



Feasibility Study
King Plant Utility Improvements



April 20, 2022

Prepared for:
City of Oak Park Heights

Prepared by:
Stantec

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.



Lee M. Mann, PE
Date: April 20, 2022 Reg. No. 24541



City of Oak Park Heights
King Plant Utility Improvements
Project No.: 193805372

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FEASIBILITY STUDY

1.0 EXECUTIVE SUMMARY

The Alan S. King Plant is scheduled to be decommissioned in 2028. This report identifies the water system, sanitary sewer and stormwater management facilities, with associated costs, needed to serve the future re-development of the King Plant site. The King Plant site is approximately 180 acres total, with an estimated 80 acres developable. The King Plant is currently served by three private wells for water supply and one small lift station to convey sanitary sewer flows.

Two development scenarios were analyzed regarding the water demand and runoff characteristics. Scenario 1 assumes commercial/industrial development with a water demand similar to Anderson Windows. Scenario 2 assumes multi-family/mixed use development with 25% of the land allocated to roads, parks, etc. The remaining 75% of the land is assumed to develop at 25 units per acre.

Figure 1 in Appendix A graphically shows the water, sewer and stormwater facility improvements needed to serve the redeveloped site. It has also been determined that the water demand from the redeveloped site will necessitate the addition of a new water tower and water supply well to the City's water distribution system.

The cost identified to provide the water, sanitary sewer and stormwater facilities to serve the redeveloped site is \$4,800,000. The additional cost for the water tower and well is \$4,100,000.

2.0 INTRODUCTION

The purpose of this report is to perform an analysis of the costs for extending City utility services and providing stormwater management facilities to serve the future King Plant site redevelopment. The redevelopment of the site is anticipated to occur after its decommissioning which is currently scheduled for 2028. This analysis includes trunk facilities related to water distribution, sanitary sewer service and storm water management.

The King Plant site covers approximately 180 acres, of which approximately 80 acres are presumed developable. For the purposes of this analysis, two development scenarios were considered. Scenario 1 assumes that the site will develop commercial/industrial. The Anderson Windows operation was used as a model for water and sewer demand. A park/open space component will be incorporated in this scenario.

Scenario 2 assumes the site will develop multi-family/mixed use. The water and sewer demand in this analysis is based on removing 25% of the developable land for roads, parks etc. and utilizing a density of 25 residential units per acre for the remainder.



3.0 PROPOSED IMPROVEMENTS

The improvements analyzed include those necessary for water service, sanitary sewer service and storm water management. The analysis includes estimates of the demand for both potential development scenarios.

3.1 WATER MAIN IMPROVEMENTS

For development scenario 1, the Andersen Windows water usage was used as a basis to assign demand for the redevelopment of a similar-type facility on the King Plant site. Andersen Windows uses a little over 90 MG per year, or 250,000 gallon per day on a 65-acre site. This translates to approximately 3,850 gallon per acre per day. If we use that rate on an 80-acre site, it is estimated that this type of development would use 308,000 gallons per day (gpd) of average flow. This type of development generally has a lower peaking factor, and we would estimate that the maximum day demand would be on the order of 600,000 gallon per day and the diurnal curve would yield a peak hourly flow of approximately 625 gallons per minute (gpm).

It is estimated that this development scenario would need a fire flow of approximately 1,500 to 2,000 gpm. Therefore, for this option, the fireflow would govern the peak flow. Please note that this number must be verified with the mechanical designers and the fire department during the development of the property. Fireflow for this type of development is generally served with a combination of a hydrant(s) and a sprinkler system.

For development scenario 2, it was assumed that 75% of the 80 acres would be developable for multi-family use at a density of 25 units per acre and a daily usage rate of 225 gallons per unit. This results in an average daily demand of 337,500 gallons per day. This type of development generally has a higher peaking factor and we would estimate that the maximum day demand would be on the order of 900,000 gallon per day and the diurnal curve would yield a peak hourly flow of approximately 1,100 gallons per minute. It is estimated that this type of development would require a fire flow of approximately 1,000 to 1,500 gpm. Therefore, for this option it is unclear as to whether the peak hour flow or the fire flow would govern the expected peak flow. Please note that this fire flow number must be verified with the mechanical designers and the fire department during the development of the property. Multi-family developments are also generally served with a combination of a hydrant(s) and a sprinkler system.

For either scenario the required level of either peak hour demand or fire demand can be conveyed in a fully looped 8-inch and 12-inch water system. The 8-inch water main is projected to connect to the City's system near the intersection of 56th St. N. and Stagecoach Trail N. and run east along 56th St. N. to the east side of Trunk Highway 95. The trunk 12-inch main would connect to the existing watermain just south of Trunk Highway 36 and east of TH 95. The 12-inch main would run south along the east side of TH95 where it would connect to the 8-inch main at the point shown on Figure 1. From that point into the remainder of the site, the watermain needs to be a fully looped 8-inch grid to convey water to either the Commercial/Industrial facility or to the multi-family units.



FEASIBILITY STUDY

This level of development will result in a significant increase in demand to the overall water system. The additional demand will bring the expected average day demand from approximately 600,000 gallons per day to over 900,000 gallons per day. This will trigger the need for an additional 250,000-gallon elevated tank, a new well and pumphouse, and the trunk water mains to serve the site. The estimated costs for these facilities are as follows:

Watermain to site	\$1,100,000
New 250,000 Gallon Elevated Tank	\$2,300,000
New Well and Pumphouse No. 3	\$1,800,000
TOTAL	\$5,200,000

3.2 SANITARY SEWER IMPROVEMENTS

Due to the topography of the site, the sanitary sewer will need to be conveyed via lift station and force main to the City's existing trunk sanitary sewer system located on the east side of TH95 (St. Croix Trail N.), south of TH 36.

For development scenario 1, an average flow of 308,000 gallons per day would require an 8-foot diameter, 770 gpm duplex submersible lift station that would convey the flows via a 8-inch force main to tie into the existing gravity sewer. For development scenario 2, an average flow of 337,500 gallons per day would result in a 9-foot diameter, 850 gpm duplex submersible lift station that would convey the flows via a 10-inch force main to tie into the existing gravity sewer. The length of the force main will be approximately 2,500 feet if the lift station is located as shown on Figure 1. The lift station would need to be very deep at this location to make sure that all areas of the developable site can drain to the lift station via gravity sewer.

The estimated cost to install the lift station and force main is on the order of **\$1,750,000 to \$2,000,000**, depending on the development scenario chosen. Note that it will be necessary to extend 480 volt, 3-phase power to the lift station location. The cost to bring power to the lift station is not included in this estimate. The lift station O&M costs will be approximately \$15,000 per year for the first 15-20 years. At that time, a pump/control replacement project will be needed.

3.3 STORM WATER MANAGEMENT IMPROVEMENTS

The proposed King Plant redevelopment will need to meet certain requirements for stormwater rate control, water quality, and volume reduction. Based on an assumed developable area of 80 acres, a range of approximately 57 to 68 acres of impervious area is expected. The proposed impervious areas account for a variety of land use ranging from residential to industrial, depending on the development needs. To meet water quality and volume requirements, the proposed stormwater management will need to treat a runoff volume of 1.1 inches from the proposed impervious surfaces. This equates to approximately 5.2 to 6.3 acre-feet of volume retention depending on relative percentages of impervious within the site. Due to unknown soil



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conditions and expected contamination, a filtration basin with an underdrain is a likely best management practice (BMP). The estimated cost range to construct this facility is **\$1,600,000 to \$1,700,000**. The BMP may be constructed as one large facility or several smaller parts as development occurs, and plans are formalized.

Peak discharge rates generated from runoff on the site must not exceed existing rates for the 2-year, 10-year, and 100-year rainfall events. The expected reduction in impervious surface associated with the proposed development compared to the existing King Plant Site will result in a reduction in peak stormwater flows being generated by the site. Peak rates leaving the site will be further reduced by BMPs being proposed to meet the water quality and volume requirements. Redevelopment of the King Plant Site is not expected to result in an increase to peak discharge rates.

Additionally, a portion of the existing King Plant Site is shown on the FEMA maps as being below the 100-year floodplain for the St. Croix River. FEMA has identified the 100-year flood plain elevation at approximately 693 feet. Approximately 48.6 acres of the 180-acre total property area are currently above the FEMA 100-year floodplain, with an additional 66.5 acres being five or less feet below the existing floodplain (see attached *Floodplain Map*). For this reason, development of 80 acres onsite is feasible but will most likely require a Letter of Map Revision (LOMR) approved by FEMA to bring portions of the site out of the floodplain.

4.0 COST ESTIMATES

Below is a summary of the estimated project costs for the improvements discussed in this report. Detailed cost estimates have been prepared for the proposed improvements identified in this report. These estimates can be found in Appendix A. The following estimates do not include costs for easement acquisition. The prices used in estimating these costs are based on costs from Spring 2021.



FEASIBILITY STUDY

For the purposes of this report, it is assumed that the identified improvements, excluding the water tower and the well & pumphouse, will be funded through a grant from the State of Minnesota.

TABLE 1 - SUMMARY OF ESTIMATED COSTS

Type	Scope	Total Cost	Funding Source
Water System Improvements	Water Main	\$1,100,000	Grant
Sanitary Sewer Improvements	Lift Station and Force Main	\$2,000,000	Grant
Storm Water Improvements	Retention/Filtration Basin(s)	\$1,700,000	Grant
Total Grant Costs		\$4,800,000	
Water System Improvements	Water Tower, Well and Pumphouse	\$4,100,000	Trunk Funds
Total Trunk Costs		\$4,100,000	

5.0 PROPOSED SCHEDULE

The following is a potential schedule for the project improvements funded by the grant from the State of Minnesota, which excludes the water tower and the well & pumphouse:

Grant awarded to City	June, 2022
Accept Feasibility Report	July, 2022
Authorize Preparation of Plans & Specifications	July, 2022
Approve Plans & Specifications	December, 2022
Authorize Advertisement for Bids	December, 2022
Receive Bids	January, 2023
Review Bids/Award Contract	March, 2023
Begin Construction	May, 2023
Substantial Completion	June, 2024
Final Completion	August, 2024



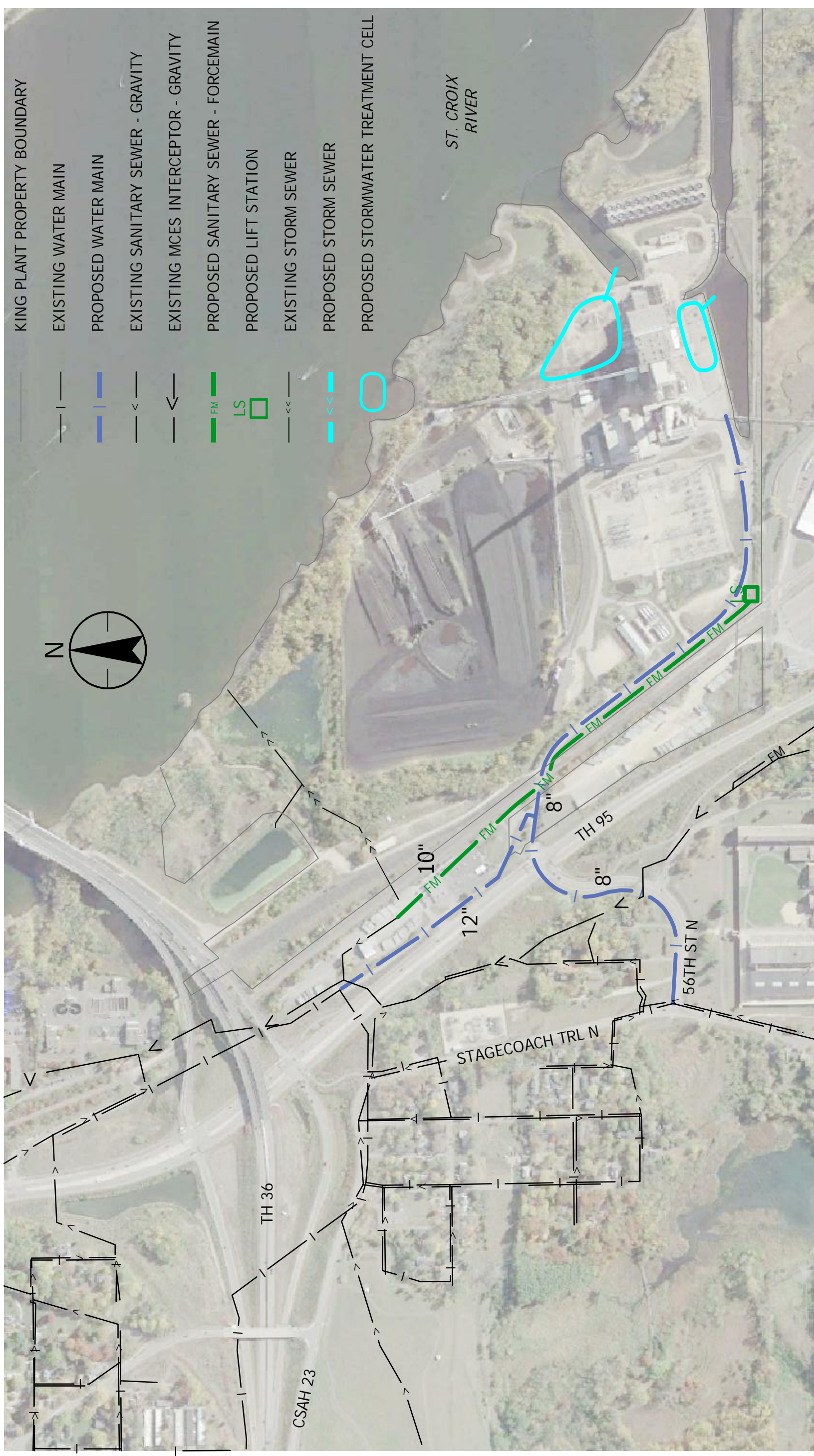
6.0 CONCLUSIONS AND RECOMMENDATIONS

The improvements identified and discussed in this report are feasible and necessary to serve the King Plant site if it is redeveloped per the assumed development scenarios. The City of Oak Park Heights is pursuing funding from the State of Minnesota to assist with the costs to serve the redevelopment of the site with City water, sanitary sewer, and storm water facilities. The King Plant is scheduled to be decommissioned in 2028. If the funding is acquired before that time, a majority of the improvements identified could be installed in preparation for the redevelopment.



Appendix A: Figures



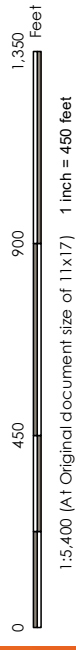
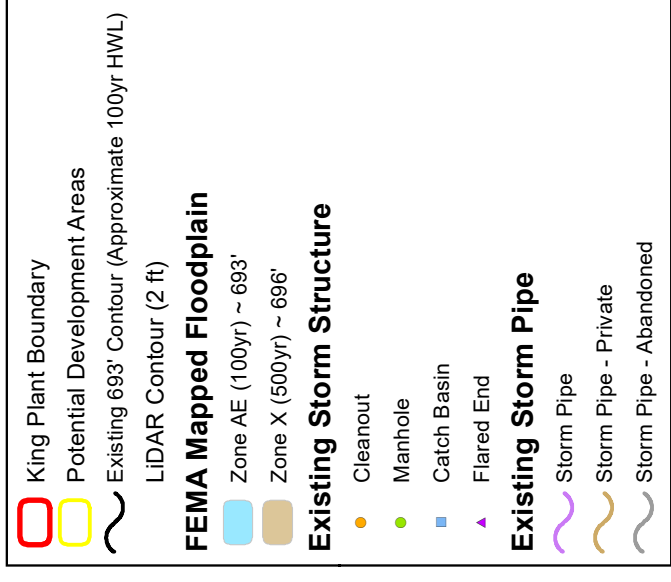


PHASE A UTILITY IMPROVEMENTS

CITY OF OAK PARK HEIGHTS
 ALLEN S. KING PLANT SITE

FIGURE 1

City of Oak Park Heights King Plant Redevelopment Floodplain Map

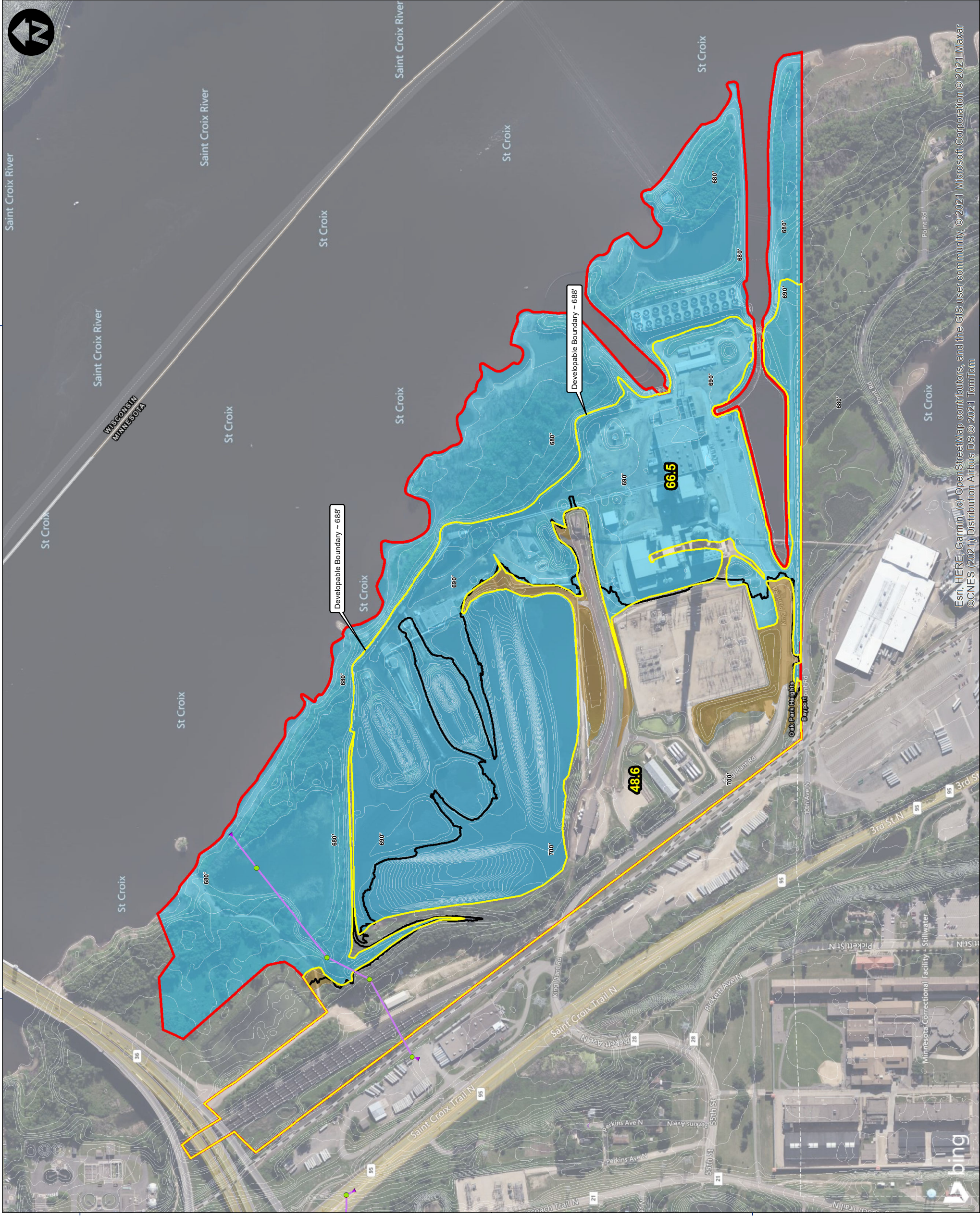


City of
Oak Park Heights

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Appendix B: Detailed Cost Estimates



ENGINEER'S OPINION OF PROBABLE COST
 KING PLANT UTILITY IMPROVEMENTS - SANITARY SEWER AND TRUNK WATER
 PROJECT NO. 193805372
 OAK PARK HEIGHTS, MN
 APRIL 2022

Item Num	Item	Units	Qty	Unit Price	Total Price
PART 1 - SANITARY SEWER SCENARIO A:					
1	Deep 8 foot Dia. Lift Station and Valve Vault	LS	1	\$600,000.00	\$600,000.00
2	Pumps, Controls, misc features	LS	1	\$600,000.00	\$600,000.00
3	8-inch Dia. FM	LF	2500	\$100.00	\$250,000.00
				Subtotal	\$1,450,000.00
				20% Contingency	\$300,000.00
TOTAL PART 1 - SANITARY SEWER SCENARIO A:					\$1,750,000.00
PART 2 - SANITARY SEWER SCENARIO B:					
4	Deep 10 foot Dia. Lift Station and Valve Vault	LS	1	\$700,000.00	\$700,000.00
5	Pumps, Controls, misc features	LS	1	\$690,000.00	\$690,000.00
6	10-inch Dia. FM	LF	2500	\$110.00	\$275,000.00
				Subtotal	\$1,665,000.00
				20% Contingency	\$335,000.00
TOTAL PART 2 - SANITARY SEWER SCENARIO B:					\$2,000,000.00
PART 3a - TRUNK WATER MAIN					
7	8 inch Trunk Water Main	LF	3000	\$130.00	\$390,000.00
8	12 inch Trunk Water Main	LF	1200	\$160.00	\$192,000.00
9	Street Patching and Jacking Work	LS	1	\$318,000.00	\$318,000.00
				Subtotal	\$900,000.00
				20% Contingency	\$200,000.00
TOTAL PART 3a - TRUNK WATER MAIN:					\$1,100,000.00
PART 3b - TRUNK WATER SYSTEM:					
10	250,000 Gallon Elevated Tank	LS	1	\$1,900,000.00	\$1,900,000.00
11	Well and Pumphouse No. 3	LS	1	\$1,500,000.00	\$1,500,000.00
				Subtotal	\$3,400,000.00
				20% Contingency	\$680,000.00
TOTAL PART 3b - TRUNK WATER SYSTEM:					\$4,080,000.00
COST SUMMARY					
PART 1 - SANITARY SEWER SCENARIO A					\$1,750,000.00
PART 2 - SANITARY SEWER SCENARIO B					\$2,000,000.00
PART 3a - TRUNK WATER MAIN					\$1,100,000.00
PART 3b - TRUNK WATER SYSTEM					\$4,080,000.00

ENGINEER'S OPINION OF PROBABLE COST
KING PLANT UTILITY IMPROVEMENTS - STORMWATER MANAGEMENT
PROJECT NO. 193805372
OAK PARK HEIGHTS, MN
APRIL 2022

Item Num	Item	Units	Unit Price	5.2 ac-ft Volume		6.3 ac-ft Volume	
				Qty	Total Amount	Qty	Total Amount
PART 1 - REMOVALS AND EROSION CONTROL:							
1	CLEAR TREE	TREE	\$250.00	40	\$10,000.00	48	\$12,000.00
2	SILT FENCE - MS	LF	\$2.50	1700	\$4,250.00	2000	\$5,000.00
3	EROSION CONTROL BLANKET, CATEGORY 3N	SY	\$1.75	18000	\$31,500.00	20000	\$35,000.00
TOTAL PART 1 - REMOVALS AND EROSION CONTROL:					<u>\$45,750</u>		<u>\$52,000</u>
PART 2 - UTILITY IMPROVEMENTS:							
4	GEOTEXTILE FILTER FABRIC, TYPE 5 NONWOVEN	SY	\$2.00	12000	\$24,000	12500	\$25,000
5	FILTRATION BASIN MEDIA (CV)	CY	\$50.00	3000	\$150,000	3200	\$160,000
6	IRON ENHANCED FILTER MEDIA (CV)	CY	\$150.00	3000	\$450,000	3200	\$480,000
7	6" SCH 40 PVC	LF	\$30.00	500	\$15,000	550	\$16,500
8	6" PERF SCH 40 PVC	LF	\$30.00	4500	\$135,000	4700	\$141,000
9	6" PVC CLEAN OUT	EA	\$500.00	30	\$15,000	32	\$16,000
10	5' DIA OUTLET CONTROL STRUCTURE	EA	\$6,000.00	4	\$24,000	5	\$30,000
11	24" RCP STORM SEWER PIPE, CLASS III	LF	\$65.00	200	\$13,000	215	\$13,975
12	24" FES, INCL TRASH GUARD	EA	\$1,800.00	4	\$7,200	5	\$9,000
13	RANDOM RIP RAP, CLASS III	CY	\$120.00	50	\$6,000	54	\$6,480
TOTAL PART 2 - UTILITY IMPROVEMENTS:					<u>\$839,200</u>		<u>\$897,955</u>
PART 3 - FILTRATION BASIN GRADING:							
14	COMMON EXCAVATION (P)	CY	\$3.10	25000	\$77,500	26000	\$80,600
TOTAL PART 3 - FILTRATION BASIN GRADING:					<u>\$77,500</u>		<u>\$80,600</u>
PART 4 - MOBILIZATION:							
15	MOBILIZATION	LS	\$30,000.00	1	\$30,000.00	1.05	\$31,500.00
TOTAL PART 4 - MOBILIZATION:					<u>\$30,000</u>		<u>\$31,500</u>
COST SUMMARY:							
TOTAL PART 1 - REMOVALS AND EROSION CONTROL:					\$45,750		\$52,000
TOTAL PART 2 - UTILITY IMPROVEMENTS:					\$839,200		\$897,955
TOTAL PART 3 - FILTRATION BASIN GRADING:					\$77,500		\$80,600
TOTAL PART 4 - MOBILIZATION:					\$30,000		\$31,500
TOTAL ESTIMATED CONSTRUCTION COST:					<u>\$992,450</u>		<u>\$1,062,055</u>
30% Contingency					\$297,735		\$318,617
30% Legal, Engineering, CM					\$297,735		\$318,617
TOTAL OPINION OF PROBABLE COST - STORMWATER MANAGEMENT:					<u>\$1,587,920</u>		<u>\$1,699,288</u>