioreactor trains include an anaerobic selector to promote enhanced biological phosphorus removal (EBPR) and maintain excellent sludge quality. A small return sludge denitrification zone is included to reduce nitrates fed to the anaerobic selector further increasing EBPR stability and performance.

Alternative 3: A/O EBPR without Primary Clarifiers

Alternative 3 is similar to Alternative 2 except it eliminates the primary clarifiers resulting in three 1.0 MG bioreactor trains and two 75-foot final clarifiers. Alternative 3 also requires a second 20-foot diameter dissolved air flotation thickener for solids processing.

Alternative 4: A/SND

Alternative 4 is an innovative flow scheme which has the same flow configuration as Alternative 2 but operates at DO concentrations of roughly 0.5 mg/L to promote simultaneous nitrification-denitrification (SND). The low DO concentrations are maintained using advanced aeration controls which includes DO and ammonia/nitrate sensors. Alternative 4's process tankage is the same as Alternative 2 except two 80-foot final clarifiers are required. This alternative also requires hydrocyclone based wasting to maintain good sludge quality.

Alternative 5: BIOCOS

BIOCOS is a continuous flow cyclic activated sludge system which has a single anaerobic selector, a two-zone aeration tank (Air-Tank), and two alternating sludge recycling and settling tanks (Alt-Tank). Alt-Tank operation consists of 4 cycles typically lasting 1.5 hours and includes periods for sludge recycle, mixing, sedimentation, and discharge. In a BIOCOS system, screened and degritted influent is fed into the anaerobic zone where it flows into one of two Air-Tank zones. Since the selector, Air-Tank and Alt-Tanks are hydraulically interconnected, flow out of the selector zone will be routed to the Air-Tank zone connected to the AltTank discharging effluent or recycling sludge to maintain a constant liquid level in the system. There is no RAS pump station or any electro-mechanical equipment for mixing or recycling as all phases of the Alt-Tank cycles are exclusively driven by pressurized air from the aeration blower.

Two BIOCOS trains are proposed for Hastings. Each train includes one 0.32 MG anaerobic selector, two 1.4 MG Air-Tank zones, two 3,750 square foot Alt-Tanks, and one hydrocyclone wasting station. This configuration provides 100% redundancy at average loading conditions. In addition, each BIOCOS train can be operated in a maintenance mode using one half the tank volume as needed for planned or unplanned maintenance activities. In this configuration the BIOCOS system acts as an SBR.

Alternative 6: Mobile Organic Biofilm (MOB)TM A/O

The Mobile Organic Biofilm or (MOB™) process is an emerging technology developed and patented by Nuvoda with the goal of improving sludge settleability, increasing treatment capacity, providing simultaneous nutrient removal, and optimizing process stability. In the MOB™ process, 0.5 to 1 mm processed Kenaf plant biomedia is added to the activated sludge system to serve as a media for biofilm growth. The small particle size allows the media to "travel" through the aeration tanks, final clarifiers and return activated sludge creating a "mobile" biofilm carrier. Kenaf biomedia is added at a 1.25 percent volume fill rate and a 0.5 mm rotary drum screen is used to capture and return of Kenaf media/biofilm back to the aeration tanks.

Alternative Cost Comparison

Table 4-9 summarizes the comparative costs and net present value (NPV) for each alternative. All alternatives assume the same sludge storage and odor control systems are provided and that solids generated are hauled, dewatered and incinerated at the Metro WWTP.

Alternative capital costs range from $63 million to $68 million and are considered equal for planning purposes since they are within 10 percent. Alternatives without primary clarifiers (Alternative 3 and 5) have the lowest annual O&M costs due to lower solids production which translates to savings in solids transport, dewatering and incineration costs.

Alternative 5-BIOCOS annual O&M cost of $130,000 per year is 20 percent less than Alternative 3 due to lower aeration energy costs and roughly $100,000 less than Alternative 2 and 4 due to reduced annual sludge production. Net Present Value (NPV) of Alternatives 2, 3, 4, and 5 are considered equal for planning since the values are within 10 percent.

Comparing Alternative 2, 3, 4 and 5, Alternative 2 and 3 are conventional, proven technologies in which MCES staff are familiar. Alternative 4-A/SND has proven very successful in full-scale and pilot testing but is still considered an emerging technology. Alternative 5-BIOCOS with hydrocyclones and anaerobic selectors is currently limited to five full-scale installations in Germany and China. Limited data provided for two of these facilities show effluent TP discharges meeting permit levels but higher than the Treatment Level 1 monthly TP target of 1 mg/L. Data from a Spain EBPR BIOCOS system without hydrocyclones shows effluent TP discharges ranging from 0.3 to 0.5 mg/L. Key advantages of a BIOCOS system are reduced energy demands, modular design and clean footprint, total inorganic nitrogen discharges of 5 mg/L or less and excellent sludge quality. Alternatives 3 and 5 both simplify solids processing since primary sludge is eliminated but do require the aeration basins to be classified as Class 1 Div 2 within 18-inches above tank wall and 10-foot perimeter of the tank. Alternative 3 offers the option to add primary clarifiers in the future if solids processing changes make primary clarification more economically attractive.

Basis of Design

The basis of design for all the alternatives is listed below in Table 4-10.

Table 4-9 Hastings WWTP Secondary Treatment Comparative Costs

ITEM	ALTERNATIVE 1: NITRIFYING ACTIVATED SLUDGE	ALTERNATIVE 2: A/O	ALTERNATIVE 3: A/O WITHOUT PRIMARY CLARIFIERS (RECOMMENDED)	ALTERNATIVE 4: A/SND	ALTERNATIVE 5: BIOCOS	ALTERNATIVE 6: MOB A/O
Construction Cost						
Civil/Sitework	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000	$2,400,000
Primary treatment	$6,400,000	$6,400,000	--	$6,400,000	--	$6,400,000
Bioreactors	$7,900,000	$8,400,000	$14,100,000	$8,400,000	$27,900,000	$7,400,000
Final Clarifiers/Blower Building	$20,600,000	$20,600,000	$20,600,000	$21,000,000	$7,900,000	$23,500,000
Electrical and instrumentation	$16,000,000	$16,000,000	$14,000,000	$16,000,000	$13,000,000	$16,000,000
Other Process Costs	--	--	--	$460,000	--	$1,200,000
Additional DAF	--	--	$1,200,000	--	1,200,000	--
Total Construction Cost	$53,200,000	$53,700,000	$52,300,000	$54,500,000	$52,400,000	$56,700,000
Engineering and Administration	$10,600,000	$10,700,000	$10,500,000	$10,900,000	$10,500,000	$11,300,000
Total Capital Cost (rounded)	$63,800,000	$64,400,000	$62,800,000	$65,400,000	$62,900,000	$68,000,000
Comparative Annual O&M						
Labor - Operations	$115,000	$115,000	$115,000	$115,000	$115,000	$115,000
Energy	$75,000	$82,000	$109,300	$65,000	$78,000	$85,000
Alum	$197,000	--	--	--	--	--
Liquid sludge hauling	$46,000	--	$(62.200)	$(3,200)	$(66,500)	$15,500
Metro WWTP solids processing	$47,000	--	$(63,700)	$ (3,300)	$ (68,100)	$15,900
Maintenance - Labor/ Materials	$61,000	$61,000	$62,000	$73,000	$71,000	$ 85,000
Total annual O&M	$540,000	$258,000	$160,000	$247,000	$129,000	$316,000
Net Present Value (rounded)	$77,000,000	$71,000,000	$67,000,000	$72,000,000	$66,000,000	$76,000,000

Table 4-10 Hastings WWTP Secondary Treatment Key Process Design Data (Year 2050)

ITEM	UNITS	ALTERNATIVE 1: NITRIFYING ACTIVATED SLUDGE	ALTERNATIVE 2: A/O	ALTERNATIVE 3: A/O WITHOUT PRIMARY CLARIFIERS (RECOMMENDED)	ALTERNATIVE 4: A/SND	ALTERNATIVE 5: BIOCOS	ALTERNATIVE 6: MOB A/O
Primary Clarifiers	-	-	-	-	-	-	-
Number	--	2	2	--	2	--	2
Diameter	feet	65	65	--	65	--	65
Side water depth	feet	15	15	--	15	--	15
Average SOR[a]	gal/sf-d	900	900	--	900	--	900
PHWWF SOR[a]	gal/sf-d	2,535	2,535	--	2,535	--	2,535
Bioreactors	-	-	-	-	-	-	-
Number of trains	No.	3	3	3	3	2	3
Total volume	MG	1.4	1.63	3.01	1.63	6.25	1.0
Dimension per train (L x W x SWD)	ft	116 x 30 x 18	135 x 30 x 18	248 x 30 x 18	135 x 30 x 18	232 x 100 x 18	83 x 30 x 18
Total SRT	days	11.0	13.9	14.1	15.2	17.0	6.7
Aerobic SRT	days	9.0	9.0	9.0	9.8	9.0	5.0
Anaerobic SRT	days	0	1.8	1.8	2.0	1.9	1.7
Anoxic SRT	days	2	3.1	3.3	3.4	6.3	0
Maximum month MLSS	mg/L	3,225	3,665	3,450	3,970	2,350	6,970[f]
Dissolved Oxygen	mg/L	2.0	2.0	2.0	0.5	2.0	2.0
Aeration Demand (average/peak)	scfm	2,500/4,500	2,980/5,400	4,000/7,400	2,150/5,400[b]	2,600/4,500	2,825/5,400
Wet weather operations at maximum month conditions			-	-	-	-	-
Flow triggering step feed[h]	mgd	6.0	5.5	6.0	5.0	NA	5.0
MLSS to clarifiers at PHWWF	mg/L	2,420	2,750	2,830	2,980	NA	4,650[f]
Final Clarifiers							
Number	--	2	2	2	2	4[c]	2
Diameter	feet	75	75	75	80	75'x50'[c]	90
Side water depth	feet	15	15	15	15	18[c]	15
RAS per clarifier	mgd	3.0	3.0	3.0	3.0	19[d]	3.0
Design SVI	mL/g	150	125	125	125	120	60 to 100
Average SOR	gal/sf-d	295	295	295	260	345	205

ITEM	UNITS	ALTERNATIVE 1: NITRIFYING ACTIVATED SLUDGE	ALTERNATIVE 2: A/O	ALTERNATIVE 3: A/O WITHOUT PRIMARY CLARIFIERS (RECOMMENDED)	ALTERNATIVE 4: A/SND	ALTERNATIVE 5: BIOCOS	ALTERNATIVE 6: MOB A/O
PHWWF SOR	gal/sf-d	950	950	950	840	1,120[e]	660
PHWWF SLR	lb/sf-d	33	37	39	36	22[e]	49
Annual alum usage (48% solution)	gal/d	475	0	0	0	0	0
Annual solids production	lb TSS/d	8,400	7,050	5,245	6,955	5,100	7,500[g]
Truck trips per day (hauling 5 days per week)		7	6	4	6	4	6

a. *Based upon one primary clarifier in service*
b. *Peak aeration demand based upon Alternative 2.*
c. *Settling Units (Alt-Tank) dimensions*
d. *RAS flow per BIOCOS reactor for 1.8 hours/day*
e. *Based upon two BIOCOS settling units (ALT-tanks) in service*
f. *MLSS includes Kenaf biomedia*
g. *Assumes 100 percent biomeadia capture in screens*
h. *Assumes 50% of influent flow is routed to the bioreactor at 2/3 its aerated length*

Primary and Secondary Treatment for Potential Future Nutrient Reduction

A total nitrogen limit is anticipated within the planning period of this Facility Plan. It is anticipated that Hasting's TN limit would be 10 mg/L If MCES accepted an early total nitrogen limit under MPCA's regulatory certainty policy. This section evaluates facility requirements to reduce annual total nitrogen (TN) discharges below 10 mg/L and monthly TP discharges less than 0.3 mg/L following a logical progression pathway from the recommended alternatives in Section 4.4.5.1 above.

Recommendation

For Alternative 3 above (A/O without primary clarifiers), Alternative 2: 5-Stage BNR, Alternative 3: 5-Stage BNR without Primary Clarifiers, or Alternative 4: Step Feed A/SND below is recommended for future TN reduction. For Alternative 5 above (BIOCOS), BIOCOS would be the recommended alternative for future TN reduction.

To achieve reduced TP levels, cloth media filtration with chemical polishing as needed is recommended for all alternatives.

Alternatives Identification

Six future TN reduction alternatives were developed based upon a logical progression pathway for reducing TN discharges. All alternatives assume cloth media filtration is added for reducing monthly TP discharges below 0.3 mg/L. The final alternative configurations selected for detailed evaluations included:

If A/O without primary clarifiers is implemented then any one of the alternatives listed below (1-5) would provide a logical progression pathway for reducing TN below 10 mg/L.

- Alternative 1: 4-Stage BNR
- Alternative 2: 5-Stage BNR
- Alternative 3: 5-Stage BNR without Primary Clarifiers
- Alternative 4: Step Feed A/SND
- Alternative 5: MOB 5-Stage BNR

If BIOCOS is implemented initially then BIOCOS would be modified to meet future TN reduction.

Alternative Cost Comparison

Table 4-11 presents the comparative costs for each potential nutrient reduction alternative.

Table 4-11 Hastings WWTP Potential Future Nutrient Reduction Comparative Costs

ALTERNATIVE	CAPITAL COST	ANNUAL O&M	TOTAL NPV
Alternative 1: 4-Stage BNR	$72,000,000	$730,000	$89,000,000
Alternative 2: 5-Stage BNR	$73,000,000	$510,000	$85,000,000
Alternative 3: 5-Stage BNR without primary clarifiers	$72,000,000	$370,000	$82,000,000
Alternative 4: Step Feed A/SND	$74,000,000	$370,000	$83,000,000
Alternative 5: MOB 5-Stage BNR	$77,000,000	$500,000	$89,000,000
Alternative 6: BIOCOS	$69,000,000	$295,000	$76,000,000

4.4.8. Disinfection

Recommendation

Alternative 2 – UV Disinfection is recommended due to reduced chemical handling, smaller footprint, and compatibility with remote operation. The UV system layout includes a redundant channel and adjacent control building.

Alternatives Identification

Sodium hypochlorite and UV disinfection were evaluated for disinfection at the Hastings WWTP. Gaseous chlorine was eliminated due to safety and security considerations.

Alternatives Analysis

Both alternatives consider requirements under the current Hastings WWTP National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit and the Ten State Standards. The current NPDES/SDS permit requires treating to a maximum of 200 fecal coliform per 100 milliliters (mL) effluent based on a calendar month geometric mean. Additionally, total residual chlorine is limited to 0.038 milligrams per liter (mg/L) as chlorine (Cl_2) daily.

Alternative 1 – Sodium Hypochlorite

The current Hastings WWTP uses sodium hypochlorite for disinfection, followed by sodium bisulfite for dechlorination. Chlorine contact basins were sized for one duty basin and one standby basin (n+1 redundancy) at peak wet weather flow. Peak instantaneous flows could be accommodated by increasing the chemical dosing and using additional freeboard in the contact basin. This alternative assumed a 12.5 percent delivered concentration of sodium hypochlorite, and storage tanks to provide a 15-day supply for both chemicals at average dosing at peak hour wet weather flows. The equipment associated with this alternative included fiberglass-reinforced plastic (FRP) tanks, peristaltic pumps, and chemical induction mixers and diffusers.

Alternative 2 – UV Disinfection

The second disinfection alternative considered for Hastings WWTP was an open-channel UV system. Open-channel UV systems are typical for wastewater applications. In wastewater applications, closed-vessel (CV) UV disinfection is used primarily when there is a desire to keep the system pressurized or if there are space constraints, which may make a closed-vessel system more advantageous. Most WWTPs which use closed-vessel UV reactors over open-channel systems have much lower flows than anticipated for the Hastings WWTP. Another major consideration for the new Hastings WWTP is that a CV UV system would require effluent pumping with increased capital and O&M costs compared to the open-channel alternative. As a result, an open-channel UV system was selected as the preferred UV alternative of this evaluation.

This alternative assumed two channels, one duty and one standby. Water quality affects the performance of a UV system by altering the UV intensity within the reactor and, consequently, the UV dose received by the organisms. A minimum required UV dose of 30 millijoule per square centimeter (mJ/cm2) based on NWRI/UVDGM (MS2) bioassay was assumed for a maximum of 200 fecal coliform/100 mL effluent based on a calendar month geometric mean.

The major components of an open channel UV disinfection system include lamps (with quartz sleeves), ballasts (which power the lamps), UV-intensity sensors, and an automatic wiping system. Low-pressure, high-output (LPHO) UV lamps are recommended for wastewater and reuse applications and are used in this evaluation.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 4-12.

Table 4-12 Hastings WWTP BCE Summary – Disinfection

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Sodium Hypochlorite	6,400,000	9,300,000	15,700,000
Alternative 2 – UV Disinfection (Recommended)	5,200,000	5,700,000	11,000,000

Alternative 2 has a lower NPV cost due to a smaller footprint and lower O&M costs. Even though UV disinfection has higher energy consumption, this cost is offset by increased chemical purchasing and delivery costs.

Basis of Design

The basis of design for the UV disinfection system is presented in Table 4-13. Additional instrumentation and equipment, such as level sensors, UVT monitoring, and control gates, would also be provided as well as level control gates are used to keep the UV equipment continually submerged.

Table 4-13 Hastings WWTP UV Disinfection System Design Criteria

DESCRIPTION	VALUE
Manufacturers	Wedeco, Trojan, Ozonia, Evoqua
UV dose, minimum	30 mJ/cm^2
Maximum Total Suspended Solids, mg/L	21[a]
UV transmittance, minimum	55% at 254 nm[b]
Lamp type	LPHO, in quartz sleeves
End of lamp life factor	0.89
Lamp fouling factor	0.9
Lamp cleaning system	Automatic mechanical
Number of channels	2 (1 Duty, 1 Standby)
Flow per channel (mgd)	10.1
Channel dimensions (ft per channel)	35.4 (L) x 4 (W) x 3.5 (D)
Number of banks per channel	4
Total number of banks	8
Number of lamps per bank	20
Total number of UV lamps	160
Lamp power draw at average flow 2.6 mgd (kW)	18.5
Lamp power draw at maximum flow 10.1 mgd (kW)	44.6
Peak power draw (kW)[c]	44.6
Headloss across UV channel at design flow, inches	18.8

a. *Maximum TSS is based on effluent data provided by Hastings WWTP from 2019 – 2020.*

b. *Limited UVT data is available. Fifty-five % UVT was assumed as a reasonably conservative value for system design. This assumption may be updated depending on results of pending data collection.*

c. *i.e., control center and other small ancillary power draws are not included.*

4.5. *Solids Processing Selections*

The solids handling alternative analysis focuses on facility requirements for processing primary and secondary solids.

4.5.1. Recommendation

Alternative 2b – Hauling Liquid Sludge to Metro WWTP is recommended based on lowest capital costs, annual operating costs, lowest NPV, and the simplification of the solids processing train.

4.5.2. Alternatives Identification

Ten solids handling alternatives were initially considered based upon chemical and enhanced biological phosphorus removal liquid stream flow schemes. The alternatives fit into one of three categories: (1) mesophilic anaerobic digestion (MAD) with biosolids land application, (2) hauling thickened liquid sludge to the Metropolitan WWTP (Metro WWTP) for further processing, and (3) on-site dewatering with dewatered cake hauling to the Metro WWTP for further processing.

The alternatives were evaluated based on solids stream projections generated when meeting the existing Hastings WWTP National Pollutant Discharge Elimination System (NPDES) permit discharge requirements operating in a nitrifying activated sludge mode. Solids process facility sizing is based upon the more conservative of chemical phosphorus (Chem-P) removal or enhanced biological phosphorus removal (EBPR) to allow the plant to operate in either phosphorus reduction mode with the final evaluation focusing on EBPR based alternatives. Five alternatives were selected for final evaluation:

- *Alternative 1:* Mesophilic Anaerobic Digestion (MAD) with Biosolids Land Application
- *Alternative 2a:* Liquid Sludge Hauling of Thickened Primary and Waste Activated Sludge to the Metro WWTP
- *Alternative 2b:* Liquid Sludge Hauling of Thickened Waste Activated Sludge to the Metro WWTP
- *Alternative 3:* Dewatering of Thickened Primary Sludge and Non-Thickened Waste Activated Sludge with Cake Hauling to Metro WWTP
- *Alternative 4:* Dewatering of Thickened Primary Sludge and Waste Activated Sludge with Cake Hauling to Metro WWTP

4.5.3. Alternatives Analysis

Alternative 1: Mesophilic Anaerobic Digestion (MAD) with Biosolids Land Application

Under this alternative, thickened primary sludge (PS) and dissolved air flotation (DAF) thickened waste activated sludge (TWAS) are stabilized on-site using MAD. Liquid biosolids are stored on-site and then field injected during the land application season.

Alternative 2a: Liquid Sludge Hauling of Thickened Primary and Waste Activated Sludge to the Metro WWTP

Alternative 2a consists of hauling combined thickened PS and DAF TWAS to the Metro WWTP using 6,000 gallon tanker trucks similar to current Hastings WWTP liquid sludge hauling operations. Thickened solids are hauled 5 days per week requiring thickened sludge storage tanks for periods when not hauling.

Alternative 2b: Liquid Sludge Hauling of Thickened Waste Activated Sludge to the Metro WWTP

Alternative 2b is identical to Alternative 2a except the liquid stream process does not include primary clarifiers so only WAS is generated. This Alternative includes a second DAF thickener and associated equipment due to the increased WAS production.

This Alternative is also representative of the BIOCOS liquid stream alternative, which would also require 2 DAF thickeners.

Alternative 3: Dewatering of Thickened Primary Sludge and Non-Thickened Waste Activated Sludge with Cake Hauling to Metro WWTP

Under Alternative 3, PS is thickened in the primary clarifiers and blended with non-thickened WAS. The combined sludge stream is then dewatered using screw press dewatering units to achieve a dewatered cake of roughly 18 percent solids. Dewatered cake is hauled 5-days per week to the Metro WWTP using 14-ton trucks. Separate liquid sludge storage of thickened PS and WAS is provided for periods when not hauling sludge or dewatering.

Alternative 4: Dewatering of Thickened Primary Sludge and Waste Activated Sludge with Cake Hauling to Metro WWTP

Alternative 4 is like Alternative 3, except WAS is thickened to 2 percent solids using DAF to reduce the WAS liquid sludge storage volume and number of screw press dewatering units.

4.5.4. Alternative Cost Comparison

Table 4-14 summarizes the comparative costs, annual operating costs and net present value (NPV) for each alternative. Alternatives 2a and 2b have the lowest capital cost. Comparative annual O&M costs of Alternative 2a, 2b, 3, and 4 range from $0.48 million to $0.56 million per year and are considered equal for planning purposes. Alternatives 2a and 2b have the lowest net present value given their capital cost is roughly half of Alternative 4.

Alternatives 2a and 2b – hauling liquid sludge to the Metro WWTP have the lowest capital cost and NPV. Alternative 2b has a higher capital cost because of the need for a second DAF unit but lower annual O&M costs since solids production is reduced without primary clarifiers (5 trips per day compared to 6 trips per day for Alternative 2a). Alternatives 2a and 2b NPVs are considered equal for planning purposes since they are within 10 percent. Alternative 2b simplifies operations since all solids are partially stabilized in the activated sludge process thus minimizing odor control requirements using aerated sludge storage.

Table 4-14 Hastings WWTP Solids Handling Comparative Cost

ITEM	ALTERNATIVE 1: ANAEROBIC DIGESTION AND LAND APPLICATION	ALTERNATIVE 2A: LIQUID SLUDGE HAULING OF THICKENED PS AND WAS	ALTERNATIVE 2B: LIQUID SLUDGE HAULING OF THICKENED WAS (RECOMMENDED)	ALTERNATIVE 3: DEWATERED CAKE HAULING (THICKENED PS AND NON-THICKENED WAS)	ALTERNATIVE 4: DEWATERED CAKE HAULING (THICKENED PS AND WAS)
Total Capital Cost	$15,400,000	$4,500,000	$5,700,000	$14,600,000	$11,600,000
Comparative Annual O&M	-	-	-	-	-
Operations	$381,000	$57,500	$57,500	$173,000	$230,000
Energy	$159,000	$23,700	$30,900	$54,600	$35,200
Chemicals	$43,000	$ -	$ -	$ -	$ -
Polymer - Dewatering	$ -	$ -	$ -	$30,700	$30,800
Polymer - Thickening	Included in Chemicals	$2,100	$3,300	$ -	$2,100
Sludge Hauling to Metro WWTP	$ -	$213,000	$179,000	$68,000	$68,000
Solids Processing at Metro WWTP	$ -	$247,000	$182,000	$135,000	$135,000
Solids Disposal	$118,000	$ -	$ -	$ -	$ -
Maintenance - Labor/Materials	$87,000	$26,000	$33,000	$83,000	$65,000
Total annual O&M	$788,000	$569,300	$485,700	$544,300	$566,100
Net Present Value (rounded)	$35,100,000	$18,700,000	$17,900,000	$28,200,000	$25,700,000

4.5.5. Basis of Design

Table 4-15 provides a detailed list of equipment associated with Alternatives 2a and 2b.

Table 4-15 Hastings WWTP Summary of Recommended Solids Handling Basis of Design

ITEM		UNITS	ALTERNATIVE 2A: LIQUID SLUDGE HAULING OF THICKENED PS AND WAS	ALTERNATIVE 2B: LIQUID SLUDGE HAULING OF THICKENED WAS (RECOMMENDED)
Dissolved Air Floatation (DAF) Thickener				
	Number	--	1	2
	Diameter	ft	20	20
	Sidewall Height,	ft	8.5	8.5
	Skimmer Drive Horsepower	HP	0.5	0.5
Solids Loading Rate @ 4% TWAS per DAF				
	Annual Average	lb/d/sf	10	8
	Maximum Month	lb/d/sf	13	11
	Maximum Day	lb/d/sf	28	23
Hydraulic Loading Rate				
	Annual Average	gpd/sf	247	100
	Maximum Month	gpd/sf	316	128
	Maximum Day	gpd/sf	668	270
	TWAS Concentration	Percent TS	4	4
	Capture	Percent	95	95
DAF Compressor				
	Number	--	1	2
	HP	HP	5	5

ITEM		UNITS	ALTERNATIVE 2A: LIQUID SLUDGE HAULING OF THICKENED PS AND WAS	ALTERNATIVE 2B: LIQUID SLUDGE HAULING OF THICKENED WAS (RECOMMENDED)
DAF Pressurization Pumps				
	Number	--	2	4
	Type	--	Centrifgual	Centrifgual
	Capacity, each	gpm	110	110
	Total Dynamic Head	psig	80	80
	Horsepower	--	15	15
Thickened WAS sludge pumps				
	Number	--	2	2
	Type	--	Progressive Cavity	Progressive Cavity
	Capacity, each	gpm	18	15
	Total Dynamic Head	psig	25	25
	Horsepower	HP	10	10
	Drive	--	Variable speed	Variable speed
Sludge Storage Tanks[a]				
	Number	--	1	1
	Volume	gallons	238,000	188,000
	Diameter	ft	45	40
	SWD	ft	17	17
	Mixing Horsepower	HP	75	75
Sludge Storage Tanks Discharge Pumps				
	Number	--	2	2

ITEM		UNITS	ALTERNATIVE 2A: LIQUID SLUDGE HAULING OF THICKENED PS AND WAS	ALTERNATIVE 2B: LIQUID SLUDGE HAULING OF THICKENED WAS (RECOMMENDED)
	Type	--	Progressive Cavity	Progressive Cavity
	Capacity, each	gpm	250	250
	Total Dynamic Head	psig	50	50
	Horsepower	HP	80	80
	Drive	--	Variable speed	Variable speed

a. *Sludge Storage Tanks are equipped with aeration system including blowers and coarse bubble diffusers.*

4.5.6. Haul Route

The WWTP is expected to generate three to four trip hauling sludge to the Metro WWTP in St Paul for incineration. The traffic planning team reviewed the local land use, highway maps, and strength of road sections for the area surrounding the WWTP site. It is recommended truck trips generated by the WWTP exit the property and cross Ravenna Trail to Glendale Ave, travel south on Glendale Ave to Spiral Blvd, west on Spiral Blvd to Trunk Highway 316, north on TH 316 to TH 61, north on TH 61 to the Metro WWTP. A map of this route is shown at the end of this section in Figure 4-6. Spiral Blvd is a City of Hastings Municipal State Aid route designed as a 10-ton roadway. The roadway has reduced access points and traverses through an industrial park on the south end of town. A detailed summary of the traffic analysis is included in Appendix 4-1.

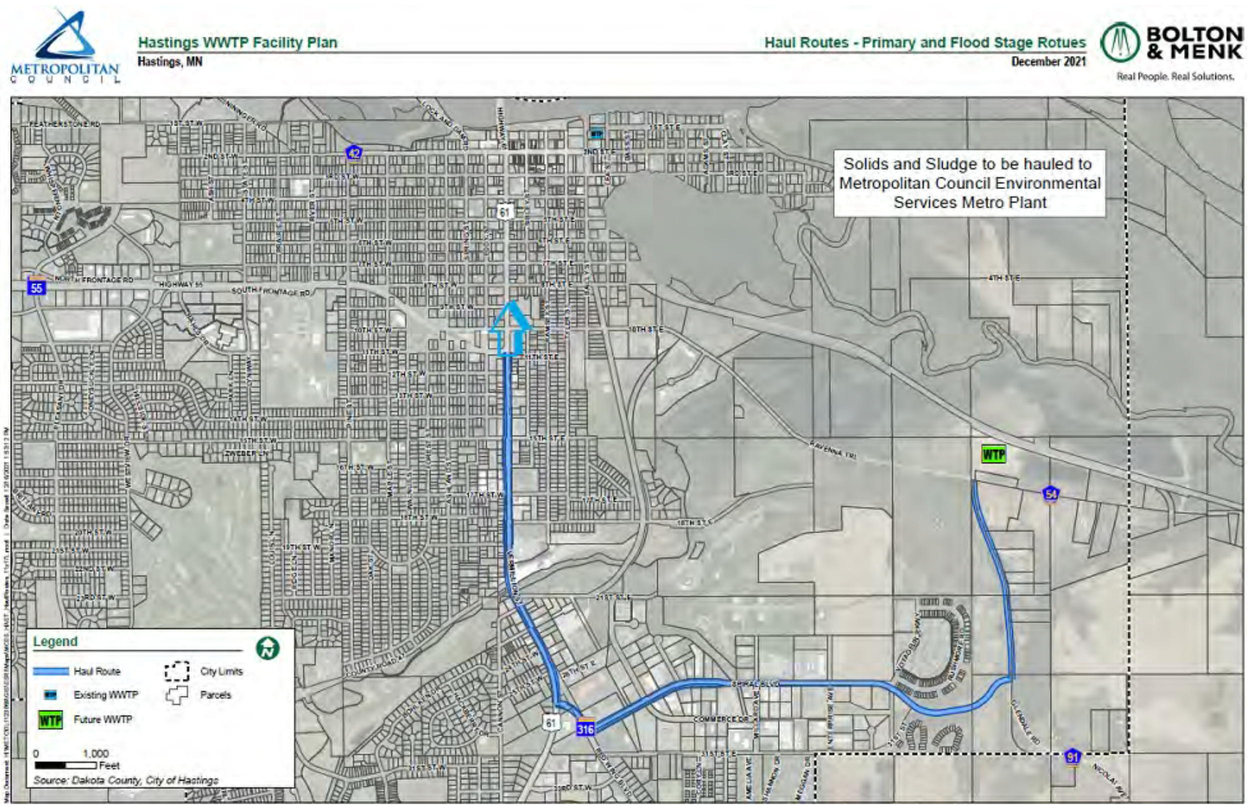


Figure 4-6 Haul route from Hasting WWTP to Metropolitan WWTP

4.6. *Facility Support Systems*

4.6.1. Instrumentation

The Hastings WWTP will be designed and constructed for remote capable operation. For remote plant operation, the following would be required:

- Secure network connection(s) between Hastings WWTP and other locations where remote operation may occur.
- Appropriate configuration of SCADA software for user access (security), role/permission level assignments, both in-plant and for remote users.

- Appropriate configuration and programming of plant control system to allow manual and automatic control of subprocess areas.
- Enhanced video monitoring.

The Instrumentation and Controls (I&C) system for the new Hastings WWTP will be based on technologies currently utilized at MCES's other treatment facilities. The I&C system will consist of the following major equipment elements:

- Field instrumentation
- Field instrumentation will include typical devices for monitoring of WWTP process parameters, such as levels, flows, pressures, analytical measurements, etc., as required for specific subprocess areas. Instrumentation equipment will be capable of producing traditional 4-20 mADC analog signals, discrete signals, and be able to communicate using Hart protocol, or over a selected Fieldbus-type network.
- Process controllers and associated control panels
- Process monitoring and control functions at the new Hastings WWTP will be performed by PLCs. PLCs will be mounted in area control panels. Control panels will be designed with appropriate National Electrical Manufacturers Association (NEMA) ratings and will include standard panel components for power conditioning and distribution, field input/output signal terminations and conditioning equipment, and temperature management equipment (if needed). Area control panels with the associated PLCs will be interconnected via the process control communications network. Process control communications network equipment may be located/mounted in enclosures separate from PLC panels.
- Human machine interface (HMI) system
- An HMI software package will be used to provide graphical interfaces for process monitoring and control, as well as historical process data storage and some reporting functions. The HMI system will be based on use of redundant HMI servers, operator workstation (OWS) computers, a historian server, and a remote access server. In addition to the plant-wide HMI system, there may be local operator interface terminals (OITs) provided at selected control panels that are designed to provide localized (subprocess area only) graphical process interfaces and monitoring and control functions to operations staff.
- Process control system network and communications equipment
- Plant PLCs, the HMI system and, possibly, some of the PLC-based vendor controls will be interconnected via a plant-wide Ethernet based process control communications network. Other types of equipment that may reside on this network include network-capable instruments, smart motor control centers, and variable frequency drives. The network will utilize fiber-optic cabling between facilities and copper cabling within facilities, where appropriate. An in-plant WiFi network may also be designed to provide local, wireless access to the plant control system network
- Vendor packaged controls
- It is anticipated that a number of processes, including the bar screens, aeration blowers, and UV disinfection, will be designed with vendor-provided packaged systems. It is further anticipated that these systems will include PLC-based controls, associated control panels, and instrumentation. Vendor controls will be integrated into the overall plant control system by two methods: (1) connection to the plant process control system communications network, and/or (2) hardwiring specific process monitoring and control signals between vendor control panels and plant PLC panels.

4.6.2. Water/Effluent Water

In-plant use of effluent water will be maximized and, where economically feasible, incorporated into the Hastings WWTP to reduce demand on city and ground waters.

Opportunities for in-plant effluent use include process/spray water and pump seal water. These uses do not require disinfection or tertiary treatment technologies for implementation, however, the existing Hastings WWTP experiences significant algae and biological growth in its effluent water distribution lines throughout the plant - leading them to shut-down the system and use city water in its place. A small disinfection system sized for the uses above is a cost-effective way to control the biological growth experienced in the existing effluent water system and is recommended for implementation. An effluent water reuse pipe would be connected downstream of the proposed UV disinfection system to serve the plant needs. Sodium hypochlorite would be injected into this effluent water reuse stream near the pumping system to minimize the detention time in the system after disinfection, so the residual is not consumed prior to use.

Effluent use other than those listed above would require additional disinfection and/or filtration developed in accordance with the Minnesota Pollution Control Agency (MPCA) standards for Disinfected Tertiary Reuse Water. End uses for non-potable recycled water are dictated by water quality. Disinfected tertiary water has the most potential reuse options and requires the following criteria to be met:

- Turbidity ≤2 NTU daily avg, ≤5 95% of time, always ≤10 NTU
- Disinfection
- Chlorination with a CT of ≥450 mg-min/L; modal contact time of ≥90 minutes
- UV disinfection that achieves 5-log MS2 removal
- And median total coliform ≤2.2/100 mL MPN, does not exceed 23/100 mL in more than one sample in a 30-day period, no sample >240/100 mL

Other effluent water quality parameters, including ammonia, chloride, minerals, and color, are all components that can affect potential end uses.

The three most common disinfection technologies currently used in disinfected tertiary reuse water are gaseous chlorine, liquid sodium hypochlorite, and UV light disinfection. Gaseous chlorine was eliminated due to safety and security considerations. A planning level evaluation of sodium hypochlorite and UV disinfection for the Hastings WWTP is shown below in Table 4-16. Tertiary disinfection for in-plant use is not economically feasible at this time and is not recommended for implementation. A list of potential in-plant and off-site uses are identified below. The economic feasibility of in-plant tertiary reuse should be reevaluated when off-site partners interested in effluent reuse are identified.

Future in-plant disinfected tertiary reuse opportunities:

- Flushing toilets
- Landscaping irrigation
- Make-up water, washdown water
- Dust abatement
- Concrete mixing
- Priming drain traps
- Fire protection

Future off-site disinfected tertiary reuse opportunities:

- Landscaping for commercial and residential areas
- Agricultural (irrigation)
- Parks (CP Adams Park, Vets Park)
- Golf courses (Hastings Golf Club)
- Local industries
- Evaporative cooling locations
- Data centers, manufacturing
- Snow making (Welch Village, Dakota County)

Table 4-16 Tertiary Disinfection Reuse Business Case Evaluation

ALTERNATIVE	CAPITAL COST	ANNUAL O&M COST	TOTAL NPV
Sodium Hypochlorite	$11,200,000	$12,400,000	$20,300,000
UV	$10,100,000	$11,100,000	$17,400,000

4.6.3. Electrical

The electrical system will consist of the following major equipment elements:

- Incoming Utility Feed
  - The facility will be fed from an incoming power company primary feeder. The east side of the plant is located in Dakota Electric territory, and the west side is located in the Xcel service area. Either service provider could supply the power to the site based on the current layout. The primary voltage would be 15-kilovolts (kv) class. One utility feed would be provided to the plant, with back-up provided by the on-site generator (discussed below).
  - An MCES-owned pad-mounted transformer will be located outdoors and will step down the power to 480 volts for plant-wide distribution.
  - An outdoor 480-volt service entrance cabinet will be installed adjacent to the pad-mounted transformer. This cabinet will house electrically operable circuit breakers for the utility and diesel standby generator sources. The breakers will be operated as an automatic transfer switch during normal operating conditions. A second mode to allow operating the generator set in parallel with the utility for peak shaving will be included.
  - A main 480-volt switchboard for the plant will be located in the Headworks Building in a dedicated electrical room that is physically separate from all process areas, and mechanically cooled and ventilated. Branch circuit breakers at the switchgear will be used to power the buildings and major processes throughout the plant.
- Standby Power System
  - A 850-kilowatt (kW) diesel standby generator will be provided and specified as Tier 4 certified to provide backup to utility power and utility demand response. When a utility power outage occurs, the outdoor service entrance cabinet will function as an automatic transfer switch and will start the generator and switch the entire plant over

to the generator. The generator will be sized to operate the entire plant load deemed critical for process in addition to all building loads including lighting, HVAC equipment and receptacles. It will be sized to include the odor control system, but it will be sized for only one aeration blower to be operated at a time. The generator will be specified with a sound attenuated outdoor enclosure and a sub-base fuel tank sized for 24 hours of operation at the generator's full load rating.

- Plant Power Distribution System
  - Four hundred eighty volt power will be routed through the plant in a reinforced, concrete-encased, duct bank system, with circuits run to buildings and major processes. At each process building, an MCC will be used as the main power distribution equipment. The MCC will be used for process motors loads, including pumps and mixers, and building systems such as exhaust fans. Motor starters and variable-frequency drives (VFDs) will be located in the MCC wherever possible. Smaller structures and non-process buildings will use a switchboard or panelboard for power distribution. Dry-type transformers and panelboards will be provided for 120, 208 and 240-volt loads, including lighting, receptacles, building systems, and small process motor loads. Dedicated panelboards fed by uninterruptible power supplies (UPS) will be provided for instrumentation and control loads
- Electrical Rooms
  - Electrical rooms will be sized and arranged to meet National Electrical Code (NEC) requirements for working clearances and egress. Doors will be provided per egress requirements and to allow equipment to be removed. Electrical rooms will include filtered air conditioning systems.
- Lighting
  - Light-emitting diode (LED) lighting fixtures will be used for their energy efficiency. Lighting will be designed for levels meeting wastewater industry standards. Site lighting will be designed for traffic areas and will be located to minimize lighting pollution beyond the site boundaries.
- Arc Flash
  - Electrical equipment will be designed and specified to limit arc flash incident energy to less than 8 calories per square centimeter (Cal/cm2) while on Utility power per MCES standard practice.

4.6.4. HVAC

The Hastings WWTP will have several buildings across the site that require HVAC systems to heat, ventilate, and in some cases, cool the spaces. The approximate size, outside air requirements, and design space temperatures are summarized in Table 4-17

Table 4-17 Hastings WWTP Estimated Building Size and HVAC System Criteria

BUILDING	PRELIMINARY S ESTIMATE (SF)	OUTDOOR AIR REQUIREMENTS	TEMPERATURE SET POINTS[A]
Administration/ Maintenance/ Laboratory	8,500	Varies per Room[a]	78°F Summer / 70°F Winter – Occupied Spaces 104°F Summer / 55°F Winter – Maintenance Garage
Headworks Wet Well, Screenings and Grit Areas	7,500	12 Air Changes per Hour (ACH)[b]	104°F Summer / 55°F Winter
Headworks Dry Well	2,500	6 Air Changes per Hour (ACH)[b]	104°F Summer / 55°F Winter
Blower/ WAS & RAS Pumping	1,000	None	104°F Summer / 55°F Winter
Solids Handling	2 levels 5,400 each	12 Air Changes per Hour (ACH)[b]	104°F Summer / 55°F Winter
Electrical Rooms	Varies	None	78°F Summer / 55°F Winter

a. *MCES 2000 – Table 5.2-1 Indoor Design Temperatures and Ventilation Rates*
b. *NFPA 820-2020 rate for occupied spaces*

The new construction of this plant will provide an opportunity to implement more energy-efficient and less carbon-intensive HVAC technologies. The following strategies will be pursued:

- Implementing systems that can be powered by an increasingly low-carbon electrical grid, which will reduce future natural gas purchases
- Installing VFDs on supply and exhaust fans to reduce winter ventilation rates in classified areas when they are unoccupied
- Using plant effluent as a heat source

An economic evaluation for the HVAC systems at the Administration and Headworks Buildings was conducted to evaluate alternatives, including effluent heat recovery. In the Administration Building, a variable refrigerant flow air source heat pump system appears to provide better long-term value than conventional natural gas or effluent-source heat pumps. In the Headworks Building, indirect natural gas fired units with effluent heat recovery to decrease natural gas use could be economically feasible based on this preliminary evaluation. Winter effluent water temperatures are approximately 55 degrees F, so effluent water can be used directly (without a heat pump) to preheat outside air when temperatures are below approximately 40 degrees F. The findings of the evaluation of these two buildings will be used during the detailed design to guide the approach to HVAC in the Blower, RAS pumping, and Solids Handling buildings.

4.6.5. Administration Building

The Administration Building provides space required to support operations and maintenance of the facility. The Administration Building will provide space for on-site work and will be designed to accommodate a variety of workspaces. Restrooms, a lunchroom, locker rooms, meeting space, and an attached maintenance shop will also be included as part of the Administration Building. This building will be designed to meet B3 SB2030 guidelines and will be ADA accessible.

ADA accessibility requirements will also be incorporated into other areas of the Hastings WWTP. Features that will be incorporated include, but are not limited to:

- Signage
- Ramps to mitigate changes in elevation
- Door hardware
- Handrails
- Hallway/doorway widths
- Restrooms/locker rooms and common rooms (kitchens, etc.)
- Parking
- Grating/grating covers

4.6.6. Odor Control

Recommendation

For the Headworks Facility, Alternative 3 - High-Dispersion Fans is recommended since H_2S and fence line odor goals can be met with no additional foul air treatment. For the Solids Handling Facility, Alternative 2 – Dry Media Adsorption (Activated Carbon) is recommended to treat the foul air from the sludge storage and load-out areas due to the higher projected fence line odors with no treatment and the reduced cost and footprint compared to a biofilter.

Alternatives Identification

Odor sources at the Hastings WWTP are projected to include the following:

Interceptor sewer: The new odor control system is assumed to extract foul air from the headspace of the interceptor sewer that contributes all wastewater to the WWTP. The airflow rate for this source is calculated based on what is needed to exert a constant negative pressure at the last manhole prior to the interceptor entering the plant.

Headworks building: Headworks facilities, including screens, channels, and grit systems, are planned to be entirely contained within a new building at the Hastings WWTP. Accordingly, foul air will be extracted from the rooms where odors are projected to be present and channels and equipment, such as screens, will not be covered or enclosed. By ventilating odorous spaces in the entire building, the resulting airflow rate sent to odor control will be higher but more dilute compared to if odorous processes were covered or enclosed.

Sludge storage tank: A single sludge storage tank will be provided for sludge detention prior to loadout. Odor containment will be provided by installing a flat aluminum cover and extracting air from the headspace.

Sludge loadout: Biosolids will be loaded into trucks at a sludge loadout building, which will be ventilated using supply air and exhaust fans. Truck loadout is expected to occur 8 hours per day and 5 days per week.

It is assumed that there will be two odor control systems at the Hastings WWTP: one for the interceptor sewer/Headworks building and one for the sludge storage tank/sludge loadout building. The Headworks Facility would require an odor control system to be sized for 36,800 cubic feet per minute (cfm) and the Solids Handling odor control system would be sized for 3,900 cfm.

Alternatives Analysis

Alternative 1 – Bulk Media Biofilters

Bulk media biofilters treat odorous compounds by a combination of sorption, biological degradation, and chemical oxidation. Once the odorous compounds are trapped, they become the food source for the microorganisms living within the media and in the biofilm. The main components of a biofilter are the air distribution system, media, media support structure, and moisture control system (air humidification and media irrigation). Foul air is distributed through the bottom of the unit and forced upward through the media. Either organic media and engineered media can be used in a biofilter. Engineered media is recommended for Hastings WWTP since it has a longer life before compaction/replacement and results in a smaller footprint for the biofilter due to a lower required residence time. Biofilters often require a larger footprint compared to other odor control systems, but the engineered media typically has a 15-year guarantee against compaction and thus requires less frequent replacement than other systems.

Alternative 2 – Dry Media Adsorption (Activated Carbon)

Activated carbon technology is typically used on air streams having relatively low H2S levels and higher concentrations of more complex compounds. Odorous compounds may be oxidized once adsorbed onto the carbon surface. Because activated carbon is non-specific, it tends to adsorb all trace vapors (including water vapor) roughly in proportion to their concentrations until the media sorptive capacity is reached. With time, activated carbon becomes less effective as the adsorption sites become saturated. The spent carbon then must be replaced or regenerated.

Dry media adsorbers may be oriented with the foul air flowing vertically (through 1 or 2 media beds), horizontally (through up to 4 media beds), or radially. Radial carbon units are recommended for the Hastings WWTP since they have the advantage of occupying less footprint and also releasing the treated air at a higher elevation, which improves vertical dispersion. Given the lower projected H2S concentrations (less than 5 ppmv) for both odor control systems projected for the new Hastings WWTP, the virgin carbon type is most appropriate for this system.

Activated carbon systems occupy a smaller footprint than biofilters but require more frequent change-out of carbon.

Alternative 3 – High-Dispersion Fans

For this alternative, a high-dispersion stack combines dilution air (approximately introducing ambient air at a 10:1 ratio) with a high velocity fan to create a “virtual stack” that releases air at a higher elevation than would occur using a regular stack. The fan than ejects the air at approximately 2,000 ft/min. With this alternative, no additional foul air treatment system would be required.

Alternative Comparison

Headworks Building Odor Control

The headworks building room air that will be extracted and conveyed to odor control is expected to be dilute; H_2S concentrations will need to be less than 1 ppmv on average and therefore, the H_2S loading to the odor control unit will also be relatively low (estimated at 0.8 ppmv average, as noted in Table 4-18).

Hydrogen sulfide outlet and fence line concentrations were modeled using a screening dispersion model (SCREEN3), which uses the above airflow rate, odor parameters, meteorological conditions, distance to fence line, stack height, air velocity, and air temperature. Results of the modeling for H_2S and odor are shown in Table 4-18 and Table 4-19, respectively. Fence line odor goals vary based on the proximity of neighbors (residences, commercial facilities, recreational areas), the history of complaints, the estimated sensitivity of the public, and other factors. A reasonable fence line odor control goal for the Hastings WWTP would be 20 D/T based on other facilities and prior experience.

Fence line odor goals vary based on the proximity of neighbors (residences, commercial facilities, recreational areas), the history of complaints, the estimated sensitivity of the public, and other factors. A reasonable fence line odor control goal for the Hastings WWTP would be 20 D/T based on other facilities and prior experience.

As shown in the tables above, the high-velocity dispersion fans reduce the offsite (fence line) odor and H_2S impact by a factor of 50%, according to the SCREEN3 model. To address potential unknowns for the Hastings WWTP with respect to odor emissions, high dispersion fans are recommended over standard fans and stack for Headworks Facility odor control mitigation. No additional odor control system would be required.

Solids Handling Facility Odor Control

The Solids Handling Facility's projected average H_2S concentration emission is 0.8 ppmv and the maximum is 1.5 ppmv. Similarly, the average and maximum odor is 4,000 D/T and 8,700 D/T. Results of the offsite H_2S and odor impacts are shown in Table 4-20 and Table 4-21, respectively.

Table 4-18 Hastings WWTP Headworks H_2S Emissions and Projected Fence Line Impacts

EMISSION TYPE	H2S INLET (PPMV)	H2S % REMOVAL [a]	H2S OUTLET (PPMV)	STACK DILUTION RATIO [b]	FENCE LINE H2S TREATED [c, d] (PPMV)	FENCE LINE H2S STACK ONLY [c, e] (PPMV)	FENCE LINE H2S HIGH-DISPERSION STACK [c, f] (PPMV)
Average	0.8	99%	0.008	200:1	< 0.0005	0.004	0.002
Maximum	3.8	99%	0.038	200:1	< 0.0005	0.019	0.010

Assumes treatment through activated carbon adsorbers containing virgin carbon

[a.] *Based on a distance of 150 ft to the fence line and a standard stack with exhaust velocity of 2,000 ft/min*

[b.] *Based on SCREEN3 model output*

[c.] *Impacts of 0.0005 ppmv or less represent zero detectability of H_2S to the average nose*

[d.] *Assumes no foul air treatment (fan and standard stack only)*

[e.] *Assume no foul air treatment and a high-velocity dispersion fan with 30-ft stack*

Table 4-19 Hastings WWTP Headworks Odor Emissions and Projected Fence Line Impacts

EMISSION TYPE	INLET (D/T)	% REMOVAL [a]	OUTLET (D/T)	STACK DILUTION RATIO [b]	FENCE LINE ODOR TREATED [c, d] (D/T)	FENCE LINE ODOR STACK ONLY [c, e] (D/T)	FENCE LINE HIGH-DISPERSION STACK [c, f] (D/T)
Average	1,300	90%	130	200:1	0.7	6.5	3
Maximum	2,800	90%	280	200:1	1.4	14	7

Assumes treatment through activated carbon adsorbers containing virgin carbon

[a.] *Based on a distance of 150 ft to the fence line and a standard stack with exhaust velocity of 2,000 ft/min*

[b.] *Based on SCREEN3 model output*

[c.] *Impacts of 1 D/T or less represent zero detectability of H_2S to the average nose*

[d.] *Assumes no foul air treatment (fan and standard stack only)*

[e.] *Assume no foul air treatment and a high-velocity dispersion fan with 30-ft stack*

Table 4-20 Hastings WWTP Solids H_2S Emissions and Projected Fence Line Impacts

EMISSION TYPE	H2S INLET (PPMV)	H2S % REMOVAL [a]	H2S OUTLET (PPMV)	STACK DILUTION RATIO[b]	FENCE LINE H2S TREATED [c, d] (PPMV)	FENCE LINE H2S STACK ONLY[c, e] (PPMV)	FENCE LINE H2S HIGH-DISPERSION STACK [c, f] (PPMV)
Average	0.8	99%	0.008	100:1	< 0.0005	0.008	0.004
Maximum	1.5	99%	0.015	100:1	< 0.0005	0.015	0.008

Assumes treatment through activated carbon adsorbers containing virgin carbon

[a.] *Based on a distance of 70 ft to the fence line and a standard stack with exhaust velocity of 2,000 ft/min*

[b.] *Based on SCREEN3 model output*

[c.] *Impacts of 0.0005 ppmv or less represent zero detectability of H_2S to the average nose*

[d.] *Assumes no foul air treatment (fan and standard stack only)*

[e.] *Assume no foul air treatment and a high-velocity dispersion fan with 30-ft stack*

Table 4-21 Hastings WWTP Solids Odor Emissions and Projected Fence Line Impacts

EMISSION TYPE	INLET (D/T)	% REMOVAL [a]	OUTLET (D/T)	STACK DILUTION RATIO[b]	FENCE LINE ODOR TREATED [c, d] (D/T)	FENCE LINE ODOR STACK ONLY [c, e] (D/T)	FENCE LINE HIGH-DISPERSION STACK [c, f] (D/T)
Average	4,000	80%	800	100:1	8	40	21
Maximum	8,700	80%	1,740	100:1	17	87	46

Assumes treatment through activated carbon adsorbers containing virgin carbon

[a.] *Based on a distance of 70 ft to the fence line and a standard stack with exhaust velocity of 2,000 ft/min*

[b.] *Based on SCREEN3 model output*

[c.] *Impacts of 1 D/T or less represent zero detectability of H_2S to the average nose*

[d.] *Assumes no foul air treatment (fan and standard stack only)*

[e.] *Assume no foul air treatment and a high-velocity dispersion fan with 30-ft stack*

For the treated air scenario, the fence line H_2S concentrations (average and maximum) are below the threshold of human detection, and the fence line odors (average and maximum) are below the 20 D/T goal. High odor H_2S concentrations and D/T values are projected for the untreated scenarios, with a maximum fence line odor impact of 46 D/T for an untreated foul air conveyed through a high-dispersion stack. Therefore, Alternative 3 was eliminated from consideration and a BCE was performed on Alternatives 1 and 2.

Table 4-22 summarizes the comparative costs and net present value (NPV) for each alternative.

Table 4-22 Hastings WWTP Odor Control BCE Summary

ALTERNATIVE	CAPITAL COST	ANNUAL O&M COST	TOTAL NPV WITH ADJUSTMENT
Alternative 1 - Bulk Media Biofilter	$1,814,000	$972,000	$2,786,000
Alternative 2 - Dry Media Adsorption: Activated Carbon (Recommended)	$173,000	$993,000	$1,166,000

For the Solids Handling Facility, Alternative 2 - Dry Media Adsorption (Activated Carbon) is recommended for odor control due to the lower capital and NPV costs as well as its smaller footprint.

Basis of Design

The basis of design for the odor control systems is presented in Table 4-23.

Table 4-23 Hastings WWTP Odor Control System Design Criteria

FACILITY	DESCRIPTION	QUANTITY	SIZE
Headworks Facility Odor Control	High Dispersion Fans	3 (2 duty, 1 standby)	40 hp (each)
Solids Handling Odor Control	Single-Bed Carbon Adsorber	1	10’ diameter, 8’ high
Solids Handling Odor Control	Odor Control Fans	2 (1 duty, 1 standby)	10 hp (each)

4.6.7. Stormwater Best Management Practices

The Hastings WWTP will be considered a “new development” by the City of Hastings and the Vermilion River Watershed District (VRWD). As a new development, stormwater best management practices (BMPs) must be implemented on-site to meet the following requirements:

- Water Quality:
  - Stormwater discharges of Total Suspended Solids (TSS) and Total Phosphorus (TP) shall have no net increase from pre-project conditions.

- Peak Flow Control:
  - Peak runoff rates shall not exceed peak runoff rates for the land cover conditions existing in the year 2005 for the 1-year 24-hour, 10-year 24-hour, 100-year 24-hour, and 100-year 4-day storm events.
- Runoff Volume:
  - Runoff volumes shall not to exceed the pre-project runoff rates for the 2-year 24-hour storm event.

The existing property includes two large wet detention ponds that can be used to help meet the water quality and runoff rate requirements above. Because wet detention ponds can be very effective for improving stormwater quality and reducing peak flows, any additional BMPs should be focused on reducing runoff volumes. In addition to using the existing wet detention ponds, the following green infrastructure (GI) BMPs will be considered:

- Grass swales
- Infiltration basins
- Biofilters with underdrains
- Rain gardens
- Porous pavement/permeable pavers
- Green roofs

These additional BMPs are focused on capturing stormwater prior to it leaving the site and encouraging infiltration to improve water quality and reduce stormwater volumes as much as possible. Stormwater that is not captured by these practices will flow to the existing ponds downstream. Modifications to the existing ponds was also considered in lieu of additional upstream practices. The final stormwater management plan may ultimately include a variety of practices throughout the site.

5. Hastings Sanitary Sewer System Modifications

5.1. *Introduction*

This section describes the plan to redirect wastewater flow from downtown Hastings to the new wastewater treatment plant site, which will be located approximately 8,700 southeast of the existing Hastings WWTP. The City of Hastings has prepared a Comprehensive Sanitary Sewer Plan (2020 Comp Plan) for the region. This plan was created by the City with consulting assistance from WSB & Associates, Inc. Relocation of Hastings WWTP service was considered in this planning effort. The Comp Plan identifies a gravity sewer pipe within the road right of way of 10th Street which can intercept most of the wastewater flow from Hastings, and direct it to the new WWTP. Implementation of this gravity interceptor will minimize the size of wastewater pumping facility needed in the downtown area at the existing WWTP.

5.2. *System Capacity*

5.2.1. System Growth Projections

The Hastings Comprehensive Sanitary Sewer Plan analyzed existing and future wastewater system capacity needs. Future growth projections have been developed in accordance with the Metropolitan Council System Statement for the City of Hastings. The plan identifies potential development area to meet the City's growth needs in accordance with the Metropolitan Council Thrive MSP 2040 framework.

5.2.2. Direct Gravity Trunk Sewer to New WWTP

The Hastings sewer district is separated into eight major sewersheds. Seven of these sewersheds flow through the main trunk sewer of the system which crosses the 10th Street right of way, 270 feet east of the intersection of Bailey Street and 10th Street. The sewersheds flowing through these two major trunk pipes are shown on Figure 5-1.

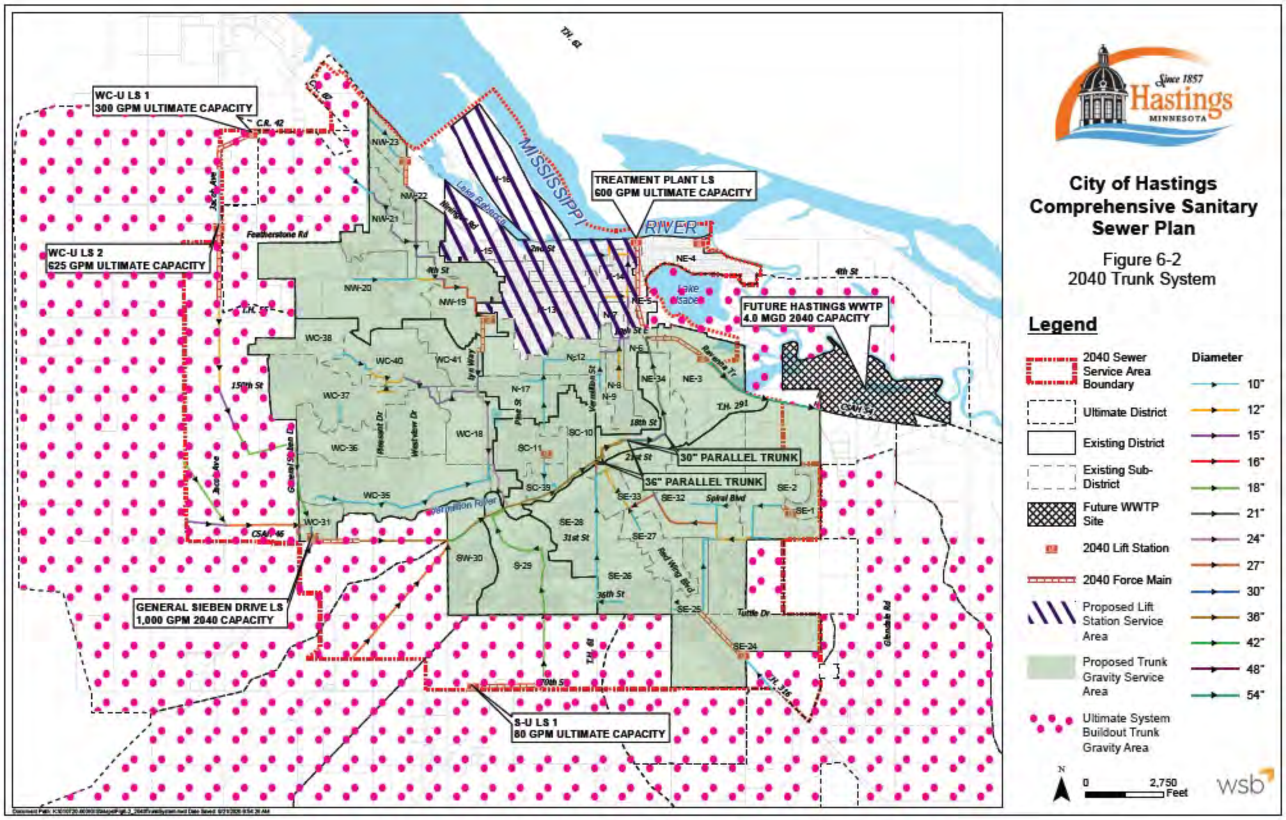


Figure 5-1 **City of Hastings Comprehensive Sanitary Sewer Plan**

The striped area is proposed to flow to the existing WWTP site to be pumped up to 10th Street by a proposed lift station. The green sewershed is the area proposed to flow into the gravity trunk sewer along 10th Street/Ravenna Trail to the proposed new WWTP. The dotted area represents conceptual future development area which would flow directly into the proposed gravity sewer along 10th Street.

The Hastings Comprehensive Sanitary Sewer Plan identifies a new gravity sanitary sewer trunk pipe proposed to intercept the primary trunk sewer as it crosses 10th Street. The existing and future flows in this primary trunk pipe at 10th Street are shown in Table 5-1 below.[3]

[3] Comprehensive Sanitary Sewer Plan (2020), City of Hastings

Table 5-1 City of Hastings Existing and Future Flows by Primary Trunk Sewers

TRUNK #	SEWER DISTRICT	2020 AVG DAILY FLOW (MGD)	2030 AVG DAILY FLOW (MGD)	2040 AVG DAILY FLOW (MGD)
Sewershed New Lift Station	North (partial)	0.151	0.162	0.172
Sewershed New Lift Station	Northeast (partial)	0.027	0.028	0.028
Subtotal	--	0.178	0.19	0.2
Sewershed New Gravity Directly Upstream	North (partial)	0.145	0.155	0.165
Sewershed New Gravity Directly Upstream	Northeast (partial)	0.139	0.143	0.143
Sewershed New Gravity Directly Upstream	Northwest	0.253	0.398	0.542
Sewershed New Gravity Directly Upstream	West Central	0.315	0.579	0.842
Sewershed New Gravity Directly Upstream	Southwest	0.03	0.079	0.129
Sewershed New Gravity Directly Upstream	South	0.041	0.12	0.199
Sewershed New Gravity Directly Upstream	Southeast	0.403	0.651	0.651
Sewershed New Gravity Directly Upstream	Southcentral	0.063	0.063	0.063
Subtotal	--	1.389	2.188	2.734

5.3. *Gravity Trunk Sanitary Sewer*

5.3.1. Proposed Alignment and Profile

The alignment of the gravity trunk sanitary sewer is proposed to follow 10th Street and County Road 54 right of way as shown in Figure 5-2. This alignment would require crossing under a spur railroad track and the Vermillion River. The profile generally slopes from west to east as the sewer flows to the river, the existing ground begins to slowly rise to the new WWTP site. The proposed plant property is approximately 14 feet above the Vermillion River. An inverted siphon is proposed for crossing under the Vermillion River to minimize the depth of sewer at the east end of the alignment as the sewer enters the plant property.

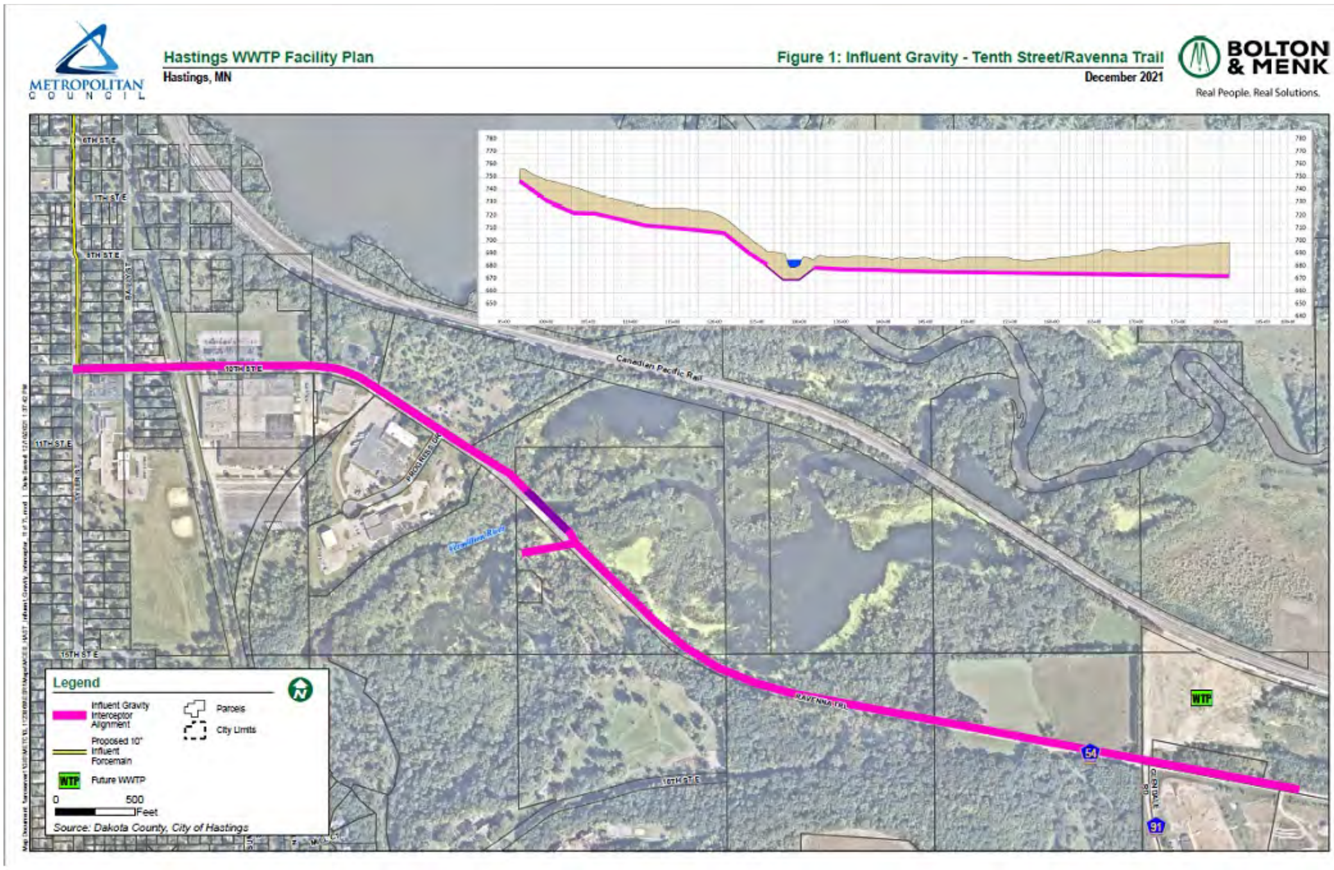


Figure 5-2 Alignment of Gravity Truck Sanitary Sewer to the Hastings WWTP.

5.4. *Downtown Hastings Lift Station*

5.4.1. Lift Station Siting

MCES reviewed both privately and publicly owned land while identifying potential locations for the proposed new lift station. Review was limited to undeveloped or underutilized properties within 1300 feet from the existing WWTP. The following six properties were reviewed:

1. Existing WWTP Property (northeast and southeast corners)
2. Riverfront Property (north of the Artspace Lofts)
3. Municipal Parking Lot (south of Depot Park)
4. UBC/City Storage Property (north of 4th Street and adjacent to west side of CP Railroad ROW)
5. Lea Street Lots (south of 3rd Street)
6. Lake Isabel Park (northeast corner of park)

A map of the properties reviewed is attached in Appendix 5-1 along with a detailed report of each property and a complete matrix of property comparisons. These six properties were compared with each other using five major categories (site characteristics, development potential, environmental considerations, constructability, and capital cost).

Using the existing WWTP property is the recommended site for the lift station. Table 5-2 lists the advantages and disadvantages for using the existing WWTP property.

Table 5-2 Advantages and Disadvantages of Existing Hastings WWTP Property as Lift Station Site

ADVANTAGES	DISADVANTAGES
Lowest capital cost	Falls within MRCCA
Met Council Owned Land	May require screening or setbacks
No easements or restrictions	
Minimal sanitary sewer improvements to transport wastewater to the lift station site	
Not located within a flood zone	
Sufficient site access with exiting roadways	

5.4.2. Construction During Existing WWTP Operations

The proposed lift station will need to be constructed while the existing treatment plant operations are functioning. The proposed lift station site is located in the southeast corner of the existing plant property. The existing odor control building is not needed for plant operations. The odor control building can be demolished, and the new lift station can be constructed in its former place.

A temporary sewer conveyance system will need to be constructed to allow wastewater to be diverted to the proposed lift station. It is recommended to install a wet tap on the existing plant pressure pipe between the headworks and the grit chambers. This will allow flexibility to adjust the flow rate diverted to the lift station during commissioning of the new WWTP.

5.4.3. Lift Station Design Flows

The proposed lift station will receive flows from properties north of Trunk Highway 55, between Lyn Way and Bailly Street. This area is mostly developed out with little opportunity to change land use or add population density. This area produced an average daily flow of 0.178 mgd. This area has a 2040 projected average daily flow of 0.200 mgd.

5.4.4. Design Configuration

The City of Hastings will own the proposed lift station after the decommissioning of the existing WWTP. Hastings Public Works has requested the lift station be constructed using pumps, valves, and controls similar to other lift stations they own for ease of operations and maintenance training. MCES will work with City staff during design to ensure continuity of the design with existing City infrastructure. Figure 5-3 shows the proposed location for the lift station. The black-colored pipe is a temporary connection between the plant headworks discharge and the new lift station. The white colored pipe is a conceptual pipe to be installed after the existing plant is decommissioned. This alignment will be reviewed with the City of Hastings to ensure it does not conflict with future land development of the existing WWTP property.

Figure 5-3 Plan view of lift station on Hastings WWTP Site

5.4.5. Sanitary Sewer Forcemain

A forcemain is needed between the lift station at the existing WWTP and the proposed gravity trunk pipe at the intersection of Tyler Street and 10th Street. A 10-inch diameter forcemain is proposed based on lift station projected flows using the City's Comprehensive Sanitary Sewer Plan..

Two pipe alignments were reviewed for the forcemain (shown in Figure 5-4). Both alignments share the same alignment on Lea Street and 3rd Street. The alignments deviate as they turn south, occupying the right of ways of Bailly Street and Tyler Street.

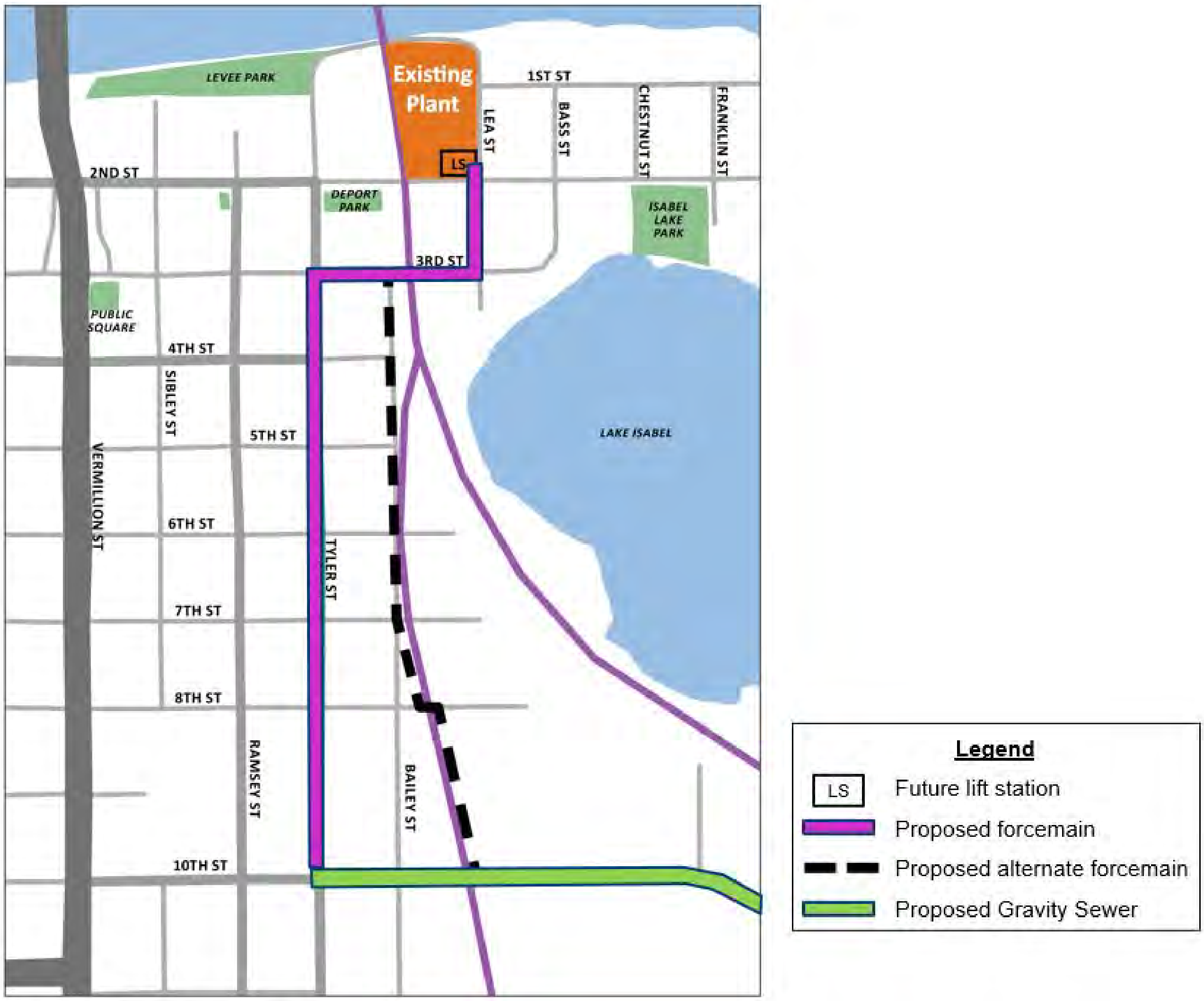


Figure 5-4 Two Proposed Forcemain Alignments to new Hastings WWTP

A planning level design was performed for each alignment. Impacts were examined to private and public utilities, MN Department of Health separation requirements, railroad impacts, tree impacts, and cooperative construction opportunities with the City of Hastings. Both alignments were reviewed in detail with City staff. Table 5-3 and Table 5-4 show the lists of the advantages and disadvantages for each alignment.

Table 5-3 Tyler Street Alignment Advantages and Disadvantages

ADVANTAGES	DISADVANTAGES
No impacts to existing 24-inch trunk sanitary sewer north of 10th Street	Higher capital construction cost
Wider street/ROW to allow for easier traffic management and impacts during construction and maintenance	Longer forcemain length
Less public impact through closures and construction	Entirety of pipe corridor within pavement that will need repair/reconstruction
Potential for City utility improvements and relocations to further improve the alignment location and constructability	
Opportunity to replace and downsize the sanitary sewer on Tyler Street	
Minimal railroad permitting requirements both for installation and future maintenance	
Existing pavement is nearing end of service life	
More consistent utility corridor (east-west within ROW)	

Table 5-4 Bailly Street Alignment Advantages and Disadvantages

ADVANTAGES	DISADVANTAGES
Lower capital construction cost	Bailly was recently reconstructed in 2017
Shorter forcemain length	Major impacts to mature trees
Fewer residential properties impacted by construction	Significant railroad permitting requirements both for construction and future maintenance operations
	Potential for extended design and construction timelines due to permitting and review requirements by railroad authority
	Confined accesses to residences results in higher construction impacts
	Narrow ROW corridor complicates future operations and maintenance
	Construction required on both Bailly Street and Tyler Street to downsize the local sanitary sewer in Tyler Street

The recommended alignment for the forcemain is the Tyler Street right of way.

5.5. *Effluent Alignment to the Mississippi River Recommendations*

5.5.1. Topography

The proposed WWTP is approximately 7,300 lineal feet from the main channel of the Mississippi River. the route to the river will need to cross under the CP Railroad right of way and under the Vermillion River. Trenchless technology was assumed when estimating the future capital cost to construct the effluent discharge pipe. The topography is mostly floodplain with a large hill rising 32 feet above the Mississippi River normal operating level. Subsurface geotechnical exploration was performed during the facility plan preparation. Limestone bedrock was observed 7 feet below existing ground at the high point of the hill.

5.5.2. Effluent Pipe Alignment and Profile

MCES previously obtained easements for most of the proposed outfall pipe alignment. These easements were recorded at the County in 2008. These easements are 70 feet wide at the narrowest location. This will provide adequate space to construct the effluent discharge pipe to the river. MCES will need to acquire approximately 920 lineal feet of easement 70 feet in width to complete the land rights needed to construct the effluent discharge pipe.

The proposed discharge elevation of the WWTP has sufficient static head to push the effluent water to the river. It is recommended the discharge pipe be designed as a closed system (no access points open to the atmosphere). The effluent pipe will function as an inverted siphon. This will prevent the floodwater from the Mississippi River and Vermillion River from depositing silts, clays and debris within the manholes and effluent pipe as flood water levels slowly recede to normal levels. A preliminary pipe alignment and profile are shown in Figure 5-5.

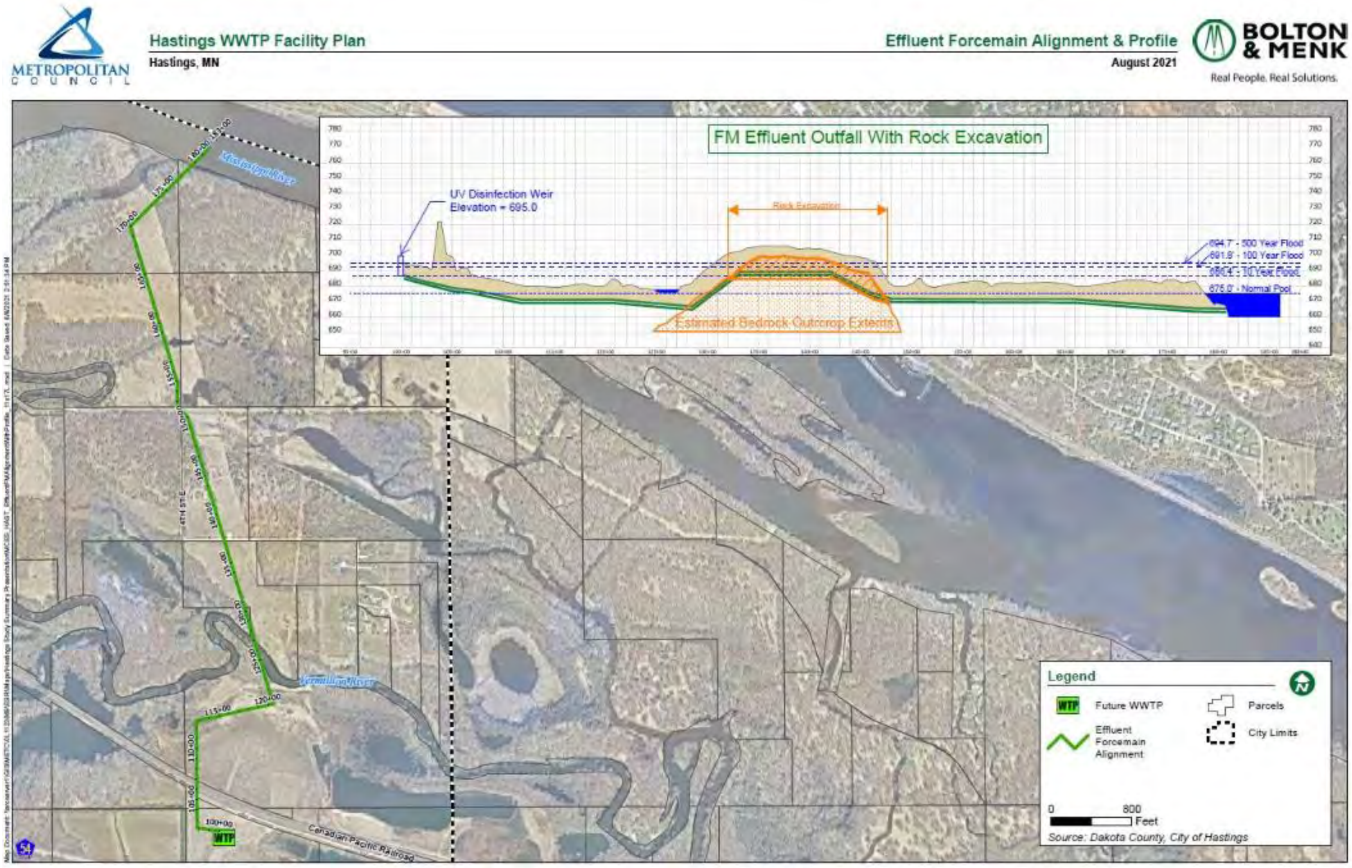


Figure 5-5 Hastings WWTP Preliminary Effluent Pipe Alignment and Profile

Significant rock excavation is required to install the proposed outfall pipe. It is recommended that the rock removal be performed at a width to accommodate the installation of a future parallel outfall pipe

5.5.3. Effluent Pipe Design Flow Rate

A 42-inch diameter high density polyethylene pipe was assumed for planning purposes. This pipe has a design capacity of 5.0 mgd which compliments the initial design capacity of the new WWTP. An additional parallel pipe will need to be installed during future expansion of the WWTP.

5.6. *Decommissioning*

5.6.1. Existing WWTP Property Agreement

MCES acquired the Hastings WWTP through signed agreement with the City of Hastings requiring land ownership to be returned to the City of Hastings if it is no longer needed for wastewater treatment services. The agreement also stipulates that MCES will remove all WWTP process buildings, pipe, and appurtenances prior to returning the site to the City of Hastings for redevelopment.

MCES and the City of Hastings will establish an intergovernmental agreement defining the terms expectations of both parties during and after the land transfer.

5.6.2. Decommissioning of Existing Treatment Facility

The north half of the existing WWTP property is below the 500-year floodplain for the Mississippi River. The southern half of the property is above the floodplain. It is assumed the City of Hastings could plan to have the southern half of the property developed into multi-family housing similar to the adjacent parcel to the west. For purposes of this facility plan, we assumed the complete removal of all buildings, tanks, piping, and appurtenances on the southern half of the property. Infrastructure on the north half within the floodplain was assumed to be removed to a depth of 6 feet below existing ground and buried. The limits of removal will need to be addressed in the intergovernmental agreement prior to developing the decommissioning plan. A preliminary plan of the proposed removals is shown in Figure 5-6.

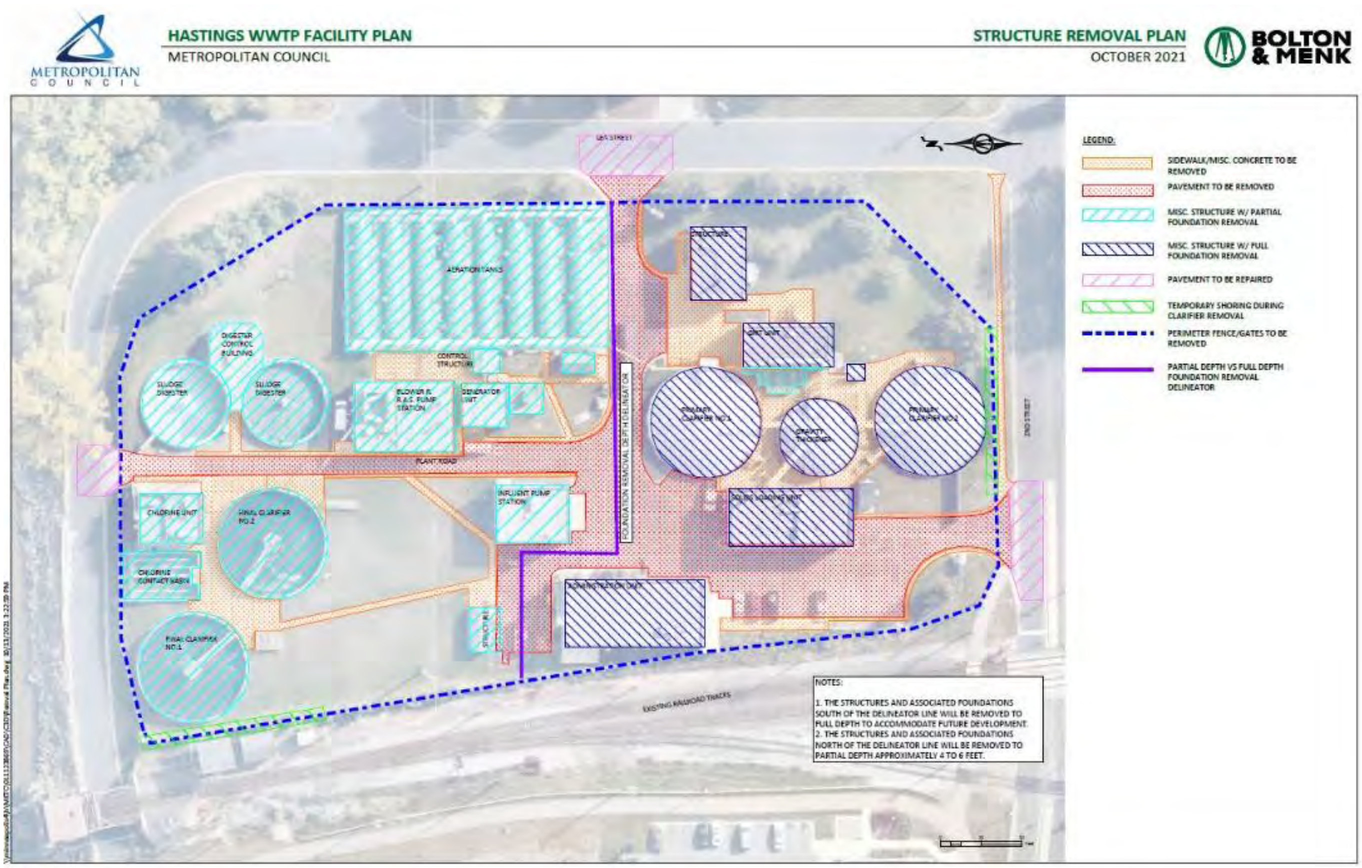


Figure 5-6 Preliminary Plan of Proposed Removals at the Existing Hastings WWTP

5.6.3. Existing WWTP Environmental Review

MCES will perform a Phase I Environmental Review of the existing WWTP property during preliminary design. Based on the findings of this review, a Phase II review and plan may need to be developed.

6. Energy and Sustainability Reviews

6.1. *Energy Review*

This section summarizes estimated future WWTP energy use and approaches evaluated to reduce energy use and minimize greenhouse gas emissions.

6.1.1. Projected Energy Consumption

The future Hastings WWTP will include expanded facilities and additional processes that are expected to increase the electrical energy consumption relative to the current facility. Additional processes include influent pumping, advanced nutrient removal, enhanced odor control, and UV disinfection. In addition, increasing future flows will further increase electrical consumption in processes like pumping, secondary treatment, and disinfection.

HVAC systems at the future WWTP will be optimized relative to the current facilities, which is anticipated to keep natural gas consumption rates roughly similar to the existing Hastings WWTP.

Table 6-1 summarizes the current energy use at the existing Hastings WWTP and the projected energy use for the new plant.

Table 6-1 Hastings WWTP – Current and Projected Energy Use

CONDITION	UNITS	CURRENT HASTINGS WWTP	PROJECTED FUTURE HASTINGS WWTP MAXIMUM DAY	PROJECTED FUTURE HASTINGS WWTP MAXIMUM DAY
Year		2018-2021	2025	2050
Average Flow	mgd	1.4	1.6	2.6
Influent Pump	kW		11	18
Headworks	kW		6	6
Primary Pump	kW		11	17
Secondary Treatment	kW		83	130
Odor Control	kW		63	63
UV	kW		12	19
Thickening	kW		10	10
Sludge Storage	kW		30	30
Other	kW		150	150
Average Electrical Demand	kW	200	380	450
Annual Natural Gas Consumption	therms/yr	54,000	50,000	50,000

6.1.2. Energy Approaches

The following energy- and carbon-efficient approaches are recommended as part of the base design for the new Hastings WWTP:

- High efficiency blowers
- LED lighting, including features like lighting timers, motion sensors, and daylight sensors
- Electric water heaters and/or heat pump/on-demand water heaters to minimize natural gas use where technology is proven and fiscally responsible to implement.
- High efficiency building envelopes, especially in administration building where the heating demand isn't dominated by outside air ventilation requirements
- Two-speed ventilation of classified process spaces such as the headworks building, with lower outside airflow to reduce natural gas use when spaces are unoccupied, as described in NFPA 820 9.3.2.
- Space-efficient headworks and solids processing buildings to minimize the air volumes required for heating to reduce natural gas consumption
- Use of a building automation system (BAS) to optimize HVAC performance such as Tridium Niagara.
- VFDs wherever applicable (i.e., influent pumps, RAS pumps, and odor control fans).
- Energy-efficient or on/off cycling of sludge storage mixing
- Commissioning requirements for process equipment that include optimizing energy use and training operators on approaches to minimize energy use while maintaining process performance.

6.1.3. Standby Power and Energy Storage Alternatives to Support a Renewable-Focused Electrical Grid

Demand Response is a key aspect of large-scale transition from fossil-fuel based electrical generation to renewable power because it allows the electrical utility to work with customers like MCES to reduce demand during peak periods when renewable and low-carbon electrical generation are struggling to meet demand.

Battery Energy Storage Systems

Energy storage is also forecast to be increasingly important as the fraction of grid power produced by renewable wind and solar energy increases. Energy storage systems such as battery storage are used to store renewable power for use when electrical demand is high and renewable generation is low.

Recommendation

A battery storage energy system (BESS) is not recommended for implementation at this time. The projected electrical cost savings are not sufficient to justify battery storage at their current cost. A BESS could be explored further if battery storage costs drop in the future or if financial incentives for BESS such as grants or rebates become available.

Alternatives Identification

Two alternatives were evaluated for standby power:

- Baseline alternative with no battery storage
- BESS used to shift power purchases from peak to non-peak periods

Alternatives Analysis

Alternative 1 – Tier 2 Diesel Generator with no BESS

A BESS is not a substitute for a standby power system because they are typically designed for only 2-8 hours of energy storage. For this alternative, the project scope is limited to a Tier 2 generator for standby power. This “status quo” alternative does not allow shifting electrical consumption and demand to off-peak periods.

Alternative 2 – Tier 2 Diesel Generator with BESS

Electrical utilities are currently pursuing changes in their time of use pricing trends that extend the traditional practice of pricing summer afternoon energy at a higher rate by adding strong price signals for reducing load during “critical peak periods.” These critical peak periods occur during extreme hot evening or cold morning weather, straining distribution systems and forcing electrical utilities to use expensive power sources. Other proposed rate structures increase summer and winter demand charges during peak 4-hour periods in the summer and to a lesser extent, winter months.

This alternative provides a standard Tier 2 standby generator for backup power combined with integrated battery storage for demand response and peak shaving. The additional cost of the BESS is roughly $1,000,000. For this BCE, the battery was assumed to be charged using inexpensive off-peak power ($0.0081/kWh) to offset peak usage and demand costs ($0.05054/kWh all months, $6.25/kW summer demand, $4.25/kW winter demand)

Without a BESS, during a grid power outage process, equipment will stop until the standby generator system is fully online, with standby diesel generators typically set to start within 30 seconds. Following the generator start, the process equipment is restarted. In an unattended WWTP, the process equipment restart can either be initiated automatically by the SCADA system or remotely by an operator at another location. With a BESS, the process equipment operates continuously, with the load transferred to the BESS when the power outage begins and then shifted to the standby generator if the outage persists. The small risk of process outages or serious equipment damage due to unmanned equipment starts associated Alternatives 1 and 2 that do not have BESS to eliminate the restart cycle has not been monetized for this BCE.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 6-2.

Table 6-2 Hastings WWTP BCE Summary – Battery Energy Storage System

ALTERNATIVE	CAPITAL COSTS ($)	ELECTRICAL	O & M COSTS ($)	EQUIPMENT REPLACEMENT SALVAGE VALUE	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Tier 2 Diesel Generator	550,000	3,100,000	800,000	(350,000)	4,100,000
Alternative 2 – Tier 2 Diesel Generator with BESS	1,500,000	2,400,000	2,300,000	(1.000,000)	5,200,000

Standby Power Generation

Recommendation

Alternative 2 – Tier 4 Diesel Generator is recommended to off-load the Hastings WWTP's grid electrical consumption when requested by the electrical utility under a Demand Response program. The annual operating hours of conventional Tier 2 standby generators are limited by air quality regulations, while Tier 4 generators can maintain operating flexibility for responding to deferral requests. The NPV of this option is approximately equivalent to standby generators with standard emissions controls that are restricted in their ability to participate in Demand Response programs.

Alternatives Identification

Two alternatives were evaluated for standby power:

- Tier 2 diesel generators meeting air permit requirements for operation up standby service
- Tier 4 diesel generators meeting air permit requirements for both standby and on-demand service, including peak shaving and deferral requests

Alternative 1 – Tier 2

This alternative provides a standard diesel generator for back-up power, with no provisions for reducing electrical billing through peak shaving or demand response. U.S. Environmental Protection Agency (U.S. EPA) regulations for stationary reciprocating internal combustion engines (RICE) allow for standby generators with less stringent emissions levels (Tier 2) to be used for stand-by power generation. These engines are typically limited to operating 50 hours per year for maintenance and up to 50 hours per year for other emergency grid support.

Alternative 2 – Tier 4

This alternative provides a diesel standby generator for backup power with additional exhaust controls for reducing NOx and VOC emissions, meeting U.S. EPA standards for Tier 4 engines. The Tier 4 engine-generator would not have limits on the number of hours it would be operated per year. A Tier 4 generator will most likely require a MN registration air quality permit.

- Tier 4 engines were assumed to be 40 percent more expensive than Tier 2 engines, with greater O&M costs for maintaining the emissions control equipment.
- One hundred hours of demand response per year were assumed to estimate fuel use.
- A utility incentive of $6/kW/month was credited in the projected electrical costs based on proposed future Xcel demand response program incentive rates.

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 6-3. Electrical savings for Tier 4 generators were estimated based on increased participation in demand response programs. These savings are offset by increased capital and O&M costs, with the total NPV for both alternatives essentially equal.

Table 6-3 Hastings WWTP BCE Summary – Standstby Power

ALTERNATIVE	CAPITAL COSTS ($)	ELECTRICAL	O & M COSTS ($)	EQUIPMENT REPLACEMENT SALVAGE VALUE	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Tier 2 Diesel	550,000	3,100,000	800,000	(350,000)	4,100,000
Alternative 2 – Tier 4 Diesel (Recommended)	800,000	2,800,000	1,100,000	(500,000)	4,200,000

Basis of Design

Refer to the electrical design summary in Section 4.1.5.

6.1.4. Decarbonized HVAC Systems and Effluent Heat Recovery

An economic evaluation of alternate HVAC systems was conducted for the Administration and Headworks Buildings to make preliminary HVAC design decisions for these and other site buildings. The evaluation considered the feasibility of alternatives that lowered fossil fuel (natural gas) use by using either air-source or water source heat pumps.

Administration Building

Recommendation

Alternative 2 – Variable Refrigerant Flow (VRF) Air Source Heat Pump system is recommended and will provide the best long-term value to MCES. This system reduces carbon emissions associated with heating and cooling the building, and this advantage will increase as the electrical grid continues to transition to renewable energy.

Alternatives Identification

The following alternatives were evaluated:

- Alternative 1: Baseline (Direct Fired Natural Gas Heating, Direct Expansion Cooling)
- Alternative 2: Variable Refrigerant Flow (Air Source Heat Pump)
- Alternative 3: Administration Building – Variable Refrigerant Flow (Water Source Heat Pump)

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 6-4.

Table 6-4 Hastings WWTP BCE Summary – Administration Building HVAC Systems

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	EQUIPMENT REPLACEMENT SALVAGE VALUE	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Direct fired natural gas, DX cooling	300,000	640,000	(200,000)	740,000
Alternative 2 – VRF Air Source Heat Pump (Recommended)	390,000	620,000	(260,000)	740,000
Alternative 3 – Effluent Source Heat Pump	445,000	640,000	(290,000)	790,000

Alternative 2 is recommended due to the low NPV cost as well as its reduction of carbon emissions associated with heating and cooling the building.

Headworks Building

Recommendation

Alternative 4 – Indirect Fired Natural Gas Heating with effluent water preheating is recommended for the Headworks Building.

Alternatives Identification

The following alternatives were evaluated:

- Alternative 1: Baseline (Indirect Fired Natural Gas Heating)
- Alternative 2: Electric resistance heating
- Alternative 3: Effluent Source Heat Pump
- Alternative 4: Effluent preheat coils with indirect natural gas heating

Alternative Cost Comparison

Based on proposed design conditions for each alternative, life cycle costs were calculated as shown in Table 6-5.

Table 6-5 Hastings WWTP BCE Summary – Headworks Building HVAC Systems

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	EQUIPMENT REPLACEMENT SALVAGE VALUE	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Indirect Natural Gas	350,000	1,320,000	(240,000)	1,400,000
Alternative 2 – Electric Resistance	300,000	3,100,000	(200,000)	3,100,000
Alternative 3 – Effluent Source Heat Pump	700,000	1,400,000	(450,000)	1,600,000
Alternative 4 – Effluent preheat with Indirect Natural Gas (Recommended)	700,000	800,000	(420,000)	1,100,000

In the Headworks Building, indirect natural gas fired units with effluent preheating (Alternative 4) provided the best long-term value to MCES. Winter effluent water temperatures are approximately 55 degrees F, so effluent water can be used directly (without a heat pump) to preheat outside air during winter months. Adding effluent water pre-heat coils directly into the HVAC units for the Headworks will decrease natural gas. This alternative will be coordinated with the design of the non-potable water system required for process use so that it is sufficiently sized for the heat load, and the effluent will be routed to a heat exchanger to warm a circulating glycol loop serving the preheat cools. The natural gas heating will supplement the effluent heat and provide back-up heat if the effluent system is out of service or impaired. Effluent heat pump systems are more costly, and the reduction in natural gas costs are not sufficient to justify Alternative 3.

6.2. *Sustainability Review*

This section summarizes approaches to enhance project sustainability using the Envision framework, which considers a broad range of sustainability measures.

6.2.1. Envision

The Envision framework was developed by the Institute for Sustainable Infrastructure to help infrastructure stakeholders implement more sustainable, resilient, and equitable projects. Envision takes a comprehensive view of sustainability by viewing proposed projects through five main categories. Sustainable approaches included in the work of this Facility Plan are identified below within the context of the Envision framework.

- *Quality of Life:* A project's impact on host and affected communities, from the health and wellbeing of individuals to the wellbeing of larger social fabric as a whole
  - Take into account community needs, goals, and issues
  - Proactively address long-term social, economic, or environmental changes that impact quality of life
  - Demonstrate that health and safety risks and impacts are not disproportionately borne by one community over another
  - Assess the potential for noise impacts on the surrounding community and/or environment
  - Implement strategies to reduce light pollution
  - Identify, document, protect, or enhance historic and cultural resources
- *Leadership:* Implementation of new way of thinking about how projects are developed and delivered in a way that enables achievement of sustainability goals
  - Stakeholder engagement, including involvement of lead member of project team so that they under-stand their needs
  - Assign roles and responsibilities for addressing sustainability to key team members
  - Include training programs for local skill development
- *Resource Allocation:* Consideration of assets such as energy and materials that are needed to build infrastructure and keep it running, including the quantity, source, and characteristics of these resources and their impacts on the overall sustainability of the project
  - Develop a plan to decrease project waste and divert waste from landfills during construction

  - Balance cut and fill to reduce the excavated material taken off site
  - Reduce operational water consumption

- *Natural World:* The way a project is located within natural ecosystems and the new elements they may introduce to a system and create unwanted impacts on ecosystem services

  - Install habitat-friendly landscaping, especially trees and other features that support bird migration on the Mississippi flyway
  - Identify and preserve sites of high ecological value
  - Determine the type and width of buffer zones necessary to protect wetlands

    - Manage stormwater to infiltrate, evapotranspirate, reuse, and/or treat stormwater on site

- *Climate and Resilience:* Minimizing emissions that may contribute to climate change and other short-and-long-term risks and ensuring that infrastructure projects are resilient

  - Reduce greenhouse gas emissions related to operations
  - Determine climate change threats to the project and develop risk mitigation strategies
  - Reduce embodied carbon in construction materials

6.2.2. Specific Sustainability Considerations for Design

The Hastings WWTP facility planning process considered alternative approaches to multiple aspects of the future plant design. Table 6-6 summarizes the major recommended alternatives and their respective favorable sustainability attributes compared to the competing alternative(s). BIOCOS sustainability attributes are included for future reference. Table 6-7 summarizes the sustainability attributes for auxiliary project features.

As noted above, resilience to the impacts of climate change is a critical aspect of sustainability. Climate change is expected to increase precipitation variability, increasing the severity of both drought and flood conditions. The proposed plant’s location near the Mississippi and Vermillion Rivers makes it vulnerable to both flooding and drought. The following mitigation strategies are envisioned to mitigate the risks associated with these future conditions:

- Plant Elevation

  - The structural elevations for all treatment tanks are all set with the top of wall above the 500-year flood elevation.
  - The UV disinfection effluent weir is set to maintain a free discharge during a 100-year flood event. During a 500-year flood event at peak flow, the UV effluent weir will be submerged, but all flow will be retained within the treatment system process units, minimizing loss of untreated wastewater contaminants to the river.

- Outfall Design

  - The structural design of the outfall piping will be designed to withstand additional forces under flooding conditions.
  - The dispersion design of the outfall will consider the effect of reduced dispersion under low-flow conditions in the Mississippi.

- Stormwater
  - Vegetated stormwater infrastructure and site landscaping will include plants selected for drought resistance.
  - Storm water infrastructure will be designed to limit run-off to the regulated benchmark under a 100-year 24-hour and a 100-year 4-day flood event

Table 6-6 Hastings WWTP Design for Sustainability

AREA	ALTERNATIVES	FAVORABLE SUSTAINABILITY ATTRIBUTES	APPLICABLE ENVISION CRITERIA
Outfall	Mississippi River	Higher assimilative capacity of Mississippi River	• Natural World
Outfall	Mississippi River	Fewer treatment stages expected, minimizing energy use and construction materials	• Resource Allocation
Outfall	Mississippi River	Smaller footprint preserves undeveloped land	• Natural World
Outfall	Mississippi River	Reduced Prairie Island Indian Community impacts	• Quality of Life (equity, recreation)
Influent Pumping	Wetwell/Drywell	5% more energy efficient pumping	• Climate and Resilience • Resource Allocation
Effluent Pumping	Influent Pumping Only (No Effluent Pumping)	Reduced pumping energy	• Quality of Life (public health and safety)
Secondary Treatment	Conventional BNR	Less potential future floodplain encroachment	• Climate and Resilience • Natural World
Secondary Treatment	BioCOS	3' less head required for hydraulic profile, reducing pumping and excavation, Reduced tankage/construction materials, Reduced blower energy use	• Climate and Resilience • Resource Allocation • Natural World
Disinfection	UV	Reduction in embedded carbon from chemical production and transportation (sodium hypochlorite)	• Climate and Resilience
Water Reuse	In-plant Uses	Reduced reliance on city water and groundwater	• Resource Allocation
Water Reuse	Future External Re-use	Additional, significant city water reductions	• Resource Allocation
Solids Hauling	Thickening	Reduced embedded carbon from chemical production and transportation (polymer for dewatering)	• Climate and Resilience • Resource Allocation
Stormwater Treatment	Central Infiltration Basin	Reduces potential wetland disturbance	• Natural World
Stormwater Treatment	Central Infiltration Basin	Adds site vegetation and habitat	• Natural World
Stormwater Treatment	Distributed Rain Gardens	Reduces potential wetland disturbance	• Natural World
Stormwater Treatment	Distributed Rain Gardens	Adds site vegetation and habitat	• Natural World
Stormwater Treatment	Existing Wet Pond Modifications	Reduced site disturbance/excavation	• Natural World
Odor Control	Activated Carbon	Reliable odor control	• Quality of Life
Administration Building HVAC	Air-source Heat Pump	No on-site fossil fuel use/CO_2 emissions. Rapidly decarbonizing electrical grid used for heat	• Climate and Resilience
Process Buildings HVAC	Effluent for Heat Pump or Preheat	Significantly lower natural gas use	• Climate and Resilience

Table 6-7 Hastings WWTP Summary of Sustainability Attributes for Auxiliary Project Features

AREA	FAVORABLE SUSTAINABILITY ATTRIBUTES	APPLICABLE ENVISION CRITERIA
Native plant landscaping	• Habitat • Less irrigation required • Less fertilizer and pesticide use	• Natural World
Tree-planting	• Migration habitat	• Natural World
Noise mitigation	• Avoids negative impacts on neighboring properties	• Quality of Life
Light pollution mitigation	• Migration habitat	• Natural World
Diversity, equity, and inclusion practices in staffing, mentorship, training	• Develop local skills and capabilities • Advance equity and social justice	• Quality of Life • Leadership
Tier 4 Standby Generator	• Supports increased utility-scale renewable development by enabling load shedding for Demand Response	• Climate and Resilience

7. Implementation Plan

7.1. *Introduction*

The work of this Facility Plan will be executed through multiple projects. Scope is generally grouped into three categories as outlined below based on sequence of construction activities required to execute the overall work of this Facility Plan.

- Lift Station and Conveyance Systems
  - 0.2 mgd lift station located on the existing Hastings WWTP site
  - 6-inch diameter forcemain from the lift station to the new gravity trunk sewer
  - Gravity trunk sanitary sewer from the forcemain to the new plant site
- Wastewater Treatment Plant and Outfall
  - Relocation of the 10-inch BP oil line to the west property boundary
  - Site access and security improvements including two driveways into the plant, access gates, and perimeter fencing
  - Preliminary Treatment including wetwell/drywell influent pumping, mag meters, multi-rake bar screens, and grit removal and processing systems
  - Secondary treatment systems including A/O EBPR system
  - UV disinfection
  - Solids processing including DAFTs, sludge storage, and sludge loadout facilities
  - Odor control systems including high dispersion fans for the preliminary treatment building and activated carbon for solids handling facilities
  - A combined administration and maintenance building including offices, meeting spaces, lunchroom, locker rooms, restrooms, and maintenance shop
  - Facility support systems including power distribution, electrical instrumentation and controls, a Tier 4 generator for stand-by power generation, and HVAC and building automation systems
  - 42-inch diameter outfall from the plant to the Mississippi River, about 7,200 linear ft
- Decommission Existing Facilities
  - Remove completely all buildings, tanks, piping, and appurtenances on the southern half of the existing plant site.
  - Remove infrastructure located within the floodplain to a depth of 6 feet below existing grade.
  - Return property to City of Hastings

Estimated total budgetary construction cost for implementation of this work is $145M. Table 7-1 summarizes project scope and capital costs including a 30% contingency for undeveloped design details, engineering, administration, and escalation to midpoint of construction. Detailed opinions of probable cost estimates are included in Appendix 7-1.

Table 7-1 Opinion of Probable Cost for Relocation of Hastings WWTP Service

MAJOR SCOPE ITEM	CONSTRUCTION COST
Lift Station	$980,000
Conveyance	$13,435,000
WWTP – Relocate BP Pipeline	$4,200,000
WWTP – Site Work	$6,966,000
WWTP – Preliminary Treatment	$15,360,000
WWTP – Secondary Treatment	$22,219,000
WWTP – UV Disinfection	$2,547,000
Outfall to Mississippi River	$12,421,000
WWTP – Solids Processing	$9,500,000
WWTP – Facility Support Systems	$12,788,000
Decommission Existing Facilities	$2,000,000
Subtotal	$102,416,000
30% Contingency	$30,725,000
Escalated Construction Cost (3% per year)	$11,983,000
Total Construction Cost	**$145,124,000**
Engineering and Admin (20%)	$20,483,000
Total Capital Cost	**$165,607,000**

7.2. *Implementation Plan*

A planning level implementation plan is shown in Figure 7-1. MCES may move scope items between groupings, or otherwise refine the schedule of this plan as conditions evolve toward the end of the planning period. Changes will be based on engineering evaluations following planning activities.

Construction of the lift station and conveyance system work is expected to start in 2024 and commence in 2026. MCES intends to deliver this work via the design/bid/build process with commissioning activities complete prior to start up of the new Hastings WWTP. Construction of the wastewater treatment plant and outfall is expected to occur between 2024 and 2027. MCES intends to deliver this work via the design/build process with at least 1 year of commissioning and process proving by the design/builder following completion of construction. Following successful commissioning of the new WWTP, the existing Hastings WWTP will be decommissioned and the land returned to the City of Hastings for redevelopment.

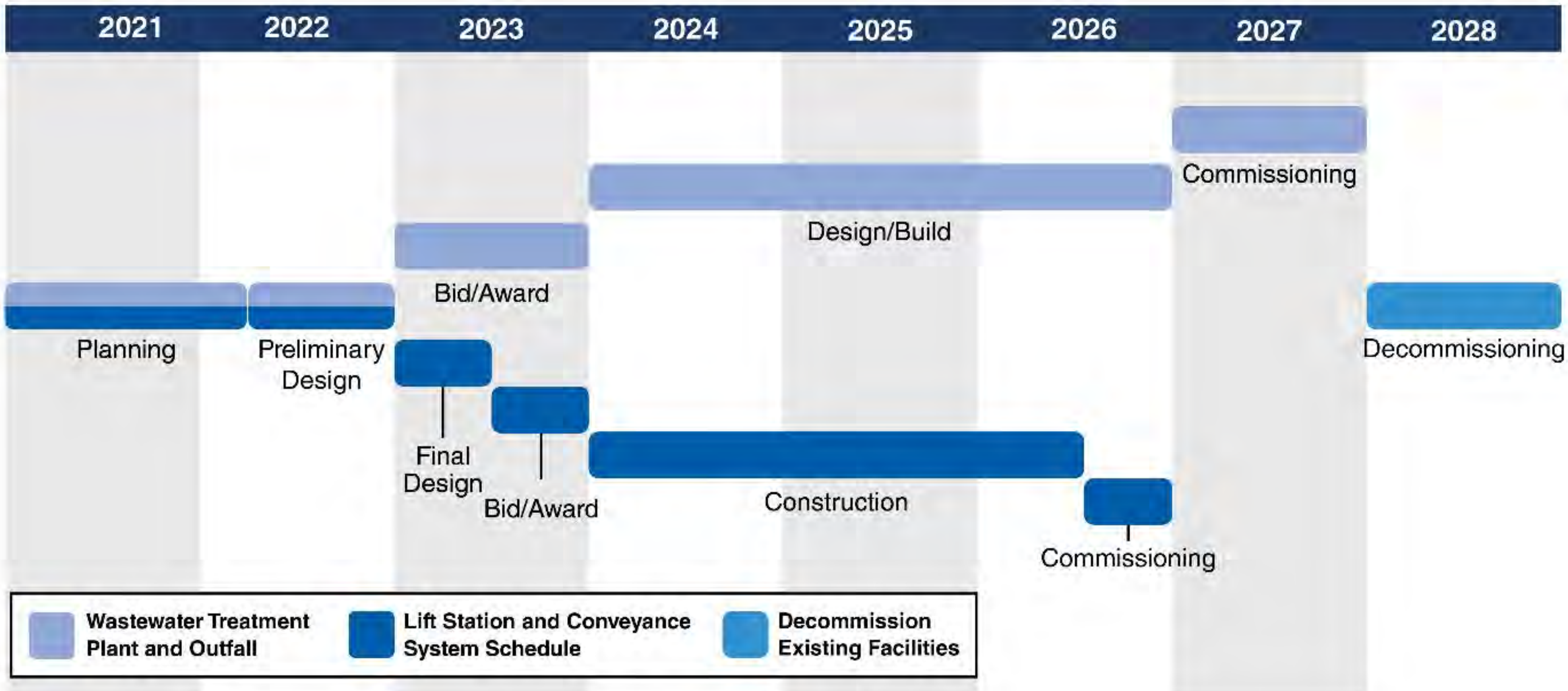


Figure 7-1 Program Schedule Overview Including Planning and Implementation Steps for Project Delivery

8. References

Minnesota Pollution Control Agency. 2021a. Preliminary Effluent Limitations for the Proposed Discharges to the Mississippi River and to the Vermillion River. Letter dated Aug 30, 2021 from Aida Mendez of MPCA to Therese Gilchrist of MCES. 5 p.

Minnesota Pollution Control Agency. 2021a. Lake Pepin and Mississippi River Eutrophication Total Maximum Daily Load Report. 151 p. *https://www.pca.state.mn.us/sites/default/files/wq-iw9-22e.pdf*

State of Minnesota. 2014. The Minnesota Nutrient Reduction Strategy. 348 p. *https://www.pca.state.mn.us/sites/default/files/wq-s1-80.pdf*

Appendix 1-1 2020 Hastings WWTP Condition Assessment

Brown AND Caldwell

30 E. 7th Street, Suite 2500
St. Paul, MN 55101

T: 651-298-0710

Technical Memorandum

Prepared for: Hastings WWTP

Project Title: Hastings WWTP Condition Assessment

Project No.: 154164

Technical Memorandum

Subject: WWTP Condition Assessment

Date: July 23, 2020

To: Seth Chmelik, P.E., MCES

From: Allen P. Sehloff, P.E., Brown and Caldwell

Copy to: File

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.

Signature: ______________________ Date: July 23, 2020

Allen P. Sehloff, PE: License number: 26295

Reviewed by: ______________________

Harold Voth, P.E.

Limitations:

This is a draft memorandum and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.

This document was prepared solely for MCES in accordance with professional standards at the time the services were performed and in accordance with the contract between MCES and Brown and Caldwell dated October 7, 2019. This document is governed by the specific scope of work authorized by MCES; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by MCES and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ADA	Americans With Disabilities Act
BC	Brown and Caldwell
BOD	biochemical oxygen demand
cBOD5	5-day carbonaceous biochemical oxygen demand
CMU	concrete masonry unit
COD	chemical oxygen demand
DIP	ductile iron pipe
DO	dissolved oxygen
ESS	effluent suspended solids
gal/sf-d	gallons per square foot per day
gpd	gallons per day
HVAC	heating, ventilation, air conditioning
I/O	input/output
lb/sf-d	pounds per square foot per day
MCC	motor control center
MCES	Metropolitan Council Environmental Services
MG	million gallons
mg/L	milligrams per liter
mg-N/L	milligrams Nitrogen per liter
PLC	Programmable Logic Controller
RAS	return activated sludge
SOR	surface overflow rate
SRT	solids retention time
SWD	side water depths
TS	total solids
TSS	total suspended solids
V	volt(s)
VFD	variable frequency drive
WAS	waste activated sludge
WRF	water reclamation facility
WWTP	wastewater treatment plant

Section 1: Project Definition

1.1 Objective

The objective of the Hasting Wastewater Treatment Plant (WWTP) condition assessment was to identify near term and long term improvements at the plant and to estimate the capital cost and approximate time frame for implementation of these improvements. This information will be used by MCES to prioritize near term improvements at the existing plant to maintain an acceptable level of service until a new Hastings Wastewater Treatment Plant (WWTP) is constructed.

1.2 Plant History

The Hastings WWTP was originally constructed in 1952 as a primary treatment facility with influent screens and primary settling tanks followed by disinfection. One anaerobic digester and sludge drying beds were provided for solids treatment. The first upgrade to the plant occurred in 1967 and added secondary treatment, including aeration tanks, final settling tanks, and a second anaerobic digester. The last major upgrade began in 1981 and was completed in 1985. This upgrade included new influent screens, an influent pump station, grit removal, new primary settling tanks, additional aeration tanks and associated blowers, new secondary settling tanks, new chlorine contact tanks, a gravity thickener, and a solids loadout building. Odor control was added to the aeration tanks circa 1990. The aeration tank covers, odor control ducts and most of the equipment are still in place, but the system is no longer in service. The effluent outfall was extended further into the Mississippi River in 1991. Dichlorination was added in 1998, and there have been projects to improve HVAC, replace the digester boiler, upgrade electrical systems, replace the diesel storage tank, replace building roofs, and other miscellaneous improvements. Alum addition for phosphorus control was added at the plant in 2018.

1.3 Condition Assessment Summary and Recommendations

The Hastings WWTP consistently meet its necessary performance requirements, however as the plant ages, the cost of maintaining the required level of service will continue to increase. A plant condition assessment has been completed to assess the useful life of existing equipment and to provide recommendations for needed capital improvements. Table 1 provides a summary of the plant process areas and the corresponding cost for capital improvements in each of those areas. Additional columns in table 1 also identify the projected schedule for capital improvements in 5-year increments. All costs listed in Table 1 are based on December 2019 costs. The field observations are included in the printout of the condition assessment workbook, included as Attachment 1 Brown and Caldwell conducted the process, process mechanical, electrical, and instrumentation and control assessments. The yard and site civil, architectural and plumbing assessments were conducted by SEH. BCG performed the structural assessment and LV Engineering performed the HVAC assessment, both as subconsultants to SEH. The outfall inspection was conducted by AMI Consulting Engineers in August 2019, as a subconsultant to SEH.

If MCES intends to construct a new Hastings WWTP prior to 2030, the cost for the minimum recommended improvements are summarized in the 2025 column of Table 1. This represents the improvements identified to maintain the safety of plant personnel and to maintain the necessary level of service and permit compliance prior to plant de-commissioning no later than 2030.

Table 1. Capital Cost Summary by Process Area

Facility Number	Description	Total Cost by Area	2025[a]	2030[a]	2035[a]	2040[a]
1	Final Clarifiers 1 and 2	$1,521,682	$277,352	$0	$1,244,330	$0
2 and 3	Chlorine Contact Basin and Disinfection Building	$658,909	$467,116	$127,551	$62,779	$1,463
4 and 5	Digester	$614,642	$113,362	$501,280	$0	$0
6	RAS/WAS Pump and Blower Building	$1,155,333	$131,483	$116,200	$907,650	$0
7	Aeration Tanks	$2,558,868	$537,000	$2,011,868	$0	$10,000
8	Generator	$67,656	$46,656	$21,000	$0	$0
9	Influent	$1,504,871	$444,318	$390,275	$228,000	$442,278
10	Administration	$290,540	$200,307	$77,092	$0	$13,141
11 and 13	Primary Tanks 1 and 2 and Gravity Thickening	$1,420,200	$435,200	$985,000	$0	$0
12	Solids	$686,102	$326,675	$188,687	$114,000	$56,740
14	Grit	$1,889,044	$354,801	$1,406,743	$124,000	$3,500
19	Odor	$151,100	$105,939	$10,161	$35,000	$0
21	Yard and Site Civil	$431,905	$161,022	$107,880	$163,003	$0
	Total Capital Cost	**$12,950,852**	**$3,601,231**	**$5,943,737**	**$2,878,762**	**$527,122**

a. *Cost distribution by year required.*

Improvements to be completed by 2025 are further described in Table 2. Should MCES decide to continue plant operation beyond 2030, further improvements should be implemented as further identified in the subsequent columns of Table 1.

Table 2. Recommended Near Term Improvements at the Hastings WWTP

Facility Number	Description	Recommended Improvements
1	Final Clarifiers 1 and 2	• Continue to perform annual preventive maintenance. • Repair bent skimmer arm on Final Clarifier 2.
2 and 3	chlorine Contact Basin and Disinfection Building	• Continue to perform annual preventive maintenance. • Repair/replace HVAC Systems as identified in Attachment 1.
4 and 5	Sludge Digesters	• Consider removing stucco and insulation from tank exterior to reduce freeze thaw damage associated with water trapped behind the stucco.
6	RAS/WAS Pump and Blower Building	• Continue to perform annual preventive maintenance. • Repair/replace HVAC Systems as identified in Attachment 1.
7	Aeration Tanks	• Replace diffusers in at least one of the north aeration tanks and place the tank back in service. • Remove abandoned, corroded, spray water piping from these tanks to keep it from falling into the tanks. • Once a north tank is back in service, sequentially remove the south two aeration tanks from service, clean and inspect. Replace diffusers as necessary.

Facility Number	Description	Recommended Improvements
8	Generator	• Continue to perform annual preventive maintenance.
9	Influent Pump Station	• Continue to perform annual preventive maintenance. • Replace plant water pumps to better meet demands • Repair/replace HVAC Systems as identified in Attachment 1.
10	Administration	• Continue to perform annual preventive maintenance. • Repair/replace HVAC Systems as identified in Attachment 1.
11 and 13	Primary Tanks 1 and 2 and Gravity Thickening	• Continue to perform annual preventive maintenance.
12	Solids Unit	• Continue to perform annual preventive maintenance. • Replace existing Wemco Model C with a pump with a screw type impeller (Hydrostal or equal), to improve sludge pumping and reduce loadout time. This would be an opportunity to test a piece of equipment that may be of use at other MCES facilities. • Repair/replace HVAC Systems as identified in Attachment 1.
14	Grit	• Continue to perform annual preventive maintenance. • Limit expenditures on the grit facilities. It is probable that the primary clarifiers remove more grit than the grit removal units, with this material being trucked to the Metro WWTP in the thickened sludge. If the grit removal equipment fails, bypass it and rely on the primary clarifiers for grit removal. • Repair/replace HVAC Systems as identified in Attachment 1.
19	Odor Control Unit	• This equipment has been abandoned in place. • Continue performing preventive maintenance on the building, so that it may continue to function as a storage facility. • Consider removal of the abandoned outdoor foul air ductwork, as the insulation is starting to fall off and become a nuisance. • Replace HVAC system with unit sized for current building function as a storage area.
21	Yard and Site Civil	• Provide concrete aprons at the sludge loadout truck bay entrance and exit. The concrete at the exist should extend to the street. • Repair electrical conduit/cable where it has pulled out of junction boxes due to settlement. Reroute electrical services above grade where possible. • Repair buried I&C conduit/cable where it has pulled out of junction boxes due to settlement. Reroute instrument cables above grade where possible.

Section 2: Condition Assessment

A site visit was conducted on October 16, 2019, to assess the overall condition of the MCES Hastings WWTP. The field observations have been documented in a tabular format and are included in Attachment A. General observations, arranged by facility number as identified on Figure 1, are presented below. This memorandum focuses on condition and remaining useful life. Assessments of the plant HVAC systems and the plant outfall were performed by AMI Consulting Engineers and LV Engineering respectively under separate assignments, but the results are summarized in this memo.

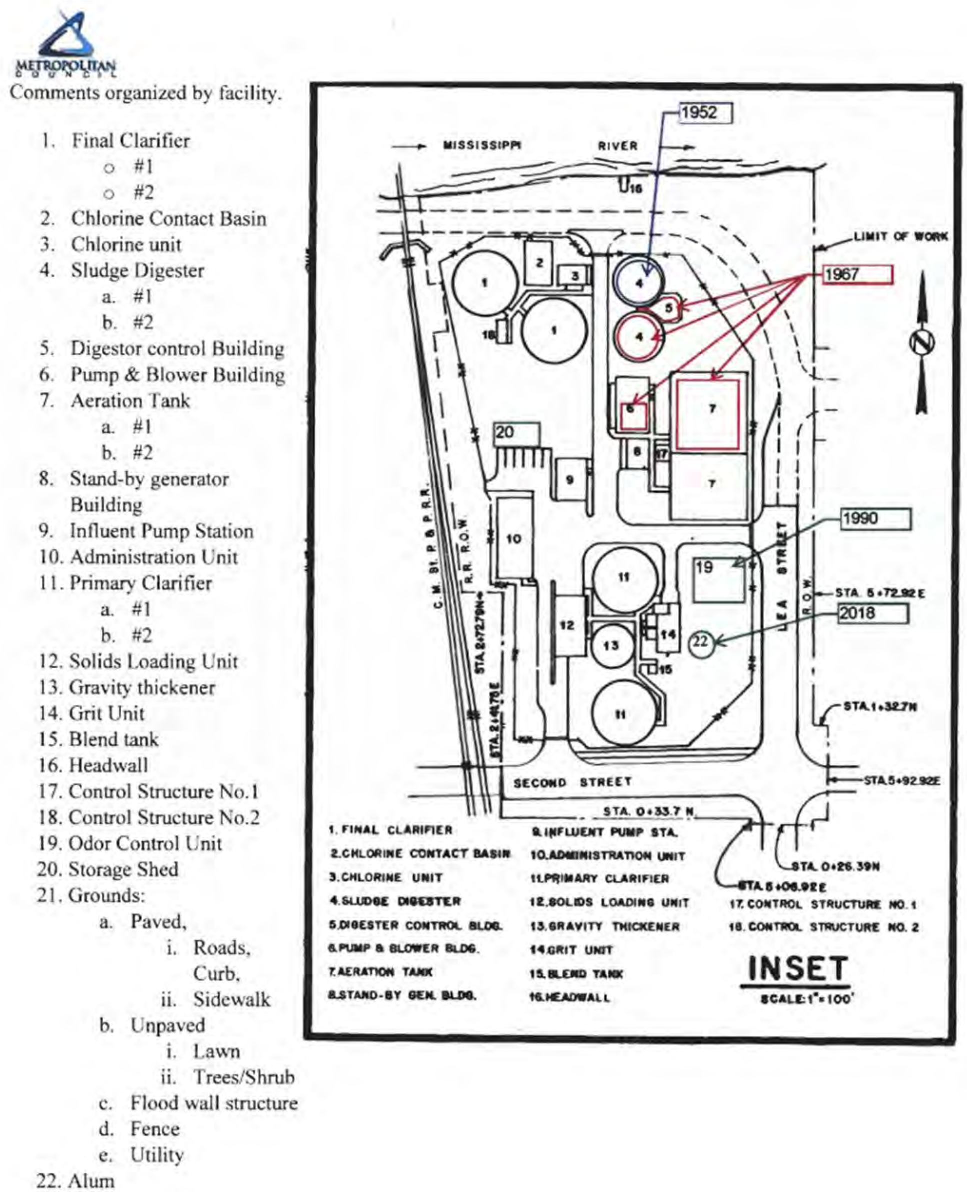


Figure 1. General observations arranged by facility number.

2.1 Facility 1 – Final Clarifiers

Two 60-foot-diameter final clarifiers with 14-foot SWD were placed in service circa 1984.

2.1.1 Process

Reported effluent data shows the effluent suspended solids (ESS) and 5-day carbonaceous biochemical oxygen demand (cBOD5) average roughly 4 to 5 milligrams per liter (mg/L) during summer months and typically increase to 10 to 12 mg/L in the winter months. Effluent ammonia discharges see a similar pattern, with summer discharges less than 1 mg-N/L and winter discharges of 10 mg-N/L or higher, even when operating at solids retention times (SRT) of 10 days. Effluent chemical oxygen demand (COD) also increases from 35 mg/L in summer to 60 mg/L or higher in winter. Part of this increase is due to higher effluent total suspended solids (TSS)/cBOD5, but there also appears to be a soluble COD increase during this period. The increase in soluble COD suggests the influent wastewater has a soluble biodegradable component that is temperature dependent, or there is a seasonal non-biodegradable COD contribution.

2.1.2 Process Mechanical

The final clarifiers use Tow-Bro®-type sludge collectors that appear to be in good condition (Figure 2 shows a final clarifier). Some comments on the final clarifiers are as follows:

- Final Clarifier 2 (South):
  - The skimming arm is bent and in need of repair.
  - The central gear box has an oil leak and requires repair.
- Both Final Clarifiers:
  - The scum beach/scum trough metals are very thin and showing signs of corrosion. Inspect and repair/replace as needed.
  - Inspect and repair/replace weirs as needed

It is anticipated that these repairs can be made as a part of annual inspections and preventive maintenance.

Figure 2. Final Clarifier.

2.1.3 Architectural

- Remove vines on tank face.

2.1.4 Structural

- A structural inspection of the mechanism should be conducted the next time a clarifier is removed from service, with repairs completed as needed.
- Bridge structure and carbon steel systems will require repainting in near future.

2.1.5 Electrical

- There have been past problems with underground wiring for finals (both power and input/output [I/O]),
- Consider replacement of buried conduit and cable with above grade power and I/O runs.

2.1.6 Instrumentation

- There have been past problems with underground wiring for finals (both power and I/O),
- Consider replacing buried conduit and cable with above-grade power and I/O runs.

2.1.7 HVAC

- No HVAC.

2.1.8 Plumbing

- No plumbing.

2.2 Facilities 2 and 3 – Disinfection

2.2.1 Process

The plant uses sodium hypochlorite and sodium bisulfite for chlorination/dichlorination. There are two 1,000-gallon sodium hypochlorite storage tanks with three peristaltic metering pumps. Sodium hypochlorite totes are currently used for chlorination. There is a project under construction to upgrade the system.

There is one 1,900-gallon sodium bisulfite storage tank, a small day tank, and a peristaltic metering pump. Approximately 50 gallons per day (gpd) of bisulfite solution is used per 1 million gallons per day (mgd) of influent flow. This tank is larger than building openings. If it needs to be replaced, consider installing two smaller tanks.

Chemical dosing is flow-paced to influent flow.

Chemical mixers installed in 1985 are used for mixing chemicals into process stream flow. These mixers were reported to be in good operating condition.

2.2.2 Process Mechanical

The chlorination/dichlorination systems are in generally good condition, with the exception of the influent gates at the chlorine contact tanks.

- The gates are normally open with both contact tanks in service. The leakage from the gates makes it difficult to take a contact tank out of service for cleaning and/or inspection. Replacement of the gates may be warranted.
  - The west side gate will not seal. This will be difficult to bypass and replace.
  - The east side gate will seal but is nearing the end of its service life.
  - Also, the drains for both the east and west tanks are stuck; replacing the drains in conjunction with the gates is recommended.
- The chlorine mixer has been repaired in the past and should be replaced when this area is down.

- The bisulfate mixers' two gearboxes are original and will need to be replaced in the near future.
- The age of the final effluent sampler and pump is impacting maintenance as it is becoming more difficult to find spare parts. Replacement is recommended.
- The chlorine and bisulfate piping have both been repaired, with chlorine piping repairs being more extensive. Review piping condition as a part of annual preventive maintenance and repair or replacements are warranted.
- The sodium hypochlorite tanks have a 10 year life and are replaced on a 10-year schedule.

2.2.3 Architectural

- The roof of this building was recently replaced (2017) and is in excellent shape as of the inspection. The exterior walls are concrete masonry unit (CMU) block with face brick veneer.
- The walls are in good shape, and the mortar joints appear to be in acceptable condition and weathertight.
- The control joints showed signs of failing sealant.
- The interior finishes were in good condition in both the original and addition portions of building.
- The building is in good shape for continued use.
- The most immediate needs are sealant replacement at control joints along the west side and providing general tuckpointing at the exterior face brick at compromised areas.

2.2.4 Structural

- Structural systems are in good condition.
- Maintenance-type repairs are required for building envelope system.
- Concrete spalling at stairs due to corrosion of embedded pipe posts will require repairs.

2.2.5 Electrical

The electrical equipment has been well maintained and is in generally good condition.

- The panelboards and dry-type transformer appear to be from the original plant construction. They should undergo maintenance testing, with replacement within five years considered.
- The transformer is an older model and needs to be replaced.
- The lighting panel is new but is rusting due to possible ventilation issues.

2.2.6 Instrumentation

- Programmable logic controller (PLC) HASAC is an Allen-Bradley SLC-5/05, which is an obsolete model. The PLC and related I/O should be replaced with the current MCES standard (Allen-Bradley CompactLogix L30ER).
- The PLC should be connected to the local field hub to network with the plantwide system.

2.2.7 HVAC

- HVAC equipment is improperly sized for ventilation requirements.
- Equipment is in poor condition, is past its expected service life, and should be replaced.

2.2.8 Plumbing

- Corrosion is present on potable piping, tank, and water heater.
- The emergency shower is in good condition.

- A natural gas odor is noticeable in the sampler room when the HVAC system is off, which may indicate a gas leak.

2.3 Facilities 4 and 5 – Digesters and Digester Control Building

2.3.1 Process

The anaerobic digesters are no longer in service. Thickened sludge is trucked to the Metro WWTP. The digester control building is now being used for storage.

2.3.2 Process Mechanical

- The plant influent piping has been modified so that the two digesters can be used as influent storage tanks, but this has never been tested.
- Consider demolition and removal of the out-of-service heat exchanger (Boiler DIG-HX) to provide additional storage space.
- The operability of the floating roofs on the two digestors being used for emergency influent storage is unknown. The only way to confirm that they are functional would be to fill a tank. Consider removal of these covers.

2.3.3 Architectural

- Each of the tanks has had a veneer finish added, and in both cases this finish is in poor condition. The north tank received a plaster-type skim coat at some point, and the south tank has a brick veneer that is in fair to poor condition.
- The roof of the digester control building was recently replaced (2017) and is in excellent shape as of the inspection.
- The exterior walls are CMU block with face brick veneer. The walls are in good shape, and the mortar joints and control joints appear to be in good condition and weathertight.
- The interior finishes are in fair condition, with visible peeling in several places. Doors and windows are in good condition.
- The building is in good shape for future use and appears to be weathertight. It is currently only being used for parts storage and maintenance.
- The structures are not currently functioning as digesters; further rehabilitation would be required to restore them for that purpose.
- The most immediate needs are to restore the tank veneers at both north and south tanks, replace interior finishes, and provide miscellaneous tuckpointing of face brick on the building itself at compromised areas.
- The grade along the east face allows water flows into the digestor control building. Regrading the exterior to redirect water away from building is recommended.

2.3.4 Structural

- Structural systems are in fair condition.
- Significant maintenance-type repairs are required for the building envelope system.
- The north digester tank displayed a large amount of concrete deterioration.
- Structural repairs of the north digester tank should be considered, as this tank functions as a part of the flood wall on the north side of the plant.
- Consider removal of failing stucco and insulation from tank exteriors to reduce freeze thaw damage due to trapped water.

2.3.5 Electrical

- The existing motor control center (MCC) and lighting panel are energized to feed a small amount of loads. No issues were noted.

2.3.5.1 Instrumentation

- No controls issues were noted.

2.3.6 HVAC

- The space is no longer used to support anaerobic digesters. Some HVAC equipment is no longer applicable.
- Equipment is in satisfactory condition. HVAC equipment should be maintained as needed.

2.3.7 Plumbing

- No plumbing comments.

2.4 Facility 6 – Pump and Blower Building

2.4.1 Process

- There are four positive displacement blowers for aeration airflow as shown in Figure 3. Aeration blowers 1 and 2 were installed in 1967, and aeration blowers 3 and 4 were installed in 1984. Aeration blowers 3 and 4 are typically used to supply aeration air and have variable-frequency drives (VFD) for adjusting blower output.
- There is no automated dissolved oxygen (DO) control for blower operation.
- The blowers have been re-built in the last 5 years. The plant typically operates with one blower in service, as the operation of two blowers results in airflow through the blow-off valves. The plant sets the blower output based on motor hertz and noted that there is a minimum motor hertz (speed) that needs to be maintained to prevent the blower from over-heating.
- There are three 2,000-gpm, variable-speed centrifugal return activated sludge (RAS) pumps. One RAS pump is dedicated to each final clarifier, with the third pump as standby.
- There are two variable-speed centrifugal waste activated sludge (WAS) pumps. A cross-connection between the clarifier RAS withdrawal lines allows the WAS pumps to draw flow from one or both clarifiers. The flow drawn from each clarifier is not reported.
- RAS pump flow is manually adjusted and not automatically flow-paced to influent flow. Typical total RAS flow is 0.5 mgd. If the sludge blanket is 3 feet or higher, the RAS speed (flow) is increased.
- The RAS magmeters were installed in 1985. The installation is not ideal, as there are 12-inch by 8-inch reducers connected to both sides of the meter. Ideally the upstream reducer flange would be a minimum of 5 pipe diameters upstream of the meter, and the beginning of the downstream fitting should be a minimum of 2 pipe diameters downstream of the meter. A clarifier draw-down test to verify RAS flow meter accuracy could be conducted. MCES staff indicate that the meters should be replaced.
- The WAS magmeter has manual valves connected to each side of the flow meter making meter accuracy questionable (There is not 5 pipe diameters upstream or 2 pipe diameters downstream). If problems with meter accuracy are suspected, a flow test to confirm meter accuracy should be conducted.
- Review of plant operating records shows the calculated RAS flow rate based on the reported mixed liquor suspended solids (MLSS), RAS TSS, and influent flow is roughly 175 percent of the reported

RAS flow. Preliminary process modeling shows increasing the RAS flow by 1.75*reported RAS flow results in a good correlation between the reported mass-based SRTs and model-predicted SRTs. This anomaly should be further investigated to confirm if the reported RAS TSS is representative of the WAS TSS, or if the RAS flow meter is correct. This is particularly important in the process model calibration, as defining the correct SRT will impact the nitrification kinetics used in the secondary treatment capacity analysis.

Figure 3. Aeration Blowers.

2.4.2 Process Mechanical

This building houses the RAS pumps, WAS pumps, and four rotary lobe blowers for aeration air supply.

- The RAS pumps have newer VFDs and are in good condition (as shown in Figure 4).
- The WAS pumps are not optimally placed and have a history of cavitation issues. Relocating these pumps to the opposite wall would provide better access to the pumps.
- The two newer blowers were installed circa 1984 and are in good condition.
  - Blower speed is controlled using VFDs. The speed is currently manually set.
  - Automation of the blower speed based on DO may be desired, with a minimum speed set point to maintain adequate blower lubrication.
  - If automated DO control is provided, these blowers may be oversized and should be evaluated for replacement.
- The two older blowers date back to the 1960s.
  - One of the two older blowers is still operable. There is a blow-off valve used during start-up that discharges into the blower room. It would be better if the blow off had been routed outdoors, due to the noise level in the room during blower startup.
  - The other older blower would need to be overhauled and a VFD provided to be placed back in service.
- There is an original 1969 air compressor ICA-BB-C that will need replacement in the next 5 to 10 years.
- The spray water system located in this building is out of service and may be removed.

Figure 4. RAS Pumps.

2.4.3 Architectural

- The roof of this building was recently replaced (2017) and is in excellent shape as of the inspection. The exterior walls are CMU block with face brick veneer.
- The walls are in excellent shape, and the mortar joints appear to be in great condition and weathertight.
- The control joints showed signs of failing sealant. Interior finishes were in good condition.
- The building is in good shape for continued use, as long as it still provides adequate space for required equipment.
- The most immediate needs would be adjusting or replacing the door into the north blower room, replacing control joint sealant, and repairing existing concrete steps on the northwest side.

2.4.4 Structural

- Structural systems are in good condition.
- Maintenance-type repairs are required for the building envelope system.
- There is concrete spalling at the walkway due to corrosion of embedded pipe posts that will require repairs. Replace the guard railing and repair concrete.

2.4.5 Electrical

- The electrical equipment has been well maintained and is in generally good condition.
  - Vertical conduits extending from underground have pulled away from electrical boxes mounted on the building exterior due to settlement. Expansion fittings should be installed, and the conduits reattached to the boxes.
  - The MCC and lighting panelboard are new and are currently being installed.
  - Arc flash analysis and labelling is to be completed for this building.

2.4.6 Instrumentation

- PLC HASAE is an Allen-Bradley CompactLogix and was installed in 2018.
  - MCES indicated a need for expansion for RAS control.

  - PLC and control for building needs to be improved; move controls for PLC for building to southeast area next to MCC
  - The PLC should be connected to the local field hub to network with the plantwide system.
  - RAS flow meters should be replaced.
- Add a pressure transmitter to monitor air flow/level. Currently there is only a digital switch.

2.4.7 HVAC

- Most HVAC equipment is in poor condition and past its expected service life.

2.4.8 Plumbing

- No plumbing comments.

2.5 Area 7 – Aeration Tanks

2.5.1 Process

There are four 0.28-million-gallon (MG) aeration tanks; the north two were constructed in 1967, and the south two in 1985. Each aeration tank has a 2-pass configuration with capabilities for step-feeding primary effluent to the head and at the 1/3 and 2/3 points of the first pass. Repair of the broken step-feedgates for step-feed operation is needed. Current operating practice is to feed primary effluent to the head of the tank.

- The north two tanks are not operable.
- The south two tanks are in operation but have not been maintained. This is because the north tanks are inoperable and unable to back up this system.
- PRVs located at the bottom of the tanks for groundwater relief need to be replaced/repaired.
- Groundwater equalization valves need to be replaced. Each pass has two on the east and west walls, for a total of 16.
- Step feed gates are not functional.
- Diffusers need replacement in all four tanks (as shown in Figure 5).
- A primary effluent and RAS control structure splits flow to each aeration basin using weirs and is doing a good job maintaining the tank MLSS concentrations within 5 percent of each tank.
- Each aeration tank has fine-pore ceramic diffusers. There is one drop leg for each pass of each aeration tank with a manual aeration airflow control valve on each drop leg. There is no automated DO control, which makes balancing airflow between the on-line aeration tanks/passes very difficult. Typically, the aeration profile is a low DO at the front of the tank and high DOs at the end of the tank. Information on the existing diffuser density was not provided. Plant staff noted that several aeration laterals are broken in the off-line tanks. Plant staff noted the existing aeration diffuser grids were scheduled to be upgraded to better fit the existing DO profile, diffusers were to be replaced and broken laterals repairs.
- There is one DO probe for each of the two operating tanks.
- Each aeration tank pass has a fiberglass cover with a wet scrubber for odor control; however, the system has not been in operation for approximately 20 years. Aeration tank off-gas is currently vented through open doors on the tank covers and deteriorated flexible connections on the fiberglass piping.

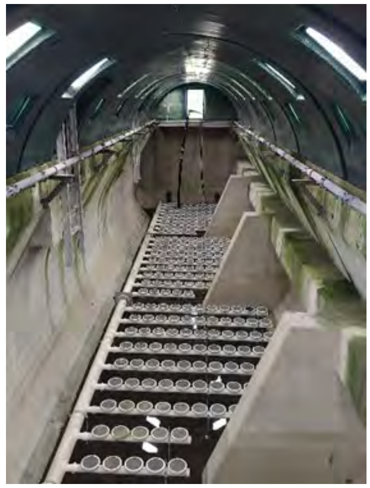


Figure 5. Aeration Tank Diffusers.

2.5.2 Process Mechanical

- The tanks and covers appear to be in good condition, but there are some issues with the aeration tanks.
  - The odor control system, designed to pull foul air from under the aeration tank covers, has been out of service for about 20 years. There does not appear to be any need to place this system back in service. The odor control building is being used for storage.
  - The insulation around the foul-air duct needs to be replaced or the entire system needs to be removed.
  - There are slide gates to allow step feed to the aeration tanks. These gates leak and should be repaired or replaced. Alternatively, if step feed is never going to be used, the gates could be removed, and the openings filled in.
  - Basins 1 and 2 are out of service for diffuser replacement. This should be completed, and then the diffusers replaced on Basins 3 and 4.
  - There is a lack of DO control in the aeration tanks. Valve automation might be considered if the plant is going to remain in service beyond 2030.
  - The spray water system in the aeration tanks is out of service, and parts have fallen into the basins and caused process disruptions. The spray water system should be demolished when the diffusers are replaced.

2.5.3 Architectural

- No architectural comments.

2.5.4 Structural

- There is isolated concrete deterioration of concrete walkways.
- Maintenance repairs of concrete is required.
  - Along the east wall of all four tanks there is CMU distress. The North-East corner has CMU Damage. Repairs are needed.

  - Concrete spalling was present at railing embedment posts. The railing at the north elevation displayed corrosion distress and should be repaired.
  - Railing distress is present. Railing repair or replacing is required

2.5.5 Electrical

- No electrical issues observed.

2.5.6 Instrumentation

- No controls issues noted.
- If automated control is provided:
  - Add six DO probes for a total of 8 installed DO probes (two per tank).
  - Provide modulating actuators on air flow control valves.
  - A DO instrumentation control system (PLC) would be needed.

2.5.7 HVAC

- No HVAC.

2.5.8 Plumbing

- No plumbing.

2.6 Facility 8 – Standby Generator

2.6.1 Process

- No comments.

2.6.2 Process Mechanical

- No Comments

2.6.3 Architectural

- The roof of this building was recently replaced (2017) and is in excellent shape as of the inspection.
- The exterior walls are CMU block with face brick veneer.
- The walls are in excellent shape, and the mortar joints and control joints appear to be in great condition and weathertight.
- The interior finishes are in good condition throughout.
- The doors are in excellent condition.
- The building is in good shape for continued use.
- There are no deficiencies to address.

2.6.4 Structural

- Structural systems are in good condition.
- Maintenance type repairs are required for building envelope system.

2.6.5 Electrical

The electrical equipment has been well maintained and is in generally good condition.

- The existing panelboard is 120/240-volt (V), 3-phase high leg delta. which is an obsolete voltage with limited 120 V capacity. The panelboard and related dry-type transformer should be replaced with a 120/208 V, 3-phase panel.
- Standby generator condition is good with no noted issues (as shown in Figure 6). Continue with regular maintenance and testing.
- The transformer to Panel GN-ELT-T is too small for the current demand. Replacement with a correctly sized transformer is recommended.
- Diesel fuel pumps for generator day tanks have a questionable usable life and should be replaced within 5 years, or sooner if needed.
- Leak detection system on the main underground fuel tank is antiquated. MCES has updated underground fuel tank leak detection at other plants.
- The capacitor bank may no longer serve a function.
- The below-ground hard wire is of questionable condition for both power and instrumentation.
- Replacement with above-ground hard wire is recommended.

Figure 6. Standby Generator

2.6.6 Instrumentation

- The below-ground hard wire is of questionable condition for both power and instrumentation. Replacement with above-ground hard wire is recommended.

2.6.7 HVAC

- HVAC equipment is in satisfactory condition. Maintain as needed.
- The electric unit heater trips out. It more capacity from the transformer. Modifications were made to the heater to work with existing power.

2.6.8 Plumbing

- Plumbing appeared to be in satisfactory condition.

2.7 Facility 9 – Influent Pump Station

2.7.1 Process

- Covered below under Process Mechanical.

2.7.2 Process Mechanical

The headworks equipment has been well maintained and is in generally good condition.

- The bar screen was rebuilt within the last year. While in fair to good condition, replacement should be considered if the plant is going to remain in service for more than 10 years.
- The screenings compactor does not appear on the original record drawings. It was reportedly installed shortly after startup of the facility and is nearing the end of its service life. The addition of the compactor pushed the screenings dumpster close to the top of the stairs, restricting access to the wetwell.
- Influent pumps are in good condition but are reported to be subject to cavitation on startup due to grit accumulation in wetwell.
- There are operational considerations associated with grit and floatable accumulation in the wetwell that may need to be addressed. The pumping station needs to be bypassed for about 6 hours roughly every 2 months to remove screenings and grit from the wetwell. This requires isolation of the wetwell and the use of an engine-driven, trailer-mounted pump to pump directly to the primary clarifiers.
- The emergency diesel-powered influent pump is subject to cavitation due grit accumulation in wet well (on start-up).
- The influent flow meter installation is less than ideal, with essentially no straight pipe either upstream of downstream of the meter.
- Plant water pumps are old, undersized for peak demand, and sometimes cavitate.
- Plant water strainer should be replaced.

2.7.3 Architectural

- The roof of this building was recently replaced (2017) and is in excellent shape as of the inspection.
- The exterior walls are CMU block with face brick veneer. The walls are in excellent shape, and the mortar joints and control joints appear to be in great condition.
- Interior finishes on the ‘wet’ side were relatively dirty but appeared to be adhered to the wall surfaces well. There was a fair amount of discoloration on the ‘dry’ side ground-level walls.
- Lower levels were in good shape. The building is in good shape for continued use
- Most immediate need would be new finishes (paint, coatings).

2.7.4 Structural

- Structural systems are in good condition.
- Maintenance-type repairs are required for building envelope system.
- Wall cracking of foundation wall was reported but no leakage or distress was present during our review. There is an inspection report by HR Green in 2019 regarding the influent wet well wall crack/ leak (MCES reported that on Dec. 13, 2019, the crack identified in the HR Green report was still leaking from the wet well to the dry)

2.7.5 Electrical

- Much of the electrical equipment goes back to the facility's original construction. There is some equipment that could develop issues in the future.
  - The MCC has been subjected to water from above and behind. This MCC is 34 years old and is near the end of its expected life, with limited replacement parts available. It should be replaced to prevent issues due to potential water damage.
  - The existing lighting panelboard is in poor condition (rusty enclosure) with out-of-production circuit breakers. It should be replaced.
  - The influent pump VFDs were installed three years ago; their condition is excellent and life expectancy should be good.
  - Abandoned electrical cabinets should be removed from the electrical space to free up space for new equipment or controls improvements.

2.7.6 Instrumentation

- PLC HASAA is an Allen-Bradley SLC-5/05, which is an obsolete model. The PLC and related I/O should be replaced with the current MCES standard (Allen-Bradley CompactLogix L30ER).
- The existing PLC is housed in a repurposed enclosure. New PLC and controls upgrades should be installed in a dedicated control cabinet in accordance with MCES standards. Abandoned cabinets can be removed to provide space for any new controls.
- The PLC should be connected to the local field hub to network with the plantwide system.

2.7.7 HVAC

- HVAC is in poor condition and improperly sized.
- HVAC cannot maintain code required air changes.
- Corrosion is present.
- Equipment is past its expected service life.

2.7.8 Plumbing

- Corrosion is present on exterior gas piping and on drains.
- Effluent and potable piping and vent piping appeared to be in satisfactory condition.

2.8 Facility 10 – Administration Unit

2.8.1 Process

- Not applicable.

2.8.2 Process Mechanical

- Not applicable.

2.8.3 Architectural

- The roof of this building was recently replaced (2017) and is in excellent shape as of the inspection. The exterior walls are CMU block with face brick veneer.
- The walls are in excellent shape, and the mortar joints and control joints appear to be in great condition and weathertight.
- The doors and windows appear to be in excellent shape.

- The overhead doors are in fair shape and operate as intended but are showing age.
- The interior finishes throughout are good but showing age and wear.
- The current layout does not comply with current ADA (Americans With Disabilities Act) requirements with regard to lab and restroom accessibility. The building is in good shape for continued use but does not offer much room for growth.
- The most immediate need would be updated interior finishes, followed by overhead door replacement.
- Any renovations needed to accommodate larger staff would be required to address improved accessibility throughout.

2.8.4 Structural

- Structural systems are in good condition,
- Maintenance-type repairs are required for building envelope system.

2.8.5 Electrical

- No issues noted on electrical.

2.8.6 Instrumentation

- PLC HASAB is an Allen-Bradley SLC-5/05, which is an obsolete model. The PLC and related I/O should be replaced with the current MCES standard (Allen-Bradley CompactLogix L30ER). At that time, the PLC should be connected to the local field hub to network with the plantwide system.
- Plant staff reported significant information technology (IT) issues and a slow network. The whole system needs to be reviewed for current usage and updated as required.

2.8.7 HVAC

- Generally, equipment is in satisfactory condition.
- Some fans need replacement.
- Most heating equipment can remain and be maintained as needed.

2.8.8 Plumbing

- Plumbing is in satisfactory condition.
- Water heater is in good condition.

2.9 Facilities 11 and 13 – Primary Clarifiers/Gravity Thickener

2.9.1 Process

The primary clarifiers and gravity thickener operation are closely integrated and were installed circa 1984.

- Primary clarifiers:
  - There are two 60-foot-diameter primary clarifiers, each with an 8.17-foot side water depth (SWD).
  - The primary clarifiers have their original collector mechanisms.
  - Both primary clarifiers are typically in service. Primary clarifier TSS, BOD, and COD removal averaged 65 percent, 40 percent, and 40 percent, respectively (based on reported plant influent and primary effluent values), from January 1, 2016, through December 31, 2018. The average surface overflow rate (SOR) during this time was 250 gallons per square foot-day (gal/sf-d).

  - Primary sludge is pumped continuously from the primary clarifiers at a rate of roughly 450,000 gpd, which results in an average primary sludge TSS concentration of roughly 600 mg/L.
- Gravity thickener:
  - The 45-foot-diameter gravity thickener has a 12-foot SWD.
  - The gravity thickener co-thickens primary sludge and WAS. Elutriation water is not added to the gravity thickener. On average, the gravity thickener is currently lightly loaded with a solids loading rate of 2.5 pounds per square foot-day (lb/sf-d) and an SOR of 310 gal/sf-d. Operating data was not provided to determine the TSS capture efficiency of the gravity thickener. Because there is no sludge loadout over the weekends, sludge pumping on Mondays is more difficult with the existing recessed impeller pumps because of higher solids concentrations that develop over the weekends.
  - The bottom rakes of the gravity thickener were replaced, which has minimized sludge “burping” in the thickener. The bridge was replaced at the same time.
- Primary and gravity thickener scum is pumped directly to loadout.
- Grit accumulation was noted to occur in the primary sludge/WAS blend tank (Area 15) upstream of the gravity thickener.
- Each clarifier/thickener has an insulated aluminum cover and is exhausted to odor control. MCES identified odor control as a concern as air is drawn through the primary clarifiers and gravity thickener in series.
- The duct work has flexible joints that are exposed and will need to be replaced.
- Roof joint caps are failing and need to be replaced.
- Lighting needs to be upgraded to provide adequate lighting.
- The gravity thickener was out of service from October 19, 2017, through May 16, 2018. During this period the primary clarifier TSS, BOD, and COD removal averaged 55 percent, 34 percent, and 32 percent, respectively (based on reported plant influent and primary effluent values). The average SOR during this time was roughly 500 gal/sf-d.

2.9.2 Process Mechanical

- The primary clarifiers and gravity thickener appear to be in fair condition.
- The gravity thickener sludge collector recently underwent significant repairs. This 2017 metals renewal was a selective repair, not a complete rebuild. The bottom rakes of the gravity thickener were replaced and has minimized sludge “burping” in the thickener. The bridge was replaced at the same time.
- The motors and gear drives on the primaries and gravity thickener are original to the tanks; maintain and replace as necessary.
- The primary sludge collectors could only be observed from the tank surface. A more thorough structural inspection of the collector mechanisms should be scheduled the next time a tank is removed from service.
- There are operational issues associated with the primary clarifiers and gravity thickeners. When the gravity thickener is out of service, the north primary clarifier is taken out of service and the south primary clarifier operates as both the primary clarifier and the gravity thickener. The sludge loadout pumps are connected to the south primary clarifier and allow for loadout to occur when the gravity thickener is out of service. The suction piping from this primary to the thickened sludge pumps is much longer, which makes sludge pumping difficult.

- The primary sludge and scum pumps are located in the lower level of the grit removal building. The primary sludge pumps are Wemco Model C recessed impeller pumps and appear to be in good condition. Parts are readily available, and these pumps can be maintained or replaced if needed. The scum pumps are piston pumps. While they still functional and are in fair condition, consider replacement with an electro-mechanical diaphragm pump (Abel EM, or equal) if a pump were to fail.

2.9.3 Architectural

- There are aluminum covers on each of the tanks, with doors providing access to the interior walkways. Please see structural and process summaries for comments on tank condition.
- Most immediate need would be replacement of doors and hardware at each of the tanks.

2.9.4 Structural

- Bridge structure and carbon steel systems in the primary clarifiers will require metals repair and repainting in near future.

2.9.5 Electrical

- No electrical equipment observed.

2.9.6 Instrumentation

- No controls issues noted.

2.9.7 HVAC

- HVAC equipment, including make-up air equipment, is in good condition (as shown in Figure 7). No recommended action.

Figure 7. Primary Clarifier Make-Up Air Unit.

2.9.8 Plumbing

- Yard drain piping and valve is nonfunctional and should be replaced.
- Gas piping is in satisfactory condition.

2.10 Facility 12 – Solids Loading Unit

2.10.1 Process

- Thickened solids, primary scum, secondary scum, and gravity thickener scum are currently hauled to the Metro WWTP 5 days per week on average.
- Thickened sludge concentrations generally range from 3 to 5 percent total solids (TS), with the higher concentrations occurring after weekends when stored sludge is being pumped.
- When pumping 5 percent TS, the plant is limited to using the piston pump (maximum of 100 gpm) until the sludge begins to "thin" out. Pumping of the thicker solids can limit the plant's ability to haul more truckloads to the Metro WWTP.

2.10.2 Process Mechanical

- The process equipment in the solids loadout building appears to be in good condition; however, there is a performance issue associated with the thickened sludge pumps. The thickened sludge pumps have difficulty pumping sludge from the gravity thickener after it has concentrated. One of the two pumps is a Wemco Model C. This is a recessed impeller pump with a flat curve, so flow will decrease rapidly as head increases due to the thicker sludge. The other thickened sludge pump is a piston pump. It can move the thicker sludge, but it is limited to a flow of about 100 gpm, which results in long sludge truck fill times. Replacing the recessed impeller pump with a screw centrifugal pump (Hydrostal or equal) may help move the thicker sludge because screw centrifugal pumps have a steeper curve.
- The sludge concentrations and desired flow rate should be reviewed with the manufacturer to determine if changing the pump type will help.
- The flexible joints of the ducts for the odor control system exterior to the building are failing and need replacement.
- Granular activated carbon (located in the solids loadout building) is used for primary clarifier/gravity thickener odor control and appears to be functional.

2.10.3 Architectural

- The roof of this building was recently replaced (2017) and is in excellent shape as of the inspection.
- The exterior walls are CMU block with face brick veneer. The walls are in good shape, and the mortar joints appear to be in great condition and weathertight. The control joints are showing signs of sealant failure in a few areas.
- The interior finishes are in good to fair condition throughout.
- The two overhead doors are showing their age but still function well. The building is in good shape for continued use.
- The most immediate needs are replacement of failing sealant at control joints (mostly west wall), and new interior finishes.
- A concrete apron is needed for both the north and south bay access due to wear and access of sludge trucks.

2.10.4 Structural

- Structural systems are in good condition.
- Maintenance-type repairs are required for the building envelope system.

2.10.5 Electrical

- The electrical equipment has been well maintained and is in generally good condition.
  - The MCC, blower VFDs, Panelboard L-12B and Transformer L-12B are installed in a shed with a window air conditioner. The air conditioner should be checked to ensure continued operation to prevent electrical failures due to high temperatures.

2.10.6 Instrumentation

- At present, a PLC is planned to be installed in 2020. This PLC should be connected to the local field hub to network with the plantwide system.

2.10.7 HVAC

- HVAC equipment is improperly sized.
- Equipment is in poor condition, past its expected service life, and should be replaced.

2.10.8 Plumbing

- A washdown sink is needed in the loading bay.
- Corrosion is present on plumbing piping, including drains, potable service, and meter.
- Water heater is in satisfactory condition.

2.11 Facilities 14 and 22– Grit Unit and Alum System

2.11.1 Process

- Two aerated grit chambers were placed in service in 1984.
- The grit chamber design is based on a center educator tube/mixer design and has been very ineffective, with most grit passing through and removed in the primary clarifiers. MCES staff reports an average of ½ yard of grit is captured every week.
- Grit pumps operate 20 minutes every 2 hours with staggered operation, so both tanks are not being pumped at one time (as shown in Figure 8)
- Grit is pumped to a grit washer. There are no grit hydrocyclones in place.
- The plant installed a new alum storage and metering system in 2017.
- Alum is metered into the grit tank influent for phosphorus control. On average, 180 gallons of approximately 38 percent alum solution is added each day. The alum system uses plant water for carrier water.
- Alum can also be added at the end of each aeration tank, but this was not being used at the time of the site visit. Alum flow splitting at this location is done manually through control valves.

Figure 8. Grit Pumps.

2.11.2 Process Mechanical

- The grit removal equipment has been well maintained but much of it is nearing the end of its service life.
  - The grit influent piping is configured so that most of the grit will go to the south unit. The valve at the inlet to the south unit has been replaced, and MCES staff report grit accumulation in this piping.
  - The grit removal units use a center draft tube/eductor (essentially an air lift pump) to keep lighter organic material in suspension while allowing heavier solids to settle. Grit removal is reported to be poor. It is suspected that most of the grit is removed in the primaries and trucked to the Metro WWTP in the thickened sludge.
  - The eductor tube structure is deteriorating and therefore not performing as designed. Evaluate how to remove more grit. Repairing or replacing the existing eductor tube and replacing the baffle plates is recommended (consider stainless steel).
  - Consider alternate grit removal options, including abandoning the grit removal units and removing all grit in the primary clarifiers, to be trucked with the thickened sludge to the Metro WWTP.
  - The grit washer/conveyor is worn and in need of replacement.
  - The blower for Grit Unit 1 is old and needs to be rebuilt or replaced.
- The scum piping is flushed as a part of preventive maintenance, but it would be better to use hot water; however, currently hot water is not available at this location. Add an on-demand water heater for this flushing.
- Alum system (Facility 22): The alum feed equipment is almost new and in good condition. The equipment is located within Area 14, with the exception of the storage tank that is located directly east of the grit building.
  - There have been issues with precipitation in the alum piping due to cold temperatures in the lower level of the building over the winter months. This should be addressed through improvements to the building HVAC system or by heat tracing the piping.

  – The Alum system storage tank is a potential failure point with heat tracing incorporated into the vessel. Evaluate future repair or replacement.
  – A strainer is needed for the whole plant water system to stop biological growth that fouls the rotameter for the Alum system.
  – The alum pump 01 flowmeter is oversized for this system and is not good for this system. Replace with correctly-sized flow meter.

2.11.3 Architectural

- The roof of this building was not replaced with recent roof work and has less than 10 years of effective life left, but still appears weathertight.
- The exterior walls are CMU block with face brick veneer.
- The walls are in excellent shape, and the mortar joints and control joints appear to be in great condition. Interior finishes in the grit area were dirty but appeared to be adhered to the wall surfaces well.
- Finishes elsewhere were in good condition.
- Building is in good shape for continued use.
- Most immediate needs would be replacing worn exterior doors and the roof, and new finishes.

2.11.4 Structural

- Structural systems are in good condition.
- Maintenance-type repairs are required for the building envelope system.
- The grit chambers are showing some minor spalling and metal work fatigue.

2.11.5 Electrical

- The electrical equipment has been well maintained and is in generally good condition. No issues affecting future operation was noted.
- This building has the original lighting and can be upgraded to better and more efficient systems.

2.11.6 Instrumentation

- PLC HASAD is an Allen-Bradley CompactLogix, which is the MCES current standard. There were no issues observed and no upgrades should be needed.
- The PLC should be connected to the local field hub to network with the plantwide system.
- Upgrade grit blower electrical controls and move controls to new PLC.
- Upgrade lighting panel for building.
- The flow meter (INS-PR-SP-A) has calibration issues and age and should be replaced in 3 to 5 years.

2.11.7 HVAC

- HVAC equipment is in poor condition.
- Equipment is non-operational and abandoned in place.
- Equipment is past its expected service life.

2.11.8 Plumbing

- Corrosion is present on sanitary piping, drains, plumbing piping, and RPZ valve.
- The water heater appeared to be new and in good condition.

2.12 Facility 15 – Blend Tank

2.12.1 Process

- Grit accumulation was noted to occur in the primary sludge/WAS blend tank (Area 15) upstream of the gravity thickener. It is suspected that more grit is removed in the primary clarifiers than in the grit removal units, so this is the likely source of most of the grit in this tank.

2.13 Facility 16 – Headwall and Outfall Pipe

2.13.1 Grounds (Site/Civil)

- The effluent outfall is comprised of a 30-inch ductile iron pipe. MCES has identified a break in the outfall line 28 feet from the shoreline, or 2/3 the outfall pipe length extending into the Mississippi River.
- Based on the MCES Hastings Treatment Plant Outfall ROV Inspection report dated August 2019, the 85'-0" and 16'-0" sections of ductile iron pipe (DIP) of the outfall were in good condition. There did not appear to be any internal damage to the pipe sections. The root intrusion in the shoreline manhole has caused the concrete extension to separate from the structure below, allowing water to infiltrate or escape the manhole. The report recommends that the root system be completely removed from between the concrete extension and structure and resealed with new sealant.
- The outfall was completely buried, and there was a break in the outfall pipe approximately 28'-0" from the shoreline manhole. The cause of the damage could not be determined but could potentially be from debris or vessel impact. It is easy for riprap and debris to accumulate in the end of the damaged section of the pipe, which could potentially lead to more clogs in the future.
- The report recommends that the outfall and damaged pipe be uncovered and thoroughly inspected. The damaged pipe should be repaired or replaced with a new outfall depending on the condition of the existing outfall. Larger riprap should be placed over the repaired or replaced outfall pipe to protect it from future damage.
- Coordinate repair work with the City of Hastings.

2.14 Facilities 17 and 18 – Control Structures Number 1 and Number 2

- No comments on these two structures.

2.15 Facility 19 – Odor Control Unit

2.15.1 Process

- The carbon unit for foul air treatment for the primary clarifiers and gravity thickeners is addressed under Area 12.
- The aeration basin bleach/caustic odor control system in the odor control building has been abandoned.

2.15.2 Process Mechanical

- The odor control system for the aeration tanks has been out of service for 20 years, and this building is currently used for storage.
- The packed towers and circulation pumps are still located in this building. If necessary, this equipment could be placed back in service.

2.15.3 Architectural

- The roof of this building was not replaced with recent roof work and has less than 10 years of effective life left, but still appears weathertight.
- The exterior walls are CMU block with face brick veneer. The walls are in excellent shape, and the mortar joints appear to be in great condition and weathertight. The control joints are showing sign of sealant failure. Interior finishes are in good condition throughout.
- The overhead doors are in excellent condition. Other doors were in fair condition.
- The building is in good shape for continued use. Abandoned equipment could be removed, which would allow more efficient use of the interior space, either for continued storage or other uses as dictated by process needs.
- Most immediate need would be roof replacement, followed by interior finishes and door replacement.

2.15.4 Structural

- Structural systems are in good condition.
- Maintenance-type repairs are required for the building envelope system.

2.15.5 Electrical

- The existing MCC and lighting panel are energized to feed a small amount of loads. No issues were noted.

2.15.6 Instrumentation

- No controls issues noted.

2.15.7 HVAC

- HVAC equipment is in poor condition and past its expected service life.

2.15.8 Plumbing

- Corrosion is present on the drain in the lower level.
- Minor paint damage/corrosion exists on gas piping.
- Plumbing supply piping appears to be in satisfactory condition

2.16 Facility 20 – Storage Shed

- The storage shed appeared relatively new but was not inspected as a part of the condition assessment.

2.17 Facility 21 – Grounds

2.17.1 Paved

- Plant roads and curbs appear to be in good condition. The majority of plant roads recently received an asphalt overlay. There is adequate slope for site drainage except at the parking lot in front of the solids load out building.
  - The east entrance road coming from Lea Street. up to the fuel dispenser was not resurfaced in 2019.
  - Adding a concrete apron to the entrance and exit of the solids loadout building is recommended. The south exit should extend all the way to the street.

- Plant sidewalks appear to be in a good condition.

2.17.2 Unpaved

- Lawn, trees, and shrubs appears to be in good condition.
- Regrade so water flows away from the digester building.
- Yard hydrants are connected to the plant water, and the plant water system is not large enough for this and other uses at the same time. There is low/inadequate pressure and no isolation valves.
- The plant drain is collapsing. The structure appears to have moved. Assessment and repair is recommended.

2.17.3 Floodwall Structure

- The floodwall structure at the north plant entrance appears to be in fair condition. The north digester tank, acting as a portion of the floodwall, displayed a large amount of concrete deterioration. Structural repairs to the tank should be implemented as identified under Area 4.
- • The frames appear to be in a good condition, but the gasket is peeling off. Replacement of the gasket is recommended.

2.17.4 Fence

- The plant chain-link fence fabric appears to be taut. All fence posts, including corner posts, appear to be straight and plumb. The majority of slats appear to be in a good condition.
- There are significant amounts of overhanging limbs and plants growing through the barbed wire throughout the west side of the plant fence. Removing overhanging limbs and plants growing through the barbed wire is recommended.
- Entrance Gate
  - The east and south entrance gates and cantilevered slide gates operate well and appear to be in good condition. Gate operator systems also appear to work well.
  - The north entrance gate, a double swing gate, operates well and appears to be in good condition.

2.17.5 Americans with Disabilities Act (ADA)

- Several items were noted as not in compliance with current ADA requirements, including fence access and signage.

2.17.6 Instrumentation

- The plant has had a recent upgrade project with a fiber-optic system run between nine buildings in the facility with field hub enclosures located at those buildings. Wireless access points are located at multiple locations and tied back to the field hub in their respective buildings. The fiber-optic network is intended to replace existing hard-wired controls run to the admin building control room from facilities throughout the plant.
- Replace the below grade instrumentation and control lines with above-grade lines.

Attachment A: Field Observation Forms

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/ replace Ranking	Commenter	Date	Comments
101	FINAL CLARIFIERS	1	DP	CLA-1	8	Final Clarifier #1, North	SLUDGE COLLECTOR	CLA	YARD	North	1985		34	3	15	Collectors are Tow-Bro® hydraulic suction tube type. Based on limited visual inspection, units appear to be in serviceable condition.	Conduct additional inspection of submerged portion of mechanism during annual pm. Repair bent skimmer arm and repair oil leak. Cost listed is for replacement of collector, scum skimmer and all tank internals. (REPLACEMENT)	$622,165	$0	$0	$622,165	$0	2	HFST	12/10/2019	
102	FINAL CLARIFIERS	1	DP	CLA-2	8	Final Clarifier #2, South	SLUDGE COLLECTOR	CLA	YARD	South	1985		34	3	15	Collectors are Tow-Bro® hydraulic suction tube type. The collector in the south tank has a bent skimmer arm and also has an oil leak in main drive gear	Conduct additional inspection of submerged portion of mechanism during annual pm. Repair bent skimmer arm and repair oil leak. Cost listed is for replacement of collector, scum skimmer and all tank internals.(REPLACEMENT)	$622,165	$0	$0	$622,165	$0	3	HFST	12/10/2019	
103	FINAL CLARIFIERS	1	E	CLA-1		Final Clarifier #1, North	Electrical Systems		YARD	North	1985		34	3	10	Past problems with underground wiring for finals (power or I/O)	Review need for Above ground wire runs. 17% allowance included in clarifier replacement cost for E/I&C. (#101)	$0	$0	$0	$0	$0	2	HFST	12/10/2019	North Sludge Collector replacement includes a $90,000 allowance for electrical I&C.
104	FINAL CLARIFIERS	1	E	CLA-2		Final Clarifier #2, South	Electrical Systems		YARD	South	1985		34	3	10	Past problems with underground wiring for finals (power or I/O)	Review need for Above ground wire runs. 17% allowance included in clarifier replacement cost for E/I&C. (#102)	$0	$0	$0	$0	$0	2	HFST	12/10/2019	South Sludge Collector replacement includes a $90,000 allowance for electrical I&C.
105	FINAL CLARIFIERS	1	S	CLA-1	8	Final Clarifier #1, North	TANK	CLA	YARD	North	1985	N/A	34	2	5	The final clarifier consisted of concrete tanks with a portion of the tank sidewalls exposed above grade. The tank sidewalls displayed vertical concrete cracking that appeared to be typical shrinkage cracking. Carbon steel systems are present within the tanks including the bridge beams, baffle wall, center column, center column bracing, and rake arm. The carbon steel materials displayed varying degrees of corrosion with the most significant corrosion present at the water line and at the end of the bridge where steel connections are located at the concrete tank wall.	The carbon steel materials in the clarifiers should be sandblasted to a white bare metal condition and an epoxy protective coating field applied to the steel sections. Repair of the steel by sectional replacement may be required based on the amount of corrosion present after surface preparation. (REPAIRS)	$123,201	$123,201	$0	$0	$0				
106	FINAL CLARIFIERS	1	S	CLA-2	8	Final Clarifier #2, South	TANK	CLA	YARD	South	1985	N/A	34	3	5	The final clarifier consisted of concrete tanks with a portion of the tank sidewalls exposed above grade. The tank sidewalls displayed vertical concrete cracking that appeared to be typical shrinkage cracking. Carbon steel systems are present within the tanks including the bridge beams, baffle wall, center column, center column bracing, and rake arm. The carbon steel materials displayed varying degrees of corrosion with the most significant corrosion present at the water line and at the end of the bridge where steel connections are located at the concrete tank wall. Condition of south tank is worse, due to bent arm. Consider lower field condition score.	The carbon steel materials in the clarifiers should be sandblasted to a white bare metal condition and an epoxy protective coating field applied to the steel sections. Repair of the steel by sectional replacement may be required based on the amount of corrosion present after surface preparation. South tank should be worked on first of the two. (REPAIRS)	$154,001	$154,001	$0	$0	$0	3	HFST	12/10/2019	
107	FINAL CLARIFIERS	1	ARCH	CLA-1		Final Clarifier #1, North	TANK		YARD	North	1985		34	1	5	Vine growth on tank face	Remove vine, tank wall excellent	$150	$150	$0	$0	$0				
108	FINAL CLARIFIERS	1	ARCH	CLA-2		Final Clarifier #2, South	TANK		YARD	South	1985		34	1	20		Tank wall excellent		$0	$0	$0	$0				
109	FINAL CLARIFIERS	1	ARCH	CLA-1		Final Clarifier #1, North	TANK		YARD	North	1985		34	1	20		Walkway excellent (Mechanism replacement cost included under item #101)	$0	$0	$0	$0	$0				Clarifier mechanism replacement cost includes walkway
110	FINAL CLARIFIERS	1	ARCH	CLA-2		Final Clarifier #2, South	TANK		YARD	South	1985		34	3	20	Center column may be out of alignment, may be related to bent arm	Walkway excellent, check center column, fix arm (Mechanism replacement cost included under item #102)	$0	$0	$0	$0	$0		HFST	12/10/2019	Clarifier mechanism replacement cost includes walkway
195	FINAL CLARIFIERS	1	DP	CLA-1 AND CLA-2		Scum beach/ Scum trough	TANK		YARD	both north and south tanks	1985		34	3	5	Metal very thin, signs of corrosion	Needs repair/replace in 5 years. Scum beach included in mechanism replacement cost (items #101 and #102)	$0	$0	$0	$0	$0	3	HFST	12/10/2019	Scum Beach and Trough included with mechanism replacement.
196	FINAL CLARIFIERS	1	DP	CLA-1 AND CLA-2		Weirs both tanks	TANK		YARD	both north and south tanks	1985		34	3	6	Check condition	Repair/Replace as needed. Weir replacent included in mechanism replacement cost (items #101 and #102)	$0	$0	$0	$0	$0	3	HFST	12/10/2019	Weirs included with mechanism replacement
																100 Final Clarifers	Area Cost Summary	$1,521,682	$277,352	$0	$1,244,330	$0				

Note: See Blower/RAS Building for RAS Pumps

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/ replace Ranking	Commenter	Date	Comments
201	H-DISINFECTION	2	DP			Tank 1 Inlet Gate	Fabricated Slide Gate		Inlet to Contact Tank 1		1985		34	3	9	Gate reportedly leaks excessively when tank out of service. West side gate will not seal.	Repair or replace gate. This will be difficult to repair or replace due to difficulties isolating and/or bypassing the gate.	$17,550	$0	$17,550	$0	$0	4.00	HFST	12/10/2019	
202	H-DISINFECTION	2	DP			Tank 2 Inlet Gate	Fabricated Slide Gate		Inlet to Contact Tank 2		1985		34	2	9	This gate will seal.	Replace gate after West is completed	$17,550	$0	$17,550	$0	$0	4.00	HFST	12/10/2019	
203	H-DISINFECTION	2	DP	CHL-MX	7	Chlorine mixer	MIXER	CHL	CONTACT TANK INLET		1985		34	3	5	Mixer appears to be serviceable. MCES reports that it has been worked on and needs to be replaced in the near future	Replace when this area is down	$38,500	$38,500	$0	$0	$0	1	HFST	12/10/2019	
204	H-DISINFECTION	2	DP	DCL-MX	7	Bisulfite Mixers (2 each)	MIXER	DCL	CHLORINE CONTACT TANK OUTLET		1991		28	3	5	Gear box has not been replace and need in near future	replace gear boxes (2 units)	$2,000	$2,000	$0	$0	$0	1	HFST	12/10/2019	
205	H-DISINFECTION	2	DP	SAM-4	9	Final effluent sampler and Pump	SAMPLER	SAM	SAMPLER ROOM					3	10	This is an older sampler and is becoming more difficult to find spare parts,	Replace with new	$7,000	$0	$7,000	$0	$0	1	HFST	12/10/2019	
206	H-DISINFECTION	2	P	EYEWASH02	6	Eyewash/shower Disinfection (Bleach Room)	SAFETY	SAFE			2006	-	13	1	20	Eyewash/shower appears to be in excellent condition with little to no signs of wear.	No action required	$1,463	$0	$0	$0	$1,463				
207	H-DISINFECTION	2	P	EYEWASH03	6	Eyewash/shower Disinfection (Bisulfite Room)	SAFETY	SAFE			2006	-	13	1	10	Eyewash/shower appears to be in excellent condition with little to no signs of wear.	No action required	$1,463	$0	$1,463	$0	$0				
208	H-DISINFECTION	2	S	CHL-CB	8	Chlorine contact tank	TANK	CHL	YARD		1985	N/A	34	2	10	Concrete spalling was present at railing embedment posts at the basin stairs.	Repair all concrete spalling at railing post embedments, a long term approach would be to replace the railing anchorages with surface mount anchorages.	$3,696	$0	$3,696	$0	$0				
295	H-DISINFECTION	2	DP			piping underground								3	5	Bleach inlet piping to mixer, unknown condition.	Replace as required	$1,000	$1,000	$0	$0	$0		HFST	12/10/2019	
296	H-DISINFECTION	2	DP			Drains for both east and west contact tanks	TANK				1985		34	4.00	0	These drains are for drainage of the E&W tanks. The side gates are stuck	Replace	$1,000	$1,000	$0	$0	$0	2	HFST	12/10/2019	

301	H-DISINFECTION	3	DP	CHL-PIPE	8	Chlorine distribution piping and valves	SYSTEM	CHL	PUMP ROOM		2006		13	2	15	Newer equipment in good condition. Has been worked on and repaired.		$0	$0	$0	$0	$0		HFST	12/10/2019	This was seen as beyond the planning cycle, so no attempt made at providing a cost.
302	H-DISINFECTION	3	DP	DCL-DAY-TANK	8	Sodium bisulfite day tank	TANK	DCL	BISULFITE ROOM		1991	2011	8	2	15	Newer equipment in good condition. This tank has been replaced in the 2010s timeframe. Confirm renewal date.		$0	$0	$0	$0	$0		HFST	12/10/2019	A small day tank will cost less than $500. This was seen as a maintenance item.
303	H-DISINFECTION	3	DP	DCL-P4	8	Chemical Transfer Pump	PUMP	DCL	BISULFITE ROOM		1991	2011	8	2	2	This pump has been replaced, they have an effective 10 year life	Maintenance item. Replace on 10 year schedule.	$0	$0	$0	$0	$0				A small metering pump will run about $2,500 plus installation. These last at most about 10 years, and were seen as maintenance items, not part of a capital project.
304	H-DISINFECTION	3	DP	DCL-PIPE	8	Chemical distribution piping	SYSTEM	DCL	BISULFITE ROOM		1991		28	2	10	This has been worked on as needed, but better than Chlorine piping		$0	$0	$0	$0	$0		HFST	12/10/2019	This is small diameter PVC pipe and was seen as more of a maintenance item than a capital cost item.
305	H-DISINFECTION	3	DP	DCL-PIPE-FM01	4	Chemical Distribution Piping - Bisulfite Flow Meter	FLOWMETER	DCL	BISULFITE ROOM		1991		28	2	15	Newer equipment in good condition.		$0	$0	$0	$0	$0		No Comments		This is small diameter PVC pipe and was seen as more of a maintenance item than a capital cost item.
306	H-DISINFECTION	3	DP	DCL-PIPE-FM02	4	Chemical Distribution Piping - Bisulfite Flow Meter	FLOWMETER	DCL	BISULFITE ROOM		1991		28	2	15	Newer equipment in good condition.		$0	$0	$0	$0	$0		No Comments		This is small diameter PVC pipe and was seen as more of a maintenance item than a capital cost item.
307	H-DISINFECTION	3	DP	DCL-PUMPS	8	Chemical Feed Pumps (3 each)	PUMP	DCL	BISULFITE ROOM		1991		28	3	5	Diaphragm pumps that do not have good spares	Replace theses pumps with new when originals fail. Maintenance item.	$0	$0	$0	$0	$0				A small metering pump will run about $2,500 plus installation. These have about a 10 year service life, and were seen as maintenance items, not part of a capital project.
308	H-DISINFECTION	3	DP	DCL-TNK	8	Sodium bisulfite storage tank	TANK	DCL	BISULFITE ROOM		1991		28	2	15	Newer equipment in good condition.	This tank is larger than building openings, When this is replaced, it may have to be with two smaller tanks.	$52,000	$0	$0	$52,000	$0	4.00	HFST	12/10/2019	
309	H-DISINFECTION	3	DP	BLEACH-P1	7	Chlorine Bleach Pump #1	PUMP	DIS	PUMP ROOM		2006		13	2	15	Newer equipment in good condition.	Replace metering pumps as needed.	$0	$0	$0	$0	$0	1	No Comments		A small metering pump will run about $2,500 plus installation. These have about a 10 year service life, and were seen as maintenance items, not part of a capital project.
310	H-DISINFECTION	3	DP	BLEACH-P2	7	Chlorine Bleach Pump #2	PUMP	DIS	PUMP ROOM		2006		13	2	15	Newer equipment in good condition.	Replace metering pumps as needed.	$0	$0	$0	$0	$0	1	No Comments		A small metering pump will run about $2,500 plus installation. These have about a 10 year service life, and were seen as maintenance items, not part of a capital project.
311	H-DISINFECTION	3	DP	BLEACH-P3	7	Chlorine Bleach Pump #3	PUMP	DIS	PUMP ROOM		2006		13	2	15	Newer equipment in good condition.	Replace metering pumps as needed.	$0	$0	$0	$0	$0	1	No Comments		A small metering pump will run about $2,500 plus installation. These have about a 10 year service life, and were seen as maintenance items, not part of a capital project.
312	H-DISINFECTION	3	DP	BLEACH-PIPE	8	Bleach distribution piping and valves	SYSTEM	DIS	SAMPLER ROOM		2006		13	2	15	Newer equipment in good condition. Has been worked on and repaired.		$0	$0	$0	$0	$0		HFST	12/10/2019	This is small diameter PVC pipe and was seen as more of a maintenance item than a capital cost item.
313	H-DISINFECTION	3	DP	BLEACH-T1004	7	Chlorine Bleach Tank 1004	TANK	DIS	PUMP ROOM		2006		14	2	2	These tanks have a nominal 10 life	Monitor and replace when necessary.	$52,000	$52,000	$0	$0	$0	2	HFST	12/10/2019	
314	H-DISINFECTION	3	DP	BLEACH-T1005	7	Chlorine Bleach Tank 1005	TANK	DIS	PUMP ROOM		**2015**		**5**	2	6	These tanks have a nominal 10 life	Monitor and replace when necessary.	$52,000	$0	$52,000	$0	$0	2	HFST	12/10/2019	
315	H-DISINFECTION	3	E	ELE-CH-DP	9	Building/Area Electrical Services	ELECTRICAL	BLD-CH										$0	$0	$0	$0	$0		No Comments		
316	H-DISINFECTION	3	E	CHL-ELE	9	Building/Area Electrical Services	ELECTRICAL	CHL										$0	$0	$0	$0	$0		No Comments		
317	H-DISINFECTION	3	E	CHL-ELE-H10	8	Power Distribution Panel	ELECTRICAL	CHL-ELE	CHLORINE ROOM		1985		34	3	5	Panelboard H-10, fed from Generator Building.	Continue regular maintenance and testing.	$0	$0	$0	$0	$0		No Comments		Costs provide for other electrical items in bldg. Replacement of this panelboard panelboard incidental to the other work.
318	H-DISINFECTION	3	E	CHL-ELE-L10	8	Lighting Panel	ELECTRICAL	CHL-ELE	CHLORINE ROOM		1985		34	3	5	No external damage noted. Lighting panel is new but is rusting due to possible ventilation issues	Continue regular maintenance and testing.	$5,000	$5,000	$0	$0	$0		HFST	12/10/2019	
319	H-DISINFECTION	3	E	CHL-ELE-T	8	Transformer to Panel L10	TRANSFORM	CHL-ELE	CHLORINE ROOM		1985		34	3	5	No external damage noted, but the transformer is an older model and should be replaced.	Replace transformer.	$5,000	$5,000	$0	$0	$0				
320	H-DISINFECTION	3	E	DCL-MCP-1	9	System Electrical Controls	ELECTRICAL	DCL	BISULFITE ROOM					2	5	PLC HASAC Allen Bradley SLC5/05 - PLC is outdated and not new standard	Replace/upgrade PLC control panel to match existing standards. Interface with new plant fiber optic network	$25,000	$25,000	$0	$0	$0		No Comments		
321	H-DISINFECTION	3	M	DI-HVAC	3	HVAC	HVAC	BLD-DI										$0	$0	$0	$0	$0		No Comments		
322	H-DISINFECTION	3	M	CH-EF2	7	Exhaust Fan Unit 2	FAN	CH-EF	ROOF									$0	$0	$0	$0	$0		No Comments		
323	H-DISINFECTION	3	M	CH-DUCT	7	Ducting	SYSTEM	CH-HVAC	VARIOUS	Various	1981	N/A	38	2	10	None.	Clean ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
324	H-DISINFECTION	3	M	CH-EF	7	Exhaust fan units, 1-3	FAN	CH-HVAC	CEILING				2019					$0	$0	$0	$0	$0		No Comments		
325	H-DISINFECTION	3	M	Unable to verify.		Exhaust fan unit, EF-1	FAN		DECHORINATION ROOM 1000	North	1998	N/A	21	4.00	0	Later addition.	Demo and replace with updated. Interlock and balance fan with replacement make-up air unit (see MU-1001).	$24,888	$24,888	$0	$0	$0		No Comments		
326	H-DISINFECTION	3	M	Unable to verify.		Exhaust fan unit, EF-1 (ROOF)	FAN		ROOF	Center	Unknown	N/A		3	5	Replacement, airflow assumed to be equal to MAU-1. Room chemical has changed, air exhaust requirement may be different.	Demo and replace with updated. Interlock and balance fan with replacement make-up air unit (see MAU-1).	$20,394	$20,394	$0	$0	$0		No Comments		
327	H-DISINFECTION	3	M	H-HVA-CH-E2		Exhaust fan unit, EF-1002	FAN		ROOF	West	1981	N/A	38	4.00	0	Original. Room is over pressurized. Exhaust rate likely much lower than MU-1002 supply air and not interlocked. Exhaust fan may be unable to provide original design air volume.	Demo and replace with updated. Interlock and balance fan with replacement make-up air unit (see MU-1002).	$19,075	$19,075	$0	$0	$0		No Comments		
328	H-DISINFECTION	3	M	HVA-CH-EUH1	7	Electric Unit Heater for Bisulfite Room	HEATER	CH-HVAC	BISULFITE ROOM	South	Unknown	N/A		1	15	Later addition, field tagged as UH-3	Maintain/replace unit heater as needed.	$3,413	$0	$0	$3,413	$0		No Comments		
329	H-DISINFECTION	3	M	Unable to verify.		Electric Unit Heater, UH-1	HEATER		CHLORINE ROOM 1002	Southeast	Unknown	N/A		1	15	Later addition.	Maintain/replace unit heater as needed.	$3,413	$0	$0	$3,413	$0		No Comments		
330	H-DISINFECTION	3	M	Unable to verify.		Electric Unit Heater, UH-2	HEATER		CHLORINE STORAGE ROOM 1001	Southwest	Unknown	N/A		1	15	Later addition.	Maintain/replace unit heater as needed.	$3,413	$0	$0	$3,413	$0		No Comments		
331	H-DISINFECTION	3	M	HVA-CH-MU1	7	Makeup air unit #1	HEATER	CH-HVAC	ROOF	Southwest	Unknown	N/A		4.00	0	Replacement, MAU-1. Room chemical has changed, air intake requirement may be different.	Demo and replace with updated. Interlock and balance unit with replacement exhaust fan (see EF-1 (Roof)).	$87,756	$87,756	$0	$0	$0		No Comments		
332	H-DISINFECTION	3	M	HVA-CH-MU2	7	Makeup air unit #2	HEATER	CH-HVAC	ROOF	North	Unknown	N/A		4.00	0	Replacement, tagged as MU1001.	Demo and replace with updated. Interlock and balance unit with replacement exhaust fan (see EF-1).	$90,844	$90,844	$0	$0	$0		No Comments		
333	H-DISINFECTION	3	M	HVA-CH-MU2-GV01	7	Gas Safety Valve	VALVE-OTH	CH-HVAC	ROOF									$0	$0	$0	$0	$0		No Comments		Included in makeup air unit cost.
334	H-DISINFECTION	3	M	HVA-CH-MU3	6	Make up air unit #3	HVAC	CH-HVAC	ROOF	Southeast	Unknown	N/A		4.00	0	Replacement, MU-1002. Room is over pressurized.	Demo and replace with updated. Interlock and balance unit with replacement exhaust fan (see EF-1002).	$85,306	$85,306	$0	$0	$0		No Comments		

335	H-DISINFECTION	3	M	Unable to verify.		Outside air louver, L-1	LOUVER		DECHLORINATION ROOM 1000	West	1998	N/A	21	2	10	Later addition. Louver not needed with variable speed 100% outdoor air MAU.	Blank off louver.	$8,952	$0	$8,952	$0	$0		No Comments		
336	H-DISINFECTION	3	P	BFP-CHL	7	Backflow preventer: Watts 1.5", Model #909, S/N #117632.	BFP	BFP	SAMPLER ROOM		1985	-	34	2	5	Backflow preventer appears to be in good condition but is starting to show signs of age.	Recommend replacement of backflow preventer	$1,528	$1,528	$0	$0	$0		No Comments		
337	H-DISINFECTION	3	P	CH-WATER-HTR	4	Bisulfite Room Water Heater	HEATER	BLD-CH	BISULFITE ROOM		1998	-	21	3	3	Water heater in fair condition, shows significant signs of wear.	Recommend replacement of water heater	$1,885	$1,885	$0	$0	$0		No Comments		
338	H-DISINFECTION	3	S	CH-MECH	7	Structural, plumbing, etc.	OTHER	BLD-CH					2019					$0	$0	$0	$0	$0		No Comments		Undefined item. Structural coss covered under following items.
339	H-DISINFECTION	3	S	BLD-CH	3	Chlorination/De-Chlorination Building	STR-BUILD	BUILDINGS			1985	1998	34	2	10	The original building displayed exterior sealant distress, brick cracking, and mortar distress. Concrete spalling was present at the railing embedment posts. The building expansion on the north side displayed failed sealants around the building perimeter, a failed expansion joint at the building addition, and mortar spalling on the north elevation at the top of the wall system.	Replace failed joint sealants. Repoint brick masonry joints and replace cracked brick units. Repair all concrete spalling at railing post embedments, a long term approach would be to replace the railing anchorages with surface mount anchorages.	$14,065	$0	$14,065	$0	$0		No Comments		
340	H-DISINFECTION	3	A	BLD-CH		Chlorination/De-Chlorination Building	BUILDING		EXTERIOR	GENERAL	1985		34	4.00	2	CONTROL JOINT SEALANT AGED	REMOVE AND REPLACE	$940	$940	$0	$0	$0		No Comments		
341	H-DISINFECTION	3	A	BLD-CH		Chlorination/De-Chlorination Building	BUILDING		EXTERIOR	GENERAL	1985		34	2	15	masonry joint cracking	tuckpoint block grout replacement	$540	$0	$0	$540	$0		No Comments		
342	H-DISINFECTION	3	A	BLD-CH		Chlorination/De-Chlorination Building	BUILDING		EXTERIOR	ROOF	2017		2	1	20	NEWER ROOF IN PLACE	NONE	$0	$0	$0	$0	$0		No Comments		New roof in place. Replacement outside of planning window.
343	H-DISINFECTION	3	A	BLD-CH		Chlorination/De-Chlorination Building	BUILDING		EXTERIOR	WEST WALL	1985		34	3				$0	$0	$0	$0	$0		No Comments		Exterior of building covered under items 339, 340 and 341.
395	New Item	3	DP			Bleach distribution piping and valves to RAS				Bleach room	2020					Upcoming project for this piping.	No action required. Being replaced under current project.	$0	$0	$0	$0	$0		HFST	12/10/2019	
396	New Item	3	M			Natural gas smell				Chlorine room						There is a natural gas smell when the HVAC system is off.	Investigate source.	$5,000	$5,000	$0	$0	$0		HFST	12/10/2019	
																200 & 300 H-DISINFECTION	Area Cost Summary	$658,909	$467,116	$127,551	$62,779	$1,463				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
401	H-DIGESTER	4	DP	DIG-DG-BU	8	Waste gas burner	OTHER	DIGESTION	YARD	NORTHEAST					N/A	Out of service (did not see on site visit)		$0	$0	$0	$0	$0		No Comments		
402	H-DIGESTER	4	DP	DIG-GAS-PIPE	8	Digester gas piping	SYSTEM	DIGESTION	BASEMENT						N/A	Out of service.		$0	$0	$0	$0	$0		No Comments		
403	H-DIGESTER	4	S	DIG-1	8	Primary digester	TANK	DIGESTION	YARD	SOUTHEAST	1955		64	4.00	9	Tank no longer function as digesters. Tanks re-configured to function as emergency influent storage. This has not been tested. The existing concrete tank displayed significant concrete distress at the top 3' to 4' of the tank walls. The concrete distress is due to freeze-thaw damage of the concrete, most likely from concrete that had low air-entrainment.	Repairs of the concrete should be completed to maintain the structural capacity of the tank walls. The deteriorated concrete should be removed to sound concrete and new structural concrete repair installed.	$234,082	$0	$234,082	$0	$0				
404	H-DIGESTER	4	S	DIG-2	8	Secondary digester	TANK	DIGESTION	YARD	NORTHEAST	1967		52	4.00	5	Tank no longer function as digesters. Tanks re-configured to function as emergency influent storage. This has not been tested. The digester tank had brick veneer on the exterior of the tank above grade to the top of the tank. The brick displayed widespread cracking, efflorescence and brick spalling. This tank is in disrepair.	The brick veneer should be removed and replaced or a new exterior finish system should be installed.	$59,547	$59,547	$0	$0	$0				
405	H-DIGESTER	4	A	DIG-1	8	Primary digester	TANK	DIGESTION	YARD	NORTH				4.00	2	TANK COATING DETERIORATION	Replace coating.	$17,550	$17,550	$0	$0	$0		No Comments		
406	H-DIGESTER	4	A	DIG-2	8	Secondary digester	TANK	DIGESTION	YARD	SOUTH				3	5	bricks/mortar separation	tuckpoint areas throughout	$5,400	$5,400	$0	$0	$0		No Comments		
495	New Item	4	DP	DIG-1		Primary digester	TANK	DIGESTION	YARD	North					9	Digester is out of service and floating cover no longer serves any purpose.	Demolish floating cover.	$37,900	$0	$37,900	$0	$0		HFST	12/10/2019	
496	New Item	4	DP	DIG-2		Primary digester	TANK	DIGESTION	YARD	South					9	Digester is out of service and floating cover no longer serves any purpose.	Demolish floating cover.	$37,900	$0	$37,900	$0	$0		HFST	12/10/2019	
501	H-DIGESTER	5	DP	DI-SUMP	9	Sump Pump	PUMP	BLD-DI	BASEMENT							None.	Maintenance item. Replace when it fails.	$0	$0	$0	$0	$0		No Comments		This is an off the shelf sump pump that would be replaced as a maintenance item. Cost less than $1000.
502	H-DIGESTER	5	DP	DIG-HX	9	Heat Exchanger (Boiler)	HVAC	DIGESTION	FIRST FLOOR						9	Out of service.	Demolish to make more space for workshop area.	$35,100	$0	$35,100	$0	$0		HFST	12/10/2019	
503	H-DIGESTER	5	DP	DIG-PIPE	7	Distribution piping and valves	SYSTEM	DIGESTION	BASEMENT						9	Out of service.	Demolition allowance.	$3,000	$0	$3,000	$0	$0		No Comments		
504	H-DIGESTER	5	DP	DIG-PUMPS	8	Digested sludge Pumps	PARENT-OTH	DIGESTION							9	Out of service.	Demolition allowance.	$3,000	$0	$3,000	$0	$0		No Comments		
505	H-DIGESTER	5	DP	DIG-SP1-P	8	Pump # 1 (loadout)	PUMP	DIG-PUMPS	BASEMENT						9	Out of service.	Demolition allowance.	$3,000	$0	$3,000	$0	$0		No Comments		
506	H-DIGESTER	5	DP	DIG-SP2-P	8	Pump # 2 (transfer)	PUMP	DIG-PUMPS	BASEMENT						9	Out of service.	Demolition allowance.	$3,000	$0	$3,000	$0	$0		No Comments		
507	H-DIGESTER	5	DP	DIG-SP4-P	8	Pump # 4 (recirculation)	PUMP	DIG-PUMPS	BASEMENT						9	Out of service.	Demolition allowance.	$3,000	$0	$3,000	$0	$0		No Comments		
508	H-DIGESTER	5	E	DI-ELE	9	Building/Area Electrical Services	ELECTRICAL	BLD-DI	WALLS									$0	$0	$0	$0	$0		No Comments		Costs not assigned to electrical in Digester building. Tanks and equipment out of service. Loads are minimal.
509	H-DIGESTER	5	E	DIG-ELE-T	8	Transformer to Panel	TRANSFORM	DIG-ELE	SOUTH DIGESTER ROOM	South wall								$0	$0	$0	$0	$0		No Comments		
510	H-DIGESTER	5	E	DIG-MCC	9	Motor Control Center (MCC)	ELECTRICAL	DIG-ELE	SOUTH DIGESTER ROOM	Southeast corner								$0	$0	$0	$0	$0		No Comments		
511	H-DIGESTER	5	E	DIG-ELE	9	Building/Area Electrical Services	ELECTRICAL	DIGESTION	MCC PANELS		1985		34	3		MCC-13 - currently energized with minimal loads.		$0	$0	$0	$0	$0		No Comments		
512	H-DIGESTER	5	E	DI-ELE-LP	9	Lighting Panel	ELECTRICAL	ELE-AD-CP	ELECTRIC ROOM	West wall	1985		34	3				$0	$0	$0	$0	$0		No Comments		
513	H-DIGESTER	5	I	INS-DI-FM-A	7	Thickened sludge flow metering	FLOWMETER	SLUDGE-PUMPS	BASEMENT		1985		34		0	Out of Service		$0	$0	$0	$0	$0		HFST	12/10/2019	Out of service and will not be replaced. No cost.
514	H-DIGESTER	5	M	DI-AHU	7	Makeup air unit, interior	HEATER	DI-HVAC	CEILING	East	2001	N/A	18	3	5	Replacement, MAU-1/ Restroom was added to space, space now being used as office/work area, maintenance shop, general storage. Requires regular maintenance to keep working.	Maintain as needed. No cost estimate for this as the digester bldg is being used minimally.	$0	$0	$0	$0	$0		No Comments		

515	H-DIGESTER	5	M	DI-DUCT	7	Ducting	SYSTEM	DI-HVAC	CEILING	Various	1981	N/A	38	2	10	None.	Clean ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
516	H-DIGESTER	5	M	DI-HVA-ELE	9	HVAC Controls	ELECTRICAL	DI-HVAC	MCC PANELS										$0	$0	$0	$0		No Comments		Digesters out of service. Minimal loads.
517	H-DIGESTER	5	M	HVA-DI-E1	7	EXHAUST FAN	FAN	DI-HVAC	CEILING	North	2001	N/A	18	3	5	Later addition, EF-3. Was added when MAU-1 replacement was installed.	Maintain as needed.		$0	$0	$0	$0		No Comments		
518	H-DIGESTER	5	M	Unable to verify.		Exhaust fan, EF-1 for penthouse.	FAN		PENTHOUSE	Center	1967	N/A	52	4.00	0	Original, no information provided from existing drawings. Exhaust fan use to serve the pump penthouse but now is abandoned in place.	Demo exhaust fan and cap curb.	$8,532	$8,532	$0	$0	$0		No Comments		
519	H-DIGESTER	5	M	Unable to verify.		Outside air louver, L-1, for penthouse.	LOUVER		PENTHOUSE	West	1967	N/A	52	4.00	0	Original, no information provided from existing drawings. Louver use to serve the pump penthouse but now is abandoned in place.	Blank off louver.	$11,933	$11,933	$0	$0	$0		No Comments		
520	H-DIGESTER	5	M	H-HVA-DI-AC		Window AC, AC-1	AIR COND		FIRST FLOOR	East	Unknown	Unknown		3	5	Later addition, no information provided from existing drawings. Was likely added for the office/work area. Could be removed with a replacement of MAU-1 with a heat/cool furnace.	Maintain as needed.		$0	$0	$0	$0		No Comments		This is a Window AC unit. If this office in the digester buidling is going to be used, a replacement unit would cost less than $500.
521	H-DIGESTER	5	S	BLD-DI	3	Digester Building	STR-BUILD	BUILDINGS			1967		52	4.00	10	Building used for storage. Tanks configured to serve as emergency influent storage. This has not been tested. The brick masonry exterior displayed significant cracking and brick spalling distress. Steel lintels at window and door openings were corroded, resulting in failed mortar joints.	The brick masonry requires replacement of cracked brick and failed mortar joints to prevent water infiltration into the wall cavity. The brick shelf angles will require at a minimum, sandblasting and repainting. However, the long term repair will require replacement of all steel lintels with stainless steel angle lintels and properly flashed.	$121,148	$0	$121,148	$0	$0		No Comments		
522	H-DIGESTER	5	A	DIG-BLD		Digester Building	BUILDING	SOLIDS	WALLS	GENERAL				3	5	bricks/mortar separation	tuckpoint areas throughout	$5,400	$5,400	$0	$0	$0		No Comments		
523	H-DIGESTER	5	A	DIG-BLD		Digester Building	BUILDING		ROOF	ROOF				1	20	NEWER ROOF	NONE		$0	$0	$0	$0		No Comments		New roof in place. Replacement outside of planning window.
524	H-DIGESTER	5	A	DIG-BLD		Digester Building	BUILDING		INTERIOR	MAIN LEVEL				3	9	WALL PAINT PEELING	REPAINT	$14,875	$0	$14,875	$0	$0		No Comments		
595	New Item	5	C			Digesters building									1	water flows into the digester control building	Fix exterior grading to redirect water away from building.	$5,000	$5,000	$0	$0	$0		HFST	12/10/2019	
																400 & 500 H-DIGESTER	Area Cost Summary	$614,642	$113,362	$501,280	$0	$0				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
601	H-BLOWER/RAS	6	DP	AER-AR1	8	Aeration Blower #1	BLOWER	AER-BLOWERS	FIRST FLOOR		1969		50	4.00		Blower out of service. Could be overhauled and placed back in service, but a VFD would be needed if it is to function as more than an intermittent back up.	Not needed. Leave out of service.	$0	$0	$0	$0	$0		HFST	12/10/2019	There is excess blower capacity. This blower to be left out of service.
602	H-BLOWER/RAS	6	DP	AER-AR1-M	8	Motor (Blower 1)	MOTOR	AER-AR1	FIRST FLOOR		1969		50	4.00		Blower out of service. Could be overhauled and placed back in service.		$0	$0	$0	$0	$0		No Comments		
603	H-BLOWER/RAS	6	DP	AER-AR2	8	Aeration Blower #2	BLOWER	AER-BLOWERS	FIRST FLOOR		1969		50	3	10	Used as a backup to Blowers 3 and 4. The blow off valve discharges inside the building. It should exhaust outdoors.	Limited use as a backup to blowers 3 and 4. No change at this time.	$0	$0	$0	$0	$0		No Comments		Keep as is for backup. Do not replace.
604	H-BLOWER/RAS	6	DP	AER-AR2-M	8	Motor (Blower 2)	MOTOR	AER-AR2	FIRST FLOOR		1969		50	3	10	For this motor to be place back in service VFD would be needed.	Limited use as a backup to blowers 3 and 4. No change at this time.	$0	$0	$0	$0	$0		HFST	12/10/2019	
605	H-BLOWER/RAS	6	DP	AER-AR3	8	Aeration Blower #3	BLOWER	AER-BLOWERS	FIRST FLOOR		1985		34	2	15	Rotary lobe blower on vfd. Speed was controlled by VFD to maintain a DO set point, but they dropped to 40 Hz at night and speed was not high enough to maintain circulation of lube oil. They now manually adjust the blower speed	If additional DO control is provided, with motorized valves, speed control of the blowers may be required as well. A minimum speed set point will be required. If DO controls provided, blowers may be oversized and should be evaluated for replacement.	$257,000	$0	$0	$257,000	$0		HFST	12/10/2019	A new Gardner Denver Blower, delivered to the site, would cost $71,000. This assumes reuse of the existing motor. This does not include any installation or electrical work. Including the motor, drive, EI&C, and installation, etc., the installed cost is approximately $257,000 per blower. Price from Travis Paine at C. Emery Nelson, Inc.
606	H-BLOWER/RAS	6	DP	AER-AR3-M	8	Motor (Blower 3)	MOTOR	AER-AR3	FIRST FLOOR		1985		34	2	15			$0	$0	$0	$0	$0		No Comments		Included with blower
607	H-BLOWER/RAS	6	DP	AER-AR3-D	8	VFD (Blower 3)	VARIABLE	AER-AR4	FIRST FLOOR		2014		5	2	15	VFDs relatively new			$0	$0	$0	$0		No Comments		Included with blower
608	H-BLOWER/RAS	6	DP	AER-AR4	8	Aeration Blower #4	BLOWER	AER-BLOWERS	FIRST FLOOR		1985		34	2	15	Rotary lobe blower on vfd. Speed was controlled by VFD to maintain a DO set point, but they dropped to 40 Hz at night and speed was not high enough to maintain circulation of lube oil. They now manually adjust the blower speed	If additional DO control is provided, with motorized valves, speed control of the blowers may be required as well. A minimum speed set point will be required. Process modeling to determine DO requirements needed to confirm blower size. Existing blowers may be oversized.	$257,000	$0	$0	$257,000	$0		HFST	12/10/2019	A new Gardner Denver Blower, delivered to the site, would cost $71,000. This assumes reuse of the existing motor. This does not include any installation or electrical work. Including the motor, drive, EI&C, and installation, etc., the installed cost is approximately $257,000 per blower. Price from Travis Paine at C. Emery Nelson, Inc.
609	H-BLOWER/RAS	6	DP	AER-AR4-M	8	Motor (Blower 4)	MOTOR	AER-AR4	FIRST FLOOR		1985		34	2	15			$0	$0	$0	$0	$0		No Comments		Included with blower
610	H-BLOWER/RAS	6	DP	AER-AR4-D	8	VFD (Blower 4)	VARIABLE	AER-AR4	FIRST FLOOR		2014		5	2	15	VFDs relatively new		$0	$0	$0	$0	$0		No Comments		Included with blower
611	H-BLOWER/RAS	6	DP	BLOWER-PIPE	7	Air distribution piping and valves	SYSTEM	AER-BLOWERS	MAIN LEVEL AND OUTSIDE		1985		34	2	15	see "aeration tanks" section		$0	$0	$0	$0	$0		No Comments		Included with Aeration Tanks
612	H-BLOWER/RAS	6	DP	SPW-P	5	Pump and Motor	PUMP	AER-SPW	BASEMENT		1985		34	3		out of service		$0	$0	$0	$0	$0		No Comments		Out of service and will not be replaced.
613	H-BLOWER/RAS	6	DP	SPW-SN	5	Strainer	STRAINER	AER-SPW	BASEMENT		1985		34	4.00		out of service		$0	$0	$0	$0	$0		No Comments		Out of service and will not be replaced.
614	H-BLOWER/RAS	6	DP	BLD-BB-P	9	Sump Pump	PUMP	BLD-BB	BASEMENT									$0	$0	$0	$0	$0		HFST	12/10/2019	This is an off the shelf sump pump that would be replaced as a maintenance item. Cost less than $1000.
615	H-BLOWER/RAS	6	DP	HST-BB-H1	3	Gantry system Blower & RAS Bldg.	HOIST	HOISTS	BASEMENT									$0	$0	$0	$0	$0		No Comments		No replacement cost, because there is no need to replace gantry crane within planning window.
616	H-BLOWER/RAS	6	DP	ICA-BB-C	8	Compressor # 2 (Blower Building)	COMPRESSOR	PLANT-WATER	OLD BLOWER ROOM					4.00	5	Air compressor , for plant air	Original to the 1969 construction. Compressor should be scheduled for replacement.	$10,000	$10,000	$0	$0	$0	1	HFST	12/10/2019	
617	H-BLOWER/RAS	6	DP	RAS-1-P	8	RAS Pump #1	PUMP	RAS-PUMPS	BASEMENT		1985		34	2	15	The RAS pumps should last for another 10 to 15 years. VFDs were replaced in the last 5 years, with one VFD per pump. RAS flow is set manually each day and adjusted if needed.	Add RAS flow pacing to the influent flow so the system automatically adjust to periods of high flow when the plant may be not be staffed. Cost is for pump, motor and VFD	$79,000	$0	$0	$79,000	$0		No Comments		
618	H-BLOWER/RAS	6	DP	RAS-1-M	8	Motor	MOTOR	RAS-2-P	FIRST FLOOR		1985		34	2	15			$0	$0	$0	$0	$0		HFST	12/10/2019	Motor is included with pump.

619	H-BLOWER/RAS	6	DP	RAS-VFD1	7	Variable Frequency Drive (VFD) for Pump RAS-1-P	VARIABLE	RAS-VFD	FIRST FLOOR	Electrical Room	2014			1	15			$10,000	$0	$0	$10,000	$0		No Comments		VFD is relatively new.
620	H-BLOWER/RAS	6	DP	RAS-2-P	8	RAS Pump #2	PUMP	RAS-PUMPS	BASEMENT		1985		34	2	15		Add RAS flow pacing to the influent flow so the system automatically adjust to periods of high flow when the plant may be not be staffed. Cost is for pump, motor and VFD	$79,000	$0	$0	$79,000	$0		HFST	12/10/2019	
621	H-BLOWER/RAS	6	DP	RAS-2-M	8	Motor	MOTOR	RAS-2-P	FIRST FLOOR		1985		34	2	15			$0	$0	$0	$0	$0		HFST	12/10/2019	Motor is included with pump.
622	H-BLOWER/RAS	6	DP	RAS-VFD2	7	Variable Frequency Drive (VFD) for Pump RAS-2-P	VARIABLE	RAS-VFD	FIRST FLOOR	Electrical Room	2014			1	15			$10,000	$0	$0	$10,000	$0		No Comments		VFD is relatively new.
623	H-BLOWER/RAS	6	DP	RAS-3-P	8	RAS Pump #3	PUMP	RAS-PUMPS	BASEMENT		1985		34	2	15		Add RAS flow pacing to the influent flow so the system automatically adjust to periods of high flow when the plant may be not be staffed. Cost is for pump, motor and VFD	$79,000	$0	$0	$79,000	$0		HFST	12/10/2019	
624	H-BLOWER/RAS	6	DP	RAS-3-M	8	Motor	MOTOR	RAS-3-P	FIRST FLOOR		1985		34	2	15			$0	$0	$0	$0	$0		HFST	12/10/2019	Motor is included with pump.
625	H-BLOWER/RAS	6	DP	RAS-VFD3	7	Variable Frequency Drive (VFD) for Pumps RAS-3-P	VARIABLE	RAS-VFD	FIRST FLOOR	Electrical Room	2014			1	15			$0	$0	$0	$0	$0		No Comments		VFD is relatively new.
626	H-BLOWER/RAS	6	DP	RAS-PIPE	7	Distribution piping and valves	SYSTEM	RAS-PUMPS	BASEMENT		1985		34	2	15	No immediate needs.		$0	$0	$0	$0	$0		No Comments		Maintenance item.
627	H-BLOWER/RAS	6	DP	WAS-1-P	8	Waste Pump #1	PUMP	WAS-PUMPS	MEZZANINE		1985	2010	9	2	15	Access to pumps could be better and MCES reports a history of cavitation. WAS withdrawal from the RAS suction lines can be from either final clarifier or both depending upon valving.	Relocate pumps to opposite wall to approve accessibility.	$57,000	$0	$0	$57,000	$0	2	HFST	12/10/2019	
628	H-BLOWER/RAS	6	DP	WAS-1-M	8	Motor	MOTOR	WAS-1-P	MEZZANINE		1985	2010	9	2	15			$0	$0	$0	$0	$0		HFST	12/10/2019	Motor is included with pump.
629	H-BLOWER/RAS	6	DP	WAS-2-P	8	Waste Pump #2	PUMP	WAS-PUMPS	MEZZANINE		1985	2010	9	2	15	Access to pumps could be better and MCES reports a history of cavitation. WAS withdrawal from the RAS suction lines can be from either final clarifier or both depending upon valving.	Relocate pumps to opposite wall to approve accessibility.	$57,000	$0	$0	$57,000	$0		HFST	12/10/2019	
630	H-BLOWER/RAS	6	DP	WAS-2-M	8	Motor	MOTOR	WAS-2-P	MEZZANINE		1985	2010	9	2	15			$0	$0	$0	$0	$0		HFST	12/10/2019	Motor is included with pump.
631	H-BLOWER/RAS	6	DP	WAS-PIPE	7	Distribution piping and valves	SYSTEM	WAS-PUMPS	MEZZANINE		1985	2010	9	2	15	No immediate needs.		$22,000	$0	$0	$22,000	$0		HFST	12/10/2019	
632	H-BLOWER/RAS	6	E	ELE-BB-CP	9	Electrical distribution, MCC?s	ELECTRICAL	AER-BLOWERS	FIRST FLOOR						5	PLC and control for building needs to be improved.	Move controls for PLC for building to Southeast area next to MCC.	$25,000	$25,000	$0	$0	$0		HFST	12/10/2019	
633	H-BLOWER/RAS	6	E	SPW-EC	5	Electrical controls	ELECTRICAL	AER-SPW	BASEMENT							Spray water out of service	Remove.	$0	$0	$0	$0	$0		HFST	12/10/2019	Abandoned in place. Could demolish
634	H-BLOWER/RAS	6	E	BB-ELE-TA	8	Transformer, Phase 'A'	TRANSFORM	BB-ELE										$0	$0	$0	$0	$0		No Comments		
635	H-BLOWER/RAS	6	E	BB-ELE-TB	8	Transformer, Phase 'B'	TRANSFORM	BB-ELE										$0	$0	$0	$0	$0		No Comments		
636	H-BLOWER/RAS	6	E	BB-ELE-TC	8	Transformer, Phase 'C'	TRANSFORM	BB-ELE										$0	$0	$0	$0	$0		No Comments		
637	H-BLOWER/RAS	6	E	BB-MCC	9	Motor Control Center (MCC)	MCC	BB-ELE	SOUTH BLOWER ROOM	East wall	2018		1	1	30	MCC-7 -Eaton Series 2100 - Recently installed (2018 noted on nameplate), no issues noted. Bucket labels in progress. No Arc Flash labels noted.	Complete bucket/compartment labelling. Arc Flash analysis and labelling needed.	$0	$0	$0	$0	$0		No Comments		
638	H-BLOWER/RAS	6	E	BB-ELE	9	Building/Area Electrical Services	ELECTRICAL	BB-HVAC						4.00	2	Conduits (from underground) have pulled away from boxes on building exterior. Per electrician, wiring has not pulled away from terminations.	Add expansion fittings to conduits. Reattach conduits to boxes. Disconnect and reconnect wiring to allow for conduit work.	$5,000	$5,000	$0	$0	$0	4.00	No Comments		
639	H-BLOWER/RAS	6	E	ELE-BB-MC	9	Building/Area Electrical Services	ELECTRICAL	BLD-BB			2018		1	1	30	Main circuit breaker installed on building exterior.	Arc Flash analysis and labelling needed.	$0	$0	$0	$0	$0		HFST	12/10/2019	
640	H-BLOWER/RAS	6	E	CLA-ELE	9	Electrical distribution, MCC?s	ELECTRICAL	CLA	BLOWER ROOM							?? Not sure what this is.		$0	$0	$0	$0	$0		HFST	12/10/2019	
641	H-BLOWER/RAS	6	E	BB-ELE-DP	9	Distribution Panel	ELECTRICAL	ELE-BB-MC	ELECTRIC ROOM	West wall					30	If this is for the 110 then that was replaced in 2018		$0	$0	$0	$0	$0		HFST	12/10/2019	
642	H-BLOWER/RAS	6	E	BB-ELE-LP1	9	Lighting Panel	ELECTRICAL	ELE-BB-MC	ELECTRIC ROOM	West wall	2019		0	1	30	New panel was being installed	No immediate needs	$0	$0	$0	$0	$0		No Comments		
643	H-BLOWER/RAS	6	E	BB-ELE-LP2	9	Lighting Panel	ELECTRICAL	ELE-BB-MC	ELECTRIC ROOM	In MCC	2019		0		25	New installed		$0	$0	$0	$0	$0		HFST	12/10/2019	
644	H-BLOWER/RAS	6	E	ELE-B-CP	9	System Electrical Controls	ELECTRICAL	SCREEN								PLC-HASAE is Allen Bradley ControlLogix.	No immediate needs. Will need expansion if RAS Control implemented.	$0	$0	$0	$0	$0		HFST	12/10/2019	
645	H-BLOWER/RAS	6	E	WAS-ELE	9	System Electrical Controls	ELECTRICAL	WAS-PUMPS	1ST FLOOR						5	Outdated system needs to be updated	Replace control panel.	$10,000	$10,000	$0	$0	$0		HFST	12/10/2019	
646	H-BLOWER/RAS	6	I	INS-AR-FM	8	Air flow metering	FLOWMETER	AER-BLOWERS	OLD BLOWER ROOM									$0	$0	$0	$0	$0		No Comments		
647	H-BLOWER/RAS	6	I	INS-RA-FM1-A	8	Flow Metering, 2 each See Interceptor Flowmeter I-M602 for Asset Data	FLOWMETER	RAS-PUMPS	BASEMENT						5	The RAS magmeters were installed in 1981. The installation is not ideal as there is a 12"x8" reducer/increaser connected to the meter. Ideally the 8" reducer flange should 5' upstream of the meter and the beginning of the 12" increaser should be 2' downstream. of the meter.	Replace RAS flow meters. If possible, relocate the upstream and downstream reducers and add additional 8" piping to meet recommended straight pipe lengths . Pipe lengths may not be achievable on FE-702.	$10,000	$10,000	$0	$0	$0		HFST	12/10/2019	
648	H-BLOWER/RAS	6	I	INS-WA-FM-A	8	Flow metering	FLOWMETER	WAS-PUMPS	MEZZANINE		2017		2		23	WAS magmeters has manual valves attached to each side of the flow meter making meter accuracy questionable (no 5X diameter upstream and 2X diameter downstream).	Conduct flow test to verify magmeter reading to see if accurate. Modify piping if meter accuracy is needed.	$0	$0	$0	$0	$0		HFST	12/10/2019	Leave as is, assuming accuracy not a concern.
649	H-BLOWER/RAS	6	M	BB-EF1	7	Exhaust Fan 1	FAN	BB-EF	ROOF									$0	$0	$0	$0	$0		No Comments		
650	H-BLOWER/RAS	6	M	BB-DUCT	7	Ducting	SYSTEM	BB-HVAC	VARIOUS	Various	1985	N/A	34	2	10	None.	Clean ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
651	H-BLOWER/RAS	6	M	BB-EF	7	Exhaust Fans, 1-4	FAN	BB-HVAC	CEILING									$0	$0	$0	$0	$0		No Comments		
652	H-BLOWER/RAS	6	M	BB-HVA-ELE	9	HVAC Controls	ELECTRICAL	BB-HVAC										$0	$0	$0	$0	$0		No Comments		
653	H-BLOWER/RAS	6	M	HVA-BB-AC1	7	A/C unit for aeration blower VFD control panels	AIR COND	BB-HVAC	ROOF	Ceiling	2001	N/A	18	2	10	Later addition.	Demo and replace with similar.	$23,878	$0	$23,878	$0	$0		No Comments		
654	H-BLOWER/RAS	6	M	Unable to verify.		Condensing Unit for AC1, CU-1	AIR COND		ROOF	Center	2001	N/A	18	2	10	Later addition.	Demo and replace with similar.	$58,105	$0	$58,105	$0	$0		No Comments		
655	H-BLOWER/RAS	6	M	HVA-BB-MU	7	Makeup air unit	HEATER	BB-HVAC	BLOWER ROOM	West	1976	N/A	43	4.00	0	Original, F-2. Abandoned in place. Unit has not been operational and no longer serves the space. The ground floor used to have sound dampening brick that has been removed, possibly increasing the skin loss of the building.	Demo and replace with updated. Interlock and balance unit with replacement fans (see EF-702/703) to maintain correct pressurization.	$65,203	$65,203	$0	$0	$0		No Comments		
656	H-BLOWER/RAS	6	M	BB-HVAC	3	HVAC	HVAC	BLD-BB										$0	$0	$0	$0	$0		No Comments		Covered under other items.
657	H-BLOWER/RAS	6	M	Unable to verify.		Modulation damper, MOD-701	DAMPER		BLOWER ROOM 701	South	1985	N/A	34	2	10	-	Maintain/replace as needed.	$0	$0	$0	$0	$0		No Comments		
658	H-BLOWER/RAS	6	M	Unable to verify.		Outside air louver, L-701	LOUVER		BLOWER ROOM 701	South	1985	N/A	34	2	10	Original.	Maintain/replace as needed.	$0	$0	$0	$0	$0		No Comments		

659	H-BLOWER/RAS	6	P	BFP-RAS	7	Backflow preventer: Watts 1", Model #909, S/N #448737	BFP	BFP	RAS PUMP ROOM, BASEMENT		1985	-	34	3	3	Backflow preventer appears to be in fair condition but is starting to show signs of age.	Recommend replacement of backflow preventer	$780	$780	$0	$0	$0		No Comments		
660	H-BLOWER/RAS	6	S	BB-MECH	7	Structural, plumbing, etc.	OTHER	BLD-BB										$0	$0	$0	$0	$0		No Comments		Covered under other items.
661	H-BLOWER/RAS	6	S	BLD-BB	3	Blower/RAS Building	STR-BUILD	BUILDINGS			1967	1985	52	2	10	The exterior joint sealants throughout the building had failed. Several wall penetrations were not sealed around the building perimeter. Concrete spalling was present on the walkway at the west side of the building due to corrosion of the carbon steel railing embedments, aluminum railing are fastened into the embedment locations. The building structural components overall were in good condition. Railings need to be replaced.	Reseal all exterior joint sealants and re-seal all wall penetrations. Provide concrete wall repair at the embedded railing post locations. Carbon steel railing embedments that are present in the concrete slab will continue to corrode leading to future concrete spalling. A more permanent repair would consist of replacement of the embedded steel railing anchorage, with an aluminum railing bracket that is surface mounted to the concrete structure.	$27,720	$0	$27,720	$0	$0				
662	H-BLOWER/RAS	6	A	BLD-BB	3	Blower/RAS Building	STR-BUILD		EXTERIOR	WALLS				2	8	Control joint sealant cracking	remove and replace	$1,222	$0	$1,222	$0	$0		No Comments		
663	H-BLOWER/RAS	6	A	BLD-BB	3	Blower/RAS Building	STR-BUILD		EXTERIOR	north wall				4.00	2	Missing splash block at drainage discharge	install splash block	$250	$250	$0	$0	$0		No Comments		
664	H-BLOWER/RAS	6	A	BLD-BB	3	Blower/RAS Building	STR-BUILD		EXTERIOR	roof	2017		2	1	20	Newer roof	none	$0	$0	$0	$0	$0		No Comments		New roof in place. Replacement outside of planning window.
665	H-BLOWER/RAS	6	A	BLD-BB	3	Blower/RAS Building	STR-BUILD		EXTERIOR	Door @ MCC (NW)				3	5	Door sticking does not close smoothly	service / adjust hardware	$250	$250	$0	$0	$0		No Comments		
666	H-BLOWER/RAS	6	A	BLD-BB	3	Blower/RAS Building	STR-BUILD		EXTERIOR	STAIR / NW				2	12	Concrete Stair Deterioration	Patch/restore concrete.	$650	$0	$0	$650	$0		No Comments		
695	New Item	6	I						RAS BLOWER							MCES would like to add a pressure transmitter to monitor air flow/ level. Currently there is only a digital switch		$5,000	$5,000	$0	$0	$0		HFST	12/10/2019	
																600 H-BLOWER/RAS	**Area Cost Summary**	$1,155,333	$131,483	$116,200	$907,650	$0				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
701	H-AERATION TANKS	7	DP	AER-SPW	5	Spray water Pump system	PARENT-OTH	AER			1985		34	N/A	0	This system is out of service but still in place. Parts of the spray headers have fallen into aeration basins and can cause process disruptions.	Spray water system needs to be removed from tanks so equipment doesn't fall into the tanks when it rusts out. This should be done in conjunction with diffuser replacement in the aeration tanks.	$7,000	$7,000	$0	$0	$0	3	HFST	12/13/2019	
702	H-AERATION TANKS	7	DP	AER-ODR-PUMPS	6	Re-circulation Pumps	PARENT-OTH	AER-ODR			1985			3	9	Out of service for about 20 years. Chemical storage tanks have been removed.	Demolish recirculation pumps, unless a decision is made to place the scrubbers back in service.	$4,000	$0	$4,000	$0	$0		HFST	12/13/2019	
703	H-AERATION TANKS	19	DP	AER-DUCTS	3	FRP ducts at aeration basins.	PARENT-OTH	LIQUIDS			1985		34	3	9	Out of service for about 20 years. Most, if not all of the rubber boots have cracks/holes.	Either demolish all ductwork from the aeration tank covers to the scrubbers or repair connections to covers, replace insulation and run fans to improve ventilation under the covers without chemical addition to the scrubbers. Price is estimate to replace all boots.	$9,000	$0	$9,000	$0	$0	1	HFST	12/13/2019	
704	H-AERATION TANKS	7	DP	AER-Covers	3	FRP Dome over each pass.	PARENT-OTH	LIQUIDS			1985		34	3	10	The FRP covers over each pass appear to be in reasonable condition (see structural and architectural comments), but most, if not all of the rubber boots connecting the covers to the ducts have cracks/holes. The lack of ventilation under the covers may be contributing to corrosion of metal items under the covers.	The odor control system is not in service and the covers trap moisture, contributing to corrosion. Either remove the covers or reconnect the odor control system, to move air through the tanks. Estimated cost is for demolition of the existing covers.	$70,000	$0	$70,000	$0	$0		HFST	12/13/2019	
705	H-AERATION TANKS	7	DP	AER-ODR	3	Wet Scrubbers	PARENT-OTH	ODOR			1985		34	N/A	N/A	Out of service for about 20 years. Stack may not be high enough to effectively disperse odors above neighborhood if this is repurposed for ventilation only, with no odor control. Older technology.	Odors have not been an issue at Hastings and similar MCES WWTPs (Stillwater) do not have covers on aeration tanks. Either remove the covers or reconnect ducts and run fans to improve ventilation under covers. A dispersion model would be required to determine the required stack height and velocity. The fans would be sized to provide proper ventilation under the covers.	$0	$0	$0	$0	$0		HFST	12/13/2019	
706	H-AERATION TANKS	7	DP	AER-SPW	5	Spray water Pump system	PARENT-OTH	AER			1985		34	N/A	9	Out of service.	Demolish to make space usable for other purposes	$4,000	$0	$4,000	$0	$0	2	HFST	12/13/2019	
707	H-AERATION TANKS	7	DP	AER-PIPE	7	Flow distribution channels and control structure	SYSTEM	AER-TANKS	YARD	East	1985		34	4.00	9	Structurally, the channels look fine, but the gates that allow step feed to the aeration tanks leak and are no longer functional.	Repair gates on Basins #1 and #2 (north tanks) while they are out of service. When #1 and #2 are back in service, take Basins #3 and #4 (south tanks) out for repairs.	$9,000	$0	$9,000	$0	$0	3	HFST	12/13/2019	
708	H-AERATION TANKS	7	DP	AER-PIPE	7	Air distribution piping and valves	SYSTEM	AER-TANKS	YARD	East	1985		34	2	10	There is one manual aeration control valve per pass for delivery of process air to the Aeration Basins. This results in over or under aeration of the Basins at times and difficulty with evenly distributing air to the tank passes. There is not an apparent condition issue, but if MCES wants to improve DO and process control , replacement is needed. Lack of DO control may also be contributing to high SVIs if suppressed DO occur in the aeration tanks.	If MCES wants improved control of the aeration system, new valves, actuators and flow meters would be required. The blowers are rotary lobe type with VFDs. One blower runs at a time. Any controls will have to include both valve position and blower speed, as the air flow from the blower will not change significantly (either up or down) as the valves are modulated. Smaller blowers may be needed for the minimum air flow rate, or excess air could be provided with the existing blowers.	$205,000	$0	$205,000	$0	$0		HFST	12/13/2019	
709	H-AERATION TANKS	7	I	AER-DO	8	Dissolved Oxygen Meters	INSTRUMENT	AER-TANKS	YARD	East					10	There is one DO probe for aeration basin control. See above for impacts on airflow distribution. Currently only 2 of the "two-pass" tanks are operational with one DO probe each.	The diffusers and DO control systems should be evaluated to determine the system requirements to meet process demands and achieve energy reduction goals. If DO control is provided, a total of 6 more DO probes may be required (2 per tank for the 4-"two-pass" tanks).	$49,000	$0	$49,000	$0	$0		HSFT	12/4/2019	

710	H-AERATION TANKS	7	I	AER-DO	8	Dissolved Oxygen Meters	INSTRUMENT	AER-TANKS	YARD	East						There is one DO probe for aeration basin control. See above for impacts on airflow distribution. Currently only 2 of the "two-pass" tanks are operational with one DO probe each.	THIS IS A REPEAT OF ITEM 709	$0	$0	$0	$0	$0		HSFT	12/4/2019	
711	H-AERATION TANKS	7	DP	AER-1	8	Basin #1	TANK	AER-TANKS	YARD		1969		50	3	5	Basins #1 and #2 are out of service. Diffuser replacement needed along with reconfiguration to match oxygen demands. Gates for step feed do not function and need to be repaired or replaced. Record drawings Dated 03/20/1970. Tanks assumed on line in 1969. Ground water pressure relief valves need to be replaced. Each pass has 2 on the east and west walls, for a total of 16.	The tanks appear to be in good condition, but the influent gates and diffusers are in need of immediate repair or replacement. Repair or replace dysfunctional gates and expedite replacement of diffusers. A total of (16) ground water pressure relief valves need to be replaced. Each east and west most wall has 2 valves. Replace diffusers in Tank 1. Then take Tanks 3 and 4 out, one at a time, to replace diffusers. This provides 2 duty and 1 standby tank.	$530,000	$530,000	$0	$0	$0	3	HSFT	12/4/2019	
712	H-AERATION TANKS	7	DP	AER-2	8	Basin #2	TANK	AER-TANKS	YARD		1969		50	3	9	Basins #1 and #2 are out of service. Diffuser replacement needed along with reconfiguration to match oxygen demands. Gates for step feed do not function and need to be repaired or replaced. Record drawings Dated 03/20/1970. Tanks assumed on line in 1969. Ground water pressure relief valves need to be replaced. Each pass has 2 on the east and west walls, for a total of 16.	The tanks appear to be in good condition, but the influent gates and diffusers are in need of immediate repair or replacement. Repair or replace dysfunctional gates and expedite replacement of diffusers. A total of (16) ground water pressure relief valves need to be replaced. Each east and west most wall has 2 valves. Defer work on Tank 2.	$530,000	$0	$530,000	$0	$0	3	HSFT	12/4/2019	
713	H-AERATION TANKS	7	DP	AER-3	8	Basin #3	TANK	AER-TANKS	YARD		1985		34	2	10	Basins # 3 and #4 should be removed from service and diffusers cleaned/inspected once Basins #1 and #2 are back in service. Diffuser densities should be evaluated to ensure the proper densities for current operations./oxygen demand profiles. Gates for step feed do not function and need to be repaired or replaced.	Take basins #3 and #4 down after repairs have been completed to Basins #1 and #2 and they are placed are back in service. Repair or replace dysfunctional gates. Clean and inspect diffusers. Replace/reconfigure as necessary.	$530,000	$0	$530,000	$0	$0	4.00	HFST	12/13/2019	
714	H-AERATION TANKS	7	DP	AER-4	8	Basin #4	TANK	AER-TANKS	YARD		1985		34	2	10	Basins # 3 and #4 should be removed from service and diffusers cleaned/inspected once Basins #1 and #2 are back in service. Diffuser densities should be evaluated to ensure the proper densities for current operations./oxygen demand profiles. Gates for step feed do not function and need to be repaired or replaced.	Take basins #3 and #4 down after repairs have been completed to Basins #1 and #2 and they are placed are back in service. Repair or replace dysfunctional gates. Clean and inspect diffusers. Replace/reconfigure as necessary.	$530,000	$0	$530,000	$0	$0	4.00	Seth	12/5/2019	
715	H-AERATION TANKS	7	A	AER-TANKS		Aeration Basin Covers (MULTIPLE)		AER	YARD	ALL				2	20	BASIN COVERS IN GOOD SHAPE. Windows are cracked, the covers have been repainted several times.	Replace windows as an immediate action, Check on the condition of the fiberglass	$10,000		$0	$0	$10,000				$10000 allowance for cover repairs.
716	H-AERATION TANKS	7	S	AER-1	8	Basin #1	TANK	AER-TANKS	YARD		1967	1990	52	2	10	Concrete spalling was present on the walkway in isolated locations. Concrete spalling was present at railing embedment posts. The railing at the north elevation displayed corrosion distress. The painted steel odor control duct supports displayed peeling paint and mild corrosion along the east side of the tanks. The walkway grating appeared in good condition. Along the east wall of all 4 tanks has CMU distress over section, North-East corner has CMU damage.	Provide concrete repairs at deteriorated concrete locations. Replace deteriorated railing systems. Recoat failed coating systems Repair CMU east wall and north east corner.	$17,967	$0	$17,967	$0	$0				
717	H-AERATION TANKS	7	S	AER-2	8	Basin #2	TANK	AER-TANKS	YARD		1967	1990	52	2	10	Concrete spalling was present on the walkway in isolated locations. The painted steel odor control duct supports displayed peeling paint and mild corrosion along the east side of the tanks. The walkway grating appeared in good condition. Along the east wall of all 4 tanks has CMU distress over section, North-East corner has CMU Damage. Concrete spalling was present at railing embedment posts. The railing at the north elevation displayed corrosion distress.	Provide concrete repairs at deteriorated concrete locations. Recoat failed coating systems. Repair CMU east wall and north east corner, replace deteriorated railing systems. Recoat failed coating systems	$17,967	$0	$17,967	$0	$0				
718	H-AERATION TANKS	7	S	AER-3	8	Basin #3	TANK	AER-TANKS	YARD		1985	1990	34	2	10	Concrete spalling was present on the walkway in isolated locations. The painted steel odor control duct supports displayed peeling paint and mild corrosion along the east side of the tanks. The walkway grating appeared in good condition. Along the east wall of all 4 tanks has CMU distress over section, North-East corner has CMU Damage.	Provide concrete repairs at deteriorated concrete locations. Recoat failed coating systems. Repair CMU east wall and north east corner.	$17,967	$0	$17,967	$0	$0				
719	H-AERATION TANKS	7	S	AER-4	8	Basin #4	TANK	AER-TANKS	YARD		1985	1990	34	2	10	Concrete spalling was present on the walkway in isolated locations. The painted steel odor control duct supports displayed peeling paint and mild corrosion along the east side of the tanks. The walkway grating appeared in good condition. Along the east wall of all 4 tanks has CMU distress over section, North-East corner has CMU Damage.	Provide concrete repairs at deteriorated concrete locations. Recoat failed coating systems. Repair CMU east wall and north east corner.	$17,967	$0	$17,967	$0	$0				
795	New Item	7	I			DO instrumentation control system										SEE ITEM 709	DO instrumentation control system, if new DO instruments are installed, actuated valves , PLC(s) etc.. (SEE ITEM 709)	$0	$0	$0	$0	$0		HFST	12/13/2019	
																700 H-AERATION TANKS	**Area Cost Summary**	**$2,558,868**	**$537,000**	**$2,011,868**	**$0**	**$10,000**				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
801	H-GENERATOR	8	DP	ICA-GN-M	9	Generator building instrument air compressor motor. 1/3 HP, 115 Volt.	MOTOR	GN-ELE	FLOOR, NORTH WALL		1985		34		10	this may no longer serve a function	Replace when fails	$1,000	$0	$1,000	$0	$0	1	HFST	12/13/2019	An oil-less compressor in this size range, with a receiver, costs less than $1000.
802	H-GENERATOR	8	E	ELE-MD	9	Plant electrical service main disconnect	ELECTRICAL	BLD-GN	MCC'S		1985		34		10			$20,000	$0	$20,000	$0	$0		HFST	12/13/2019	
803	H-GENERATOR	8	E	GN-ELE	9	Building/Area Electrical Services	ELECTRICAL	BLD-GN								this is just as catch all for building service electrical work		$0	$0	$0	$0	$0		HFST	12/13/2019	Electric work covered under other items below.
804	H-GENERATOR	8	E	GN-ELE-T	8	Transformer to Panel	TRANSFORM	BLD-GN	GENERATOR ROOM	North wall				3		45 kVA, 3 Phase - High Leg Delta (120/240) on Secondary. High Leg Delta is considered obsolete.	Replace with 120/208 volt. Coordinate with panelboard replacement. Coordinate with existing loads to be refed.	$3,500	$3,500	$0	$0	$0				

804	H-GENERATOR	8	E	GN-ELE-T	8	Transformer to Panel	TRANSFORM	BLD-GN	GENERATOR ROOM	North wall	?			3	2	This transformer is too small for current demand	Replace with correct sized transformer	$5,000	$0	$0	$0	$0		HFST	12/13/2019	
805	H-GENERATOR	8	E	TRANS	9	Main Distribution Oil Filled Transformer	TRANSFORM	BLD-GN	OUTSIDE	South				2	15	MCES owned. No visible issues. 500 kVA. Capacity is sufficient per MCES.	Continue regular maintenance and testing.	$0	$0	$0	$0	$0		No Comments		
806	H-GENERATOR	8	E	BLD-GN	3	Generator Building	STR-BUILD	BUILDINGS								this is just as catch all for items in this area		$0	$0	$0	$0	$0		HFST	12/13/2019	Electric work covered under other items below.
807	H-GENERATOR	8	E	EGR-CP	9	Electrical controls	ELECTRICAL	EGR	MCC PANELS		1985		34		??			$0	$0	$0	$0	$0		HFST	12/13/2019	
808	H-GENERATOR	8	E	EGR-DT	9	Day tank	TANK	EGR	NORTHEAST CORNER							No problems noted.	No action at this time. Add this to COOP. Possible service plan with Ziegler (Current servicer)	$0	$0	$0	$0	$0		HFST	12/13/2019	
809	H-GENERATOR	8	E	EGR-EN	9	Standby Generator Engine	GENERATOR	EGR	GROUND LEVEL	Control Panels				2		Caterpillar 3412, 500 KW. Kato Alternator. No visible issues.	Continue regular maintenance and testing		$0	$0	$0	$0		HFST	12/13/2019	
810	H-GENERATOR	8	E	EGR-DT-P1	9	Generator day tank: Diesel fuel pump #1. 1/3 HP, 115 volt.	PUMP	EGR-DT	ON TOP OF FUEL PUMP UNIT						5	Part of generator package. Questionable remaining useful life	Replace as needed or 5 year	$1,000	$1,000	$0	$0	$0		HFST	12/13/2019	
811	H-GENERATOR	8	E	EGR-DT-P2	9	Generator day tank: Diesel fuel pump #2. 1/3 HP, 115 volt.	PUMP	EGR-DT	ON TOP OF FUEL PUMP UNIT						5	Part of generator package. Questionable remaining useful life	Replace as needed or 5 year	$1,000	$1,000	$0	$0	$0		HFST	12/13/2019	
812	H-GENERATOR	8	E	GN-ELE-LP	9	Lighting Panel	ELECTRICAL	ELE-MD	ELECTRIC ROOM					3		High Leg Delta (120/240, 3 phase, 4 wire). High Leg Delta is considered obsolete.	Replace with 120/208 volt. Coordinate with transformer replacement. Coordinate with existing loads to be refed.	$3,500	$3,500	$0	$0	$0	3	HFST	12/13/2019	
813	H-GENERATOR	8	E	FUL-MON	6	Leak detection	INSTRUMENT	FUEL	SOUTHEAST CORNER		1985		34		5	Leak detector on the main underground fuel tank , very antiquated system	Leek detection has been upgraded in other plants	$3,000	$3,000	$0	$0	$0		HFST	12/13/2019	
814	H-GENERATOR	8	E	FUL-P	6	Fuel Pump	PUMP	FUEL	OUTSIDE	South						Diesel pump, questionable remaining service life. Components of the measuring system fail intermittently.	Replace as needed.	$10,000	$10,000	$0	$0	$0		HFST	12/13/2019	
815	H-GENERATOR	8	E	GN-ELE-ATS01	9	Automatic Transfer Switch for GN-MCC from Normal (Xcel) Power to EGR-EN	ATS	GN-ELE			1985		34		10	This is checked during the monthly generator test.	Continue to monitor.	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
816	H-GENERATOR	8	E	GN-ELE-CAP	8	Capacitor Bank	CAPACITOR	GN-ELE	GENERATOR ROOM		1985		34			this may no longer serve a function	Remove if no longer needed.	$0	$0	$0	$0	$0		HFST	12/13/2019	Out of service. Do not replace.
817	H-GENERATOR	8	E	GN-MCC	9	Plant Process Switchboard	SUBSTATION	GN-ELE	MCC PANELS		1985		34				Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
818	H-GENERATOR	8	E	GN-MCC-CB01	8	Main Switchboard Circuit Breaker 01 (to BB-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD					2		700 Amp to Blower Building	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
819	H-GENERATOR	8	E	GN-MCC-CB02	8	Main Switchboard Circuit Breaker 02 (to AD-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		125 Amp to Admin Building	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
820	H-GENERATOR	8	E	GN-MCC-CB03	8	Main Switchboard Circuit Breaker 03 (to IF-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		300 Amp to Influent Pump Station	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
821	H-GENERATOR	8	E	GN-MCC-CB04	8	Main Switchboard Circuit Breaker 04 (to GRIT-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		100 Amp to Grit Unit	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
822	H-GENERATOR	8	E	GN-MCC-CB05	8	Main Switchboard Circuit Breaker 05 (to Building Transformer and Generator Panel)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2			Replace per Transformer/Lighting Panel	$1,000	$1,000	$0	$0	$0		HFST	12/13/2019	
823	H-GENERATOR	8	E	GN-MCC-CB06	8	Main Switchboard Circuit Breaker 06 (to CHL-ELE-H10)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		90 Amp to Chlorine	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
824	H-GENERATOR	8	E	GN-MCC-CB07	8	Main Switchboard Circuit Breaker 07 (to SLU-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		150 Amp to Solids Handling Unit	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
825	H-GENERATOR	8	E	GN-MCC-CB08	8	Main Switchboard Circuit Breaker 08 (to DIG-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		100 Amp to Digester Unit	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
826	H-GENERATOR	8	E	GN-MCC-CB09	8	Main Switchboard Circuit Breaker 09 (to Capacitor Bank)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2			Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
827	H-GENERATOR	8	E	GN-MCC-CB10	8	Main Switchboard Circuit Breaker 10 (to AER-ODR-MCC)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2		125 Amp to Odor Reduction	Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
828	H-GENERATOR	8	E	GN-MCC-CBG	9	Main Switchboard Circuit Breaker (from Generator)	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2			Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
829	H-GENERATOR	8	E	GN-MCC-CBM	9	Circuit Breaker, Motor Control Center 'GN-MCC' Main Breaker	SUBSTATION	GN-MCC	MAIN SWITCHBOARD		1985		34	2			Continue normal pm 3-year	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item
830	H-GENERATOR	8	I	TLM-CPI	9	Alarm telemetry	SYSTEM	BLD-GN	WEST WALL					4.00	5	Below ground hard wire is in questionable condition.	Replace with above ground hard wire	$10,000	$10,000	$0	$0	$0	3	HFST	12/13/2019	$10,000 allowance inserted.
831	H-GENERATOR	8	M	HVA-GN-UH	4	Electric Unit Heater	HEATER	GN-HVAC	CEILING, 9' HIGH							this heater trips out, need more capacity from transformer. Modifications were made to heater to work with existing power.		$2,568	$2,568	$0	$0	$0				
832	H-GENERATOR	8	S	STRUCTURE	7	Structural	STR-BUILD	BLD-GN								New roof in 2017		$11,088	$11,088	$0	$0	$0				
~~895~~	~~New Item~~	~~8~~	~~DP~~	~~Tank~~	~~2~~	~~4,000 - gallon Below ground fuel storage tank~~					~~1985~~		~~34~~			~~There is antiquated leak detection system.~~	~~Upgrade monitoring and leak detection~~	$0	$0	$0	$0	$0		HFST	12/13/2019	
																800 H-GENERATOR	Area Cost Summary	$72,656	$46,656	$21,000	$0	$0				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
901	H-INFLUENT	9	P	IF-SUMP	9	Sump Pumps	PUMP	BLD-IF	BASEMENT	Basement	1985	-	34	4.00	2	Submersible sump pump is in poor condition and showing significant wear.	Recommend sump pump replacement	$725	$725	$0	$0	$0		No Comments		This is an off the shelf maintenance item.
902	H-INFLUENT	9	DP	HST-IF-H1	3	Influent Pumping station hoist #1	HOIST	HOISTS	FIRST FLOOR		1985		34		15			$3,000	$0	$0	$3,000	$0		No Comments		A manual chain hoist with trolly will cost between $1000 and $3000.
903	H-INFLUENT	9	DP	HST-IF-H2	3	Influent Pumping station hoist #2	HOIST	HOISTS	BASEMENT		1985		34		15			$3,000	$0	$0	$3,000	$0		No Comments		A manual chain hoist with trolly will cost between $1000 and $3000.
904	H-INFLUENT	9	P	IF-SUMP-P1	8	Influent Building Sump Pump #1; P-208	PUMP	IF-SUMP	BASEMENT		1985		34	3	5	Submersible Sump Pumps. System appears to be in fair condition, showing signs of age.	Maintenance item. Replace as needed.	$725	$725	$0	$0	$0		No Comments		
905	H-INFLUENT	9	P	IF-SUMP-P2	8	Influent Building Sump Pump #1; P-209	PUMP	IF-SUMP	BASEMENT		1985		34	3	5	Submersible Sump Pumps. System appears to be in fair condition, showing signs of age.	Maintenance item. Replace as needed.	$725	$725	$0	$0	$0				

906	H-INFLUENT	9	DP	INF-RSP-4	9	Emergency diesel powered influent pump	PUMP	INF-PUMPS	DRYWELL	BASEMENT (engine on first floor)	2006		13	2	20	Pump 4, the engine driven pump, is newer than the other pumps. Pump is driven by an engine through a right-angle-gear. Only runs when there is high level in the station. Cavitation reported at start-up due to grit accumulation at pump inlet. This requires grit cleaning every 2-months (6-hours of downtime).	Determine if an alternative control strategy for the pumps, such as ramping the end pump up to full speed and drawing the wet well down, once per week, can flush the accumulated grit from the wet well.	$0	$0	$0	$0	$0				This pump should last beyond the planning window.
907	H-INFLUENT	9	DP	RSP-PIPE	9	Distribution piping and valves	SYSTEM	INF-PUMPS	BASEMENT		1985		34	2	20	This is a generic catch-all for this building		$0	$0	$0	$0	$0		HFST	12/13/2019	Covered under other items.
908	H-INFLUENT	9	DP	WET WELL	9	Wet well of the influent building	SYSTEM	INF-PUMPS	BASEMENT		1985		34			The flow enters the north end of the screen channel and then makes a 180 degree turn to enter the pump suction channel. Grit accumulation in the wet well is a problem. They bypass the wet well every 6 weeks to remove grit and scum. The influent gate is closed and trailer mounted diesel engine driven pump is used to pump to the primaries during wet well cleaning.	1) A means of pumping the wet well down to remove grit and scum, without having to isolate the wet well, should be investigated. 2) Has the collection system been smoke tested? Are there roof drains or parking lot catch basins connected to the sanitary system, that contribute to the grit problem in the wet well? 3) How well are restaurant grease traps monitored? Does this need to be improved?	$0	$0	$0	$0	$0		No Comments		No changes assumed for the wet well, so no cost.
909	H-INFLUENT	9	DP	PCA-IF1-C	8	Compressor # 1 (Influent Building)	COMPRESSOR	PLANT-Air	DRYWELL	First Floor	1985		34	3	10	Compressor for Hydropneumatic Tank. This is no longer attached to the tank , but instead is attached to the plant air line.	Replace compressor if necessary.	$0	$0	$0	$0	$0		HFST	12/13/2019	Compressor removed and plant air used for hydropnuematic tank. No replacement cost.
910	H-INFLUENT	9	DP	PLW-T	9	Hydro-pneumatic tank	TANK	PLANT-WATER	DRYWELL	First Floor	1985		34		5	There may be a system capacity issue. This became more apparent when the alum feed with more or less continuous 10 gpm demand was started. When there is a high demand, the pressure in the hydropneumatic tank drops to about 40 psig and both pumps run non stop. They appear to be cavitating, indicating that they are running off their curve.	Further investigation of system demands and possibly replacement of pumps with larger units may be required. It may be possible to keep the existing tank and just provide new pumps.	$65,000	$65,000	$0	$0	$0		HFST	12/13/2019	
911	H-INFLUENT	9	DP	PLW-1-P	8	Plant Water Pump #1	PUMP	PLW-PUMPS	DRYWELL	MEZZANINE	1985		34	2	5	Age and undersized, water usage has increased and pumps run off curve and sometimes cavitate under peak demand.	Upgrade system to meet current demand.	$25,000	$25,000	$0	$0	$0		HFST	12/13/2019	
912	H-INFLUENT	9	DP	PLW-1-M	8	Motor	MOTOR	PLW-1-P	DRYWELL, MEZZANINE, EAST SIDE	North Unit	1985		34			Motors over amp under high demand.	Provide new pumps and motors to meet current demand.	$0	$0	$0	$0	$0		HFST	12/13/2019	Included with pump
913	H-INFLUENT	9	DP	PLW-2-P	8	Plant Water Pump #2	PUMP	PLW-PUMPS	DRYWELL	MEZZANINE	1985		34	2	5	Age and undersized, water usage has increased and pumps run off curve and sometimes cavitate under peak demand.	Upgrade system to meet current demand.	$25,000	$25,000	$0	$0	$0		HFST	12/13/2019	
914	H-INFLUENT	9	DP	PLW-2-M	8	Motor	MOTOR	PLW-2-P	DRYWELL, MEZZANINE, EAST SIDE	South Unit	1985		34			Motors over amp under high demand.	Provide new pumps and motors to meet current demand.	$0	$0	$0	$0	$0		HFST	12/13/2019	Included with pump
915	H-INFLUENT	9	DP	PLW-PIPE	7	Distribution piping and valves	SYSTEM	PLW-PUMPS	DRYWELL	MEZZANINE	1985		34	2	20	No apparent issues.		$0	$0	$0	$0	$0		No Comments		Plant water piping is a maintenance, not a capital item.
916	H-INFLUENT	9	DP	PLW-SN	7	Strainer	STRAINER	PLW-PUMPS	DRYWELL	MEZZANINE	1985		34	3	5	Improved straining or disinfection of plant water may be needed. Plant staff noted algae from the secondary effluent creates issue with plant water strainer and a more robust system may be needed.	Determine if this is an algae problem or if there is biological growth in the piping due to low chlorine residual in the plant effluent. Replace strainer if necessary.	$10,000	$10,000	$0	$0	$0		HFST	12/13/2019	
917	H-INFLUENT	9	DP	RSP-1	9	Influent Pump #1	PUMP	RSP	DRYWELL	Basement	1985		34	2	15	The pumps appear to be in good condition but grit and grease accumulation in the wet well is a concern. The plant staff use a portable diesel engine driven pump approximately every other month to bypass the wet well for removal of grease and grit. Cleaning requires 6 hours of downtime. Name plate for Pumps 1 and 3 are dated November 1984. Base for Pump 2 is different than for Pumps 1 and 3 and it has a newer name plate, dated June 2014. Motors all appear to be original. Name plates indicate a capacity of 2,400 gpm at 28 feet and 3,000 gpm at 20 feet. Pump appears to experience cavitation on startup, possibly due to grit accumulation.	Determine if an alternative control strategy for the pumps, such as ramping the end pump up to full speed and drawing the wet well down, once per week, can flush the accumulated grit from the wet well.	$192,000	$0	$0	$192,000	$0		HFST	12/13/2019	
918	H-INFLUENT	9	DP	RSP-1-M	9	Motor	MOTOR	RSP-1	1ST FLOOR, WEST SIDE	North Unit	1985		34	2			Replace as needed.	$0	$0	$0	$0	$0		HFST	12/13/2019	Included with pump
919	H-INFLUENT	9	DP	RSP-2	9	Influent Pump #2	PUMP	RSP	DRYWELL	Basement	2014		5	2	20	See comments under Influent Pump #1. Note that RSP 2 was renewed in 2014. This pump has a newer name plate and different support than RSP 1 and 3.	Determine if an alternative control strategy for the pumps, such as ramping the end pump up to full speed and drawing the wet well down, once per week, can flush the accumulated grit from the wet well.	$192,000	$0	$0	$0	$192,000		HFST	12/13/2019	
920	H-INFLUENT	9	DP	RSP-2-M	9	Motor	MOTOR	RSP-2	1ST FLOOR, WEST SIDE	Center unit	1985		34	2			Replace as needed.	$0	$0	$0	$0	$0		HFST	12/13/2019	Included with pump
921	H-INFLUENT	9	DP	RSP-3	9	Influent Pump #3	PUMP	RSP	DRYWELL	Basement	1985		34	2	20	See comments under Influent Pump #1	Determine if an alternative control strategy for the pumps, such as ramping the end pump up to full speed and drawing the wet well down, once per week, can flush the accumulated grit from the wet well.	$192,000	$0	$0	$0	$192,000		HFST	12/13/2019	
922	H-INFLUENT	9	DP	RSP-3-M	9	Motor	MOTOR	RSP-3	1ST FLOOR, WEST SIDE	South Unit	1985		34	2			Replace as needed.	$0	$0	$0	$0	$0		HFST	12/13/2019	Included with pump
923	H-INFLUENT	9	DP	SAM-1	9	Combined influent/primary effluent sampler and Pumps	PUMP	SAM	DRYWELL	1st Floor	N/A		N/A	2	N/A	Not reviewed	Replace as needed.	$0	$0	$0	$0	$0		HFST	12/13/2019	
924	H-INFLUENT	9	DP	SAM-2	3	Primary Effluent Sample Pump	PUMP	SAM-2	B2		N/A		N/A	2	N/A	Not reviewed	Replace as needed.	$0	$0	$0	$0	$0		HFST	12/13/2019	
925	H-INFLUENT	9	DP	PRE-B	9	Bar Screen	BAR SCREEN	SCREEN	WETWELL		1985		34	3	10	Installation assumed in 1985, same as the influent pumps. Schloss Engineered Equipment bar screen. Schloss was acquired by Smith & Loveless in 2015 and is still in business as a subsidiary to S&L. The screen appears to be functional and parts should be available. MCES indicates that gears and chains are worn. There was no evidence of significant corrosion. Staff indicated that the manual screen is used at PWWF to ensure adequate capacity.	Screen is getting old, but has been maintained. There is a capacity concern at PWWF. Consider replacing if new plant is more than 5 years out.	$231,000	$0	$231,000	$0	$0		HFST	12/13/2019	
926	H-INFLUENT	9	DP	PRE-B-PRS	8	Screenings Press	OTHER	SCREEN	WETWELL		?	2018	?	3	10	The screenings press was not in the original plans. It was rebuilt in 2018. The screen originally discharged directly to a dumpster. The additional of the compactor has pushed the dumpster closer to the roll-up door, restricting access to the wet well stairs.	The press will likely need to be rebuilt again or replaced in the next 5 years. Replace compactor when bar screen is replaced.	$154,000	$0	$154,000	$0	$0		HFST	12/13/2019	

927	H-INFLUENT	9	E	IF-ELE-L2	9	Lighting Panel	ELECTRICAL	ELE-IF-MC	CONTROL ROOM	North wall	1985		34	4.00	1	Panelboard L2 (120/240 V, single phase, 125 Amp)- enclosure exterior extremely rusty. Panel has 42-poles with 34 poles in use and 8 poles available. Westinghouse BA breakers are no longer in production.	Fix sources of leakage and moisture in vicinity. Replace panelboard. Verify circuits and update panelboard schedule. Include spare breakers in replacement panelboard. Verify capacity during replacement.	$3,000	$3,000	$0	$0	$0		No Comments		
928	H-INFLUENT	9	E	IF-ELE-T	9	Transformer to Panel L2	TRANSFORM	ELE-IF-MC	CONTROL ROOM	North wall	1985		34	3	5	Transformer (Single phase, 480-120/240 V, 25-kVA, wall mounted). No visible issues.	Perform maintenance testing of transformer. Replace if issues noted during testing.	$10,000	$10,000	$0	$0	$0		No Comments		$10,000 allowance inserted.
929	H-INFLUENT	9	E	IF-MCC	9	Motor Control Center (MCC)	MCC	ELE-IF-MC	CONTROL ROOM	North wall	1985		34	4.00	1	This MCC is designated as MCC-2. Signs of water leaks above and behind MCC. Internals of MCC not investigated. No evidence of outages resulting from leaks. MCC is a Westinghouse Five Star, which is no longer on the market, but should have support from Eaton if parts/buckets are needed. This MCC was specifically raised by electrician as concern at this facility	Fix sources of leakage in vicinity of MCC-2. Replace MCC with given age and possible leakage damage to components. At minimum, MCC should be opened up, cleaned and thoroughly tested. Also, abandoned cabinets located adjacent to MCC (on the left side) should be removed.	$40,000	$40,000	$0	$0	$0		No Comments		
930	H-INFLUENT	9	E	RSP-ELE	9	System Electrical Controls	ELECTRICAL	INF-PUMPS	DRYWELL	1st Floor						This is a generic catch-all for this building		$0	$0	$0	$0	$0		HFST	12/13/2019	
931	H-INFLUENT	9	E	PLW-CP	9	System Electrical Controls	ELECTRICAL	PLW-PUMPS	CONTROL ROOM	West Wall	1997		22	2	5	Allen Bradley SLC 5/05 PLC controller (Tag HASAA) and I/O. Mounted in "repurposed" control cabinet. Est. age based on paperwork in cabinet is 1997. No functional issues noted, other than concerns over age and not being current. Owner noted should be upgraded.	Replace with new PLC supervisory cabinet in accordance with MCES standards. Connect to facility fiber optic network currently under construction.	$25,000	$25,000	$0	$0	$0		No Comments		
932	H-INFLUENT	9	E	ELE-IF-MC	8	Building/Area Electrical Services	ELECTRICAL	PRE	DRYWELL, 1ST FLOOR MCC PANELS		1985		34			This is a generic catch-all for this building		$0	$0	$0	$0	$0		HFST	12/13/2019	
933	H-INFLUENT	9	E	RSP-VFD1/2	9	Influent Pump P201 Variable Frequency Drive (VFD)	VARIABLE	RSP-VFD	DRYWELL	1st Floor	2014		5	3	15	Drive replaced in 2014. They now have 1 VFD for each pump. The wiring between this VFD and the pump was replaced.	Coordinate VFD controls and I/O with possible upgrades with PLC control system.	$10,000	$0	$0	$10,000	$0		HFST	12/13/2019	Inserted allowance of $10,000 to replace drive.
934	H-INFLUENT	9	E	RSP-VFD2/3	9	Influent Pump P202 Variable Frequency Drive (VFD)	VARIABLE	RSP-VFD	DRYWELL	1st Floor	2014		5	3	15	Drive replaced in 2014. They now have 1 VFD for each pump. The wiring between this VFD and the pump was replaced.	Coordinate VFD controls and I/O with possible upgrades with PLC control system.	$10,000	$0	$0	$10,000	$0		HFST	12/13/2019	Inserted allowance of $10,000 to replace drive.
935	H-INFLUENT	9	E	RSP-VFDSS	9	Influent Pump P203 Variable Frequency Drive (VFD)	ELECTRICAL	RSP-VFD	DRYWELL	1st Floor	2016		3	3	15	This is the "New" VFD, installed in 2016. They now have 1 VFD for each pump.	Coordinate VFD controls and I/O with possible upgrades with PLC control system.	$10,000	$0	$0	$10,000	$0		HFST	12/13/2019	Inserted allowance of $10,000 to replace drive.
936	H-INFLUENT	9	I	ELE-IF-CP	9	Bubbler control system	OTHER	INF-PUMPS	DRYWELL, 1ST FLOOR MCC PANELS		N/A		N/A			Bubbler system removed from service. Submersible pressure transducers now used for level control.	Demolish any remnants of decommissioned bubble system.	$0	$0	$0	$0	$0		HFST	12/13/2019	Out of service. No cost.
937	H-INFLUENT	9	I	PCA-IF3-C	9	Bubbler compressors, 2 each	COMPRESSOR	INF-PUMPS	DRYWELL, FIRST FLOOR	In Control Panels	N/A		N/A			Bubbler system removed from service. Submersible pressure transducers now used for level control.	Demolish any remnants of decommissioned bubble system.	$0	$0	$0	$0	$0		HFST	12/13/2019	Out of service. No cost.
938	H-INFLUENT	9	I	INS-PW-FM-A	8	Flow metering	FLOWMETER	PLW-PUMPS	MEZZANINE		N/A		N/A			Age unknown.	Replace plant water Flowmeter and update controls	$1,000	$1,000	$0	$0	$0		HFST	12/13/2019	
939	H-INFLUENT	9	I	INS-RS-FM-A	8	Influent flow metering	FLOWMETER	PRE	BASEMENT		2018		1		25	The influent magmeter is relatively new. The installation is not ideal. There is a tee, with a gate valve, and then the flow meter. There is not a straight run of pipe between the meter and a flow disturbing fitting.	Nothing at this time.	$0	$0	$0	$0	$0		HFST	12/13/2019	
940	H-INFLUENT	9	I	PW-FLOW	5	In-plant waste flow meter	FLOWMETER	PRE	WETWELL	Lower Level	N/A		N/A	3		Plans indicate small parshall flume.	Replace instrumentation as needed	$0	$0	$0	$0	$0		HFST	12/13/2019	Maintenance item.
941	H-INFLUENT	9	I	INS-IF-PA	8	PH meter & recorder	INSTRUMENT	SAM-1	DRYWELL		N/A		N/A			PH meter and recorder have been removed.		$0	$0	$0	$0	$0		HFST	12/13/2019	No longer in service and removed.
942	H-INFLUENT	9	M	HVA-IF-MU1	7	Make up air unit #1	HEATER	IF-HVAC	ROOF	East	1985	Unknown	Unknown	3	5	Replacement, field tagged as MAU-201, airflow assumed to be equal to EF-201.	Demo and replace with updated. Interlock unit with exhaust fan (see EF-201).	$58,618	$58,618	$0	$0	$0		No Comments		
943	H-INFLUENT	9	M	HVA-IF-MU1-GV01	7	Gas Safety Valve	HEATER	IF-HVAC	ROOF		1985	-	34	3	5	Gas Safety Valve is in fair condition and showing signs of age.	Recommend replacement of gas safety valve	$860	$860	$0	$0	$0		No Comments		
944	H-INFLUENT	9	M	HVA-IF-MU2	7	Make up air unit #2	HEATER	IF-HVAC	CEILING	Center	1985	N/A	34	4.00	0	Original, MU-202. Low supply airflow observed. Leads to not enough heat being brought down to the pits.	Demo and replace with updated. Interlock unit with exhaust fan (see EF-202).	$57,575	$57,575	$0	$0	$0		No Comments		
945	H-INFLUENT	9	M	HVA-IF-MU2-GV01	7	Gas Safety Valve	HEATER	IF-HVAC	GROUND	North	1985	-	34	3	5	Gas Safety Valve is in fair condition and showing signs of age.	Recommend replacement of gas safety valve	$860	$860	$0	$0	$0		No Comments		
946	H-INFLUENT	9	M	IF-DUCT	7	Ducting	SYSTEM	IF-HVAC	VARIOUS	Various	1985	N/A	34	2	10	None.	Clean ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
947	H-INFLUENT	9	M	IF-EFF	7	Exhaust fan units #1-3	FAN	IF-HVAC	CEILING										$0	$0	$0	$0		No Comments		
948	H-INFLUENT	9	M	H-HVA-IF-E1		Exhaust fan unit #1, EF-201	FAN		CONTROL ROOM 201	South	1985	N/A	34	4.00	0	Original.	Demo and replace with updated. Interlock fan with make-up air unit (see MAU-201).	$29,301	$29,301	$0	$0	$0		No Comments		
949	H-INFLUENT	9	M	H-HVA-IF-E2		Exhaust fan unit #2, EF-202	FAN		BAR SCREEN ROOM 202	Southeast	1985	N/A	34	4.00	0	Original. Low exhaust airflow observed. Will need to equal supply airflow for neutral pressurization.	Demo and replace with updated. Interlock fan with make-up air unit (see MU-202).	$33,861	$33,861	$0	$0	$0		No Comments		
950	H-INFLUENT	9	M	H-HVA-IF-E3		Exhaust fan unit #3, EF-203	FAN		ROOF	Southwest	1985	N/A	34	4.00	0	Original. Fan not needed. Space is served by MU-202, EF-202, and ERU-201.	Demo fan and cap curb.	$8,814	$8,814	$0	$0	$0		No Comments		
951	H-INFLUENT	9	M	IF-HVA-ELE	9	HVAC Controls	ELECTRICAL	IF-HVAC		MCC Panels								$0	$0	$0	$0	$0		No Comments		
952	H-INFLUENT	9	M	LO-EF	7	Exhaust fan units 1 & 2	FAN	LO-HVAC	CEILING									$0	$0	$0	$0	$0		No Comments		
953	H-INFLUENT	9	M	LO-HVA-ELE	9	HVAC Controls	ELECTRICAL	LO-HVAC		MCC Panels								$0	$0	$0	$0	$0		No Comments		
954	H-INFLUENT	9	M	Unable to verify.		Outside air louver, L-201	LOUVER		BAR SCREEN ROOM 202	Southeast	1985	N/A	34	2	10	Original.	Maintain louver as needed.	$0	$0	$0	$0	$0		No Comments		
955	H-INFLUENT	9	M	Unable to verify.		Outside air louver, L-202	LOUVER		CONTROL ROOM 201	South	1985	N/A	34	2	10	Original.	Maintain louver as needed.	$0	$0	$0	$0	$0		No Comments		
956	H-INFLUENT	9	M	Unable to verify.		Outside air louver, L-203	LOUVER		CONTROL ROOM 201	East	1985	N/A	34	3	5	Original. Louver not needed. Space is served by MU-202, EF-202, and ERU-201.	Blank off louver.	$383	$383	$0	$0	$0		No Comments		
957	H-INFLUENT	9	M	Unable to verify.		Modulation damper, MOD-201	DAMPER		CONTROL ROOM 201	East	1985	N/A	34	4.00	0	Controls are pneumatic (likely inoperable). Associated louver not needed (see L-203).	Demo damper.	$393	$393	$0	$0	$0		No Comments		
958	H-INFLUENT	9	M	Unable to verify.		Energy recovery unit, ERU-201	ERU		CONTROL ROOM 201	Center	1985	N/A	34	4.00	0	Original.	Demo and replace energy recovery unit (fixed-plate heat exchanger) with updated. Provide controls for frost prevention and interlock with MU/EF-202.	$43,915	$43,915	$0	$0	$0		No Comments		
959	H-INFLUENT	9	M	Unable to verify.		Filter, F202A	FILTER		CONTROL ROOM 201	Center	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
960	H-INFLUENT	9	M	Unable to verify.		Filter, F202B	FILTER		CONTROL ROOM 201	Center	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
961	H-INFLUENT	9	M	Unable to verify.		Intake hood, H-201	HOOD		ROOF	Center	1985	N/A	34	2	10	Original.	Maintain/replace air hood as needed.	$0	$0	$0	$0	$0		No Comments		
962	H-INFLUENT	9	P	BFP-INF	7	Backflow preventer: Watts 3/4", S/N #244141	BFP	BFP	BASEMENT		1985	-	34	2	5	Backflow preventer appears to be in good condition but is starting to show signs of age.	Recommend replacement of backflow preventer	$735	$735	$0	$0	$0		No Comments		

963	H-INFLUENT	9	S	BLD-GT	3	Grit/Primary Treatment Building	STR-BUILD	BUILDINGS			1985	N/A	34	2	20	The building displayed minor distress including: exterior joint sealant distress, brick masonry cracking and mortar failure, corrosion of steel lintels, and concrete access stairs risers that did not meet code requirements (first riser to short compared to remaining risers). The loading dock slab displayed widespread crazed cracking.	Replace all failed joint sealants, sandblast and repaint steel lintels with epoxy paint system, repair brick masonry distress.	$12,833	$0	$0	$0	$12,833				
964	H-INFLUENT	9	S	BLD-IF	3	Influent Pumping Building	STR-BUILD	BUILDINGS			1985	N/A	34	2	20	The building displayed minor distress including: exterior joint sealant distress, foundation wall cracking at pump room floor was reported, however, the crack was recently sealed and repainted by MCES Staff no water leakage was observed during our review. The building structural systems were in good condition, a minor hairline crack was present at the entrance door CMU lintel. There is an inspection report by HR Green in 2019, regarding the influent wet well wall crack/ leek (@ 12-13-2019 this is still leaking form the wet well to the dry).	Replace all failed joint sealants, provide waterproofing injection at wall crack to prevent water leakage.	$15,195	$0	$0	$0	$15,195				
965	H-INFLUENT	9	A	BLD-GT		Grit/Primary Treatment Building	STR-BUILD		INTERIOR	GENERAL	1985		34	3	20	WALL FINISH DETERIORATED	REPAINT WALLS, ETC	$6,000	$0	$0	$0	$6,000				
966	H-INFLUENT	9	A	BLD-IF	3	Influent Pumping Building	STR-BUILD		INTERIOR	GENERAL	1985		34	2	20	WALL FINISH DETERIORATED	REPAINT WALLS, ETC	$24,250	$0	$0	$0	$24,250		No Comments		
967	H-INFLUENT	9	A			OVERALL BUILDING	STR-BUILD		ROOF	GENERAL	2017		2	1	20	NEWER ROOF	NONE	$0	$0	$0	$0	$0		No Comments		Newer Roof. Life assumed to extend beyond planning window.
968	H-INFLUENT	9	A			OVERALL BUILDING	STR-BUILD		EXTERIOR	GENERAL	1985		34	1	20	EXTERIOR MASONRY EXCELLENT	NONE	$0	$0	$0	$0	$0		No Comments		
																900 H-INFLUENT	Area Cost Summary	$1,504,871	$444,318	$390,275	$228,000	$442,278				

Notes:
1. Plans dated 1981. Record drawings dated 1987. Nameplates on influent pumps indicate November 1984. 1985 installation assumed.
2. In 2010 an emergency influent sewer line was added upstream of the Headworks Building so influent flow can be diverted and stored in the abandoned digesters. Flow to the digesters is by gravity and portable pumps are needed to convey flow back to the headworks. To date, this emergency storage has not been used.

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
1001	H-ADMINISTRATION	10	A	BLD-AD-OH1	3	Overhead Door in Shop	DOOR	BLD-AD									Remove and Replace OH Door	$7,500	$7,500	$0	$0	$0		No Comments		
1002	H-ADMINISTRATION	10	A	BLD-AD-OH2	3	Overhead Door in Shop	DOOR	BLD-AD									Remove and Replace OH Door	$8,500	$8,500	$0	$0	$0		No Comments		
1003	H-ADMINISTRATION	10	E	AD-ELE-L1	9	Lighting Panel	ELECTRICAL	AD-ELE	MECHANICAL ROOM	Northwest corner	1985		34	3	10	Panelboard L1	Continue regular maintenance and testing. Consider replacement if circuits being added in future.	$0	$0	$0	$0	$0		No Comments		
1004	H-ADMINISTRATION	10	E	AD-ELE-MCC	8	Motor Control Center (MCC)	MCC	AD-ELE	MECHANICAL ROOM	Northwest corner								$5,000	$5,000	$0	$0	$0		No Comments		$5000 allowance inserted.
1005	H-ADMINISTRATION	10	E	AD-ELE-T	8	Transformer to Panel L1	TRANSFORM	AD-ELE	MECHANICAL ROOM	Northwest corner								$5,000	$5,000	$0	$0	$0		No Comments		$5000 allowance inserted.
1006	H-ADMINISTRATION	10	E	AD-MCC	9	Motor Control Center (MCC)	MCC	AD-ELE	MECHANICAL ROOM	Northwest corner	1985			2	10	MCC-1 (Westinghouse Five Star) - mostly building loads. No visible issues.	Continue regular maintenance and testing.	$5,000	$0	$5,000	$0	$0				$5000 allowance inserted.
1006	H-ADMINISTRATION	10	E	AD-MCC	9	Motor Control Center (MCC)	MCC	AD-ELE	MECHANICAL ROOM	Northwest corner	1985			2		this the original equipment		$5,000	$5,000	$0	$0	$0		HFST	12/16/2019	$5000 allowance inserted.
1007	H-ADMINISTRATION	10	E	AD-ELE	9	Building/Area Electrical Services	ELECTRICAL	BLD-AD										$0	$0	$0	$0	$0		No Comments		
1008	H-ADMINISTRATION	10	E	ELE-AD-CP	9	Main control panel	PARENT-OTH	BLD-AD						2		PLC HASAB: Allen Bradley SLC5/05 - PLC is outdated and not current standard	Replace/upgrade PLC control panel to match existing standards. Interface with new plant fiber optic network	$25,000	$25,000	$0	$0	$0		No Comments		$25000 allowance inserted.
1009	H-ADMINISTRATION	10	I	INS-IF-RC	8	Recording Chart: plant influent & plant waste	INSTRUMENT	ELE-AD-CP	CONTROL ROOM									$0	$0	$0	$0	$0				
1009	H-ADMINISTRATION	10	I	INS-IF-RC	8	Recording Chart: plant influent & plant waste	INSTRUMENT	ELE-AD-CP	CONTROL ROOM							Asset out of service and no longer in place	Remove from database	$0	$0	$0	$0	$0		HFST	12/16/2019	
1010	H-ADMINISTRATION	10	I	INS-RA-RC	8	Recording Chart: Return activated sludge	INSTRUMENT	ELE-AD-CP	CONTROL ROOM									$0	$0	$0	$0	$0				
1010	H-ADMINISTRATION	10	I	INS-RA-RC	8	Recording Chart: Return activated sludge	INSTRUMENT	ELE-AD-CP	CONTROL ROOM							Asset out of service and no longer in place	Remove from database	$0	$0	$0	$0	$0		HFST	12/16/2019	
1011	H-ADMINISTRATION	10	I	INS-TK-RC	8	Recording Chart: Thickener, Primary sludge and WAS	INSTRUMENT	ELE-AD-CP	CONTROL ROOM									$0	$0	$0	$0	$0				
1011	H-ADMINISTRATION	10	I	INS-TK-RC	8	Recording Chart: Thickener, Primary sludge and WAS	INSTRUMENT	ELE-AD-CP	CONTROL ROOM							Asset out of service and no longer in place	Remove from database	$0	$0	$0	$0	$0		HFST	12/16/2019	
1012	H-ADMINISTRATION	10	I	LONE-WORKER	9	Lone Worker Personal Alarm system	SAFETY	HASTINGS PLANT										$0	$0	$0	$0	$0		No Comments		
1013	H-ADMINISTRATION	10	I	SCADA	9	SCADA System	INSTRUMENT	HASTINGS PLANT										$0	$0	$0	$0	$0				
1013	H-ADMINISTRATION	10	I	SCADA	9	SCADA System	INSTRUMENT	HASTINGS PLANT									updated as needed	$0	$0	$0	$0	$0		HFST	12/16/2019	Item undefined. No cost provided.
1014	H-ADMINISTRATION	10	M	AD-EF1	7	Exhaust Fan Unit 1	FAN	AD-EF	CEILING	West	2001	N/A	18	4.00	0	Later addition, EF-1, not needed (lab exhaust).	Demo unit.	$1,422	$1,422	$0	$0	$0		No Comments		
1015	H-ADMINISTRATION	10	M	AD-EF2	7	Exhaust Fan Unit 2	FAN	AD-EF	CEILING	West	2001	N/A	18	3	5	Later addition, EF-2, needs rebalancing or replacement.	Demo and replace with updated.	$9,539	$9,539	$0	$0	$0		No Comments		
1016	H-ADMINISTRATION	10	M	AD-EF3	7	Exhaust Fan Unit 3	FAN	AD-EF	CEILING	Southwest	1981	N/A	38	4.00	0	Original, EF-101, out of service.	Demo and replace fan with updated. Interlock fan with AHU-103.	$27,648	$27,648	$0	$0	$0		No Comments		
1017	H-ADMINISTRATION	10	M	AD-EF4	7	Exhaust Fan Unit 4	FAN	AD-EF	CEILING	West	1981	N/A	38	4.00	0	Original, EF-104, not needed due to combustion air being directly ducted.	Demo unit.	$1,422	$1,422	$0	$0	$0		No Comments		
1018	H-ADMINISTRATION	10	M	AD-HT1	7	Heater 1	HEATER	AD-HT	DENNIS' OFFICE	Ceiling	1981	N/A	38	2	10	Original, CUH-101, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1019	H-ADMINISTRATION	10	M	AD-HT2	7	Heater 2	HEATER	AD-HT	BUCS OFFICE	North wall	1981	N/A	38	2	10	Original, CUH-102, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1020	H-ADMINISTRATION	10	M	AD-HT3	7	Heater 3	HEATER	AD-HT	BUMS OFFICE	North wall	1981	N/A	38	2	10	Original, CUH-103, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1021	H-ADMINISTRATION	10	M	AD-HT4	7	Heater 4	HEATER	AD-HT	OPERATIONS OFFICE	East wall	1981	N/A	38	2	10	Original, CUH-104, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1022	H-ADMINISTRATION	10	M	AD-HT5	7	Heater 5	HEATER	AD-HT	LUNCH ROOM	North wall	1981	N/A	38	2	10	Original, CUH-105, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1023	H-ADMINISTRATION	10	M	AD-HT6	7	Heater 6	HEATER	AD-HT	WOMEN'S LOCKER ROOM	North	1981	N/A	38	2	10	Original, CUH-106, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1024	H-ADMINISTRATION	10	M	AD-HT7	7	Heater 7	HEATER	AD-HT	MENS LOCKER ROOM	West	1981	N/A	38	2	10	Original, CUH-107, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1025	H-ADMINISTRATION	10	M	AD-HT8	7	Heater 8	HEATER	AD-HT	ENTRYWAY	Floor level	1981	N/A	38	2	10	Original, CUH-108, operated on manual switch.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		

1026	H-ADMINISTRATION	10	M	AD-DUCT	7	Ducting	SYSTEM	AD-HVAC	CEILING	Various	1981	N/A	38	2	10	None.	Clean ductwork, remove abandoned ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
1027	H-ADMINISTRATION	10	M	AD-HVA-ELE	9	HVAC Controls	ELECTRICAL	AD-HVAC	WALLS, CEILING									$0	$0	$0	$0	$0		No Comments		
1028	H-ADMINISTRATION	10	M	HVA-AD-AC101	7	Air handling unit #1	AIR HANDLR	AD-HVAC	ROOF	South	Unknown	Unknown	Unknown	2	10	Later addition, AC-101, needs rebalancing.	Rebalance.	$819	$0	$819	$0	$0		No Comments		
1029	H-ADMINISTRATION	10	M	HVA-AD-BO	7	Boiler	BOILER	AD-HVAC	BOILER ROOM		2017							$0	$0	$0	$0	$0				
1030	H-ADMINISTRATION	10	M	HVA-AD-S3	7	Air handling unit #3	AIR HANDLR	AD-HVAC	GARAGE 112	Southwest	1981	N/A	38	4.00	0	Original, AHU-103.	Demo and replace with updated.	$47,178	$47,178	$0	$0	$0		No Comments		
1031	H-ADMINISTRATION	10	M	AD-HWP-P1	7	Hot Water Recirculating Pump 1	PUMP	AD-HWP	BOILER ROOM									$0	$0	$0	$0	$0		No Comments		
1032	H-ADMINISTRATION	10	M	AD-HWP-P2	7	Hot Water Recirculating Pump 2	PUMP	AD-HWP	BOILER ROOM									$0	$0	$0	$0	$0		No Comments		
1033	H-ADMINISTRATION	10	M	AD-HWP-P3	7	Hot Water Recirculating Pump 3	PUMP	AD-HWP	BOILER ROOM									$0	$0	$0	$0	$0		No Comments		
1034	H-ADMINISTRATION	10	M	AD-HWP-P4	7	Hot Water Recirculating Pump 4	PUMP	AD-HWP	BOILER ROOM									$0	$0	$0	$0	$0		No Comments		
1035	H-ADMINISTRATION	10	M	AD-UH1	7	Unit Heater 1	PARENT-OTH	AD-UH	TRADES OFFICES	Ceiling, 12'	1981	N/A	38	2	10	Original, UH-101	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1036	H-ADMINISTRATION	10	M	AD-UH2	7	Unit Heater 2	PARENT-OTH	AD-UH	GARAGE	North	1981	N/A	38	2	10	Original, UH-102	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1037	H-ADMINISTRATION	10	M	AD-UH3	7	Unit Heater 3	PARENT-OTH	AD-UH	GARAGE	South	1981	N/A	38	2	10	Original, UH-103	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1038	H-ADMINISTRATION	10	M	AD-UH4	7	Unit Heater 4	PARENT-OTH	AD-UH	SHOP, BOILER ROOM	East wall	1981	N/A	38	2	10	Original.	Maintain/replace as needed.	$3,413	$0	$3,413	$0	$0		No Comments		
1039	H-ADMINISTRATION	10	M	AD-HVAC	3	HVAC	HVAC	BLD-AD								This is a place holder for this building		$0	$0	$0	$0	$0		HFST	12/16/2019	Place holder for building. Not cost provided.
1040	H-ADMINISTRATION	10	M	Unable to verify.		Outside air louver, L-101	LOUVER		GARAGE 112	Southeast	1981	N/A	38	2	10	Original louver.	Maintain/replace as needed.	$1,170	$0	$1,170	$0	$0		No Comments		
1041	H-ADMINISTRATION	10	M	Unable to verify.		Outside air louver, L-103	LOUVER		MECHANICAL ROOM	West	1981	N/A	38	2	10	Original louver.	Maintain/replace as needed.	$1,170	$0	$1,170	$0	$0		No Comments		
1042	H-ADMINISTRATION	10	M	Unable to verify.		Outside air louver, L-104	LOUVER		MECHANICAL ROOM	West	1981	N/A	38	2	10	Original louver.	Blank off louver.	$383	$0	$383	$0	$0		No Comments		
1043	H-ADMINISTRATION	10	M	Unable to verify.		Condensing Unit, CU-1	AIR COND		OUTSIDE	West	Unknown	Unknown	Unknown	2	10	Later addition, serves AC-1.	Maintain/replace as needed.	$2,790	$0	$2,790	$0	$0		No Comments		
1044	H-ADMINISTRATION	10	M	Unable to verify.		Condensing Unit, CU-2	AIR COND		OUTSIDE	North	Unknown	Unknown	Unknown	2	10	Later addition, serves AC-1, -2, and -3.	Maintain/replace as needed.	$8,369	$0	$8,369	$0	$0		No Comments		
1045	H-ADMINISTRATION	10	M	Unable to verify.		Mini-Split AC Unit, AC-1	AIR COND		PARTS ROOM 108	West	Unknown	Unknown	Unknown	2	10	Later addition.	Maintain/replace as needed.	$2,790	$0	$2,790	$0	$0		No Comments		
1046	H-ADMINISTRATION	10	M	Unable to verify.		Mini-Split AC Unit, AC-2	AIR COND		CORRIDOR 106	Northwest	Unknown	Unknown	Unknown	2	10	Later addition.	Maintain/replace as needed.	$2,790	$0	$2,790	$0	$0		No Comments		
1047	H-ADMINISTRATION	10	M	Unable to verify.		Mini-Split AC Unit, AC-3	AIR COND		CONTROL ROOM 105	West	Unknown	Unknown	Unknown	2	10	Later addition.	Maintain/replace as needed.	$2,790	$0	$2,790	$0	$0		No Comments		
1048	H-ADMINISTRATION	10	M	Unable to verify.		Mini-Split AC Unit, AC-4	AIR COND		LUNCH ROOM 107	East	Unknown	Unknown	Unknown	2	10	Later addition.	Maintain/replace as needed.	$2,790	$0	$2,790	$0	$0		No Comments		
1049	H-ADMINISTRATION	10	M	Unable to verify.		Automatic damper, MOD-101	DAMPER		LABORATORY 103	Northwest	1981	N/A	38	4.00	0	Original damper, needs rebalancing.	Rebalance.	$1,380	$1,380	$0	$0	$0		No Comments		
1050	H-ADMINISTRATION	10	M	Unable to verify.		Automatic damper, MOD-102	DAMPER		LABORATORY 104	Southeast	1981	N/A	38	4.00	0	Original damper, needs rebalancing.	Rebalance.	$1,380	$1,380	$0	$0	$0		No Comments		
1051	H-ADMINISTRATION	10	M	Unable to verify.		Automatic damper, MOD-103	DAMPER		MECHANICAL ROOM	West	1981	N/A	38	4.00	0	Original damper, needs rebalancing.	Rebalance.	$1,380	$1,380	$0	$0	$0		No Comments		
1052	H-ADMINISTRATION	10	M	Unable to verify.		Automatic damper, MOD-104	DAMPER		MECHANICAL ROOM	West	1981	N/A	38	4.00	0	Original damper, not needed.	Demo.	$218	$218	$0	$0	$0		No Comments		
1053	H-ADMINISTRATION	10	M	Unable to verify.		Automatic damper, MOD-106	DAMPER		GARAGE 112	Southeast	1981	N/A	38	4.00	0	Original damper, needs rebalancing.	Rebalance.	$1,380	$1,380	$0	$0	$0		No Comments		
1054	H-ADMINISTRATION	10	M	Unable to verify.		Automatic damper, MOD-109	DAMPER		LABORATORY 103	Southeast	1981	N/A	38	4.00	0	Original damper, needs rebalancing.	Rebalance.	$1,380	$1,380	$0	$0	$0		No Comments		
1055	H-ADMINISTRATION	10	M	Unable to verify.		Heating coil, HC-103	HEATING		GARAGE 112	West	1981	N/A	38	4.00	0	Original heating coil for AHU-103.	Demo. Heating coil with replacement AHU-103.	$436	$436	$0	$0	$0		No Comments		
1056	H-ADMINISTRATION	10	M	Unable to verify.		Filter, F-103	FILTER		GARAGE 112	West	1981	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter (included with AHU-103).	$1,414	$1,414	$0	$0	$0		No Comments		
1057	H-ADMINISTRATION	10	M	AD-MECH	7	Structural, plumbing, etc.	OTHER	BLD-AD								this is a place holder for this building		$0	$0	$0	$0	$0		HFST	12/16/2019	
1060	H-ADMINISTRATION	10	P	WATER-SOFT	7	Water Softener	OTHER	BLD-AD										$0	$0	$0	$0	$0				
1060	H-ADMINISTRATION	10	P	WATER-SOFT	7	Water Softener	OTHER	BLD-AD			???				?	Check on age of this system	Replace based on age.	$0	$0	$0	$0	$0		HFST	12/16/2019	
1061	H-ADMINISTRATION	10	S	BLD-AD	3	Administration Building	STR-BUILD	BUILDINGS			1985	N/A	38	2	20	Exterior joint sealants failed, step cracking on CMU storage building expansion, Brick masonry in good condition. Building structural systems in good condition.	Replace failed joint sealants, re-point failed masonry joints.	$13,141	$0	$0	$0	$13,141		No Comments		
1062	H-ADMINISTRATION	10	A	BLD-AD		Administration Building	STR-BUILD		ROOF	EXTERIOR	2017		3	1	20	NEWER ROOF	NONE	$0	$0	$0	$0	$0		No Comments		Newer roof. Life exceeds planning window.
1063	H-ADMINISTRATION	10	A	BLD-AD		Administration Building	STR-BUILD		WALLS	EXTERIOR	1981		38	1	20	EXTERIOR MASONRY EXCELLENT	NONE	$0	$0	$0	$0	$0		No Comments		No costs anticipated in planning window.
1064	H-ADMINISTRATION	10	A	BLD-AD		Administration Building	STR-BUILD		WINDOWS	EXTERIOR	1981		38	1	20	ALUMINUM WINDOWS EXCELLENT	NONE	$0	$0	$0	$0	$0		No Comments		No costs anticipated in planning window.
1065	H-ADMINISTRATION	10	A	BLD-AD		Administration Building	STR-BUILD		INTERIOR	GENERAL	1981		38	2	10	WORN FINISHES	UPDATE/RENOVATE. Scope maintenance varies.	$0	$0	$0	$0	$0		No Comments		Maintenance item.
1066	H-ADMINISTRATION	10	A	BLD-AD		Administration Building	STR-BUILD		INTERIOR	GENERAL						LACK OF ADA-COMPLIANCE	UPDATE IF RENOVATED	$0	$0	$0	$0	$0		No Comments		
1079	New Item	10	I	BLD-AD		Laboratory Instrumentation								3		The Laboratory instruments are old and becoming more antiquated	upgrade Laboratory equipment	$0	$0	$0	$0	$0		HFST	12/16/2019	Maintenance item.
1080	New Item	10	I	BLD-AD		IT / PCG Assets								4.00		There are a lot of IT issues, slow network,	This system hole system needs to be reviewed for current usage and updated as required	$0	$0	$0	$0	$0		HFST	12/16/2019	
1081	New Item	10	A	BLD-AD		Door, Interior			Interior spaces								Interior spaces	$2,500	$2,500	$0	$0	$0		ADA	1/2/2020	
1082	New Item	10	A	BLD-AD		Sign, Exterior Parking			Parking Lot							The existing sign does not included any information about fines.	Parking Lot	$500	$500	$0	$0	$0		ADA	1/2/2020	
1083	New Item	10	A	BLD-AD		Door, exterior/entrance			Garage Entrance							There is currently a 1/2" rise at the stoop. The garage entry functions as the accessible entry due to step at the main entry.	Garage Entrance	$1,000	$1,000	$0	$0	$0		ADA	1/2/2020	
1084	New Item	10	A	BLD-AD		Sign, Interior Room			Interior spaces								Interior spaces	$480	$480	$0	$0	$0		ADA	1/2/2020	
1085	New Item	10	A	BLD-AD		Sanitizer Dispenser			Corridor							The sanitizer protrudes 5" at a height of 54" AFF.	Corridor	$400	$400	$0	$0	$0		ADA	1/2/2020	
1086	New Item	10	A	BLD-AD		AED			Entrance Vestibule							The pull to the AED case is currently at 65" AFF.	Entrance Vestibule	$100	$100	$0	$0	$0		ADA	1/2/2020	
1087	New Item	10	A	BLD-AD		Door, exterior/entrance			Garage Entrance							The garage entry currently functions as the accessible entry due to the 7" exterior step at the main entry.	Garage Entrance	$650	$650	$0	$0	$0		ADA	1/2/2020	
1088	New Item	10	A	BLD-AD		Sidewalk/Pavement			Exterior Route							There is currently a 7" step at the entry door.	Exterior Route	$4,000	$4,000	$0	$0	$0		ADA	1/2/2020	
1089	New Item	10	A	BLD-AD		Toilet room			Women's Toilet Room							Signs indicate this location is used as a single-user public toilet room.	Women's Toilet Room	$20,000	$20,000	$0	$0	$0		ADA	1/2/2020	

1090	New Item	10	A	BLD-AD		Door, exterior/entrance			Main Entrance							At the time of site visit the door required 26 pounds of force to operate.	Main Entrance	$100	$100	$0	$0	$0		ADA	1/2/2020	
1091	New Item	10	A	BLD-AD		Sidewalk			Entrance Vestibule								Entrance Vestibule	$100	$100	$0	$0	$0		ADA	1/2/2020	
1092	New Item	10	A	BLD-AD		Time Clock			Corridor							The time cards protrude 7" at a height of 46" AFF.	Corridor	$400	$400	$0	$0	$0		ADA	1/2/2020	
1093	New Item	10	A	BLD-AD		Kitchen			Lunch Room							A full kitchen is provided; there are currently no features of accessibility.	Lunch Room	$14,000	$14,000	$0	$0	$0		ADA	1/2/2020	
1094	New Item	10	A	BLD-AD		Door, exterior/entrance			Entrance Vestibule							Vestibule does not turning space or 48" clearance past door swing (currently provides 39").	Entrance Vestibule	$3,000	$3,000	$0	$0	$0		ADA	1/2/2020	
1095	New Item	10	A	BLD-AD		Door, exterior/entrance			Entrance Vestibule							Or remove the interior vestibule door. Currently provides 14" beyond the latch (vs. 18" minimum).	Entrance Vestibule	$800	$800	$0	$0	$0		ADA	1/2/2020	
1096	New Item	10	A	BLD-AD		Door, exterior/entrance			Entrance Vestibule								Entrance Vestibule	$100	$100	$0	$0	$0		ADA	1/2/2020	
																1,000 H-ADMINISTRATION	Area Cost Summary	$290,540	$200,307	$77,092	$0	$13,141				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	comments
1101	H-PRI TANK 1	11	DP	PRI-1	8	Primary Clarifier #1, North	TANK	PRI	YARD		1985		34	3	10	The units appear to be in good working order, but the tanks were in service during the site visit, so the condition of the collector mechanisms could not be observed.	Schedule sheet metal evaluation and a thorough inspection of the collector mechanism in 2020, 2021 at the latest. (Replacement cost)	$450,000	$0	$450,000	$0	$0		HFST	12/16/2019	The $450,000 covers replacement of the mechanism and other components.
1102	H-PRI TANK 1	11	M	HVA-PR1-MU	7	Make up air unit	HEATER	PRI-1	OUTSIDE		2011	-	8	1	17	Makeup air unit in excellent condition with no significant signs of wear	No action required	$0	$0	$0	$0	$0		No Comments		
1103	H-PRI TANK 1	11	M	HVA-PR1-MU-GV01	7	Gas Safety Valve	HEATER	PRI-1	OUTSIDE		1985	-	38	4.00	1	Gas safety valve is in poor condition with significant wear, corrosion, and rust.	Recommend replacement of gas safety valve	$0	$0	$0	$0	$0	4.00	No Comments		
1104	H-PRI TANK 1	11	S	PRI-1	8	Primary Clarifier #1, North	TANK		YARD		1985		34	3	5	The painted steel bridge structure displayed corrosion of the steel members. Recoating and repairing the steel will be an ongoing maintenance item. The odor control pipe support systems at the exterior of the tanks appear to be in good condition.	The carbon steel materials in the primary clarifiers should be inspected when a tank is out of service in the next 1 to 2 years. If in good condition, the sludge collectors should be sandblasted to a white bare metal condition and an epoxy protective coating field applied to the steel sections. Repair of the steel by sectional replacement may be required based on the amount of corrosion present after surface preparation. Schedule metal evaluation in 2020 or 2021. (Repair Cost)	$154,000	$154,000	$0	$0	$0				The structural cost is an estimate for rehab of the mechanism, bridge etc. The Mechanical cost under item 1101 is for replacement of the entire collector mechanism and internal tank components.
1105	H-PRI TANK 2	11	DP	PRI-2	8	Primary Clarifier #2, South	TANK	PRI	YARD		1985		34	3	10	The units appear to be in good working order, but the tanks were in service during the site visit, so the condition of the collector mechanisms could not be observed.	Consider taking one tank out of service at a time during low flow, for a more thorough inspection of the mechanism.	$0	$0	$0	$0	$0				**Duplicate item. See below.**
1105	H-PRI TANK 2	11	DP	PRI-2	8	Primary Clarifier #2, South	TANK	PRI	YARD		1985		34	3	10	When Gravity Thickner is out of service the south Primary clarifier serve as both gravity and Primary and North Primary clean out be use because of process piping design. At future capacity load this will not be adequate.	Schedule metal evaluation in 2020 or 2021, (Replacement cost)	$450,000	$0	$450,000	$0	$0		HFST	12/16/2019	The $450,000 covers replacement of the mechanism and other components.
1106	H-PRI TANK 2	11	M	HVA-PR2-MU	7	Make up air unit	HEATER	PRI-2	OUTSIDE		2011		8	1	17	Makeup air unit in excellent condition with no significant signs of wear. Each clarifier/thickener has an insulated aluminum cover and is vented to odor control. MCES identified odor control as a concern as air is drawn through both the primary clarifiers and gravity thickener in series.	No action required.	$0	$0	$0	$0	$0		No Comments		
1107	H-PRI TANK 2	11	M	HVA-PR2-MU-GV01	7	Gas Safety Valve	HEATER	PRI-2	OUTSIDE		1985	-	34	4.00	1	Gas safety valve is in poor condition with significant wear, corrosion, and rust.	Recommend replacement of gas safety valve	$0	$0	$0	$0	$0	4.00	No Comments		
1108	H-PRI TANK 2	11	S	PRI-2	8	Primary Clarifier #2, South	TANK	PRI	YARD		1985	2007	34	3	2	The painted steel bridge structure displayed corrosion of the steel members. Recoating and repairing the steel will be an ongoing maintenance item. The odor control pipe support systems at the exterior of the tanks appear to be in good condition.	The carbon steel materials in the primary clarifiers should be sandblasted to a white bare metal condition and an epoxy protective coating field applied to the steel sections. Repair of the steel by sectional replacement may be required based on the amount of corrosion present after surface preparation. Schedule metal evaluation 2020 or 2021. (Repair cost)	$154,000	$154,000	$0	$0	$0				The structural cost is an estimate for rehab of the mechanism, bridge etc. The Mechanical cost under item 1105 is for replacement of the entire collector mechanism and internal tank components.
1109	H-PLANT	13	DP	THK-BT		blend tank	TANK	THK	YARD	Between Primaries						Grit accumulation was noted to occur in the primary sludge/WAS blend tank upstream of the gravity thickener.	Grit tanks need renewal	$0	$0	$0	$0	$0		HFST	12/16/2019	This is not a capital cost item.
1110	H-PLANT	13	DP	THK	8	Gravity thickener tank	TANK	THICK	YARD	Between Primaries	**1985**	**2017**			10	The 2017 metals renewal was a selective repair not a complete rebuild. The gravity thickener co-thickens primary sludge and waste activated sludges. Elutriation (plant water) is not added to the gravity thickener. On average, the gravity thickener is currently lightly loaded with a solids loading rate of 2.5 pounds per square foot-day (lb./sf-d) and SOR of 310 gal/sf-d, but does store solids over the weekend when not hauling sludge to the Metro Plant. The bottom rakes of the gravity thickener were replaced and has minimized sludge "burping" in the thickener. The bridge was also replaced at the same time. If the gravity thickener is out of service, one primary clarifier is operated as the gravity thickener to serve as sludge storage and thickening. When pumping thickened sludge from the primary clarifier, MCES staff reports the pumping rate is severely reduced.	Evaluate treatment capacity at higher flow when gravity thickener is out of service and one primary is used as both a clarifier and thickener.	$75,000	$0	$75,000	$0	$0		HFST	12/16/2019	
1111	H-PRI TANK 1	11	A	PRI-1	8	Primary Clarifier #1, North	TANK	PRI	YARD	DOOR				3	8	WORN DOOR	REPLACE DOOR. Maintain and replace as necessary.	$5,000	$0	$5,000	$0	$0				
1112	H-PRI TANK 2	11	A	PRI-2	8	Primary Clarifier #2, South	TANK	PRI	YARD	DOOR				3	8	WORN DOOR	REPLACE DOOR. Maintain and replace as necessary.	$5,000	$0	$5,000	$0	$0				

1113	Gravity Thickener	13	S			Gravity Thickener Tank	Tank		Yard		1985	2017	34	2	5	The 2017 metals renewal was a selective repair not a complete rebuild. The painted steel bridge structure displayed corrosion of the steel members. Recoating and repairing the steel will be an ongoing maintenance item.	The carbon steel materials in the gravity thickener should be sandblasted to a white bare metal condition and an epoxy protective coating field applied to the steel sections. Repair of the steel by sectional replacement may be required based on the amount of corrosion present after surface preparation.	$123,200	$123,200	$0	$0	$0				
1193	New Item	11	E	PRI-1		Lighting for tank interior dome	TANK			North tank							Lighting needs to be upgraded to provide adequate lighting	$2,000	$2,000	$0	$0	$0		HFST	12/16/2019	
1194	New Item	11	E	PRI-2		Lighting for tank interior dome	TANK			South Tank							Lighting needs to be upgraded to provide adequate lighting	$2,000	$2,000	$0	$0	$0		HFST	12/16/2019	
1196	New Item	11	DP			PRI-2					1985		34	4.00	0	Yard drain piping and valve is non functional	replace	$0	$0	$0	$0	$0	4.00	HFST	12/16/2019	
1197	New Item	11	A			PRI-1 & PRI-2 & Gravity								3		Roof joint caps are failing and need to be replaced	replace caps	$0	$0	$0	$0	$0	2	HFST	12/16/2019	
1198	New Item	11	DP			PRI-1 & PRI-2 & Gravity	Motor				1985		34		5-10	The motors and gear on the PRI-1, PRI-2, Gravity this are original to the tanks	Maintain and replace as necessary	$0	$0	$0	$0	$0		HFST	12/16/2019	
																		$0	$0	$0	$0	$0				
																		$0	$0	$0	$0	$0				
1301	H-PLANT	13	DP	THK-BT		blend tank	TANK	THK	YARD	Between Primaries						Grit accumulation was noted to occur in the primary sludge/WAS blend tank upstream of the gravity thickener.		$0	$0	$0	$0	$0		No Comments		
1302	H-PLANT	13	DP	THK	8	Gravity thickener tank	TANK	THICK	YARD	Between Primaries						SEE ITEM 1110. The gravity thickener co-thickens primary sludge and waste activated sludges. Elutriation (plant water) is not added to the gravity thickener. On average, the gravity thickener is currently lightly loaded with a solids loading rate of 2.5 pounds per square foot-day (lb./sf-d) and SOR of 310 gal/sf-d, but does store solids over the weekend when not hauling sludge to the Metro Plant. The bottom rakes of the gravity thickener were replaced and has minimized sludge "burping" in the thickener. The bridge was also replaced at the same time. If the gravity thickener is out of service, one primary clarifier is operated as the gravity thickener to serve as sludge storage and thickening. When pumping thickened sludge from the primary clarifier, MCES staff reports the pumping rate is severely reduced.		$0	$0	$0	$0	$0				**See item 1010.**
1303	Gravity Thickener	13	S			Gravity Thickener Tank	Tank		Yard		1985	2017	34	2	5	See 1113. The painted steel bridge structure displayed corrosion of the steel members. Recoating and repairing the steel will be an ongoing maintenance item.	The carbon steel materials in the gravity thickener should be sandblasted to a white bare metal condition and an epoxy protective coating field applied to the steel sections. Repair of the steel by sectional replacement may be required based on the amount of corrosion present after surface preparation.	**$0**	$0	$0	$0	$0				$75,000 included under Item 1010 for future collector repairs.
1398	New Item	13	DP			ODR-DUCT	Duct							4.00	1	The Ducts work has flexible joints that are exposed and will need to be replace	replace flexible joints	$0	$0	$0	$0	$0	3	HFST	12/16/2019	
1399	New Item	13	DP			Gravity Thickener Tank	Tank				1985	2007	34			When Gravity Thickener is out of service the south Primary clarifier serves as both gravity and Primary and North Primary cannot be used because of process piping design. At future capacity load this will not be adequate.	Evaluate future loads.	$0	$0	$0	$0	$0		HFST	12/16/2019	Further evaluation needed to determine if piping and pumps can be modified to allow the north primary to be used when the gravity thickener is out of service.
																1100 & 1300 H-PRI TANK 1 & 2 & Gravity Thickener	**Area Cost Summary**	$1,420,200	$435,200	$985,000	$0	$0		HFST	12/16/2019	

Note: Primary Sludge and Scum Pumps are located in the Grit Building

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
1201	H-SOLIDS	12	A	BLD-LO-OHD-N	3	Loadout Building Overhead Door (North)	DOOR	BLD-LO	LOADOUT BAY	North door	1985		34				Remove and replace OH Door	$8,500	$8,500	$0	$0	$0		No Comments		
1202	H-SOLIDS	12	A	BLD-LO-OHD-S	3	Loadout Building Overhead Door (South)	DOOR	BLD-LO	LOADOUT BAY	South Door	1985		34				Remove and replace OH Door	$8,500	$8,500	$0	$0	$0		No Comments		
1203	H-SOLIDS	12	DP	PCA-SLO-C	5	Compressor	COMPRESSOR	BLD-LO	SLUDGE PUMP ROOM		1985		34	3	5		Maintain and replace as needed	$10,000	$10,000	$0	$0	$0		HFST	12/16/2019	$10,000 allowance inserted.
1204	H-SOLIDS	12	DP	VEHC-SPW-P	5	High pressure washer	PUMP	BLD-LO	SLUDGE BAY		2011		8		2		Maintain and replace as needed	$0	$0	$0	$0	$0		HFST	12/16/2019	Maintenance item
1205	H-SOLIDS	12	DP	ODR-1-T	8	Vessel #1	ODOR	CARBON	CARBON ROOM		1985		34	2	15	No immediate needs.	Monitor carbon and replace as needed.	$0	$0	$0	$0	$0		HFST	12/16/2019	Maintenance item
1206	H-SOLIDS	12	DP	ODR-2-T	8	Vessel #2	ODOR	CARBON	CARBON ROOM		1985		34	2	15	No immediate needs.	Monitor carbon and replace as needed.	$0	$0	$0	$0	$0		HFST	12/16/2019	Maintenance item
1207	H-SOLIDS	12	DP	ODR-DUCT	7	Ductwork	SYSTEM	CARBON	CARBON ROOM		1985		34	2	15	The flexible joints, exterior to the building are failing and need replacement	Replace flexible joints, Insulation repair/replace as needed	$0	$0	$0	$0	$0		HFST	12/16/2019	Maintenance item
1208	H-SOLIDS	12	DP	HST-LO-H1	3	Sludge loadout building hoist	HOIST	HOISTS	PUMP ROOM		1985		34					$3,000	$3,000	$0	$0	$0		No Comments		$3000 allownce inserted for a new chain hoist.
1209	H-SOLIDS	12	DP	ODR-1-BL	8	Blower	BLOWER	ODR-1-T	CARBON ROOM		1985		34	2	15			$25,000	$0	$0	$25,000	$0		HFST	12/16/2019	$25,000 allowance inserted for new fan.
1210	H-SOLIDS	12	DP	ODR-1-M	8	Motor	MOTOR	ODR-1-T	CARBON ROOM	South	1985		34	2	15	Motor recently replaced. No other issues. Blower VFD located in MCC Shed.		$0	$0	$0	$0	$0		HFST	12/16/2019	Included with fan
1211	H-SOLIDS	12	DP	ODR-2-BL	8	Blower	BLOWER	ODR-2-T	CARBON ROOM		1985		34	2	15			$25,000	$0	$0	$25,000	$0		HFST	12/16/2019	$25,000 allowance inserted for new fan.
1212	H-SOLIDS	12	DP	ODR-2-M	8	Motor	MOTOR	ODR-2-T	CARBON ROOM	North	1985		34	2	15	Motor recently replaced. No other issues. Blower VFD located in MCC Shed.		$0	$0	$0	$0	$0		HFST	12/16/2019	Included with fan
1213	H-SOLIDS	12	DP	SLO-PIPE	7	Solids piping and valves	SYSTEM	SLO	PUMP ROOM		1985		34	2	15	The piping and valves appears to be in good condition.	The size and configuration of the sludge piping needs to be evaluated to determine if it is contributing to the sludge loadout issues.	$0	$0	$0	$0	$0		HFST	12/16/2019	

1214	H-SOLIDS	12	DP	SLU-1-P	8	Loadout Pump #1 (centrifugal)	PUMP	SLUDGE-PUMPS	PUMP ROOM		1985	2018	34	2	15	Wemco Model C. Pump recently rebuilt. Motor and belt drive appear to be original. Pump in good condition, but cannot handle thick sludge whenever it is over 4% solids. This significantly increased loadout time, and therefor decreases the number of loads removed. Also this pump will not work when pumping sludge from Primary - (South).	Consider keeping this pump for loadout of sludge at 3% and less. This is a recessed impeller pump, with a relatively flat curve. A slight increase in head will result in a significant decrease in capacity. Pump should be replaced with a pump with a much steeper curve to maintain flow, but a decrease should still be expected with thicker sludges and when pumping from the south primary.	$64,000	$0	$0	$64,000	$0		HFST	12/16/2019	A new hydrostal pump will cost approximately 24000. Installed cost, including electrical, I&C, controls, etc. is estimated at $64,000.
1215	H-SOLIDS	12	DP	SLU-1-M	8	Motor	MOTOR	SLU-1-P	PUMP ROOM		1985		34	2	15	original motor		$0	$0	$0	$0	$0		HFST	12/16/2019	
1216	H-SOLIDS	12	DP	SLU-2-P	8	Loadout Pump #2 (piston)	PUMP	SLUDGE-PUMPS	PUMP ROOM		1985		34	4.00	10	Piston pump used for thicker sludge. Limited to about 100 gpm. Some of this may be due to pump capacity and some of the problem may be associated with losses in long suction lines, resulting in lower NPSHA. The pump is also old, worn, and replacement parts may be difficult to find.	Evaluate pumping options for thicker sludge. Need to determine if suction piping is the limiting factor for thicker sludge, and not the pump. The piston pump should be replaced with a progressing cavity or some other type of positive displacement pump.	$64,000	$0	$64,000	$0	$0		HFST	12/16/2019	A new progressive cavity pump will cost approximately $24,000. Installed cost, including electrical, I&C, controls, etc. is estimated at $64,000. Due to space constraints, an ABEL electro-mechanical diapragm pump might be considered.
1217	H-SOLIDS	12	DP	SLU-2-M	8	Motor	MOTOR	SLU-2-P	PUMP ROOM		1985		34	2	15	original motor		$0	$0	$0	$0	$0		HFST	12/16/2019	
1218	H-SOLIDS	12	DP	DLU-PUMPS	3	Dilution water Pumps	PARENT-OTH	THICK			1985		34			Elutriation (dilution water) is not used at gravity thickener and pumps have been removed from service.		$0	$0	$0	$0	$0		HFST	12/16/2019	No longer used.
1219	H-SOLIDS	12	E	ELE-LO-MC	9	Building/Area Electrical Services	ELECTRICAL	BLD-LO	PUMP ROOM									$0	$0	$0	$0	$0		No Comments		No costs, other than maintenance, anticipated in planning window.
1220	H-SOLIDS	12	E	ODR-VFD	8	VFD?s, electrical controls	VARIABLE	CARBON	ELECTRICAL ROOM									$0	$0	$0	$0	$0		No Comments		No costs, other than maintenance, anticipated in planning window.
1221	H-SOLIDS	12	E	SLU-ELE-L12B	9	Lighting Panel	ELECTRICAL	ELE-LO-MC	ELECTRIC ROOM									$0	$0	$0	$0	$0		No Comments		No costs, other than maintenance, anticipated in planning window.
1222	H-SOLIDS	12	E	SLU-ELE	9	System Electrical Controls	ELECTRICAL	SLUDGE-PUMPS	PUMP ROOM									$0	$0	$0	$0	$0		No Comments		No costs, other than maintenance, anticipated in planning window.
1223	H-SOLIDS	12	E	SLU-PIPE	7	Distribution piping and valves	SYSTEM	SLUDGE-PUMPS	PUMP ROOM							The valves in this area are manual	to automate this area some automated valving would be necessary	$0	$0	$0	$0	$0		HFST	12/16/2019	
1224	H-SOLIDS	12	E	SLU-ELE-L12	9	Lighting Panel	ELECTRICAL	SLU-ELE	PUMP ROOM						20	Panelboard L-12, 120/208 Volt, no issues noted.	Continue regular maintenance and testing.	$5,000	$0	$0	$0	$5,000		No Comments		$5000 allowance inserted.
1225	H-SOLIDS	12	E	SLU-ELE-T	8	Transformer to Panel L12	TRANSFORM	SLU-ELE	CONTROL ROOM	Southeast corner				1	20	Transformer T-12, 45 kVA, 3-phase. No issues noted	Continue regular maintenance and testing.	$5,000	$0	$0	$0	$5,000		No Comments		$5000 allowance inserted.
1226	H-SOLIDS	12	E	SLU-ELE-TB	8	Transformer to Panel L12b	TRANSFORM	SLU-ELE	ELEC RM					1	20	Transformer T-12B, 30 KVA, 3 phase. In MCC12 Shed. No issues noted. Feeds 120/208 V panelboard L-12B in MCC shed.	Continue regular maintenance and testing.	$5,000	$0	$0	$0	$5,000		No Comments		$5000 allowance inserted.
1227	H-SOLIDS	12	E	SLU-MCC	9	Motor Control Center (MCC)	MCC	SLU-ELE	MCC12 SHED					1	20	MCC is relatively recent. Window unit AC for space. No issues noted.	Continue regular maintenance and testing. Evaluate window unit air conditioner for MCC shed.	$0	$0	$0	$0	$0		No Comments		No costs, other than maintenance, anticipated in planning window.
1228	H-SOLIDS	12	I	INS-LO-FM-A	8	Loadout flow meter	FLOWMETER	SLO	GARAGE							MCES staff question the location of the flow meter.	Evaluate location of flow meter	$0	$0	$0	$0	$0		HFST	12/16/2019	
1229	H-SOLIDS	12	I	SLO-CP	7	Loadout Pump control station	ELECTRICAL	SLO	SLUDGE BAY							The equipment is outdated	Automation with new PLC controls	$3,000	$3,000	$0	$0	$0		HFST	12/16/2019	
1230	H-SOLIDS	12	I	SLO-SP	7	Sludge Loadout Control Panel Screen. Siemens: "SimaticTouch Panel"	PCS	SLO		East wall						The equipment is outdated	Automation with new PLC controls	$7,500	$7,500	$0	$0	$0		HFST	12/16/2019	
1231	H-SOLIDS	12	M	HVA-LO-MU	7	Makeup air unit, interior	HEATER	LO-HVAC	CEILING	North	1985	N/A	34	4.00	0	Original, MU-1201. Exhaust fans are on manual switches so the outside air is not being pre-treated when the fans are off.	Demo and replace makeup air unit with updated. Interlock with exhaust fans EF-1202 and EF-1202 to maintain correct building pressurization.	$80,105	$80,105	$0	$0	$0		No Comments		
1232	H-SOLIDS	12	M	HVA-LO-MU2	7	Makeup air unit, roof top	HEATER	LO-HVAC	ROOF	West	1985	N/A	34	4.00	0	Later addition, MV-403. Make-up air unit added to provide supply air to the pump room. No exhaust fans found on site.	Demo and replace makeup air unit with updated.	$47,730	$47,730	$0	$0	$0		No Comments		
1233	H-SOLIDS	12	M	HVA-LO-MU-GV01	7	Gas Safety Valve	HEATER	LO-HVAC	CEILING			2019	0		20	MCES does not recall having this done	Confirm that valve was replaced in 2019.	$860	$0	$0	$0	$860		HFST	12/16/2019	
1234	H-SOLIDS	12	M	LO-DUCT	7	Ducting	SYSTEM	LO-HVAC	CEILING	Various	1985	N/A	34	2	10	None.	Clean ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
1235	H-SOLIDS	12	M	LO-EF1	7	Exhaust fan unit #1, 1HP, 1.5 amp	FAN	LO-HVAC	CEILING, CENTER OF BAY, 16' UP	Center	1985	N/A	34	4.00	0	Original, EF-1201. Exhaust fan is on a manual switch and is only turned on when needed, usually in the winter when the solids truck is idling inside.	Demo and replace exhaust fan with updated. Interlock with makeup-air unit (see MU-1201) to maintain correct building pressurization.	$35,480	$35,480	$0	$0	$0		No Comments		
1236	H-SOLIDS	12	M	H-HVA-LO-EF2		Exhaust fan unit #2, EF-1202	FAN		ODOR CONTROL ROOM	Southwest	1985	N/A	34	4.00	0	Original. Exhaust fans are on manual switches so the outside air is not being pre-treated when the fans are off.	Demo and replace energy recovery unit (fixed-plate heat exchanger) with updated. Provide controls for frost prevention and interlock with MU-1201, EF-1201, and EF-1202.	$66,231	$66,231	$0	$0	$0		No Comments		
1237	H-SOLIDS	12	M	ODR-HVA-ELE	9	HVAC Controls	ELECTRICAL	ODR-HVAC	ELECTRICAL ROOM									$0	$0	$0	$0	$0		No Comments		
1238	H-SOLIDS	12	M	Unable to verify.		Energy recovery unit, ERU-1201	ERU		ROOF	East	1985	N/A	34	4.00	0	Original. Exhaust fans are on manual switches so the outside air is not being pre-treated when the fans are off.	Demo and replace energy recovery unit (fixed-plate heat exchanger) with updated. Provide controls for frost prevention and interlock with MU-1201, EF-1201, and EF-1202.	$49,332	$49,332	$0	$0	$0		No Comments		
1239	H-SOLIDS	12	M	Unable to verify.		Filter, F-1201A	FILTER		ROOF	East	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1240	H-SOLIDS	12	M	Unable to verify.		Filter, F-1201B	FILTER		ROOF	East	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1241	H-SOLIDS	12	M	Unable to verify.		Filter, F-1201C	FILTER		ROOF	East	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1242	H-SOLIDS	12	M	Unable to verify.		Outside air louver, L-1	LOUVER		PUMP ROOM	South	1985	N/A	34	2	10	Later addition, no information provided on louver. Louver added, presumably in lieu of transfer fans (originally shown on drawings as a future addition), to provide relief air for pump room.	Maintain louver as needed.	$1,170	$0	$1,170	$0	$0		No Comments		
1243	H-SOLIDS	12	P	POT	9	Potable Water	SYSTEM	AUXILIARY	GARAGE									$0	$0	$0	$0	$0		No Comments		
1244	H-SOLIDS	12	P	BFP-SLOB	7	Backflow preventer: Conbraco 2", Model 40208A, S/N #W4357	BFP	BFP	LOADOUT BAY	West wall	1985	-	34	2	5	Backflow preventer appears to be in good condition but is starting to show signs of age.	Recommend replacement of backflow preventer	$1,820	$1,820	$0	$0	$0		No Comments		
1245	H-SOLIDS	12	P	BFP-WASH	7	Backflow preventer: Conbraco 3/4", Model 4020402, S/N #J7258	BFP	BFP	LOADOUT BAY	Southeast wall	1985	-	34	2	5	Backflow preventer appears to be in good condition but is starting to show signs of age.	Recommend replacement of backflow preventer	$735	$735	$0	$0	$0		No Comments		
1246	H-SOLIDS	12	P	LO-WATER-HTR	3	Loadout Building Water Heater	HEAT XCHNG	BLD-LO	PUMP ROOM		2012		7	2	13	Water heater is in good condition with only minor wear	No action required	$0	$0	$0	$0	$0		No Comments		This is a maintenance item. Replace when it fails.

1247	H-SOLIDS	12	S	BLD-LO	3	Sludge Loadout Building	STR-BUILD	BUILDINGS			1985	N/A	34	2	10	The exterior joint sealants throughout the building had failed. Brick masonry cracking and mortar distress was present at isolated locations. Vertical brick cracking was present at the building corners and was likely due to the layout of the vertical masonry control joints. Steel lintels displayed corrosion at the door headers. The overall structure was in good condition. There is a need a concrete apron for both the north and south bay access.	Replace failed joint sealants. Repoint brick masonry joints and replace cracked brick units, additional vertical masonry control joints should be added at the building corners to control the masonry movement distress that is occurring. Sandblast and repaint all carbon steel lintels. Add Concrete apron for north and south access.	$85,215	$0	$85,215	$0	$0				
1248	H-SOLIDS	12	S	BLD-LO	3	Sludge Loadout Building	HOIST		PUMP ROOM		1985	N/A	34	2	10	The hoist and monorail were in good condition. Minor surface corrosion of the monorail beam were present.	Sandblast and repaint the monorail.	1027	$0	$1,027	$0	$0		No Comments		
1249	H-SOLIDS	12	A	BLD-LO		Sludge Loadout Building	STR-BUILD		EXTERIOR	ROOF	2017		2	1	20+	NEWER ROOF	NONE	$0	$0	$0	$0	$0		No Comments		New roof. No replacement in planning window.
1250	H-SOLIDS	12	A	BLD-LO		Sludge Loadout Building	STR-BUILD		EXTERIOR	SKYLIGHTS	1985		34	1	20+	SKYLIGHTS EXCELLENT	NONE	$0	$0	$0	$0	$0		No Comments		No replacement in planning window.
1251	H-SOLIDS	12	A	BLD-LO		Sludge Loadout Building	STR-BUILD		EXTERIOR	DOORS	1985		34	2	18	DOORS EXCELLENT, Door frames are in moderate to poor condition		$39,000	$0	$0	$0	$39,000				
1252	H-SOLIDS	12	A	BLD-LO		Sludge Loadout Building	STR-BUILD		EXTERIOR	WALLS	1985		34	1	20	EXTERIOR MASONRY EXCELLENT	REMOVE & REPLACE CONTROL JOINT SEALANT WEST WALL	$1,880	$0	$0	$0	$1,880		No Comments		
1253	H-SOLIDS	12	A	BLD-LO		Sludge Loadout Building	STR-BUILD		INTERIOR	WALLS CONTROL RM	1985		34	3	6	WORN FINISHES	REPAINT	$17,500	$0	$17,500	$0	$0		No Comments		
1254	H-SOLIDS	12	A	BLD-LO		Sludge Loadout Building	STR-BUILD		INTERIOR	WALLS LOADOUT	1985		34	2	10	WORN FINISHES	REPAINT	$14,500	$0	$14,500	$0	$0		No Comments		
1295	New Item, H-SOLIDS	12	DP	BLD-LO		Wash down sink									0		Add a washdown sink	$500	$500	$0	$0	$0		HFST	12/16/2019	
																1200 H-SOLIDS	Area Cost Summary	$686,102	$326,675	$188,687	$114,000	$56,740				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
1401	H-GRIT	14	DP	GRT-TANK-1	8	Aerated Grit Chamber #1.	TANK	GRT-TNK	NORTH TANK		1985		34	3	9	This is an aerated grit system using an eductor tube to keep organic material and fines in suspension, while letting coarser material settle. It may capture grit in the 200 micron and larger size range. MCES reports an average of ½ yard of grit is captured every week. Finer grit likely passes through to the primary clarifiers. Westech still manufactures this type of grit removal unit. MCES reports that the eductor tube structure is deteriorating and therefore not performing as designed.	Grit that passes through the grit removal system will be removed in the primary clarifiers, and get pumped to the gravity thickener. The thickened sludge is then trucked to the MWWTP and discharged upstream of the headworks. Evaluate how to remove more grit. Replace or repair existing inductor tube, also replace baffle plates. Look at Stainless steel.	$232,000	$0	$232,000	$0	$0		HFST	12/16/2019	Keep costs to a minimum and bypass before replacing. There are no digesters at Hastings to accumulate grit. Settle grit in primaries and send to MWWTP with thickened sludge.
1402	H-GRIT	14	DP	GRT-TANK-2	8	Aerated Grit Chamber #2.	TANK	GRT-TNK	SOUTH TANK		1985		34	3	9	This is an aerated grit system using an eductor tube to keep organic material and fines in suspension, while letting coarser material settle. It may capture grit in the 200 micron and larger size range. MCES reports an average of ½ yard of grit is captured every week. Finer grit likely passes through to the primary clarifiers. Westech still manufactures this type of grit removal unit. MCES reports that the eductor tube structure is deteriorating and therefore not performing as designed.	Grit that passes through the grit removal system will be removed in the primary clarifiers, and get pumped to the gravity thickener. The thickened sludge is then trucked to the MWWTP and discharged upstream of the headworks. Evaluate how to remove more grit. Replace or repair existing inductor tube, also replace baffle plates. Look at Stainless steel.	$232,000	$0	$232,000	$0	$0		HFST	12/16/2019	Keep costs to a minimum and bypass before replacing. There are no digesters at Hastings to accumulate grit. Settle grit in primaries and send to MWWTP with thickened sludge.
1403	H-GRIT	14	DP	GRT-CN	8	Grit Washer/conveyor	CONVEYOR	GRIT	GRIT ROOM		1985		34	4.00	9	The grit pumps discharge to the pool on the grit washer. There is no cyclone to concentrate the grit. MCES staff report that the screw classifier is worn out and in need of replacement.	This type of grit classifier probably captures much of the coarse grit (100 mesh/150 micron and larger) removed by the grit tanks. It is reported to be worn out and in need of replacement. Consider a Wemco Hydrogritter or similar unit by WesTech.	$488,000	$0	$488,000	$0	$0		HFST	12/16/2019	Keep costs to a minimum and bypass before replacing. There are no digesters at Hastings to accumulate grit. Settle grit in primaries and send to MWWTP with thickened sludge.
1404	H-GRIT	14	DP	GRIT-BL-PIPE	8	Grit Blower Piping and Valves	SYSTEM	GRIT-BLOWERS			1985		34	3	10	No significant issues identified.		$0	$0	$0	$0	$0		No Comments		
1405	H-GRIT	14	DP	GRT-AR1-BL	8	Grit Blower #1	BLOWER	GRIT-BLOWERS	FIRST FLOOR	Blower Room	1985		34	3	9	Rotary Lobe blower. Still functional but getting old.	The blowers are functional, but performance of the grit removal units is questionable. If a new grit removal unit is provided, these blowers may not be needed. The blower should be rebuilt or replaced. Coordinate with grit tank eductor replacement.	$25,000	$0	$25,000	$0	$0		HFST	12/16/2019	Allowance for replacement. Consider abandoning grit removal, allowing grit to settle in primaries and get trucked to MWWTP with thickened sludge.
1406	H-GRIT	14	DP	GRT-AR1-M	8	Motor	MOTOR	GRT-AR1-BL	FIRST FLOOR	Blower Room	1985		34	3	10		Monitor and replace when necessary.	$0	$0	$0	$0	$0		HFST	12/16/2019	Included with blower
1407	H-GRIT	14	DP	GRT-AR2-BL	8	Grit Blower #2	BLOWER	GRIT-BLOWERS	FIRST FLOOR	Blower Room	1985		34	3	9	Rotary Lobe blower. Recently rebuilt.		$25,000	$0	$25,000	$0	$0		HFST	12/16/2019	Allowance for replacement. Consider abandoning grit removal, allowing grit to settle in primaries and get trucked to MWWTP with thickened sludge.
1408	H-GRIT	14	DP	GRT-AR2-M	8	Motor	MOTOR	GRT-AR2-BL	FIRST FLOOR	Blower Room	1985		34	3	10		Monitor and replace when necessary.	$0	$0	$0	$0	$0		HFST	12/16/2019	Included with blower
1409	H-GRIT	14	DP	GRIT-PIPE	8	Distribution Piping & Valves	SYSTEM	GRIT-PUMPS			1985		34		15	The pipe from the influent pumps enters the basement where the grit pumps are located, tees into one grit tank and makes a 90 degree bend into the other. There is a center tee piped to the grit tank effluent box, that allows both grit tanks to be isolated. The valve at the inlet to the downstream tank is newer. It wore out due to the high grit load to the end tank. The pipe to the end tank accumulates grit.	Valve at south end that wore out has been replaced. Should anticipate replacement of at least one valve in the next 15 years.	$0	$0	$0	$0	$0		No Comments		Monitor valve condition and replace as necessary. This is a maintenance item.
1410	H-GRIT	14	DP	GRT-GP1-P	8	Grit Pump #1	PUMP	GRIT-PUMPS	BASEMENT		1985		34	3	10	Grit pumps operate 20 minutes every 2 hours with staggered operation, so both tanks are not being pumped at one time. Pumps are Wemco Model C. Could be maintained for another 10 to 15 years.	Continue preventive maintenance and replace if necessary.	$90,000	$0	$90,000	$0	$0		HFST	12/16/2019	
1411	H-GRIT	14	DP	GRT-GP1-M	8	Motor	MOTOR	GRT-GP1-P	BASEMENT		1985		34	3	10		Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		HFST	12/16/2019	Included with pump.
1412	H-GRIT	14	DP	GRT-GP2-P	8	Grit Pump #2	PUMP	GRIT-PUMPS	BASEMENT		1985		34	3	10	Grit pumps operate 20 minutes every 2 hours with staggered operation, so both tanks are not being pumped at one time. Pumps are Wemco Model C. Could be maintained for another 10 to 15 years.	Continue preventive maintenance and replace if necessary.	$90,000	$0	$90,000	$0	$0		HFST	12/16/2019	

1413	H-GRIT	14	DP	GRT-GP2-M	8	Motor	MOTOR	GRT-GP2-P	BASEMENT		1985		34	3	10		Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		HFST	12/16/2019	Included with pump.
~~1414~~	~~H-GRIT~~	~~14~~	~~DP~~	~~GT-SUMP~~	~~9~~	~~Sump Pumps~~	~~PUMP~~	~~GT-HVAC~~	~~BASEMENT~~		~~1985~~		~~34~~	~~N/A~~	N/A	~~There is no sump pumps in Grit building.~~	~~Continue preventive maintenance and replace if necessary.~~	$0	~~$0~~	~~$0~~	~~$0~~	~~$0~~		~~HFST~~	~~12/16/2019~~	
1415	H-GRIT	14	DP	HST-GT-H1	3	Grit building hoist #1	HOIST	HOISTS	BASEMENT		1985		34	N/A	N/A	Not reviewed	Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		No Comments		
1416	H-GRIT	14	DP	HST-GT-H2	3	Grit building hoist #2	HOIST	HOISTS			1985		34	N/A	N/A	Not reviewed	Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		No Comments		
1417	H-GRIT	14	DP	HST-GT-H3	3	Grit building hoist #3	HOIST	HOISTS	GRIT ROOM		1985		34	N/A	N/A	Not reviewed	Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		No Comments		
1418	H-GRIT	14	DP	PRI-PIPE	7	Flow distribution piping and control structure	SYSTEM	PRI	OUTSIDE	West	1985		34	3	15	This item is believed to be the buried piping from the grit removal units to the primary clarifiers. Condition is unknown.		$0	$0	$0	$0	$0		HFST	12/16/2019	
1419	H-GRIT	14	DP	PRI-SLU-PIPE	8	Distribution piping and valves	SYSTEM	PRI-PUMPS	BASEMENT		1985		34	3	15	When the Gravity Thickener is out of service, one of the primaries functions as both a primary clarifier and the gravity thickener. The other clarifier is out of service. The sludge piping from this primary to the thickened sludge pumps is much longer, resulting in reduced thickened sludge pumping capacity.	This is only an issue when the gravity thickener is out of service, which is an annual event and needs to be addressed. Investigate if primary sludge piping could be modified, so that both primaries could remain in service when the gravity thickener is out. Also look at replacing both sludge pumps.	$100,000	$0	$0	$100,000	$0		HFST	12/16/2019	$100,000 allowance inserted for piping modifications. Modifications to allow both primaries to back up the gravity thickener may not be viable.
1420	H-GRIT	14	DP	PRI-SP1-P	8	Primary Sludge Pump #1	PUMP	PRI-PUMPS	BASEMENT		1985		34	3	10	Pumps are Wemco Model C. They will likely last another 10 years. This pump design has not changed and parts are available.	There is not a redundant pump, but parts are readily available for Wemco Model C. Continue preventive maintenance and replace if necessary.	$90,000	$0	$90,000	$0	$0		HFST	12/16/2019	
1421	H-GRIT	14	DP	PRI-SP1-M	8	Motor	MOTOR	PRI-SP1-P	BASEMENT		1985		34	3	10		Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		HFST	12/16/2019	Included with pump.
1422	H-GRIT	14	DP	PRI-SP2-P	8	Primary Sludge Pump #2	PUMP	PRI-PUMPS	BASEMENT		1985		34	3	10	Pumps are Wemco Model C. They will likely last another 10 years or more. This pump design has not changed and parts are available.	There is not a redundant pump, but parts are readily available for Wemco Model C. Continue preventive maintenance and replace if necessary.	$90,000	$0	$90,000	$0	$0		HFST	12/16/2019	
1423	H-GRIT	14	DP	PRI-SP2-M	8	Motor	MOTOR	PRI-SP2-P	BASEMENT		1985		34	3	10		Continue preventive maintenance and replace if necessary.	$0	$0	$0	$0	$0		HFST	12/16/2019	Included with pump.
1424	H-GRIT	14	DP	PRI-SC1-P	7	Primary Scum Pump #1	PUMP	PRI-SCUM-PUMPS	BASEMENT		1985		34	3	5	These are piston pumps. Parts availability and continued maintenance may be an issue.	Consider replacing with alternate pump type. The MWWTP was using Tuthill Heavy Duty Process pumps for primary scum. Abel mechanical diaphragm pumps and PC pumps have also been used for this service.	$38,000	$38,000	$0	$0	$0		HFST	12/16/2019	
1425	H-GRIT	14	DP	PRI-SC1-M	7	Motor	MOTOR	PRI-SC1-P	BASEMENT		1985		34	3	10		Continue preventive maintenance until pump is replaced.	$0	$0	$0	$0	$0		HFST	12/18/2019	Included with pump.
1426	H-GRIT	14	DP	PRI-SC2-P	7	Primary Scum Pump #2	PUMP	PRI-SCUM-PUMPS	BASEMENT		1985		34	3	5	These are piston pumps. Parts availability and continued maintenance may be an issue.	Consider replacing with alternate pump type. The MWWTP was using Tuthill Heavy Duty Process (rotary lobe) pumps for primary scum. Abel mechanical diaphragm pumps and PC pumps have also been used for this service.	$38,000	$38,000	$0	$0	$0		HFST	12/18/2019	
1427	H-GRIT	14	DP	PRI-SC2-M	7	Motor	MOTOR	PRI-SC2-P	BASEMENT		1985		34	3	10		Continue preventive maintenance until pump is replaced.	$0	$0	$0	$0	$0		HFST	12/18/2019	Included with pump.
1428	H-GRIT	14	DP	PRI-SCUM-PIPE	7	Distribution piping and valves	SYSTEM	PRI-SCUM-PUMPS	BASEMENT		1985		34	2	20	No apparent issues with the scum piping. There is no hot water available to flush the scum piping.	Add on demand water heater for this process.	$3,000	$0	$0	$0	$3,000		HFST	12/18/2019	
1429	H-GRIT	14	E	ELE-GT-MC	9	Building/Area Electrical Services	ELECTRICAL	BLD-GT			1985		34			General catch-all for this building		$0	$0	$0	$0	$0		HFST	12/18/2019	
1430	H-GRIT	14	E	GT-ELE-LP	9	Lighting Panel	ELECTRICAL	ELE-GT-MC	ELECTRIC ROOM	North wall	2015		4	1	20	Lighting Panel LP-3 appears to be recently installed. No issues/concerns noted. (2015 estimated age)	Continue regular maintenance and testing.	$0	$0	$0	$0	$0		No Comments		New panel. Should last beyond planning window.
1431	H-GRIT	14	E	GRIT-ELE	8	Building/Area Electrical Services	ELECTRICAL	GRIT			1985		34			General catch-all for this building	Consider upgrading lighting panel for building	$0	$0	$0	$0	$0		HFST	12/18/2019	
1432	H-GRIT	14	E	GRIT-BL-ELE	8	Grit Blower Electrical Controls	ELECTRICAL	GRIT-BLOWERS			1985		34		10	Grit blower controls are original and could be updated.	Consider upgrading controls and move controls to new PLC.	$3,000	$0	$3,000	$0	$0		HFST	12/18/2019	
1433	H-GRIT	14	E	GRIT-ELE-T	8	Transformer to Panel	TRANSFORM	GRIT-ELE	ELECTRICAL ROOM	West wall	2015		4	1	20	Transformer T-3 appears to be recently installed. No issues/concerns were noted. (2015 estimated age)	Continue regular maintenance and testing.	$0	$0	$0	$0	$0		No Comments		New transformer. Should last beyond planning window.
1434	H-GRIT	14	E	GRIT-MCC	8	Motor Control Center (MCC)	MCC	GRIT-ELE	ELECTRICAL ROOM	Southwest corner	1985		34	2	10	MCC (MCC-3, Westinghouse Five Star) appears to be in good condition with no "environmental" issues noted.	Perform maintenance testing and cleaning. Fix wiring panel covers taped shut.	$1,000	$0	$1,000	$0	$0		No Comments		Inserted $1000 allowance for maintenance work.
1435	H-GRIT	14	E	GRT-P-ELE	8	System Electrical Controls	ELECTRICAL	GRIT-PUMPS	FIRST FLOOR	Electrical Room	1985		34	1	10	The grit controls are original and could be moved over to a newer system	Move this over to a newer system HAST-PLC-AD	$3,000	$0	$3,000	$0	$0				
1436	H-GRIT	14	E	PRI-ELE	9	Electrical distribution, MCC?s	ELECTRICAL	PRI	MCC ROOM		1985		34		10	This panel is at it capacity, age	Replacement as expansion is needed	$3,000	$0	$3,000	$0	$0				**Set at $3000, same as similar panels**
1437	H-GRIT	14	E	PRI-SP-CP	9	System Electrical Controls	ELECTRICAL	PRI-PUMPS	FIRST FLOOR	Electrical Room	1985		34		10	This panel is at it capacity, age	Replacement as expansion is needed	$3,000	$0	$3,000	$0	$0				
1438	H-GRIT	14	E	PRI-VFD	8	VFD?s	VARIABLE	PRI-PUMPS	FIRST FLOOR	Electrical Room	2010		9	1	20	VFD-305 and VFD-306 - Allen Bradley 1336. No issues noted. (Age estimated at 2010).	Continue regular maintenance and testing. Make any control scheme changes/updates per process control.	$0	$0	$0	$0	$0		No Comments		
1439	H-GRIT	14	E	PRI-SCUM-ELE	8	System Electrical Controls	ELECTRICAL	PRI-SCUM-PUMPS	FIRST FLOOR	Electrical Room	1985		34	3	5	This panel is at its capacity, age.	Replace panel in next 5 years.	$3,000	$3,000	$0	$0	$0		HFST	12/18/2019	
1440	H-GRIT	14	I	INS-PR-SP-A	8	Flow metering	FLOWMETER	PRI-PUMPS	BASEMENT		1985		34	3	5	MCES noted age and calibration issues	Replace meter.	$5,000	$5,000	$0	$0	$0		HFST	12/18/2019	
1441	H-GRIT	14	M	GT-DUCT	7	Ducting	SYSTEM	GT-HVAC	VARIOUS	Various	1985	N/A	34	2	10	None.	Clean ductwork.	$5,275	$0	$5,275	$0	$0		No Comments		
1442	H-GRIT	14	M	GT-EF	7	Exhaust fan units, 1 & 2	FAN	GT-HVAC	CEILING		1985		34					$0	$0	$0	$0	$0		No Comments		
1443	H-GRIT	14	M	H-HVA-GT-E1		Exhaust fan unit 1, EF-301	FAN		GRIT WASHER ROOM 301	West	1985	N/A	34	4.00	0	Original. Fan is running without the rest of equipment running, which leads to outside air being brought in without any treating.	Demo and replace exhaust fan with updated. Interlock with makeup-air unit (see MU-301) to maintain correct building pressurization.	$27,917	$27,917	$0	$0	$0		No Comments		
1444	H-GRIT	14	M	H-HVA-GT-E2		Exhaust fan unit 2, EF-302	FAN		ELECTRICAL ROOM 302	East	1985	N/A	34	4.00	0	Original.	Demo and replace exhaust fan with updated. Interlock with makeup-air unit (see MU-302) to maintain correct building pressurization.	$27,372	$27,372	$0	$0	$0		No Comments		
1445	H-GRIT	14	M	GT-HVA-ELE	9	HVAC Controls	ELECTRICAL	GT-HVAC	FIRST FLOOR	Electrical Room	1985		34					$0	$0	$0	$0	$0		No Comments		
1446	H-GRIT	14	M	HVA-GT-MU1	7	Makeup air unit #1	HEATER	GT-HVAC	CEILING		1985		34					$0	$0	$0	$0	$0		No Comments		
1447	H-GRIT	14	M	HVA-GT-MU1	7	Makeup air unit #1	HEATER	GT-HVAC	CEILING	Center	1985	N/A	34	4.00	0	Original, MU-301. Abandoned in place. Most of associated equipment is abandoned in place, but the space still needs heating.	Demo and replace make-up air unit with updated. Interlock with exhaust fan (see EF-301) to maintain correct building pressurization.	$52,132	$52,132	$0	$0	$0		No Comments		
1448	H-GRIT	14	M	HVA-GT-MU1-GV01	7	Gas Safety Valve	HEATER	GT-HVAC	CEILING		1985		34					$0	$0	$0	$0	$0		No Comments		

1449	H-GRIT	14	M	HVA-GT-MU2	7	Makeup air unit #2	HEATER	GT-HVAC	CEILING	Center	1985	N/A	34	4.00	0	Original, MU-302.	Demo and replace make-up air unit with updated. Interlock with exhaust fan (see EF-302) to maintain correct building pressurization.	$54,964	$54,964	$0	$0	$0		No Comments		
1450	H-GRIT	14	M	HVA-GT-MU2-GV01	7	Gas Safety Valve	HEATER	GT-HVAC	CEILING	Center								$0	$0	$0	$0	$0		No Comments		
1451	H-GRIT	14	M	Unable to verify.		Filter, F-301A	FILTER		GRIT WASHER ROOM 301	West	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1452	H-GRIT	14	M	Unable to verify.		Filter, F-301B	FILTER		GRIT WASHER ROOM 301	West	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1453	H-GRIT	14	M	Unable to verify.		Filter, F-302A	FILTER		ELECTRICAL ROOM 302	East	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1454	H-GRIT	14	M	Unable to verify.		Filter, F-302B	FILTER		ELECTRICAL ROOM 302	East	1985	Unknown	Unknown	3	0	Unable to inspect filters.	Replace filter.	$1,414	$1,414	$0	$0	$0		No Comments		
1455	H-GRIT	14	M	Unable to verify.		Energy recovery unit, ERU-301	ERU		GRIT WASHER ROOM 301	West	1985	N/A	34	4.00	0	Original. Most of associated equipment is abandoned in place, but the space still needs heating.	Demo and replace energy recovery unit (fixed-plate heat exchanger) with updated. Provide controls for frost prevention and interlock with MU/EF-301.	$35,071	$35,071	$0	$0	$0		No Comments		
1456	H-GRIT	14	M	Unable to verify.		Energy recovery unit, ERU-302	ERU		ELECTRICAL ROOM 302	East	1985	N/A	34	4.00	0	Original.	Demo and replace energy recovery unit (fixed-plate heat exchanger) with updated. Provide controls for frost prevention and interlock with MU/EF-302.	$36,991	$36,991	$0	$0	$0		No Comments		
1457	H-GRIT	14	M	Unable to verify.		Intake hood, H-301	HOOD		ROOF	East	1985	N/A	34	2	10	Original.	Maintain/replace air hood as needed.	$4,420	$0	$4,420	$0	$0		No Comments		
1458	H-GRIT	14	M	Unable to verify.		Outside air louver, L-301	LOUVER		GRIT WASHER ROOM 301	West	1985	N/A	34	2	10	Original. Most of associated equipment is abandoned in place, but the space still needs heating.	Maintain louver as needed.	$1,170	$0	$1,170	$0	$0		No Comments		
1459	H-GRIT	14	M	Unable to verify.		Outside air louver, L-302	LOUVER		ELECTRICAL ROOM 302	East	1985	N/A	34	2	10	Original.	Maintain louver as needed.	$1,170	$0	$1,170	$0	$0		No Comments		
1460	H-GRIT	14	P	BFP-GRIT	7	Backflow preventer: Apollo 3/4", Model RPLF4A, SN# 743632	BFP	BFP	GRIT BASEMENT		2004	-	15	3	5	Backflow preventer is in fair condition but shows signs of corrosion from environment.	Recommend replacement of backflow preventer.	$735	$735	$0	$0	$0		HFST	12/18/2019	
1461	H-GRIT	14	P	BFP-GRIT-02	7	Backflow preventer: Apollo 1 1/4", Model RPLF4A, SN# 894648	BFP	BFP	GRIT BASEMENT		2004	-	15	3	5	Backflow preventer is in fair condition but shows signs of corrosion from environment.	Recommend replacement of backflow preventer.	$1,463	$1,463	$0	$0	$0		HFST	12/18/2019	
1462	H-GRIT	14	P	EYEWASH04	6	Eyewash/shower Alum System (Grit Building Inside)	SAFETY	SAFE	INSIDE BUILDING		2018	-	1	1	25	Eyewash is in excellent condition and only a year old.	No action needed	$0	$0	$0	$0	$0		No Comments		
1463	H-GRIT	14	P	EYEWASH05	6	Eyewash/shower Alum System (Grit Building Outside)	SAFETY	SAFE	OUTSIDE BUILDING		2018	-	1	1	25	Eyewash is in excellent condition and only a year old.	No action needed	$0	$0	$0	$0	$0		No Comments		
1464	H-GRIT	14	S	GRT-TNK	8	Grit chambers (2 ea.)	STR-OTHER	GRIT	OUTSIDE	West Side	1985	N/A	34			Interior of space not reviewed. Concrete is showing some minor spalling, and metal work showing fatigue.		$0	$0	$0	$0	$0				
1465	H-GRIT	14	S	GRT-TANK-1	8	Aerated Grit Chamber #1.	TANK	GRT-TNK	NORTH TANK		1985	N/A	34			Interior of space not reviewed. Concrete is showing some minor spalling, and metal work showing fatigue.		$0	$0	$0	$0	$0				
1466	H-GRIT	14	S	GRT-TANK-2	8	Aerated Grit Chamber #2.	TANK	GRT-TNK	SOUTH TANK		1985	N/A	34			Interior of space not reviewed. Concrete is showing some minor spalling, and metal work showing fatigue.		$0	$0	$0	$0	$0				
1467	H-GRIT	14	A	GRT-BLD		GRIT BUILDING	BUILDING	BLD-GT	EXTERIOR	ROOF	2017		3	1	10	This roof has not been rebuilt	Rebuild roof	$19,708	$0	$19,708	$0	$0				
1468	H-GRIT	14	A	GRT-BLD		GRIT BUILDING	BUILDING	BLD-GT	EXTERIOR	WALLS	1985		34	1	20	EXTERIOR MASONRY EXCELLENT		$0	$0	$0	$0	$0		No Comments		
1469	H-GRIT	14	A	GRT-BLD		GRIT BUILDING	BUILDING	BLD-GT	EXTERIOR	SOUTH	1985		34	3	5	NO SPLASH BLOCK AT DRAIN DISCHARGE	INSTALL SPLASH BLOCK	$0	$0	$0	$0	$0		No Comments		
1470	H-GRIT	14	A	GRT-BLD		GRIT BUILDING	BUILDING	BLD-GT	EXTERIOR	DOORS	1985		34	2	15	WORN DOORS	REPLACE DOORS and frames.	$24,000	$0	$0	$24,000	$0		HFST	12/18/2019	
1471	H-GRIT	14	A	GRT-BLD		GRIT BUILDING	BUILDING	BLD-GT	INTERIOR	GRIT AREA	1985		34	3	5	WORN FINISHES	REPAINT	$28,500	$28,500	$0	$0	$0		No Comments		
1472	H-GRIT	14	A	GRT-BLD		GRIT BUILDING	BUILDING	BLD-GT	INTERIOR	CONTROLS AREA	1985		34	1	20	FINISHES EXCELLENT	NONE	$0	$0	$0	$0	$0		No Comments		
1495	New Item, H-GRIT	14	E			Lighting Fixtures	BUILDING				1985		34		3	this is the original lighting	upgrade lighting to newer (maintenance item)	$0	$0	**$0**	**$0**	**$0**		HFST	12/18/2019	
2201	H-GRIT	22	DP	ALM-FM01	5	Alum System Effluent Carrier Water Rotameter 01 (Grit Effluent Supply)	FLOWMETER	ALM	NORTH ROTAMETER		2018		1	1	20	Biological growth fouls rotameter.	Evaluate plant water system. Consider adding a strainer for particulates, but that will not stop biological growth in piping. Additional disinfection required?	$0	$0	$0	$0	$0		HFST	12/18/2019	The alum system is new. No costs included for replacement.
2202	H-GRIT	22	DP	ALM-FM02	5	Alum System Effluent Carrier Water Rotameter 02 (Aeration Tank Supply)	FLOWMETER	ALM	SOUTH ROTAMETER		2018		1	1		Not in use. Alum only fed to head end of grit tanks at this time.	Evaluate plant water system. Consider adding a strainer for particulates, but that will not stop biological growth in piping. Additional disinfection required?	$0	$0	$0	$0	$0		HFST	12/18/2019	The alum system is new. No costs included for replacement.
2203	H-GRIT	22	DP	ALM-P01	5	Alum Pump 01	PUMP	ALM			2018		1	1	20	New System	None at this time.	$0	$0	$0	$0	$0		No Comments		The alum system is new. No costs included for replacement.
2204	H-GRIT	22	DP	ALM-P01-FM01	5	Alum Pump 01 Flowmeter	FLOWMETER	ALM			2018		1	1	20	New System, but MCES reports that the alum flowmeter is oversized.	Replace with correctly sized flow meter.	$500	$0	$0	$0	$500		HFST	12/18/2019	
2205	H-GRIT	22	DP	ALM-P02	5	Alum Pump 02	PUMP	ALM			2018		1	1	20	New System	None at this time.	$0	$0	$0	$0	$0		No Comments		The alum system is new. No costs included for replacement.
2206	H-GRIT	22	DP	ALM-P02-FM01	5	Alum Pump 02 Flowmeter	FLOWMETER	ALM			2018		1	1	20	New System	None at this time.	$0	$0	$0	$0	$0		No Comments		The alum system is new. No costs included for replacement.
2207	H-GRIT	22	DP	ALM-PIPE01	3	Alum System Copper Pipe	PIPE-MTL	ALM			2018		1	1	20	New System	None at this time.	$0	$0	$0	$0	$0		No Comments		The alum system is new. No costs included for replacement.
2208	H-GRIT	22	DP	ALM-TANK	3	Alum System Storage Tank	TANK	ALM	EAST SIDE OF BUILDING		2018		1	1	20	New System	None at this time.	$0	$0	$0	$0	$0		No Comments		The alum system is new. No costs included for replacement.
2295	New Item, H-GRIT Alum	22	DP	ALM-TANK	3	Alum System Storage Tank	TANK	ALM			2018		1		10	This is a potential failure point	Evaluate for future repair/replacement.	$0	$0	$0	$0	$0		HFST	12/18/2019	The alum system is new. No costs included for replacement.
																2200 H-GRIT	Area Cost Summary	$1,889,044	$354,801	$1,406,743	$124,000	$3,500				

Note: Plans dated 1981. Record drawings dated 1987. Nameplates on influent pumps indicate November 1984. 1985 installation assumed.

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
1901	H-ODOR	19	DP	AER-ODR-1-TWR	7	Scrubber #1	ODOR	AER-ODR	FIRST FLOOR		1989		30		N/A	Out of service		$0	$0	$0	$0	$0		No Comments		
1902	H-ODOR	19	DP	AER-ODR-2-TWR	7	Scrubber #2	ODOR	AER-ODR	FIRST FLOOR		1989		30		N/A	Out of service		$0	$0	$0	$0	$0		No Comments		
1903	H-ODOR	19	DP	AER-ODR-DUCT	7	Ductwork	SYSTEM	AER-ODR	FIRST FLOOR		1989		30		N/A	Out of service		$0	$0	$0	$0	$0		No Comments		

1904	H-ODOR	19	DP	AER-ODR-1-BL	7	Wet Scrubber Odor Blower #1	BLOWER	AER-ODR-1-TWR	FIRST FLOOR		1989		30		N/A	Out of service	If ductwork was repaired, the fans could be used to exhaust foul air from the aeration tanks up, to improve dispersion. Given the low level of odors at the plant, this might be more than adequate. A dispersion model could be done to determine if this is worth the cost of the needed repairs.	$0	$0	$0	$0	$0		No Comments		
1905	H-ODOR	19	DP	AER-ODR-2-BL	7	Wet Scrubber Odor Blower #2	BLOWER	AER-ODR-1-TWR	FIRST FLOOR		1989		30		N/A	Out of service	If ductwork was repaired, the fans could be used to exhaust foul air from the aeration tanks up, to improve dispersion. Given the low level of odors at the plant, this might be more than adequate. A dispersion model could be done to determine if this is worth the cost of the needed repairs.	$0	$0	$0	$0	$0		No Comments		
1906	H-ODOR	19	DP	AER-ODR-P1-REC	4	Odor Scrubber Recirculation Pump #1	PUMP	AER-ODR-PUMPS	BASEMENT, ODOR SCRUBBER BLDG.		1989		30		N/A	Out of service	Demolish.	$0	$0	$0	$0	$0		No Comments		
1907	H-ODOR	19	DP	AER-ODR-P2-REC	4	Odor Scrubber Recirculation Pump #2	PUMP	AER-ODR-PUMPS	BASEMENT, ODOR SCRUBBER BLDG.		1989		30		N/A	Out of service	Demolish.	$0	$0	$0	$0	$0		No Comments		
1908	H-ODOR	19	DP	AER-ODR-P3-REC	4	Odor Scrubber Recirculation Pump #3	PUMP	AER-ODR-PUMPS	BASEMENT, ODOR SCRUBBER BLDG.		1989		30		N/A	Out of service	Demolish.	$0	$0	$0	$0	$0		No Comments		
1909	H-ODOR	19	DP	AER-ODR-PIPE	6	Distribution piping and valves	SYSTEM	AER-ODR-PUMPS	BASEMENT		1989		30		N/A	Out of service	Demolish.	$0	$0	$0	$0	$0		No Comments		
1910	H-ODOR	19	DP	ACME-PUMP	3	6" Portable Acme-Dynamics pump, 1500 gpm.	PUMP	PORT	GROUND LEVEL		1989		30		N/A	Not reviewed.		$0	$0	$0	$0	$0				
1910	H-ODOR	19	DP	ACME-PUMP	3	6" Portable Acme-Dynamics pump, 1500 gpm.	PUMP	PORT	GROUND LEVEL		1989		30			If Plant flow increases then a larger pump is needed, may start having parts availability issues for age	Monitor plant flows and pump condition. Replace if necessary.	$0	$0	$0	$0	$0		HFST	12/18/2019	
1911	H-ODOR	19	DP	POR-P3	3	3" portable Pump, multi-quip	PUMP	PORT	GROUND LEVEL		1989		30		N/A	Not reviewed.		$0	$0	$0	$0	$0				
1911	H-ODOR	19	DP	POR-P3	3	3" portable Pump, multi-quip	PUMP	PORT	GROUND LEVEL		2016		3			This has been replaced with a hydraulic Pump		$0	$0	$0	$0	$0		HFST	12/18/2019	
1912	H-ODOR	19	DP	POR-P-SYK	3	6" Portable Pump, Sykes	PUMP	PORT	GROUND LEVEL		1989		30		N/A	Not reviewed.		$0	$0	$0	$0	$0				
1912	H-ODOR	19	DP	POR-P-SYK	3	6" Portable Pump, Sykes	PUMP	PORT	GROUND LEVEL		1989		30			Out of service- may have been moved to EMPIRE Plant		$0	$0	$0	$0	$0		HFST	12/18/2019	
1913	H-ODOR	19	E	AER-ODR-ELE-LVD	8	Lighting Panel	ELECTRICAL	AER-ODR-ELE	ELECTRICAL ROOM		1989		30	2		Kept energized for minimal building loads only.		$0	$0	$0	$0	$0		No Comments		Electrical loads minimal. No costs for replacement included.
1914	H-ODOR	19	E	AER-ODR-ELE-T	8	Transformer to Panel AER-ODR-ELE-LVD	TRANSFORM	AER-ODR-ELE	ELECTRICAL ROOM	South wall	1989		30	2		Kept energized for minimal building loads only.		$0	$0	$0	$0	$0		No Comments		Electrical loads minimal. No costs for replacement included.
1915	H-ODOR	19	E	AER-ODR-MCC	9	Motor Control Center (MCC)	MCC	AER-ODR-ELE	ELECTRICAL ROOM	South wall	1989		30	2		Kept energized for minimal building loads only.		$0	$0	$0	$0	$0		No Comments		Electrical loads minimal. No costs for replacement included.
1916	H-ODOR	19	E	AER-ODR-ELE	8	Building/Area Electrical Services	ELECTRICAL	BLD-AER-ODR			1989		30					$0	$0	$0	$0	$0		No Comments		Electrical loads minimal. No costs for replacement included.
1917	H-ODOR	19	M	AER-ODR-HVA	7	Gas Furnace	HEATER	ODR-HVAC	FIRST FLOOR	Center	1989	N/A	30	3	5	Original unit, AHU-1501.	Demo and replace with updated.	$62,102	$62,102	$0	$0	$0		No Comments		
1918	H-ODOR	19	M	Unable to verify.		Exhaust fan, EF-1501	FAN		ROOF	Northeast	1989	N/A	30	3	5	Original unit, likely sized for process.	Demo and replace with updated.	$23,254	$23,254	$0	$0	$0		No Comments		
1919	H-ODOR	19	M	Unable to verify.		Outside air louver, L-1501	LOUVER		FAN ROOM 1501	South	1989	N/A	30	2	10	Original louver.	Maintain/replace as needed.	$1,170	$0	$1,170	$0	$0		No Comments		
1920	H-ODOR	19	M	ODR-HVAC	3	HVAC	HVAC	BLD-AER-ODR	MECHANICAL ROOM		1989		30					$0	$0	$0	$0	$0		No Comments		
1921	H-ODOR	19	S	ODR-MECH	7	Structural, plumbing, etc.	OTHER	BLD-AER-ODR			1989		30					$0	$0	$0	$0	$0		No Comments		
1922	H-ODOR	19	S	BLD-AER-ODR	3	Odor Scrubber Building	STR-BUILD	BUILDINGS			1989	N/A	30	2	10	The exterior joint sealants throughout the building had failed. Mortar distress was present at isolated locations. Steel lintels displayed corrosion at the interior side of the building, most likely from condensation.	Replace failed joint sealants. Repoint brick masonry joints and replace cracked brick units. Sandblast and repaint all carbon steel lintels.	$8,991	$0	$8,991	$0	$0		No Comments		
1923	H-ODOR	19	A	BLD-AER-ODR	3	Odor Scrubber Building	STR-BUILD		EXTERIOR	GENERAL	1989		30	1	20	EXTERIOR MASONRY EXCELLENT	NONE	$0	$0	$0	$0	$0		No Comments		Excellent condition. No costs included.
1924	H-ODOR	19	A	BLD-AER-ODR	3	Odor Scrubber Building	STR-BUILD		INTERIOR	GENERAL	1989		30	2	15	WORN INTERIOR FINISHES	REPAINT WALLS, ETC	$13,000	$0	$0	$13,000	$0		No Comments		
1925	H-ODOR	19	A	BLD-AER-ODR	3	Odor Scrubber Building	STR-BUILD		EXTERIOR	OH DOORS	1989		30	1	15	OH DOOR EXCELLENT, recently painted.	NONE	$0	$0	$0	$0	$0				Excellent condition. No costs included.
1926	H-ODOR	19	A	BLD-AER-ODR	3	Odor Scrubber Building	STR-BUILD		EXTERIOR	DOORS	1989		30	3	15	WORN DOORS	REPLACE DOORS AND FRAMES	$22,000	$0	$0	$22,000	$0				
1995	New Item, H-ODOR	19	A	BLD-AER-ODR	3	ROOF	STR-BUILD		EXTERIOR	DOORS	1989		30	3	5	Original roof and will need to be replaced	Replace as needed	$20,583	$20,583	$0	$0	$0		HFST	12/18/2019	
																1900 H-ODOR	Area Cost Summary	$151,100	$105,939	$10,161	$35,000	$0				

Repair/replace Ranking: 1) Simple 2) Moderate 3) Challenging 4) Very Difficult
Discipline: DP=Process Mechanical, M=HVAC, P=Plumbing, S=Structural, A=Architectural, E=Electrical, I=Instrumentation
Condition Ranking: 1) Excellent 2) Good 3) Fair 4) Poor
Replacement Cost: All costs are in 2020 dollars. Future costs have not been adjusted for inflation.

NN#	Building	Facility ID #	Discipline	Asset	Criticality	Asset Description	Asset Type	Parent Asset Id	Location	Position	Install Year	Renewal Year	Estimated age	Field Condition Score	Estimated Remaining Useful life	Field observations	Recommended Action	Replacement Cost	2025	2030	2035	2040	Repair/replace Ranking	Commenter	Date	Comments
2101	East Entrance Gate	21	C	NA		26' Cantilevered Slide Gate	Gate		East Entrance		1985	N/A	35	1	10	Gate operates good and it appears in a good condition	N/A	$24,640	$0	$24,640	$0	$0		No Comments		
2102	South Entrance Gate	21	C	NA		26' Cantilevered Slide Gate	Gate		South Entrance		1985	N/A	35	1	10	Gate operates good and it appears to be in a good condition	N/A	$24,640	$0	$24,640	$0	$0		No Comments		
2103	North Entrance Gate	21	C	NA		26' Double Swing Gate	Gate		North Entrance		1985	N/A	35	1	10	Gate operates good and it appears to be in a good condition	N/A	$5,900	$0	$5,900	$0	$0		No Comments		
2104	East Fence	21	C	NA		8-foot high chain link fence with top rail; 3-strands of barbed wire with privacy slats.	Fence		Eastside of Plant		1985	N/A	35	1	15	The chain link fence fabric appears to be taut. All fence posts, including corner posts, are straight and plumb. The slats appear to be in a good condition. There are overhanging limbs.	Remove overhanging limbs	$48,438	$0	$0	$48,438	$0		No Comments		
2105	South Fence	21	C	NA		8-foot high chain link fence with top rail; 3-strands of barbed wire with privacy slats.	Fence		Southside of Plant		1985	N/A	35	1	15	The chain link fence fabric appears to be taut. All fence posts, including corner posts, are straight and plumb. The slats appear to be in a good condition. There are overhanging limbs and growth through the barbed wires near Primary Clarifier 2.	Remove overhanging limbs. Remove plants growing through the barbed wire.	$19,182	$0	$0	$19,182	$0		No Comments		

2106	West Fence	21	C	NA		8-foot high chain link fence with top rail; 3-strands of barbed wire with NO privacy slats.	Fence		Westside of Plant		1985	N/A	35	1	15	The chain link fence fabric appears to be taut. All fence posts, including corner posts, are straight and plumb. There are overhanging limbs and growth through the barbed wires throughout the westside fence.	Remove overhanging limbs. Remove plants growing through the barbed wire.	$64,028	$0	$0	$64,028	$0				
2107	North Fence	21	C	NA		8-foot high chain link fence with top rail; 3-strands of barbed wire with privacy slats.	Fence		Northside of Plant		1985	N/A	35	1	15	The chain link fence fabric appears to be taut. All fence posts, including corner posts, are straight and plumb. The slats appear to be in a good condition. There are overhanging limbs and growth through the barbed wires near Chlorin Contact Basin.	Remove overhanging limbs. Remove plants growing through the barbed wire.	$31,355	$0	$0	$31,355	$0		No Comments		
2108	East Entrance Road (Plant Road)	21	C	NA		East entrance road coming from Lea St. up to Fuel Dispenser	Road/Curb		East Entrance Road (Plant Road)		1985	N/A	35	2	5	The entrance road and curb appear to be in a good condition with minor cracks on the road. This area was not resurfaced in the last time	Resurfacing is needed in 5 years	$10,762	$10,762	$0	$0	$0				
2109	Plant Road/Curb	21	C	NA		Plant Road in front of Influent PS and Admin Building	Road/Curb		Plant Road in front of Influent PS and Admin Building		1985	2019	35	1	15	Plant road was recently overlaid and appear to be in a good condition. Adequate slope for site drainage.	N/A	$0	$0	$0	$0	$0		No Comments		New pavement. No Cost provided
2110	Plant Road/Curb	21	C	NA		Plant Road in front of Solid Load Out Building	Road/ Curb		Plant Road in front of Solid Loa Out Building		1985	2019	35	1	10	Plant road was recently overlaid and appear to be in a good condition. However, water ponding at the parking lot in front of solid load out building.	Install catch basin at the lowest spot of the parking lot and direct the flow to control structure No. 3 located by Final Clarifier No. 1.	$52,700	$0	$52,700	$0	$0		No Comments		
2111	North Entrance Road/Curb (Plant Road)	21	C	NA		North Entrance Road	Road/ Curb		North Entrance Road (Plant Road)		1985	2019	35	1	15	Plant road was recently overlaid and appear to be in a good condition. There is Adequate slope for site drainage.	N/A	$0	$0	$0	$0	$0		No Comments		New pavement. No Cost provided
2112	Flood Wall Structure (Frames)	21	C	NA		Slide Gate Frames	-		Near North Entrance Gate		2011	N/A	9	2	5	Frame appear to be in a good condition with gasket peeling off.	Replace gasket	$3,080	$3,080	$0	$0	$0		No Comments		
2113	Unpaved Lawn/Trees/Shrubs	21	C	NA		Lawn/Trees/Shrub			Entire Plant		NA	NA	NA	1	10	Lawn/Trees and Shrub appears to be in good condition. Dead and cracked tree in front of the Solid Load Out Building.	Cut and Remove Tree in front of Solids Load Out Building by the west parking lot. Tree was removed in November 2019.	$0	$0	$0	$0	$0		No Comments		Tree already removed.
2114	Plant Outfall	21	C	NA		Outfall			Plant Outfall		1991	N/A	29	4.00	1	Based on the MCES Hastings Treatment Plant Outfall ROV Inspection report, dated August 2019, the 85'-0" and 16'-0" sections of DIP of the outfall were in good condition. There did not appear to be any internal damage to the pipe sections. The root intrusion in the shoreline MH has caused the concrete extension to separate from the structure below, allowing water to infiltrate or escape the manhole. The outfall was completely buried and there was a break in the outfall pipe approximately 28'-0" from the shoreline MH. The cause of the damage could not be determined but could potentially be from debris or vessel impact. It is easy for riprap and debris to accumulate in the end of the damaged section of the pipe which could potentially lead to more clogs in the future.	The report recommends that the root system be completely removed from between the concrete extension and structure and resealed with new sealant. The report also recommends that the outfall and damaged pipe be uncovered and thoroughly inspected. The damaged pipe should be repaired or replaced with a new outfall depending on the condition of the existing outfall. Larger riprap should be placed over the repaired or replaced outfall pipe to protect it from future damage. Coordinate replacement with City.	$104,440	$104,440	$0	$0	$0				
2191		21	ADA			Visitor Call Box			Fence Gate						1		Revise the alarm system to provide both audible and visual notification.	$300	$300	$0	$0	$0		ADA	1/2/2020	
2192		21	ADA			Sidewalk			Pedestrian Gate						1	A pedestrian gate is provided at the security fence. There are currently curbs on both sides of the gate.	Add curb ramp.	$10,000	$10,000	$0	$0	$0		ADA	1/2/2020	
2193		21	ADA			Visitor Call Box			Fence Gate						1	The call box on the public side of the entry gate is currently at 57" AFF.	Lower communication box.	$300	$300	$0	$0	$0		ADA	1/2/2020	
2194	South Entrance Road (Plant Road)	21	C	NA		south entrance road coming from 2nd Street	Road/Curb		South Entrance Road (Plant Road)		1985	N/A	35	4.00	1	The south exit of the solids building the pavement dips due to the high frequency of loaded truck traffic. See Item 1248.	add concrete apron and concrete road	$0	$0	$0	$0	$0		HFST	12/18/2019	
2195	New item	21				Grounds around Digestor building (West)									1	The grading around the north east side by digestor building needs to be improved	regrade	$5,000	$5,000	$0	$0	$0		HFST	12/18/2019	
2196	New item	21				All underground utilities (City Water, N Gas line, Electrical, Process lines, I&C lines)										Based on the subgrade, there is a lot of movement and conditions of assets are questionable		$0	$0	$0	$0	$0		HFST	12/18/2019	
2197	New item	21				Yard Hydrants									5	These hydrants are connected to the plant water and the plant water system is not large enough for this and other usages at the same time, no isolation valves, low/inadequate pressure	Upgrade plant water system	25140	25140	$0	$0	$0		HFST	12/18/2019	
2198		21	DP			Man Hole									5	Plant Drain, it is collapsing. The structure appears to have moved	assess and repair.	$2,000	$2,000	$0	$0	$0		HFST	12/18/2019	
2199	New item	21				Underground I&C lines											Replace with above grade I & C Lines	0	0	$0	$0	$0		HFST	12/18/2019	
																2200 Yard & Site Civle	Area Cost Summary	$431,905	$161,022	$107,880	$163,003	$0				

	Replacement Cost	2025	2030	2035	2040
Total Estimated Capital Cost	**$12,955,852**	**$3,601,231**	**$5,943,737**	**$2,878,762**	**$527,122**
100 Final Clarifers	**$1,521,682**	**$277,352**	**$0**	**$1,244,330**	**$0**
200 & 300 H-DISINFECTION	**$658,909**	**$467,116**	**$127,551**	**$62,779**	**$1,463**
400 & 500 H-DIGESTER	**$614,642**	**$113,362**	**$501,280**	**$0**	**$0**
600 H-BLOWER/RAS	**$1,155,333**	**$131,483**	**$116,200**	**$907,650**	**$0**
700 H-AERATION TANKS	**$2,558,868**	**$537,000**	**$2,011,868**	**$0**	**$10,000**
800 H-GENERATOR	**$67,656**	**$46,656**	**$21,000**	**$0**	**$0**
900 H-INFLUENT	**$1,504,871**	**$444,318**	**$390,275**	**$228,000**	**$442,278**
1,000 H-ADMINISTRATION	**$290,540**	**$200,307**	**$77,092**	**$0**	**$13,141**
1100 & 1300 PRI TANK 1 & 2 & Gravity Th	**$1,420,200**	**$435,200**	**$985,000**	**$0**	**$0**
1200 H-SOLIDS	**$686,102**	**$326,675**	**$188,687**	**$114,000**	**$56,740**
1400 H-GRIT	**$1,889,044**	**$354,801**	**$1,406,743**	**$124,000**	**$3,500**
1900 H-ODOR	**$151,100**	**$105,939**	**$10,161**	**$35,000**	**$0**
2100 Yard & Site Civ1l	**$431,905**	**$161,022**	**$107,880**	**$163,003**	**$0**

		4	DP			**Digestor System**										**Repurposed as influent overflow storage. No testing to-date.**	**Verify this is needed as a contingency plan for the plant. If so, evaluate design to see if it can function as required then commission system.**							HMH	1/6/2020
		6	DP			**Old Blowers**										**blowoff valve routed inside the building.**	**Correct in conformance with MCES guidelines. Do additional safety measures need to be taken while working in this building. Should blowoff valve be re-routed outside?**							HMH	1/6/2020

		7	DP			Aeration System										Difficulty controlling DO throughout tank and repeat issues with filamentous bacteria.	Evaluate aeration tank system and consider DO control, automated valves, and tapered diffuser design if existing plant is to remain in service beyond 5-yrs.			HMH	1/6/2020
		22	P			Alum System										Eyewash/shower associated with this system is freezing during winter months.	Correct freezing issue for continued use of this safety system. Near-term need.	1030		HMH	1/6/2020
		19	DP			Odor Control Unit										System for aeration tanks currently OOS	Return this system to use or evaluate the need for covered aeration tanks. Without ventilation, the covers are causing corrosion to aeration system components above the water line (OOS tanks worst).			HMH	1/6/2020

Appendix 2-1   MPCA Flow Determination Worksheet

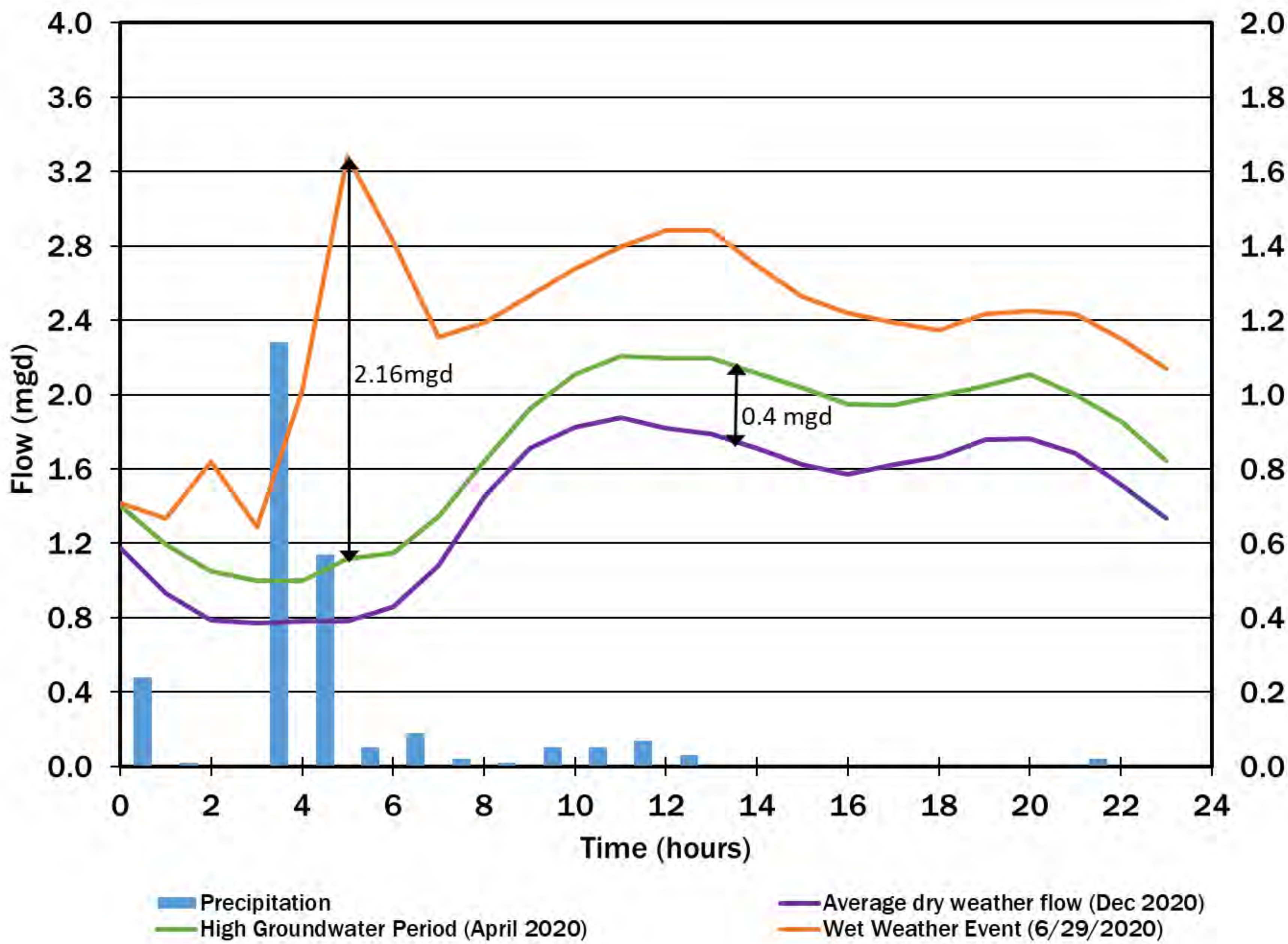
MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Design flow and loading determination worksheets

Municipal/Industrial Wastewater

Doc Type: Engineering Report
wq-wwtp5-20a (Revised 1/17/19)

A.	**Determine peak hourly wet weather design flows (PHWWF)**	Flow, mgd
1	Present peak hourly dry weather flow	1.79
2	Present peak hourly flow during high ground water period (no run off)	2.20
3	Present peak hourly dry weather flow	1.79
4	Present peak hourly infiltration	0.41
5	Present peak hourly dry weather flow during high ground water period and runoff at point of greatest distance between curves Y and Z	3.28
6	Present hourly flow during high ground water (no runoff) at same time of day as (5) measurement	1.12
7	Present peak hourly inflow	2.16
8	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event	3.38
9	Present peak hourly infiltration	0.4
10	Peak hourly infiltration cost effective to eliminate	0.0
11	Peak infiltration after rehabilitation	0.41
12	Present peak hourly adjusted inflow	3.4
13	Peak hourly inflow cost effective to eliminate	0.0
14	Peak hourly inflow after rehaibilitation	3.38
15	Population increase:	Flow, mgd
16	Peak hourly flow from planned industrial increase	0.0
17	Estimated peak hourly flow from future unidentified industries	0.0
18	Peak hourly flow from other future increases	0.0
19	Peak hourly wet weather design flow [1+11+ sum(14...18)]	5.6
B.	**Determine peak instantaneous wet weather design flow (PIWWF)**	Flow, mgd
20	Peak hourly wet weather design flow [same as (19)]	5.6
21	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event [same as (8)]	3.4
22	Present peak inflow adjusted for a 25-year 1 hour rainfall event	5.1
23	Peak instantaneous wet weather design flow [20-21+22]	7.3


4.0
3.6
3.2
2.8
2.4
2.0
1.6
1.2
0.8
0.4
0.0
Flow (mgd)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Precipitation, inches/hour
2.16mgd
0.4 mgd
0
2
4
6
8
10
12
14
16
18
20
22
24
Time (hours)
Precipitation
High Groundwater Period (April 2020)
Average dry weather flow (Dec 2020)
Wet Weather Event (6/29/2020)

Appendix 2-2 5-Year Flows and Loading Data

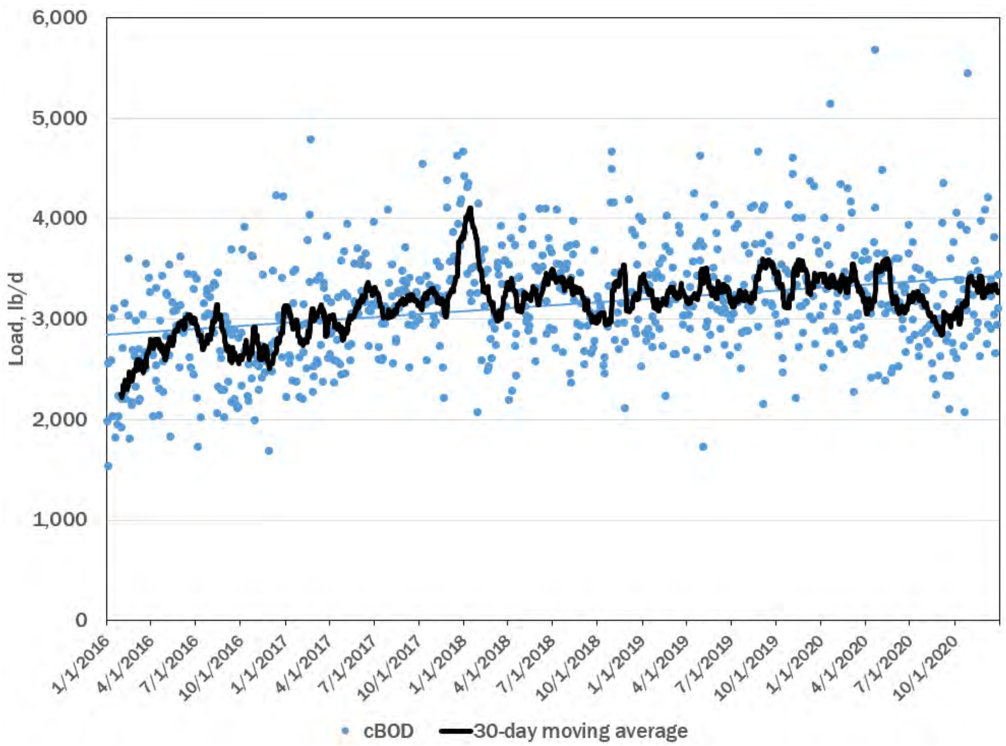


Figure 1. Hastings WWTP reported influent $cBOD_5$ loading

(January 1, 2016 – December 31, 2020)

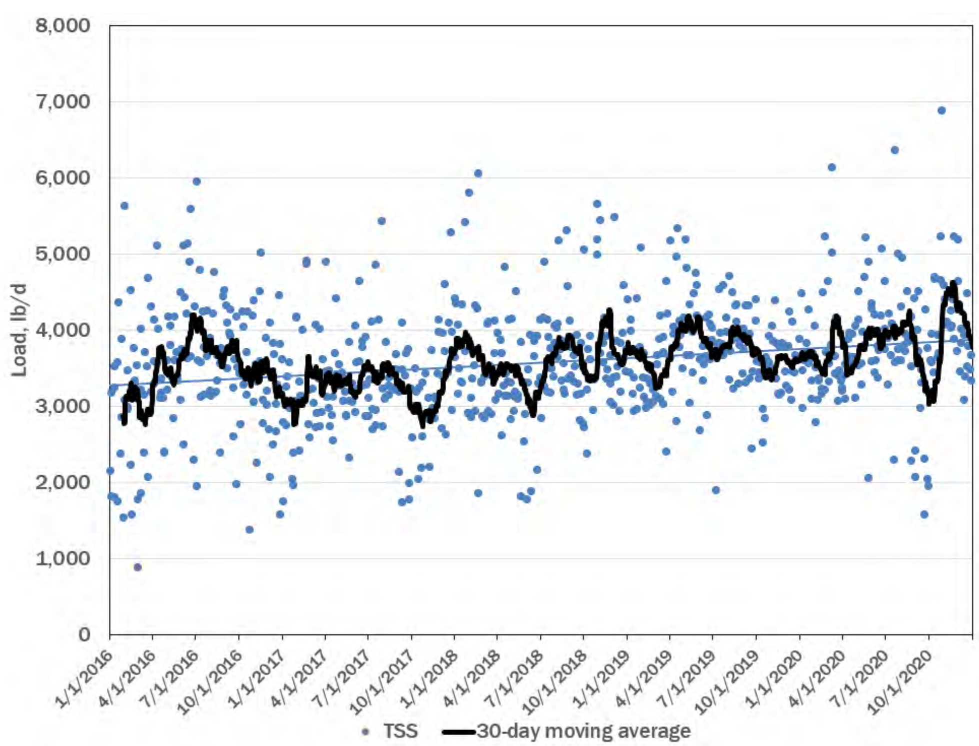


Figure 2. Hastings WWTP reported influent TSS loading

(January 1, 2016 – December 31, 2020)

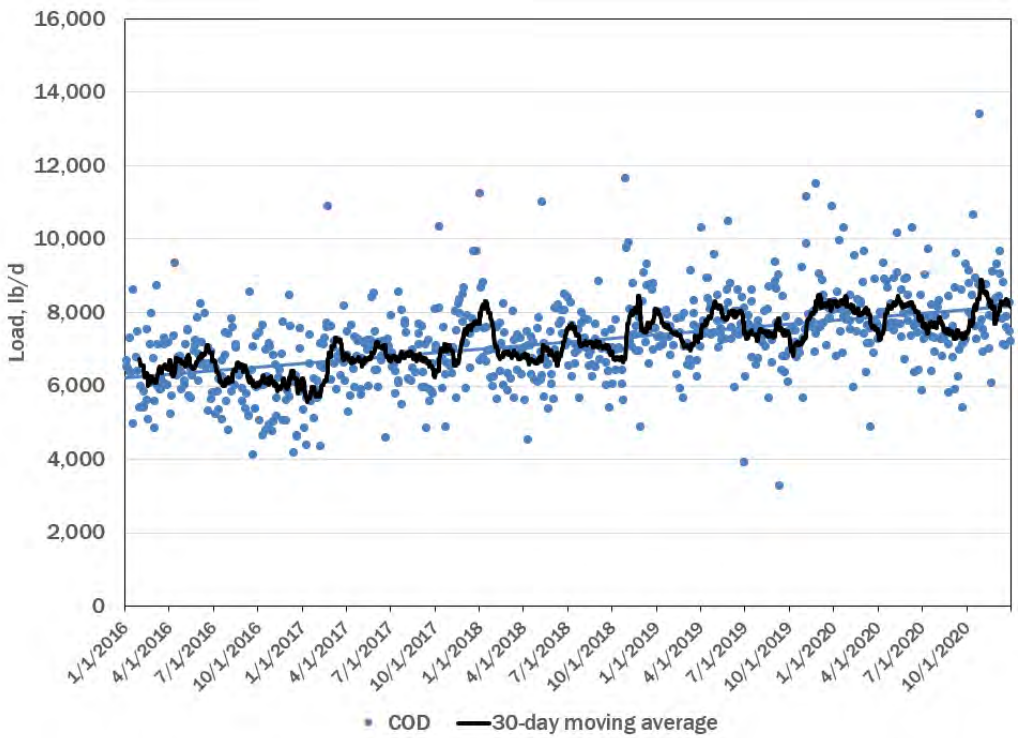


Figure 3. Hastings WWTP reported influent COD loading

(January 1, 2016 – December 31, 2020)

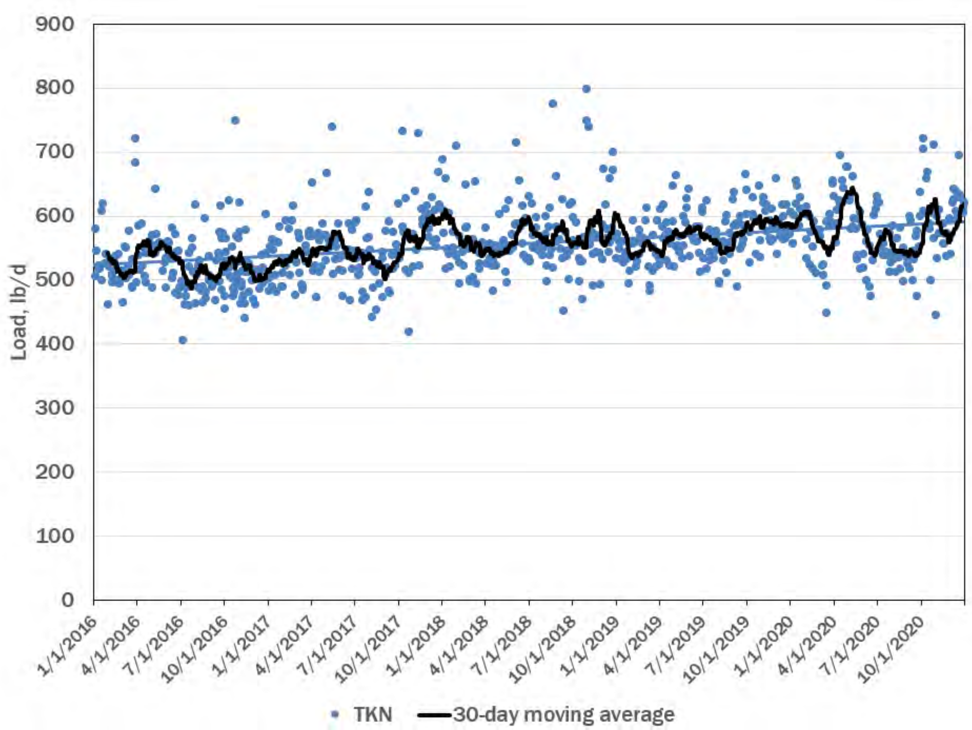


Figure 4. Hastings WWTP reported influent TKN loading

(January 1, 2016 – December 31, 2020)

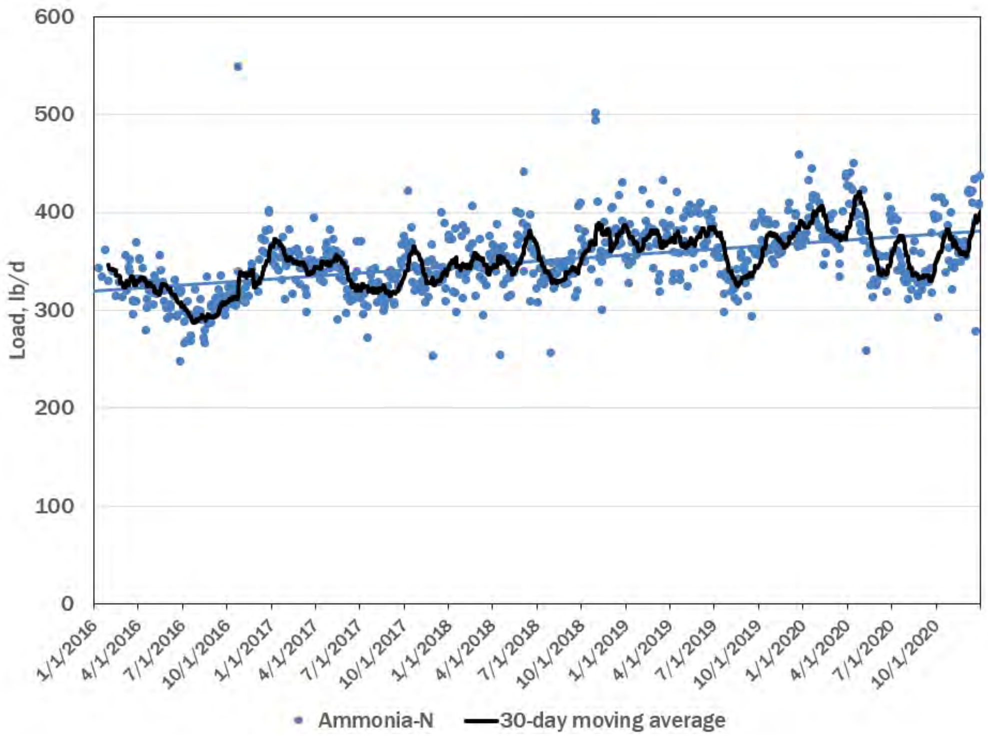


Figure 5. Hastings WWTP reported influent ammonia loadings

(January 1, 2016 – December 31, 2020)

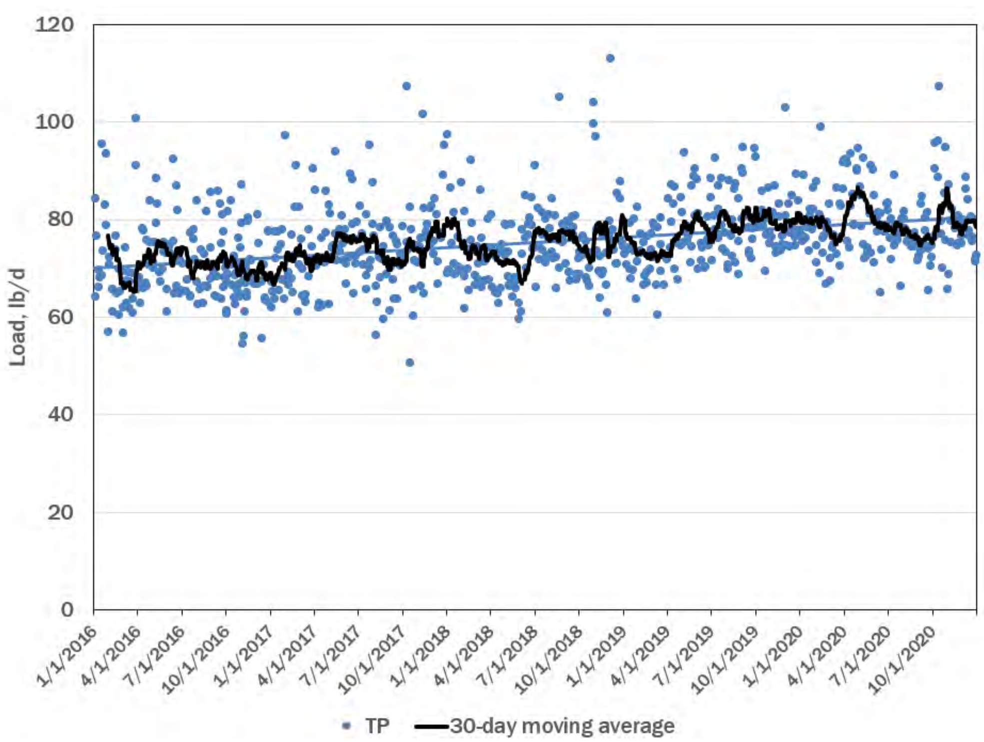


Figure 6. Hastings WWTP reported influent TP loadings

(January 1, 2016 – December 31, 2020)

Appendix 2-3 MCES Sewer Design Peak Hourly Flow Factors

Table A-1: MCES Flow Variation Factors for Sewer Design

Average Flow (MGD)	Peak Hourly Flow Factor	Average Flow (MGD)	Peak Hourly Flow Factor
0.00 – 0.11	4.0	1.90 – 2.29	2.8
0.12 – 0.18	3.9	2.30 – 2.89	2.7
0.19 – 0.23	3.8	2.90 – 3.49	2.6
0.24 – 0.29	3.7	3.50 – 4.19	2.5
0.30 – 0.39	3.6	4.20 – 5.09	2.4
0.40 – 0.49	3.5	5.10 – 6.39	2.3
0.50 – 0.64	3.4	6.40 – 7.99	2.2
0.65 – 0.79	3.3	8.00 –10.39	2.1
0.80 – 0.99	3.2	10.40 – 13.49	2.0
1.00 – 1.19	3.1	13.50 – 17.99	1.9
1.20 – 1.49	3.0	18.00 – 29.99	1.8
1.50 – 1.89	2.9	over 30.00	1.7

Appendix 3-1 Draft Preliminary Effluent Limits

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300
800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

Aug 30, 2021

Therese Gilchrist
Metropolitan Council Environmental Services
2400 Childs Road
St. Paul, MN 55106

RE: Preliminary Effluent Limitations for the Proposed Discharges to the Mississippi River and to the Vermillion River
MCES – Hastings Wastewater Treatment Facility
MN0029955

Dear Therese Gilchrist:

This letter is a response to your preliminary limits review request received on May 19, 2021. It summarizes the preliminary effluent limits for the wastewater treatment plant (WWTP) proposed expansion/new discharge.

The preliminary limits are draft values. Effluent limits only become final after the National Pollutant Discharge Elimination System (NPDES) permit has undergone a complete review, been public noticed, the public's comments considered and either our Commissioner or a delegated representative signs the permit.

Please be aware that receiving the preliminary effluent limits in the table below does not mean that your proposed expansion/new discharge has been approved. As part of the permitting process, your project must comply with antidegradation requirements. You must demonstrate that the chosen project alternative is the least degrading prudent and feasible alternative. In many cases, the least degrading prudent and feasible alternative may not be your preferred option or the option(s) discussed in this letter. (7050.0280, subp. 2).

Currently, MCES – Hastings consists of a mechanical bar screen, two grit removal chambers, two primary clarifiers, two four-pass aeration tanks, two final clarifiers, chemical disinfection, and dechlorination.

Proposed scenarios description

The Metropolitan Council requested preliminary effluent limits for two scenarios:

- Scenario 1: Continuous discharge. An increase of the facility average wet weather design flow (AWWDF) from 2.69 mgd to 3.0 mgd and an expanded average dry weather design flow (ADWDF) of 2.1 mgd. The coordinates of the proposed outfall (SD001a) are: Lat 44.7495, long -92.8251, Mississippi River.
- Scenario 2: Continuous discharge. Same AWWDF and ADWDF as for Scenario 1. The coordinates of the proposed outfall (SD002) are: Lat 44.7344, long -92.8188, Vermillion River.

In Scenario 1 the receiving water will be the Mississippi River. In Scenario 2, the receiving water will be the Vermillion R. Neither of these waters has a "listed" use designation under Minnesota Rule 7050.0470, subpart 1-

9 and associated tables. Under Minn. R. 7050.0430 subpart 1 such “unlisted” waters are given uses as 2Bg, 3C, 4A, 4B, 5 and 6 class waters.

Under Minn. R. 7053.0205, subp. 7, water quality must be protected down to the low flow $7Q_{10}$ for all pollutants except for ammonia-nitrogen (NH_3-N). Since the chronic NH_3-N water quality standard is for a 30-day mean, the $30Q_{10}$ is used for NH_3-N calculations.

The annual $7Q_{10}$ at SD001a is 2198 cfs. The annual $7Q_{10}$ and annual $30Q_{10}$ at SD002 are 26.6 cfs and 30.5 cfs, respectively.

Preliminary effluent limits

The preliminary effluent limits for Scenarios 1 and 2 are as follow:

Table 1. Preliminary effluent limits

	SD001a		SD002	
Substance or Characteristic (Monthly Average unless noted)	**Concentration or Range Limit**	**Mass Limit**	**Concentration or Range Limit**	**Mass Limit**
5-Day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	25 mg/L	254[a]/284 kg/day	5[b]/15 mg/L	57/170 kg/d
Total Suspended Solids (TSS)	30 mg/L	305[c]/341 kg/day	30 mg/L	341 kg/d
Fecal Coliform Group Organisms[d]	200 organisms/100 mL	NA	200 organisms/100 mL	NA
pH Range (standard unit)	6.0 - 9.0	NA	6.0 - 9.0	NA
Total Residual Chlorine[e] (daily maximum)	0.038 mg/L	NA	0.038 mg/L	NA
DO	NA		5 mg/L	
Total nitrogen[f]	10 mg/L	114 kg/d	10 mg/L	114 kg/d
Total ammonia-N				
Jun 1 – Sep 30	NA	NA	7.3[b]/3 mg/L	83/34 kg/d
Oct 1 – Nov 30	NA	NA	--/--	--/--
Dec 1 – Mar 31	NA	NA	-- [b]/5 mg/L	--/57 kg/d
Apr 1 – May 31	NA	NA	--/--	--/--
Total Phosphorus				
Jun - Sept	NA	NA	0.15 – 0.4	1.7 – 4.5 kg/d
Jan - Dec	1.0	MCES Miss. Basin Permit[g]	1.0	MCES Miss. Basin Permit[g]

NA: not applicable

[a]The first number would be the mass limit if the mass is frozen, in which case, $CBOD_5$ would not need an antidegradation review.

[b]The ammonia/$CBOD_5$ linkage concept may be applied to this discharge. The first $CBOD_5$/ammonia concentration applies if the facility does not accept the $CBOD_5$ linkage option

[c]The first number would be the mass limit if the mass is frozen, in which case, TSS would not need an antidegradation review. Neither would mercury.

[d]Monthly geometric mean. Applicable April 1 through October 31 (Minn R. 7053.0215, subp. 1).
[e]Total residual chlorine (TRC) limits if the mechanical facility chlorinates. Dechlorination may be required.
[f]Total nitrogen: Limit if the facility accepts regulatory certainty.
[g]Annual mass requirements for Lake Pepin and the Mississippi River are included in the Met Council - Mississippi Basin Total Phosphorus Permit.

Monitoring requirements

Monitoring for the listed parameters in the Table 2 will be required in addition to the NPDES permit monitoring requirements for the effluent limitations in Table 1.

Table 2. Monitoring requirements for SD001a and SD002

Parameter	**Influent (I)/Effluent (E)**	**Frequency**
Ammonia Nitrogen	E	1 x month, Jan - Dec
Nitrite + Nitrate Nitrogen	I/E	I/E: 1 x month, Jan-Dec
Total Kjeldahl Nitrogen	I/E	I/E: 1 x month, Jan-Dec
Priority pollutant scan	E	Three times during the life of the permit
Acute WET testing, SD001a	E	Annually
Chronic WET testing, SD002	E	Annually

Antidegradation requirements

Antidegradation is one of the fundamental protections in the Clean Water Act, and all newly issued wastewater permits must comply with both state and federal antidegradation rules. The goal of antidegradation is to preserve waters of high quality and to ensure that they are not degraded unless balanced by important economic or social development.

An antidegradation assessment/review must be completed and approved in order to determine the final limits for the selected option. The antidegradation assessment/review must meet the antidegradation requirements in Minn. R. 7050.0250 to 7050.0335.

An antidegradation assessment is a valuation that considers the beneficial uses of the receiving water, potential economic impacts, possible treatment options and the potential environmental degradation for every pollutant that triggers the need for an antidegradation assessment. The pollutants that will be considered are total suspended solids (TSS), 5-day carbonaceous biochemical oxygen demand (CBOD5), ammonia, chloride, sulfate and mercury, if Met Council chooses to discharge to the Vermillion R or if Met Council chooses not to freeze the TSS load if the discharge is to the Mississippi R.

Federally endangered or threatened aquatic species

There are federally endangered or threatened species downstream of the proposed outfall on the Mississippi River. Please, contact Ms. Lisa Joyal, Department of Natural Resources (lisa.joyal@dnr.state.mn) and Mr. Nicholas Utrup, U.S. Fish and Wildlife Service (nick_utrup@fws.gov) to determine if further evaluation is needed. I have already emailed both alerting them of this proposed increase in effluent flow and/or new discharge location.

Total maximum daily load (TMDL) requirements/Waste load Allocation (WLA)

Discharge to the Mississippi River

South Metro Mississippi TMDL Turbidity Impairment

- Total suspended solids waste allocation (WLA) equal to 111,325 kg/year and 305.00 kg/day. Equivalent to the current permitted effluent mass TSS limit. This facility is eligible for WLA increase.

Upper Mississippi River Bacteria TMDL

- The E. coli WLA is 12.8 billion organisms per day. The WLA is equivalent to the current permitted effluent fecal coliform limit of 200 organisms per 100 mL.

Lake Pepin and Mississippi River Eutrophication TMDL

- The total phosphorus wasteload allocation is 2,973 kg/yr. Annual mass requirements for Lake Pepin and the Mississippi River are included in the Met Council - Mississippi Basin Total Phosphorus Permit.

Discharge to the Vermillion R.

South Metro Mississippi TMDL Turbidity Impairment

- Total suspended solids waste allocation (WLA) equal to 111,325 kg/year and 305.00 kg/day. Equivalent to the current permitted effluent mass TSS limit. This facility is eligible for WLA increase.

Wetlands

Since the construction activities will alter a wetland, the Permittee should contact Mark Gernes (MPCA) at 651-757-2387 or via email at mark.gernes@state.mn.us. Wetland mitigation is required if construction within any part of an existing wetland results in that wetland's physical alteration (Minn. R. 7050.0186). Wetland sequencing from the construction impacts requires consideration of alternatives that avoid, minimize and replace lost wetland designated uses.

The Permittee will need to follow up with Mr. Ben Carlson, Wetland Specialist, Carver, Dakota, Hennepin, and Scott Counties, Minn. Board of Water & Soil Resources (bern.carlson@state.mn.us) and with Mr. David Studenski, US Army Corps of Engineers, Regulatory Division (david.a.studenski@usace.army.mil).

Regulatory Certainty

In response to listening session comments, a voluntary option would provide up to 20 years of regulatory certainty for wastewater treatment facilities that are willing to accept phosphorus and nitrogen effluent limits and design, construct, and fully operate a biological nutrient removal (BNR) treatment system. BNR systems remove both phosphorous and nitrogen, and are considered the best available technology for wastewater treatment. Indeed, BNR is the only known cost-effective wastewater removal technology for nitrate.

Once the BNR system is in place, the facility would not be required to comply with any new phosphorous or nitrogen limits, beyond those in their discharge permit, for the estimated useful life of the new BNR system. The proposal is linked to a bonding request for water infrastructure grants, and is intended to incentivize facility upgrades to BNR systems.

Communities that volunteer to participate by installing and operating BNR would comprehensively address all nutrients for up to 20 years and obtain regulatory certainty. Over time, communities could also save money by reducing both energy usage and the purchase of chemicals for phosphorus removal. Water quality in Minnesota lakes and rivers would also benefit from more treatment plants converting to the best available technology.

If you have any questions, comments or concerns, please contact me at 651-757-2566 or email me at aida.mendez@state.mn.us

Sincerely,

Aida Mendez, PhD, PE
Water Assessment Section
Environmental Analysis and Outcomes Division
MPCA
520 Lafayette Road North, St. Paul, MN 55155

Appendix 4-1 Traffic Analysis

BOLTON & MENK

Real People. Real Solutions.

2638 Shadow Lane
Suite 200
Chaska, MN 55318-1172

Ph: (952) 448-8838
Fax: (952) 448-8805
Bolton-Menk.com

TECHNICAL MEMORANDUM – PRELIMINARY SITE TRAFFIC ANALYSIS

Date: October 15, 2021

To: Chad Davison, P.E. Project Manager – Metropolitan Council Environmental Services

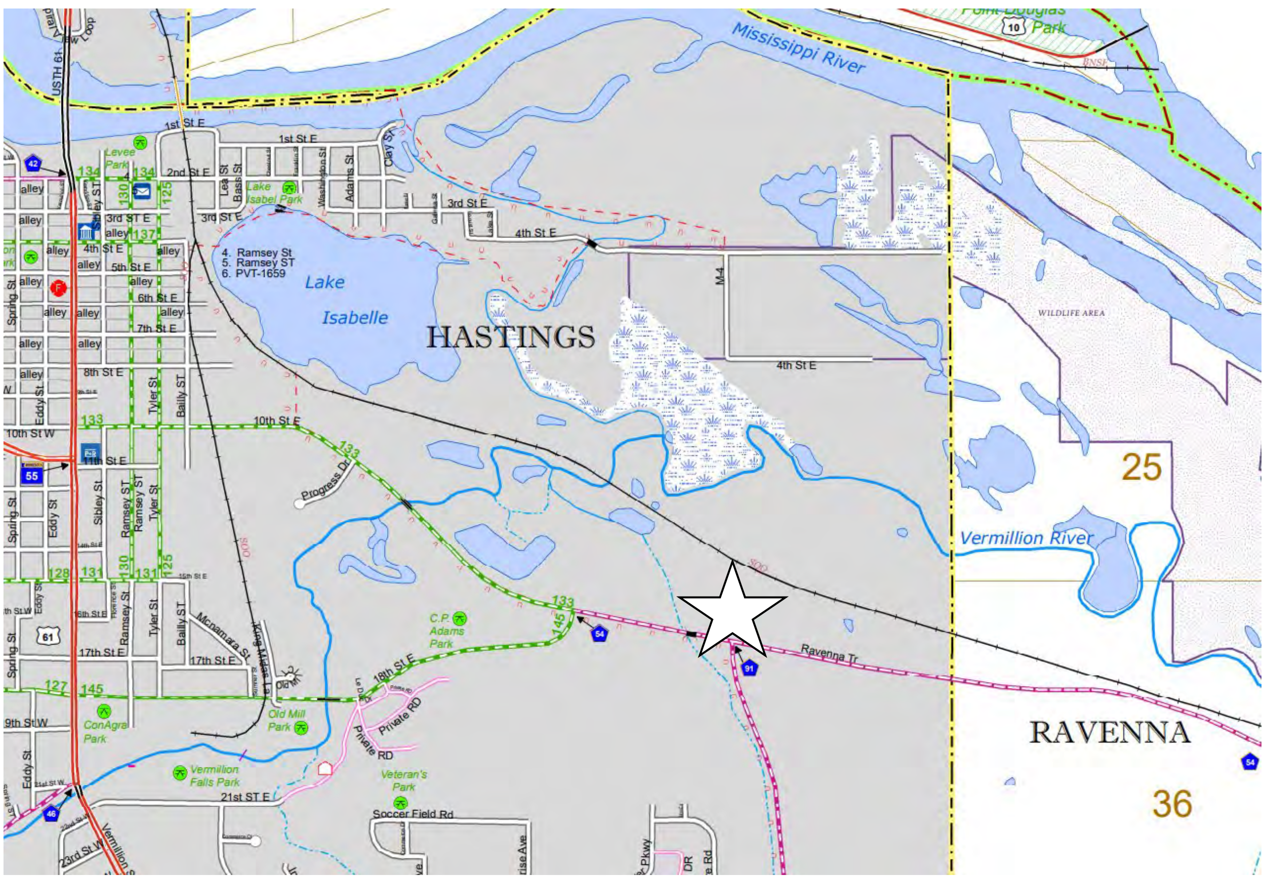
From: Brian Simmons, P.E.,
Kelsey Retherford P.E.

Subject: Proposed Hastings Regional Wastewater Treatment Facility
Preliminary Traffic and Trip Generation Analysis

Purpose:
The Metropolitan Council Environmental Services is proposing a new regional wastewater treatment facility to be constructed on MCES owned property on/near the border of the City of Hastings and Ravenna Township. The proposed plant will replace the existing wastewater treatment facility found in the center of the City of Hastings.

This preliminary site traffic analysis will evaluate the expected traffic, trip generations, and turning movements for the proposed treatment plant site, and is intended to be included in the facility plan.

A site plan showing the current driveway and access plan is attached for reference.



Site Components:
The proposed treatment plant site was previously a gravel and sand pit. The site is bordered by Ravenna Trail / Dakota County Road 54. Ravenna Trail to the west becomes 10th Street in Hastings. Glendale / Dakota County Road 91 to the south connects with State Hwy 316 south of Hastings, and is also linked via Spiral Blvd, which is an MSA Route. The site itself occupies parcels in both the City of Hastings, and Ravenna Township. At the time of this writing, it is owned by the MCES and undeveloped. Six (6) accesses onto Ravenna Trail exist along the property, formerly serving pit mining activities. As part of the site development, four (4) accesses will be removed and two (2) will be improved as treatment plant accesses. Dakota County will also require that the total number of driveway accesses does not increase beyond the existing number, and new accesses shall meet their requirements for spacing. The primary access point for the proposed treatment plant is a driveway aligned with Glendale Road / Dakota County Road 91. There is an existing access onto Ravenna Trail / Co Rd 54 at the eastern limits of the property that must remain for access to a Canadian Pacific railroad easement that borders/divides a portion of the site to the north. The attached site plan also indicates the existing accesses to be eliminated.

Existing Traffic:
Existing traffic counts are shown on the figure below and indicate a primary east-west direction of travel along Ravenna Trail adjacent to the site. 2018 traffic volumes recorded by MnDOT are 5300 vehicles AADT. 1250 AADT are observed on Glendale Road to the south of the site, and Ravenna continuing east of the intersection of Glendale (approximately at the primary driveway location) is 4250 AADT. Ravenna is classified by MnDOT as a Major Collector Road adjacent to the site.

Trip Generations:
Traffic to and from the site is understood to be primarily operations and maintenance staff arriving to and leaving the site as part of performing daily duties and maintaining the operation of the treatment plant. Operation of the plant itself will also require daily hauling of sludge and solids to other MCES facilities. Consumable deliveries will vary in size but will generate approximately one trip per day at the site. Traffic forecasts for the site are based on empirical data from the MCES on the size and number of staff needed to operate the treatment facility. Table 1 represents the weekday trip

generations from the proposed site. Best practices for evaluating trip generations includes consulting the ITE Trip Generation Manual (10^{th} Edition), however the type of facility being proposed is not included, therefore the trips reported based on employees and deliveries represents the best data available.

Table 1

Source	**Daily Trips**	**Daily Trips**	**Peak Hour**	**Peak Hour**	**Peak Hour**	**Peak Hour**
	Entering	Exiting	AM Entering	AM Exiting	PM Entering	PM Exiting
Plant Staff	16	16	8	1	1	8
Sludge Hauling	4	4	2	2	2	2
Deliveries	2	2	1	1	1	1
TOTAL TRIPS	**22**	**22**	**11**	**11**	**11**	**11**

Due to the current nature of the site, there are no existing trips being generated. No parking analysis was performed in this preliminary study, with the understanding that adequate parking for the eight (8) full time employees that will office at the plant will be exceeded with the number of parking spots to be constructed. Parking at the office, and for maintenance access at major process buildings in the plant will be constructed.

Turn Lanes:

The MnDOT Access Management manual defines the warrants for turn lanes on undivided highways, which applies to Ravenna Trail / Co Rd 54. Table 2 below details the lack of warrants for the addition of turn lanes at the proposed treatment plant site.

Table 2

Turn Lane Warrant No.	**Type**	**Warrant(s) Requirements**
Warrant 1	Passing Lane/Climbing Lane	>100 trips per day – N/A
Warrant 2	Limited Sight Distance or Terrain	Not Applicable
Warrant 3	Railroad Crossings	Not Applicable
Warrant 4	Signalized Intersections	Not Applicable
Warrant 5	Heavy-Vehicle Traffic	Not Applicable
Warrant 6	School Entrances	Not Applicable
Warrant 7	Crash History	Not Applicable
Warrant 8	Corridor Crash Experience	Not Applicable
Warrant 9	Vehicular Volume Warrant	>100 trips per day – N/A

Dakota County was also consulted as part of the preparation of the Facility Plan, and they indicated no requirement for the construction of turn lanes based on their understanding of the site improvements, at that time. Dakota County also reserves the right to examine the adherence to their requirements at the time of permit application.

Intersection Analysis:

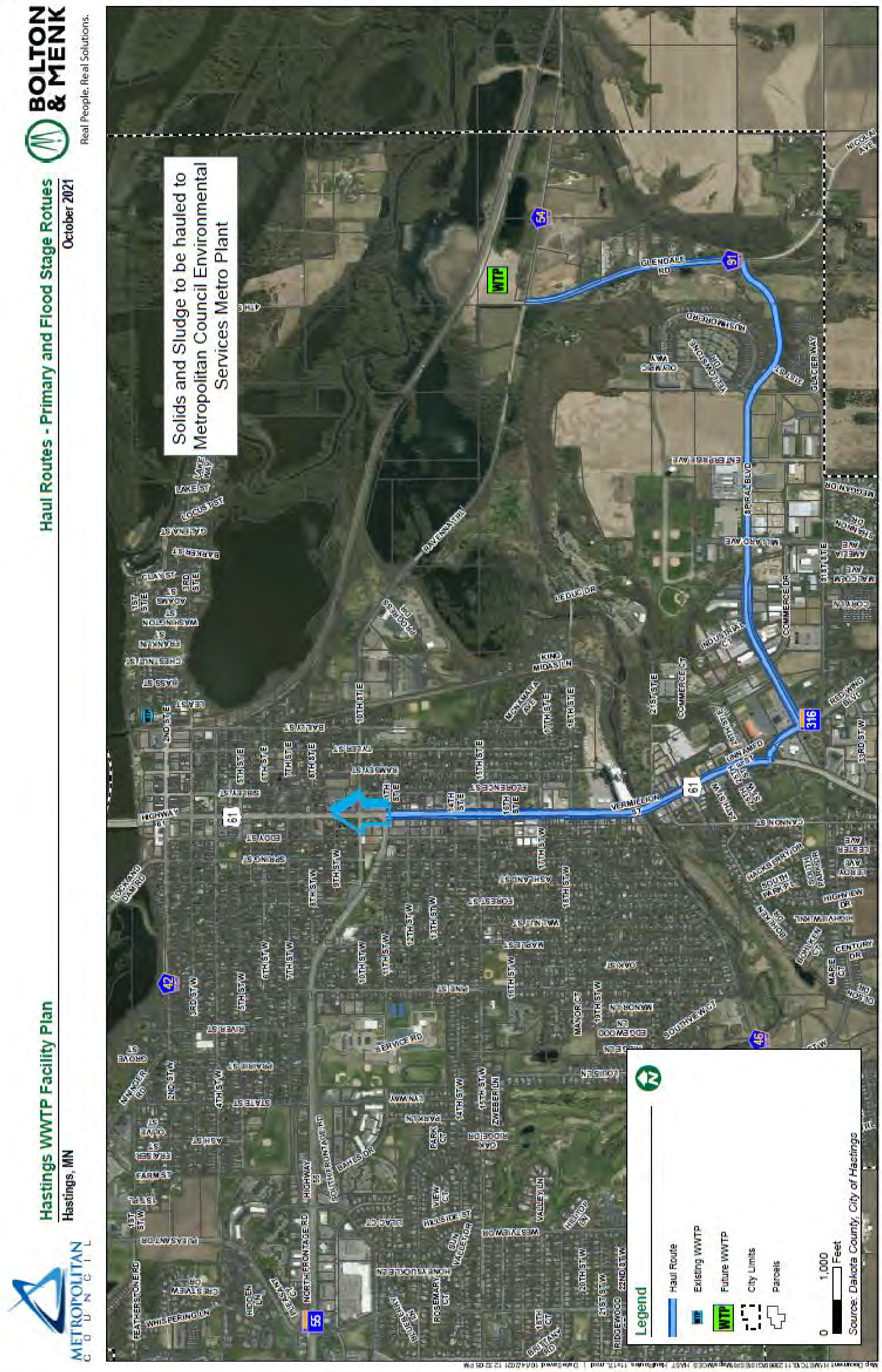
Trips generated by the proposed treatment plant measure equal to or less than 22 per day, and do not have an impact on the capacity of the intersection of Ravenna Trail and Glendale Road. Conflicts from turning movements will be avoided largely as sludge hauling and other trucking activities will be required to follow the designated haul routes. A map of the proposed haul route is attached, and it routes trucks entering and exiting the plant site from Glendale to the south directly into the plant site, with no turning movements off of/on to Ravenna Trail.

Site Configuration and Internal Circulation:

The driveway access at Glendale Road will be the primary site access. A secondary access drive will be constructed at approx. the midway point of the property and is to be operated as an emergency or interim entrance. The site will have controlled gate access, with stacking room provided for two (2) large vehicles (WB62) to safely queue off Ravenna Trail while navigating gate access. The site plan also shows the approximate configuration of buildings on site, and the location of parking at treatment plant buildings. In general terms the access to and from the site will be at the primary driveway at Glendale Road.

Haul Routes:
The disposal of sludge and solids will be an element of treatment plant operation. The attached haul route map indicates the planned route for these trucks to travel to and from the site and the MCES Metro plant for disposal. Because Ravenna Trail to the west becomes more residential, and includes a number of 4-way stops, the haul route will leave the plant and proceed directly to the south along Glendale, navigating on Hastings MSA routes, rather than residential streets, to connect with the county road, and eventually state highway. This haul route also has the added benefit of reducing the turning movements at the plant site.


BOLTON & MENK
OPTION 2: WWTP OVERVIEW
OCTOBER 2021
HASTINGS WWTP FACILITY PLAN
METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES
CANADIAN PACIFIC RAILROAD
PERIMETER FENCE
SECURITY GATE
PERIMETER FENCE
RAVENNA TRAIL
GLENDALE ROAD
PERIMETER FENCE
SECURITY GATE
STACKING FOR TWO WB-62 SIZED VEHICLES


Hastings WWTP Facility Plan
Hastings, MN
Haul Routes - Primary and Flood Stage Rotues
October 2021
BOLTON & MENK
Real People. Real Solutions.
METROPOLITAN COUNCIL
Solids and Sludge to be hauled to Metropolitan Council Environmental Services Metro Plant
Legend
Haul Route
Existing WWTP
Future WWTP
City Limits
Parcels
0
1,000
Feet
Source: Dakota County, City of Hastings

Appendix 5-1 Lift Station Siting Report

Metropolitan Council Environmental Services

Hastings, MN Wastewater Facility Plan

Lift Station Siting Report

November, 2021

Submitted by:
Bolton & Menk, Inc.

Table of Contents

Figures

I. INTRODUCTION

The Metropolitan Council is planning to move the existing wastewater treatment plant in Hastings to the Council owned property on Ravenna Trail by 2027. A lift station is required to transport the wastewater to the new plant site. This report documents the property research for the new lift station in downtown Hastings.

II. PAST PLANS REVIEWED

Past City plans were reviewed as part of this assessment exercise, including:

- Downtown Hastings Property Study (2021)
- Hastings 2040 Comp Plan (2020)
- Improving On the Original: A Plan for the Heart of Hastings (2003)
- Red Rock Southeast Corridor map and related materials

III. EXISTING WWTP SITE

The Existing WWTP Site is being considered as a site for the future lift station by MCES because:

- The existing sanitary flow is already being conveyed to the site.
- The Council already owns the property and this is the least cost option.
- The facility is already present and a new lift station at the site is just an extension of the current use, but on a much smaller footprint.
- The adjacent empty lot to the west is desirable for many of the same reasons, but would allow for construction of the new lift station, with less disruption to WWTP operations, compared to a new lift station constructed on the same site.

However, alternative lift station sites within the City are also being considered due to:

- Future development potential on the existing WWTP site, and adjacent property.
- City policy guidance for new mixed-use development and build-out of Downtown Hastings
- Recent area public infrastructure investments
- A new riverfront station may risk detracting from built & natural character of Downtown Hastings and planned enhancements.
- Constructibility of the lift station under existing WWTP operations

IV. ALTERNATIVE SITE ASSUMPTIONS AND CONSIDERATIONS

- Siting a lift station adjacent or near the south-bound **Bailey Street/rail "utility corridor"** is acceptable, as it presents the opportunity to intercept existing gravity main and may help reduce utility and interceptor costs.
- A search area **no further than approximate 1300 ft** from the existing WWTP site was used due to geotechnical constraints and assumed costs of utility improvements outside of that range.
- Locations with a **combined minimum area of .5** acres were considered necessary to accommodate a required lift station site footprint, including necessary setbacks & buffering. An approximate 150' x 150' footprint is assumed for the future lift station and accompanying needs. MGPD supportive information?
- As such, this analysis used the following criteria to identify eligible sites that could accommodate a future lift station:
  - Undeveloped, publicly owned land*
  - Undeveloped or underutilized private land
  - Located along the Bailey St/rail utility corridor**
  - No further than ~1300 ft from current WWTP site
  - At least .5 acres in area

**Publicly owned sites were compiled from Met Council publicly available data.*

***Sites located along the Influent Route Alternative route along E 2nd St were also included*

V. ASSESSMENT HIGHLIGHTS

Seven total sites were identified and assessed, as shown on the Hastings Lift Station Preliminary Site Map.

- **Two** locations at the **existing WWTP site.**
- **One** publicly owned undeveloped location, the "Riverfront" site, was identified that met search criteria.
  - The site has a number of constraints, including floodplain and powerline easement
- **Two** publicly owned sites, the "Municipal Parking" and "UBC/City Storage" were identified that met the search criteria.
  - Both sites have recent (2021) City guidance around future development potential

    - The Municipal Parking Lot, contains an encumbrances resulting from a 2010 Met Council grant
    - UBC/City Storage is used as city storage, which would need to be relocated and is adjacent to residential
- **One** privately owned site, the "Lea St Lots" was identified, and consists of two owners across three parcels. One of those parcels contains a single-family home.
- **One** additional publicly owned site, "Lake Isabel Park", was identified, but is not located close to the existing primary WWTP interceptor alignments.
    - Lake Isabel Park will only be considered based on the future alignment location.

VI. LIFT STATION SITING

Development setback requirements are generally established based on the underlying land use zoning designation. While some use-specific regulations may exist, no such guidance is outlined for public utilities within any zoning district in the City of Hastings. Therefore, to determine necessary or appropriate setbacks considerations for the Lift Station, an underlying site zoning designation should first be established.

Zoning

Per the City of Hastings 2040 Comprehensive Plan, utilities are guided for either the I-1 Industrial Park or I-2 Industrial Park Storage/Service districts (see figure 1). As currently designated in the City's official land use map (see appendix x), Site 4 is the only site currently zoned to accommodate the lift station. None of the potential Lift Station sites however are guided for Industrial & Utility in the 2040 Comprehensive Plan future land use map, which is the comparable designation for I-1 or I-2.

Figure 1 – Applicable Future Land Use Categories (text from Hastings 2040 Comprehensive Plan)

Plan Map Category	Land Uses	Potential Zoning Districts
Industry and Utility	This category includes the manufacturing or warehousing that may involve heavy truck traffic, railroad service, the handling of raw materials. It also includes railroad yards major ROW, outdoor truck parking, power substations, and the regional sewage treatment plan.	I-1 Industrial Park; I-2 Industrial park storage/service

Sites 1A-3, and 5-6 would therefore presumably need to be rezoned, likely as either I-1, I-2, Conditional Use Permit, or as part of a Special Use Permit (SUP). An SUP may be worth considering for the final selected site regardless of current zoning, as SUPs may allow additional flexibility in site design. Rezoning for the lift station may also require a Comprehensive Plan Amendment, and/or a Lot Line Adjustment. Further conversation with Hastings City staff will be needed to determine the full scope of requirements and processes needed.

Setbacks

As currently outlined in the City's zoning code, no clear setback requirements exist for either the I-1 or I-2 districts, or for Public Utilities as a land use. With the absence of such lot regulations, it is recommended that the future lift station site design process take effort to ascribe setbacks that are complimentary with the character of current surrounding land uses, and/or support future land use guidance provided in the 2040 Comprehensive Plan. Towards this end, a Comparable District has been identified for each potential lift station site for the purpose of identifying complimentary setbacks (Table 1)

Additionally, Sites 1A, 1B, and 2 are located within the CA-River Town Crossing MRCCA District, which brings some additional siting requirements on building height and setbacks from any river bluffs. As such, the Lift Station may be no more than 48' without a condition use permit, and no less than 40ft from a Bluff.

Table 1 – Recommended Site Regulations

SITE	Comparable District (for setbacks)	Front Setback	Side Setback	Rear Setback	Bluff Setback (MRCCA)
1A	R-2	20ft min - 30ft max	7ft min (10ft at Corner)	20ft min	40' (Setback from Bluff)
1B	R-2	20ft min - 30ft max	7ft min (10ft at Corner)	20ft min	40' (Setback from Bluff)
2	Residential Mixed Use	10ft min - 20ft max	5ft min (10ft at Corner)	10ft min	40' (Setback from Bluff)
3	Residential Mixed Use	10ft min - 20ft max	5ft min (10ft at Corner)	10ft min	N/A
4	R-3	20ft min - 30ft max	7ft min (10ft at Corner)	20ft min	N/A
5	R-2	20ft min - 30ft max	7ft min (10ft at Corner)	20ft min	N/A
6	R-2	20ft min - 30ft max	7ft min (10ft at Corner)	20ft min	N/A

VII. LIFT STATION SITING CONSIDERATIONS MATRIX

The matrix on the following page outlines key considerations for each of the seven potential lift station siting locations.

Site			1A – WWTP NE	1B – WWTP SE	2 – Riverfront	3 – Municipal Parking Lot	4 – UBC/City Storage	5 – Lea St Lots	6 – Lake Isabel Park
Site Characteristics	Site Size (acres)		1.34	0.50	1.49	0.93	0.85	1.25	1.79
	Current Ownership		Met Council	Met Council	Public - HEDRA	Public - HEDRA	Public - HEDRA	Private (multiple owners)	Public - City of Hastings
	Current Use		WWTP	WWTP	Vacant	Municipal Parking Lot	City Storage	Vacant (N. lots) SF Home (S. lot)	Public Park, Water Access
	Easements or Restrictions		None	None	Transmition Line, Mid Site	Encumbrance Prohibiting Change of Tax-Exempt Status	None	None	None
	Adjacent Residential		Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Ajacent Distances	Nearest Property Distance* (Approx.)	60ft	80ft	105ft	95ft	20ft	65ft	100ft
		Nearest Property Type	Singe Family Res.	Singe Family Res.	Multi Family Res.	Singe Family Res.	Singe Family Res.	Singe Family Res.	Singe Family Res.
		Distance from Rail Line (Approx.)**	70ft - 335ft	100ft - 290ft	30ft - 290ft	10ft - 260ft	30ft - 160ft	50ft - 210ft	970ft - 1,240ft
Development Potential (internal use only)	City Future Land Use Designation		Mixed Use	Mixed Use	Mixed Use	Mixed Use/Red Rock SW Corridor Station	Medium-Density Res.	Low-density Res.	Neighborhood Park
	2021 Estimated Market Value (Land + Buildings)		(Land Only) $573,100	(Land Only) $129,000	$473,600	(Includes park) $476,500	$361,900	$74,600 (N. Lots) $237,000 (S. Lot)	$64,200
	Potential Future Market Value (comps est.)***		$6.4M (Doesn't account for Flood Plain)	$3.8M	$7.1M	N/A (encumbrance prohibition)	$3.1M	$747,300 (N. Lots) $225,000 (S. Lot)	N/A Public Park
Environmental Considerations	Prevailing Winds	Primary Directions & Speed	WNW/NW/NNW (Approx 20%) 8-13 ave mph	WNW/NW/NNW (Approx 20%) 8-13 ave mph	WNW/NW/NNW (Approx 20%) 8-13 mph	WNW/NW/NNW (Approx 20%) 8-13 mph	WNW/NW/NNW (Approx 20%) 8-13 mph	WNW/NW/NNW (Approx 20%) 8-13 mph	WNW/NW/NNW (Approx 20%) 8-13 mph
		Adjacent Property Type	Singe Family Res.	Singe Family Res.	Multi Family Res. / Existing WWTP	Rail Line	Warehouse / Rail Line	Singe Family Res.	Singe Family Res.
	Site in Flood Plain		Partial - Northern Portion of Site	Partial - Northern Portion of Site	Partial - Northern & Western Portions of Site	No	No	No	Partial - Southern Portion of Site
	Site in MRCCA		Yes, CA-RTC	Yes, CA-RTC	Yes, CA-RTC	No	No	No	No
	Historic/Cultural elements		No	No	No	Adjacent Depot	No	No	No
	Active MPCA Site		Yes - Very Small Quantity Generator	Yes - Very Small Quantity Generator	Yes - Petroleum Brownfield	No	No	No	No
Constructability	Geotechnical		Positive - to be verified	Neutral - bedrock close to ground surface	Positive - to be verified	Neutral - bedrock close to ground surface	Neutral - bedrock close to ground surface	Positive - to be verified	Positive - to be verified
	Maintenance of flow/temp conveyance		Nuetral - short term temporary conveyance	Nuetral - short term temporary conveyance	Nuetral - short term temporary conveyance	Nuetral - short term temporary conveyance	Nuetral - short term temporary conveyance	Nuetral - short term temporary conveyance	Nuetral - short term temporary conveyance
	Flow diversion during plant startup		Positive - bypass from WWTP pump station	Positive - bypass from WWTP pump station	Negative- requires gravity flow diversion	Negative- requires gravity flow diversion	Negative- requires gravity flow diversion	Negative- requires gravity flow diversion	Negative- requires gravity flow diversion
	Operation of existing WWTP		Negative- requires removal of existing facilities and potential impacts to flood wall	Neutral - can be constructed with minimal impacts	Positivie - no impacts to operations	Positivie - no impacts to operations	Positivie - no impacts to operations	Positivie - no impacts to operations	Positivie - no impacts to operations
	Existing sanitary sewer facilities on site		Yes	Yes	Yes	No	No	No	No
	Existing utilities impacts		Positive- minimal utility impacts	Positive- minimal utility impacts	Positive- minimal utility impacts	Positive- minimal utility impacts	Positive- minimal utility impacts	Positive- minimal utility impacts	Positive- minimal utility impacts
	Other		Limited staging around construction site	Limited staging around constructin site	Suitable staging areas	Suitable staging areas	Suitable staging areas	Suitable staging areas	Suitable staging areas
Capital Costs	Pipe routing - existing WWTP to proposed lift station		N/A	$1,811,000.00	$971,000.00	$2,513,000.00	$2,518,000.00	$1,999,000.00	N/A
	Proposed lift station		N/A	$1,356,000.00	$1,356,000.00	$1,356,000.00	$1,356,000.00	$1,356,000.00	N/A
	Land Aqcuisition Costs ****		N/A	$0.00	$69,800.00	$57,800.00	$48,000.00	$2,200.00	N/A
Site Preference Designation			Not Recommended	Preferred	Neutral	Neutral	Neutral	Preferred	Not Recommended

* Nearest property measured based on prospective Lift Station siting location, as identified in the March 2021 Hastings Lift Station Preliminary Analysis.
** Approximate range from nearest reail line to both nearest property line, and furthest property line. Exact Lift Station structure siting distance may vary.
***Comps estimate is based on publically available data for comparable properties within Hastings as of spring 2021, and is for approximate reference only. No guarantee is being made for the accuracey of this data, and should be adjusted based on a trained real estate appraiser before making final valuation claims.
****Site area needed assumed to be 0.22 acres per the site dimensions of the parcel for site 1B on existing MCES property. This site acreage was applied to the 2021 taxable land value of each parcel to determine the acquisition costs.

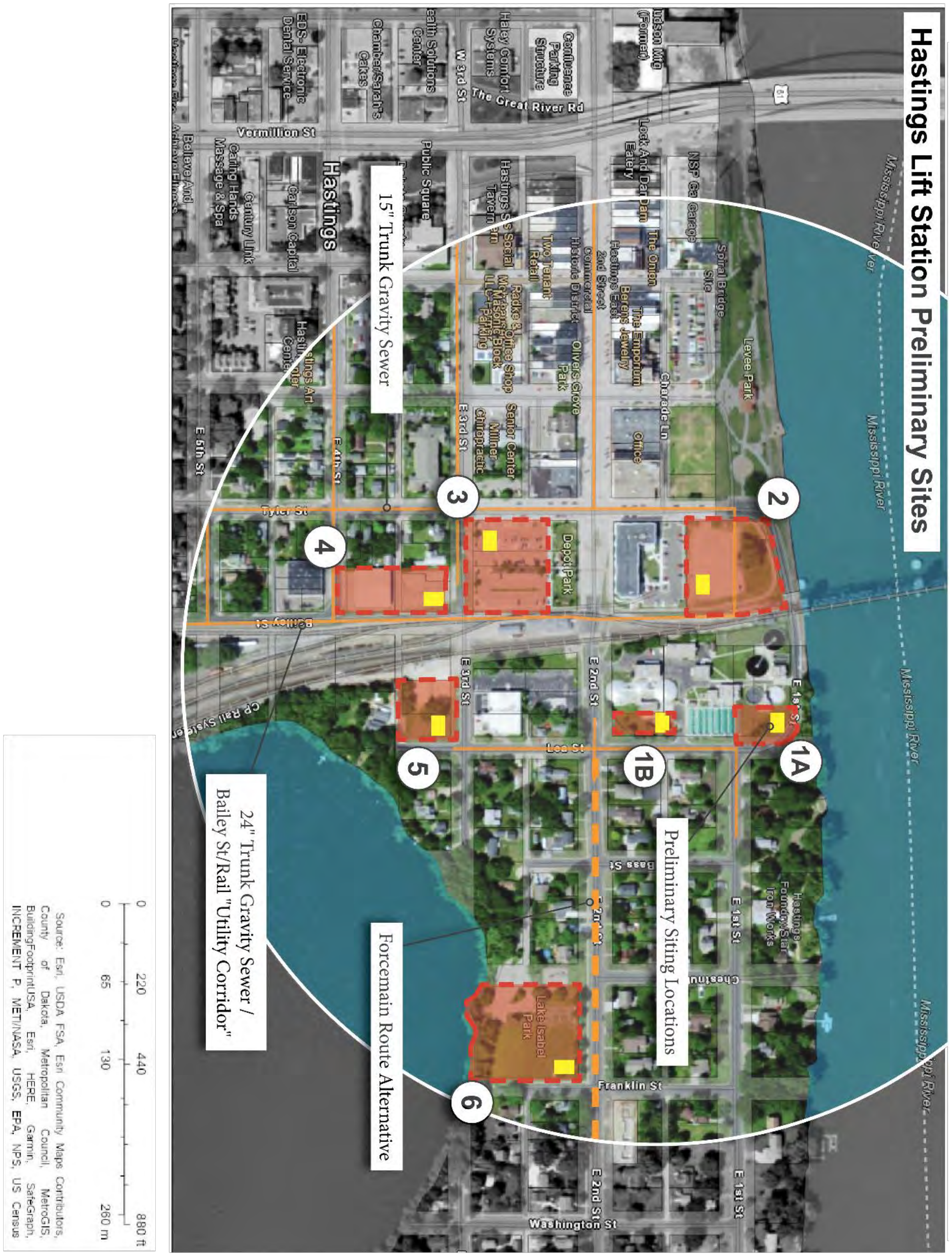
VIII. LIFT STATION PRELIMINARY SITES

The following image notes the seven preliminary lift station locations, and adjacent sewer lines (in orange).

Table 2 below lists the corresponding location names and total acreage.

Site	Acreage (total)
1A – WWTP Site NE	.38
1B – WWTP Site SE	.22
2 – Riverfront	1.49
3 – Municipal Parking Lot	.93
4 – UBC/City Storage	.85
5 – Lea St Lots	.53
6 – Lake Isabel Park	1.79

Figure 2 – Hastings Lift Station Preliminary Sites



Site 1A. WWTP Site NE

Site Name	1A WWTP Site NE
Ownership	Publicly Owned (MetCouncil)
Acreage	1.34 Acres

Site Summary

Encompassing a total site of nearly 4 acres, the WWTP facility is located in the northwest edge of Downtown Hastings. The original WWTP plant was built in 1955, preceding a 1986 renovations to support a now average flow of over 2.3 million gallons per day. The WWTP facility is planned to be relocated about 1.5 miles to the southeast along Ravenna Trail. Once the existing treatment plant is vacated, the site has been guided for mixed use development within the Hastings 2040 plan.

Figure 3 – Site 1A Location Map

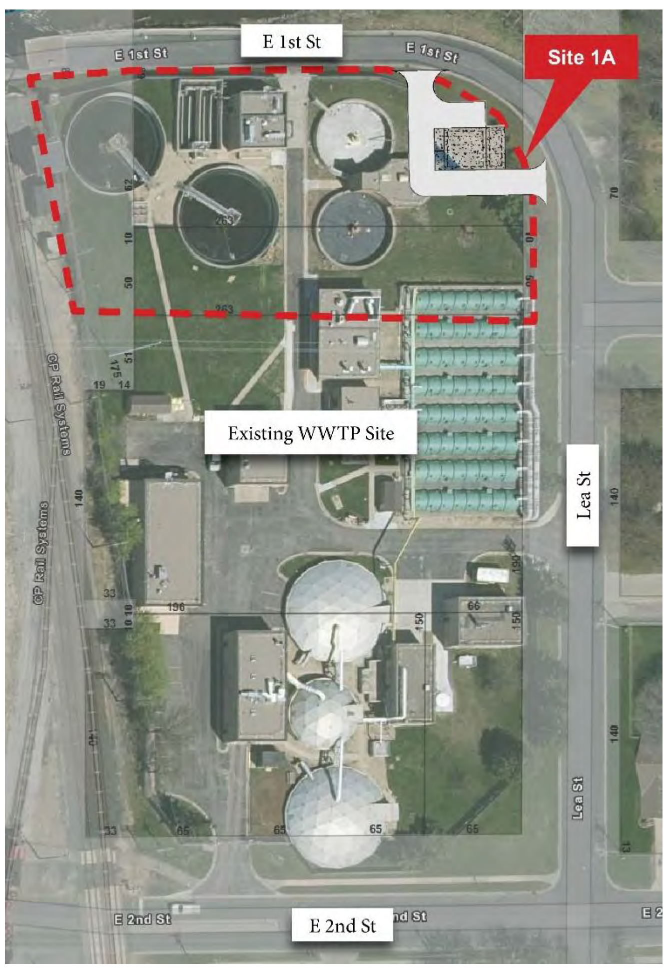
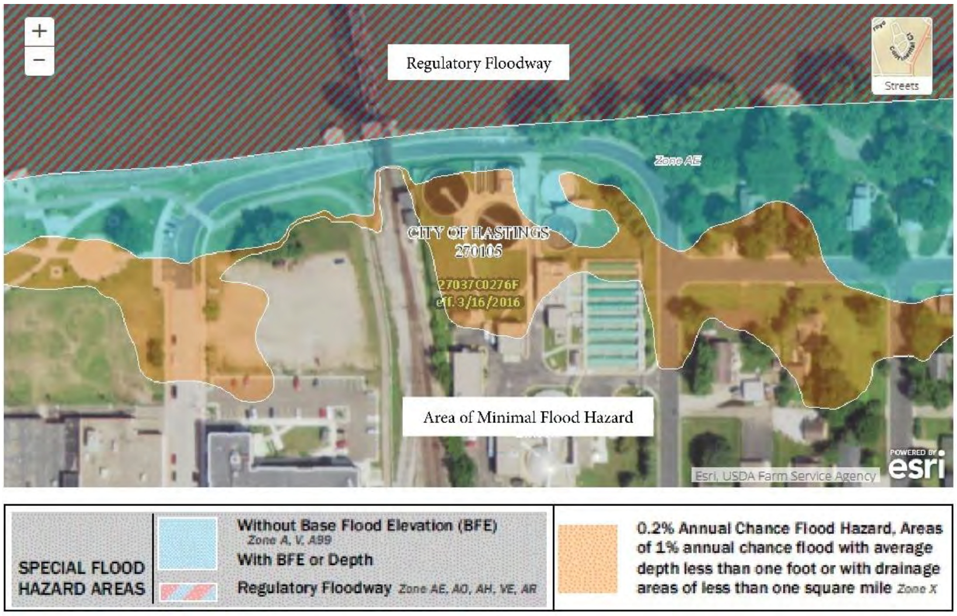


Figure 4 – WWTP site flood zones (based on FEMA flood data)



Key Considerations

- Runs adjacent the Bailey St/Rail UtilityCorridor.
- This WWTP NE Site would require minimal infrastructure improvements for the lift station, offering favorable geotechincal conditions.
- Is guided for mixed use development in the Hastings 2040 Comp Plan, and could provide new tax capacity growth for the city if developed.
- Falls within MRCCA *River Towns and Crossing District* (CA-RTC), which limits structures to 48', and bluff setbacks of 40'.
- Is located in a low-topography area and within two flood zones.
- Site 1A is in a less prominent view, and may allow for additional site development
- Is located adjacent a residential neighborhood, and may require mindful buffering, and other features

Site 1B. WWTP Site SE

Site Name	1B WWTP Site SE
Ownership	Publicly Owned (MetCouncil)
Acreage	.50 Acres

Site Summary

WWTP facility is located in the northwest edge of Downtown Hastings. The original WWTP plant was built in 1955, preceding a 1986 renovations to support a now average flow of over 2.3 million gallons per day. The WWTP facility is planned to be relocated about 1.5 miles to the southeast along Ravenna Trail. Once the existing treatment plant is vacated, the site has been guided for mixed use development within the Hastings 2040 plan. The WWTP SE Site presents several very favorable site and geotechincal benefits.

Key Considerations

- Runs adjacent the Bailey St/Rail Utility Corridor.
- This WWTP SE Site would require minimal infrastructure improvements for the lift station, particularly if existing build sites are repurposed for the Lift Station, offering favorable geotechincal conditions.
- Is guided for mixed use development in the Hastings 2040 Comp Plan, and could provide new tax capacity growth for the city if developed.
- Falls within MRCCA *River Towns and Crossing District* (CA-RTC), which limits structures to 48', and bluff setbacks of 40'.
- Unlike the 1A site, 1B is not located in a does not fall within a flood zone.
- Is prominently located adjacent a residential neighborhood, and may require mindful buffering, setbacks, and other design features.

Figure 5 – Site 1B Location Map

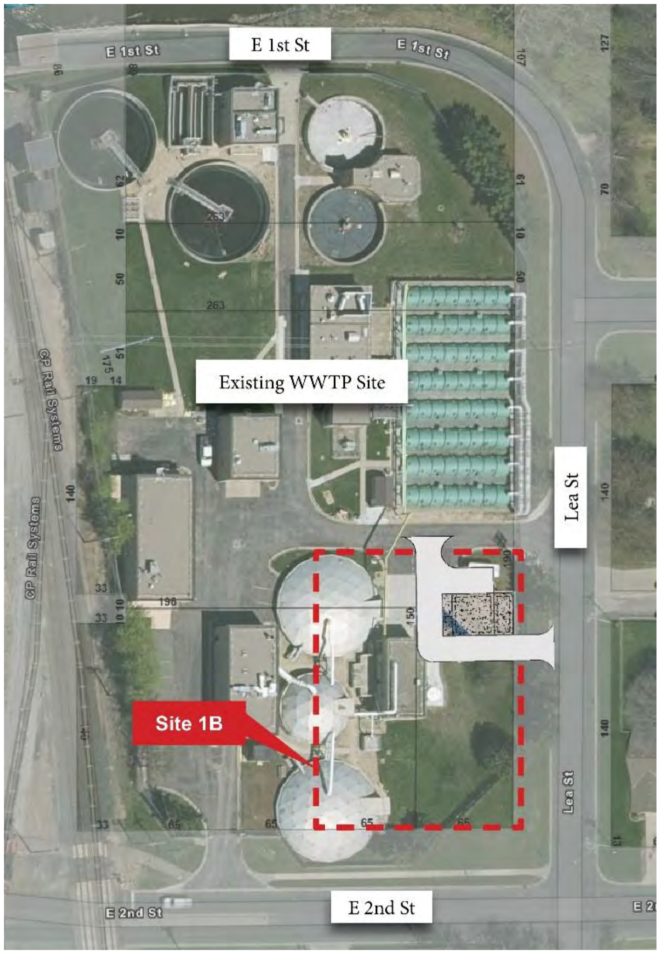
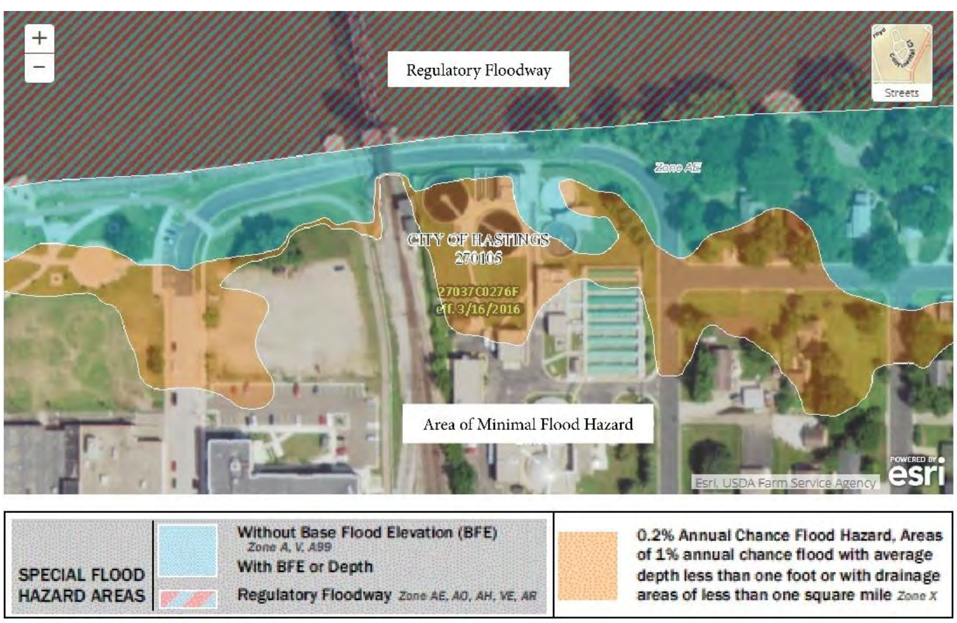


Figure 6 – WWTP site flood zones (based on FEMA flood data)



Site 2. Riverfront

Site Name	2 Riverfront
Ownership	Publicly Owned (HEDRA)
Acreage	1.49 Acres

Site Summary

The "Riverfront" site is situated just west of the WWTP site, between the rail line and Levee Park. The nearly 1.5 acre site fronts the Mississippi River, providing opportunities for unique riverfront views. The Mississippi River Regional Trail also cuts across the site, offering access to both the park, river, and larger trail network. A 2018 agreement between HEDRA and a developer for the site expired in 2020, and HEDRA retains full ownership of the land.A recent multi-family affordable housing project, Artspace, was completed on the southern portion of the block.

Figure 7 – Site 2 Location Map

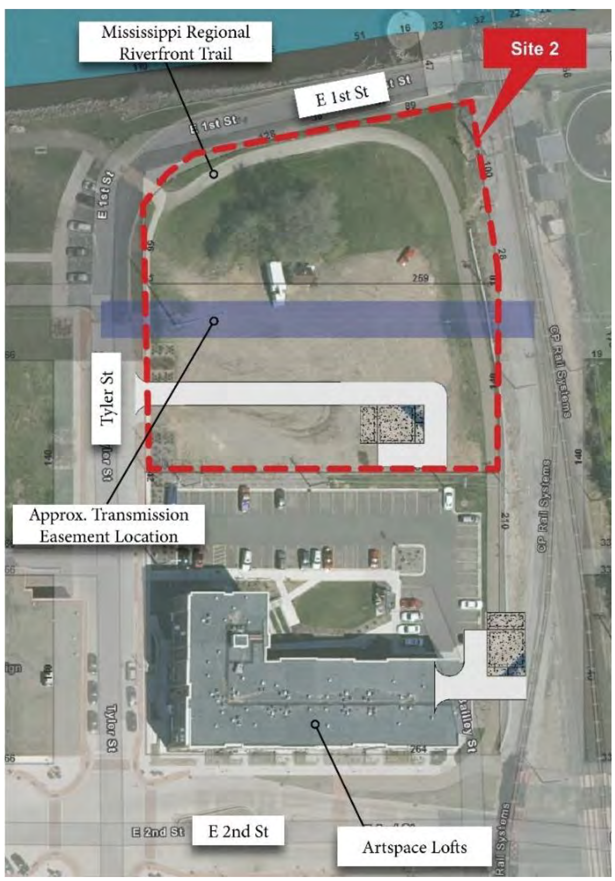
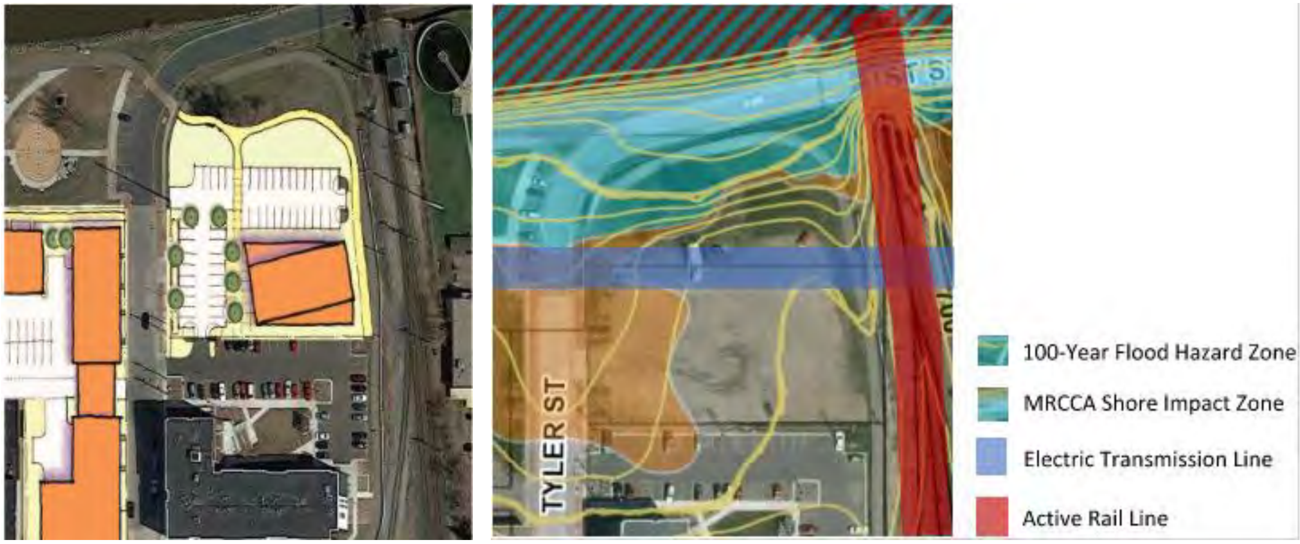


Figure 8 – Development Concept and Site Constraints (2021 Hastings Downtown Property Study)



Key Considerations

- Runs adjacent the Bailey St/Rail Utility Corridor.
- Uncertain requirements for running necessary infrastructure underneath the rail line from the WWTP site.
- Is located in a low-topography area, with favorable geotechnical conditions.
- Is guided for "stage 1" mixed use development in the Hastings 2040 Comp Plan.
- Falls within MRCCA *River Towns and Crossting District* (CA-RTC) which limits structures to 48', and bluff setbacks of 40'.
- The identified northern portion of the site falls within two flood zones.
- An electric transmission line easement bisects the center of the site, presenting a probable site constraint.
- Mississippi River Regional Trail *may* need to be rerouted to accommodate a lift station depending on final siting.

Site 3. Municipal Parking

Site Name	3 Municipal Parking
Ownership	Publicly Owned (HEDRA)
Acreage	.93 Acres

Site Summary

The "Municipal Parking" site consists almost entirely of municipally managed parking. While some development guidance has been offered in both the Hastings 2040 Comp Plan and 2021 Downtown Property Study, the site contains encumbrances due to a 2010 MetCouncil grant, funded through State bond funds. The grant supported construction of the parking lot in anticipation of the Red Rock transit corridor. As such, the site has a ground lease agreement between HEDRA and the Met Council, which prohibits the City from taking action that impacts the site's tax-exempt status. The Mississippi River Regional Trail bisects the center of the site, and Depot Park is located along its northern edge. The park is not impacted by the development encumbrance.

Figure 9 – Site 3 Location

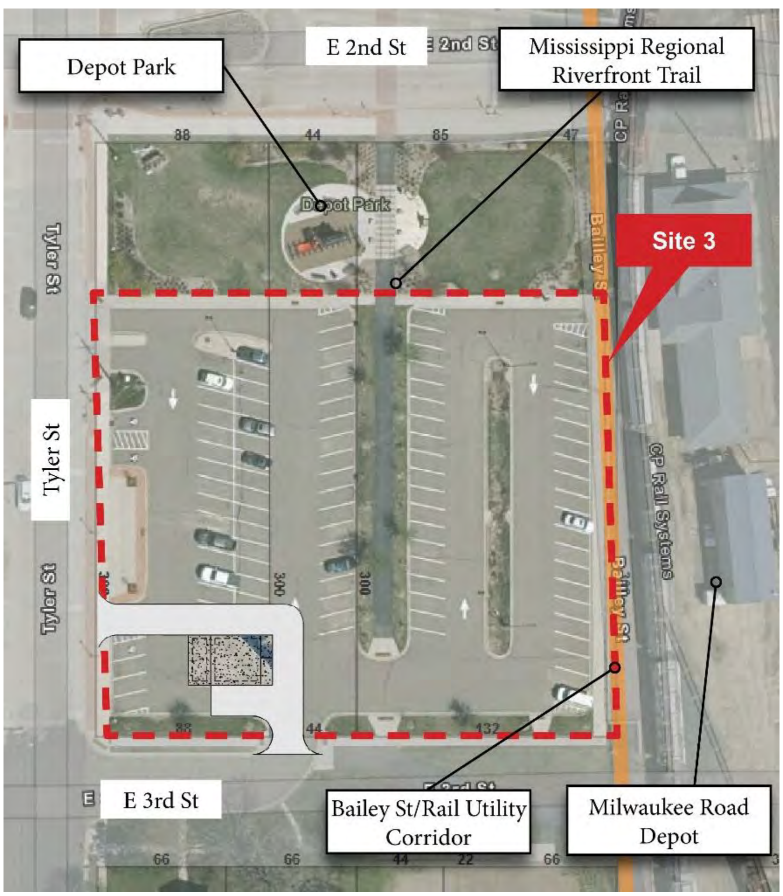
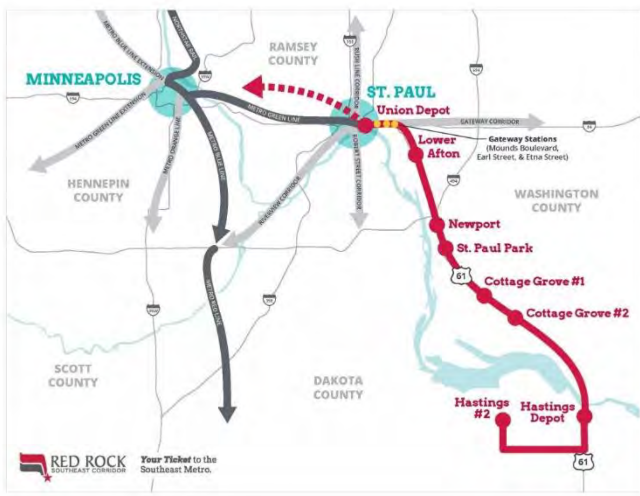


Figure 10 – Development Concept (2021 Hastings Downtown Property Study

Figure 11 – Red Rock Southeast Corridor Route Map



Key Considerations

- Runs adjacent the Bailey St/Rail Utility Corridor - minimal infrastructure needs.
- Presumed minimal requirements for running necessary infrastructure to the site.
- Is located in a low-topography area, with favorable geotechnical constraints.
- Is guided for "stage 1" mixed use in the Hastings 2040 Comp Plan.
- Was constructed to support the Red Rock Corridor Hastings Depot stop, the status of which is unknown at this time.
- Contains a development encumbrance dating back to a 2010 Met Council grant, which prohibits changes to the site's tax-except status.
- Lift Station site access could come from along 3rd St, minimizing impacts.
- Mississippi River Regional Trail may need to be rerouted to accommodate a lift station depending on final siting.

Site 4. UBC/City Storage

Site Name	4 UBC/City Storage
Ownership	Publicly Owned (HEDRA)
Acreage	.85 Acres

Site Summary

The "UBC/City Storage" site spans three parcels across .85 acres immediately south of the Municipal Parking site, and heart of downtown. In 2005 HEDRA acquired the former United Building Center property, and now uses it primarily for City storage. The 2003 Heart of Hastings and 2021 Downtown Property Study both suggest medium or low density housing on the site. The Mississippi River Regional Trail runs along the eastern edge of the site, as does an active rail line.

Figure 12 – Site 4 Location Map

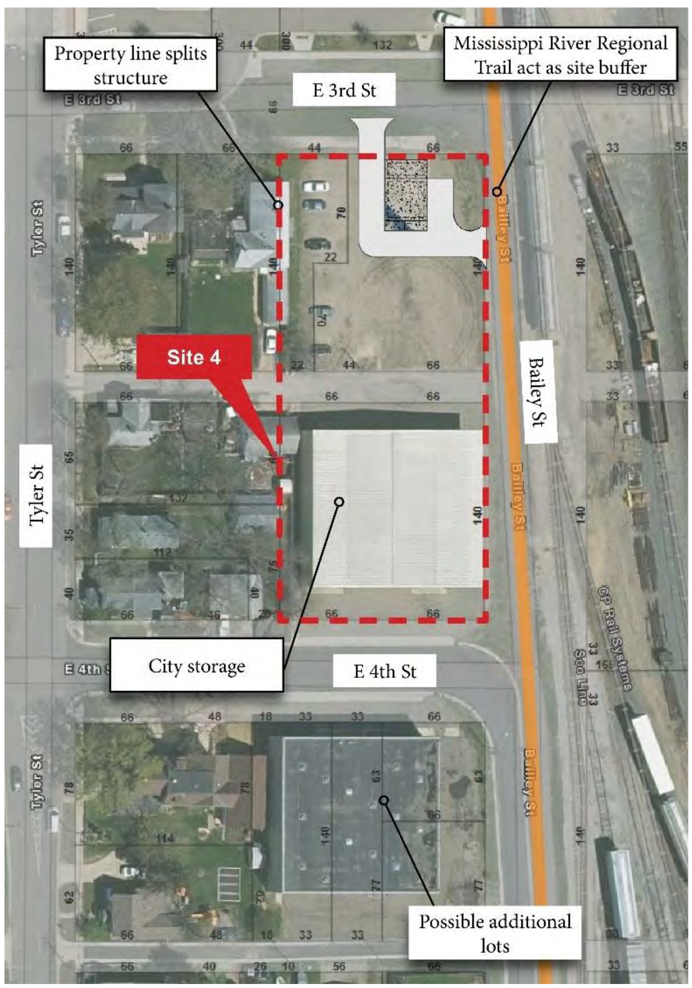


Figure 13 – Development Concept (2021 Hastings Downtown Property Study)

Key Considerations

- Runs adjacent the Bailey St/Rail Utility Corridor - minimal infrastructure needs.
- Is located in a relatively low-topography area, with fairly favorable geotechnical constraints.
- Is located adjacent a residential neighborhood, and may require mindful buffering, and other features.
- Presumed minimal requirements for running necessary infrastructure to the site.
- Is guided for medium density residential in the Hastings 2040 Comp Plan.
- Lift Station site access could come from along 4th St, minimizing area impacts.
- Would require an atypical station footprint from the 150' x 150' arrangement.

Site 5. Lea Street Lots

Site Name	5 Lea Street Lots
Ownership	Privately Owned (Multiple Owners)
Acreage	.5 Acres

Site Summary

The "Lea Street Lots" site is located on the eastern edge of Downtown Hastings, across the rail lines and on the northwest shore of Lake Isabel. The site consists of three lots, all of which are privately owned. The northern two lots are owned by the church across the street to the north, and are undeveloped. The southern lot is owned by a separate owner, and containes a single family home.

Figure 14 – Site 5 Location Map

Key Considerations

- Located near the Bailey St/Rail Utility Corridor.
- Is located in a relatively low-topography area, with fairly favorable geotechnical constraints.
- Is guided for low density residential in the Hastings 2040 Comp Plan.
- Is privately owned across two owners, and would require private purchase agreements for each property.
- Lift Station site access could come from Lea St., minimizing area impacts.
- Is located adjacent a residential neighborhood, and may require mindful buffering, and other features.

Site 6. Lake Isabel Park

Site Name	6 Lake Isabel Park
Ownership	Publicly Owned (City of Hastings)
Acreage	1.79 Acres

Site Summary

Lake Isabel Park is a neighborhood park located just east of downtown Hastings, and on Lake Isabel's northern shore. The park hosts a children's play area, basketball court, open green space, picnic tables, a public boat launch, and a fishing pier. Isabel Park should only be considered however if a future Influent Route Alternative along or near 2nd St is implemented.

Figure 15 – Site 6 Location Map

Figure 15 – Isabel Park Fishing Pier and Playground

Key Considerations

- Would only be considered if the Forcemain Route Alternative to the future WWTP site runs along or near E 2nd St.
- Uncertain requirements for running necessary infrastructure to the site.
- Is located in a relatively low-topography area, with only moderately favorable geotechnical constraints.
- Would result in reducing available public park space, and may require redesigning public amenities. City guidance calls for any reduction in park land to be balanced at the neighborhood level to ensure sufficient level of service for the neighborhood.
- Is located within a residential neighborhood, and would require mindful buffering, and other features.
- May require a new access off of Franklin St to minimize area impacts.

IX. LIFT STATION PRELIMINARY SITE LOCATIONS

Site 1A: WWTP NE

Site 1B: WWTP SE

Site 2: Riverfront

Site 3: Municipal Parking

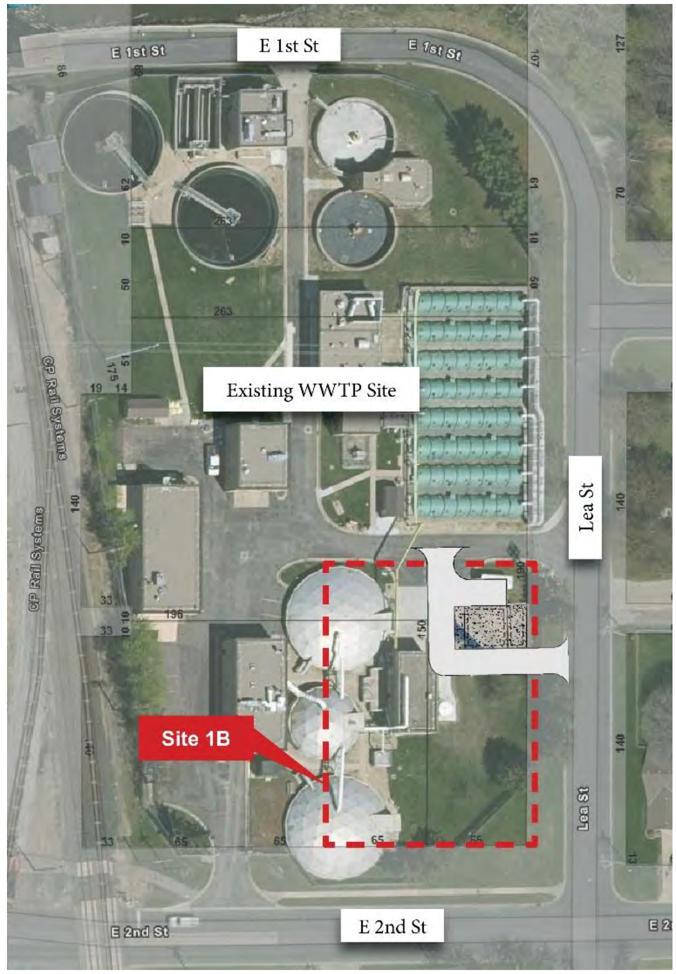
Site 4: UBC/City Storage

Site 5: Lea Street Lots

Site 6: Lake Isabel Park

Preferred Site

Site 1B is the recommended site for the new lift station. The existing odor control building south of the WWTP entrance off Lea Street is currently not in use and is not an essential operation for the treatment of wastewater. This building can be demolished allowing the use of the existing rock excavation in the area. This will minimize the new rock excavation for the lift station wet well. There is sufficient open space to the south for staging of construction work while the existing plant is treating wastewater.



Alternative 1 (*preferred*)

Pros:

- Reuse of existing WWTP building(s) could reduce costs, particularly with rock excavation.
- Preserves significant, high-profile locations for future uses.
- Reduces station visibility from Lea St and 2nd St.
- Maintains station access for city staff, and removes driveways along 2nd St.
- Would require minimal screening.

Cons:

- Some additional piping will be needed for utility connectivity.
- Places the station nearer, but still outside, flood zones.
- Staging considerations will be needed as WWTP decommission occurs.
- As shown, would require preservation of existing northern access road.

Alternative 2

Pros:

- Preserves some high-profile locations for future uses.
- Reduces station visibility from Lea St and 2nd St.
- Maintains site access for city staff, and removes driveways along 2nd St.
- May not require preservation of existing northern access road.

Cons:

- Some additional piping will be needed for utility connectivity,
- Does not reuse existing WWTP buildings and will require full rock excavation.

- Would require a medium amount of site screening

Alternative 3

Pros:

- Easy siting location from a geotechnical perspective
- Maintains easy station access for city staff

Cons:

- Some additional piping will be needed for connectivity
- Preserves little high-profile locations for future uses.
- Highly visible location from both Lea St and 2nd St.
- Introduces new driveways along both Lea St and 2nd St near the 2nd St/Lea St intersection.
- Would require a significant amount of site screening.
- Does not provide an active use at a key corner, guided to be a future gateway into Downtown Hastings.

Appendix 7-1 Detailed Opinions of Probable Cost

LOCATION/AREA	COST DETAIL	CONSTRUCTION COST
Lift Station Subtotal	**n/a**	**$943,000**
Conveyance – Gravity Sewer Subtotal	**n/a**	**$7,768,000**
Conveyance – Tyler Force Main Subtotal	**n/a**	**$5,666,000**
WWTP – Relocate BP Pipeline Subtotal	**n/a**	**$4,200,000**
WWTP - Preliminary Treatment	Sitework	$2,460,000
WWTP - Preliminary Treatment	Structural	$3,293,000
WWTP - Preliminary Treatment	Piping	$576,000
WWTP - Preliminary Treatment	HVAC/Fire Protection	$645,000
WWTP - Preliminary Treatment	Equipment	$4,005,000
WWTP - Preliminary Treatment	Electrical/I&C	$4,381,000
WWTP – Preliminary Treatment Subtotal	**n/a**	**$15,360,000**
WWTP – UV Disinfection	Yard Piping	$322,000
WWTP – UV Disinfection	Sitework	$65,000
WWTP – UV Disinfection	Structural	$169,000
WWTP – UV Disinfection	Piping	$109,000
WWTP – UV Disinfection	HVAC/Fire Protection	$13,000
WWTP – UV Disinfection	Equipment	$1,207,000
WWTP – UV Disinfection	Electrical/I&C	$662,000
WWTP – UV Disinfection Subtotal	**n/a**	**$2,547,000**
WWTP – Administration Building	Structural	$4,940,000
WWTP – Administration Building	Piping Systems	$270,000
WWTP – Administration Building	HVAC/Fire Protection	$514,000
WWTP – Administration Building	Electrical/I&C	$859,000
WWTP – Administration Building	Furnishings	$202,000
WWTP – Administration Building Subtotal	**n/a**	**$6,785,000**
WWTP – Piping & Generator	Yard Piping	$3,983,000
WWTP – Piping & Generator	Electrical/I&C	$2,020,000
WWTP – Piping & Generator Subtotal	**n/a**	**$6,003,000**
WWTP – Aeration Basins	Yard Piping	$415,000
WWTP – Aeration Basins	Sitework	$2,066,000
WWTP – Aeration Basins	Structural	$4,693,000

LOCATION/AREA	COST DETAIL	CONSTRUCTION COST
WWTP – Aeration Basins	Piping Systems	$270,000
WWTP – Aeration Basins	Equipment	$1,998,000
WWTP – Aeration Basins Subtotal	**n/a**	**$9,442,000**
WWTP – Secondary Clarifier	Yard Piping	$2,645,000
WWTP – Secondary Clarifier	Sitework	$1,029,000
WWTP – Secondary Clarifier	Structural	$3,410,000
WWTP – Secondary Clarifier	Piping Systems	$2,655,000
WWTP – Secondary Clarifier	HVAC/Fire Protection	$239,000
WWTP – Secondary Clarifier	Equipment	$2,799,000
WWTP – Secondary Clarifier Subtotal	**n/a**	**$12,777,000**
WWTP – Site Work	Sitework	$1,653,000
WWTP – Site Work	Electrical/I&C	$5,313,000
WWTP – Site Work Subtotal	**n/a**	**$6,966,000**
WWTP – Solids Processing	Sitework	$14,000
WWTP – Solids Processing	Structural	$5,260,000
WWTP – Solids Processing	Piping Systems	$190,000
WWTP – Solids Processing	HVAC/Fire Protection	$92,000
WWTP – Solids Processing	Equipment	$1,292,000
WWTP – Solids Processing	Electrical/I&C	$2,652,000
WWTP – Solids Processing Subtotal	**n/a**	**$9,500,000**
Outfall to Mississippi River Subtotal	**n/a**	**$12,421,000**
Decommission Existing Facilities Subtotal	**n/a**	**$2,000,000**
Subtotal		$102,378,000
30% Contingency		$30,713,400
Escalated Construction Cost (3% per year)		$11,978,226
Total Construction Cost		**$145,069,626**
Engineering and Admin (20%)		$20,475,600
Total Capital Cost		**$165,545,226**

Appendix 8-1 Summary of Public Hearing Noticing, Presentation, Public Comments Received, and Actions

Appendix 8-1 Summary of Public Hearing Noticing, Presentation, Public Comments Received, and Actions

Contents:

- 8.1 Public Hearing Notice
  - 8.1.1 Version of notice for MCES project webpage posting and for newspaper publication.
  - 8.1.2 Version of notice for mailing to property owners near project route.

- 8.2 Publication of Public Hearing Notice
  - 8.2.1 Pioneer Press, December 5, 2021
  - 8.2.2 Metropolitan Council Environmental Services project webpage [Metropolitan Council Environmental Services Public Hearing (metrocouncil.org)]

- 8.3 Public Hearing, January 5, 2022
  - 8.3.1 Public hearing purpose
  - 8.3.2 Sign-in sheet
  - 8.3.3 Presentation
    - Location of project site, pp. 10, 16-18, 26, 27, 29, 30, 33-35
    - Alternatives evaluation, pp. 19-25, 28, 30-33
    - Estimated sewer service charges, p. 40
  - 8.3.4 Printed transcript

- 8.4 Documentation of Comments from Public and Other Agencies:
  - Public comments, questions, and responses
  - Discussions with public hearing attendees focused on decommissioning of the existing wastewater treatment plant, noise and odor management, outfall route to the Mississippi River, and the 106 review process (see attached public hearing transcript).
  - We heard no major opposition to the project.

- 8.5 Mailing Lists
  - 8.5.1 SERP Form
  - 8.5.2 Government/Community Stakeholder List
  - 8.5.3 Citizens/Property Owners List
  - The mailing lists are also available as Excel spreadsheets by contacting Tim O'Donnell, Metropolitan Council Environmental Services, at tim.odonnell@metc.state.mn.us

Metropolitan Council Environmental Services Public Hearing:

Hastings Wastewater Treatment Plant Relocation Draft Facility Plan

Wednesday, January 5, 2022
Time: 6:00 p.m.
Location: Online

Metropolitan Council Environmental Services (MCES), operator of the metro-area wastewater collection and treatment system, will hold an **online public hearing** at 6:00 p.m. January 5, 2022, to inform the public about and accept comments on the Draft Facility Plan for proposed relocation of its Hastings Wastewater Treatment Plant. MCES proposes moving the plant from its existing site in downtown Hastings to a site about two miles to the southeast on the border of Hastings and Ravenna Township. MCES also proposes constructing a new wastewater pumping station at the existing plant site and a sanitary sewer between the two sites.

Three weeks before the public hearing, MCES will hold an **online public open house** at 6:00 p.m. December 15, 2021, to introduce the project to the public and to property owners near the proposed project sites.

For detailed information about the proposed project and project area maps, along with instructions to register for and log into the online public open house and the online public hearing, go to *www.HastingsWWTP.com*.

Project overview:
The current wastewater treatment plant site poses challenges for MCES to respond to growth or changes in regulatory requirements that would require expansion of the facility. Relocating the plant will allow MCES to continue meeting the long-term wastewater service needs of the city of Hastings and land areas of the surrounding townships of Marshan, Nininger, and Vermillion. The new plant would be located northeast of the intersection of Ravenna Trail and Glendale Road.

Before closing the existing Hastings Plant and removing the wastewater treatment structures, MCES would construct a wastewater pumping station on the southeast corner of the existing site and install a new sanitary sewer between the old and new plant sites. The route of the new underground sewer would follow portions of Lea, Third, Tyler and 10th Streets and Ravenna Trail. The tentative project schedule calls for facility design in 2022-2023, construction in 2024-2026, and starting up the new facilities in 2027.

Draft Facility Plan process:
MCES's Draft Facility Plan for this project outlines the issues at the existing wastewater treatment plant site; why a new plant in a new location is needed; various alternatives studied for the new plant, pumping station, and sanitary sewer route; and the reasons that support MCES's resulting recommendations.

Copies of the Draft Facility Plan, a plan summary, and project-area maps will be available for the public to review after December 22, 2021, at the project webpage: *www.HastingsWWTP.com*. The Draft Facility Plan also will be available for the public to review during regular business hours at:

- Hastings City Hall, 101 Fourth St. E., Hastings
- Pleasant Hill Library, 1490 S. Frontage Rd., Hastings

All interested people are encouraged to attend the online public open house on December 15 and attend the online public hearing on January 5 to offer comments for the public record. The public hearing will be streamed live and recorded. In addition to providing comments during the online public hearing, you also may provide comments in the following ways by 5:00 p.m. January 18, 2022:

- Mail written comments to: Heidi Hutter at Metropolitan Council Environmental Services, 390 Robert St. N., Saint Paul, MN 55101-1805
- Email comments to: *comment@hastingswwtp.com*
- Record comments on: project comment line at 651-302-2908
- Send TTY comments to 651-291-0904

Comments submitted prior to the public hearing will be read into the public record during the online public hearing.

Upon request, MCES will provide reasonable accommodations to persons with disabilities at the public open house and public hearing. Please submit such requests to Tim O'Donnell before December 10, 2021, by email at *tim.odonnell@metc.state.mn.us* or by phone at 651-602-1269.

Next steps: MCES staff will review public comments and evaluate changes to the Draft Facility Plan to address the comments. A recommendation for adoption of the final Facility Plan will be considered by the Metropolitan Council in February 2022.

8.1.2 Version of notice for mailing to property owners near project route.

Hastings Wastewater Treatment Plant (WWTP) Facility Plan Public Outreach

Plans for relocating the Hastings Plant will be finalized in the coming months. To learn about the plan and provide your feedback, please consider registering for the upcoming public outreach opportunities.

Virtual Open House

Wednesday, Dec. 15, 6:00 p.m.

Zoom Link: tinyurl.com/WWTPopenhouse

Learn about the project and speak directly with project staff.

Virtual Public Hearing

Wednesday, Jan. 5, 6:00 p.m.

Zoom Link: tinyurl.com/WWTPpublichearing

Give your comments about the plan at the MCES public hearing.

METROPOLITAN COUNCIL

Metropolitan Council Environmental Services (MCES) operates the metro-area wastewater collection and treatment system. Our goal is to ensure reliable sanitary sewer service with the lowest impact possible to residents and businesses.

METROPOLITAN COUNCIL

390 Robert Street North
Saint Paul, MN 55101-1805

WHAT: MCES plans to relocate the current Hastings Plant from Downtown to a site on the border of Hastings and Ravenna Township. In addition, a wastewater pumping station will be built on the southeast corner of the existing plant site and new sanitary sewers will be installed to the new plant site.

WHY: The current site is challenged to respond to growth or changes in regulatory requirements that would require expansion of the facility. Relocating the plant will allow MCES to continue meeting the needs of the long-term service area.

HastingsWWTP.com
Comment@HastingsWWTP.com
651-302-2908

AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA

COUNTY OF RAMSEY

Emily Kunz, being duly sworn on oath, says: that she is, and during all times herein state has been, Sales Assistant of Northwest Publication, LLC., Publisher of the newspaper known as the Saint Paul Pioneer Press, a newspaper of General circulation within the City of St Paul and the surrounding Counties of Minnesota and Wisconsin including Ramsey and Kanabec.

That the notice hereto attached was cut from the columns of said newspaper and was printed and published therein on the following date(s): Sunday, December 5, 2021

Newspaper Ref./Ad Number#: 71480694

Client/Advertiser: Metropolitan Council

Emily Kunz (Dec 8, 2021 12:46 CST)

AFFIANT SIGNATURE

Subscribed and sworn to before me this 8th day of December 2021

True Lee

True Lee (Dec 8, 2021 12:46 CST)

NOTARY PUBLIC

Ramsey County, MN
My commission expires January 31, 2025

TRUE LEE
NOTARY PUBLIC
STATE OF MINNESOTA
MY COMMISSION EXPIRES
JANUARY 31, 2025

Metropolitan Council Environmental Services Public Hearing:

Hastings Wastewater Treatment Plant Relocation Draft Facility Plan

Wednesday, January 5, 2022
Time: 6:00 p.m.
Location: Online

Metropolitan Council Environmental Services (MCES), operator of the metro-area wastewater collection and treatment system, will hold an **online public hearing** at 6:00 p.m. January 5, 2022, to inform the public about and accept comments on the Draft Facility Plan for proposed relocation of its Hastings Wastewater Treatment Plant. MCES proposes moving the plant from its existing site in downtown Hastings to a site about two miles to the southeast on the border of Hastings and Ravenna Township. MCES also proposes constructing a new wastewater pumping station at the existing plant site and a sanitary sewer between the two sites.

Three weeks before the public hearing, MCES will hold an **online public open house** at 6:00 p.m. December 15, 2021, to introduce the project to the public and to property owners near the proposed project sites.

For detailed information about the proposed project and project area maps, along with instructions to register for and log into the online public open house and the online public hearing, go to www.HastingsWWTP.com.

Project overview:
The current wastewater treatment plant site poses challenges for MCES to respond to growth or changes in regulatory requirements that would require expansion of the facility. Relocating the plant will allow MCES to continue meeting the long-term wastewater service needs of the city of Hastings and land areas of the surrounding townships of Marshan, Nininger, and Vermillion. The new plant would be located northeast of the intersection of Ravenna Trail and Glendale Road.

Before closing the existing Hastings Plant and removing the wastewater treatment structures, MCES would construct a wastewater pumping station on the southeast corner of the existing site and install a new sanitary sewer between the old and new plant sites. The route of the new underground sewer would follow portions of Lea, Third, Tyler and 10th Streets and Ravenna Trail. The tentative project schedule calls for facility design in 2022-2023, construction in 2024-2026, and starting up the new facilities in 2027.

Draft Facility Plan process:
MCES's Draft Facility Plan for this project outlines the issues at the existing wastewater treatment plant site; why a new plant in a new location is needed; various alternatives studied for the new plant, pumping station, and sanitary sewer route; and the reasons that support MCES's resulting recommendations.

Copies of the Draft Facility Plan, a plan summary, and project-area maps will be available for the public to review after December 22, 2021, at the project webpage: www.HastingsWWTP.com. The Draft Facility Plan also will be available for the public to review during regular business hours at:

- Hastings City Hall, 101 Fourth St. E., Hastings
- Pleasant Hill Library, 1490 S. Frontage Rd., Hastings

All interested people are encouraged to attend the online public open house on December 15 and attend the online public hearing on January 5 to offer comments for the public record. The public hearing will be streamed live and recorded. In addition to providing comments during the online public hearing, you also may provide comments in the following ways by 5:00 p.m. January 18, 2022:

- Mail written comments to: Heidi Hutter at Metropolitan Council Environmental Services, 390 Robert St. N., Saint Paul, MN 55101-1805
- Email comments to: comment@hastingswwtp.com
- Record comments on: project comment line at 651-302-2908
- Send TTY comments to 651-291-0904

Comments submitted prior to the public hearing will be read into the public record during the online public hearing.

Upon request, MCES will provide reasonable accommodations to persons with disabilities at the public open house and public hearing. Please submit such requests to Tim O'Donnell before December 10, 2021, by email at tim.odonnell@metc.state.mn.us or by phone at 651-602-1269.

Next steps: MCES staff will review public comments and evaluate changes to the Draft Facility Plan to address the comments. A recommendation for adoption of the final Facility Plan will be considered by the Metropolitan Council in February 2022.

8.3.1 Public Hearing Purpose

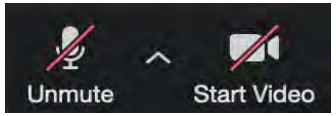
- Summarize the proposed wastewater treatment plant improvements project and explain alternative approaches that we evaluated
- Answer your questions
- Receive your comments for the public record

8.3.2 – Sign-In Sheet

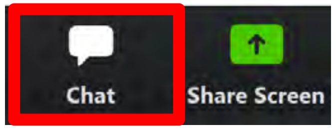
- Christopher Remus Christopher.Remus@metc.state.mn.us
- Daniel White daniel.white@metc.state.mn.us
- Sue Yaeger Stischler04@yahoo.com
- Mike Childs michael.childsjr@piic.org
- Colton Janes colton.janes@metc.state.mn.us
- Heidi Hutter Heidi.Hutter@metc.state.mn.us
- Margaret Bohn pegbohn@yahoo.com
- Adam Gordon Adam.Gordon@metc.state.mn.us
- Christine Simons cmunson84@hotmail.com
- Chad Davison Chad.Davison@metc.state.mn.us
- Mike Ruud News@KDWA.com
- Connie Beissel cbeissel@midco.net
- Mary Fasbender Mayormary@hastingsmn.gov
- Tom Klug Thomaswk1980@yahoo.com
- Uma Vempati umasankarvempati2000@yahoo.com
- John Powell John.Powell@Foth.com
- Mark Vaughan mvaughan@hastingsmn.gov
- Ryan Stempski rstempski@hastingsmn.gov
- Dan Wietecha dwietecha@hastingsmn.gov
- Tim O'Donnell tim.odonnell@metc.state.mn.us
- Tina Folch tinafolch@comcast.net
- Seth Chmelik Seth.Chmelik@metc.state.mn.us
- Christine Simons Christine.simons.transcripts@gmail.com
- Sophia Voight svoight@ororkemediagroup.com
- Craig Edlund craig.edlund@metc.state.mn.us
- Rene Heflin rene.heflin@metc.state.mn.us
- Wendy Wulff wendy.wulff@metc.state.mn.us
- John Hinzman jhinzman@hastingsmn.gov
- Haila Maze haila.maze@bolton-menk.com
- John Lee jlee@cemstone.com
- Pete Likes Likesp@yahoo.com
- Jake Majeski majeskijake@yahoo.com
- Noah Johnson njohnson@carollo.com
- Leslee Storlie leslee.storlie@metc.state.mn.us
- Justin Conner justin.conner@kimley-horn.com
- Paul Kurywchak paul.kurywchak@metc.state.mn.us

Welcome to the

Hastings Wastewater Treatment Plant Facility Plan Public Hearing



You are muted and your video is disabled upon entry.



Please use the chat (between the 'participants' and 'share screen' buttons) to send in comments and questions throughout the public hearing. Comments and questions will be addressed after the presentation during the public comment session.

If you experience any technical difficulties, please call or text 651.302.2908 or email comment@hastingswwtp.com

METROPOLITAN COUNCIL

MCES Hastings Wastewater Treatment Plant Facility Plan Public Hearing

Wendy Wulff, Metropolitan Council Member, Vice Chair of the Environment Committee
Tim O'Donnell, Project Citizen Liaison, Facilitator
Rene Heflin, Manager, Wastewater Plant Engineering
Heidi Hutter, Principal Engineer, Project Manager, Wastewater Treatment Plant
Chad Davison, Principal Engineer, Project Manager, Collection System and Roadway Improvements

Public Hearing
January 5, 2022

METROPOLITAN COUNCIL

Meet the presenters of the

Hastings Wastewater Treatment Plant Public Hearing

Tim O'Donnell

Wendy Wulff

Rene Heflin

Heidi Hutter

Chad Davison

Public Hearing Purpose

- Summarize the proposed project and explain alternative approaches that we evaluated
- Answer your questions
- Receive your comments for the public record

Comment Period

The comment period is open through January 18 at 5 p.m.
In addition to offering comments at the public information meeting and public hearing, you can submit comments in the following ways:

- Mail written comments to Heidi Hutter at Metropolitan Council Environmental Services, 390 Robert St. N., Saint Paul, MN 55101-1805
- Email comments to: comment@hastingswwtp.com
- Record comments: 651.302.2908 (Project Comment Line)
- Send Teletype (TTY) comments to 651.291.0904

Public Notices & Schedule

Postcard Notice mailed
12/3/2021

12/5/2021
Pioneer Press Notice

Open House
12/15/2021

We are Here

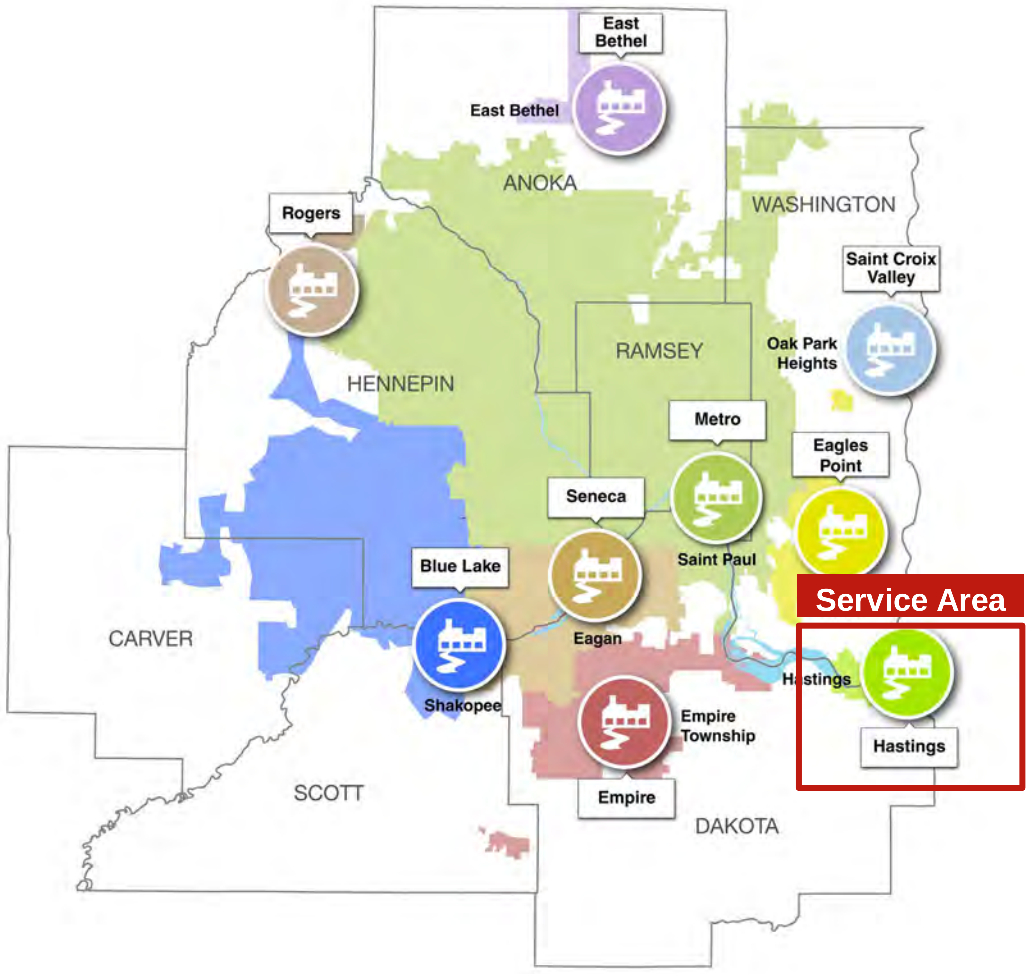
1/5/2022
Public Hearing

Metropolitan Council adoption of Facility Plan
2/23/2022

3/4/2022
Submit Plan to Minnesota Pollution Control Agency (MPCA) with application for Clean Water Revolving Fund Project Priority List

Service Area and Facilities

Wastewater Treatment Plant Locations



WHO WE SERVE

7-county Twin Cities Metro Area

111 communities

3,000 square miles

2,700,000+ people

OUR FACILITIES

9 wastewater treatment plants

640 miles of interceptors

61 lift stations (pumping stations)

250 million gallons per day (average)

- 1952 Constructed
- 1970 MCES Acquired
- 1985 Last Expansion
- 2020 Condition Assessment

30 Consecutive Years of Perfect Permit Compliance

Hastings WWTP Service Area

Long Term Service Area

10M gallons/day long-term planned capacity*

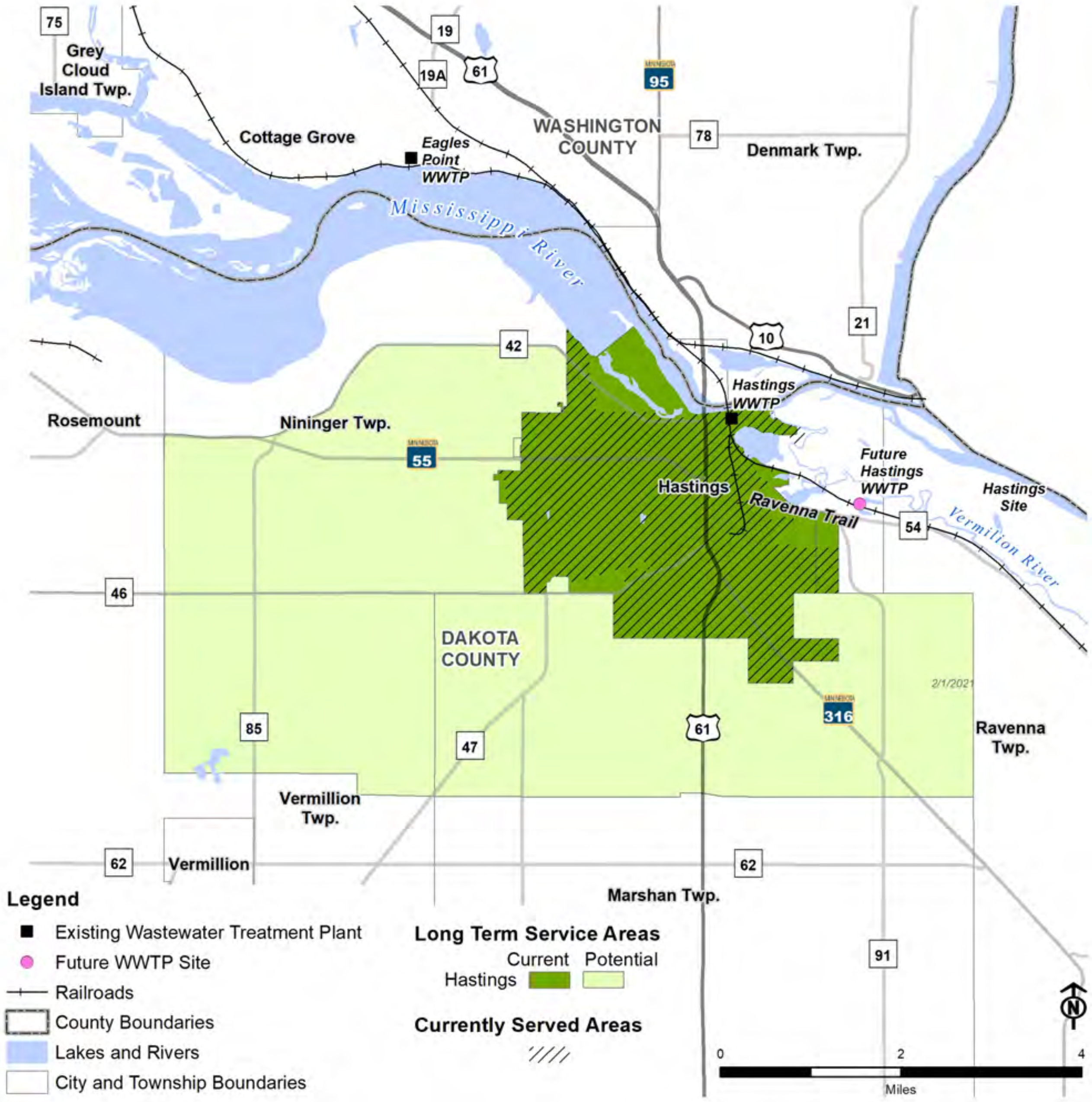
29,000 residents served (in 2040)

*MCES 2040 Water Resources Policy Plan – Post 2040

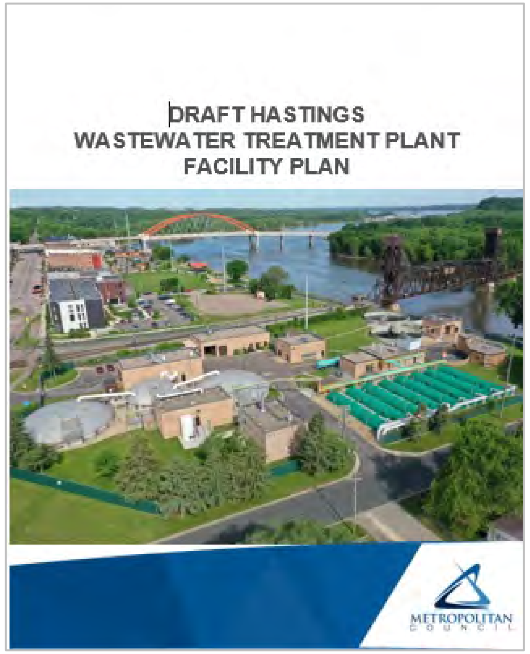
Existing Service Area

2.3M gallons/day plant capacity

23,000 residents served



What is a Facility Plan?



MCES Facility Plan

This document is a prerequisite for a portion of the financing on MCES projects. The MCES Facility Plan:

- Summarizes the current state of the existing MCES wastewater treatment plant
- Identifies the need for rehabilitating existing facilities or constructing new facilities
- Determines the potential environmental impacts of new facilities
- Recommends a course of action

Facility Plan Schedule

- Nov. 2020 – Facility Plan Development
- Dec. 15, 2021 – Open House
- Jan. 5, 2022 – Public Hearing
- Mar. 2022 – Final Facility Plan

Facility Planning

Hastings Wastewater Treatment Plant Facility Plan

Project Need

Existing facilities that are near end of service life need to be renewed.

The plant needs to expand to serve population growth in the service area.

Additional wastewater treatment is needed to meet future environmental regulations.

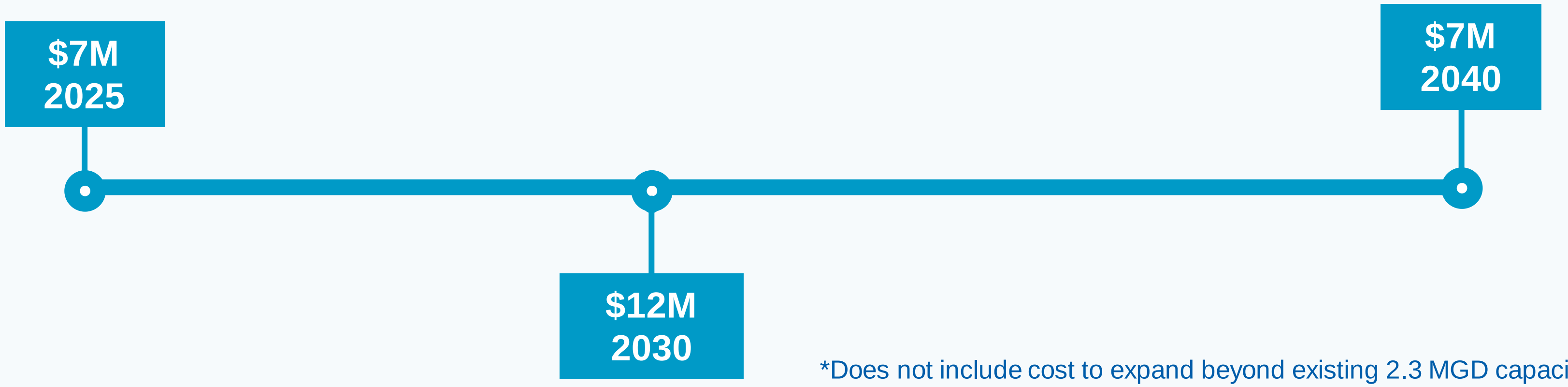
Implementation Schedule

2020 — Planning — 2022 — Design — 2024 — Design/Construction/ Commission — 2028 — Decommissioning — 2029

$165 Million

Hastings WWTP
Condition Assessment & Renewal Project

Condition Assessment - $26M to Renew through 2040*

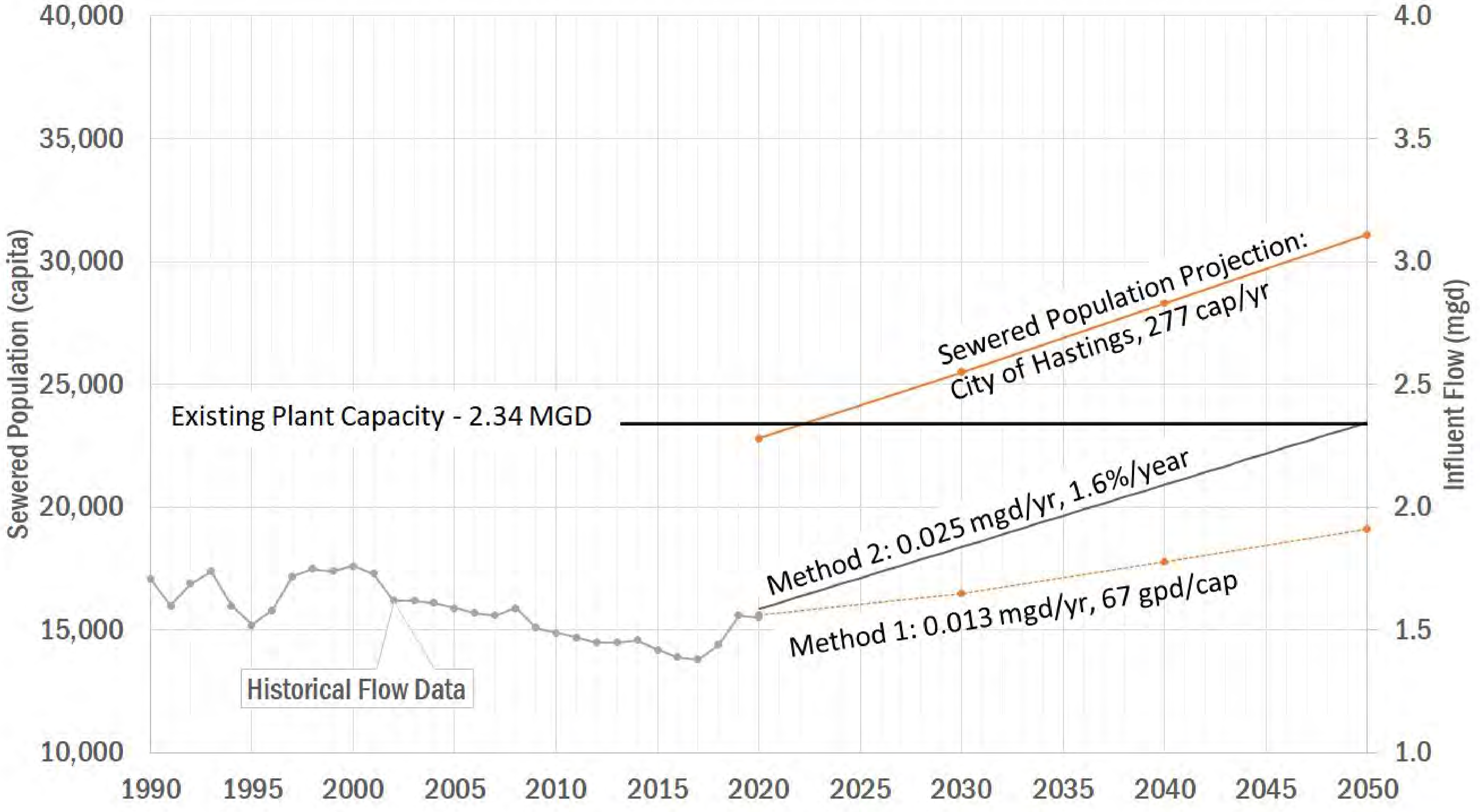


*Does not include cost to expand beyond existing 2.3 MGD capacity.
*Does not include administration, engineering, contingency, or inflation.
*Status quo renewal.

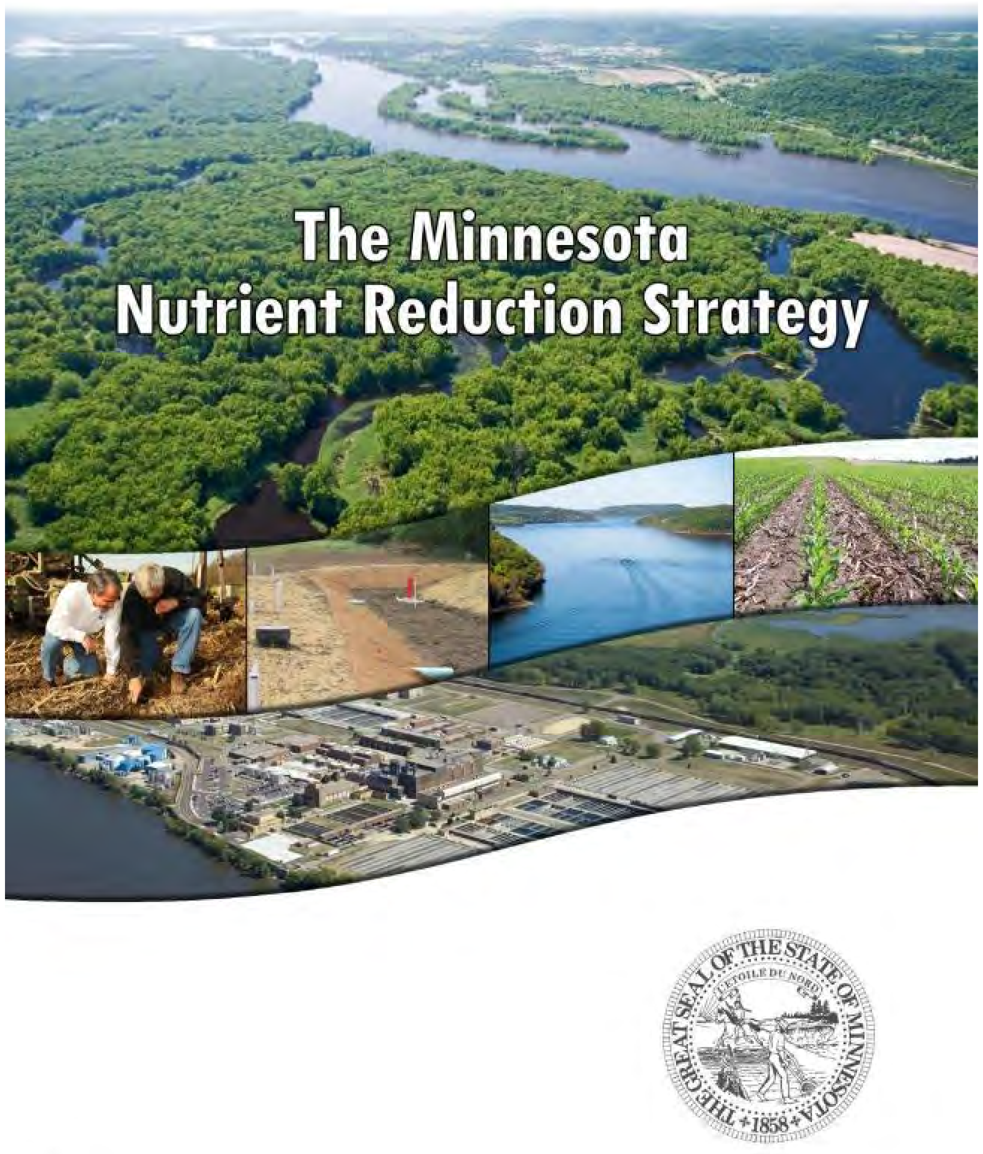
Renewal Project Scope

- Plant Outfall
- Aeration Tanks
- Mechanical HVAC
- Security for new plant site

Projected Growth in the Service Area



Minnesota Nutrient Reduction Strategy



- 45% Reduction in Nitrogen Loads to the Mississippi by 2040
- Load Reductions at Wastewater Treatment Plants will be necessary
- Hastings area is prioritized by the MPCA for future nutrient reduction
- Plant expansion at the current Hastings WWTP would be required
  - Expansion is challenging and limited.
  - Derating capacity is not an option for MCES.

METROPOLITAN COUNCIL

Key Scope & Implementation Plan
$165M Program

Lift Station and Conveyance Systems ($23M)*
Construction 2024 to 2026

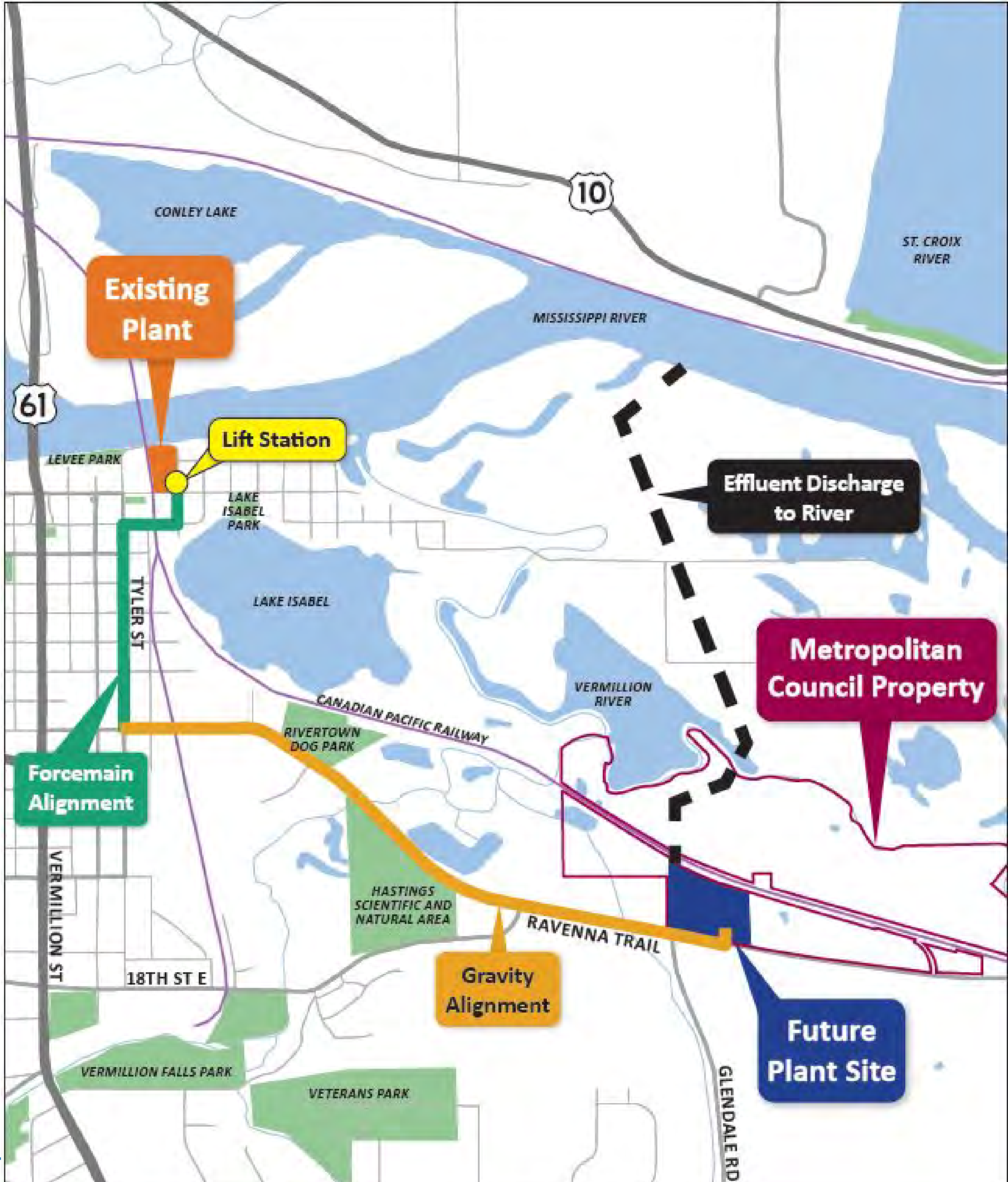
- Lift Station on Existing Site ($1M)
- Conveyance System to New Site ($22M)

Wastewater Treatment Plant and Outfall ($139M)*
Design/Build 2024 to 2027

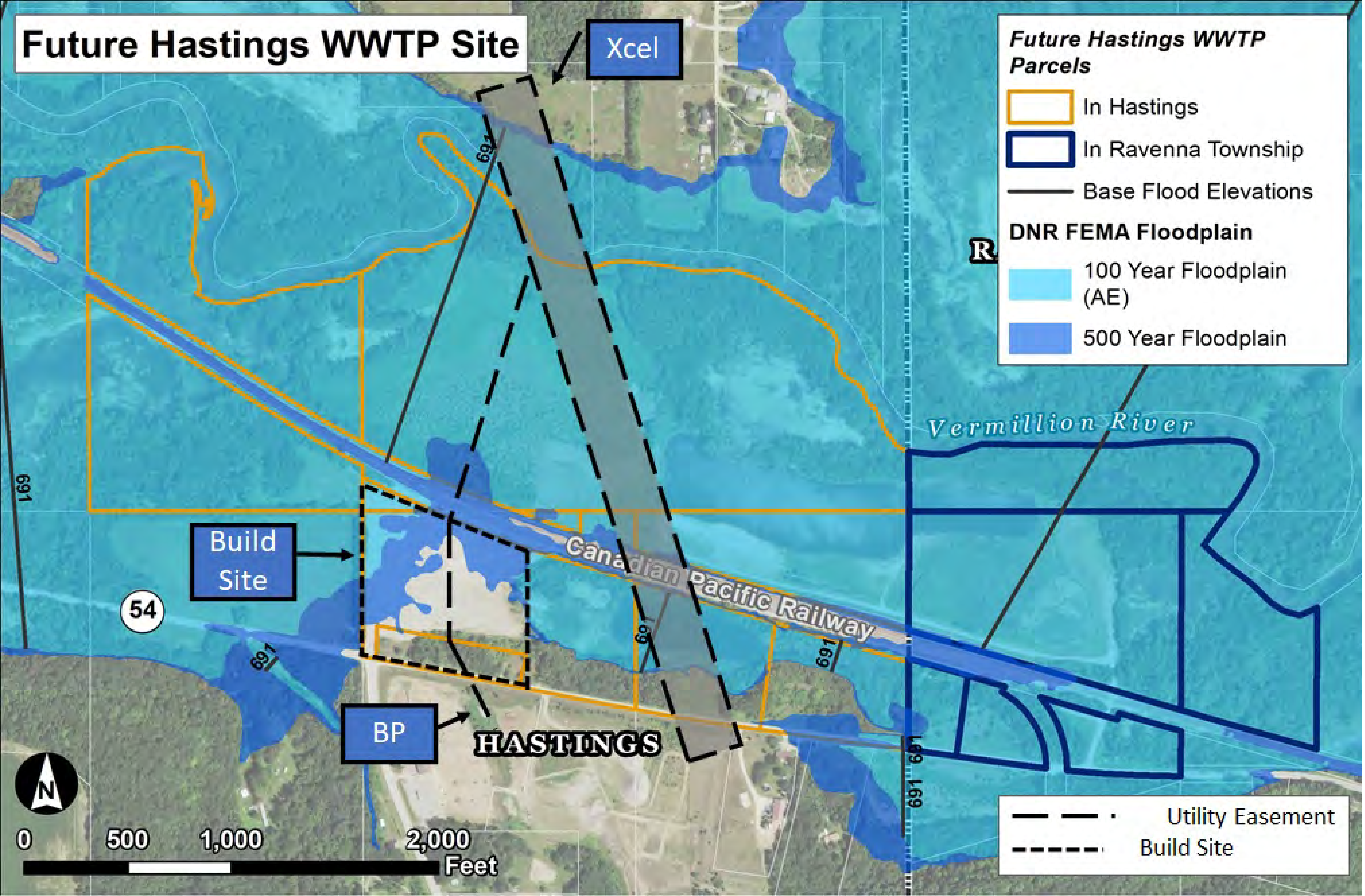
- Wastewater Treatment Plant ($119M)
- Outfall to the Mississippi River ($20M)

Decommission Existing Facilities ($3M)*
2028 to 2029

- Decommission Existing Facility



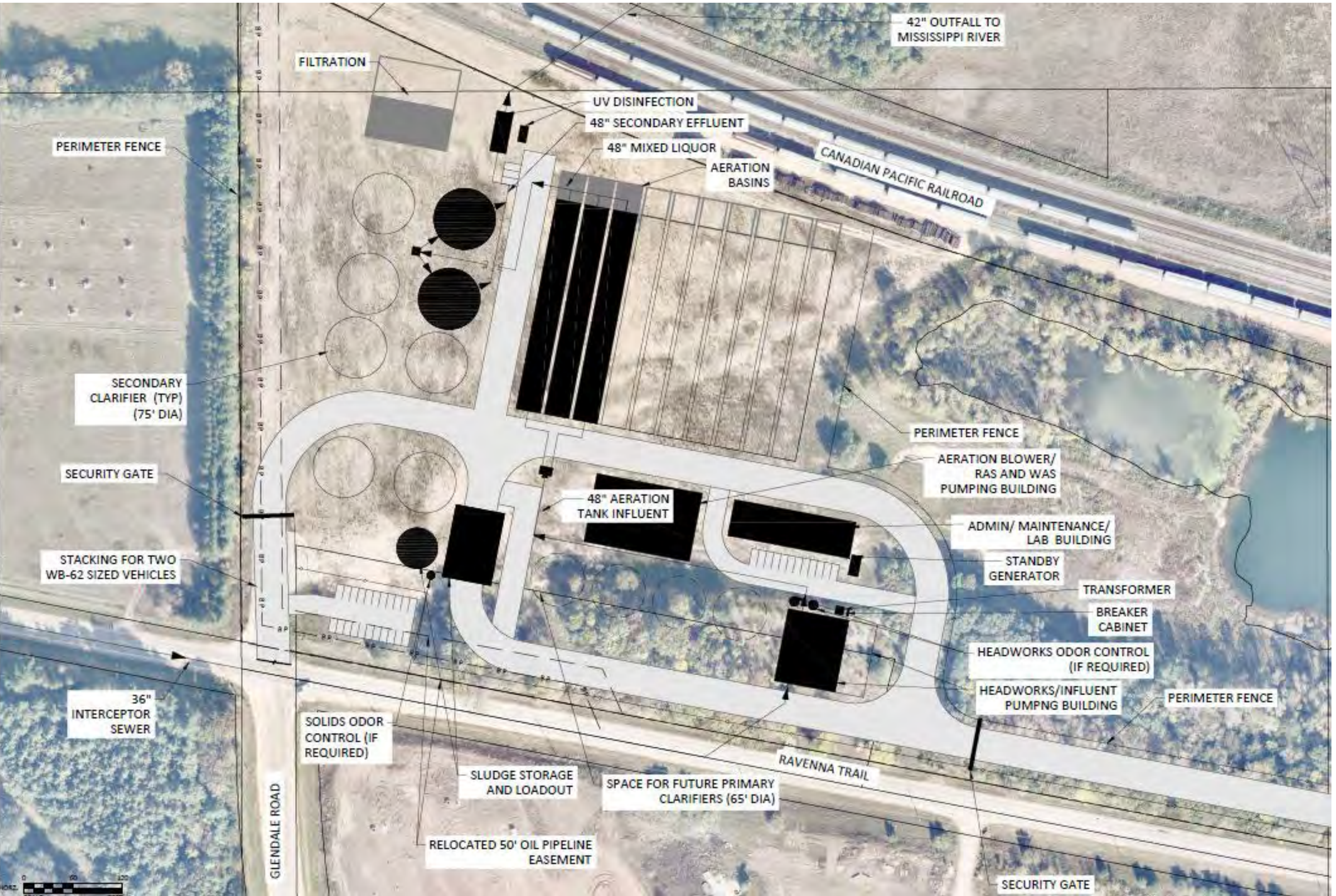
*Rounded costs. See Facility Plan for further detail.
Planning level costs include 30% contingency, 3% annual escalation cost, 20% Engineering and Administration.



Future Hastings WWTP Site
Xcel
Future Hastings WWTP Parcels
In Hastings
In Ravenna Township
Base Flood Elevations
DNR FEMA Floodplain
100 Year Floodplain (AE)
500 Year Floodplain
Vermillion River
Canadian Pacific Railway
Build Site
54
BP
HASTINGS
691
0
500
1,000
2,000
Feet
N
Utility Easement
Build Site

Wastewater Treatment Plant and Outfall ($139M)

2022	2024	2027	2028
Preliminary Design & Bid/Award	Design/Build	Commissioning	



- Relocate Oil Line
- Preliminary Treatment
  - Influent Pumping
  - Screening
  - Grit Removal and Processing
- Primary/Secondary Treatment
  - Primary Clarifiers (future)
  - Biological Phosphorus Removal
- UV Disinfection
- Gravity Outfall to the Mississippi River
- Solids Thickening, Storage, and Loadout
- Odor Management Systems
- Facility Support Systems
- Site Access and Security

Effluent Discharge - Alternatives

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	SALVAGE VALUE ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Outfall to Mississippi River **(Recommended)**	$5,910,000	$6,025,000	$(2,308,000)	$9,927,000
Alternative 2 – Outfall to Vermillion River	$9,932,000	$8,903,000	$(2,223,000)	$16,611,000
Alternative 3 – Rapid Infiltration Basin	$14,645,000	$28,937,000	$(4,159,000)	$39,424,000
Alternative 4 – Deep Injection wells	$31,475,000	$23,496,000	$(7,384,000)	$47,588,000

Alternative 1 is recommended

- Lowest Net Present Value
- Large Assimilative Capacity
- Supports Expanded Flows
- Included in MCES Mississippi Basin Total Phosphorus Permit

METROPOLITAN COUNCIL

Preliminary Treatment: Influent Pumping Alternatives

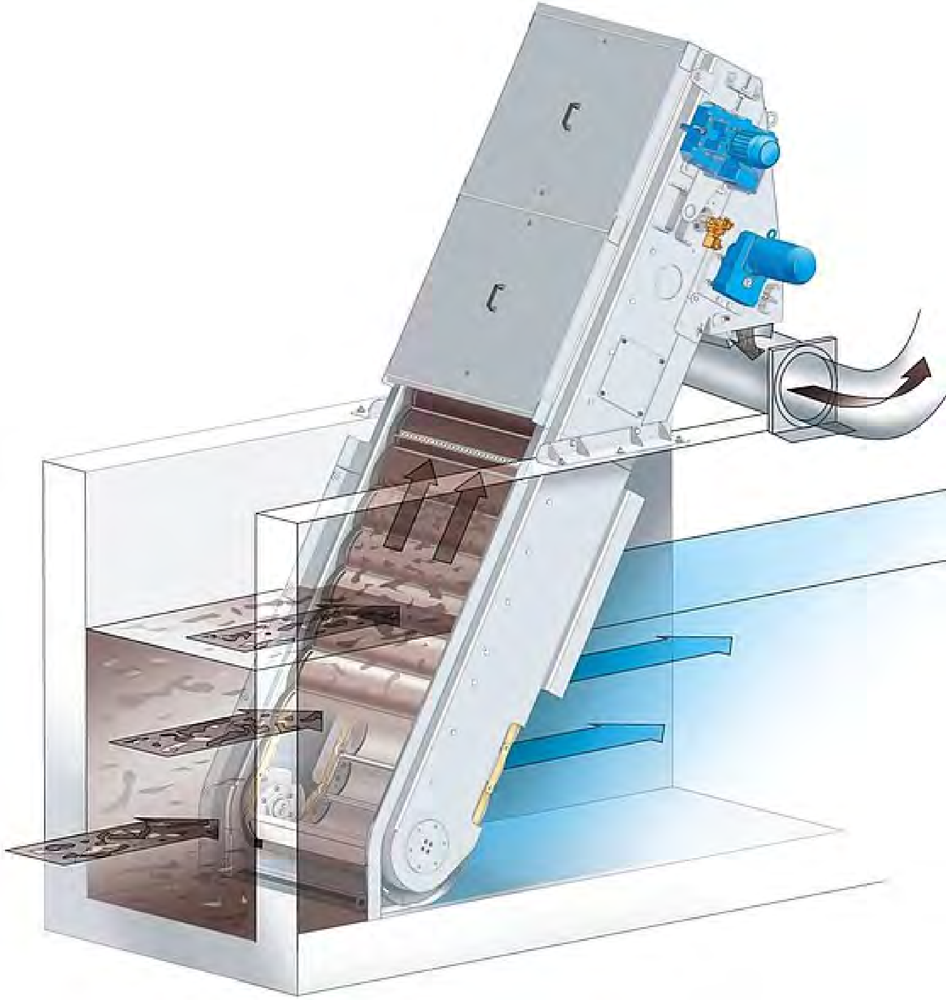
INFLUENT PUMPING ALTERNATIVES	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Wetwell with Submersible Pumps	15,550,000	8,180,000	23,730,000
Alternative 2 – Wetwell/Drywell **(Recommended)**	17,125,000	8,320,000	25,440,000

Alternative 2 is recommended

- Highest Net Present Value
- Ease of Maintenance
- Expandability

Preliminary Treatment: Screenings Alternatives

SCREENINGS ALTERNATIVES	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Perforated Plate	820,000	1,680,000	2,500,000
Alternative 2 – Multi-Rake **(Recommended)**	880,000	1,560,000	2,440,000
Alternative 3 – Climber	1,050,00	1,865,000	2,920,000



Alternative 2 is recommended

- Lowest Net Present Value
- Ease of Maintenance
- Lowest Operating Cost

Preliminary Treatment: Grit Removal and Processing Alternatives

GRIT REMOVAL ALTERNATIVES	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – Smith and Loveless Vortex	250,000	442,000	692,000
Alternative 2 – Hydro International HeadCell	331,000	587,000	917,000

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 – WEMCO Hydrogritter II	453,000	802,000	1,255,000
Alternative 2 – Hydro International GritCleanse	438,000	776,000	1,215,000
Alternative 3 – Smith and Loveless Grit Washer	174,000	308,000	482,000

Selection will be based on performance specifications developed during design.

Primary and Secondary Treatment Alternatives

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV ($)
Alternative 1: Nitrifying Activated Sludge with Chemical Phosphorus Removal	$63,800,000	$540,000	$77,000,000
Alternative 2: Activated Sludge with Enhanced Biological Phosphorus Removal	$64,400,000	$258,000	$71,000,000
Alternative 3: Activated Sludge with Enhanced Biological Phosphorus Removal and no Primary Clarifiers **(Recommended)**	$62,800,000	$160,000	$67,000,000
Alternative 4: Simultaneous Nitrification/Denitrification	$65,400,000	$247,000	$72,000,000
Alternative 5: BIOCOS	$62,900,000	$129,000	$66,000,000
Alternative 6: Mobile Organic Biofilm	$68,000,000	$316,000	$76,000,000

Alternative 3 is recommended

- Second Lowest Net Present Value Alternative
- Proven for Phosphorus Removal
- Progression Path for Potential Future Nutrient Reduction

Alternative 5 may be evaluated further in preliminary design if Total Phosphorus removal below 1 mg/L is proven.

METROPOLITAN COUNCIL

Disinfection Alternatives

ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 - Sodium Hypochlorite	6,400,000	9,300,000	15,700,000
Alternative 2 – UV Disinfection **(Recommended)**	5,200,000	5,700,000	11,000,000

Alternative 2 is recommended

- Lowest Net Present Value
- Reduced Chemical Handling
- Smaller Footprint
- Remote Operation Potential

Solids Processing Alternatives

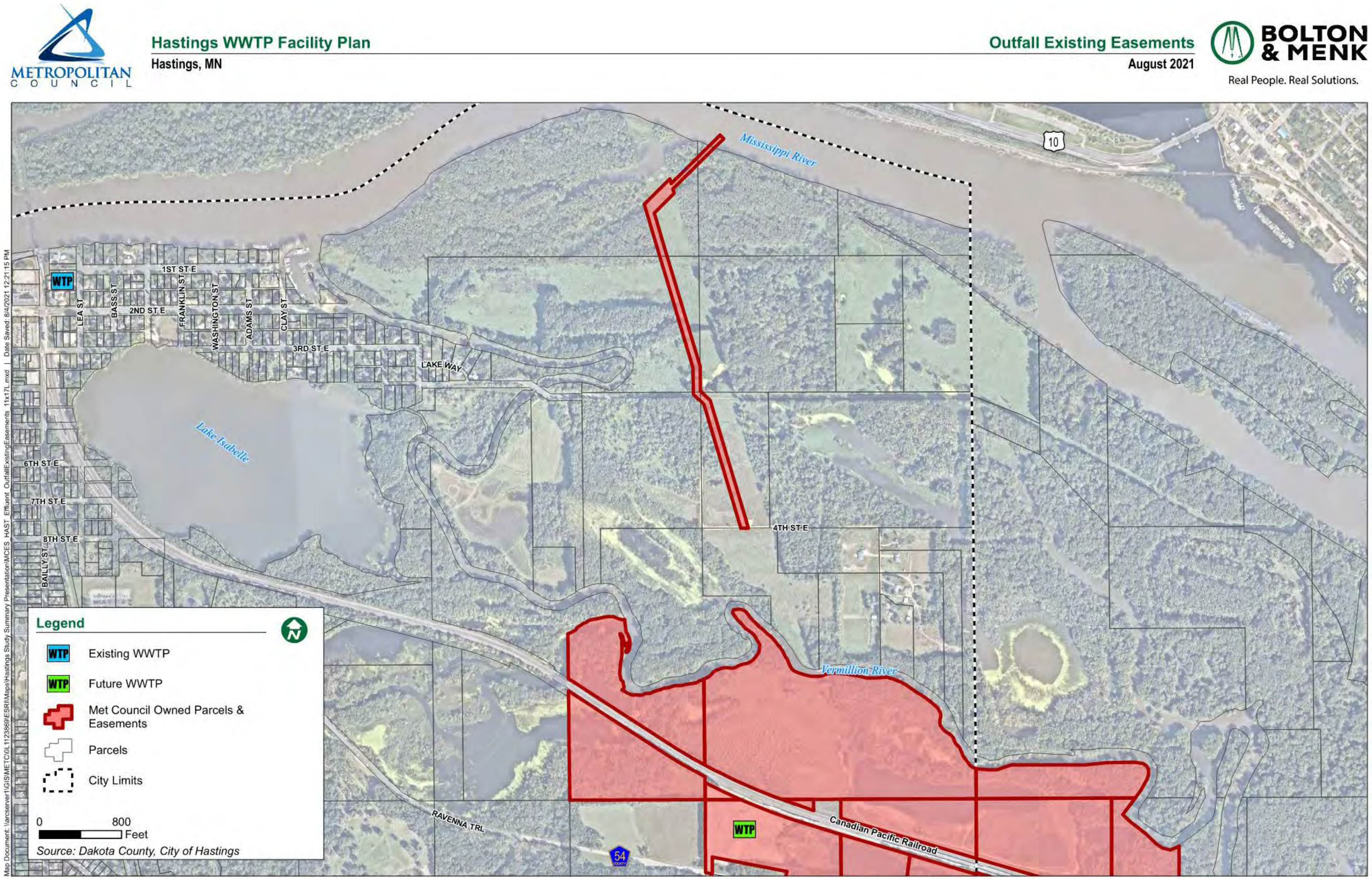
ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV ($)
Alternative 1: Mesophilic Anaerobic Digestion and Land Application	$15,400,000	$788,000	$35,100,000
Alternative 2a: Liquid Sludge Hauling, Thickened Primary and Waste Activated Sludge	$4,500,000	$569,300	$18,700,000
Alternative 2b: Liquid Sludge Hauling, Thickened Waste Activated Sludge Only – No Primary Clarifiers **(Recommended)**	$5,700,000	$485,700	$17,900,000
Alternative 3: Dewatered Cake Hauling, Thickened Primary Sludge and Non-thickened Waste Activated Sludge	$14,600,000	$544,300	$28,200,000
Alternative 4: Dewatered Cake Hauling, Thickened Primary and Waste Activated Sludge	$11,500,000	$566,100	$25,700,000

Alternative 2b is recommended

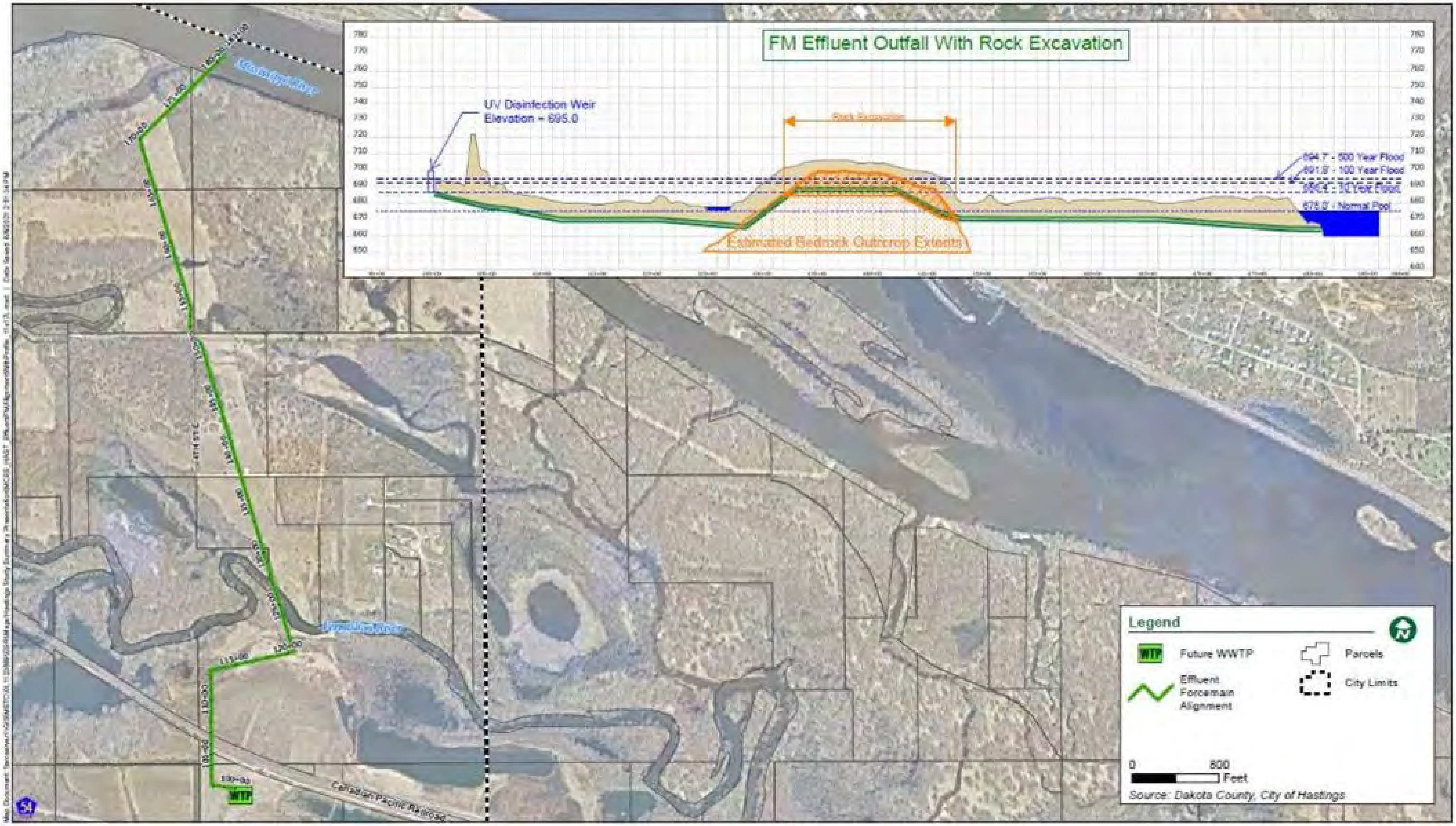
- Lowest Net Present Value
- Simplifies Solids Processing

METROPOLITAN COUNCIL

Discharge Alignment Existing Easements



Treated Water Discharge Alignment



Effluent Pumping Alternatives

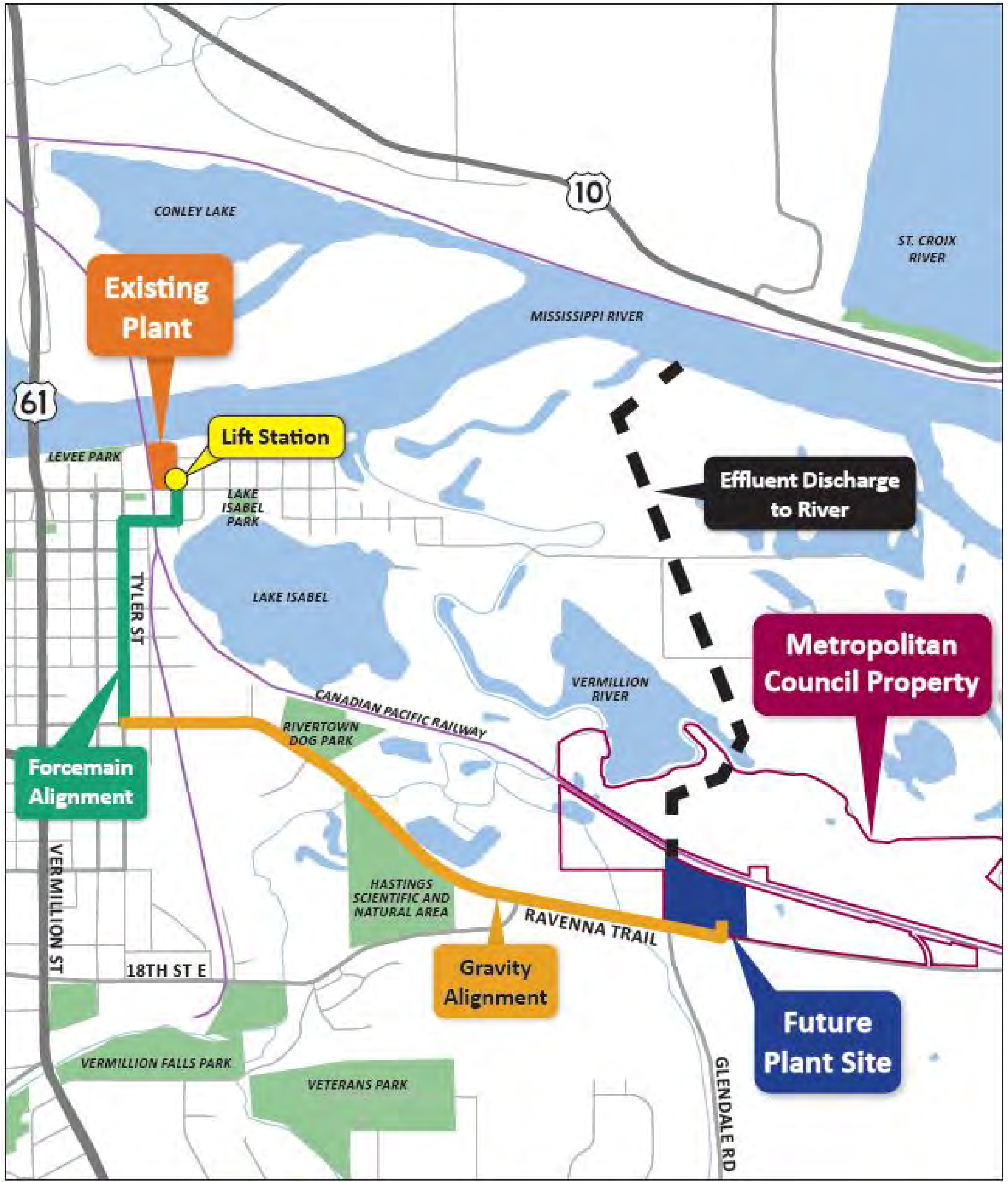
ALTERNATIVE	CAPITAL COSTS ($)	O & M COSTS ($)	TOTAL NPV WITH ADJUSTMENT ($)
Alternative 1 Only Influent Pumping (Recommended)	22,300,000	327,000	22,627,000
Alternative 2 - Influent and Effluent Pumping	29,113,000	3,500,000	32,613,000

Alternative 1 is Recommended

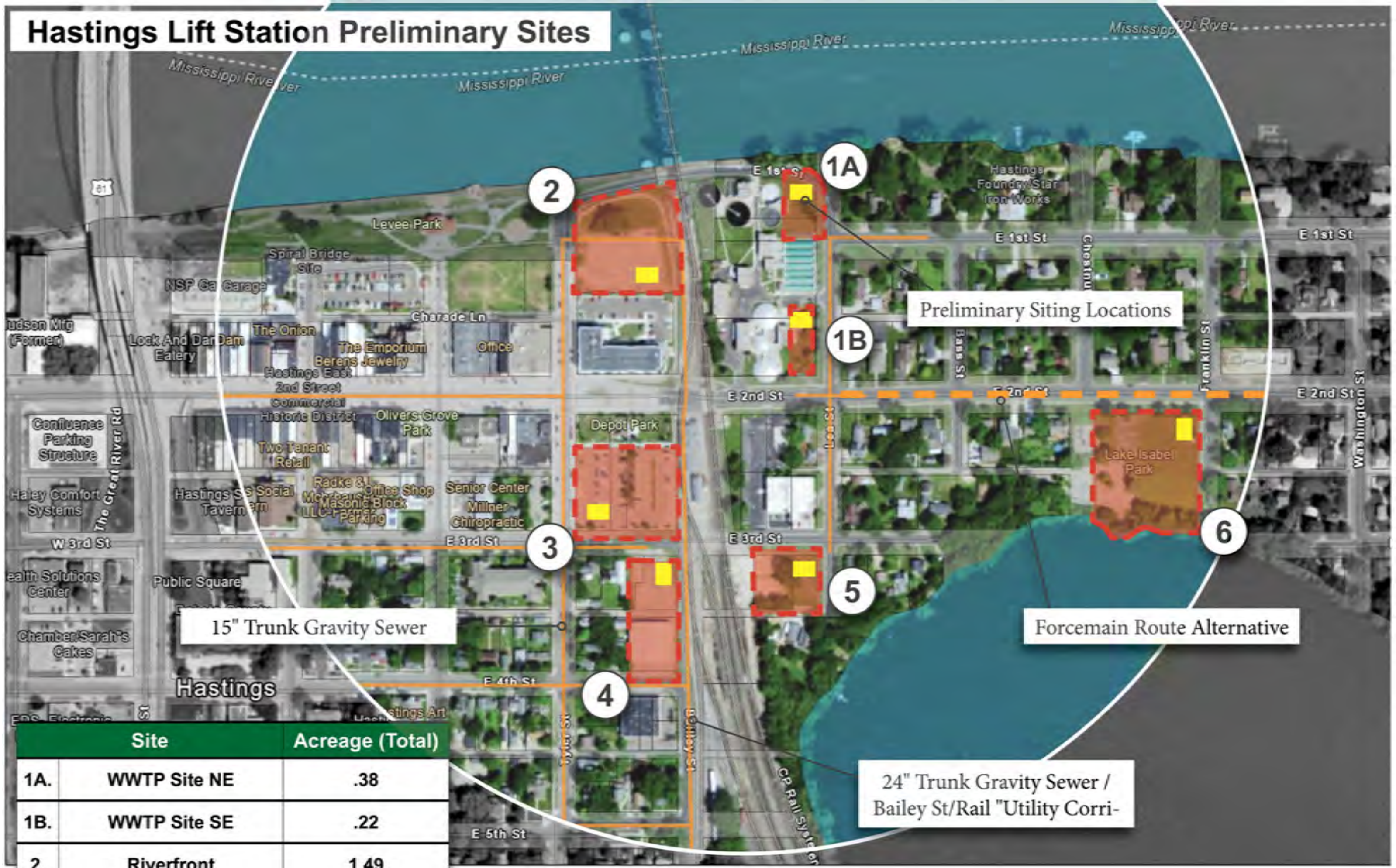
- Lowest Net Present Value
- One Pumping Station at the Plant
- Gravity Flow to the Mississippi River

Lift Station and Conveyance Systems ($23M)

- 0.2 mgd lift station located on the existing Hastings WWTP site
- 6-inch diameter forcemain from the lift station to the new gravity trunk sewer
- Gravity trunk sanitary sewer from the forcemain to the new plant



Lift Station Siting Map



Site		Acreage (Total)
1A.	WWTP Site NE	.38
1B.	WWTP Site SE	.22
2.	Riverfront	1.49
3.	Municipal Parking Lot	.93
4.	UBC/City Storage	.85
5.	Lea St Lots	.53
6.	Lake Isabel Park	1.79

0 220 440 880 ft
0 65 130 260 m

Source: Esri, USDA FSA, Esri Community Maps Contributors, County of Dakota, Metropolitan Council, MetroGIS, BuildingFootprintUSA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census

- Reviewed undeveloped properties within 1300 feet of existing WWTP
- 6 properties total reviewed

Lift Station Siting - Major Criteria Reviewed

- Site Characteristics
  - lot size
  - current land use
  - existing encumbrances

- Development Potential
  - future land use designation
  - estimated market value
  - potential market value

- Environmental Considerations
  - prevailing winds
  - flood plain
  - MRCCA
  - historic
  - cultural
  - active MPCA site

- Constructability
  - Geotechnical
  - temp conveyance needs
  - operations of existing plant
  - existing utilities)

- Capital Cost
  - pipe routing to lift station
  - land acquisition

Lift Station Siting Comparison

Site 1B | WWTP SE

Pros

- Met Council owned land
- No easements or restrictions
- Would require minimal infrastructure improvements compared to other sites
- Not located within a flood zone
- Lowest capital costs
- Minimal impacts to existing WWTP plant
- Sufficient site access with existing roadway infrastructure

Cons

- Falls within MRCCA, which has regulations around siting and construction (*not anticipated to present a significant issue*)
- May require screening, setbacks, and site design considerations to buffer from adjacent residential

Site 1B Quick Facts

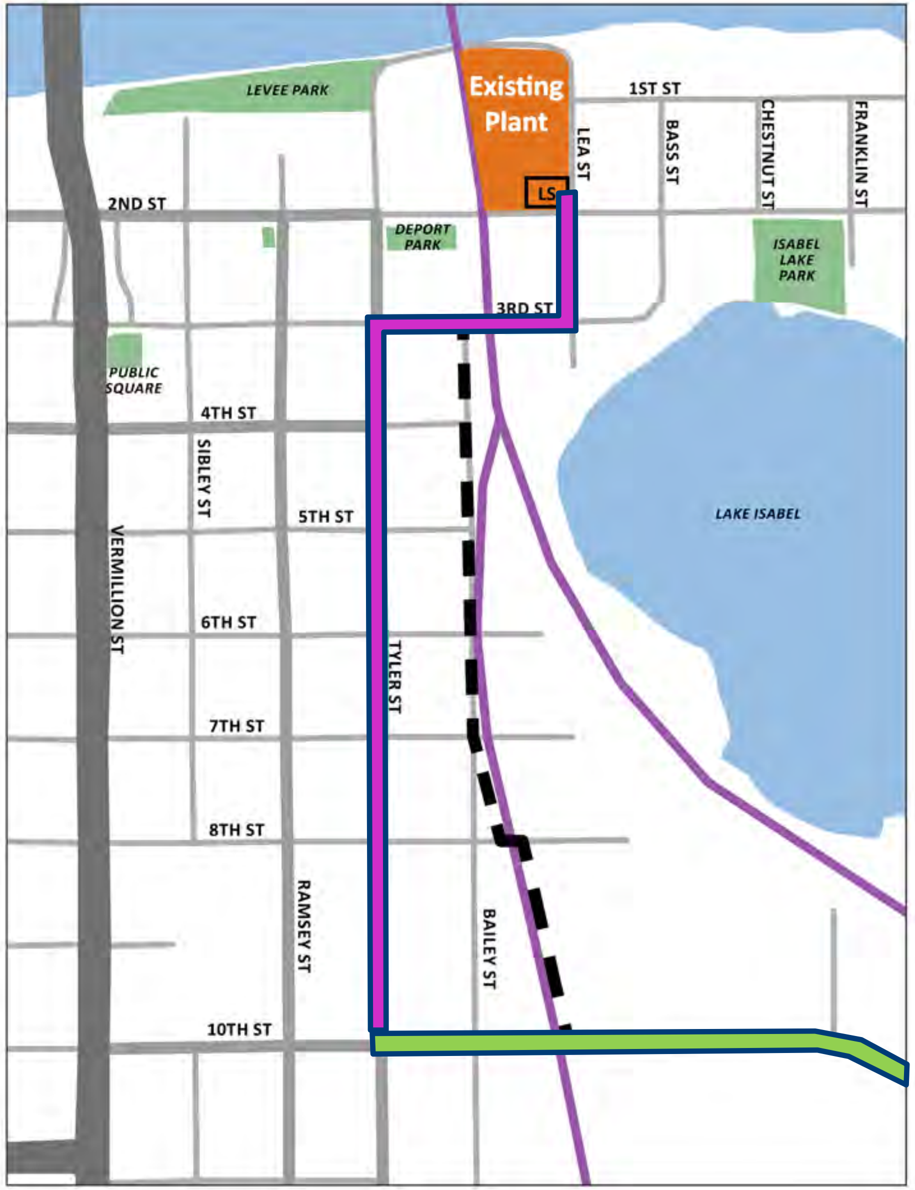
.50 Acre Site

80ft from nearest residential property

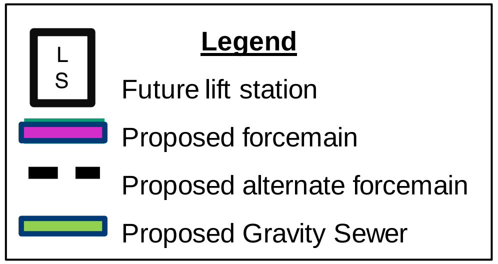
Located on existing WWTP

Siting may allow for future develop on surrounding site

Forcemain Alignments

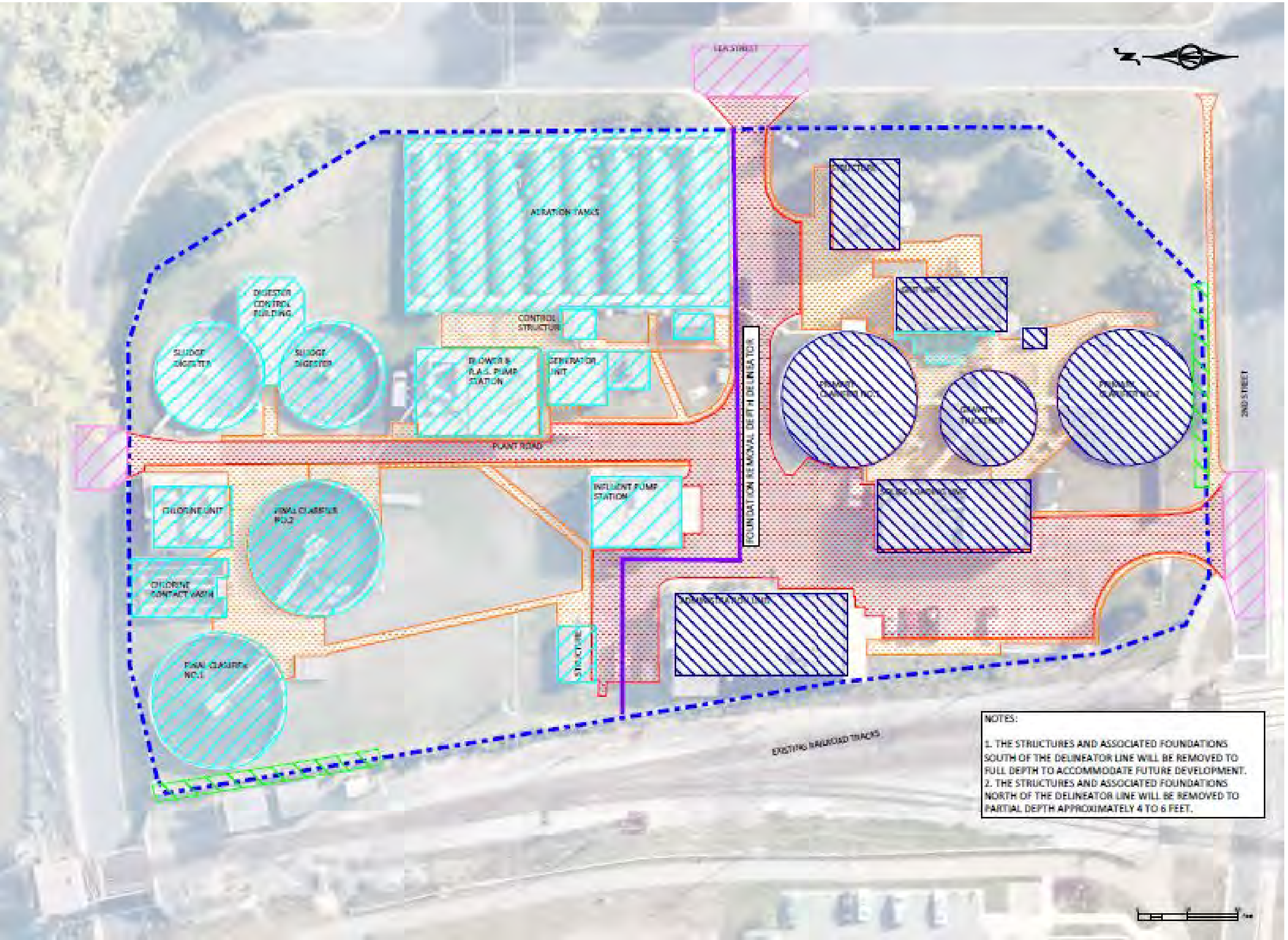


- 2 forcemain alignments reviewed
  - Tyer Street and Bailly Street
- Tyler Street is the recommended alignment
  - Bailly Street has been recently reconstructed and has complications with the railroad to the east
- Met Council will repair or replace any City utilities impacted by the forcemain installation



Gravity Alignment

Decommission Existing Facilities ($3M)



- Concept to be used as a starting point for our intergovernmental agreement negotiations.
- South half of property shows removal of structures to bottom of footings.
- North half shows partial removal to 6 feet below ground elevation.

2028 — 2029

Decommissioning

Sustainability & Community Impacts

Environmental Sustainability

- Environmental Sustainability
  - Energy Conservation

Sustainable Services

- Sustainable Services
  - Odor Management

Community Impacts

- Community Impacts
  - Hauling
  - Archeological and Historical Review

Environmental Sustainability

- B3 SB2030 Guidelines
  - Administration/Maintenance Building
- Energy and Carbon Efficient Approaches
  - High Efficiency Equipment, Lighting, and Building Systems
  - Tier 4 Generator
  - Gravity Flow to Mississippi River
- Sustainable Landscapes and Green Infrastructure Best Management Practices
- On-site Non-Potable Effluent Water Use

Image of Green Roof at the MCES Empire Wastewater Treatment Plant in Farmington, MN

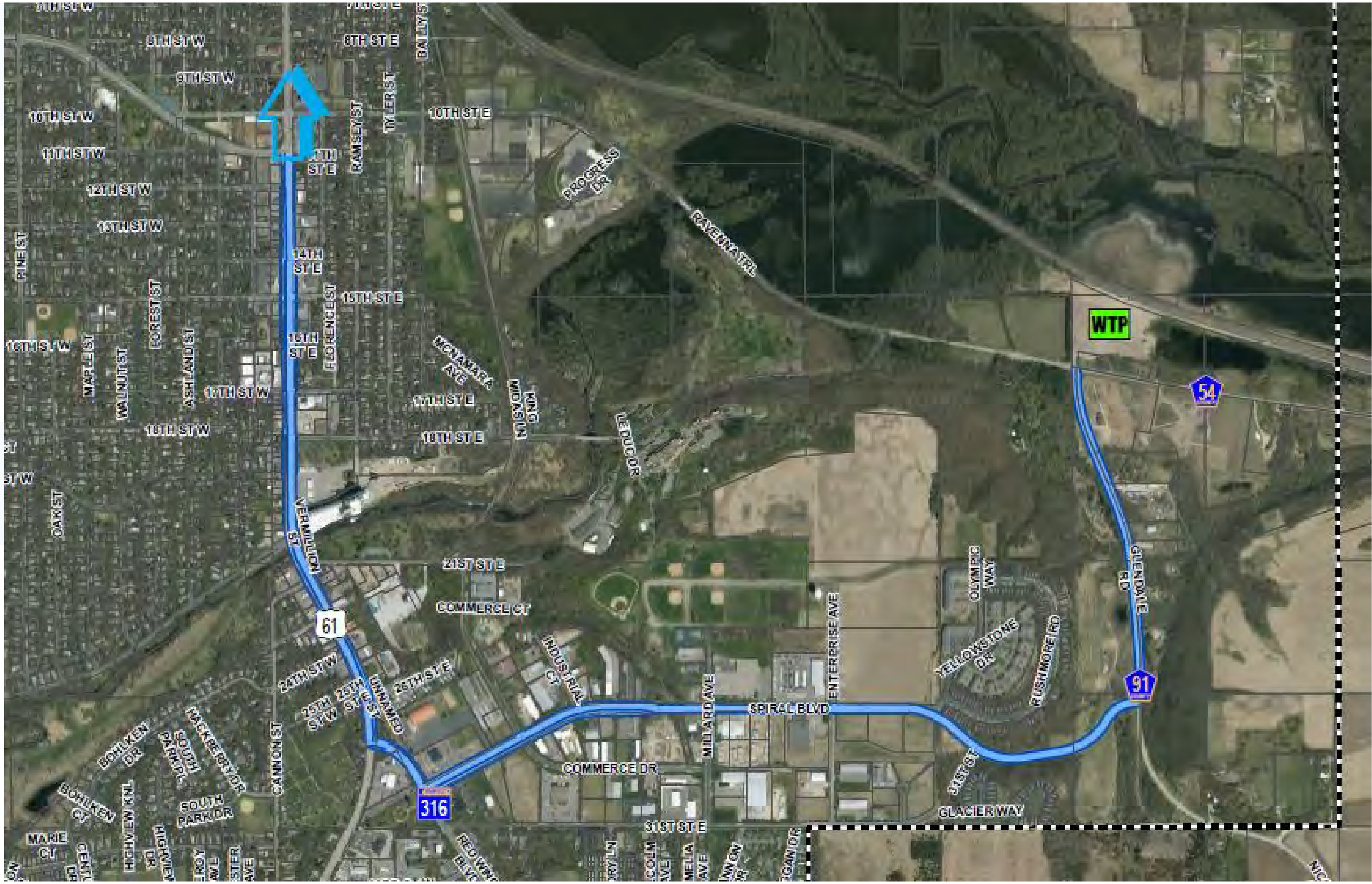
Sustainable Services and Community Impacts

Odor Management

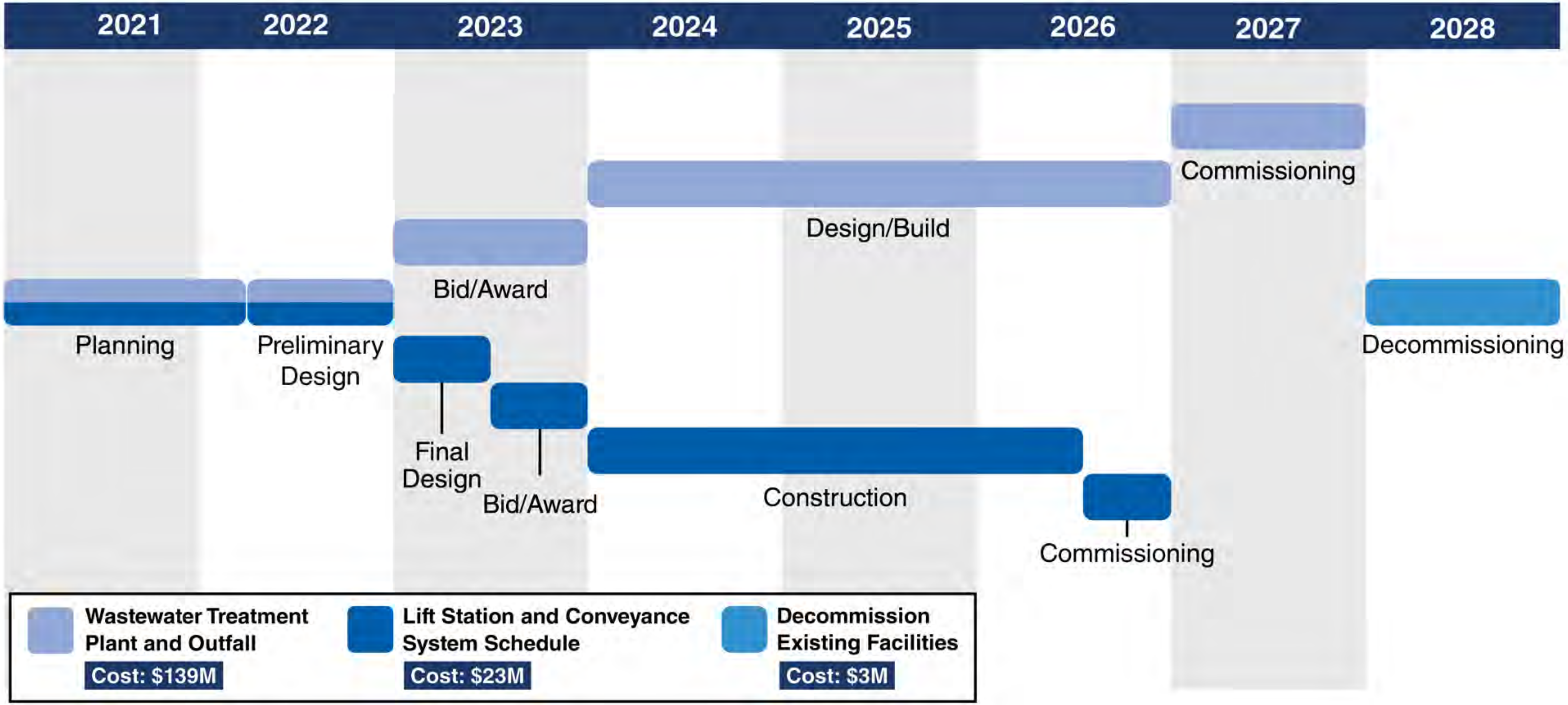
- Headworks
- Gravity Thickening
- Sludge Loadout
- Lift Station

Community Impacts

- Hauling Route
  - 4 trucks/day
  - 9-ton minimum roadway design
- Archeological and Historical Review



Implementation Schedule



Total Cost and Rate Impacts

- MCES project funding: Public Facilities Authority (PFA) loans (20-year term)
- Loans for these projects are paid from two funding sources:
  1. Municipal Wastewater Charge (MWC): This is the MCES portion of your sewer bill.
  2. Sewer Availability Charge (SAC): This is a one-time charge for new connections.
- Impact to rates from $165 million in loans*:
  1. $6.25 = increase to the annual sewer billing per household (average $199 per year).
  2. $80 = per new household connection (or equivalent) per year paid from the SAC fund (for 20 years).

* This project is included in MCES capital improvement plan, so loan payments are already built into future increases to MWC and SAC rates. These figures show the relative impact on rates and how the project will be paid for over time.

Next Steps

1/18/2022
Deadline for comments on Draft Facility Plan

2/8/2022
Metropolitan Council Environment Committee Plan Review

2/23/2022
Metropolitan Council adoption of Facility Plan

3/4/2022
Submit Plan to Minnesota Pollution Control Agency (MPCA)

Next Steps – Environmental Assessment Worksheet

Some of the items included in the EAW:

- Natural Heritage Review
- Land Use Compatibility Review
- Environmental Assessment
- Air and Water Resource Review
- Historical Property Survey
- Noise and Transportation Assessment
- Cultural Properties Review and Assessment

Submit your comments

- Submit comments no later than **January 18, 2022**
- Submit comments via:
  - **E-mail:** comment@hastingswwtp.com
  - **Postal mail:** Heidi M. Hutter,
    Metropolitan Council Environmental Services,
    390 Robert St. N., St. Paul, MN 55101-1805
  - **Record comments:** 651.302.2908
    (Project Comment Line)
  - **Send TTY comments:** to 651.291.0904

Draft Facility Plan – Report Available for Review

- Hastings City Hall, 101 Fourth St. E., Hastings
- Pleasant Hill Library, 1490 S. Frontage Rd., Hastings
- Metropolitan Council Website: MetroCouncil.org/HastingsWWTPProject.com

Stay Informed

Share questions and comments:

Email: comment@hastingswwtp.com

Call the Project Hotline: (651) 302 - 2908

Learn more about the project:

MetroCouncil.org/HastingsWWTPProject

METROPOLITAN COUNCIL

Thank you for joining us!

METROPOLITAN
COUNCIL

PUBLIC COMMENTS

WEDNESDAY, JANUARY 5, 2022

6:00 P.M.

Metropolitan Council Environmental Services (MCES) - Hastings Wastewater Treatment Plant Facility Plan

Meeting held remotely via:

Zoom

I N D E X

MR. TIM O'DONNELL: Good evening, everyone, and welcome to this Metropolitan Council Environmental Services Public Hearing on the Hastings -- on the Hastings Wastewater Treatment Facility plan, which focuses on relocating the wastewater treatment plant.

And I'm Tim O'Donnell, and that's spelled T-I-M, O, apostrophe, D-O-N-N-E-L-L, and I'm from Metropolitan Council Environmental Services staff, and I'll be helping facilitate the meeting tonight.

You will also hear us use the acronym MCES to describe our division of the Metropolitan Council, and you'll also hear the acronym WWTP, which is a shorter way of saying wastewater treatment plant.

Next slide, please.

Before we begin the hearing, I want to note a few things for you. To preserve bandwidth, all of our attendees have been muted for now and your video has been disabled. Although you are muted, you can still submit comments or questions throughout our upcoming presentation. We will address them during the public comment period later. Please include your name, address, and the organization you represent, if any. Use the chat button on the bottom of your screen between the participants and share screen buttons, and please include your name with your comment or your question.

You can also submit questions or comments by calling or texting us at (651) 302-2908, or e-mailing us at comment@HastingsWWTP.com. This is also how you can contact us if you experience any technical difficulties.

If you'd like to make a comment or ask a question out loud during the public comment period, click on the raise-hand symbol, and we will unmute you when it's your turn to speak.

We have a transcriber recording tonight's hearing for the public record. If you offer comments or questions, we ask that you please spell your first and last name for our transcriber so it could be included accurately in the public record.

Next slide, please.

And now it's my pleasure to introduce you to our public hearing convenor, Metropolitan Council Council Member Wendy Wulff.

Wendy.

COUNCIL MEMBER WULFF: Good evening, and thank you for attending the online public hearing on the Hastings Wastewater Treatment. My name is Wendy Wulff, W-E-N-D-Y, W-U-L-F-F, and I am the Metropolitan Council Member representing District 16, which is the southeastern portion of the Twin Cities Metropolitan area.

At this time, I would like to call the public hearing to order, and as we begin our public hearing, I'd like to welcome a few local officials.

Tim, could you call out who are local officials?

MR. TIM O'DONNELL: Yes, I'd be happy to.

Tonight we have with us from the Hastings City Council, Mayor Mary Fasbender and City Council Member Mark Vaughan.

COUNCIL MEMBER WULFF: I believe I also saw Tina Folch from the city council as well on the list.

MR. TIM O'DONNELL: Oh, I apologize if I missed that one.

COUNCIL MEMBER WULFF: If there's anybody else --

MR. TIM O'DONNELL: And also from the Hastings --

Go ahead. Council Member, go ahead.

COUNCIL MEMBER WULFF: No, you go ahead.

MR. TIM O'DONNELL: All right. Also from the Hastings city staff is Dan Wietecha, city administrator; Ryan Stempski, public works director and city engineer; and John Hinzman, community development director.

COUNCIL MEMBER WULFF: Thank you.

The subject of this public hearing is that --

MR. TIM O'DONNELL: Oh, pardon me for just one second, Council Member. I just noticed on the participant list, it looks like we have Mike Childs with us tonight also. Mike is on the tribal council of the Prairie Island Indian Community, so we want to welcome him as well.

And if there are any other members from the Prairie Island Indian Community in the audience, we welcome them, too.

COUNCIL MEMBER WULFF: Thank you.

The subject of this public hearing is the MCES draft facility plan. This plan outlines our recommendations and lays out a process for us to replace the existing, aging wastewater treatment plant that is on the east side of Downtown Hastings, with a new plant to be constructed along Ravenna Trail near the border with Ravenna Township.

We will also construct a wastewater pumping station on the current plant site and a new sanitary sewer from the station to the new plant. After these new facilities are in operation in approximately 2027, we will remove the old wastewater treatment structures.

We have several MCES staff joining us tonight to present the draft facility plan for the project and to collect comments. I'll have them unmute and turn on their video and introduce themselves.

First, is Tim O'Donnell.

MR. TIM O'DONNELL: Thank you, Council Member. Again, my name is Tim O'Donnell. It's T-I-M, O, apostrophe, D-O-N-N-E-L-L. I'm the project citizen liaison for Met Council Environmental Services. And in that role, I assist with our -- with the community outreach that we have for sewer improvement projects like this. Thank you.

COUNCIL MEMBER WULFF: Thank you.

Next, is Rene Heflin.

MS. RENE HEFLIN: Thank you, Council Member Wulff.

My name is Rene Heflin, R-E-N-E,

H-E-F-L-I-N. I am manager of plant engineering for the Council, and my role in this facility plan is to support the project managers in development and finalization of the plan.

COUNCIL MEMBER WULFF: Thank you.

Next is Heidi Hutter.

MS. HEIDI HUTTER: Thank you, Council Member Wulff.

My name is Heidi Hutter, H-E-I-D-I, H-U-T-T-E-R. I'm a principal engineer in the plant engineering group. My role here is as project manager for the delivery of the wastewater treatment plant work. Thank you.

COUNCIL MEMBER WULFF: Thank you.

And, finally, we have Chad Davison.

MR. CHAD DAVISON: Thank you, Council Member Wulff.

My name is Chad Davison. I am principal engineer for Metropolitan Council and project manager of the collection system modifications that are needed to get the wastewater out to the new plant site, and to the river, the discharge. Thank you.

COUNCIL MEMBER WULFF: Thanks to each of you in advance for helping us learn about this important project in the city of Hastings.

Next slide, please.

The purpose this public hearing is to summarize the project and explain alternative approaches that we evaluated, answer any questions that you may have about the project, and receive your comments for the public record.

As we've noted, we have a transcriber recording the proceedings for our official public record. The transcription and video recording of the presentation will be posted on the project web page.

As we conduct this hearing public, there are a few things I'd like to point out. All interested persons may present comments or opinions as they relate to the draft facility plan. We will read your comments and questions posted in the online chat box in the order they are entered.

If you'd like to speak out loud, we will call on you and unmute your microphone in order -- in the order that you have clicked your raise-hand symbol. We ask that you state and spell your first and last name each time you speak. Also, please include your address and the organization you represent, if any. Individuals will have three minutes to offer their remarks. Designated representatives of groups or organizations will have five minutes.

We also welcome written comments, and we'll provide you instructions on how to submit them. And we will read into the public record any comments we have received prior to today's public hearing.

Next slide, please.

The public comment period will remain open through January 18th at 5:00 p.m. Besides offering comments tonight at our public hearing, you can also submit comments in the following ways:

You can mail written comments to Heidi Hutter at Metropolitan Council Environmental Services, 390 Robert Street North, St. Paul, Minnesota 55101-1805. E-mail comments to comment@HastingsWWTP.com. Record comments on the project comment line at (651) 302-2908, or send teletype comments to (651) 291-0904.

Next slide, please.

The project implementation schedule includes these key dates: We published a legal notice of the public hearing in the Pioneer Press Newspaper on December 5th, 2021. We mailed the public hearing notice on December 3rd, 2021, to property owners in the proposed project areas, as well as numerous government and community stakeholders. We held a public information open house to introduce our project to the community on December 15th, 2021.

We're holding the public hearing today, January 5th, 2022. Metropolitan Council review and adoption of the final facility plan is scheduled for February 23rd, 2022. In March 2022, we will submit the approved facility plan to the Minnesota Pollution Control Agency and will include our application to be included on a priority funding list. This funding would be in the form of low-interest loans that MCES would pay off over a 20-year period.

At this time, I'd like to turn it back over to Tim O'Donnell to begin our presentation.

MR. TIM O'DONNELL: Thank you, again, Council Member Wulff.

I'd like to begin our presentation with a brief overview of the regional wastewater system and our service area and facilities. Then we will zero in on the improvements we are planning for the Hastings area.

The regional wastewater system is run by Metropolitan Council Environmental Services, and as I mentioned before, we go by the acronym MCES. We are an operating division of the Metropolitan Council.

The map that you can see on the screen is of the seven-county Twin Cities Metropolitan area, and it shows our wastewater service area and regional sanitary sewer facilities. The color shading on the map shows the areas that we serve. Basically, it's the urban and suburban portions of the Metro area. Each color-shaded area corresponds to one of our nine regional wastewater treatment plants.

Our wastewater collection system consists of approximately 640 miles of regional sanitary sewers, which we also call interceptor sewers. We also have 61 pump stations and 190 meter stations. These interceptor sewers, in effect, intercept the flow of wastewater from 111 cities and townships in the Metro area, and they carry it to our nine wastewater treatment plants.

Now, in addition to the regional sewers that MCES operates, these 111 communities combined operate more than 5,000 miles of local sanitary sewer pipes. The icons that you see on the map indicate our wastewater treatment plants. The nine plants combined treat approximately 250 million gallons of wastewater each day. To put this volume of wastewater into perspective, 250 million gallons would easily fill the Empire State Building every day. Our treatment plants discharge the resulting clean water to the Mississippi, Minnesota, and St. Croix Rivers.

Now, it's important to remember that MCES's primary role is collecting and treating wastewater, also known as sewage. So basically what goes down your drains or the drains of the businesses or other facilities in your community.

Your city handles drinking water treatment and distribution, as well as storm water management, but we want to remind you that our primary business is wastewater collection and treatment.

So we're often asked in public hearings like this, how does MCES finance the regional wastewater system? What we do is we bill the 111 communities that are connected to our regional system to pay for all of our operation, maintenance, and capital improvement costs. The cities, in turn, bill these costs and their local costs to their property owners connected to their local sewer system.

In the end, about 60 percent of your sewer bill pays for MCES's regional system costs and about 40 percent stays in your own community to pay for your local sewer system costs.

The sewer-user fees that MCES collects are enough to fund our regional wastewater system without the need for any tax dollars. We also do not levy special assessments on properties near sewer projects like we're discussing here at the public hearing tonight. These projects have a much broader public benefit and so their costs are paid for region-wide.

So, now, after this broad overview into who we are and what we do for the region, I'd like to turn it over to my colleague, Rene Heflin, and she's going to start to focus more narrowly on our plans for the Hastings area.

Rene.

MS. RENE HEFLIN: Thank you, Tim.

I'm going to provide some background information on the plant and a little bit more about what a facility plan is.

So, first off, I wanted to share that the Hastings Wastewater Treatment Plant has 30 years of perfect permit compliance, and we are very proud of the plant's performance. Each year the plant has received the NACWA Peak Performance Award for 100 percent permit compliance. NACWA stands for National Association of Clean Water Agencies. There are only two other facilities in the country with better performance. It's the city of Ames Water and Pollution Control Department in Iowa, and Hanover Sewage Authority in New Jersey.

The plant is located in Downtown Hastings and has limited room for expansion. The site is bounded by the Mississippi River and city roadways. Outside of this photo, at the bottom and the right is residential area.

The existing plant was constructed in 1952 by the city of Hastings and acquired by MCES in 1970. The plant's last expansion was in 1985, bringing it to its current capacity of 2.3 million gallons per day. A 2020 condition assessment identified a need for major renewal at the existing facility to continue reliable service through the year 2040.

Next.

The existing Hastings Wastewater Treatment Plant serves 23,000 residents in the city of Hastings. The small black square on this map locates the existing plant, and the dark green crosshatched area is its existing service area.

The small pink dot locates the future Hastings Wastewater Treatment Plant on Council-owned property, which is about two miles southeast of the existing site.

The long-term post-2040 service area, shaded light green, includes land areas of Marshan, Ninninger, and Vermillion Townships. The long-term planned capacity for the Hastings Wastewater Treatment Plant is 10 million gallons per day.

Relocation of the Hastings wastewater treatment service to the new plant site is included in the MCES 2040 Water Resources Policy Plan, which has been approved by the Council.

This plan provides for continued high quality, affordable wastewater collection and treatment services to support economic growth and development in ways that protect the region's water and land resources.

Next.

What is a facility plan? A facility plan documents planning activities for evaluating and recommending capital projects. It provides a basis for review by the Minnesota Pollution Control Agency, or MPCA, in qualifying capital projects for funding through the Minnesota Public Facilities Authority, and it provides a basis for Council approval prior to implementation.

Based on a condition assessment of the existing facilities, projected wastewater flows and loads and anticipated future treatment requirements, this facility plan recommends relocation of the Hastings treatment service to the new site at 2445 Ravenna Trail by the year 2026.

The implementation plan includes three projects: Lift station and conveyance, wastewater treatment plant and outfall, decommissioning of existing facilities. The budgetary total project cost is $165 million.

Next, Heidi Hutter will present planned elements for the new waste treatment plant and outfall project.

MS. HEIDI HUTTER: Thank you, Rene.

Relocation of the Hastings Wastewater Treatment Plant service is driven by three main elements. The first is the need to make significant investments in the existing plant. A 2020 condition assessment of existing facilities indicated a need for significant investment of a site that can no longer meet the needs of the long-term service area.

The second driver is growth. The Hastings Wastewater Treatment Plant is projected to exceed its existing capacity of 2.34 MGD in 2050 due to growth within the service area.

And that third driver is the ability to meet future potential regulatory requirements. In addition to capacity that's needed for growth, additional treatment capacity would be required to meet future environmental regulations for total nitrogen that we are anticipating within the planning period.

Next slide.

Wastewater treatment plants typically have major renewals on a 40-year cycle, with minor projects in between to help maintain them in good working order. With the last major expansion occurring in 1985, that 40-year mark is coming up here in about 2025.

That renewal cycle led MCES to complete a conditional assessment of the Hastings plant in 2020. We did find that in order to maintain the existing plant functions through 2040, an investment of $26 million would be required. That would be just a status quo renewal. It does not include any capacity expansions or other work that would be required to address changes in regulatory requirements or to accommodate future potential growth.

Considering this and our other drivers, it's decided to advance plans for relocation of the Hastings Wastewater Treatment Plant. In the interim, the existing plant does need to maintain its operation until the proposed plant is commissioned and fully operational. Therefore, we do plan to do a modest renewal of the existing plant systems. Scope for that renewal includes the plant outfall, the aeration tank work, the mechanical HVAC, and site and security improvements for the new plant site. The renewal project is separate from the work of this facility plan, and that is scheduled to start construction in 2022.

Next slide, please.

Shown here is our preliminary projected flow envelope for the Hastings service area. Before I dive right into it, I do want to point out that the left axis depicts sewered population and the right depicts flow in million gallons per day.

Historical influent flow data is shown in the gray. To discount the impacts of COVID-19 on the flow data, the flow envelope begins at the 2019 maximum annual average flow that was recorded at the facility.

Method one, which is the orange, is the lower bound of the flow projection envelope, and that equates to an annual average flow increase of 0.013 million gallons per day per year. This data comes directly from the MCES 2040 Water Resources Policy Plan, and that is the flow projections for the city of Hastings.

Water conservation efforts and I&I improvements have had a dampening effect on flow increases to MCES facilities. 91 to 97 percent of the influent organic and solid loads to the Hastings Wastewater Treatment Plant comes from domestic sources.

Historical influent organic and solid loadings, which are independent of flow and are negligibly impacted by industrial waste contribution, can be used to evaluate the projected growth in the Hastings Wastewater Treatment Plant service area.

Method two, which is the solid gray line, represents the upper bound of the flow projection envelope. This method looks at historic organic loading to the plant, and it uses the steady increase that we have recorded there over the last ten years to project capacity needs. This equates to 1.6 percent annual increase from the base year through 2050. That puts the annual average flow at 2.35 million gallons per day, which is beyond the capacity of the existing plant.

Next slide, please.

Growth is not the only demand for capacity at a wastewater treatment plant. In 2014, Minnesota adopted a statewide Nutrient Reduction Strategy that calls for 45 percent reduction in nitrogen loads to the Mississippi River by 2040.

In order to achieve this goal, load reductions at wastewater treatment plants will be necessary. The Hastings area is prioritized by the MPCA for future nutrient reduction. The existing plant's ability to respond to potential future total nitrogen limit within this planning period was considered in planning.

To meet the anticipated total nitrogen limit of 10 milligrams per liter, or less, would require expansion on a site that is already challenged. If existing tanks were used for nitrogen removal, plant capacity would have to be de-rating. De-rating plant capacity is not recommended because it expedites the need for facility expansion and it further limits MCES's ability to respond to growth in the service area.

Next slide, please.

The work of this facility plan is generally grouped into the three categories that we would like to share with you this evening. We will be stepping through these in a little more detail further on in the presentation.

In general, those are a new lift station on the existing wastewater treatment plant site and a conveyance system to the new wastewater treatment plant. There will be a new wastewater treatment plant about two miles southeast of the existing site, and there will be a new outfall to the Mississippi River.

Following successful commissioning and process-proving of the new wastewater treatment plant, the existing facility would be decommissioned and land areas returned to the city of Hastings for redevelopment.

The planning-level cost estimate for this program is 165 million. That cost includes a standard 30 percent contingency for undefined design details, 20 percent for engineering and administration, and 3 percent annual escalation rate.

I'm going to spend a little bit of time reviewing the wastewater treatment plant scope with you before we move on to the other categories.

Next slide, please.

The new wastewater treatment plant site consists of 221 acres located in both the city of Hastings and Ravenna Township, it's framed by the Vermillion River and Ravenna Trail, and it's bisected by a railroad.

There are two utilities easements that encumber the site. There's a large overhead power line from Xcel Energy and a shallow ten-inch-diameter oil pipeline owned by British Petroleum. Most of the site is also located in a floodplain.

Relocation of the BP pipeline to the property boundary allows us to site the new facility on about ten acres of natural high-ground that's located in the southwest corner of the property.

The facility would be located in the city of Hastings, with no treatment plant infrastructure constructed in Ravenna Township. This area is able to support a 10-MGD facility, it minimizes disruption to the natural landscape, and it's the most efficient and effective use of the site.

In addition, MCES is interested in pursuing partnerships with land management entities for the maintenance and management of the buffer property. That may include provisions for public access.

Next slide, please.

Shown here is a site layout depicting the recommended wastewater treatment plant. The dark shapes depict infrastructure that's required for initial construction of the facility. The empty shapes depict infrastructure that's required to meet the 10-MGD ultimate planned capacity for the service area.

Relocation of that BP oil line allows us to utilize that natural high ground, further elevating treatment structures above that will protect the infrastructure from the 500-year flood and will allow treated effluent to flow by gravity to the Mississippi River.

Wastewater will be treated using a variety of physical and biological treatment processes. Effluent will be disinfected by a UV system prior to discharging treated effluent flow to the Mississippi River.

A lifecycle cost analysis determined that continued transport of solids of the Metropolitan Wastewater Treatment Plant for incineration is the most cost-effective solids management alternative for this facility. A two-lane, drive-through load-out facility will be provided to support the increased efficiency of this practice.

Odor control facilities will manage odors associated with the treatment process. An administration building and attached maintenance shop will provide space for onsite work and will be designed to accommodate a variety of workspaces.

The new facility will have two access points. Primary access to the site is proposed across from a local county road for traffic safety. Entrance design will allow for stacking of multiple vehicles on MCES property that will not impede the flow of traffic on Ravenna Trail. Perimeter fencing and entry/exit card readers with motorized gates and surveillance cameras will help MCES secure and monitor the property.

The planning-level estimate for this work is $139 million. This work will be delivered via the design/build process between 2024 and 2026, with at least a year of commissioning and process proving by the design/builder starting in 2027. These recommendations are based on business case evaluations.

Next, I'd like to take a little time to review some of the key business case evaluations for the wastewater treatment plant with you. I'd like to do that before Chad discusses the outfall, the lift station and conveyance system, and the decommissioning of the existing plant.

Next slide, please.

Four major effluent discharge options for the new facility were considered: The Mississippi River, the Vermillion River, rapid infiltration basins, and deep-injection wells. Alternatives 3 and 4, rapid infiltration basins and deep-injection wells, are cost-prohibitive for the new facility.

Alternative 2, discharge to the Vermillion River, requires more stringent treatment requirements to be protective of the environment, including dissolved oxygen, ammonia and nitrogen limits, more stringent CBOD5, TSS, and phosphorus limits, and there's a potential for a chloride limit as well. Tertiary filtration and denitrification will be required to meet these limits for this option.

Alternative 1, outfall to the Mississippi River, is recommended. This is the lowest net present value alternative. The Mississippi River has a large assimilative capacity and the ability to explore -- to support expanded flows resulting from growth in the service area. This option also provides MCES with the continued flexibility of the existing Mississippi Basin total phosphorus permit.

Next slide, please.

Two influent pumping alternatives for the new facility were considered: A wet-well with submersible pumps, and a wet-well/dry-well configuration. Alternative 2, the wet-well/dry-well configuration is recommended. This is the highest net present value alternative. However, this alternative offers improved maintainability compared to a submersible system, and it's more easily expanded to accommodate growth up to the 10-MGD ultimate facility capacity.

Next slide, please.

Three screenings alternatives for the new facility were considered. Those were perforated plate, multi-rake, and climber screens. Perforated plate screens require the addition of spray water, they have increased head loss compared to other alternatives, and they require relatively high maintenance due to the multiple mechanical systems that are included with this alternative.

Climber screens require large frames, and that results in increased building space and -- space needs and that translates to increased building costs. They also have reduced loading capacity and lower screening retention compared to the other alternatives.

Alternative 2, the multi-rake screens, is recommended. This is the lowest net present value alternative. It also has the lowest operation and maintenance costs compared to the other alternatives.

Next slide, please.

Several grit removal and processing alternatives were evaluated during planning. Final recommendations will be based on further evaluation and performance specifications that are developed during design.

Identified here are systems capable of meeting the desired performance of a new facility sized at 2 to 3 MGD. This information serves as the basis for future evaluations.

Next slide, please.

Six primary and secondary treatment alternatives for the new facility were considered. Nitrifying activated sludge with chemical phosphorus removal; activated sludge with enhanced biological phosphorus removal; activated sludge with enhanced biological phosphorus removal and no primary clarifiers; simultaneous nitrification and denitrification; BIOCOS; and mobile organic biofilm.

Alternatives 3 and 5 are the lowest net present value alternatives comparatively and both provide a logical progression path for future total nitrogen reduction that we are expecting within the planning period.

Alternative 3, the activated sludge with enhanced biological phosphorus removal and no primary clarifiers, is recommended. This is the second lowest net present value alternative. However, it is proven for phosphorus removal at anticipated limits, where BIOCOS is not.

Eliminating primary clarifies simplifies solids processing, it reduces solids generation, and it reduces odor control needs for solid storage. MCES may choose to evaluate alternative 5, BIOCOS, further in preliminary design if total phosphorus removal below 1 milligram per liter is proven for the system. Changes to the recommended alternatives will be based on business case evaluations and documented with the MPCA.

Next slide, please.

Two disinfection alternatives for the new facility were considered: Sodium hypochlorite and UV disinfection. The current Hastings Wastewater Treatment Plant uses sodium hypochlorite for disinfection, followed by sodium bisulfite for dechlorination.

As the service area grows and flows increase, chemical disinfection becomes a less favorable option. Alternative 2, UV disinfection, is recommended. This is the lowest net present value. It also reduces chemical handling for the new facility, it has the smallest footprint, and it's remote-operation capable.

Next slide, please.

Five solids processing alternatives for the new facility were considered: Mesophilic anaerobic digestion and land application; liquid sludge hauling with thickened primary and waste-activated sludge; liquid sludge hauling with thickened waste-activated sludge only and no primary clarifiers; dewatered cake hauling with thickened primary sludge and non-thickening waste-activated sludge; and dewatered cake hauling with thickened primary and waste-activated sludge.

Alternatives 1, 3, and 4 require advanced solids processing facilities, and they have the highest capital and operating and maintenance costs of all alternatives considered for a facility of this size.

Alternative 2B, liquid sludge hauling with thickened waste-activated sludge only and no primary clarifiers, is recommended. This is the lowest net present value alternative, and it simplifies solids processing for this facility. Under this alternative, solids will continue to be hauled to the Metro Wastewater Treatment Plant for incineration as they are currently.

Next, Chad will discuss the outfall, lift station and conveyance system, and decommissioning of the existing plant. Thank you.

MR. CHAD DAVISON: Thank you, Heidi.

And thank you, Council Member Wulff.

My name is Chad Davison. I believe I forgot to spell my name previously. That spelling is C-H-A-D, D-A-V-I-S-O-N.

This slide here shows, the large parcels in red are the parcels that Met Council owns for where the treatment plant is being proposed. The narrow corridor to the north, paralleling the open grass area along the electrical power line is where Met Council currently owns easements -- permit easements for the outfall pipe.

Phase one archeological study was performed on the alignment prior to acquiring of the easements. No historic finds were observed during the excavation of the 106 test holes that were performed on the actual easement that's shown there.

There was a phase two archeological study that was performed on a known historic site beginning 250 feet to the west. That's at the high point of the alignment. The site was placed on the National Registry of Historic Sites upon the conclusion of that study.

Next slide, please.

This here shows the profile and the planned view of the alignment that we just discussed where the easements are. The image in the upper corner is the profile. The blue lines on that profile, the highest blue line there, is the 500-year rain event elevation of the river. And then the next line down, that dashed line, is the 100-year floodplain elevation, and then the ten-year floodplain elevation.

The alignment would require crossing into the CP Railroad way -- or right-of-way and the Vermillion River.

The high point of the profile shows shallow bedrock, which will need to be excavated to allow installation of the outfall pipe to be gravity-fed at the plant and not have to be pumped. The hatched area in orange on that profile shows the area of rock excavation.

Next slide, please.

So a business case study that we did for the outfall pipe was whether or not to start with pumping into the discharge or gravity-feed discharge.

Alternative 1 would require a higher lift at the start of the wastewater treatment, additional fill for the plant itself to have a higher treatment elevation, and then the rock excavation on the route to the Mississippi River.

Alternative 2 required a second pumping station at the tail end of the treatment, and then controls for handling the surge-basin effect through the system, having pumping both in and out of the system.

Alternative 1 is the recommended option due to system functionality and lowest net present worth.

Next slide, please.

Lift station and conveyance system, the gravity trunk sewer shown in orange on this map can intercept 90 percent of the Hastings wastewater flow and route directly to the plant by gravity flow.

This greatly reduces the size and impact of the lift station needed in the downtown area, and that results in a .2 MGD lift station located in the downtown area, a six-inch force main to get up to the gravity trunk sewer, and then the trunk that we just discussed.

Next slide, please.

In reviewing the location of where the lift station in the downtown area should be, we reviewed all underdeveloped and underutilized properties within 130 feet [sic] of the existing wastewater treatment plant. That process, we identified six properties, in total, that were reviewed, and they're shown in red on this map. The actual siting location of the potential lift station are shown in yellow. You can notice on the existing plant, we actually showed two lift station locations, 1A and 1B.

Next slide, please.

In reviewing those properties, we reviewed five major criteria in comparing them with each other: Site or land characteristics, developmental potential, environmental considerations, constructability, and then capital cost.

Next slide, please.

The site 1B, which is the southwest corner of the existing wastewater treatment plant, is the recommended option. It is land that the Met Council currently owns. There are no easement restrictions on the property. They require minimal infrastructure improvements compared to other sites to get the wastewater to the lift station to pump it since all the water goes to the existing plant site currently. It's not located within a flood zone. The northern portion of the existing wastewater treatment plant is within the flood zone. That would be 1A, this is 1B (indicating).

It is lowest capital cost of all the options, and minimal impacts to existing wastewater treatment plant operations during construction, and then sufficient site access to existing roadways and infrastructure.

Next slide, please.

The force main from the lift -- recommended lift station site up to the gravity pipe on Tenth Street, we reviewed two different force main lines. Basically a straight shot there on both options.

So you have Tyler Street and Bailey Street for review. Tyler Street is the recommended alignment. Bailey Street had -- was recently reconstructed by the city and has complications with the railroad to the east.

Metropolitan Council will repair or replace any city utilities impacted by our construction in Tyler Street as we construct that force main pipe.

Next slide, please.

The alignment of the gravity trunk sewer is basically a straight shot from the new wastewater treatment plant property to the top of the hill where we intercept the trunk following Tenth Street and Ravenna Trail right-of-way line. The trunk sewer will allow the city to abandon the local sewer after the project is complete. The profile shows a gravity-fed pressure pipe that would cross underneath the Vermillion River. This is to conserve depth on our pipe and reduce the height of required lift at the beginning of the wastewater treatment plant.

Next slide, please.

After we install a lift station and our new plant is up and running, we would need to decommission the existing plant. We are -- we do have an agreement where we obtain the property and the plant from the city that the property would revert back to city ownership upon the plant no longer being needed on that site.

This is just a concept, a starting point for negotiations with the city, and how we would leave the property for them. This plan here shows on the southern half of the property removing all the structures, all the way down to the footing. This is -- because this is land that is outside the 500-year floodplain of the Mississippi River and most likely has development potential.

The portion of the north end is within the floodplain, and they're currently proposing to remove the structures five feet below grade, knocking holes in all structures so they don't retain, and then backfilling it with clean fill.

You can advance to the next slide, please.

The work on this facility plan will have sustainability and community impacts; energy conservation and odor management; community impacts like hauling; archeological and historical review in all parts of the planning process.

Next slide, please.

Relocation of the Hastings Wastewater Treatment Plant opens opportunities to advance the Council's environmental sustainability initiative. B3 -- which is Buildings, Benchmarks & Beyond -- guidelines will be followed on the construction of the administration and maintenance buildings, and where it makes sense, process buildings like headworks.

Non-potable use of disinfected effluent water at the treatment plant will be maximized to reduce reliance on the city and groundwater use whenever possible and economically feasible.

Examples of sustainability solutions planned for this facility include energy- and carbon-efficient approaches, like high-efficient equipment, lighting, and building systems. A Tier 4 generator used for standby power generation and demand responses. The gravity flow to the Mississippi River by -- for the effluent pipe.

Additionally, drought-tolerant sustainable landscapes and green infrastructure and best management practices for storm water management, like rain gardens, porous pavement, permeable pavers, infiltration basins, are also planned.

Next slide, please.

Odor management will be designed into the systems where odors are typically. This would be places like headworks, gravity thickening, sludge load-out, and the lift station in the downtown area.

Haul route is needed for three to four sludge trucks hauling solid waste to the Metro plant in St. Paul daily. This route uses stated routes, and the minimum strength design of the pavement at 10-ton design. That shows going south on Glendale to the Hastings State Aid route, Spiral Boulevard, over to 316 State Highway, and north on Trunk Highway 61 up to St. Paul.

A phase 1 and 2 archeological review was performed on the new plant property prior to the purchase of the land back in 2005. No historical or cultural artifacts were found on plant property at that time, and no evidence of the visual survey of the property that led the surveyor to believe there was any sites on the property. Further review will be done during our environmental process, which I'll lay out here in the next couple slides.

Next slide, please.

Our implementation schedule of this project: This plan is to begin design in 2024 -- or 2023, and then -- for the collection system, and then begin construction 2024. We show three years for the collection system modifications, like the lift station and the force main and the trunk sewer going out to the plant.

The construction commission will take three years, and then we would finish commissioning right before we'd want to commission the plant, which would be constructed over three years, and then commissioned for a year in 2027.

And then once that plant is fully

operational and all the operations of treatment are terminated at the existing plant, then we would begin decommissioning, and then eventually turn that property back over to the city.

Next slide, please.

So our project is going to be funded through Public Facilities Authority loans, PFA loans, which are paid back over a 20-year term. These loans are paid for by municipal wastewater charges. So that is the cost per gallon of water used by all the people throughout the Twin Cities that they pay to their cities. Those cities pay Metropolitan Council a portion of that money to pay for our treatment of the wastewater.

There's also sewer availability charges, or SAC charges. These are one-time charges that help pay for the trunk modifications to the system and provide new service to areas.

The impacts on these rates for this project, we have -- an average person that pays in their water bill to the city for sewage $200 per year, their rate would go up -- or their amount paid to the city that year would go up roughly $6.25. On a SAC charge, they're proposing an increase of $80 per new household connection.

Next slide, please.

Our next steps, our deadline for comment on this facility plan will be January 18th, 2022. Metropolitan Council Environment Committee will review the plan with the comments addressed on February 8th, 2022. Metropolitan Council will consider adoption of this facility plan on February 23rd, 2022, and then submittal in early March to the MPCA to be placed on the intended use plan for the PFA funding in early March.

Next slide, please.

Part of our planning process, our preliminary design, which is yet to come, we will be doing an environmental assessment on both the collection system modifications and the plant site.

Some of these items included in the EAW are natural heritage review; land use compatibility review; environmental assessment; air and water resources review; historical property survey; noise and transportation assessment; and cultural property review and assessment.

Next slide, please.

I'd like to now turn it back over to Council Member Wulff to conclude the public hearing. Thank you.

COUNCIL MEMBER WULFF: Thank you, Jim, Rene, Heidi, and Chad for your very informative presentations.

At this time, we'll open it up to our attendees for your comments and questions on the draft facility plan for the public record. I'd like to remind you to state and spell your first and last name each time you speak. Also, please include your address and the organization you represent, if any, for the record.

As I said before, there's a few ways you can offer comments or questions. You can type them in the chat box. You can select the "reactions" button to use the raise-hand function to be unmuted and speak out loud. You can e-mail us your comment or question to comment@HastingsWWTP.com. Or if you're joining our public hearing by phone, you can call or text us at (651) 302-2908.

First, I will check the chat. I have a comment from Tina Folch, Council Member Tina Folch from Hastings: If the existing site is -- turnover back to the ownership of the city, I do not understand why the property wouldn't be given back in the same condition as it was taken without any underground infrastructure left behind. I do not understand why it would be acceptable to leave infrastructure left behind that the city would have to remove for site redevelopment. It is not acceptable for the city of Hastings to be left with any potential cleanup for the site to be used for any redevelopment purposes.

Do we have any response from staff?

MR. CHAD DAVISON: Council Member Wulff, I could take that question, if you wouldn't mind.

COUNCIL MEMBER WULFF: Go ahead.

MR. CHAD DAVISON: So like in the presentation, I said that that is a starting point of negotiation with the city. We, obviously, will have to have some sort of intergovernmental agreement so both parties know exactly what's happening, who is paying for what, and what the conditions of the site will be when it gets reverted back to the ownership of the city. So those are details that will be worked out.

COUNCIL MEMBER WULFF: Thank you. I'm not seeing anything else in the chat just yet. Do we have any participants with their hands raised?

MR. TIM O'DONNELL: I don't see any participants with hands raised yet.

COUNCIL MEMBER WULFF: Okay. Mikaela, is

there any more coming in in the chat not directly to me?

MS. MIKAELA ISAACSON: No, I'm not seeing anything else coming in right now.

COUNCIL MEMBER WULFF: Okay. Tina has raised her hand. Tina Folch, would you like to speak?

MS. MIKAELA ISAACSON: And I also see someone in the chat has asked, how do I raise my hand? So if you go to the bar at the bottom of your screen, you'll see on the lower right-hand side, there should be a little reactions button. If you click that, you will see it says "raise hand," and that's what you click on.

COUNCIL MEMBER WULFF: I'll take Tina first.

MS. TINA FOLCH: Hi, Wendy. This is Tina. Can you hear me?

COUNCIL MEMBER WULFF: I can.

MS. TINA FOLCH: Great. Thanks for having this presentation for us, it's greatly appreciated, and thanks for reading my question there.

And so just, you know, even going one step further with that, I guess I'm not, again, understanding how it was presented was even a starting point for negotiations with the city of Hastings to leave all that infrastructure left behind.

You know, I don't know what it was that -- was originally on the site when the Met Council had taken it over, but I have to imagine everything that there is today has been the responsibility of the Met Council for installation.

And so, again, I just have to reiterate that I -- you know, being an elected official and representing the interests of the city of Hastings, its taxpayers, I just do not have any understanding as to how that would be an acceptable standing point to leave any infrastructure left over that the city doesn't have any use for, potentially, in the future.

And so I just wanted to reiterate my, kind of, shock and dismay about -- about that much infrastructure being left behind underneath the ground. We don't want to see that site left -- you know, as a green space potentially. You know, it's in our -- it's between our downtown and residential neighborhood.

And so, again, you know, we would like to see that site used for other purposes in redevelopment, you know, some kind of commercial or high-density development into the future. And so, again, just reiterating, I don't understand how that's a starting point.

And then my second point was in regards to providing notice about these plans. I had asked one of the staff members of the city of Hastings as to how many folks were notified about this particular -- this presentation, and I was told that postcards only went to houses or property owners that were within like a few blocks, like two blocks, or something to that effect, of the new property.

And so as you're doing communications into the future, I would really hope that a direct communication would be provided to all the residents that are along Tyler Street, that -- between the Second Street and up to Tenth Street that are going to be -- because they're going to be most impacted by all of this construction work with the ripping up of that roadway, which was just redone a few years ago, like three or four years ago.

And so I'm sure that they'll be very surprised to be having, you know, the inconvenience of Tyler Street being completely torn up and demolished, again. And so, just, I would ask that a better communication would be done directly with those residents.

And so thanks, again, Wendy. I appreciate you making this time available for us. Thank you.

COUNCIL MEMBER WULFF: Thank you, Tina. Can you spell your name and state your address for the court reporter that's keeping the transcript?

MS. TINA FOLCH: Sure. Yeah. My name is Tina, T-I-N-A, Folch, F as in frank, O-L-C-H. My address is 1523 Tyler Street, T-Y-L-E-R, Street, Hastings, Minnesota 55033.

COUNCIL MEMBER WULFF: Thank you.

Did staff want to respond to the comments?

MR. CHAD DAVISON: Council Member Wulff, I could add some clarification on the distribution of the invites.

COUNCIL MEMBER WULFF: Go ahead, Chad.

MR. CHAD DAVISON: We did provide invites for everybody on Tenth Street and Ravenna Trail and Tyler and Bailey and Third Street and Lea Street, and a block and a half either way of those corridors that were being looked at. So that's who we mailed out to -- postcards.

COUNCIL MEMBER WULFF: Thank you.

And also, Tina, I think the intent with the property is to leave it in a developable condition when it's turned over to the city. The area where some footings would be left in place eight-feet below the ground was in the floodplain where it's not developable anyway. But there will be more time to discuss that between Met Council staff and the city council and city staff.

We have a couple other hands raised. I'll take --

MR. TIM O'DONNELL: Council Member Wulff.

COUNCIL MEMBER WULFF: Yes.

MR. TIM O'DONNELL: Can I jump in here? This is Tim O'Donnell.

COUNCIL MEMBER WULFF: Go ahead, Tim.

MR. TIM O'DONNELL: Do we have somebody on our team who could address the -- Council Member Folch's question about what was the condition of the property when we -- when the Met Council Environmental Services took ownership of it. I believe that the existing treatment plant, although we've expanded on it and renovated it over the years, was constructed by the city of Hastings, originally, I believe back in the 1950s. And we would have acquired the property with the centralization of the wastewater system in the Twin Cities in the late 1960s or early 1970s.

So anybody else on the staff who can clarify that for us?

MS. RENE HEFLIN: Council Member Wulff, may I?

COUNCIL MEMBER WULFF: Go ahead, Rene.

MS. RENE HEFLIN: It's on one of the initial slides, if we would scroll back. The plant -- the original plant was constructed by the city of Hastings, and then acquired by the Metropolitan Council.

I'm sorry for the scrolling up. I thought it might help to look on the original photo of the plant.

So in 1952, the Hastings Wastewater Treatment Plant was constructed by the city of Hastings, and the Council acquired the wastewater treatment plant in 1970. Thank you.

COUNCIL MEMBER WULFF: Thank you, Rene. So we would be decommissioning the plant and returning the land in a state that is more developable than when it was acquired by the

Council.
Jake Majeski, you have your hand up. Can you unmute and spell your name and state your address?
MR. JAKE MAJESKI: (Indiscernible.)
COUNCIL MEMBER WULFF: I'm having --
THE REPORTER: I --
COUNCIL MEMBER WULFF: -- a hard time hearing. Are other people having a hard time hearing?
THE REPORTER: I can't hear either.
MR. JAKE MAJESKI: Can you hear me now?
THE REPORTER: No.
COUNCIL MEMBER WULFF: Barely.
MR. JAKE MAJESKI: How about now?
COUNCIL MEMBER WULFF: Still barely.
I'm not hearing anything now. Jake, do you want to try calling in?
MR. JAKE MAJESKI: (No response.)
MS. MIKAELA ISAACSON: The number to call-in is in the chat if anyone needs it.
MR. TIM O'DONNELL: If somebody on the screen that -- could you unmute Mr. Majeski?
Mr. Majeski, could you try again, please?
MR. JAKE MAJESKI: (No response.)

COUNCIL MEMBER WULFF: I'm not hearing anything at all right now. So maybe staff can work on connecting with him and getting a sound that we can hear, and I will go to Mike Childs and come back to Mr. Majeski when we get that figured out.

MS. MIKAELA ISAACSON: Yeah. And, Jake, I can -- I'll open up a private chat with you and see if we figure out your speaker and get you to where we can actually hear you.

COUNCIL MEMBER WULFF: That sounds great.

Mike Childs, go ahead. Spell your name and state your address, please.

MR. MICHAEL CHILDS: Okay. Mike, M-I -- well, Michael, M-I-C-H-A-E-L, Childs, C-H-I-L-D-S, Junior. I'm actually representing just not -- I mean, I'm a Prairie Island Indian Community Council Member, but I also -- mainly is because some of my family ties in Hastings. So I'll just do my home address, which is 16501 235th Street Way, that's in Welch, Minnesota 55089.

And then that's all you needed, right?

COUNCIL MEMBER WULFF: Yes. So go ahead and ask your questions or make your comments.

MR. MICHAEL CHILDS: Thank you. Okay. Okay. I've just got a couple comments. I think there's a comment about who was notified. The reason I found out about it is because, as being on the Prairie Island Indian Community Council, I was mailed as an official, so I was notified.

And I assume that was because under state law, you know, there's a -- there's -- well, last meeting, it wasn't brought up, but you brought it up this meeting that there was a, you know, potential site to -- a village site 250 feet to the west of where that water pipe was going to discharge into the river. And that's -- that was my main interest as a -- because my ties to Hastings are through my -- some of my -- Hoffman, John and Emmett Hoffman, relatives. Which, by the way, some of that discharge piping is going through some of their old land, and the Whipple family of Hastings. So these are my native Dakota relatives that were in and around that area.

And my main concern is, as these being my ancestors, is that nothing is dug up. Because in the last 100-plus years there's been a lot of desecration of historic sites and graves. And a lot of times these kind of projects, even though there's a -- you know, archeological-type stuff done for the preliminary, it's been found halfway through. A lot times things are dug up.

So that's my main concern, and making sure that if something is dug up that it's not -- somebody just doesn't hide it because there's been a lot of that. So, you know, that's my main concern.

Also, you know, under this -- because it's a State-of-Minnesota-funded project, I would assume that the Minnesota Indian Affairs Council Cultural Resources have been notified of this project.

And, also, under a newly passed law this year, that tribal consultation is being requested by the tribe, Prairie Island Indian Community, from the Met Council on this.

So I just wanted -- and I figure, I'm kind of glad that the mayor of Hastings is on there. So I wanted them to know that, our concerns from the Prairie Island Indian Community, at least of possible destruction of stuff, so thank you.

COUNCIL MEMBER WULFF: Thank you. And is there any staff response?

MR. CHAD DAVISON: Wendy, I can have a short response.

COUNCIL MEMBER WULFF: Go ahead, Chad.

MR. CHAD DAVISON: Yes. We will be

reaching out for consultation with Prairie Island Indian Community. That will be initiated once we begin to enter into preliminary design. And we will definitely consult with you on what has been done to date and review those documents with you. And then, potentially, arrange something for -- during construction, too.

COUNCIL MEMBER WULFF: Thank you.

And I would reiterate, you know, the Council, it tends to obey all appropriate laws and be respectful of any archeological findings that may happen. We're designing this to avoid any interference with any archeological places, and the Council is committed to conferring with the Prairie Island Community and working on this in partnership.

Have we figured out Jake Majeski's issues yet for communication?

MS. MIKAELA ISAACSON: Yeah, I think we did. So we're going to give it a try, and if it doesn't work, then I am unable to solve the problem.

So I'll unmute you now, Jake.

COUNCIL MEMBER WULFF: And please spell your name and state your address.

(No response.)

COUNCIL MEMBER WULFF: I'm not hearing

anything.

MS. MIKAELA ISAACSON: Yeah. No, I had him adjust the audio settings on his Zoom account so -- if that was the issue. So if it's not, it must just be something with the device itself.

COUNCIL MEMBER WULFF: I'm not hearing anything at all. Jake, maybe try calling that phone number and we can get you on that way.

MR. TIM O'DONNELL: Mr. Majeski, the phone number you can reach us at is (651) 302-2908, and we'll work with you to try to convey your question or comment one way or the other.

While we're waiting for that to happen, why don't I go ahead and read questions and comments that we received prior to the public hearing today.

This question came from James Powell. It's spelled J-A-M-E-S, P-O-W-E-L-L. He's from both infrastructure and environmental. His first question was, Section 4.5.6 of the facility plan indicates that the strength of the road sections for the area that's surrounding the wastewater treatment plant site were reviewed. Will the roadway strength data used for this review be included in the final report?

His second question is in Appendix 7-1,

it includes detailed opinions of probably cost. Is there more detailed conveyance -- in parentheses, gravity and force main sewers -- detailed conveyance and Mississippi River outfall capital cost data available?

And his third question is, have treatment plant or other components been identified that have a high risk of negatively impacting the construction schedule due to supply chain issues?

So MCES will look into these questions and respond to Mr. Powell, and we will include his questions and our response in the public record, but we don't have answers for him at this point.

COUNCIL MEMBER WULFF: And I would note that he put in the chat, it's John Powell, J-O-H-N, not James.

MR. TIM O'DONNELL: Oh, I apologize, Mr. Powell. I made a mistake in putting my notes together.

COUNCIL MEMBER WULFF: So he is actually in the Zoom meeting as well.

MR. TIM O'DONNELL: Okay. My apologies. But thank you for submitting your questions, and we will get a response back to you.

The second comments and a question that

we received came from Craig Christenson, and that's spelled C-R-A-I-G, last name, Christenson C-H-R-I-S-T-E-N-S-O-N.

His comments are: There is no information regarding the rivers' floodplains. The soils must be very poor for construction. There must be a need for a 500-plus-year flood wall. There must be a flood impact due to the large flood wall area construction. And his question is: Why was not the higher land further north not used for the project?

And, again, we will look into these questions and comments and respond to Mr. Christensen, and then include his comments and questions in response in the public record.

The other correspondence we received was the following questions from Tyler Cysiewski, and that's spelled T-Y-L-E-R, last name is, C-Y-S-I-E-W-S-K-I. And those questions -- his questions and these responses from MCES will be included in the public record.

First question is: Was the property that the new plant will go on private property before? The answer is yes. MCES purchased the property in 2005 as an active gravel mine from the previous property owner.

The second question: Is the property part of the Vermillion water floodplain? The answer is: Most of the property is located in the floodplain. MCES will optimize siting new facilities outside of the floodplain. The FEMA flood map for this property can be found at the website https://msc.FEMA.gov/portal/home, and then use the property address 2445 Ravenna Trail, Hastings.

His third question: If the property was privately owned, what was the purchase price? And is there a cap for this plan? And then in parenthesis, for clarification, he adds, what is the budget for this project, and where is the money coming from?

Our response is that we will need to look through our records to find the property purchase price, and we will get that information to him.

The second part -- the second part of the answer is: Projects of this nature are typically funded through the issuance and revenue generated through general obligation bonds that are sold by the Metropolitan Council and through low-interest loans that we can acquire from the Clean -- the

Minnesota Clean Water State Revolving Fund, or parentheses, SRF.

The planning level construction cost estimate for this work is $145 million. The cost will be further refined as the project moves forward into design.

That concludes the questions and comments that we received prior to the public hearing. Thank you.

COUNCIL MEMBER WULFF: Thank you.

MS. MIKAELA ISAACSON: And then we've got Jake on the phone now, so I'm going to unmute him, and so hopefully we can hear him this time.

COUNCIL MEMBER WULFF: Wonderful.

Jake.

MR. JAKE MAJESKI: Okay. Can you guys hear me now?

COUNCIL MEMBER WULFF: We can. That's wonderful.

MS. MIKAELA ISAACSON: Yay.

COUNCIL MEMBER WULFF: Please state and spell your name and then state your address, and then you can proceed with your comments or questions.

MR. JAKE MAJESKI: All right. My name is

Jake Majeski, J-A-K-E, M-A-J-E-S-K-I. Address is 2002 Fourth Street East in Hastings here.

I have a few questions for you. I believe the first one will go to Heidi, or she's the one that brought it up anyway. But you stated that to dump the water in the Vermillion would cost more, but it would be cleaner water going into the Vermillion River. To dump water in the Mississippi, less money but more excavation, but dirtier water. It all runs into the same place, so I don't understand the difference in that one.

COUNCIL MEMBER WULFF: Heidi, do you want to clarify?

MS. HEIDI HUTTER: Can you see me? Yes. Yes, I sure will do that.

So the requirement -- the treatment level requirement is based on where the discharge point is, and it's not that the Mississippi is worse than the Vermillion in terms of water quality, it's that the Mississippi River is much larger and it's able to handle larger loads. So we are discharging water to the Mississippi River that is cleaner than the water that is currently in the river, and those limits are set by the MPCA.

MR. JAKE MAJESKI: Okay. And I've got a

few questions, if that's okay.

COUNCIL MEMBER WULFF: Go ahead.

MR. JAKE MAJESKI: Question number two was, you said a buffer zone for a pipeline for the discharge, what would that buffer zone be?

COUNCIL MEMBER WULFF: Heidi.

MS. HEIDI HUTTER: I'm not sure I understand the question regarding a buffer zone for the discharge. Could you clarify for me a little bit?

MR. JAKE MAJESKI: Well, somebody stated -- I'm not sure if it was you, Heidi, but somebody stated that there needs to be a buffer zone for the pipeline for the discharge pipe. I'm curious on what that buffer zone would be as far as an easement.

MS. HEIDI HUTTER: Chad.

MR. JAKE MAJESKI: How big of an easement would that be?

MS. HEIDI HUTTER: Chad, is this something related to your work you could help us with?

MR. CHAD DAVISON: I can chime in. I don't believe I ever mentioned buffer zone, but we have existing easements north of your property.

That easement is currently 70-feet wide.
And then once it gets up towards the river, it makes a 90-degree-angle bend to get away from tail -- some tail water from the Mississippi, and it discharges, kind of, in the flow with -- with the flow of the river. At that point, it widens out to 130 feet, and then right at the discharge, it's narrowed down to 100.
But the whole portion, the north/south portion across the DNR property is where we require those permits -- or the easements. That easement is currently 70-feet wide.
MR. JAKE MAJESKI: Okay.
MR. CHAD DAVISON: I believe there are two parcels that are missing from that alignment and easements, and one is your property and then the other would be -- (indiscernible).
THE REPORTER: I --
MR. JAKE MAJESKI: When do you (indiscernible) --
COUNCIL MEMBER WULFF: Oh, we're getting feedback.
THE REPORTER: I missed the -- this is Christine, can you hear me?
COUNCIL MEMBER WULFF: Yes.

THE REPORTER: I missed the last thing that Chad said. "One is your property and the other would be," and I didn't hear what the other would be.

MR. CHAD DAVISON: The Lapine (phonetic) property.

THE REPORTER: Thank you.

MR. CHAD DAVISON: I'm not sure how to spell it. I can get that spelling to you later.

THE REPORTER: Thank you.

MR. JAKE MAJESKI: Bruce Lapine.

MR. CHAD DAVISON: Yes.

MR. JAKE MAJESKI: So when do you plan on speaking to these landowners?

MR. CHAD DAVISON: As part of our preliminary design process, we've actually started the process of initiating real estate with our -- our Metropolitan Council real estate office has not been assigned a person to reach out yet.

MR. JAKE MAJESKI: Okay. And one more question for you, this might be for you, Chad. How deep will you have to go through the highest ground on your way to the river to be gravity-fed?

MR. CHAD DAVISON: It would be -- well, the preliminary -- we haven't -- we have not reached the final -- we have not designed the final discharge elevation of the plant yet, but based on preliminary discharge elevations, we're talking, like, 12-feet deep with seven feet of rock excavation, is, I think, what we estimated. But that might change a little bit. It might be a little deeper, it might be a little shallower.

The whole point is that the feed point of the plant needs to be just a little bit higher than the high point so it can push the water through the high point and out to the river.

MR. JAKE MAJESKI: Okay. Will dynamite be used, do you know, if you're going through bedrock, limestone?

MR. CHAD DAVISON: I doubt it. I would -- I don't know for sure, but being that that's a sensitive area, I would say no. It would be pneumatic and jackhammer.

MR. JAKE MAJESKI: Okay. Is there any studies on pneumatic jackhammers disturbing wells? Because we're all well-fed down here. We don't have city water and sewer.

MR. CHAD DAVISON: That I am not sure of. I would have to get back to you on that.

MR. JAKE MAJESKI: Okay. And that's all

the questions I had for now. Thank you for your time.

MR. CHAD DAVISON: You're welcome.

COUNCIL MEMBER WULFF: Thank you, Jake.

MR. JAKE MAJESKI: Thank you.

COUNCIL MEMBER WULFF: I'm glad we were able to resolve your communication issues and give you a chance to ask your questions.

MR. JAKE MAJESKI: Yeah. You've got to love COVID, right?

COUNCIL MEMBER WULFF: Do we have anybody else who would like to speak?

MS. MIKAELA ISAACSON: I had a question come in through text on the hotline number.

COUNCIL MEMBER WULFF: Okay.

MS. MIKAELA ISAACSON: So I'm just going to read that off quick. This is from Margaret Bohn or Bohn (different pronunciation). I'm sorry if I'm pronouncing your last name wrong. It's spelled M-A-R-G-A-R-E-T, and last name is B-O-H-N. And they live at 601 Second Street East.

The question was: We are wondering how much noise we can expect out of the new pump station? Will it be placed on the southeast corner? And odor?

COUNCIL MEMBER WULFF: Do we have -- thank you for the question.

Do we have a staff member who wants to give a quick answer now, or are we waiting to get back to them?

MR. CHAD DAVISON: Council Member Wulff, I could provide a brief answer, if you'd like.

COUNCIL MEMBER WULFF: Thank you.

MR. CHAD DAVISON: The size of the lift station that will be required on the plant site is very small. It's very similar to other municipal lift stations that are around town. An example of the similar size of the station would be on the South Frontage Road, right by the middle school or by Schafer Field. That one has a vent pipe that comes up and goosenecks down towards the grounds. There are currently no odors there.

The system -- the sewer in the system is going to be in the system about the same duration of time. That is important because of the anaerobic process of wastewater decaying creates those gases, and they don't have an odor problem there.

We will provide a design that has the ability to add odor control if it is a problem for the city, but we'll know that before we turn it over to the city. And if it is, we will install that odor control.

Noise-wise, under general, normal operations, it should be very quiet. The electrical will be provided by an Xcel electric grid. During power outages, there could be a generator running, which would make some noise, but that would be an intermittent, very, very limited time.

That's all. Thank you.

COUNCIL MEMBER WULFF: Thank you, Chad.

Do we have anybody else who would like to ask a question or make a comment?

I'm not seeing any hands raised or anything appearing in the chat. I will turn it back over to Tim O'Donnell to give some additional information.

MR. TIM O'DONNELL: Thank you, Council Member Wulff.

And if we could go to the next slide, please. Thank you.

We want to remind you that, again, we covered this earlier, but just as a reminder, the public hearing record will remain open until 5:00 p.m. on Tuesday, January 18th, 2022. You can submit comments through any of the methods showing now on the screen: By e-mail, by postal mail, on our project comment line, or by TTY text telephone.

Next slide, please.

And we will continue to have the draft facility plan available for the public to review through January 18th, 2022, which is the end of the comment period. You can find it at Hastings City Hall, at Pleasant Hill Library in Hastings, and it will also be on our project website at MetroCouncil.org/Hastings/WWTPproject.

And we will keep the draft facility plan on the project website for longer than the January 18th public comment deadline. So it will be an information resource that will be available on the website.

And next slide, please.

Looking a little bit further out, we want to do what we can to help you stay informed as we keep moving our project forward over the next several years even. So anytime you have a question or a comment and you want to reach us, you can e-mail at comment@HastingsWWTP.com. That's a dedicated e-mail address to this project, and you could also call our project hotline at (651) 302-2908.

We also will post new information as we have it available on the project website. So, again, the website address is MetroCouncil.org/HastingsWWTPproject.

So I would like to turn it back to Council Member Wulff to close us out tonight. Thank you.

COUNCIL MEMBER WULFF: Thank you to everyone for participating tonight. Your input is very important, and we appreciate you taking the time to learn more about our Hastings Wastewater Treatment Plant relocation project. Hopefully you got the information you needed today. Feel free to contact us if you need more information, and we hope you have a great rest of your evening.

This public hearing is concluded.

(Public comment concluded.)

Q

R

CHRISTENSON, CRAIG

From: Craig Christenson <craigpc1@usfamily.net>
Sent: Thursday, November 25, 2021 11:28 AM
To: comment@hastingswwtp.com
Subject: Hastings new wwtp

There is no information regarding the rivers floodplains.
The soils must be very poor for construction.
There must be a need for a 500+ year flood wall.
There must be a flood impact due to the large flood wall area construction.
Why was not the higher land further north not used?

Craig Christenson
craigpc1@usfamily.net

CYSIEWSKI, TYLER

From: Tyler Cysiewski <outlawironlawncare@gmail.com>
Sent: Monday, January 24, 2022 10:59 PM
To: Hutter, Heidi <Heidi.Hutter@metc.state.mn.us>
Subject: Re: Water treatment plant.

Thank you!

On Fri, Jan 21, 2022 at 1:53 PM Hutter, Heidi <Heidi.Hutter@metc.state.mn.us> wrote:

Hi Tyler,

Based on the state deed tax information we found in our records, the final purchase price of the Hastings WWTP Property at 2445 Ravenna Trail, Hastings was $5.3M.

Thank you for your patience as we worked to locate this information.

Please let me know if you have any additional questions.

Heidi M. Hutter, P.E.
Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533
390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Hutter, Heidi
Sent: Wednesday, January 12, 2022 3:39 PM
To: Tyler Cysiewski <outlawironlawncare@gmail.com>
Subject: RE: Water treatment plant.

Hi Tyler,

I wanted to reach out and let you know we are still looking for final documentation on the purchase price. Our real estate office will be reviewing remaining paper files this week.

I do apologize for the delay. The information is past our record retention time but we do have other ways to find it, they just take a little bit of digging on our end.

Thank you for your continued patience.

Heidi M. Hutter, P.E.

Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533
390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Tyler Cysiewski <outlawironlawncare@gmail.com>
Sent: Monday, January 10, 2022 9:03 AM
To: Hutter, Heidi <Heidi.Hutter@metc.state.mn.us>
Subject: Re: Water treatment plant.

Still looking for that information if it is available thanks

On Wed, Dec 15, 2021 at 12:59 PM Tyler Cysiewski <outlawironlawncare@gmail.com> wrote:

Thank you for the update. It's greatly appreciated!

On Wed, Dec 15, 2021 at 12:58 PM Hutter, Heidi <Heidi.Hutter@metc.state.mn.us> wrote:

Hi Tyler,

I just wanted to circle back with you and let you know we are still pulling information on the final purchase price of the Hastings WWTP property. We are just verifying some final information through our real estate office. I expect to be able to share that information with you this month.

Thank you for your continued patience as we work to answer all your questions. Please let me know if I can assist in any other way.

Thank you,

Heidi M. Hutter, P.E.
Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533
390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Hutter, Heidi
Sent: Friday, December 3, 2021 4:14 PM

To: Tyler Cysiewski <outlawironlawncare@gmail.com>
Subject: RE: Water treatment plant.

Hi Tyler,

I do sincerely apologize for the delay. Please see below for response to your questions. I hope you had a wonderful holiday.

1. Was the property that the new plant will go on private property before?
   a. Yes. MCES purchased the property in 2005 as an active gravel mine from the previous property owner.
2. Is the property part of the vermillion water flood plan?
   a. Most of the property is located in the flood plain. MCES will optimize siting new facilities outside of the flood plain. The FEMA flood map for this property can be found here: https://msc.fema.gov/portal/home (2445 Ravenna Trail, Hastings)
3. If the property was privately owned what was the purchase price and is there a cap for this plan [the budget for this project and where the money is coming from]?
   a. I will look through our records to find the property purchase price and get back to you.
   b. Projects of this nature are typically funded through the issuance and revenue generated through general obligation bonds sold by Council and low interest loans from the Clean Water State Revolving Fund (SRF). The planning level construction cost estimate for this work is $145,000,000. Cost will be further refined as the project moves forward into design.

Please let me know if I can provide further assistance. Thank you for your interest in the Hastings Wastewater Treatment Plant.

Heidi M. Hutter, P.E.
Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533
390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Tyler Cysiewski <outlawironlawncare@gmail.com>
Sent: Monday, November 29, 2021 1:57 PM
To: Hutter, Heidi <Heidi.Hutter@metc.state.mn.us>
Subject: Re: Water treatment plant.

Also include the purchase price for the land it is going on if you could please. Thanks again!

On Mon, Nov 29, 2021 at 1:55 PM Tyler Cysiewski <outlawironlawncare@gmail.com> wrote:

Hi just wondering if you had gotten to what I had previously requested? Thanks tyler

---

On Tue, Nov 9, 2021 at 3:56 PM Tyler Cysiewski <outlawironlawncare@gmail.com> wrote:

No worries, thanks for the update!

On Mon, Nov 8, 2021 at 4:03 PM Hutter, Heidi <Heidi.Hutter@metc.state.mn.us> wrote:

Hi Tyler,

I apologize for taking longer than anticipated to respond to your questions. I will be working on these this week.

Thank you,

Heidi M. Hutter, P.E.
Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533
390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Tyler Cysiewski <outlawironlawncare@gmail.com>
Sent: Friday, October 29, 2021 11:49 AM
To: Hutter, Heidi <Heidi.Hutter@metc.state.mn.us>
Subject: Re: Water treatment plant.

Sounds good thank you!

On Fri, Oct 29, 2021 at 11:48 AM Hutter, Heidi <Heidi.Hutter@metc.state.mn.us> wrote:

Hi Tyler,

Thank you for clarifying! I will get back to you next week with a more detailed response.

In the interim please let me know if any additional questions come up.

Heidi M. Hutter, P.E.
Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533

390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Tyler Cysiewski <outlawironlawncare@gmail.com>
Sent: Friday, October 29, 2021 11:39 AM
To: Hutter, Heidi <Heidi.Hutter@metc.state.mn.us>
Subject: Re: Water treatment plant.

I guess the budget for this project and where the money is coming from maybe would be a better description.

On Fri, Oct 29, 2021 at 11:37 AM Hutter, Heidi <Heidi.Hutter@metc.state.mn.us> wrote:

Hi Tyler,

Thank you for your interest in the new Hastings Wastewater Treatment Plant.

I wanted to let you know that I received this correspondence and plan to respond in greater detail next week. Would you mind elaborating on question #3 regarding the referenced cap?

Thank you,

Heidi M. Hutter, P.E.
Project Manager | Wastewater Planning & Capital Project Delivery
Heidi.Hutter@metc.state.mn.us
P. 651.602.1026 | C. 612.237.4533
390 North Robert Street | St. Paul, MN | 55101 | metrocouncil.org

---

From: Tyler Cysiewski <outlawironlawncare@gmail.com>
Sent: Tuesday, October 26, 2021 5:42 PM
To: Hutter, Heidi <Heidi.Hutter@metc.state.mn.us>
Subject: Water treatment plant.

Couple of questions on the new water treatment plan.

1. Was the property that the new plant will go on private property before?
2. Is the property part of the vermillion water flood plan?
3. If the property was privately owned what was the purchase price and is there a cap for this plan?

POWELL, JOHN

From: Powell, John <John.Powell@foth.com>
Sent: Tuesday, January 4, 2022 12:55 PM
To: comment@hastingswwtp.com
Subject: Draft Hastings Wastewater Treatment Plant Facility plan

Thank you for posting the Draft Hastings Wastewater Treatment Plant Facility Plan. A few questions arise based on our review to date:

1. Section 4.5.6 indicates that the strength of the road sections for the area surrounding the WWTP site were reviewed; will the roadway strength data used for this review be included in the final report?
2. Appendix 7-1 includes Detailed Opinions of Probable Cost; is there more detailed conveyance (gravity and force main) and Mississippi River outfall capital cost data available?
3. Have treatment plant or other components been identified that have a high risk of negatively impacting the construction schedule due to supply chain issues?

If we missed this information during our review of the document, we apologize for our oversight.

Thank you!

John M. Powell, PE

Infrastructure Market Lead

Licensed in MN

Foth Infrastructure & Environment, LLC

Cell: 612.618.8024

foth.com

MAJESKI, JAKE

From: Davison, Chad <Chad.Davison@metc.state.mn.us>
Sent: Tuesday, January 25, 2022 10:24 AM
To: Boyce, Cynthia <Cynthia.Boyce@metc.state.mn.us>
Cc: Ewig, Greg <Greg.Ewig@metc.state.mn.us>
Subject: FW: Waste Water Treatment Plan

Cynthia,

Below is the email from Jake Majeski to Senator Bingham.

Chad Davison
Principal Engineer | Environmental Services - Interceptors
Metropolitan Council
3565 Kennebec Drive, Eagan, MN 55122
P. 651-602-4031 | C. 651-775-5108

From: Davison, Chad
Sent: Thursday, January 6, 2022 11:09 AM
To: Ewig, Greg <Greg.Ewig@metc.state.mn.us>
Subject: FW: Waste Water Treatment Plan

Greg,

Below is the email from the state senator regarding the Majeski property

Chad Davison
Principal Engineer | Environmental Services - Interceptors
Metropolitan Council
3565 Kennebec Drive, Eagan, MN 55122
P. 651-602-4031 | C. 651-775-5108

From: Heflin, Katherine <rene.heflin@metc.state.mn.us>
Sent: Thursday, January 6, 2022 10:56 AM
To: Davison, Chad <Chad.Davison@metc.state.mn.us>
Subject: FW: Waste Water Treatment Plan

From: Thompson, Leisa <leisa.thompson@metc.state.mn.us>
Sent: Thursday, January 6, 2022 8:27 AM
To: Heflin, Katherine <rene.heflin@metc.state.mn.us>
Cc: Taylor, Susan <Susan.Taylor@metc.state.mn.us>
Subject: FW: Waste Water Treatment Plan

Good morning Rene,

How would you like to approach creating a response to this request? I can engage others to help but you are also able to work directly with those that you need to include. I have time that I could make available at 10:30 if you would like to discuss. Thanks, Leisa

Leisa Thompson
She/Her/Hers
General Manager | Environmental Services
Metropolitan Council
390 North Robert St, St Paul, MN 55101
P. 651-602-8101 | C. 612-229-3503

From: Schetnan, Judd <judd.schetnan@metc.state.mn.us>
Sent: Wednesday, January 5, 2022 10:50 PM
To: Bordson, Brooke <Brooke.Bordson@metc.state.mn.us>; Thompson, Leisa <leisa.thompson@metc.state.mn.us>
Cc: Bogie, Mary <mary.bogie@metc.state.mn.us>
Subject: Fwd: Waste Water Treatment Plan

Leisa - please see the following email from Senator Bigham.

I would appreciate your assistance with a response.

Judd

From: Sen. Karla Bigham <Sen.Karla.Bigham@senate.mn>
Sent: Wednesday, January 5, 2022 9:43 PM
To: Schetnan, Judd; Emily Spiteri
Subject: Fwd: Waste Water Treatment Plan

A little help.

Karla

From: Jake Majeski <majeskijake@yahoo.com>
Sent: Wednesday, January 5, 2022 10:00:43 PM
To: Sen. Karla Bigham <Sen.Karla.Bigham@senate.mn>
Subject: Waste Water Treatment Plan

Hi Ms. Bigham,

I am a resident of Hastings, MN. I'm sure you are aware of the new waste water treatment plant for the city of Hastings. I understand the necessity of a new water treatment plant in our city. However, as one of two landowners the Met Council will have to cross to get to their end location of the Mississippi River, I was wondering if there is any power we have against the Met Council? This is something the Met Council has clearly planned for awhile since they've acquired easements on either side of our land, yet not spoken to me directly. I raised this point in a virtual public hearing this evening and was told a land use coordinator would contact me in the future.

The land they plan to cross is our last 10 acres to build on and has been in our family for over 60 years. I dreamed of passing that land on to my family in memory of my Grandparents. We lost our home to a devastating fire 5 years ago and can't believe we're about to lose more. Could you please provide insight or help on what to do?

Thanks,

Jake Majeski

January 11, 2022

The Honorable Senator Karla Bigham
Capitol Office
95 University Avenue W.
Minnesota Senate Building, Room 2411
Saint Paul, MN 55155

Dear Senator Bigham:

We appreciate the opportunity to respond to Mr. Majeski's concerns. The Metropolitan Council is committed to a public process for the new Hastings Wastewater Treatment Plant through the holding of the public hearing this past Wednesday evening in addition to a public open house that was held on December 15, 2021, and presentations to Hastings City Council on October 18, 2021. In addition to these meetings, the Council has mailed notices to residents and materials have been placed at the local library and on-line for the residents to review.

The new Hastings Wastewater Treatment Plant project is currently in the planning phase. It is common to address issues raised by property owners as the planning process proceeds. In our latest concept plans, the Council would need to acquire a sanitary sewer easement over Mr. Majeski's property, which would run parallel to an existing Xcel Energy electrical transmission easement.

Our wastewater treatment plant needs to discharge to the main channel of the Mississippi River. The proposed easement is being considered as the most direct and cost-effective route that avoids conflicts with culturally significant and historic sites.

As we finalize the planning process in March 2022, the Council's real estate staff will reach out to Mr. Majeski and start an independent appraisal process. He will be invited to attend an appraiser site visit where he can identify and share any issues that may be a factor for the appraiser to consider related to valuation. Upon completion of the appraisal, a formal offer would be provided to Mr. Majeski and he would have the option to obtain his own independent appraisal, which we will reimburse up to $5,000 under state law.

We are committed to working with Mr. Majeski and the other property owners as this project proceeds. Our sewer improvements Project Manager is scheduling a site visit with Mr. Majeski for the week of January 16th.

Best regards,

Leisa Thompson

Leisa Thompson
General Manager
Environmental Services

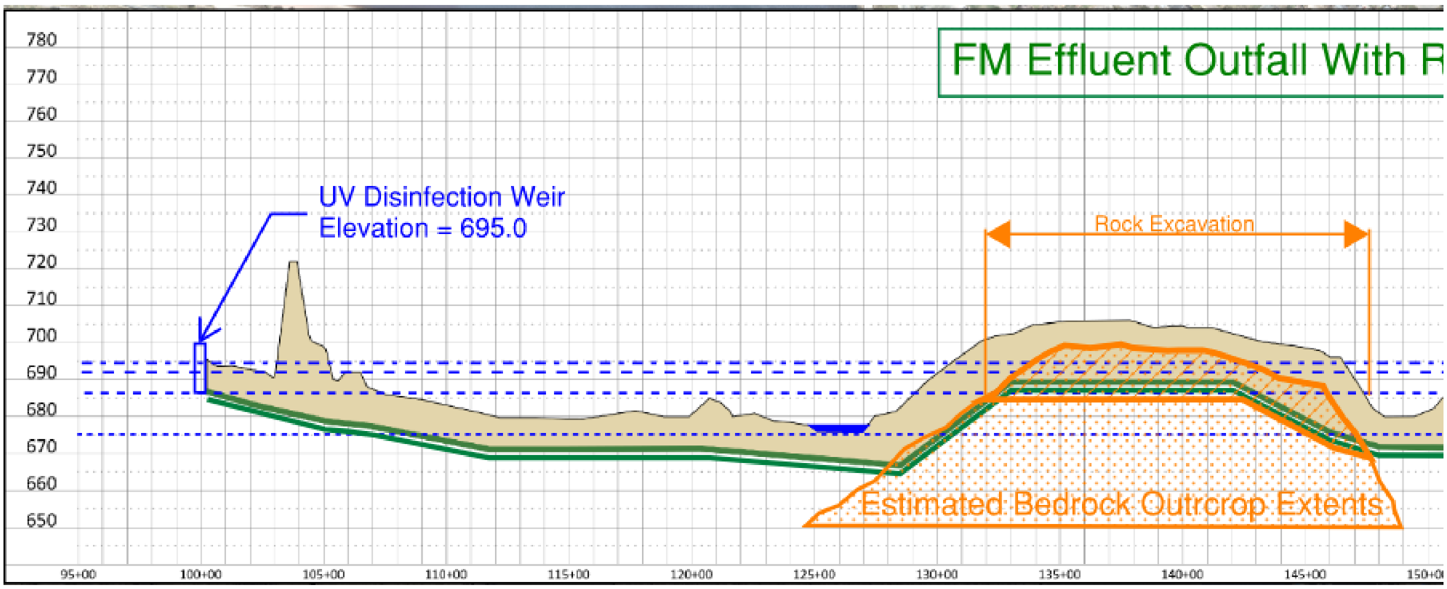
CC: Mr. Jake Majeski

Davison, Chad

From: Eric Leagjeld <Eric.Leagjeld@bolton-menk.com>
Sent: Monday, January 10, 2022 8:28 PM
To: Davison, Chad
Cc: Brian Simmons; Remus, Christopher
Subject: RE: Hastings WWTP - Public Hearing comment Regarding Rock Exc

Hello Chad,

Soil boring 6 and 6A are located at the top of the bedrock outcrop on 4th Street East where the maximum rock excavation is require. No ground water was observed in these geotechnical borings, which were drilled to top of intact rock. Soil boring 5 and the related piezometer located 1360 feet northwest of soil boring 6 and 6A, indicate the groundwater elevation is located at approximately 675 feet. Elevation 675 is also the normal pool elevation of the Mississippi River.



Based on maximum rock excavation to approximately elevation 685 near 4th Street East, we do not anticipate that rock excavation on the project will have any negative impact to drinking water wells in the area. We would expect all drinking wells to be well below the normal pool elevation of the Mississippi River or the proposed maximum rock excavation elevation of 685.

Please review and advise if you feel additional information or explanation is required.

Regards,

Eric Leagjeld, PE (MN,SD)
Senior Structural Project Engineer
Bolton & Menk, Inc.
111 Washington Avenue South – Suite 650
Minneapolis, MN 55401
Phone: (612) 416-0220 ext. 3292
Mobile: (612) 772-4272
email: Eric.Leagjeld@bolton-menk.com
Bolton-Menk.com

From: Davison, Chad <Chad.Davison@metc.state.mn.us>
Sent: Monday, January 10, 2022 10:50 AM
To: Eric Leagjeld <Eric.Leagjeld@bolton-menk.com>
Cc: Brian Simmons <Brian.Simmons@bolton-menk.com>; Remus, Christopher <Christopher.Remus@metc.state.mn.us>
Subject: Hastings WWTP - Public Hearing comment Regarding Rock Exc

Eric,

During our public hearing, one of the property owners near the outfall asked if the rock excavation would cause any issues with the local private wells.

Due to the archeological sites at the high point, we would not permit blasting. Do you or possibly AET have any info or knowledge of the groundwater aquifer in the area that you can share to provide a response in the appendix of the facility plan?

Chad Davison
Principal Engineer | Environmental Services - Interceptors
Metropolitan Council
3565 Kennebec Drive, Eagan, MN 55122
P. 651-602-4031 | C. 651-775-5108

metrocouncil.org | facebook | twitter

Hastings WWTP Facility Plan Project

Comments Collected during Public Comment Period

Emails

Craig Christenson, November 25, 2021

1. There is no information regarding the river's floodplains.
    a. A map depicting the floodplain is available in the Facility Plan. Reference Figure 1-3.
2. The soils must be very poor for construction.
    a. Soil borings across the site were performed as part of planning activities. Soil correction as needed will be part of construction activities and has been accounted for during planning.
3. There must be a need for a 500+ year flood wall.
    a. The wastewater treatment plant will be built on approximately 10 acres of natural high ground, located outside the 500-year flood plain. This area supports a 10 million gallon per day facility planned for the service area.
4. There must be a flood impact due to the large flood wall area construction.
    a. Construction on natural high ground located outside the 500-yr floodplain minimizes disruption to the natural landscape and impacts to the floodplain. Any impacts to the floodplain will be addressed through the proper regulatory channels.
5. Why was not the higher land further north not used?
    a. This property was selected following Phase I and Phase II archeological investigations of potential properties due to low potential to contain intact archeological resources based on extensive gravel and sand extraction, housing and commercial development, and road construction activities that have occurred in the area.

Tyler Cysiewski October 26, 2021 through January 10th, 2022.

1. Was the property that the new plant will go on private property before?
    a. Yes. MCES purchased the property in 2005 as an active gravel mine from the previous property owner.
2. Is the property part of the vermillion water flood [plain]?
    a. Most of the property is located in the flood plain. MCES will optimize siting new facilities outside of the flood plain. The FEMA flood map for this property can be found here: https://msc.fema.gov/portal/home (2445 Ravenna Trail, Hastings)
3. If the property was privately owned what was the purchase price and is there a cap for this plan? Clarification: I guess the budget for this project and where the money is coming from maybe would be a better description.
    a. Based on the state deed tax information found in Council records, the final purchase price of the Hastings WWTP Property at 2445 Ravenna Trail, Hastings was $5.3M.
    b. Projects of this nature are typically funded through the issuance and revenue generated through general obligation bonds sold by Council and low interest loans from the Clean Water State Revolving Fund (SRF). The planning level construction cost estimate for this

work is $145,000,000. Cost will be further refined as the project moves forward into design.

John Powell January 4, 2022

1. Section 4.5.6 indicates that the strength of the road sections for the area surrounding the WWTP site were reviewed; will the roadway strength data used for this review be included in the final report?
    a. All proposed haul route roadways are a minimum of 9-ton design strength. Roadway strength data will not be added to the facility plan.
2. Appendix 7-1 includes Detailed Opinions of Probable Cost; is there more detailed conveyance (gravity and force main) and Mississippi River outfall capital cost data available?
    a. See certified opinion of probable cost added to Appendix 7-1
3. Have treatment plant or other components been identified that have a high risk of negatively impacting the construction schedule due to supply chain issues?
    a. At this time no risks have been identified due to current supply chain issues. The project is currently in the planning phase. Construction is schedule for 2024-2026. Risk will be evaluated and accounted for during design.

Public Hearing

Tina Folch:

1. If the existing site is to turn over back to ownership of the city, why wouldn't the property be given back in the same condition as it was taken without any underground infrastructure let behind? Why would it be acceptable to leave infrastructure behind that the city would have to remove for site redevelopment?
    a. The existing WWTP was constructed by the city of Hastings in 1952. Ownership was transferred to the Metropolitan Council in 1970. The proposed decommissioning plan removes structures in their entirety on the developable portions of the site and returns the property to the City in a more developable manner than it was received. The specifics of decommissioning will be developed in an intergovernmental agreement between the City of Hastings and the Council.
2. I was told that postcards only went to houses or property owners that were within a few blocks of the new property. And so, as you're doing communications into the future, I would really hope that a direct communication would be provided to all the residents that are along Tyler Street.
    a. Invites for the open house and public hearings were sent to over 300 stakeholders and residents within and adjacent to the project boundary. Publications were also sent to the local and regional newspapers.
    b. A map was provided depicting the mailing area.

Michael Childs (Tribal Council):

1. Some of that discharge piping is going through some of my relative's old land. My main concern is that nothing is dug up. A lot of times these kinds of projects, even though there's

archeological-type stuff done for the preliminary, it's been found halfway through. A lot times things are dug up. So that's my main concern and making sure that if something is dug up that it's not hidden because there's been a lot of that.

   a. The Metropolitan Council will initiate tribal consultation following Adoption of the Facility Plan by Council.

Jake Majeski:

1. You stated that to dump the water in the Vermillion would cost more, but it would be cleaner water going into the Vermillion River. To dump water in the Mississippi, less money but more excavation, but dirtier water. It all runs into the same place, what's the difference?
   a. Water quality standards are established by the MPCA based on the specific characteristics of the discharge location and receiving water body. The Mississippi River has the capacity to accept treated effluent water from the wastewater treatment plant currently and as it grows with the service area. It also maintains flexibility of the Council's Mississippi Basin Total Phosphorus Permit which is protective of the environment.
2. Someone stated that there needs to be a buffer zone for the pipeline for the discharge pipe. I'm curious on what that buffer zone would be as far as an easement. How big of an easement would that be and when do you plan on speaking to landowners?
   a. We currently plan to request a 70' wide easement adjacent to the Xcel Energy overhead transition line easement. Negotiations for the easement will begin in January 2022.
3. How deep will you have to go through the highest ground on your way to the river to be gravity-fed?
   a. Preliminary design revealed a 15-foot excavation at the high point as it crosses 4th Street. This may change a foot or two during final design. The lower 8 to 10 feet of trench is expected to by rock excavation.
4. Will dynamite be used, do you know, if you're going through bedrock, limestone?
   a. Blasting will not be used. Rock excavation will be performed by pneumatic and mechanical excavation.
5. Are there any studies on pneumatic jackhammers disturbing wells? Because we're all well-fed down here. We don't have city water and sewer.
   a. A memo from the Council consultant engineer addressing the concerns about the groundwater aquifer was sent to Mr. Majeski.
6. Email sent by Jacob Majeski to Senator Bingham expressed concern regarding an easement across his property for the treated water discharge pipe to the Mississippi River. The Senator's office forwarded this email to the Council requesting a response they could forward to Mr. Majeski.
   a. Email correspondence contains all communication related to this inquiry.

Margaret Bohn:

1. We are wondering how much noise we can expect out of the new pump station?
    a. The new pump station will be very quiet during normal use. There may be intermittent noise if there is a power outage due to the sound of a generator running.
2. Will it be placed on the southeast corner?
    a. Yes
3. Will odor be an issue?
    a. We do not anticipate any odor issues. The Metropolitan Council will be operating this lift station for a year prior to turning the facility over to the City. We will assess any odors at the lift station and install odor control if needed.

Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-4194

State Environmental Review Process (SERP) Mailing List Form

Clean Water State Revolving Fund Program

Minnesota Rules 7077.0272, subp. 2.a.A.
Minnesota Rules 7077.0277, subp. 3.B.

Doc Type: Wastewater Point Source

Instructions: This is the complete mailing list that the Minnesota Pollution Control Agency (MPCA) will use to public notice the Environmental Summary or other environmental review documents. Please type names and addresses on this form and return to the MPCA staff engineer. This list should be considered minimum. If a more substantial mailing list is available for the Public Participation Program, it should be added to this mailing list. **Please return this mailing list in MS Word format only.**

Example address blocks:

The Honorable Mark Anderson
Minnesota State Senator
135 State Office Building
St. Paul, MN 55113

Marv Johnson, City Administrator
City of Willmar
236 Oriole Avenue
Willmar, MN 55699

Municipality name: Metropolitan Council Environmental Services **Project number:** 809800

Contact name: Tim O'Donnell **Phone number:** 651-602-1269
(person completing the form)

Public notice address information

1.	**The Honorable State Senator:**	**6.**	**City Administrator/Clerk:**
	See attached Government/Community stakeholder list		See attached Government/Community stakeholder list
2.	**The Honorable State Representative:**	**7.**	**Engineering Consultant:**
	See attached Government/Community stakeholder list		Bolton & Menk Eric Leagjeld 111 Washington Ave. S. #650 Minneapolis MN 55401
3.	**The Honorable County Board Chair:**	**8.**	**County Planning and Zoning Office:**
	See attached Government/Community stakeholder list		See attached Government/Community stakeholder list
4.	**The Honorable Mayor:**	**9.**	**Watershed District (if established):**
	See attached Government/Community stakeholder list		See attached Government/Community stakeholder list
5.	**Township Board Clerk:***	**10.**	**Regional Development Commission:**
	See attached Government/Community stakeholder list		Metropolitan Council Attn: Lisa Barajas 390 Robert St. N. St. Paul, MN 55101-1805

******Include if any portion of the project (including the facility, interceptor, influent or outfall lines) will be located in the township(s).*

To add rows, place your cursor in the last row of the second column and hit tab.

Interested citizens:	**Interested groups:** (i.e., homeowners associations, environmental, business, civic, etc., organizations)
See attached Citizen/Property Owners list	See attached Government/Community stakeholder list

To add rows, place your cursor in the last row of the second column and hit tab.

Property owners:

Property owner list should include all property owners of the site to be, or which has been previously acquired. For pond systems, include the property owner(s) of the pond site, spray irrigation site(s) and all property owners of homes within one-fourth mile of the pond site and any clusters of homes within one-half mile of the pond site.

See attached Citizen/Property Owners list	

Federal agencies:

ATTN: Field Supervisor
U.S. Fish and Wildlife Service
Twin Cities Field Office
4101 American Boulevard East
Bloomington, MN 55425-1665

ATTN: Environmental Compliance Chief
U.S. Army Corps of Engineers
St. Paul District
180 Fifth Street East, Suite 700
St. Paul, MN 55101-1678

ATTN: Regional Environmental Officer
Federal Emergency Management Agency
Region V Office
536 South Clark Street, 6th Floor
Chicago, IL 60605

State agencies:

ATTN: Environmental Review Supervisor
MN Department of Natural Resources
Division of Ecological and Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155 -4025

ATTN: Manager of Government Programs and Compliance
MN Historical Society
Minnesota Historic Preservation Office
345 West Kellogg Boulevard
St. Paul, MN 55102-1906

ATTN: Cultural Resource Director
MN Indian Affairs Council
161 St. Anthony Avenue, Suite 919
St. Paul, MN 55103

MPCA regional office(s):

Mark Zabel
14955 Galaxie Ave.
Apple Valley MN 55124

Mark Ryan
14955 Galaxie Ave.
Apple Valley MN 55124

Ryan Stempski
101 4th St. E
Hastings MN 55033

Justin Fortney
102 4th St. E
Hastings MN 55033

John Hinzman
103 4th St. E
Hastings MN 55033

Mark Peine
104 4th St. E
Hastings MN 55033

Mark Krebsbach
14955 Galaxie Ave.
Apple Valley MN 55124

Brian Watson
4100 220th St. W
Farmington MN 55024

Martha Vickery
1200 Warner Road
St Paul MN 55033

Amy Klobuchar
425 Dirksen
Senate Office Building
Washington DC 20510

Tina Smith
425 Dirksen
Senate Office Building
Washington DC 20510

Tony Jurgens
351 State Office Building
St Paul MN 55155

Mike Slavik
1590 Highway 55
Hastings MN 55033

Mary Fasbender
101 4th Street East
Hastings MN 55033

Tina Folch
101 4th Street East
Hastings MN 55033

Jen Fox
101 4th Street East
Hastings MN 55033

Lisa Leifeld
101 4th Street East
Hastings MN 55033

Trevor Lund
101 4th Street East
Hastings MN 55033

Charlie Zelle
390 Robert St. N.
St. Paul MN 55101

Wendy Wulff
390 Robert St. N.
St. Paul MN 55101

Susan Taylor
391 Robert St. N.
St. Paul MN 55101

Shelley Buck
5636 Sturgeon Lake Road
Welch MN 55089

Lucy Taylor
5636 Sturgeon Lake Road
Morton MN 55089

Valentina Mgeni
5636 Sturgeon Lake Road
Morton MN 55089

Johnny Johnson
5636 Sturgeon Lake Road
Morton MN 55089

Michael Childs Jr.
5636 Sturgeon Lake Road
Morton MN 55089

Jody Johnson
5636 Sturgeon Lake Road
Morton MN 55089

Margaret Flower
12390 Ivanhoe Way
Hastings MN 55033

Robert Rotty
12390 Ivanhoe Way
Hastings MN 55033

Marjory Snyder
19497 205th Street East
Hastings MN 55033

Jerry Bauer
19497 205th Street East
Hastings MN 55033

Tim Odonnell
390 Robert St. N.
St. Paul MN 55101

Chris Berglund
414 Nicollet Mall
Minneapolis MN 55401

Karla Bigham
95 University Avenue W.
Minnesota Senate Bldg.,
Room 2411
St. Paul, MN 55155

Kathleen Gaylord
Administration Center
1590 Highway 55
Hastings, MN 55033-2343

Lori Braucks
101 4th Street East
Hastings MN 55033

Mark Vaughan
101 4th Street East
Hastings MN 55033

Dan Wietecha
101 4th St. E
Hastings MN 55033

Dawn Skelly
101 4th St. E
Hastings MN 55033

Dakota County Office of
Planning
1590 Highway 55
Hastings, MN 55033

Dakota Soil & Water
Conservation District
4100 220th St. West, Suite
102
Farmington, MN 55024

CURRENT RESIDENT
1001 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
1002 Tyler St
Hastings MN 55033-2830

CURRENT RESIDENT
1003 Ramsey St
Hastings MN 55033-2809

CURRENT RESIDENT
1005 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
1006 Tyler St
Hastings MN 55033-2830

CURRENT RESIDENT
1007 Ramsey St
Hastings MN 55033-2809

CURRENT RESIDENT
1009 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
1010 Tyler St
Hastings MN 55033-2830

CURRENT RESIDENT
1011 Ramsey St
Hastings MN 55033-2865

CURRENT RESIDENT
1013 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
1014 Tyler St
Hastings MN 55033-2830

CURRENT RESIDENT
1016 Tyler St
Hastings MN 55033-2830

CURRENT RESIDENT
1017 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
102 Chestnut St
Hastings MN 55033-1320

CURRENT RESIDENT
1021 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
1025 Bailey St
Hastings MN 55033-2215

CURRENT RESIDENT
1027 Ramsey St
Hastings MN 55033-2809

CURRENT RESIDENT
1035 Ramsey St
Hastings MN 55033-2809

CURRENT RESIDENT
109 Bass St
Hastings MN 55033-1317

CURRENT RESIDENT
109 Lea St
Hastings MN 55033-1322

CURRENT RESIDENT
110 Chestnut St
Hastings MN 55033-1320

CURRENT RESIDENT
1175 Tyler St
Hastings MN 55033-2833

CURRENT RESIDENT
121 Tyler St
Hastings MN 55033-1297

CURRENT RESIDENT
1225 Progress Dr
Hastings MN 55033-2203

CURRENT RESIDENT
1229 Progress Dr
Hastings MN 55033-2203

CURRENT RESIDENT
150 Bass St
Hastings MN 55033-1316

CURRENT RESIDENT
15211 Ravenna Trl
Hastings MN 55033-9673

CURRENT RESIDENT
15213 Ravenna Trl
Hastings MN 55033-9673

CURRENT RESIDENT
15215 Ravenna Trl
Hastings MN 55033-9673

CURRENT RESIDENT
1614 4th St E
Hastings MN 55033-1424

CURRENT RESIDENT
1621 4th St E
Hastings MN 55033-1425

CURRENT RESIDENT
217 Ramsey St
Hastings MN 55033-1220

CURRENT RESIDENT
301 Ramsey St
Hastings MN 55033-1200

CURRENT RESIDENT
1901 Glendale Rd
Hastings MN 55033-9377

CURRENT RESIDENT
2200 Ravenna Trl
Hastings MN 55033-9704

CURRENT RESIDENT
303 5th St E
Hastings MN 55033-1907

CURRENT RESIDENT
2002 4th St E
Hastings MN 55033-1453

CURRENT RESIDENT
2200 Ravenna Trl
Hastings MN 55033-9704

CURRENT RESIDENT
3050 4th St E
Hastings MN 55033-9379

CURRENT RESIDENT
2019 Glendale Rd
Hastings MN 55033-9377

CURRENT RESIDENT
2551 Glendale Rd
Hastings MN 55033-8301

CURRENT RESIDENT
307 4th St E
Hastings MN 55033-1948

CURRENT RESIDENT
2020 Glendale Rd
Hastings MN 55033-9377

CURRENT RESIDENT
2900 4th St E
Hastings MN 55033-1447

CURRENT RESIDENT
307 6th St E
Hastings MN 55033-1915

CURRENT RESIDENT
2100 Glendale Rd
Hastings MN 55033-9377

CURRENT RESIDENT
2925 4th St E
Hastings MN 55033-1405

CURRENT RESIDENT
308 4th St E
Hastings MN 55033-1947

CURRENT RESIDENT
2121 Glendale Rd
Hastings MN 55033-9377

CURRENT RESIDENT
2950 4th St E
Hastings MN 55033-1447

CURRENT RESIDENT
309 4th St E
Hastings MN 55033-1948

CURRENT RESIDENT
213 Ramsey St
Hastings MN 55033-1220

CURRENT RESIDENT
300 2nd St E
Hastings MN 55033-1266

CURRENT RESIDENT
309 5th St E
Hastings MN 55033-1907

CURRENT RESIDENT
215 Bass St
Hastings MN 55033-1319

CURRENT RESIDENT
3000 4th St E
Hastings MN 55033-9379

CURRENT RESIDENT
310 Tyler St
Hastings MN 55033-1232

CURRENT RESIDENT
215 Ramsey St
Hastings MN 55033-1220

CURRENT RESIDENT
301 2nd St E
Hastings MN 55033-1207

CURRENT RESIDENT
311 2nd St E
Hastings MN 55033-1207

CURRENT RESIDENT
311 4th St E
Hastings MN 55033-1948

CURRENT RESIDENT
312 2nd St E
Hastings MN 55033-1206

CURRENT RESIDENT
312 4th St E
Hastings MN 55033-1947

CURRENT RESIDENT
312 5th St E
Hastings MN 55033-1906

CURRENT RESIDENT
313 2nd St E
Hastings MN 55033-1207

CURRENT RESIDENT
313 4th St E
Hastings MN 55033-1948

CURRENT RESIDENT
313 Ramsey St
Hastings MN 55033-1222

CURRENT RESIDENT
313 Tyler St
Hastings MN 55033-1233

CURRENT RESIDENT
314 2nd St E
Hastings MN 55033-1259

CURRENT RESIDENT
314 5th St E
Hastings MN 55033-1906

CURRENT RESIDENT
314 7th St E
Hastings MN 55033-2105

CURRENT RESIDENT
315 11th St E
Hastings MN 55033-2805

CURRENT RESIDENT
315 2nd St E
Hastings MN 55033-1207

CURRENT RESIDENT
315 3rd St E
Hastings MN 55033-1215

CURRENT RESIDENT
316 4th St E
Hastings MN 55033-1947

CURRENT RESIDENT
316 7th St E
Hastings MN 55033-2105

CURRENT RESIDENT
319 Tyler St
Hastings MN 55033-1233

CURRENT RESIDENT
320 2nd St E
Hastings MN 55033-1206

CURRENT RESIDENT
320 Tyler St
Hastings MN 55033-1232

CURRENT RESIDENT
321 5th St E
Hastings MN 55033-1907

CURRENT RESIDENT
321 6th St E
Hastings MN 55033-1915

CURRENT RESIDENT
322 7th St E
Hastings MN 55033-2105

CURRENT RESIDENT
323 Ramsey St
Hastings MN 55033-1222

CURRENT RESIDENT
323 Tyler St
Hastings MN 55033-1233

CURRENT RESIDENT
400 5th St E
Hastings MN 55033-1908

CURRENT RESIDENT
400 8th St E
Hastings MN 55033-2114

CURRENT RESIDENT
401 5th St E
Hastings MN 55033-1909

CURRENT RESIDENT
401 Ramsey St
Hastings MN 55033-1953

CURRENT RESIDENT
401 Tyler St
Hastings MN 55033-1932

CURRENT RESIDENT
402 3rd St E
Hastings MN 55033-1216

CURRENT RESIDENT
402 6th St E
Hastings MN 55033-1967

CURRENT RESIDENT
402 7th St E
Hastings MN 55033-2106

CURRENT RESIDENT
402 Tyler St
Hastings MN 55033-1928

CURRENT RESIDENT
404 3rd St E
Hastings MN 55033-1216

CURRENT RESIDENT
406 3rd St E
Hastings MN 55033-1245

CURRENT RESIDENT
406 6th St E
Hastings MN 55033-1916

CURRENT RESIDENT
406 7th St E
Hastings MN 55033-2106

CURRENT RESIDENT
406 Tyler St
Hastings MN 55033-1928

CURRENT RESIDENT
407 Tyler St
Hastings MN 55033-1932

CURRENT RESIDENT
408 5th St E
Hastings MN 55033-1908

CURRENT RESIDENT
409 5th St E
Hastings MN 55033-1909

CURRENT RESIDENT
409 7th St E
Hastings MN 55033-2107

CURRENT RESIDENT
410 6th St E
Hastings MN 55033-1916

CURRENT RESIDENT
411 Tyler St
Hastings MN 55033-1932

CURRENT RESIDENT
412 5th St E
Hastings MN 55033-1908

CURRENT RESIDENT
413 8th St E
Hastings MN 55033-2115

CURRENT RESIDENT
414 7th St E
Hastings MN 55033-2106

CURRENT RESIDENT
415 6th St E
Hastings MN 55033-1917

CURRENT RESIDENT
417 5th St E
Hastings MN 55033-1909

CURRENT RESIDENT
417 7th St E
Hastings MN 55033-2107

CURRENT RESIDENT
417 8th St E
Hastings MN 55033-2115

CURRENT RESIDENT
418 5th St E
Hastings MN 55033-1908

CURRENT RESIDENT
418 7th St E
Hastings MN 55033-2106

CURRENT RESIDENT
419 5th St E
Hastings MN 55033-1909

CURRENT RESIDENT
419 6th St E
Hastings MN 55033-1917

CURRENT RESIDENT
420 6th St E
Hastings MN 55033-1916

CURRENT RESIDENT
420 7th St E
Hastings MN 55033-2106

CURRENT RESIDENT
422 5th St E
Hastings MN 55033-1908

CURRENT RESIDENT
500 2nd St E
Hastings MN 55033-1301

CURRENT RESIDENT
502 6th St E
Hastings MN 55033-1918

CURRENT RESIDEN
503 Ramsey St
Hastings MN 55033-1926

CURRENT RESIDENT
504 Tyler St
Hastings MN 55033-1933

CURRENT RESIDENT
505 7th St E
Hastings MN 55033-2205

CURRENT RESIDENT
508 6th St E
Hastings MN 55033-1918

CURRENT RESIDENT
509 6th St E
Hastings MN 55033-1919

CURRENT RESIDENT
510 6th St E
Hastings MN 55033-1918

CURRENT RESIDENT
512 7th St E
Hastings MN 55033-2204

CURRENT RESIDENT
517 7th St E
Hastings MN 55033-2205

CURRENT RESIDENT
517 Ramsey St
Hastings MN 55033-1926

CURRENT RESIDENT
517 Tyler St
Hastings MN 55033-1934

CURRENT RESIDENT
518 2nd St E
Hastings MN 55033-1301

CURRENT RESIDENT
520 7th St E
Hastings MN 55033-2204

CURRENT RESIDENT
520 8th St E
Hastings MN 55033-2208

CURRENT RESIDENT
521 2nd St E
Hastings MN 55033-1302

CURRENT RESIDENT
521 7th St E
Hastings MN 55033-2205

CURRENT RESIDENT
521 Tyler St
Hastings MN 55033-1934

CURRENT RESIDENT
522 Lea St
Hastings MN 55033-1922

CURRENT RESIDENT
523 Ramsey St
Hastings MN 55033-1926

CURRENT RESIDENT
526 2nd St E
Hastings MN 55033-1301

CURRENT RESIDENT
600 2nd St E
Hastings MN 55033-1303

CURRENT RESIDENT
600 3rd St E
Hastings MN 55033-1312

CURRENT RESIDENT
600 7th St E
Hastings MN 55033-2206

CURRENT RESIDENT
600 Tyler St
Hastings MN 55033-1935

CURRENT RESIDENT
601 2nd St E
Hastings MN 55033-1304

CURRENT RESIDENT
601 3rd St E
Hastings MN 55033-1313

CURRENT RESIDENT
604 7th St E
Hastings MN 55033-2206

CURRENT RESIDENT
607 1st St E
Hastings MN 55033-1331

CURRENT RESIDENT
613 1st St E
Hastings MN 55033-1331

CURRENT RESIDENT
614 1st St E
Hastings MN 55033-1339

CURRENT RESIDENT
614 2nd St E
Hastings MN 55033-1303

CURRENT RESIDENT
614 3rd St E
Hastings MN 55033-1312

CURRENT RESIDENT
615 1/2 Tyler St
Hastings MN 55033-1936

CURRENT RESIDENT
616 3rd St E
Hastings MN 55033-1312

CURRENT RESIDENT
617 3rd St E
Hastings MN 55033-1313

CURRENT RESIDENT
618 2nd St E
Hastings MN 55033-1303

CURRENT RESIDENT
623 1st St E
Hastings MN 55033-1331

CURRENT RESIDENT
623 2nd St E
Hastings MN 55033-1355

CURRENT RESIDENT
623 3rd St E
Hastings MN 55033-1313

CURRENT RESIDENT
623 Tyler St
Hastings MN 55033-1936

CURRENT RESIDENT
629 2nd St E
Hastings MN 55033-1304

CURRENT RESIDENT
700 10th St E
Hastings MN 55033-2218

CURRENT RESIDENT
700 2nd St E
Hastings MN 55033-1305

CURRENT RESIDENT
701 10th St E
Hastings MN 55033-2201

CURRENT RESIDENT
701 Ramsey St
Hastings MN 55033-2139

CURRENT RESIDENT
703 2nd St E
Hastings MN 55033-1306

CURRENT RESIDENT
706 1st St E
Hastings MN 55033-1338

CURRENT RESIDENT
707 1st St E
Hastings MN 55033-1332

CURRENT RESIDENT
707 2nd St E
Hastings MN 55033-1306

CURRENT RESIDENT
708 2nd St E
Hastings MN 55033-1305

CURRENT RESIDENT
709 Ramsey St
Hastings MN 55033-2119

CURRENT RESIDENT
710 Tyler St
Hastings MN 55033-2124

CURRENT RESIDENT
711 Tyler St
Hastings MN 55033-2125

CURRENT RESIDENT
714 Tyler St
Hastings MN 55033-2124

CURRENT RESIDENT
715 2nd St E
Hastings MN 55033-1306

CURRENT RESIDENT
715 Ramsey St
Hastings MN 55033-2119

CURRENT RESIDENT
718 Bailey St
Hastings MN 55033-2209

CURRENT RESIDENT
718 Tyler St
Hastings MN 55033-2124

CURRENT RESIDENT
721 Ramsey St
Hastings MN 55033-2119

CURRENT RESIDENT
721 Tyler St
Hastings MN 55033-2125

CURRENT RESIDENT
723 2nd St E
Hastings MN 55033-1306

CURRENT RESIDENT
724 2nd St E
Hastings MN 55033-1305

CURRENT RESIDENT
800 10th St E
Hastings MN 55033-2217

CURRENT RESIDENT
800 Bailey St
Hastings MN 55033-2211

CURRENT RESIDENT
801 Ramsey St
Hastings MN 55033-2121

CURRENT RESIDENT
802 Tyler St
Hastings MN 55033-2126

CURRENT RESIDENT
805 Ramsey St
Hastings MN 55033-2121

CURRENT RESIDENT
806 Tyler St
Hastings MN 55033-2126

CURRENT RESIDENT
808 Bailey St
Hastings MN 55033-2211

CURRENT RESIDENT
809 Bailey St
Hastings MN 55033-2212

CURRENT RESIDENT
809 Tyler St
Hastings MN 55033-2127

CURRENT RESIDENT
811 Ramsey St
Hastings MN 55033-2121

CURRENT RESIDENT
812 Bailey St
Hastings MN 55033-2211

CURRENT RESIDENT
812 Tyler St
Hastings MN 55033-2126

CURRENT RESIDENT
813 Bailey St
Hastings MN 55033-2212

CURRENT RESIDENT
816 Tyler St
Hastings MN 55033-2126

CURRENT RESIDENT
817 Bailey St
Hastings MN 55033-2212

CURRENT RESIDENT
817 Ramsey St
Hastings MN 55033-2121

CURRENT RESIDENT
817 Tyler St
Hastings MN 55033-2127

CURRENT RESIDENT
819 Tyler St
Hastings MN 55033-2127

CURRENT RESIDENT
820 Tyler St
Hastings MN 55033-2126

CURRENT RESIDENT
822 Bailey St
Hastings MN 55033-2211

CURRENT RESIDENT
823 Tyler St
Hastings MN 55033-2127

CURRENT RESIDENT
830 Bailey St
Hastings MN 55033-2211

CURRENT RESIDENT
831 Bailey St
Hastings MN 55033-2212

CURRENT RESIDENT
832 Bailey St
Hastings MN 55033-2211

CURRENT RESIDENT
901 Tyler St
Hastings MN 55033-2129

CURRENT RESIDENT
905 Ramsey St
Hastings MN 55033-2122

CURRENT RESIDENT
908 Tyler St
Hastings MN 55033-2128

CURRENT RESIDENT
909 Ramsey St
Hastings MN 55033-2145

CURRENT RESIDENT
914 Tyler St
Hastings MN 55033-2128

CURRENT RESIDENT
915 Ramsey St
Hastings MN 55033-2122

CURRENT RESIDENT
920 Tyler St
Hastings MN 55033-2128

CURRENT RESIDENT
921 Ramsey St
Hastings MN 55033-2122

CURRENT RESIDENT
921 Tyler St
Hastings MN 55033-2129

CURRENT RESIDENT
923 Tyler St
Hastings MN 55033-2129

CURRENT RESIDENT
925 Tyler St
Hastings MN 55033-2129

CURRENT RESIDENT
927 Bailey St
Hastings MN 55033-2214

CURRENT RESIDENT
927 Ramsey St
Hastings MN 55033-2122

CURRENT RESIDENT
929 Bailey St
Hastings MN 55033-2214

CURRENT RESIDENT
930 Tyler St
Hastings MN 55033-2128

CURRENT RESIDENT
931 Bailey St
Hastings MN 55033-2214

CURRENT RESIDENT
933 Bailey St
Hastings MN 55033-2214

CURRENT RESIDENT
933 Ramsey St
Hastings MN 55033-2122

CURRENT RESIDENT
934 Bailey St
Hastings MN 55033-2213

CURRENT RESIDENT
936 Bailey St
Hastings MN 55033-2213

CURRENT RESIDENT
936 Tyler St
Hastings MN 55033-2128

CURRENT RESIDENT
940 Bailey St
Hastings MN 55033-2213

CURRENT RESIDENT
950 Bailey St
Hastings MN 55033-2213

Appendix 8-2 Resolution

METROPOLITAN COUNCIL

390 North Robert Street, St. Paul, Minnesota 55101-1634

Phone (651) 602-1000 · TDD (651) 291-0904 · FAX (651) 602-1550 · Metro Info (651) 602-1888

RESOLUTION NO. 2022-3
RESOLUTION APPROVING AND ADOPTING THE

Facility Plan for the Hastings Wastewater Treatment Plant
PROJECT NO. 809800

WHERE AS:

1. The Metropolitan Council is a public corporation and political subdivision of the State of Minnesota and has statutory responsibility for operating the Twin Cities Metropolitan Area regional wastewater collection and treatment system, and
2. The Metropolitan Council is a public corporation and political subdivision of the State of Minnesota and has statutory responsibility for operating the Twin Cities Metropolitan Area regional wastewater collection and treatment system, and
3. The Metropolitan Council has determined it is necessary and convenient for the fulfillment of its statutory responsibilities to construct the Hastings Wastewater Treatment Plant, Project Number 809800, and
4. A draft Facility Plan for the project has been completed and a public hearing was held on January 5, 2022 to discuss the proposed project and the draft Facility Plan

NOW, THEREFORE, BE IT RESOLVED BY THE METROPOLITAN COUNCIL,

that the Facility Plan for the

Hastings Wastewater Treatment Plant
PROJECT NO. 809800

is hereby approved and adopted.

Adopted this 23rd day of February, 2022.

Charles A. Zelle, Chair

Bridget Toskey
Bridget Toskey, Recording Secretary

390 Robert Street North
Saint Paul, MN 55101-1805

651.602.1000
TTY 651.291.0904
public.info@metc.state.mn.us
metrocouncil.org

Follow us on:
twitter.com/metcouncilnews
facebook.com/MetropolitanCouncil
youtube.com/MetropolitanCouncil