DRAFT-(06.24.24)

Report for
City of Watertown, Wisconsin

Allerman and Concord Heights Lift Stations and Force Main Preliminary Engineering Report

Prepared by:

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Madison, WI 53715
www.strand.com

June 2024

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June 24, 2024

Mr. Peter Hartz
City of Watertown
800 Hoffman Drive
P.O. Box 477
Watertown, WI 53094

Re: Allerman and Concord Heights Lift Stations Preliminary Engineering Report
City of Watertown, Wisconsin (City)

Dear Mr. Hartz:

Enclosed is a draft electronic copy of the Allerman and Concord Heights Lift Stations Preliminary Engineering Report for the City's review.

Please call 608-251-4843 with questions.

Sincerely,

STRAND ASSOCIATES, INC.®

DRAFT **DRAFT**

Andrew B. Constant, P.E. Eric D. Vieth, P.E.

Enclosure: Report

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The purpose of this preliminary engineering report (PER) is to study the existing and future sanitary sewer flows to the Allerman and Concord Heights Lift Stations located in the City of Watertown, Wisconsin (City). The Concord Heights Lift Station is included in this PER because it is tributary to the Allerman Lift Station. Additionally, alternatives for a new Allerman Lift Station and force main will be reviewed for future implementation. Conceptual layouts and budgets for these improvement alternatives will be provided.

The Allerman Lift Station is tributary to the Hidde Lift Station, located at 1432 East Main Street in the City. The Hidde Lift Station conveys flow to the interceptor along North 1st Street. It is the City's desire to gain capacity in that interceptor by rerouting the Allerman Lift Station force main to discharge at an alternate location in the system.

BACKGROUND

A. Allerman Lift Station

The Allerman Lift Station, located at 1206 Richards Avenue in the City, is an approximately 18-foot-deep wet well and dry well lift station, originally constructed in 1963. The 5-horsepower (hp) dry-pit submersible pumps (installed in 2002) are manufactured by Flygt, model CP3102, with an approximate capacity of 120 gallons per minute (gpm). The lift station is served by 230-volt (V), three-phase power.

Figure 1 Allerman Lift Station

The dry well contains two pumps, suction and discharge piping, shutoff valves, check valves, and header piping. The wet well contains one 8-inch gravity sewer penetration and two pump suction pipe penetrations. The wet well wastewater elevation is controlled by a level transducer. The control building is located over the dry well and contains the electrical panels and equipment. An emergency generator plug is located on the outside of the building for a portable generator connection.

The existing 4-inch cast iron force main (installed in 1992) is approximately 690 feet in length and discharges to a manhole located in the intersection of South Concord Drive and Richards Avenue.

B. Concord Heights Lift Station

The Concord Heights Lift Station, located at 224 West Haven Drive in the City, is an approximately 25-foot-deep submersible lift station, originally constructed in 2006. The installed 10-hp submersible pumps are manufactured by Flygt, model NP3102, with an approximate capacity of 120 gpm. The lift station is served by 230-V, single-phase power.

Figure 2 Concord Heights Lift Station

The 8-foot-diameter precast concrete wet well contains two pumps, guide rails, level transducer and backup floats, and one active 8-inch gravity sewer penetration. Another inactive 8-inch gravity sewer penetration to the south was also provided for future development. The 8-foot-diameter valve vault, adjacent to the wet well, contains discharge piping, shutoff valves, check valves, and header piping. The electrical panel is located outside, next to the wet well and valve vault.

The existing 4-inch polyvinyl chloride (PVC) force main (installed in 2006) is approximately 430 feet in length and discharges to a manhole located in the street adjacent to 231 West Haven Drive.

SEWER SERVICE AREA ANALYSIS

An analysis of the existing, 20-year, and ultimate sanitary service areas was conducted. Land use for the 20-year and ultimate service areas are assumed to be Planned Neighborhood, which is consistent with the City's Future Land Use in the 2009 Comprehensive Plan. The type and quantity of each land use was used to estimate the average wastewater flows using typical flow rates, such as per capita per acre rates for various land uses. Peaking factors (PF) were then applied to the average flow rates.

A. General Design Criteria

When planning for sanitary sewers, the size and character of the ultimate service area must be defined. The size of the service area is important in that the amount of area served impacts the estimated wastewater flow from the service area. The type of development (industrial, commercial, or residential) also influences the estimated wastewater flow from the service area.

The sanitary sewer service area limits for the Allerman and Concord Heights Lift Stations were defined in cooperation with City staff. It was based on existing planning documents, topography, and environmental constraints where appropriate. Land use within the service area was obtained from the City's land use maps. For the purposes of projecting the average daily flows to each lift station for the 20-year and ultimate areas, a figure of 1,200 gallons per acre per day (gpad) was used for Planned Neighborhood. Wisconsin NR Code 110.09 for sewage treatment facilities recommends using 65 to 80 gallons per capita per day (gpcd) for calculation of average daily base flows with allowance for infiltration and inflow (I/I). Further, NR Code 110.13 sewage collection systems may be designed assuming a design flow rate of 100 gpcd. For planning purposes, a figure of 100 gpcd will be used.

Units per Acre	Persons per Unit	Persons per Acre	gpcd	gpad
4	3	12	100	1,200

Table 1 Planned Neighborhood Design Criteria

Additionally, PFs are significant in the design of sanitary sewers and lift stations. PFs are used to forecast the maximum peak flow to guide the design capacity. PFs are multiplied by the average daily flow and result in design values for these facilities. Variance in PFs directly affect the facility size. In general, as the population and/or area served increases, the PF declines because there is a decreasing chance that the population would be contributing flow at the same time. The PF for this project was determined using the Ten States Standards--Recommended Standards for Wastewater Facilities. PF is given by the following equation, where P is equal to the population in thousands.:

$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

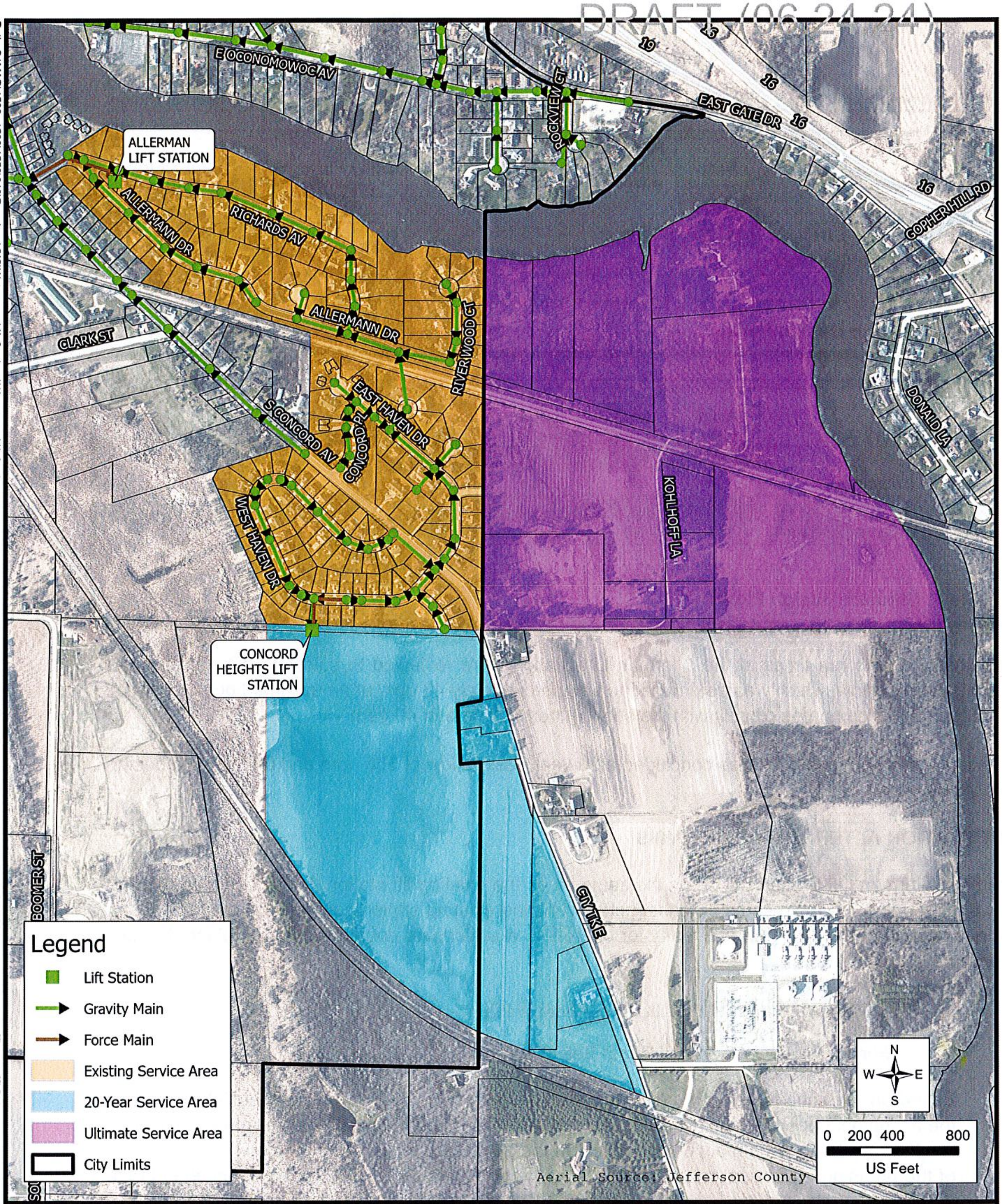
B. Service Area Analysis

Figure 3 displays the existing, 20-year, and ultimate service areas, and existing lift station locations. The Allerman Lift Station force main route options will be discussed further under its respective section.

Using the previous design criteria and the service area displayed in Figure 3, the anticipated existing, 20-year, and ultimate flows were calculated. To gain a more accurate representation of the total serviceable area, it was assumed 80 percent of the land area would be applied to housing and development, and the remaining 20 percent would be attributed to right-of-way (ROW), park space, and stormwater management. Tables 2, 3, and 4 display the estimated average daily and peak flows to the Allerman Lift Station for the existing, 20-year, and ultimate planning periods.

Tributary Area	No. of Units	Persons per Unit	Total Persons	gpcd	Average Daily Flow (gpm)	PF	Peak Flow (gpm)
Allerman (Existing)	160	3	480	100	34	4.0	133
Concord Heights (Existing)	30	3	90	100	6	4.0	25
				Total	**40**		**138**

Table 2 Existing Design Flows



Path: S:\MAD\1500--1599\1550\010\Drawings\GIS\Watertown Lift Stations\Watertown Lift Stations.aprx

User: Danc

Date: 6/3/2024

Time: 1:57 PM

SEWER SERVICE AREA

ALLERMAN AND CONCORD HEIGHTS LIFT STATION AND FORCE MAIN
PRELIMINARY ENGINEERING REPORT
CITY OF WATERTOWN
JEFFERSON COUNTY, WISCONSIN

STRAND ASSOCIATES

FIGURE 3
1550.010

Tributary Area	Area (acres)	Percent Area Served	Total Persons	gpad	Average Daily Flow (gpm)	PF	Peak Flow (gpm)
Allerman (Existing)					34	3.7	123
Concord Heights (Existing)					6	3.7	23
Concord Heights (20-Year)	85	80	818	1,200	57	3.7	210
				Total	**97**		**356**

Table 3 20-Year Design Flows

Tributary Area	Area (acres)	Percent Area Served	Total Persons	gpad	Average Daily Flow (gpm)	PF	Peak Flow (gpm)
Allerman (Existing)					34	3.5	117
Allerman (Ultimate)	125	80	1,203	1,200	84	3.5	292
Concord Heights (Existing)					6	3.5	22
Concord Heights (20-Year)	85	80	818	1,200	57	3.5	199
				Total	**181**		**630**

Table 4 Ultimate Design Flows

The existing pump run times at the Allerman Lift Station were reviewed to calculate the approximate existing average flow, which was determined to be approximately 43 gpm at an assumed pump capacity of 120 gpm. This compares closely with the service area estimate of 40 gpm.

A review of the future service area concluded a 20-year design flow of 356 gpm and the ultimate design flow of 630 gpm.

LIFT STATION ALTERNATIVE ANALYSIS

The new Allerman Lift Station will be on the same lot as the existing lift station. It is anticipated that the new station and force main could be constructed while the existing station continues to operate. When the new station and force main are ready for operation, a switchover could be made to place the new infrastructure into service.

A. Station Operation, Pump Selection, and Station Sizing

1. Force Main Operation and Pump Selection

Based on the anticipated flows, a 6- or 8-inch-diameter force main would be feasible based on the acceptable operating velocities as described in the Force Main Alternative Analysis Section. Another aspect to force main design relies on the generated friction loss, which impacts the size of the pumping equipment required to convey the design flow. Friction loss is a function of pipe diameter, length, and roughness. As the pipe diameter reduces and the length increases, the overall friction loss increases. Generally, longer distances of smaller diameter force mains generate enough friction loss to cause the pumps and equipment to dramatically increase in size for the required flow.

The three force main alternatives range in lengths of 7,860 to 9,495 linear feet (LF). For a 6-inch-diameter force main, the friction loss alone would be approximately 305 to 315 feet of total dynamic head (TDH) for the ultimate flow, which would be unusually high for a pumping station of this size. If the pipe diameter is increased to 8 inches, the friction loss decreases to 70 to 95 feet of TDH, which is more reasonable for a pump to handle. Based on the length of the proposed force main, it is recommended to install an 8-inch force main to provide a reasonably sized pump selection.

2. Wet Well Sizing

The code-required wet well storage capacity can be found by the following equation V=Tq/4, where V is equal to the required volume in gallons, T is equal to the required cycle time in minutes, and q is equal to the pump capacity in gpm. The wet well will be sized for the ultimate flow, so that when the lift station capacity needs to be increased, the buried infrastructure can be used. For a cycle time of 5 minutes and flow of 630 gpm, the volume required would be equal to 788 gallons. Based on this volume, the minimum recommended wet well diameter would be 8 feet, which corresponds to a volume of 376 gallons per foot of storage in the structure. The wet well diameter could be increased to limit the depth of the lift station but can be determined during detailed design.

NR Code 110.14 states that wet wells shall be designed based on a minimum pump cycle time greater than or equal to 5 minutes (T).

a. For the 20-year peak flow of 356 gpm (q), the corresponding required volume (V) is equal to 445 gallons, which equates to an operating depth of 1.2 feet in an 8-foot-diameter wet well.

b. For the ultimate peak flow of 630 gpm (q), the corresponding required volume (V) is equal to 787.5 gallons, which equates to an operating depth of 2.1 feet in an 8-foot-diameter wet well.

The lowest invert elevation into the Allerman Lift Station is approximately 818.00, and the ground elevation is 830.00. For a preliminary pump selection at the ultimate flows, the following operating levels could be set:

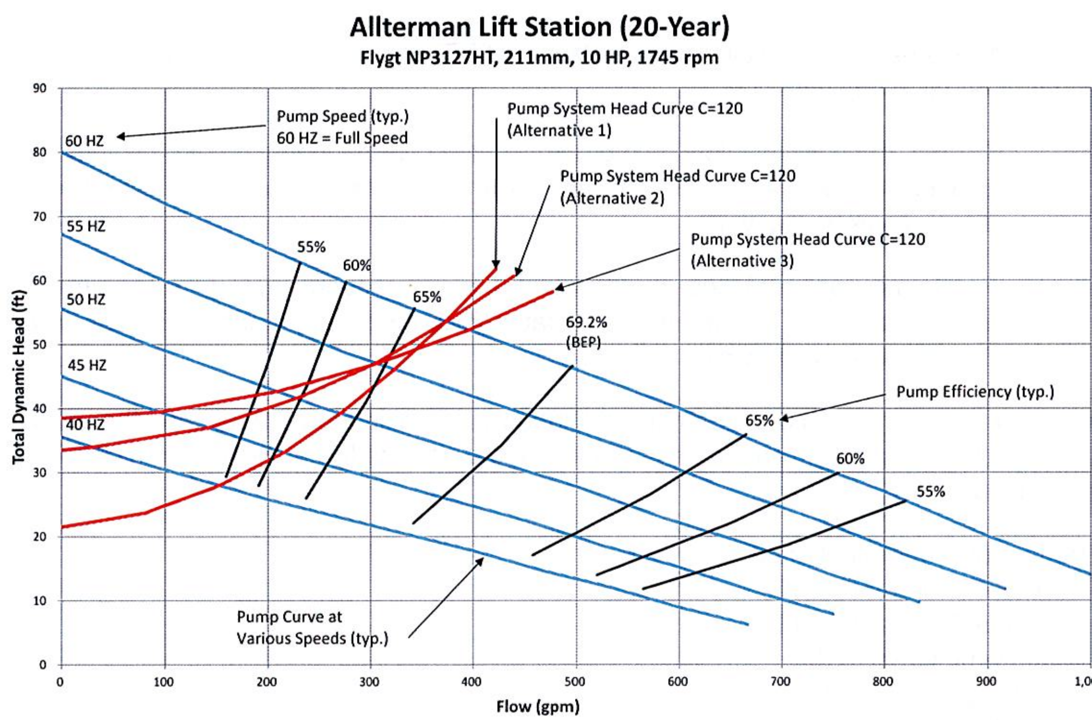
- Bottom of Wet Well=810.00
- Low Water Alarm=813.00
- Common Pumps Off=813.50
- Lead Pump On=816.50
- Lag Pump On=817.50
- High-Water Alarm=818.00
- Lift Station Depth=20 feet

This would allow for a pump operating range of 3.0 feet, or approximately 1,128 gallons. This would be more than adequate for the existing, 20-year, and ultimate peak flows at full speed pump operation. Additionally, if these pumps are selected to operate with variable frequency drives (VFD), the flow rate of the pumps can be reduced to further limit the pump cycle time.

3. Pump Selection

With the approach to pump selection, Strand Associates, Inc.® will look for pumps that are not only efficient at the full-speed operation, but also efficient at the more typical flows to the lift station. The following figure displays the pump curve and system head curve for the potential pump selection for the 20-year flows. Because there is a range in flows between the 20-year and ultimate flows, it is likely that the pumps, starters, and electrical equipment would need to be replaced to handle the ultimate flows when the 20-year flows are exceeded at the lift station.

Figure 4 displays the pump and system head curve for the 211-millimeter (mm), 10-hp pump selection. At full speed, this pump operates within the preferred operating range at approximately 67 percent. This pump could operate with a variable speed drive, which would allow the speed of the pump to be slowed down to match lower flows as they enter the lift station. However, with an 8-inch force main, the minimum flow to maintain at least 2 feet per second (fps) velocity is 315 gpm. This means that the available recommended turndown for this pump would only be 55 hertz (Hz). VFDs could l be used, but there would not be much benefit with operating at a reduced speed.



rpm=revolutions per minute
BEP=Best Efficiency Point

Figure 4 Flygt NP3127, 211-mm, 10-hp Pump Selection

B. Lift Station Layout

Through discussions with City staff, it was determined that the desired lift station would be a duplex submersible-type lift station with a valve vault adjacent to the wet well and an exterior control panel and generator. This layout would be similar to the Concord Heights lift station.

The submersible-type lift station includes pumps that are submerged in a wet well. Wastewater is pumped and usually conveyed into an adjacent underground valve vault where pump discharge piping combines into a singular header pipe that eventually leaves the station. Advantages of this layout include a more streamlined structure that fits into confined sites and typically are more cost-effective than a wet well and dry well layout. However, access to these pumps require maintenance crews to raise the pumps from the wet well to work for maintenance and confined space entries to enter the valve vault.

Figures 5 and 6 display a preliminary site layout and a plan and section view of the proposed Allerman Lift Station. One challenge in siting this new lift station includes trying to maintain operation of the existing lift station during the construction of the new lift station to reduce bypass pumping costs or temporary force main costs. Once the location of the existing force main on-site is known, the structures on-site can be moved to avoid the conflict.

It is anticipated that costs to construct this lift station would be $891,000. A detailed breakdown of this Opinion of Probable Construction Cost (OPCC) is included in Appendix A.

FORCE MAIN ALTERNATIVE ANALYSIS

This section of the PER evaluates the proposed force main with respect to current and anticipated flows.

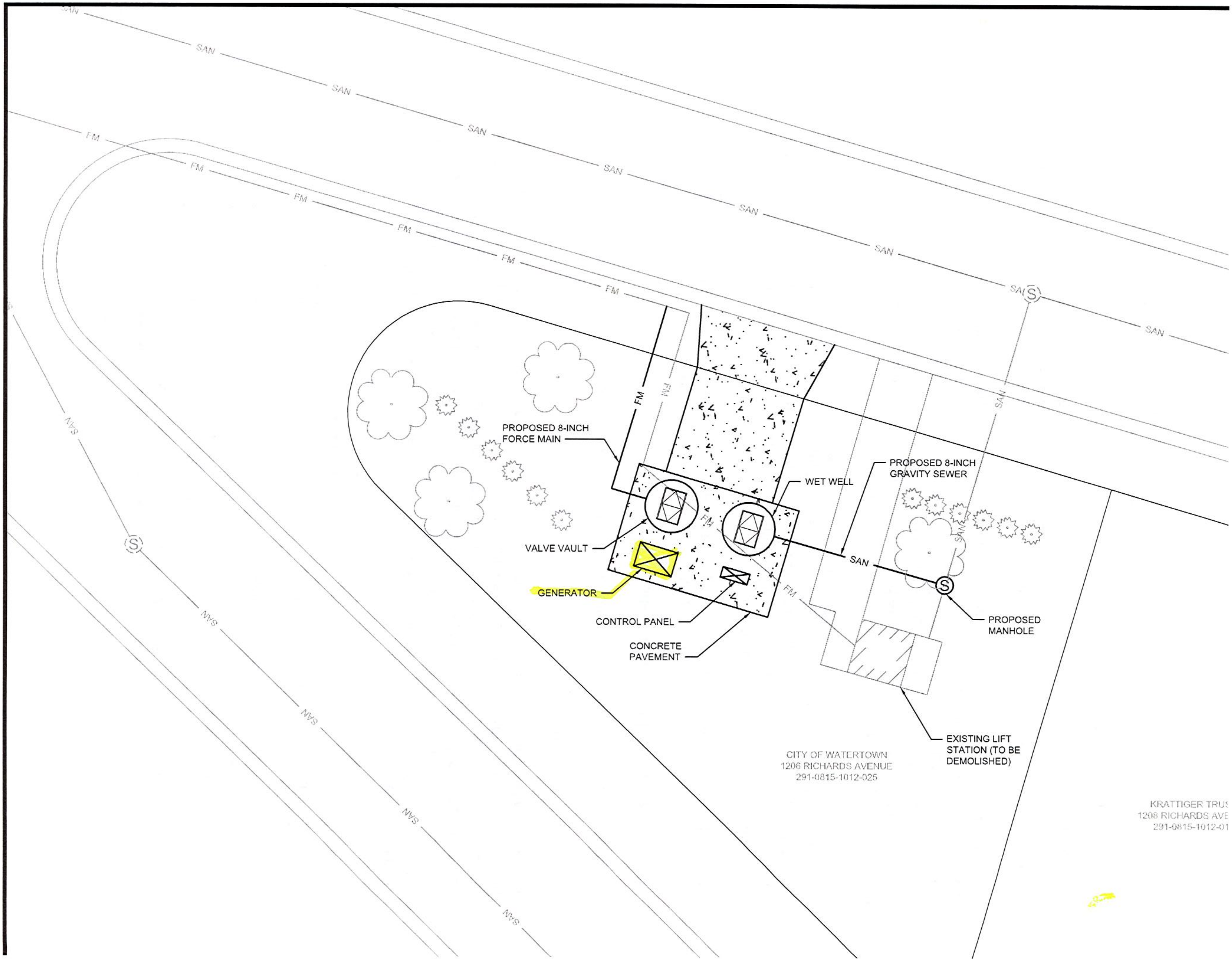
A. Force Main Sizing

In general, wastewater force mains are sized to maintain a velocity of at least 2 fps under the initial 20-year design peak flow conditions to keep grit moving and prevent settling of sediment in the pipeline. Typical maximum velocities in force main design are usually under 8 fps. Any flows higher than that result in greater head losses and may create excessive water hammer. For the flows discussed, a reasonable force main could either be a 6- or 8-inch diameter. Table 5 displays the anticipated velocities in both diameter force mains for the flows determined in the service area analysis, assuming a C900 PVC pipe with a dimension ratio of 18.

Flow Condition	Flow (gpm)	6-Inch Force Main Velocity (fps)	8-Inch Force Main Velocity (fps)
20-Year Average	97	1.1	0.6
20-Year Peak	356	3.9	2.3
Ultimate Average	181	2.0	1.2
Ultimate Peak	630	6.9	4.0

Note: Red text indicates force main velocities below minimum 2.0 fps for the given flow.

Table 5 Summary of Anticipated Force Main Velocities


PROPOSED 8-INCH
FORCE MAIN
WET WELL
PROPOSED 8-INCH
GRAVITY SEWER
VALVE VAULT
GENERATOR
CONTROL PANEL
CONCRETE
PAVEMENT
PROPOSED
MANHOLE
EXISTING LIFT
STATION (TO BE
DEMOLISHED)
CITY OF WATERTOWN
1206 RICHARDS AVENUE
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FM

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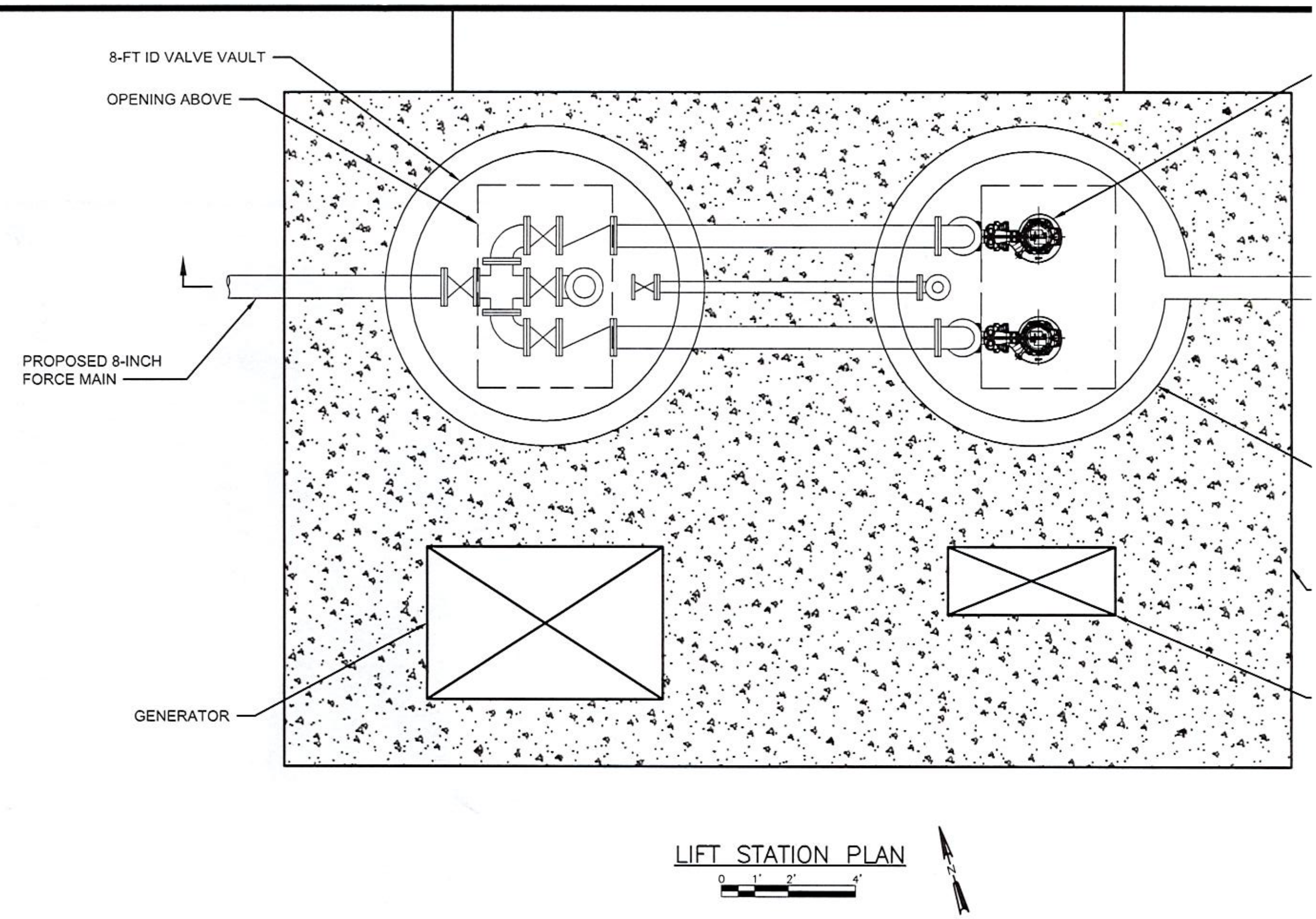
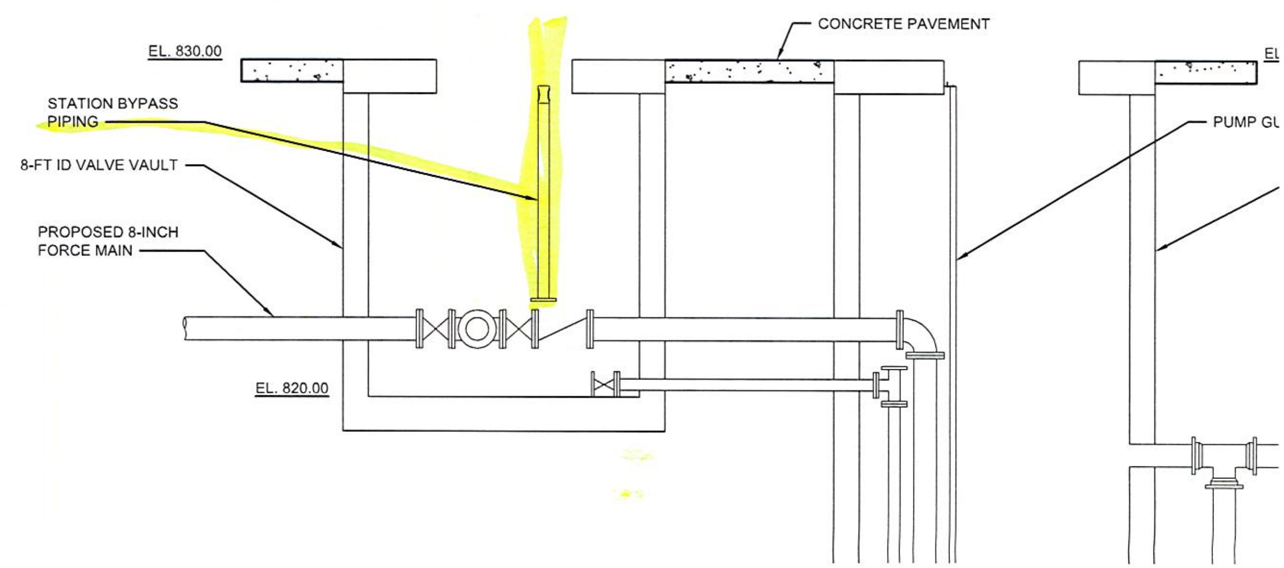


LIFT STATION PLAN



Both force mains achieve acceptable velocities between 2 and 8 fps for the 20-year and ultimate peak flow scenarios. However, because such a wide range of flows are expected for the force main, there are instances where velocity falls below the desired minimum velocity of 2 fps. Strategies to reduce the amount of sedimentation in the force main can be included, such as setting a minimum flow set point and/or providing a daily pump ramp up cycle to resuspend settled solids. For instance, if the pump is operating using VFDs, the pump could be set to a minimum flow of 180 gpm to achieve a minimum velocity of 2 fps in the 6-inch-diameter force main, or 315 gpm to achieve a minimum velocity of 2 fps in the 8-inch-diameter force main.

The lift station alternative analysis section reviewed pump selections for the 6- and 8-inch-diameter force mains to try and optimize the pump selection. The analysis concluded that an 8-inch force main is recommended.

B. Force Main Routes

Three routes for the Allerman Lift Station force main were reviewed. An overview of the routes are displayed in Figure 7.

1. Alternative Route No. 1: Proposed 8-Inch Force Main–12th Street

* obstacle to deal with

This alternative proposes to install approximately 7,860 LF of 8-inch force main from the Allerman Lift Station to an existing sanitary sewer manhole and 18-inch sanitary sewer at the intersection of 12th Street and Air Park Drive. Refer to Appendix B for Alternative Route No. 1 drawings for more detailed routing information.

Figure 8 We Energies High Pressure Gas Facility on Twelfth Street

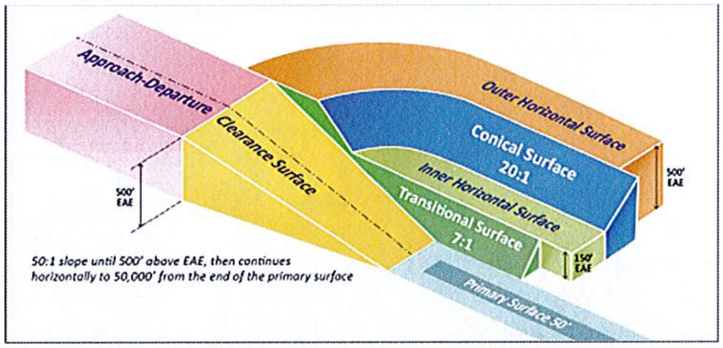
Challenges associated with this alternative include the trenchless crossing of the Canadian Pacific Kansas City (CPKC) railway on Humboldt Street and potential impacts to mature street trees and overhead power and light poles in the street ROW on Humbolt Street. On 12th Street, north of the connection point at Air Park Drive, We Energies owns gas facilities and their parcel extends into the 12th Street ROW. In addition, the routing of the force main along the eastern side of 12th Street will require excavation of materials adjacent industrial facilities that may have contaminated soil and groundwater. A Phase 1 desktop environmental assessment should be performed in this area to establish environmental impacts. Should contaminated soils exist in this area, directional drilling of a ductile iron force main may be considered to minimize existing soils excavation.

Alternative Route No. 1 should not require permanent easement acquisition but may require temporary construction easements after more detailed design progresses.

It is anticipated that costs for a force main along this route would be $3,076,000. A detailed breakdown of this OPCC is included in Appendix A.

2. Alternative Route No. 2: Proposed 8-Inch Force Main–Boomer Street

This alternative proposes to install approximately 9,495 LF of 8-inch force main from the Allerman Lift Station to an existing sanitary sewer manhole and 24-inch sanitary sewer at the intersection of Franklin Street and River Drive. Refer to Appendix C for the Alternative Route No. 2 drawings for more detailed routing information.



Source: Trumbull County Planning Commission

Figure 9 Conflict Avoidance Surface Areas for Airfield Runways

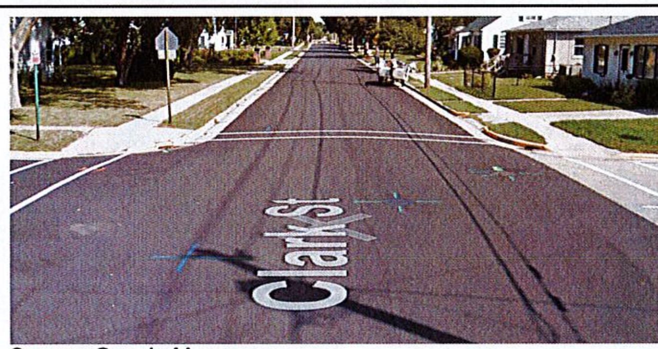
Challenges associated with this alternative include the trenchless crossing of the CPKC railway on Humboldt Street and potential impacts to mature street trees and overhead power and light poles in the street ROW on Humbolt Street. On Boomer Street, the force main route would parallel the existing 8-inch sanitary sewer through the City Municipal Airport property. Coordination with the airport and Federal Aviation Administration would be required during design and to avoid conflict with airfield operations during construction.

Alternative Route No. 2 should not require permanent easement acquisition but may require temporary construction easements after more detailed design progresses.

It is anticipated that costs for a force main along this route would be $3,480,000. A detailed breakdown of this OPCC is included in Appendix A.

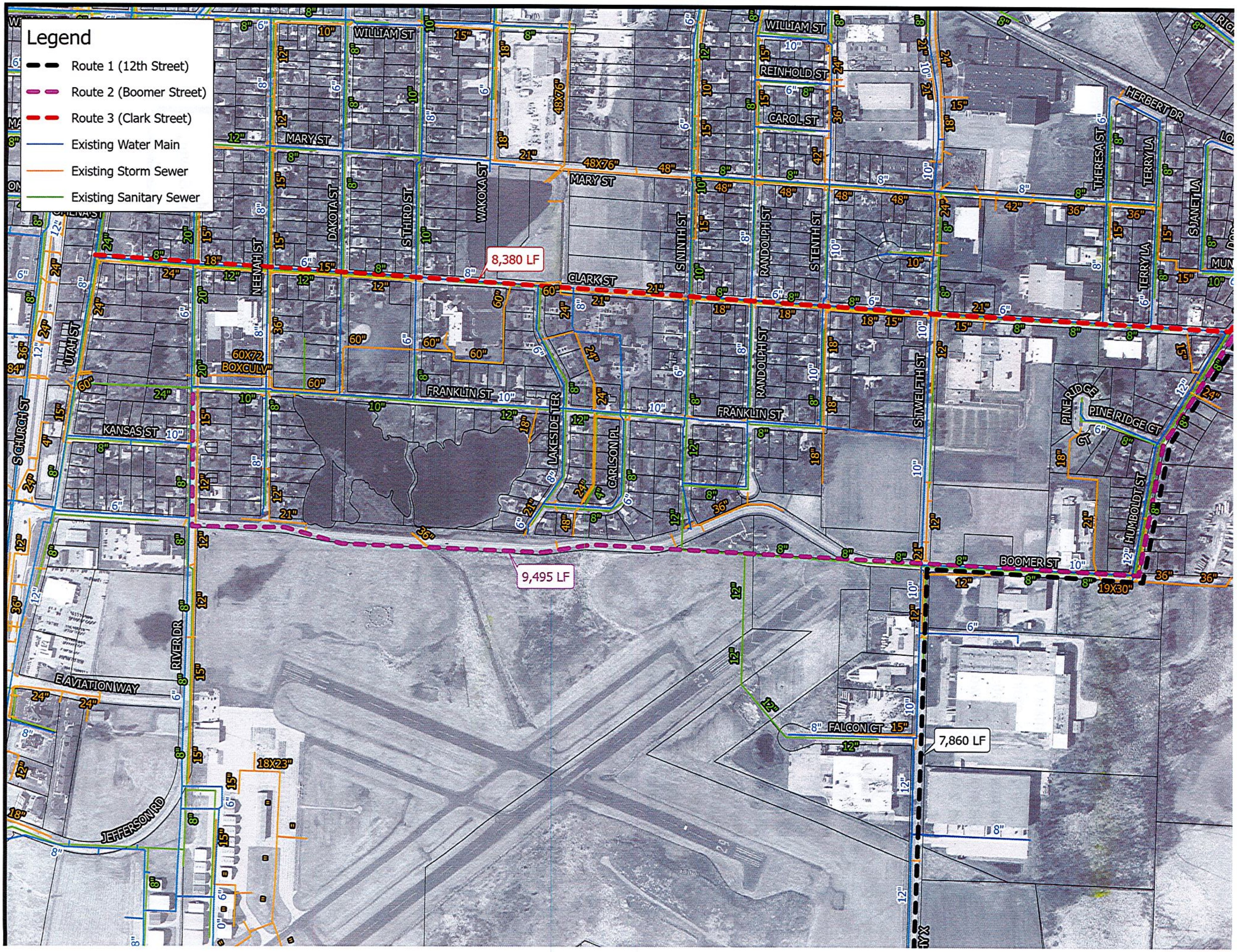
3. Alternative Route No. 3: Proposed 8-Inch Force Main–Clark Street

This alternative proposes to install approximately 8,380 LF of 8-inch force main from the Allerman Lift Station to an existing 24-inch sanitary sewer at the intersection of Utah Street and Clark Street. Refer to Appendix D for the Alternative Route No. 3 drawings for more detailed routing information.



Source: Google Maps

Figure 10 Clark Street and Neenah Street Intersection with Marked Water, Sewer, and Storm Utilities


Legend
Route 1 (12th Street)
Route 2 (Boomer Street)
Route 3 (Clark Street)
Existing Water Main
Existing Storm Sewer
Existing Sanitary Sewer
8,380 LF
9,495 LF
7,860 LF
CLARK ST
BOOMER ST
WILLIAM ST
MARY ST
FRANKLIN ST
KANSAS ST
UTAH ST
S CHURCH ST
NEENAH ST
DAKOTA ST
S THIRD ST
WAKOKA ST
S NINTH ST
RANDOLPH ST
S TENTH ST
S TWELFTH ST
REINHOLD ST
CAROL ST
THERESA ST
TERRY LA
S JANET LA
HERBERT DR
PINE RIDGE CT
HUMBOLDT ST
LAKESIDE TER
CARLSON PL
FALCON CT
RIVER DR
E AVIATION WAY
JEFFERSON RD
60X72 BOXCULV
48X76"
19X30"
18X23"

Challenges associated with this alternative include the trenchless crossing of CPKC railway on Humboldt Street and potential impacts to mature street trees and overhead power and light poles in the street ROW on Humbolt Street. Clark Street has a relatively narrow ROW that varies between 49 and 55 feet and is heavily congested with existing storm sewer, sanitary sewer, and water main utilities. Impacts to mature trees and power and light poles would be required on Clark Street to avoid utility conflicts.

Alternative Route No. 3 should not require permanent easement acquisition but may require temporary construction easements after more detailed design progresses.

It is anticipated that costs for a force main along this route would be $3,465,000. A detailed breakdown of this OPCC is included in Appendix A.

SUMMARY OF ALTERNATIVE COSTS

A summary of estimated construction costs for each alternative are displayed in Table 1.

	Alternative No. 1	Alternative No. 2	Alternative No. 3
Lift Station Capital Costs	$891,000	$891,000	$891,000
Force Main Capital Costs	$3,076,000	$3,480,000	$3,465,000
Total Alternative Capital Costs	$3,967,000	$4,371,000	$4,356,000

Table 6 Summary of Alternative Costs

ADDITIONAL CONSIDERATIONS

A. Trenchless Construction Beneath CPKC Railway

As mentioned in the force main alternative analysis, the three routes will require trenchless construction for crossing of the CPKC railway mainline track on Humboldt Street. The method of trenchless construction will be determined after geotechnical investigation and CPKC coordination is completed but likely requires a 16- or 20-inch steel casing pipe installed via auger boring. Layout of the trenchless shafts may require the acquisition of temporary construction easements from adjacent property owners.

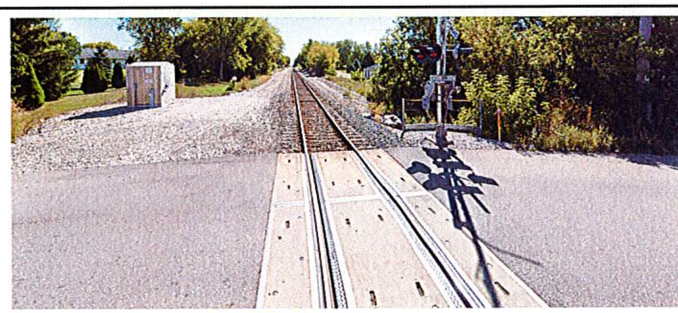


Figure 11 CPKC Railway Track on Humboldt Street

Jake & Bore

B. Surface Water Data View (SWDV)

The SWDV is a Wisconsin Department of Natural Resources (WDNR) data delivery system that provides interactive web mapping tools for a variety of data. This can be used to determine whether the proposed project area is located within mapped wetland, wetland soil indicator area, or within a mapped floodplain. Appendix E shows the proposed project area with these layers turned on. The proposed project is adjacent to mapped wetlands and wetland indicator soils, but the force mains should be able to be placed outside these areas. If the force main route determined during detailed design does impact a mapped wetland, a Wetland General Permit through the WDNR can be obtained.

C. Anticipated Permits to be Acquired

The following permits are anticipated to be required for construction and will be applied for during the design phase:

- WDNR Submittal Requirements for Municipal Sewage Collection System Projects
- WDNR Wetland General Permit (if applicable)
- WDNR Notice of Intent for Construction Site Storm Water
- CPKC Utility Occupancy License

D. Funding

Typical of most wastewater lift station projects, the WDNR Clean Water Fund Program is an applicable source of funding that could be considered for this project. Under this program, municipalities may receive financial assistance in the form of subsidized loans.

For the City, the interest rate for a loan term of 20 years or less is 2.145 percent, and the interest rate for a loan term of 21 to 30 years is 2.255 percent. For State Fiscal Year (SFY) 2026, an application for a loan can be submitted as early as July 1, 2025, and as late as June 30, 2026. An Intent to Apply is required to be submitted by October 31, 2024, in order to be scored in the SFY 2026 Project Priority List.

DRAFT (06.24.24)

ALLERMAN LIFT STATION
WATERTOWN, WISCONSIN

OPINION OF PROBABLE CONSTRUCTION COST

				ENGINEER'S ESTIMATE	
No.	Description	Quantity	Unit	Unit Price	Total Price
Structures					
	Precast 8-ft DIA Wetwell	25	VF	$2,000	$50,000
	Precast 8-ft DIA Wetwell Lid with Access Hatch	1	EA	$15,000	$15,000
	Precast 8-ft DIA Valve Vault	10	VF	$2,000	$20,000
	Precast 8-ft DIA Valve Vault Lid with Access Hatch	1	EA	$15,000	$15,000
Electrical					
	Control Panel and Equipment	1	LS	$115,000	$115,000
	Generator and Automatic Transfer Switch	1	EA	$80,000	$80,000
	Utility Allowances	1	LS	$15,000	$15,000
Process					
	Submersible Pumps	2	EA	$50,000	$100,000
	Piping/Mechanical	1	LS	$80,000	$80,000
Misc.					
	Erosion Control/Site Restoration/Grading	1	LS	$25,000	$25,000
	Concrete Pavement	600	SF	$25	$15,000
	Concrete Driveway	750	SF	$20	$15,000
	Demolition	1	LS	$30,000	$30,000
	Construction Bypass Pumping	1	LS	$25,000	$25,000
				Subtotal	$600,000
				Contrator's General Conditions (10%)	$60,000
				Total Construction Costs	$660,000
				Contingencies and Engineering (35%)	$231,000
				Total Cost	**$891,000**

APPENDIX B
ALTERNATIVE ROUTE NO. 1 DRAWINGS

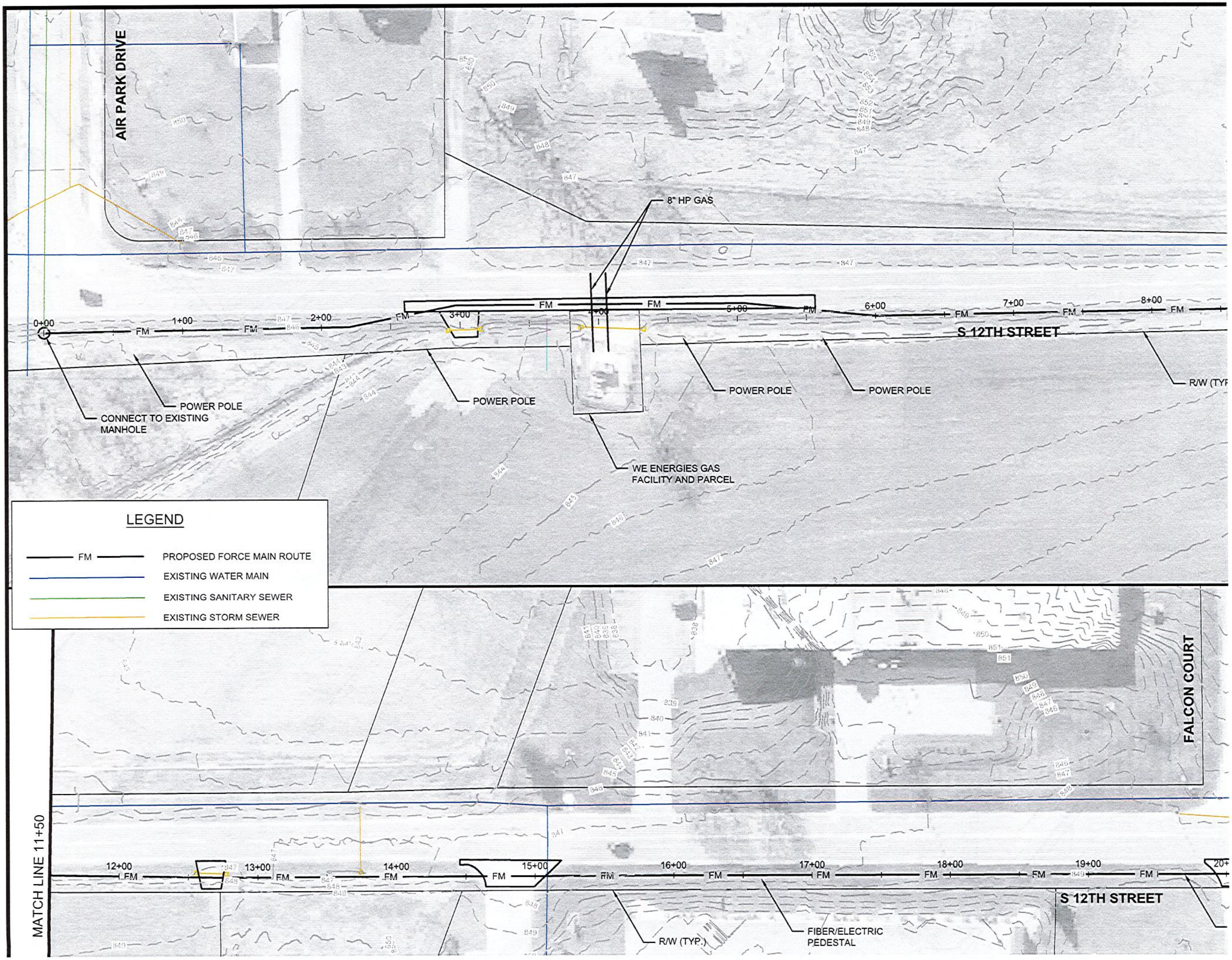
DRAFT-(06.24.24)

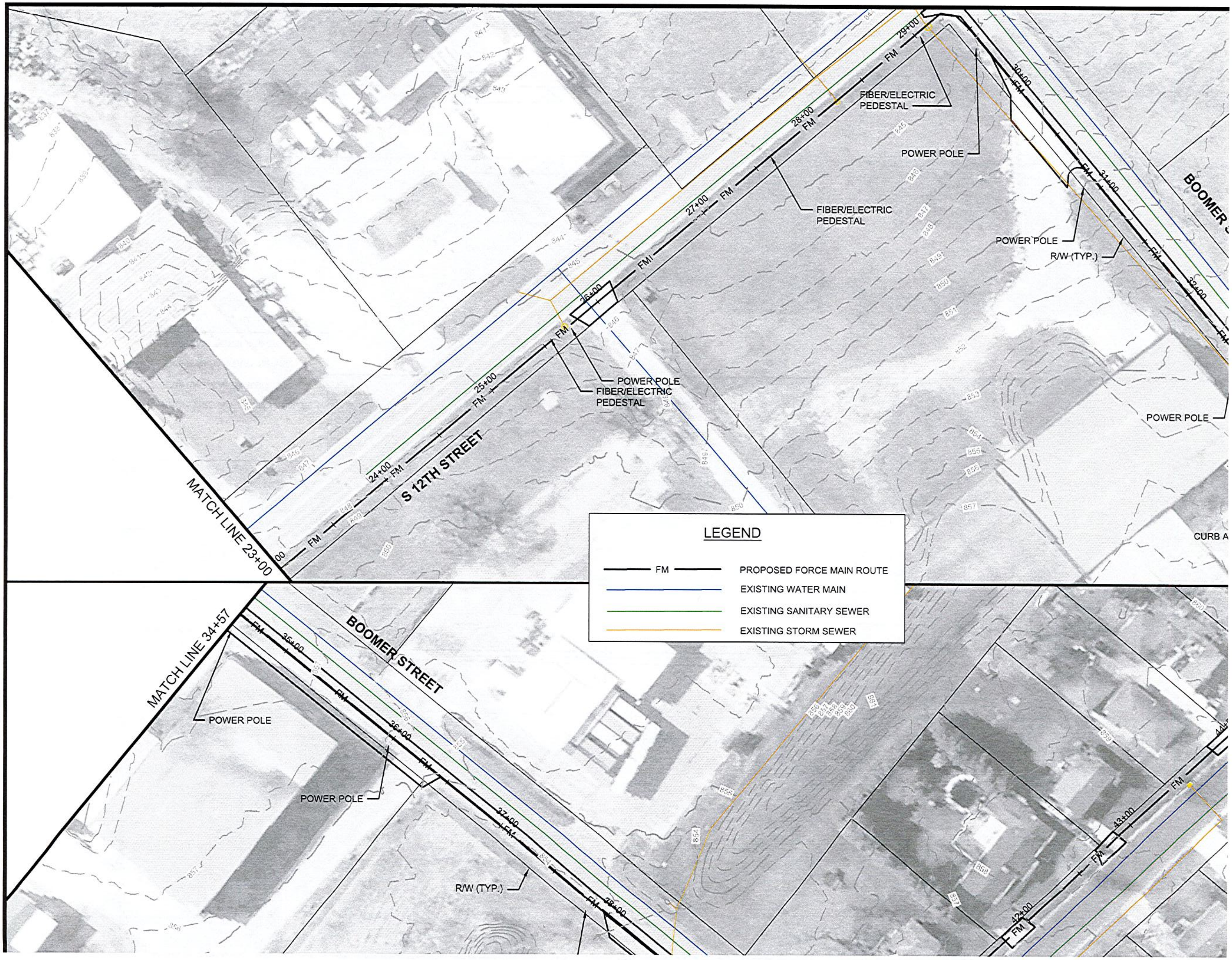
Allerman Lift Station Forcemain Route Alternatives
Opinion of Probable Construction Cost (2025 Dollars)

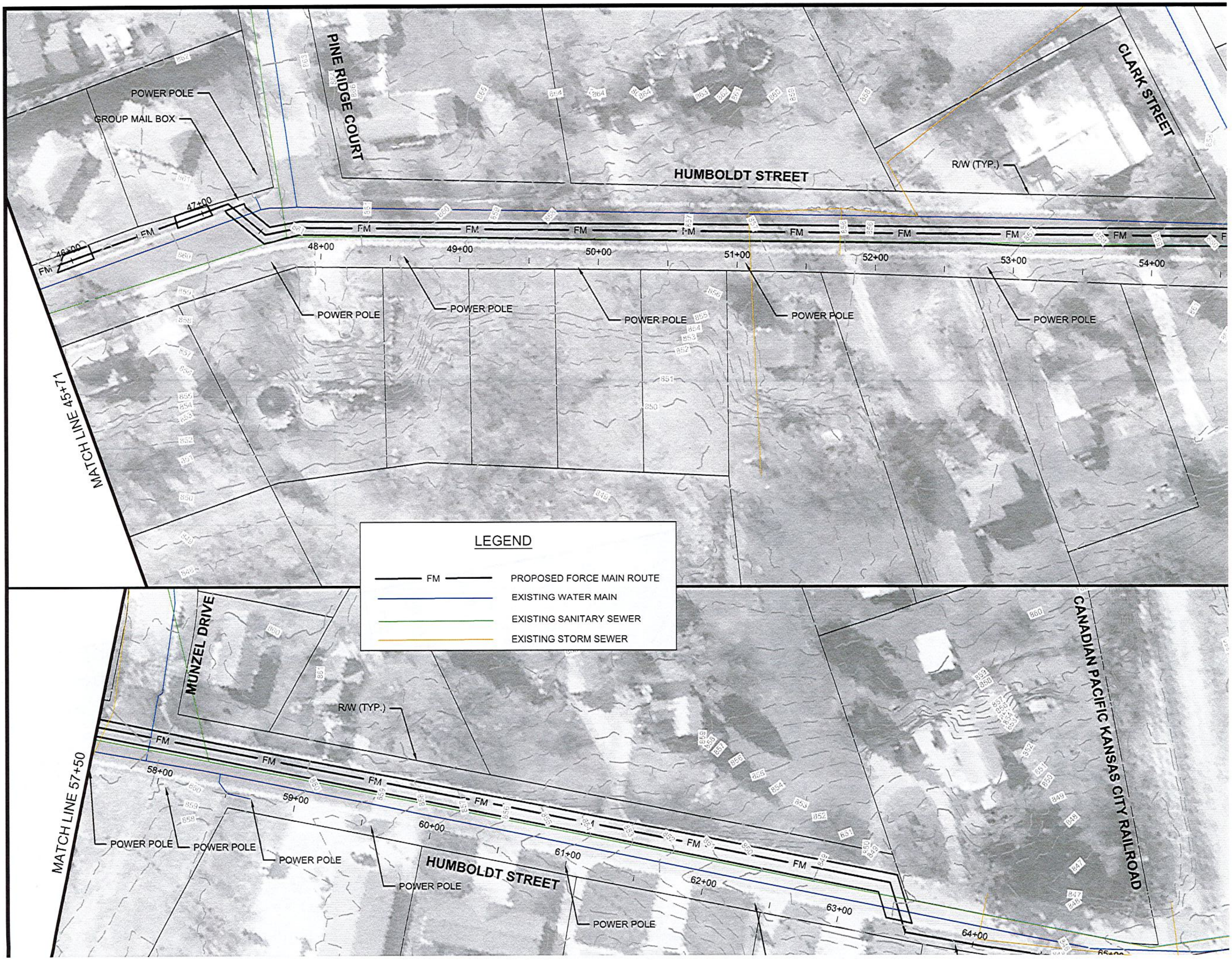
				Alternative 1 (12th Street)		Alternative 2 (Boomer Street)		Alternative 3 (Clark Street)	
Item No.	**Description**	**Unit**	**Unit Price**	**Quantity**	**Amount**	**Quantity**	**Amount**	**Quantity**	**Amount**
1	Mobilization	LS	$ 100,000.00	1	$100,000	1	$100,000	1	$100,000
2	Traffic Control	LS	$ 15,000.00	1	$15,000	1	$15,000	1	$15,000
3	Abandon Existing Force Main	LS	$ 10,000.00	1	$10,000	1	$10,000	1	$10,000
4	Erosion Control	LS	$ 15,000.00	1	$15,000	1	$15,000	1	$15,000
5	Tree Removals	LS	$ 20,000.00	1	$20,000	1	$20,000	1	$20,000
6	Pavement Removal	SY	$ 12.00	4,500	$54,000	5,500	$66,000	5,500	$66,000
7	Storm Sewer Replacement	LF	$ 120.00	150	$18,000	150	$18,000	250	$30,000
8	Storm Sewer Structure Replacement	EA	$ 5,000.00	3	$15,000	4	$20,000	15	$75,000
9	Water Main Replacement	LF	$ 200.00	100	$20,000	100	$20,000	200	$40,000
10	Fire Hydrant Replacement	EA	$ 10,000.00	0	$0	0	$0	4	$40,000
11	Force Main, 8-IN	LF	$ 150.00	7,760	$1,164,000	9,400	$1,410,000	8,280	$1,242,000
12	Force Main with Casing Pipe, Trenchless, 8-IN	LF	$ 800.00	100	$80,000	100	$80,000	100	$80,000
13	Air Release Manhole and Valve	EA	$ 10,000.00	4	$40,000	6	$60,000	3	$30,000
14	Valve, Gate, 8-IN	EA	$ 8,000.00	2	$16,000	2	$16,000	2	$16,000
15	Connection to Forcemain	EA	$ 7,500.00	2	$15,000	2	$15,000	2	$15,000
16	HMA/Base Course Pavement Patch	SY	$ 80.00	4,400	$352,000	5,200	$416,000	5,100	$408,000
17	Imported Granular Backfill - In Paved Areas	LF	$ 40.00	3,825	$153,000	4,325	$173,000	4,300	$172,000
18	Curb and Gutter Remove/Replace	LF	$ 60.00	150	$9,000	150	$9,000	300	$18,000
19	Driveway Remove/Replace	SY	$ 120.00	1,500	$180,000	950	$114,000	850	$102,000
20	Sidewalk Remove/Replace	SY	$ 120.00	0	$0	0	$0	675	$81,000
21	Turf Restoration	SY	$ 10.00	9,000	$90,000	10,000	$100,000	9,000	$90,000
				Subtotal	$2,366,000	Subtotal	$2,677,000	Subtotal	$2,665,000
				30% Contingency*	$710,000	30% Contingency*	$803,000	30% Contingency*	$800,000
				Alternative 1 Total	**$3,076,000**	**Alternative 2 Total**	**$3,480,000**	**Alternative 3 Total**	**$3,465,000**

* Includes Construction Contingency + Design Services

APPENDIX A
COST ALTERNATIVE BREAKDOWNS


AIR PARK DRIVE
8" HP GAS
S 12TH STREET
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
FM
POWER POLE
CONNECT TO EXISTING MANHOLE
POWER POLE
POWER POLE
POWER POLE
R/W (TYP.)
WE ENERGIES GAS FACILITY AND PARCEL
LEGEND
FM
PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER
FALCON COURT
MATCH LINE 11+50
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
S 12TH STREET
R/W (TYP.)
FIBER/ELECTRIC PEDESTAL

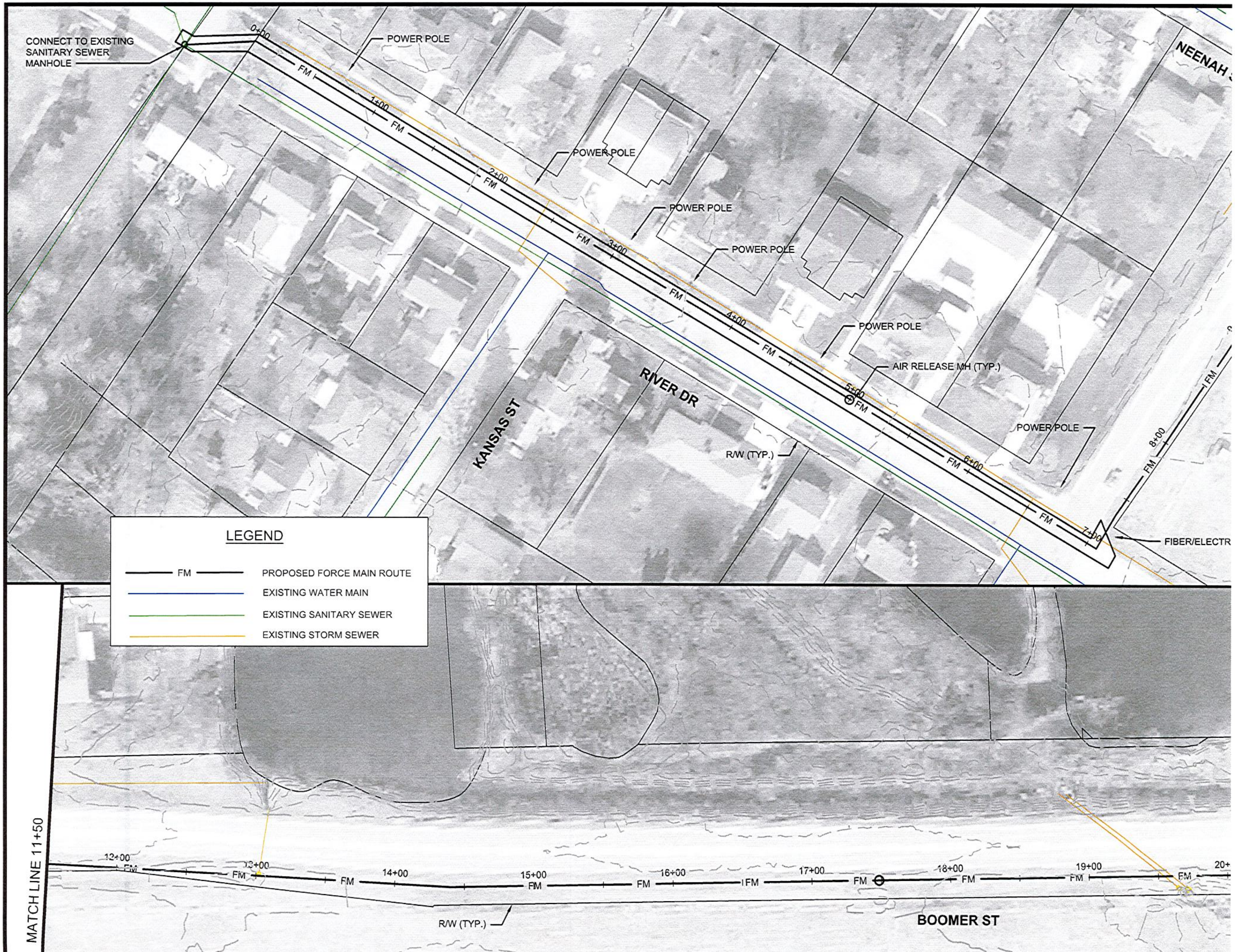

S 12TH STREET
BOOMER STREET
MATCH LINE 23+00
MATCH LINE 34+57
FIBER/ELECTRIC PEDESTAL
POWER POLE
R/W (TYP.)
CURB A
LEGEND
FM
PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER



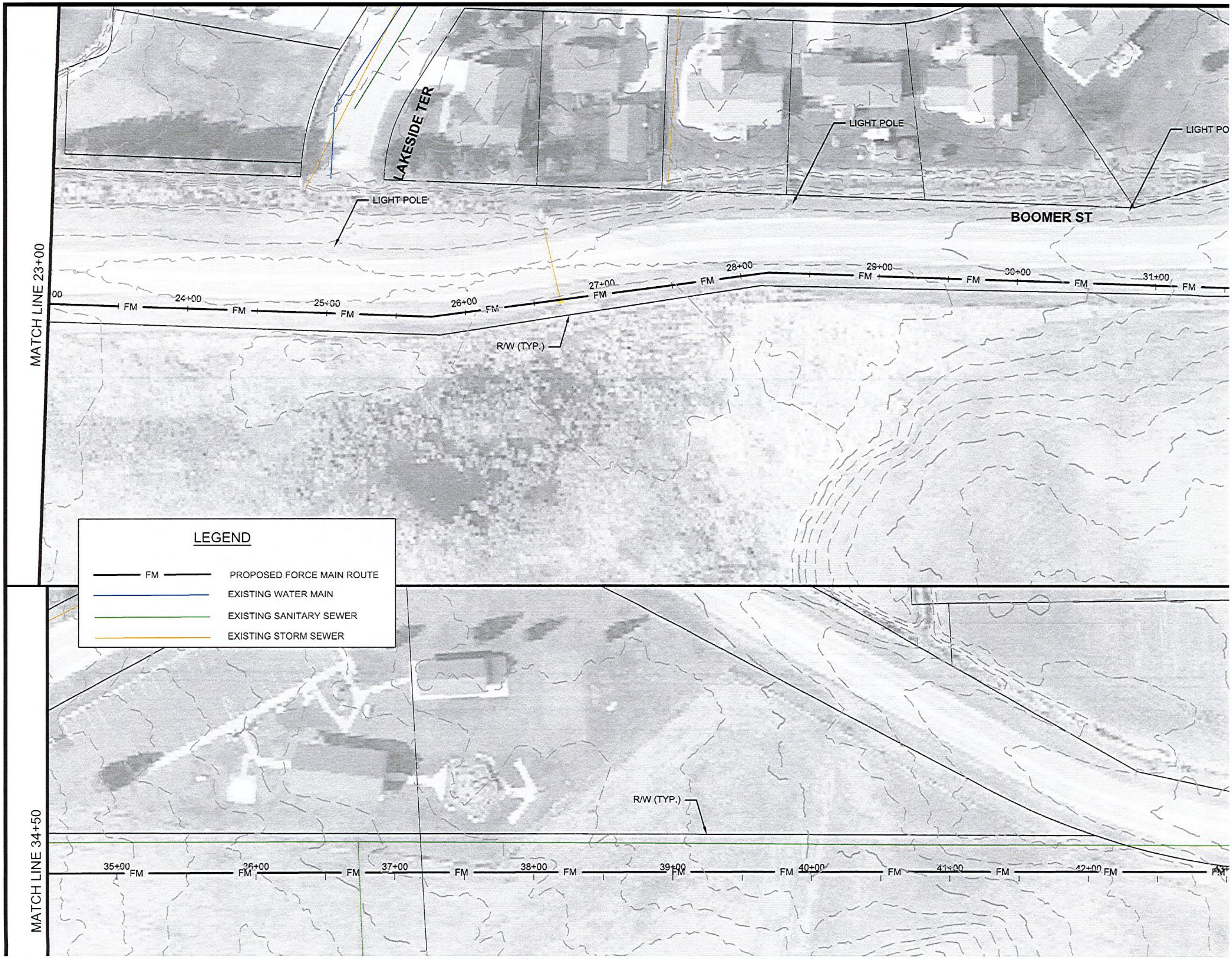
PINE RIDGE COURT
HUMBOLDT STREET
CLARK STREET
R/W (TYP.)
POWER POLE
GROUP MAIL BOX
FM
47+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
MATCH LINE 45+71
LEGEND
PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER
MUNZEL DRIVE
CANADIAN PACIFIC KANSAS CITY RAILROAD
58+00
59+00
60+00
61+00
62+00
63+00
64+00
MATCH LINE 57+50

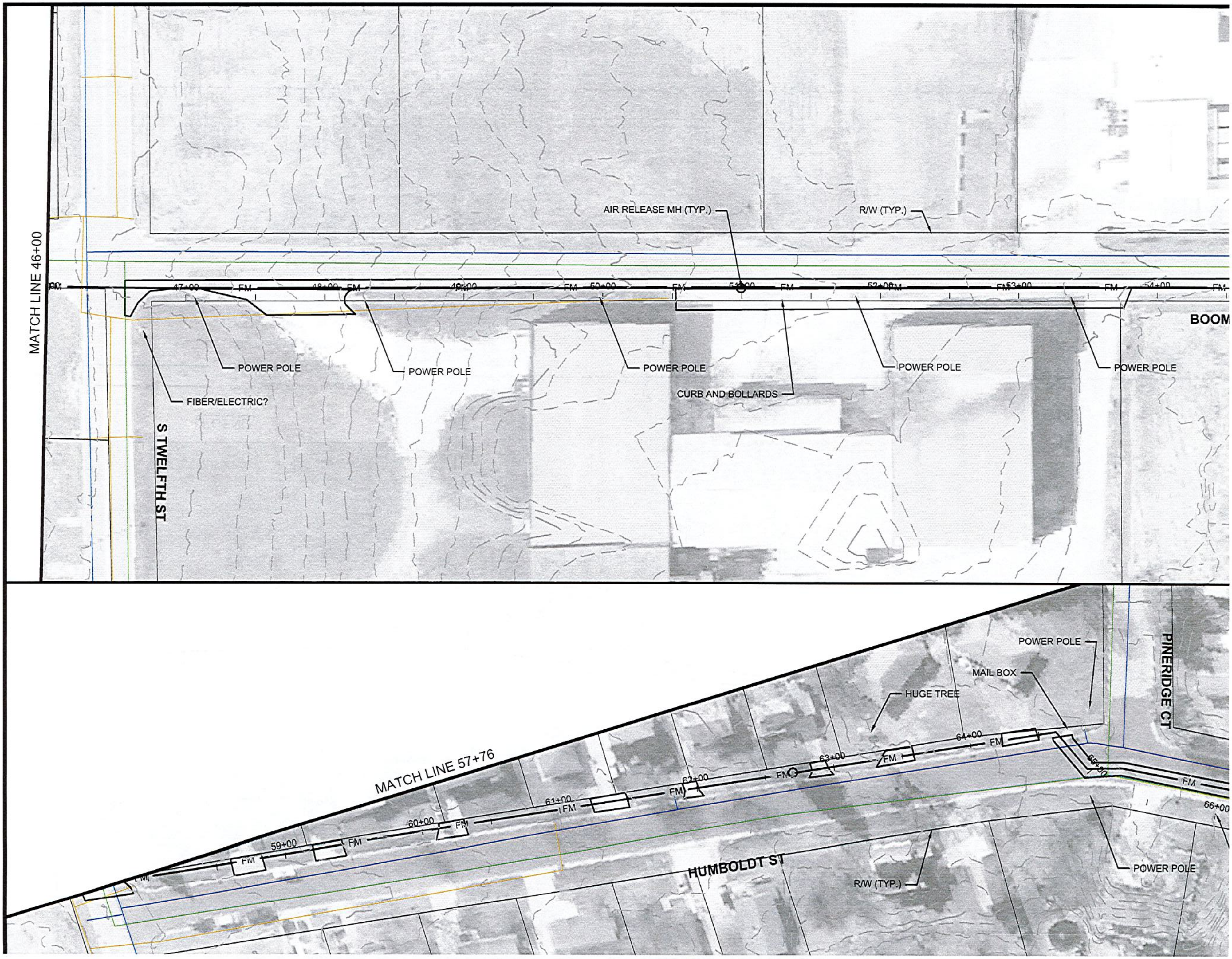

RICHARDS AVENUE
S CONCORD AVENUE
RICHARDS AVENUE
HUMBOLDT STREET
ALLERMAN DRIVE
R/W
GAS
POWER POLE
GAS
POWER POLE
71+00
72+00
73+00
74+00
75+00
76+00
77+00
FM
MATCH LINE 69+14
LEGEND
FM PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER

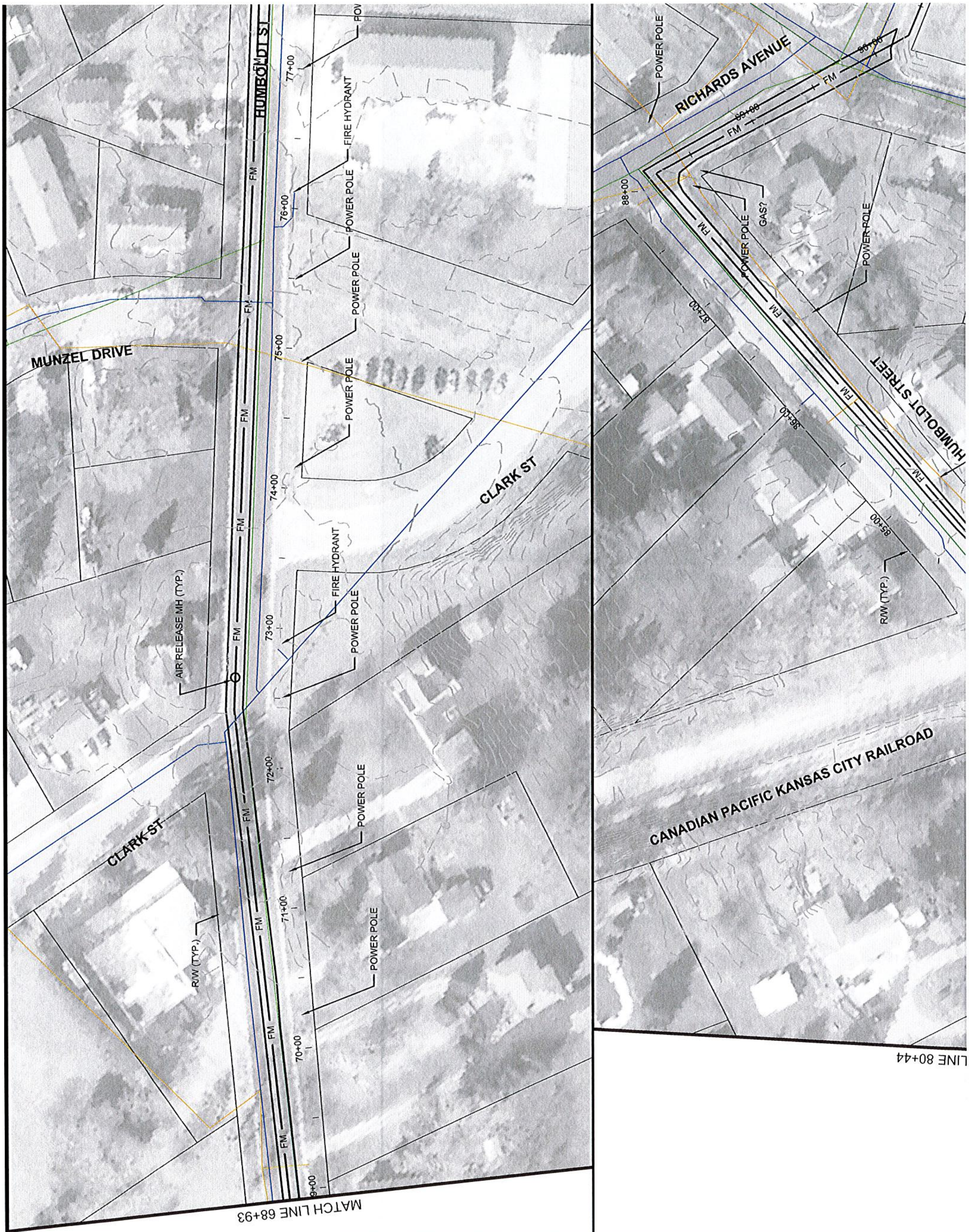
APPENDIX C
ALTERNATIVE ROUTE NO. 2 DRAWINGS



CONNECT TO EXISTING SANITARY SEWER MANHOLE
POWER POLE
AIR RELEASE MH (TYP.)
FIBER/ELECTR
NEENAH
RIVER DR
KANSAS ST
R/W (TYP.)
BOOMER ST
MATCH LINE 11+50
LEGEND
FM PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER

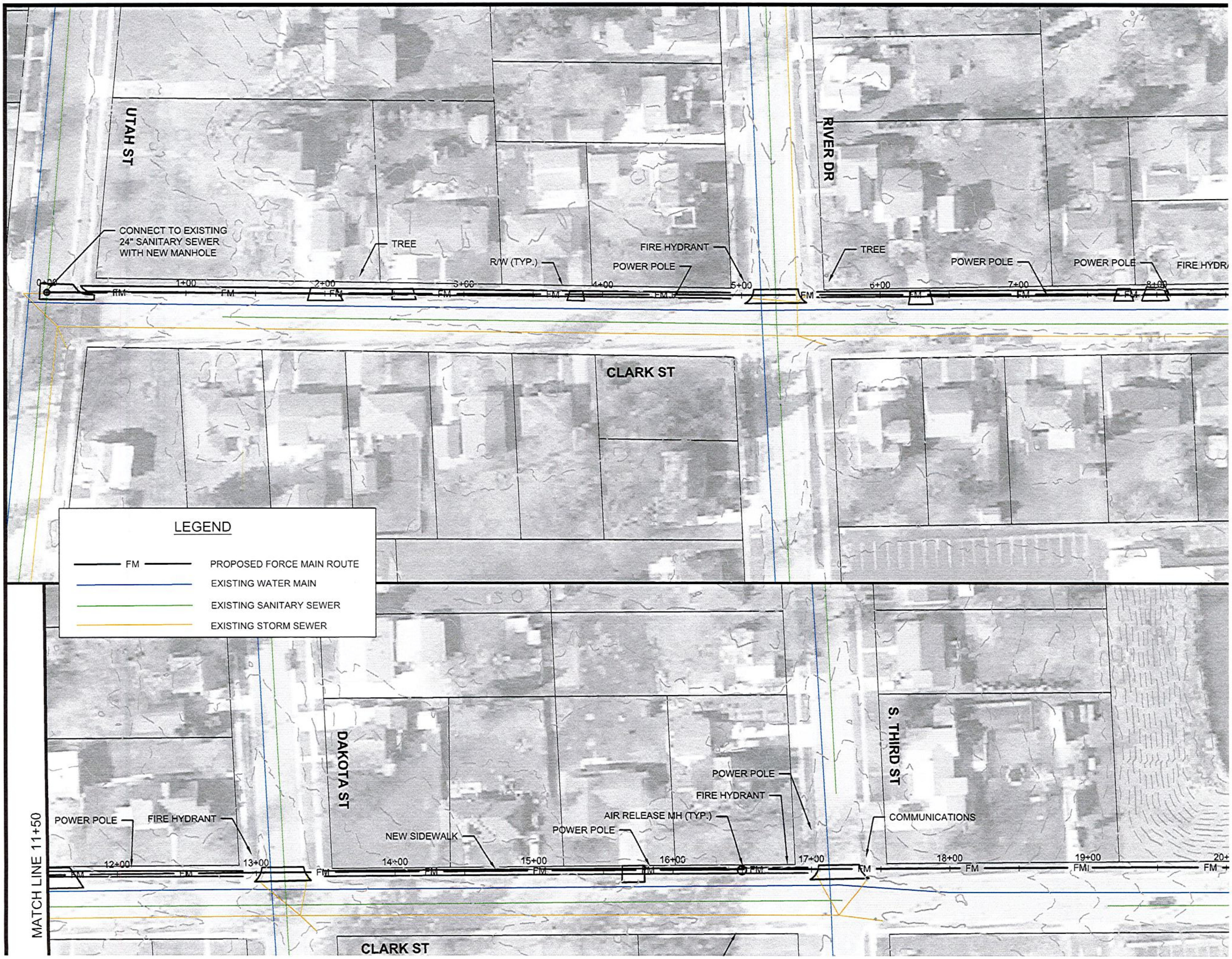

MATCH LINE 23+00
MATCH LINE 34+50
LAKESIDE TER
BOOMER ST
LIGHT POLE
LIGHT POLE
R/W (TYP.)
R/W (TYP.)
24+00
25+00
26+00
27+00
28+00
29+00
30+00
31+00
35+00
36+00
37+00
38+00
39+00
40+00
41+00
42+00
FM
LEGEND
FM PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER

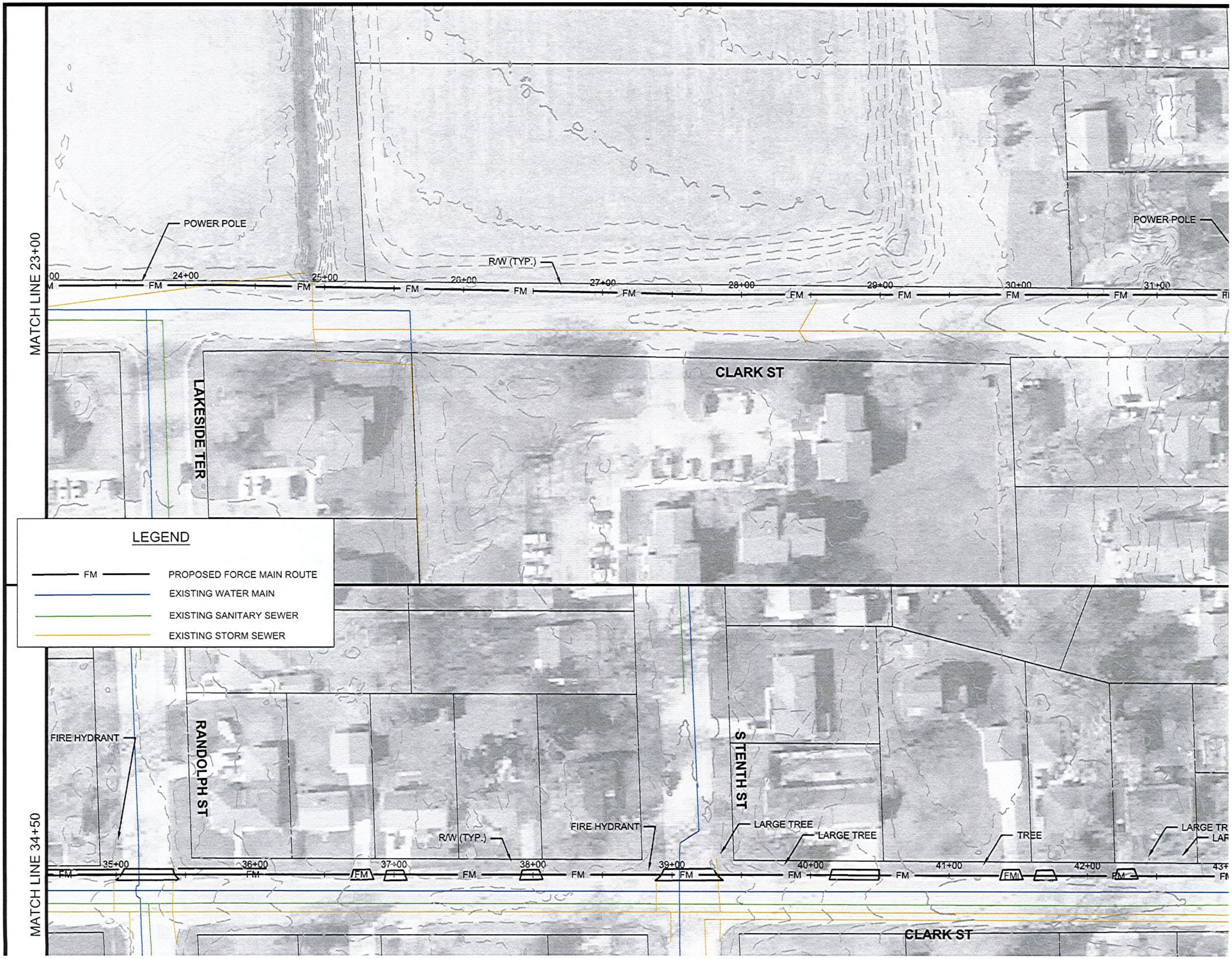

MATCH LINE 46+00
AIR RELEASE MH (TYP.)
R/W (TYP.)
47+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
FM
BOOM
POWER POLE
POWER POLE
POWER POLE
POWER POLE
POWER POLE
CURB AND BOLLARDS
FIBER/ELECTRIC?
S TWELFTH ST
POWER POLE
PINERIDGE CT
MAIL BOX
HUGE TREE
MATCH LINE 57+76
59+00
60+00
61+00
62+00
63+00
64+00
65+00
66+00
HUMBOLDT ST
R/W (TYP.)
POWER POLE


HUMBOLDT ST
MUNZEL DRIVE
CLARK ST
CLARK ST
FIRE HYDRANT
FIRE HYDRANT
POWER POLE
AIR RELEASE MH (TYP.)
R/W (TYP.)
FM
77+00
76+00
75+00
74+00
73+00
72+00
71+00
70+00
MATCH LINE 68+93
RICHARDS AVENUE
HUMBOLDT STREET
GAS?
POWER POLE
R/W (TYP.)
CANADIAN PACIFIC KANSAS CITY RAILROAD
88+00
87+00
86+00
85+00
LINE 80+44

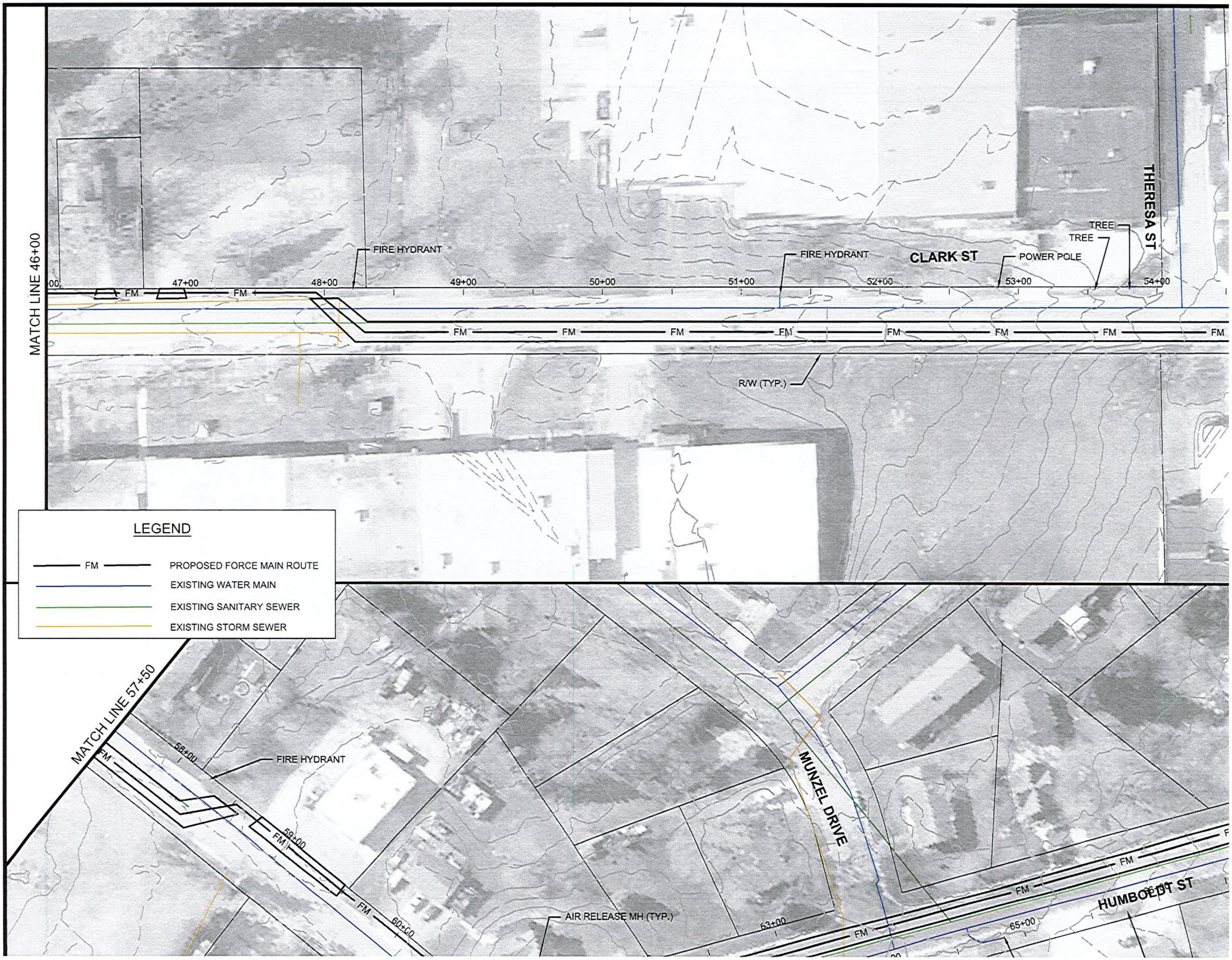
MATCH LINE 92+79

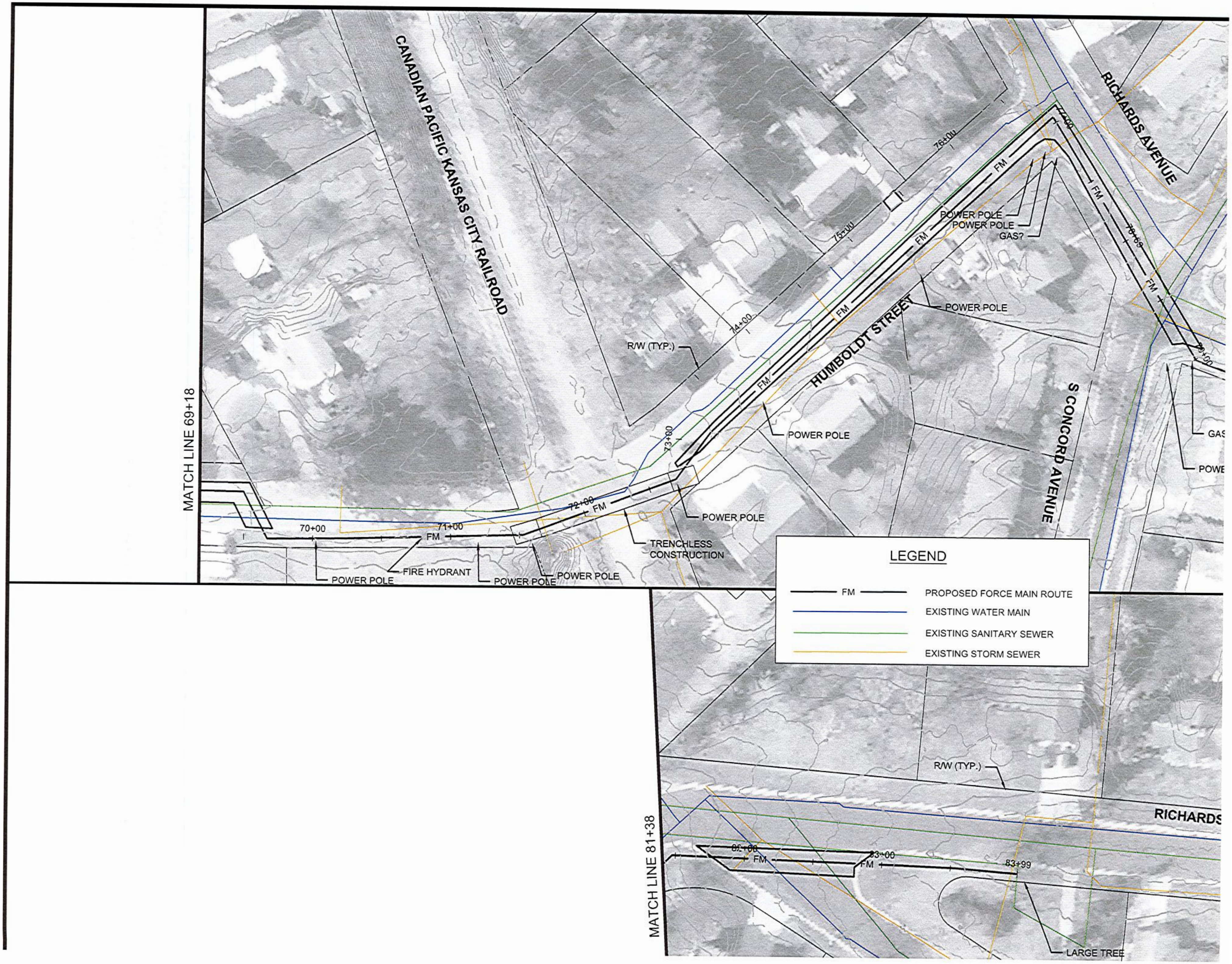
APPENDIX D
ALTERNATIVE ROUTE NO. 3 DRAWINGS


UTAH ST
RIVER DR
CLARK ST
DAKOTA ST
S. THIRD ST
CONNECT TO EXISTING
24" SANITARY SEWER
WITH NEW MANHOLE
TREE
R/W (TYP.)
FIRE HYDRANT
POWER POLE
POWER POLE
FIRE HYDRA
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+
FM
NEW SIDEWALK
AIR RELEASE MH (TYP.)
COMMUNICATIONS
MATCH LINE 11+50
LEGEND
PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER



MATCH LINE 23+00
MATCH LINE 34+50
POWER POLE
R/W (TYP.)
24+00
25+00
26+00
27+00
28+00
29+00
30+00
31+00
FM
CLARK ST
LAKESIDE TER
RANDOLPH ST
S TENTH ST
FIRE HYDRANT
LARGE TREE
TREE
35+00
36+00
37+00
38+00
39+00
40+00
41+00
42+00
LEGEND
FM PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER


MATCH LINE 46+00
MATCH LINE 57+50
THERESA ST
CLARK ST
MUNZEL DRIVE
HUMBOLDT ST
TREE
TREE
POWER POLE
FIRE HYDRANT
FIRE HYDRANT
FIRE HYDRANT
R/W (TYP.)
AIR RELEASE MH (TYP.)
47+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
58+00
59+00
60+00
63+00
65+00
FM
LEGEND
FM PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER



CANADIAN PACIFIC KANSAS CITY RAILROAD
RICHARDS AVENUE
HUMBOLDT STREET
S CONCORD AVENUE
MATCH LINE 69+18
MATCH LINE 81+38
R/W (TYP.)
POWER POLE
POWER POLE
GAS?
FIRE HYDRANT
TRENCHLESS CONSTRUCTION
LARGE TREE
RICHARDS
70+00
71+00
72+00
73+00
74+00
75+00
76+00
83+00
83+99
FM
LEGEND
PROPOSED FORCE MAIN ROUTE
EXISTING WATER MAIN
EXISTING SANITARY SEWER
EXISTING STORM SEWER

DRAFT-(06.24.24)

APPENDIX E
WDNR SWDV

Surface Water Data Viewer Map - Allerman Lift Station and Force Main