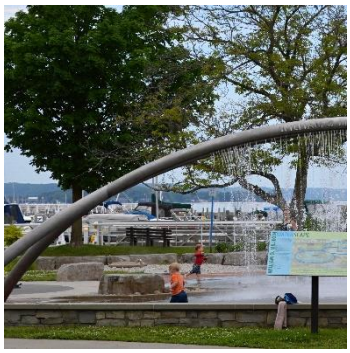
CITY of TRAVERSE CITY MICHIGAN

WATER RELIABILITY STUDY

WSSN #6440



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1 Executive Summary

The purpose of this study is to satisfy the requirements of the Michigan Department of Energy, Environment and Great Lakes (EGLE) Michigan Safe Drinking Water Act which indicates that Type 1 water suppliers (community supply) are required to conduct a reliability study every five (5) years to determine the adequacy of the system to meet the water demands at a certain pressure.

The *normal system working conditions* as published by the "Recommended Standards for Water Works, 2012 Edition" by the Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten State Standards), Section 8.2.1, indicates the following:

> *"The system shall be designed to maintain a minimum pressure of 20 psi (140 kPa) at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system should be approximately 60 to 80 psi (410-550 kPa) and not less than 35 psi (240 kPa)."*

The existing and future demands for the projected 5-year and 20-year conditions were determined and summarized below. The estimates demonstrate that the current maximum demand can be met by the firm water supply capacity (19.7 mgd) of the WTP but the 20-year maximum daily demand will be approaching the firm water supply capacity. EGLE requires communities plan for expansion when maximum daily demands are in excess of 80% of the firm capacity.

Year	Averaged Daily Demand (mgd)	Maximum Daily Demand (mgd)	Peak Hourly Demand (mgd)
2020	5.43	13.48	22.66
2025	5.72	14.19	23.86
2030	5.96	14.78	24.85
2040	6.46	16.03	26.95

As of 2020, the City had 5,870 residential connections and 1,428 commercial connections. The total number of residential equivalent units (REUs) in the City was 13,010. The total estimated residential service population in the City and customer communities was 31,155.

In order to address EGLE's requirement, a hydraulic model of the City of Traverse City's water distribution system was created using Bentley's WaterGEMS to evaluate the City's existing and future potable water needs. The existing conditions model was updated for 2020 and re-calibrated using previous hydrant tests completed by the City in 2019 and 2020. The future conditions model using was created by utilizing the calibrated existing conditions model and adding to it, potential system expansion limits and future demands. The existing and future conditions models were

analyzed under typical demand conditions and fire flow demand conditions, (fire flows available at maximum day demand while maintaining 20 psi in the system).

All the larger system water mains (8-inch to 24-inch), pressure reducing valves, bypass valves, pumping facilities and storage facilities were input into the computer model to simulate existing and future distribution system hydraulics. Minor areas of smaller water main (4-inch and 6-inch) were included in the model to provide looping and more accurately represent system operations. The developed model is a schematic of the actual system and should be utilized as a tool to simulate actual system operations and reactions.

The City's water supply system (existing and future conditions) maintains satisfactory pressures between 35 psi and 135 psi through normal demand conditions (average day, maximum day, and peak hour demands). Per Ten States Standards guidelines, it is City policy that any areas of the system that routinely experience pressures over 100 psi be equipped with pressure regulating valves on their service lines. The model was also used to analyze some specific areas of operational concern that relate to the City's outlying higher elevation pressure districts on the northwest side of the City. Improvements were developed and tested using the model for viability.

The City currently meets the minimum requirements to provide potable drinking water in a safe, efficient, and reliable manner. The City continues to enhance the system's reliability, performance, capacity, and firefighting capabilities, with its ongoing water main replacement program (water main replacement/extensions/looping).

There are several system improvements (water main replacements/looping) that, when made, will further enhance the system's reliability, performance, and capacity. In addition, some specific improvements were developed for the northwest area of the system as stated above and to address capacity limitations at the Water Treatment Plant (WTP) at the low service pump station. Recommended improvements are detailed in Table 8-1 for the water treatment plant and distribution system to be completed as part of the 5-year, 10-year, and 20-year planning periods. The 5-year planning period CIP is summarized as follows:

Category	Estimated Cost
WTP Improvements Projects (5-Yr)	$2,114,000
Distribution System Improvements Projects (5-Yr)	$6,835,000
Total Estimated Cost of Projects (5-Yr)	**$8,949,000**

2 Introduction

2.1 Background

The City of Traverse City is located in Grand Traverse County in the northwest Lower Peninsula. The City is situated on the southern shores of Grand Traverse Bay. The City maintains great pride in ensuring high-quality drinking water and reliability to its residents as well as protecting the clean waters of Grand Traverse Bay.

The City's raw water supply is from an intake structure from the east arm of Grand Traverse Bay (East Bay). The City's original water supply was located near the City in West Bay in the 1890s and was relocated to East Bay, which is more protected from runoff and potential contamination sources, in 1965. Treatment is provided by a 20 million gallon per day (mgd) Water Treatment Plant (WTP) located in the City near the intake in East Bay. The WTP was converted to direct filtration in 1993 and is equipped with four low service pumps (raw water), two flocculators, five rapid sand filters, two clear wells, finished water storage, and five high service pumps (finished water).

The City's water distribution system provides water service for water use and fire flows throughout the City's service area. The City's system comprises 660,340 feet (125 miles) of water main and two booster pumping stations. Approximately two-thirds of the piping is cast iron and the majority of the water mains were constructed in the 1960s and prior. New ductile iron mains have been installed since the 1980s.

The City also supplies the surrounding townships through bulk water agreements with Garfield Township (5 mgd maximum), Elmwood Township (0.75 mgd maximum), and Peninsula Township (1 mgd maximum). An emergency connection is also provided with the East Bay Township water distribution system which operates at a higher system pressure and a dissimilar water quality (groundwater source).

2.2 Purpose

The purpose of this study is to satisfy the requirements of the Michigan Department of Environment, Great Lakes and Energy (EGLE) Michigan Safe Drinking Water Act (SDWA), and the Rules promulgated pursuant to the Act (P.A. 399 of 1976, as amended). Part 12 of the Rules indicates that Type 1 water suppliers (community supply) are required to conduct a reliability study every five (5) years to determine the adequacy of the system to meet the water demands at a certain pressure. The principal elements of this Reliability Study, which provide the requirements to satisfy of Part 12 of Michigan's Safe Drinking Water Act (SDWA), include the following:

1. Study of Water Supply Requirements
    a. Present, 5-Year and 20-Year projected average daily, maximum daily and peak hour demands

   b. Present, 5-Year and 20-Year projected fire flow demands
   c. Basis of demand projections
2. Required Capacity of Waterworks System
   a. Rated capacity from the treatment system
   b. Finished water storage capacity in excess of the established normal waterworks system requirements
3. Interruption of Power Service
4. Interruption in Water Service to Distribution System

The existing conditions model was created using Bentley's WaterGEMS water distribution modeling software. Model calibration was accomplished by utilizing field data collected by the City. The future conditions model was created by utilizing the calibrated existing conditions model and adding to it the expected future conditions within the City and potential expansion of the water system.

This Reliability Study includes information that will satisfy the requirements of Part 16 of the SDWA and the rules promulgated by the Act (P.A 399 of 1976, as amended) which indicates that certain suppliers of water shall submit and maintain an up-to-date waterworks system General Plan. The principal elements of the General Plan, which are provided to satisfy these requirements, include the following:

1. General layout of the entire waterworks systems.
2. A hydraulic analysis of the distribution system showing pressure contours under peak demands.
3. Identification of the entire area served or proposed to be served by the public water supply.
4. Rated capacity of the waterworks system.
5. An inventory of water main by size, material and age.
6. A Capital Improvements Plan (CIP) that identifies needs for 5- and 20-year planning periods.

3 Existing Water Supply System

3.1 Water Supply and Treatment

3.1.1 Raw Water Pumping and Intake

The City treats water from the east arm of Grand Traverse Bay in Lake Michigan. The Low Service Pump Station (LSPS) is located on Eastern Avenue pumps water from a 36-inch diameter raw water intake pipe and crib structure (located 4,000 feet offshore) to the Water Treatment Plant. The station is a 38-ft diameter circular caisson with a split wet well and a total of four vertical turbine pumps. Low Service Pumps No. 1, 2, and 4 are constant speed pumps, and pump No. 3 motor was replaced in 2015 and operates on a VFD and the speed is controlled to vary the raw water flow rate to the WTP. The pumps discharge to a single 30-inch cast-iron raw water main along Eastern Avenue. Table 3-1 summarizes the LSPS capacities and information.

Table 3-1: Low Service Pump Station

#	LSPS Clear Well	Speed (rpm)	Date of Construction	Make	Model	Motor HP	Stages	Design Capacity		Current Capacity	
								Flow (mgd)	TDH (ft)	Flow (mgd)	TDH (ft)
1	South	1160	1965	Worthington	20H-500-W	75	2	5.0	62.4	6.4	47.6
2	North	1160	1965	Worthington	20H-500-W	75	2	5.0	62.4	5.6	45.2
3	North	1775	1993	Worthington	18H-500-1	200	1	8.0	62.4	7.7	46.5
4	South	1175	1973	Johnston	14PS	150	2	8.0	62.4	7.8	51.2
							Total Capacity (mgd)			27.6	
							Firm Capacity (mgd)			19.7	
							Operating Capacity (mgd)			16.7	

Notes:

1. Current capacities from flow testing completed in December 2020
2. Firm capacity with the largest pump out of service
3. Operating capacity is determined by transmission constraints with the largest pump out of service

HRC reviewed and checked the hydraulics based on recordings taken during pumping in August 2020 and pump testing completed in December 2020. The measured current firm capacity of the pump station during the pump testing is 19.7 mgd for the largest pump 3 out of service. The measured operating capacity of the pump station is 16.7 mgd and the hydraulics indicate the friction factor on the 30-inch raw water main (constructed in the 1960s) has been reduced (estimated C Factor = 80).

3.1.2 Rapid Mix and Flocculation

Raw water entering the treatment plant flows through the 30-inch pipe in the lower level. Raw water is measured by a single 30-inch magnetic flow meter installed in 2015. The single 30-inch line splits into two 24-inch pipes that are installed in parallel, each equipped with inline mixers. Ferric sulfate is applied before each of the mixers. The water

then flows to two flocculation basins each having a center draft tube and variable speed flocculator (mixer). The flocculation tanks provide 27 minutes of detention time at their rated capacity of 10 mgd each (20 mgd total). A circular weir launder controls the water surface within the tanks and discharges the flow to a 36-inch pipe before it is applied to the filters.

3.1.3 Filtration

Filtration is provided by five filters and each is rated for 4 mgd at a filtration rate of 4 gallons per minute (gpm) per square foot sf). Each filter is comprised of two 14-ft by 25-ft cells configured for simultaneous normal operation and individual surface wash and backwash. Filters 4 and 5 were rehabilitated in 2014 and equipped with HDPE underdrains with four layers of gravel for an overall depth of 9-inches for media support. 30 inches of dual media is comprised of 18-inches of sand and 12-inches inches of anthracite. Each cell contains two rotating surface wash assemblies. Filters 1, 2, and 3 currently have clay block and gravel for media support, and the underdrains are scheduled to be inspected and rehabilitated in 2021. The gravel and sand media and the influent, surface wash, backwash drain, filter effluent, and backwash supply valves for Filters 1, 2, and 3 will also be replaced in 2021.

The filtered water production is monitored and controlled by a dedicated rate of flow controller connected to SCADA. Individual filter effluent turbidity is monitored and each filter console provides monitoring and control for washing of its associated filter(s). Three filter consoles are located on the filter operating level. The original consoles were constructed in 1964 for Filters 1 and 2. Filter 3 console was installed in 1973 and Filter 4 and 5 console was constructed in 1993.

A surface wash pump provides suitable supply and pressure to rotate the pair of surface washers in each bay. The surface wash pump is rated at 225 gpm at 176 feet TDH. There is no redundant supply.

The filters are backwashed by closing the filter effluent valve and opening the washwater supply and backwash drain valves for each cell. The backwash water is supplied by the filter backwash pump, which is rated at 8,000 gpm at 40-ft TDH. Backwash water can also be supplied by a 14-inch line from the high service pump station efflux using the filter backwash control valve located in the basement level. The filters are backwashed when the filter head loss is at 8.5 to 10 feet. Filters are typically washed for 10 to 15 minutes at 3,000 to 4,000 gpm. The average run time between backwashes is 80 to100 hours. Typically, up to 75,000 gallons are used per filter backwash. The monthly average backwash volume ranges from 90,000 gal during low demand periods up to 200,000 gal during higher flow months.

Filter piping is located in the filter gallery on the lower level of the WTP. Each filter is served by a total of nine (9) valves; one modulating valve for filter rate control and eight that are in either the open or closed position. Pneumatic valve actuators serve Filters 1, 2, and 3 and electric valve actuators serve Filters 4 and 5. Filters are flow-paced based

on magnetic flow meter information. Filter-to-waste capability is provided for Filters 4 and 5. There is no filter-to-waste currently available on Filters 1, 2, and 3.

3.1.4 Clear Wells and Treated Water Reservoir

Filtered water flows to two clearwells located beneath Filters 1, 2, and 3. One clearwell is below Filters 1 and 2 and the other clearwell is below Filter 3. Filters 4 and 5 and can be piped to either clearwell. From the clearwells, the water passes through piping where fluoride is applied before entering the 1.5-million-gallon rectangular storage reservoir which is partially below grade and located south of the WTP building. Chlorine can also be applied near the fluoride application point. The reservoir is baffled to provide suitable contact time to achieve satisfactory disinfection contact time. Water exiting the treated water storage reservoir flows through a 36-inch finished water main to the high service pump suction well. A separate 12-inch finished water main feeds the Huron Hills Pump Station suction well.

3.1.5 Chemical Feed

3.1.5.1 Coagulant

The WTP uses ferric sulfate as its primary coagulant which replaced the original equipment which fed aluminum sulfate (alum). This system, which was installed in 2017, is equipped with three 1000-gallon double-walled fiberglass storage tanks, three metering pumps, and a 100-gallon day tank and scale. The ferric bulk storage provides sufficient storage for a minimum of 30 days at maximum daily demand. The storage tank valves are manually opened to fill the 100-gallon day tank. Coagulant aids such as polymers are not used.

3.1.5.2 Fluoride

The WTP feeds hydrofluosilicic acid using a feed system that consists of one 1000-gallon double-walled fiberglass storage tank, one transfer pump, one 100-gallon day tank, and a metering pump. The storage tank and day tank have sufficient storage for maximum daily demands.

3.1.5.3 Disinfectant

The WTP feeds sodium hypochlorite using a feed system including two 8,200 gallon bulk storage tanks, two transfer pumps, a 450-gallon day tank with scale, and three metering pumps. Chlorine is fed to several locations in the WTP including the raw water intake for zebra mussel control.

3.1.5.4 Antiscalant

The WTP adds sodium hexametaphosphate to prevent calcification within the disinfection feed piping. The sodium hexametaphosphate feed system is comprised of a batch tank and chemical pump located in the chlorine room.

3.1.6 Wash Water and Sludge Lagoons

Two lagoons are used for washwater and sludge waste from the filter backwash and flocculation tank drain water. The two lagoons are approximately 61,000 cubic feet and 66,000 cubic feet respectively. The water is decanted and the decant drains by gravity through an 8-inch drain to a 5-ft diameter sump in the WTP basement. There are two sump pumps which return discharge to a sewer on Eastern Avenue with an NPDES permitted outfall to East Bay. These sump pumps were replaced in 2015 and 2017 and are each rated for 500 gpm. Sodium thiosulfate is added to dechlorinate the discharge per the NPDES permit.

3.1.7 High Service Pumping

The High Service Pump Station (HSPS) pumps treated water from the WTP to the distribution system from two wet wells which are connected to the Finished Water Storage Reservoir. The HSPS has five vertical turbine pumps which discharge to two 24-inch water mains that connect to the 30-inch water main on Eastern Avenue. A surge relief valve is provided on the discharge main for surge protection. The flows in each main are measured by 24-inch magnetic flow meters which were installed in November 2015. Table 3-2 summarizes the HSPS pump capacities and information.

Table 3-2: High Service Pump Station Pump Capacities

#	WTP Clear Well	Speed (rpm)	Date of Construction	Make	Model	Motor HP	Stages	Design Capacity		Current Capacity	
								Flow (mgd)	TDH (ft)	Flow (mgd)	TDH (ft)
1	West	1160	1964	Worthington	15HH-340	125	6	3.0	180.0	3.2	140
2	East	1180	1964	Worthington	24M425-W	200	2	5.0	180.0	4.7	142
3	West	1180	1964	Worthington	24M425-W	200	2	5.0	180.0	5.0	144
4	East	1180	1964	Worthington	24M425-W	300	2	7.0	180.0	7.0	148
5	West	1775	1993	Worthington	18H500-2	300	1	7.0	180.0	7.5	152
								Total Capacity (mgd)		27.4	
								Firm Capacity (mgd)		19.9	

Notes:

1. Current pump capacities from flow testing completed in June 2014

High Service Pumps 1, 3, and 5 were recently refurbished, equipped with new motors, and their starters were replaced with variable frequency drives (VFDs). High service pump 2 continues to operate at a constant speed. High service pump number 4 utilizes a soft starter.

3.1.8 Plant Capacities and Redundancy

A summary of the current unit processes is provided in Table 3-3.

Table 3-3: Unit Process Capacities

Unit Process	Total Capacity (mgd)	Firm Capacity (mgd)	Basis of Capacity
Intake	24.0	24.0	Max head loss
Low Service Pump Station	27.6	19.7	Pump test (2020)
Flocculation Tanks	20.0	20.0	30 min residence time
Filters	20.2	20.2	Filter rate 4 gpm/sf
Clearwell/Reservoir	38.2	38.2	Capacity to maintain C*T = 61
High Service Pump Station	27.4	19.9	Pump test (2015)
Lagoons	32.0	32.0	3% of Design Flow (0.95 mgd)

3.2 Storage Facilities

The City's water system includes five ground level finished water storage tanks. These include the one water storage tank at the WTP having a total of 1.5 million gallons (mgal) of storage, two water storage tanks located on LaFranier Road south of South Airport Road with a total of 6.0 mgal of storage, and Wayne Hill tank with 1.3 mgal of storage. Due to hydraulic limitations with the booster pump suction piping that draws from the Wayne Hill tank, the available volume in the Wayne Hill tank is 0.67 mgal. The Barlow and Wayne Hill tanks are located at higher elevations within the City and essentially function as elevated tanks, providing the required pressure of the Central PD-1 distribution system. Several other tanks provide storage for separate pressure districts in the City, Garfield Township, and Peninsula Township. The total available storage in the City is 6.74 mgal. Table 3-4 summarizes the information for these tanks.

Table 3-4: Water Storage Facility Information

Tank Name	Base Elev.	LWL	HWL	Dimension	Type	Material	Construction Year	Volume	Volume Available*
	(ft)	(ft)	(ft)	(ft)				(mgal)	(mgal)
Barlow 1	711	715	751	132	Cylindrical	Steel	1972	4.04	4.04
Barlow 2	711	715	751	93	Cylindrical	Steel	2018	2.03	2.03
Wayne Hill	725	734	741	90 x 180	One Cell Rect.	Concrete	1948	1.32	0.67
WTP Storage	580	590	610	110 x 135	One Cell Rect.	Concrete	1965	1.50	1.50

Notes:

2. Available volume represents volume available for system usage/hydraulics. The Wayne Hill Reservoir does not include the lower 7 feet depth of the Wayne Hill tank due to the pump suction header elevation in the booster station.

3.3 Water Distribution Piping

The City's water distribution system provides water service for potable use and fire flow throughout the City's service area. The system comprises 660,340 feet (125 miles) of water main and approximately two-thirds of the system is cast iron and the majority of the water mains were constructed in the 1960s and prior. New ductile iron mains have been installed since the 1960s. Tables 3-5 and 3-6 provide a summary of the materials, installation year, and diameter.

Table 3-5: Water Main Materials and Installation Year

Installation Year	Material							Total Length (ft)
	Cast Iron	Ductile Iron	Steel	Other	PVC	HDPE	Unknown	
Unknown	6,667	0	0	0	1	0	177	6,844
1881-1929	4,532	0	0	0	0	0	0	4,532
1930-1939	6,221	0	0	0	0	0	0	6,221
1940-1949	28,177	0	0	0	0	0	0	28,179
1950-1959	131,702	0	0	0	0	0	11	131,713
1960-1969	222,469	16,200	3,201	537	0	0	7	242,413
1970-1979	28,178	12,032	192	0	0	0	0	40,403
1980-1989	0	18,351	1,766	0	0	0	0	20,117
1990-1999	0	50,585	0	316	4	0	0	50,904
2000-2009	0	93,115	1,989	0	0	0	0	95,104
2010-2019	0	30,257	3,182	2	299	171	1	33,912
Total	**427,946**	**220,540**	**10,330**	**855**	**306**	**171**	**196**	**660,340**

Table 3-6: Water Main Diameters

Diameter	Length (ft)
<6	13,221
6	337,539
8	92,812
10	28,208
12	119,433
16	23,903
18	1,279
20	6,811
24	22,333
30	14,801
Total	**660,340**

3.4 Pressure Districts and PRVs

The City's water system operates in eight pressure districts with several incorporated into the surrounding Township's pressure districts. The pressure districts are controlled by the ground storage tanks, booster pump stations, and various pressure reducing valves (PRVs). These districts are summarized in Table 3-7 and depicted in Figure A-1. Table 3-8 summarizes the City's PRVs and pressure settings.

Table 3-7: City Pressure Districts

District ID	District Name	HGL (ft)	Controlled by:
PD-1	Central	750	Barlow and Wayne Hill Tanks
PD-2	Morgan Farms/Incochee	825	Control Valves WCV-1341, WCV-1328, WCV-1329
PD-3	Incochee Upper	875	PRV at Wayne Hill Booster Station, WCV-1300
PD-4	Wayne Hills Upper	1000	Wayne Hill Booster Pumps
PD-5	Huron Hills Lower	850	Huron Hills PRV WCV-7
PD-6	Timber Lane	875	Timber Lane PRV WCV-8
PD-7	Huron Hills Upper	920	Huron Hills Booster Station
PD-8	Veterans Drive (from Garfield)	875	McRae Hill PRV (Garfield Township)

Pressure District PD-1 is the main pressure district in the City and encompasses most of the service area within the City limits as well as lower elevations of Elmwood, Garfield, and Peninsula Townships. This district's pressure is maintained by the Barlow and Wayne Hill ground storage facilities and has an operating hydraulic grade line (HGL) of 750 feet. Three other pressure districts are maintained by the Wayne Hill Booster Station (described below). PD-4 is maintained at an HGL of 1000 feet to service customers on Wayne Hill. Pressure District 3 (PD-3) is currently maintained at an HGL of 885 feet using a pressure sustaining valve (PSV) that down-feeds from PD-4 located at the Wayne Hill Booster Station (WCV-1300). The lower pressure district, PD-2, is maintained at an HGL of 825 feet using PSVs: WCV-1328, WCV-1329, and WCV-1341 that are down-fed from PD-3 through. A Pressure Regulating Valve (PRV) located at M-72 (WCV-1340) is also used to supplement fire flows to the City's main pressure district PD-1 for the far northwest portion of this district.

Three higher pressure districts in the City limits are controlled by the Huron Hill Booster Station system. This station feeds the intermediate pressure district in the southern portion of Peninsula Township (HGL = 920 feet) as well as higher elevations in the City adjacent to the Township including Pressure District PD-7 (HGL = 920 feet), PD-6 (HGL=875 feet), and PD-5 (HGL=850 feet). Two City PRVs downfeed from PD-7 to maintain pressures in districts PD-5 and PD-6. Pressure District PD-6 is maintained by WCV-7 (HGL = 875 feet) and Pressure district PD-5 is controlled by WCV-8 (HGL = 850 feet). Check valves in the lower elevations of these districts are installed at the

boundaries of district PD-1 to maintain minimum system pressures in these districts during extreme conditions or during interruptions of supply in the higher elevation districts.

One pressure district (PD-8) is back-fed from Garfield Township (Veteran's Drive Pressure District) to the City, east and west of Veterans Dr. south of Boughey Drive and operates at an HGL of 875 feet. Check valves in the lower elevations of PD-8 are installed near the boundaries of district PD-1 to maintain minimum system pressures in PD-8 during extreme conditions or during interruptions of supply from the higher districts.

Table 3-8: City Pressure Reducing Valves

Facility ID	Name	Approx. Elevation (ft)	Size (in)	Upstream Pressure (psi)	Downstream Pressure (psi)	Pressure District From	HGL From (ft)	Pressure District To	HGL To (ft)	Manufacturer
WCV-8	Huron Hills PRV	718	4	84	54	PD-7	920	PD-5	850	OCV
WCV-7	Timberlane PRV	720	6	26	72	PD-7	920	PD-6	875	OCV
WCV-1341	Morgan Farms #2 PRV	698	6	80	67	PD-3	875	PD-2	825	Ames
WCV-1328	Incochee #1 PRV	715	6	73	65	PD-3	875	PD-2	825	Ames
WCV-1329	Incochee #2 PRV	685	12	86	70	PD-3	875	PD-2	825	Ames
WCV-1340	Morgan Farms #1 PRV	650	6	75	25	PD-2	825	PD-1	750	Ames
WCV-1300	Incochee/Morgan Farms PRV, Wayne Hill PS	735	8	115	67	PD-4	1000	PD-3	875	OCV

Notes:

1. PRV pressure settings as of 2020

3.5 Booster Stations

The City operates two major booster stations, the Huron Hill Booster Station at the WTP and the Wayne Hill Booster Station located adjacent to the Wayne Hill Storage Tank. Table 3-9 provides a summary of the pump information at each of these stations.

Table 3-9: Booster Pump Station Data

Pumps	Pump Elevation (ft)	Capacity (gpm)	Head (ft)	Power (hp)	Auxiliary Power	
					Description	Power Rating
Huron Hills Booster Station						
Huron Hills Pump 1	620	500	300	60	WTP Generator, 480V, 3 Ph, Diesel	875 kVA 700 kW
Huron Hills Pump 2	620	500	300	60		
Huron Hills Pump 3	620	500	300	60		
Wayne Hill Booster Station						
Wayne Hill Pump 1	732	500	300	75	Generator, 480V, 3 Ph, Diesel	275 kW
Wayne Hill Pump 2	732	500	300	75		
Wayne Hill Pump 3	732	500	300	75		

3.5.1 Huron Hills Booster Station

The Huron Hills Booster Station is located at the WTP and consists of three vertical turbine pumps that draw from the WTP storage reservoir. Backup power is provided by the 700 kW WTP generator. Two 720-gallon pressurized bladder tanks are installed on the pump discharge piping and are set to 100 psi. The pump station operates to maintain the following pressure settings:

Table 3-10: Huron Hills Booster Station Operating Conditions

Pump	Pump On Setpoint		Pump Off Setpoint		Start Delay (seconds)
	Pressure (psi)	HGL (ft)	Pressure (psi)	HGL (ft)	
Lead	126	911	136	934	2
Lag	124	906	132	925	2
Lag-Lag	120	897	130	920	2

This booster station feeds the southern portion of the Peninsula Township intermediate district including the Peninsula Booster Station that draws from the adjacent 0.3 mgal Peninsula Storage Tank. This station and tank are owned and operated by Peninsula Township. This tank has a 6-inch actuated valve that opens and closes to regulate the tank level and four pumps (one jockey, two larger pumps, and one large fire pump) that are used to boost the pressures to the upper-pressure district in Peninsula Township. A 2-inch hydraulically actuated valve is used to backfeed from the

upper district to PD-7 if the pressure falls below 40 psi. The 6-inch fill valve to the tank is controlled such that the 2-inch backfeed valve does not open simultaneously and overfill the tank.

3.5.2 Wayne Hill Booster Station

The Wayne Hill reservoir and pump station were originally constructed in 1945. This 1.3 mgal reinforced concrete reservoir is maintained approximately 5-10 feet lower than the two Barlow Tanks of PD-1. Accordingly, the fill line contains an electrically actuated control valve to limit the tank from over-filling. The tank was originally constructed to provide additional fire flow storage for the western portion of PD-1. In the early 1960s, the reservoir fill valve vault was enlarged and a building was constructed. Booster pumps were installed in the building on the suction side of the reservoir drain line to provide pressure to a relatively high portion of the northwestern section of the City that was too high to be served by PD-1. This initial upper-pressure district was also provided with a steel hydro-pneumatic storage tank including a compressor to provide some storage for this small pressure district.

In 2006, this district was expanded to the north to provide service to some additional areas within the City and neighboring Elmwood Township which were still too high to be serviced by the main pressure district (PD-1) but were lower than the initial area serviced by the Booster Pumps and hydropneumatic tank. Since these areas of the upper district were slightly lower, pressure reducing valves were provided to drop the pressure from the original Wayne Hill district down into the lower districts. This area is broken into three distinct pressure districts designated as PD-2, PD-3, and PD-4.

When the Wayne Hill District was first expanded, the original booster pumps and the hydro-pneumatic tank were demolished. The current pumping station includes a prefabricated skid-mounted pump station with three vertical multistage centrifugal booster pumps and two bladder tanks to provide a storage cushion between pump cycles. All of the flow from the station is pumped to the pressure of PD-4 (HGL = 1000 feet) before splitting to the lower pressure districts. A pressure reducing valve downfeeds a portion of the flow from PD-4 to PD-3 (HGL= 875 feet) within the station. PD-2 (HGL = 825 feet) is down-fed from PD-3 using remote PRVs located in the system. Backup power is provided by a 275-kW generator. Tables 3-11 summarizes the pump operating conditions and a complete listing of the tanks and down feed valves is included in Table 3-12 below.

Table 3-11: Wayne Hill Booster Station Operating Conditions

Pump	Pump On Setpoint		Pump Off Setpoint		Start Delay (seconds)
	Pressure (psi)	HGL (ft)	Pressure (psi)	HGL (ft)	
Lead	111.5	990	120.0	1009	2
Lag	105.0	975	111.5	990	2
Lag-Lag	95.0	951	100.0	963	2

Table 3-12: Wayne Hill/Incochee/Morgan Farms Pressure District Components

Item	Facility ID	Location	Size/Capacity	Source	Discharges to:	Setting US/DS
CV-1		WHPS	12-inch Butterfly	PD-1	Wayne Res.	741 feet
CV-2		WHPS	8-inch Butterfly	Wayne Res.	WBP 1-3	Open
CV-3		WHPS	8-inch Butterfly	PD-1	WBP 1-3	Open at 105 psi
Two Bladder Tanks		WHPS	720 Gals Total EA 100 Gals Usable EA	WBP 1-3	PD2	90-115 psi
PRV-WH1	WCV-1300	WHPS	8-inch	PD-4	PD-3	115 psi /67psi
PRV-WH2	NA	WHPS	4-inch, Surge Relief	PD-4	Exterior	150 psi /0 psi
PRV-WH3	WCV-1301	WHPS	8-inch	PD-4	PD-1	67 psi / 5 psi
PRV-IN1	WCV-1328	Incochee Woods Dr./ Incochee Hills Dr.	6-inch	PD-3	PD-2	73 psi / 65 psi
PRV-IN2	WCV-1329	Incochee Woods Dr. / Old Incochee Farms Trail	12-inch	PD-3	PD-2	86 psi / 70 psi
PRV-MF1	WCV-1340	Incochee Woods Drive/ M-72	6-inch	PD-2	PD-1	75 psi / 25 psi
PRV-MF2	WCV-1341	Old Morgan Trail/ M-72	6-inch	PD-3	PD-2	80 psi / 67 psi

As part of the 2006 improvements, a 12-inch main was added along Wayne Street to provide a loop in this pressure district (now PD-4). This 12-inch main has been alleged to be causing some of the difficulties in the loss of pressure when hydrants are opened since water can more rapidly flow to the hydrant. The higher-pressure district service area (PD-4) supplied by this station experiences pressure issues at the highest elevations of Wayne Hill during hydrant openings that include temporary pressure drops in system pressure (to near atmospheric). To minimize the potential for these transient pressure issues, the City has partially closed many of the hydrant isolation gate valves to limit the hydrant flow in this service area.

The City had a transient pressure analysis completed in 2018 (Prince-Lund Engineering letter dated February 8, 2018). The report simulated the transient pressure conditions using data from hydrant testing completed in 2016 in the Wayne Hill service area (PD-4). The recommendations from that study included raising the system pressure setpoints and reduce the startup times for the lag pumps (from 15 seconds to 2 seconds) to improve the system response time and maintain residual pressures in the higher elevations of the district during fire flow conditions. Installing a third 726-gallon pressurized bladder tank would also provide approximately an additional 10 seconds of fire flow while the pumps respond to the drop in pressure.

These efforts have corrected the immediate transient pressure drops at the top of Wayne Hill during hydrant openings (typically 30 seconds or shorter). However, several problems continue to occur including:

1. **Numerous pump stop/start cycles** even though the pumps are all equipped with variable frequency drives.

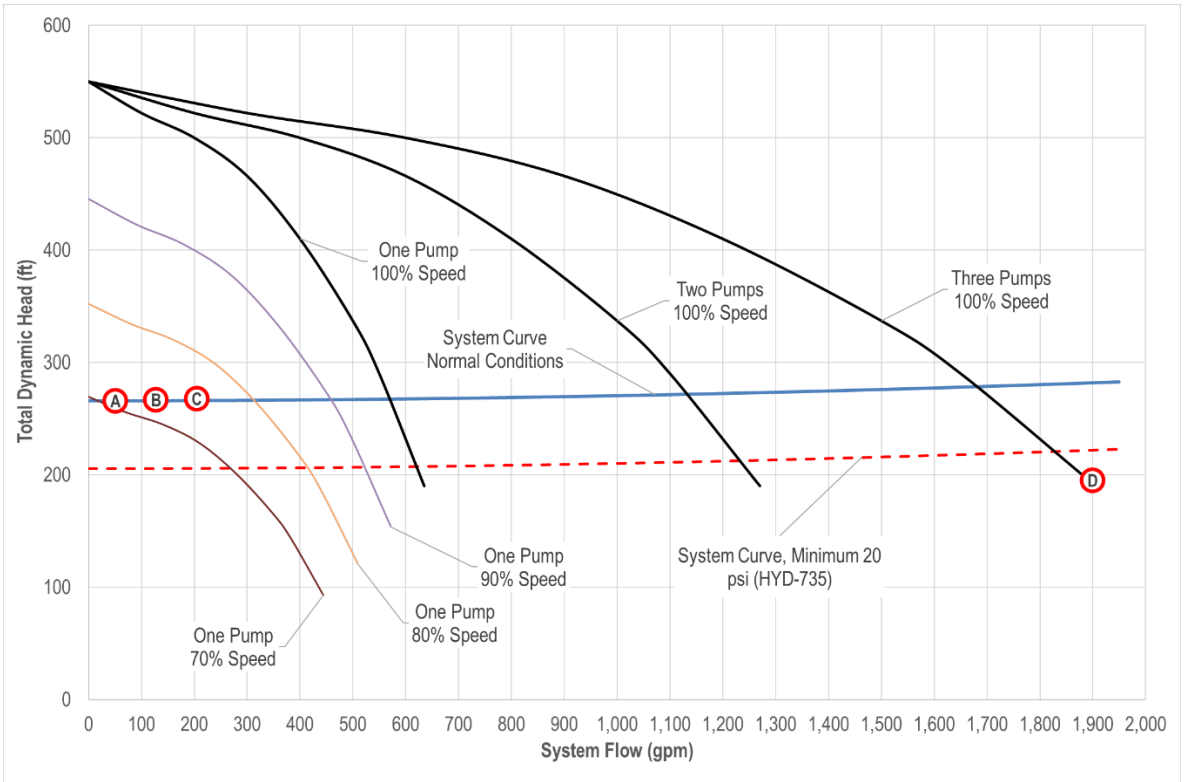
2. **Significant pump ramping** of the pumps up and down in an attempt to control the output pressure.

3. **Limited storage is available in the bladder tanks**. The tanks have a total volume of 720 gallons each but only an available drawdown volume of approximately 100 gallons. This limitation is typical of any bladder tank that does not have a compressor to provide an automatic pressure recharge and is usually limited to a volume determined by the ratio of high to low-pressure setpoints.

4. **Limited $NPSH_A$.** Because the booster pump suction volutes are located approximately 7 feet above the bottom of the reservoir and due to losses, they do not have an available net positive suction head ($NPSH_A$) to operate when the tank level is less than 732 feet and therefore cannot utilize the bottom 7 feet of the tank capacity. For tank levels below 732 feet, the $NPSH_A$ is below the required $NPSH_R$ (28 feet) during high flow conditions (600 gpm). Also, re-priming the pumps when the reservoir is this low is not possible.

5. **The pumps are unable to maintain a residual pressure above 20 psi at the top of Wayne Hill during prolonged hydrant openings near or below the pump station elevation.** Figure 3.1 depicts the pump curve with the various operating conditions and two ranges of system curves – one to maintain 115 psi at the pump station and one to a minimum of 20 psi of residual pressure at the top of Wayne Hill (PD-4) at HYD-735. During normal operating conditions, the pump station can reliably provide adequate pressures for the average daily (Point A), maximum daily (Point B), and peak hourly demands (Point C). However, hydrants in the lower elevations of PD-4 (near the booster station) and the lower elevations of PD-2 can flow above 1800 gpm, according to the hydraulic model. At this flow and head (Point D), the pumps can potentially operate to the far right of their pump curve thus causing system pressures to drop below 20 psi at the highest elevations of PD-4.

Figure 3-1: Wayne Hill Booster Station Existing Pump and System Curves



Notes:

1. Flow Conditions: A – Average Daily Demand, B – Maximum Daily Demand, C – Peak Hourly Demand, D – Fire Flow (Hydrant Opening in lower elevations)

3.6 Population

The population data for the City of Traverse City and surrounding townships, in its entirety, was obtained from U.S. Census Bureau data, the Networks Northwest, and the City of Traverse City. Table 3-13 displays the current and projected total population in the City and serviced Townships. Growth rates are highest in Garfield Township and Elmwood Township and lower in Traverse City and Peninsula Township.

Table 3-13: Population Growth

Year	Grand Traverse County	City of Traverse City		Garfield Township		Elmwood Township		Peninsula Township		Total
	Total	Total	Service	Total	Service	Total	Service	Total	Service	Service
1990	64,273	15,115	15,115	10,516	NA	3,427	NA	4,340	NA	NA
2000	77,654	14,532	14,532	13,840	9,985	4,264	321	5,265	1,570	26,408
2010	86,986	14,674	14,674	16,526	11,923	4,503	339	5,433	1,620	28,556
2015	91,541	15,323	15,323	16,953	12,231	4,500	339	5,696	1,699	29,591
2020	98,023	14,818	14,674	20,028	14,450	4,762	358	5,609	1,673	31,155
2025	104,056	14,891	14,674	22,049	15,907	4,897	369	5,699	1,700	32,649
2030	110,461	14,963	14,674	24,273	17,512	5,036	379	5,790	1,727	34,292
2040	124,477	15,110	14,674	29,417	21,223	5,325	401	5,978	1,783	38,081
Growth Rate	1.20%	0.10%		1.94%		0.56%		0.32%		0.81%

Notes:

1. Population data from the US Census Bureau, Networks Northwest, and City of Traverse City
2. 5-year planning period will be 2025 and the 20-year planning period will be 2040
3. Correspondence with City

3.7 Existing Water Usage and Unaccounted Water

Historical total water use records were supplied by the City. Table 3-14 on the following page provides a summary of the water use records in the City and each customer community.

Table 3-14: Water System Average Water Supplied and Billing

Fiscal Year	Total Supplied (mgd)	Traverse City (mgd)	Garfield Township (mgd)	Peninsula Township (mgd)	Elmwood Township (mgd)	Total Billed (mgd)	Unaccounted Water (mgd)	Loss (as % of Supplied)
2010	4.81	2.17	1.58	0.13	0.019	3.90	0.91	18.9%
2011	5.38	2.15	1.64	0.13	0.017	3.93	1.45	27.0%
2012	5.89	2.30	1.71	0.16	0.020	4.19	1.70	28.9%
2013	6.00	2.33	1.55	0.16	0.031	4.08	1.92	32.0%
2014	5.69	2.49	1.35	0.15	0.032	4.03	1.67	29.3%
2015	5.71	2.17	1.41	0.16	0.041	3.74	1.93	33.8%
2016	5.83	2.32	1.63	0.19	0.031	4.18	1.66	28.4%
2017	5.34	2.39	1.68	0.17	0.031	4.26	1.08	20.2%
2018	5.19	2.06	1.80	0.18	0.032	4.07	1.12	21.6%
2019	5.41	2.47	1.69	0.17	0.028	4.35	1.06	19.6%
2020	4.85	1.94	1.79	0.20	0.039	3.97	0.88	18.1%

Notes:

1. From City's Water Output and Financial History Report
2. Community demands from Township meter records

Unaccounted for water or water loss in the system from unmetered losses were determined by tabulating the water pumped and comparing the billed amount for the City and each Township. Water loss estimates before 2017 are less accurate as the new high service pump station flow meters were installed in November 2015. Since 2017, the unaccounted water comprises approximately 19.9% of the total water supplied. The typical goal of unaccounted water in municipal water systems is 10%. The estimated losses are not adjusted for seasonal flushing and fire flows which can comprise up to 2% of the water loss.

3.8 Benefit Counts

As of 2020, the City had 5,870 residential connections and 1,428 commercial connections. The total number of residential equivalent units (REUs) in the City was 13,010.

4 Model Development

4.1 Existing Model Development

A computerized hydraulic model of the City of Traverse City Water System was originally developed in 2008 as part of the Water System Master Plan and updated for the 2014 Water Reliability Study. This model is used to simulate existing water system operations and evaluate future water system improvements and expansion using WaterGEMS v8i by Bentley Systems, Inc. The software enables the simulation of a variety of usage conditions and predicted resultant system pressures and flows throughout the system for review. In general, the major system data that required input into the model included water main diameters, length, age, and estimated pipe roughness. Additional required input information included; pump performance data, locations and hydraulic gradients, booster station locations with pump operating characteristics, storage facility locations and operating ranges, pressure reducing valve locations with downstream pressure settings; bypass valve and pressure district boundaries, and ground elevations throughout the system.

Refer to Appendix A for Figure A-1 for Overall Water System Map and A-2 for the City of Traverse City Water System Map. Nodes are created in the water model at water main intersections, change in pipe diameter, distribution system facilities, etc. The nodes are used to allocate the demands placed throughout the system.

The model and simulations focus on the City's water distribution system but do incorporate portions of Garfield Township, Peninsula Township, and Elmwood Township as these systems are hydraulically connected with the City. For this study, the interconnection with East Bay Township was not incorporated into the model. Improvements to the water system completed since the original model development were added to the model and system demands were modified to reflect the updated water system supply data and operations. The updates to the model incorporate the following construction projects completed since 2014 include:

- Replacement of 6-inch CIP main with new 8-inch DIP water main on Union Street between 14th and 17th Street (2015)
- Replacement of 6-inch CIP main with new 8-inch DIP main on Lake Street connecting to the 6-inch main approximately 100 feet west of Cass Street (2015)
- Replacement of 6-inch CIP main with new 8-inch DIP main on State Street between Railroad Ave and Boardman Avenue (2016)
- Replacement 6-inch CIP main with new 8-inch DIP main on Front St. between Wadsworth to the western City limits except for 6-inch main under Division Street (2016 east of Division, 2017 west of Division)
- Construction of 12-inch DIP main at Costco east of Airport entrance on South Airport Road (2017)
- Construction of 2 mgal Barlow Tank 2 (2018) adjacent to the existing 4 mgal Barlow Tank 1

- Replacement of 10-inch CIP main with 24-inch DIP water main along with 8th between Railroad and Boardman Ave (2019)
- Replacement of 10-inch CIP main with new 16-inch DIP iron water main in Franklin from Washington to 8th (2019)
- Construction of 8-inch DIP in Moorings Development in PD-2

Revisions to the system operating conditions include

- Configuration of Wayne Hill and Huron Hills Booster Stations as variable speed pumps and control settings maintain the pressure setpoints for each pump as described in Section 3.5
- Updates to the PRV setpoints
- Closure of isolation valves between the East Bay water system.

4.2 Model Demands

Table 4-1 summarizes the Average Day Demand (ADD), Maximum Day Demand (MDD), and Peak Hour Design (PHD) flow rates utilized for the existing conditions models.

Table 4-1: Existing Model Design Flow Rates And Factors

Year	ADD	Max Day Factor	MDD	Peak Hour Factor	PHD
2020	5.43	2.5	13.48	1.7	22.66

4.2.1 Average Daily Demand

The total average daily pumpage was obtained from historical WTP MORs and daily water usage. Supervisory Control and Data Acquisition (SCADA) data were made available by the City, which provided booster and pump station flow information and tank level information. Coordinating all this information permitted a detailed evaluation of the consumption allocation per pressure district. Both average day and maximum day evaluations were completed to determine consumption estimates per pressure district.

Water billing records were utilized to allocate the estimated average daily usage to be input into the model node that corresponded to these locations. The demand calculated for each pressure district outside of the City was allocated uniformly throughout the pressure district. This method of demand allocation is consistent with previous modeling efforts.

The average daily demand (ADD) for the City water supply system utilized in the model is 5.43 million gallons per day (mgd). A summary of the nodal allocation assigned in the model is provided in Appendix C.

4.2.2 Maximum Daily Demand

The total maximum daily pumpage was also obtained from historical City water use data. Peaking factors for each pressure district were developed. These pressure district peaking factors, while most likely non-coincidental to system maximum days, were utilized to compute the estimated maximum day demands in each pressure district, which establishes a system maximum day demand that is more conservative than historical data.

The maximum daily demand (MDD) for the City's water supply system utilized in the model is 13.5 mgd. Tables 4-1 and 4-2 summarizes the historical Maximum Daily design flow rates and peaking factors in the City's water supply system.

4.2.3 Peak Hour Demand

Analysis of the SCADA data was used to estimate hourly treatment and pumpage as well as the volume either stored or drained from the storage tanks to determine the estimated hourly system usage on various high-water usage days in 2020. From these calculations, system demand curves were developed (Appendix D). The peak hour demand (PHD) for the City water supply system utilized in the model is 21.6 mgd. Table 4-2 displays the maximum day daily usage pattern developed from the SCADA data analysis for use in this study. The peak hour usage occurs in the early morning hours from 4:00 AM to 8:00 AM.

Table 4-2: Maximum Day Hourly Usage Factors

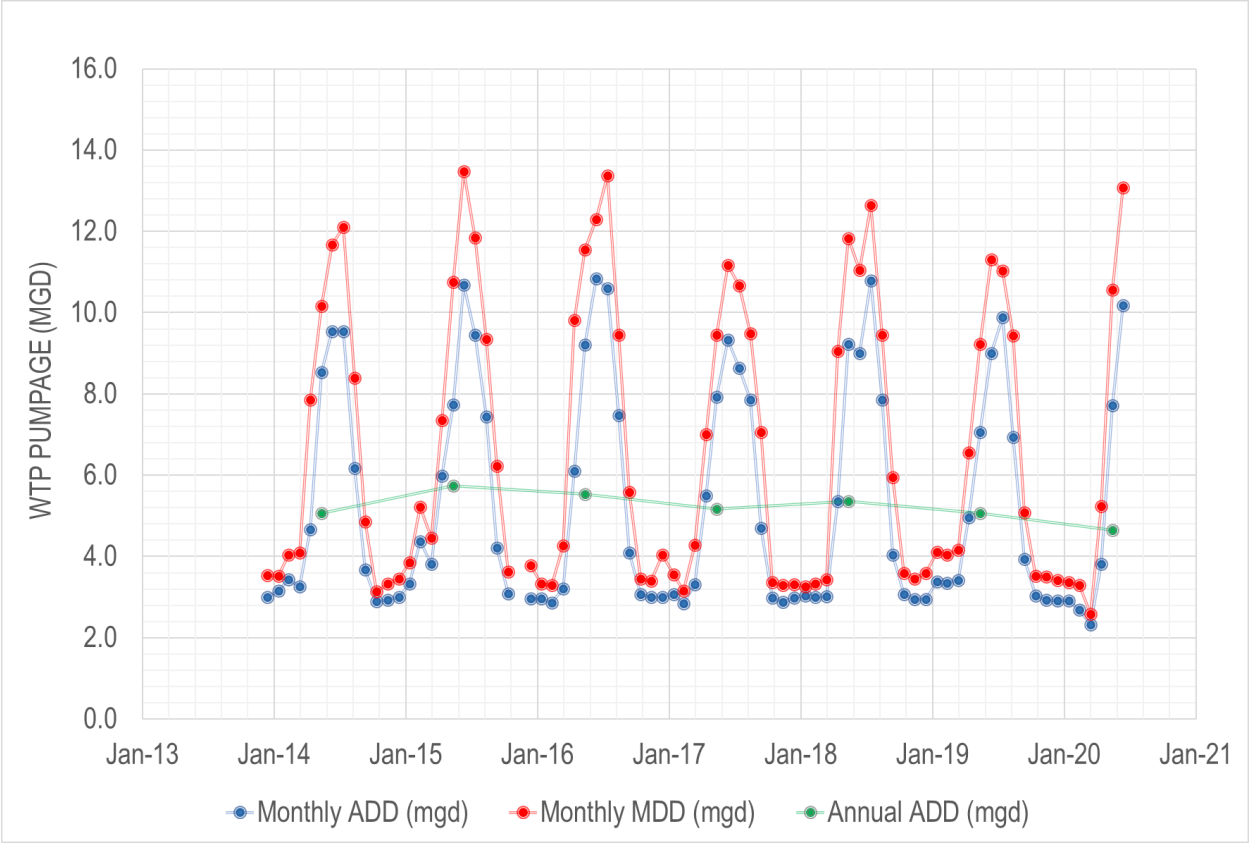
Hour	Factor
0:00	0.99
1:00	1.01
2:00	1.03
3:00	1.05
4:00	1.26
5:00	1.47
6:00	**1.68**
7:00	1.56
8:00	1.43
9:00	1.31
10:00	1.24
11:00	1.16
12:00	1.09
13:00	0.88
14:00	0.67
15:00	0.47
16:00	0.48
17:00	0.50
18:00	0.51
19:00	0.58
20:00	0.64
21:00	0.70
22:00	0.75
23:00	0.89

Table 4-3 summarizes the monthly demand factors utilized for the existing conditions models denoting the monthly average daily demands reported. The data demonstrates the seasonal variability in the City's water system demand. The peak usage month is July which overlaps with the higher number of summer visitors and other water uses. The lowest usage months are December and January.

Table 4-3: Model Design Monthly Factors

Month	Monthly ADD (mgd)	Factor
January	2.95	0.54
February	3.17	0.58
March	3.29	0.61
April	3.25	0.60
May	5.28	0.97
June	8.40	1.55
July	10.54	1.94
August	10.19	1.87
September	7.51	1.38
October	4.37	0.80
November	3.09	0.57
December	2.97	0.55

Figure 4-1: WTP Production since 2014



4.3 Model Input

4.3.1 Pumps

The various pump flow and head information were input into the model. Design data are shown in Section 3. This was used as a starting point for modeling the pump performance. In the hydraulic model, pump curves were modified from the design data to replicate actual conditions. City SCADA data was used to analyze actual discharge (flow and head) patterns from these pumps to simulate more accurately, tank filling and depletion. Refer to Appendix E for the pump curves utilized for the existing conditions hydraulic model.

4.3.2 Water Storage Tanks

The City's water system contains three water storage tanks. Information for each of these tanks is provided in Section 3. No modifications from the design data were necessary for input into the hydraulic model.

4.3.3 Pressure Reducing Valves

Section 3 details the locations, size, and pressure conditions of each PRV in the system. The PRVs have been modeled so that the simulated demand flows are seen through the valve to maintain downstream pressures except at peak demand periods or conditions of uncharacteristically high demand (i.e. fire flow conditions).

4.3.4 Booster Stations

The pump flow and head information for the Booster Stations were input into the model. Design data are shown in Section 3. This was used as a starting point for modeling the booster pump performance. In the hydraulic model, the booster pump curves were modified from the design data to replicate actual conditions. Refer to Appendix E for the pump curves utilized for the existing conditions hydraulic model.

4.4 Model Calibration

The existing hydraulic model has been calibrated during previous hydraulic model simulations. This study updated the calibration based on testing data provided by the City. Based on the age and type of water main, the roughness coefficients for the pipes in the model were estimated. Pipes in this model were separated into different distinct groups, see Table 4-4 and the C factor was adjusted to best fit the hydrant flows and Table 4-5 presents the results of the model calibration. The Wayne Hill Pump Station was also updated to reflect the current operating conditions of the pump station and the PRVs. The residual pressures during hydrant testing in the Wayne Hill Booster Station service area reflect the low residual pressures that occur.

Table 4-4: Calibration Groups and Results

Calibration Group	Pipe Installation	Size	Normal Range[1]	C Factor
1	1965 and older	8-inch and smaller	21 - 49	35
2		12-inch and larger	39 -71	45
3	1965 to 1980	8-inch and smaller	30-58	50
4		12-inch and larger	48-78	60
5	1980 to 2000	8-inch and smaller	59-90	80
6		12-inch and larger	58-107	85
7	2000 to 2010	8-inch and smaller	83-106	95
8		12-inch and larger	97-120	110
9	2010 to 2020	8-inch and smaller	100-133	120
10		12-inch and larger	112-141	130

Notes:
1. Water Distribution Modeling, T. Walski, D.V. Chase and D. Savic. 2001

Table 4-5: Model Calibration, Hydrant Testing vs Model Results

Location Description	Gauge Hydrant ID	Gauge Hydrant Model Node	Flow Hydrant ID	Flow Hydrant Model Node	Hydrant Test			Model Simulation		
					Static (psi)	Residual (psi)	Fire Flow (gpm)	Static (psi)	Residual (psi)	Fire Flow (gpm)
Pine and Seventh	84	J-T237	83	J-T272A	55	49	961	55	49	931
Cass and Seventeenth Alley	156	J-T467	530	J-T465	55	49	859	55	51	843
305 West Front	68	J-T052	67	J-T053A	63	50	1,664	64	58	1,599
Front and Boardman	172	J-T028	171	J-T171	73	60	2,190	73	58	2,222
Randolph and Maple	12	J-T011	11	J-T014A	65	62	1,488	65	59	1,629
710 Carver	730	J-T447B	305	J-T447C	53	38	1,358	61	38	1,041
800 Hastings	449	J-T324	380	J-T350	58	46	1,358	61	46	1,335
Third and Spruce	997	J-T207	734	J-T207A	57	54	1,215	57	55	1,261
Front and Elmwood	997	J-T234A	36	J-T234B	55	42	2,148	56	41	2,445
Union and Thirteenth	144	J-T315A	136	J-T315B	55	35	1,358	58	33	1,385
Gray and Commons	790	J-41	1011	J-166	39	33	1,052	38	33	1,232
Aero Park	655	J-147	656	J-T220	60	44	1,664	60	40	1,785
M-72 Moorings (PD-2, PD-3, PD-4)	735	J-T560	974	J-T497	68	18	1,920	70	17	1,995

5 Existing Water System Analysis

Using the calibrated model, the City's existing water distribution system was analyzed for the average day, maximum day, peak hour, and maximum day plus fire flow conditions in accordance with the EGLE requirements. Results will be compared to the *normal system working conditions* as presented in the "Recommended Standards for Water Works, 2003 Edition" by the Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten State Standards). In the Ten States Standards, Section 8.2.1 indicates the following:

> *"The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system should be approximately 60 to 80 psi and not less than 35 psi."*

This standard suggests that during average day, maximum day, and peak hour demand conditions (considered normal working conditions), the operational pressures in the system should be above 35 psi, and during occasions of fire suppression or system flushing (typically uncharacteristic conditions) the operational pressure should never drop below 20 psi.

The average day demand analysis was run with the storage tanks at their average operating levels. The maximum day and peak hour demand analyses were run with the three water storage tanks at their minimum operating levels.

5.1 Steady State Model Analyses

Based on the steady state model analyses, each pressure district in the City's distribution system experiences pressures in the ranges shown in Table 5-1 for Average Day, Maximum Day, and Peak Hour demand conditions:

Table 5-1: Existing Conditions Model - Distribution System Pressures

Pressure District	Model Pressure Range (psi)					
	Average Day Demand[1]		Maximum Day Demand[2]		Peak Hour Demand[2]	
	Min	Max	Min	Max	Min	Max
PD-1	37	97	33	93	32	93
PD-2	57	102	57	102	57	102
PD-3	45	87	44	87	44	87
PD-4	40	117	40	117	40	117
PD-5	75	115	75	114	75	114
PD-6	92	99	92	99	92	99
PD-7	62	80	58	77	58	77
PD-8	66	94	61	89	60	89

Notes:
1. Average day initial conditions with tank levels at average operating levels (Barlow Tanks 28-ft, Wayne Hill 12-ft)
2. Maximum day and peak hour demand simulated at minimum operating levels (Barlow Tanks 24-ft, Wayne Hill 7-ft)

The distribution system in PD-1 experiences pressures within a reasonable range of "normal working pressures" for the low-end pressures as defined by the Ten States Standards. Because of the varying topology, it is City policy to require the installation of pressure regulating devices on service lines seeing pressures above 90 psi. The pressures in PD-1 which are controlled by the storage tank elevations vary slightly based on the demand conditions while the other pressure districts are generally controlled by the booster stations or water system control valves. The lowest pressure nodes are in PD-1 and mostly located in Hillside Estates which are discussed further in Section 8.

The suction pressures near Cass Road Booster Station in Garfield Townships are lower than 35 psi.

The figures provided in Appendix C display the existing system pressure contours for Average Day, Maximum Day, and Peak Hour demand conditions based on the static model analyses.

5.2 Extended Period Simulation

When the variation of the system attributes over time is important, an extended period simulation (EPS) is appropriate. This type of analysis allows the modeling of tanks filling and draining, pumps starting/stopping, and pressures and flow rates changing throughout the system in response to varying demand conditions.

This Study utilized two 72-hour extended period simulations (EPS) under Minimum and Maximum Day Demands conditions. The EPS provides an example representation of system operations based on tank operating levels, pump discharge information, and pump start and stop levels provided by City Staff. The system demands, flow supplied and storage volumes throughout this 72-hour EPS are displayed in Figures provide in Appendix C.

5.2.1 Minimum Day Demands (Winter)

This simulation for the minimum day demand occurs during the winter. The highest usage occurs during the morning hours and two of the high service pumps operate in response to the levels in the Barlow and Wayne Hill storage tanks. The two pumps operate at full speed. As the levels increase in the late afternoon, the pumps shut down once the tanks reach their high-level setpoints. While the pumps are off, the pressures in the distribution system in PD-1 are only controlled by the tank levels and in the locations near the WTP, the system pressures are noticeably lower. Then the cycle repeats itself as the demands increase again the next day. The pressure districts for the Wayne Hill and Huron Hills booster stations are maintained at the control pressures of the pumps and PRVs.

5.2.2 Maximum Day Demands (Summer)

During this simulation of the maximum day demand during the summer, the highest usage occurs during the early morning hours and two of the high service pumps operate in full speed response to the falling levels in the Barlow and

Wayne Hill storage tanks. Pump number 5 operates on VFD and its speed reduces until the tanks reach their high-level setpoint. This pump is maintained at a minimum speed until the cycle repeats itself as the demands increase again the next day causing the tank levels to reduce again. As at least one high service pump is are running during the full duration of this simulation the pressures in the distribution system in PD-1 near the WTP remain high. The pressure districts for the Wayne Hill and Huron Hills booster stations are maintained at the control pressures of the pumps and PRVs.

5.3 Fire Flow

In addition to providing normal flows, the water distribution system must be capable of supplying adequate fire flows at all locations throughout the City. The fire flow analysis is typically a tedious process that requires the water system modeler to iteratively apply fire flow demands at selected nodes within the model. Most water system models including WaterGEMS, have a Fire Flow Analysis Module to simplify the process of the fire flow analysis. The Fire Flow Analysis Module gives the modeler the ability to select all or a portion of the available nodes for which fire flows are to be determined. The Module automatically performs an iterative analysis of each selected node to determine the maximum available fire flow available without dropping the lowest residual pressure in the system below 20 psi. It is important to note that the Industry Standard is to provide fire flow during maximum day demand conditions and with a residual pressure in the system of at least 20 psi. Typical fire flow requirements are specified by organizations such as the American Water Works Association (AWWA) and the Insurance Services Office (ISO). Fire flow requirements will vary by community based on density, land use, building size and materials of construction, and distance between buildings.

Fire flows can be provided either through a combination of storage or pumping from the booster pumps. The City's minimum fire flow recommendations are summarized as follows:

- Single and Multi-family dwellings less than 3500 sf: 1000 gpm (2 hours)
- Apartment Buildings & Commercial w/fire suppression 1500 gpm (2 hours)

Based on the fire flow modeling results, a majority of the system meets or exceeds the minimum recommended fire flows. Over 95% of the service area in the City's water system can provide the City's minimum recommended fire flows from the distribution system alone. Most of the nodes that did not meet the recommended fire flows are located at dead ends, high elevations of the Wayne Hill service area, and areas supplied by undersized 4-inch and 6-inch water mains. Additionally, the fire flow analysis was run with the storage tanks near their minimum elevation which is a conservative or "worst case" situation. Under lesser demand conditions and with the storage tanks operating closer

to their normal levels, there is a greater ability for the system to fight fires. Furthermore, a closer study of the output data shows that the majority of the nodes that did not meet the minimum recommended fire flow did so due to the minimum residual pressure of 20 psi being reached at unrelated nodes typically located at higher ground elevations within the Pressure District. Appendix C provides the available fire flow contours under the existing conditions.

It is a challenge to provide the recommended fire flow from the water system alone due to the limited sizes of water mains in the areas where only 4-inch and 6-inch water mains exist, however, the City has provided its fire-fighting personnel with the resources to provide its customers proper fire protection. The fire department can utilize auxiliary sources of water (i.e. tanker trucks, etc.) or multiple points to supplement the water supply furnished by the City water system. Additionally, the City is working towards color coding its hydrants so that the fire-fighting personnel can easily recognize hydrants with adequate water supplies to support fire protection services.

Based on the water capacity/storage analysis (See Section 7), there is sufficient supply available to provide needed fire flows to all areas of the water system, as long as these areas have adequate distribution facilities to convey these volumes. Therefore, the fire protection deficiencies in the City's water system as reviewed are not capacity issues.

6 Future Water System Analysis

Following the existing conditions input process and the calibration process; the model was used to simulate the estimated future conditions. The Safe Drinking Water Act recommends 5-Year and 20-Year projections for future demands when developing a Reliability Study, therefore additional demands for undeveloped areas/population increases were entered. Undeveloped areas that have been cited for future expansion are described herein and specific supply and storage considerations are discussed.

6.1 Growth

Much of the projected system expansion within the City limits is anticipated to occur in the Wayne Hill Pump Station service area. This includes expansions of pressure districts PD-2 and PD-3. The estimated number of REUs will increase from 211 to 470 consisting of single family residential, multifamily residential and commercial development in the next 5 years and to 550 REUs in the next 20 years. Additional growth is anticipated in the form of increased housing density. The City estimates an increase in density of approximately 10% in the established neighborhoods of the City. This equates to an estimated increase of 300 REUs in PD-1 over the next 5 years and an additional 300 REUs in the next 20 years.

Pressure districts PD-5, P-6, PD-7 and PD-8 are near full buildout and new growth outside the estimated population growth is not anticipated to increase outside of the current projected population within these pressure districts. Growth in the adjacent Townships is anticipated to increase at the currently projected population growth rates with the highest growth forecast in Garfield Township.

Table 6-1 provides the estimated future demands for the projected 5-year and 20-year conditions. The estimates demonstrate that the current maximum demand can be met by the firm supply capacity (19.7 mgd) of the WTP but the 20-year maximum daily demand will be approaching the firm supply capacity. EGLE requires communities to plan for expansion when maximum daily demands are in excess of 80% of the firm capacity.

Table 6-1: Future Demands

Year	ADD	MDD	PHD
2020	5.43	13.48	22.66
2025	5.72	14.19	23.86
2030	5.96	14.78	24.85
2040	6.46	16.03	26.95

Notes:
1. Current population growth rates
2. Includes 10% growth in established neighborhoods over the next 20 years
3. Assumes estimated future connections in Wayne Hill Service Area

6.2 Normal Working Condition Performance

The projected pressure ranges in each of the Districts are shown in Table 6-2 and reasonable considering the topographic. Several connections in the future connections in PD-3 and PD-2 will require PRVs. The predicted pressures in the Grand Traverse Commons area remain low for during these conditions. The PRV setpoint for WCV-1300 would need to be raised from 67 psi to 85 psi to maintain the HGL of PD-3 at 930 feet, which will be sufficient to provide adequate pressure for all but the one highest lot in the proposed Hillside Estates. This raised setpoint would provide a minimum pressure of 35 psi at the highest elevation of PD-3, during the future MDD conditions.

Table 6-2: Future Conditions Model - Predicted Water System Pressures

Pressure District	Model Pressure Range (psi)					
	Average Day Demand[1]		Maximum Day Demand[2]		Peak Hour Demand[2]	
	Min	Max	Min	Max	Min	Max
PD-1	37	87	33	84	32	84
PD-2	57	102	57	102	57	102
PD-3	23	105	23	105	23	105
PD-4	39	116	39	116	39	116
PD-5	75	115	75	114	75	114
PD-6	92	99	92	99	92	99
PD-7	62	81	61	81	61	81
PD-8	65	94	61	88	61	88

Notes:
1. Average day initial conditions with tank levels at average operating levels (Barlow Tanks 28-ft, Wayne Hill 12-ft)
2. Maximum day and peak hour demand simulated at minimum operating levels (Barlow Tanks 24-ft, Wayne Hill 7-ft)

6.3 Fire Flow

The City's water model was simulated under the fire flow scenario to simulate maintaining a minimum 20-psi residual in the system for the projected 5-year and 20-year buildings for the MDD flow scenario. Based on the fire flow simulation results, the majority of the system meets or exceeds the minimum recommended fire flows. However, fire suppression is limited by the pumping capacity at Wayne Hill Booster Station and this station which has 1,260 gpm available fire flow at the proposed Morgan Farms Phase III and is not sufficient for the proposed development of apartment buildings or commercial buildings with fire suppression, which requires a 1,500 gpm minimum.

7 Water Supply Requirements and Capacity

7.1 Water Supply Requirements

7.1.1 Average Day, Maximum Day and Peak Hour Demands

The present and projected water supply requirements were summarized previously in Section 4.

7.1.2 Fire Flow Demands

The minimum recommended fire flows are commonly dependent on the types of construction and structures present within the City service areas. Table 7-1 summarizes the recommended fire flows that should be provided from the water system as a minimum based on industry-standard equations (ISO, AWWA) for selecting the required fire flow (FF):

Table 7-1: Minimum Recommended Fire Flows

Category	Recommended Fire Flow	Duration
Residential	1,000 gpm	2 hrs.
Multi-Family Residential/Commercial	1,500 gpm	2 hrs.
Downtown Commercial	3,500 gpm	3 hrs.

The duration of the required fire flows is dependent on several factors. Literature sources vary significantly on this subject but the most recent issue of AWWA standard M-31 requires that fire flows in excess of 3,500 GPM be provided for a duration of three hours which is a reasonable expectation for the City water system. Fire flows for the City Wide System can be provided either through a combination of storage or pumping from the firm capacity of the WTP pumps. Fire flows for the pumped storage systems at Wayne Hill and Huron Hill Booster Stations are provided by the pumping capacity but are not included in the calculation for the required storage.

EGLE and the *Ten State Standards* recommend water utilities to provide storage equal to the average day demand. The City's overall available storage capacity (6.7 mgal) can supply both the overall system average daily demand (5.43 mgd) and the City's average daily demand (2.26 mgd). This does not include the approximate 450,000 gallons of stored water available in Wayne Hill Reservoir, which is available under emergency conditions in PD-1. Another approach includes supplying the maximum daily demand plus one hour of peak hourly demand and available volume for fire flows. Due to the emergency power generation capacity, the City assumes the WTP can provide 8.0 mgd supply capacity as a conservative estimate. Table 7.2 provides the storage capacity analysis for the City's system.

Table 7-2: Storage Capacity Analysis

Year	Pumping Capacity (mgd)	System ADD (mgd)	System MDD (mgd)	System PHD (mgd)	Required Fire Flow (gpm)	Fire Flow Duration (hr)	Customer Demand Duration (hr)	Water Supplied (mgal)	Customer Demand, 7hr MDD + 1hr PHD (mgal)	Fire Demand (mgal)	Required Storage (mgal)	City Available Storage (mgal)	System Available Storage (mgal)
City Wide System													
2020	8.0	5.43	13.5	22.7	3500	3.0	8	2.7	5.4	0.6	3.4	6.7	11.0
2025	8.0	5.66	14.0	23.6	3500	3.0	8	2.7	5.7	0.6	3.6	6.7	11.0
2030	8.0	5.89	14.6	24.6	3500	3.0	8	2.7	5.9	0.6	3.9	6.7	11.0
2040	8.0	6.39	15.9	26.7	3500	3.0	8	2.7	6.4	0.6	4.4	6.7	11.0
Wayne Hill Booster Station Service Area (PD-2, PD-3, PD-4)													
2020	1.4	0.07	0.2	0.3	1500	3.0	8	0.5	0.1	0.3	0.3	0.7	0.7
2025	1.4	0.17	0.4	0.7	1500	3.0	8	0.5	0.2	0.3	0.4	0.7	0.7
2030	1.4	0.19	0.47	0.80	1500	3.0	8	0.5	0.2	0.3	0.5	0.7	0.7
2040	1.4	0.23	0.57	0.97	1500	3.0	8	0.5	0.2	0.3	0.5	0.7	0.7
Huron Hills Booster Station Service Area (PD-5, PD-6, and PD-7)													
2020	1.4	0.14	0.7	1.18	1500	3.0	8	0.5	0.3	0.3	0.6	1.5	1.5
2025	1.4	0.15	0.78	1.30	1500	3.0	8	0.5	0.3	0.3	0.6	1.5	1.5
2030	1.4	0.17	0.86	1.44	1500	3.0	8	0.5	0.3	0.3	0.6	1.5	1.5
2040	1.4	0.20	1.04	1.75	1500	3.0	8	0.5	0.4	0.3	0.7	1.5	1.5

Notes:

1. Estimated WTP pumping capacity is 8.0 mgd during auxiliary power
2. Customer demand for 7 hours of MDD and 1 hour of PHD
3. System Demands include City, Garfield Township, Elmwood Township and Peninsula Township
4. Wayne Hill Storage Reservoir Available Storage is 0.67 mgal
5. Required storage = Customer Demand + Fire Demand – Water Supplied (except for pumped storage systems)

The City currently has enough storage volume to accommodate their respective required fire flow capacities through pumping capacities and their storage tanks for gravity storage is PD-1 and pumped storage in the remaining pressure districts. In addition, the Fire Flow Analysis module of the modeling software was run to evaluate the representative firefighting capabilities of the water system. Adequate pressures are generally verified using the model by determining the ability of a water system to provide a fire flow at any node during maximum day demand while maintaining a residual pressure of at least 20 psi in all portions of the system. This analysis determines the available fire flow at selected nodes throughout the system. The fire flow contour map for the existing and future water system can be found in Appendix C.

7.1.3 Basis of Demand Projections

Demand projections are based on historical water use that were presented earlier.

7.2 Capacity of Waterworks System

7.2.1 Firm Supply Capacity

The firm pumping capacity of the HSPS is 19.9 mgd and the current WTP treatment/supply firm capacity is 19.7 mgd. The current maximum demand can be met by the firm supply capacity (19.7 mgd) of the WTP but the 20-year maximum daily demand will be approaching 80% of the firm supply capacity.

7.2.2 Finished Water Storage Capacity in Excess of the Normal Water System Requirements

The City is able to meet and exceed the water system's maximum day and peak hour demands with the firm capacity of its pumps and tanks. The capacity calculations in excess of normal water system requirements should also completed for each separate pressure district.

Based on the capacity of the system as described herein, the City's water supply system and each of its pressure districts individually, have the capacity to supplement peak hour demands, have available fire protection capacities during the maximum day and have finished water storage volumes in excess of normal water system requirements.

8 Recommended Water System Improvements

The City's water system has adequate capacity and conveyance capabilities to provide suitable supply and pressure to its customers during existing normal operating conditions, but the 20-year maximum daily demand will be approaching 80% of the firm supply capacity. Based on the Fire Flow Analysis, the City's water system has detected a few minor deficiencies in the area of fire protection. The following is a list of improvements that will improve the City's fire fighting capabilities, provide additional redundancy and looping and likely promote improved water quality.

8.1 Fire Flow Improvements

The following improvements would specifically improve fire-fighting capabilities in the City's water supply system. Certain improvements significantly enhance firefighting capabilities in specific areas. These improvements are important, but their system benefit is significantly less than the previous recommendations. There is no urgency to complete these within any specific period, but it is important to include these upgrades as street improvement projects are contemplated. These site-specific improvements, in no particular order, are as follows:

1. Complete Wayne Hill improvements to address pumping capacity and suction issues as described in 8.5.1.
2. Replace aging undersized water mains.

   As described in previous studies, the older 4-inch and 6-inch water mains vary in their capacity to convey the minimum required fire flow. The mains with limited fire flow are generally located in the older portions of the City within Pressure District PD-1 and can be serviced by multiple hydrants.

3. Replace older hydrants

   Approximately 80% of the City's hydrants are older cast iron Traverse City Iron Works (TCIW) hydrants. The seats for the hydrant foot valves penetrate the flow path to the channel and cause a higher head loss through the hydrant. Fire flows from these older hydrants are up to 10% less than other new hydrant models. The City should continue to implement its fire hydrant replacement program to increase fire flow capacity using newer higher flow hydrant models.

8.2 Redundancy and Reliability Improvements

The evaluation of the existing water system capacity concludes that redundancy and reliability improvements are recommended at:

1. Construct approximately 12,200 feet of 16-inch and 24-inch main on Webster Street, 8th Street, Lake Street, 7th Street and Spruce Street replacing the existing, older distribution main and providing redundancy of transmission to the west side of town.

2. Construction of a parallel 30-inch raw service water line from the LSPS to the WTP (see additional description in 8.5.3.1)

3. Construction of 16-inch water main on East Front Street from Park to Franklin Street

4. Construction of 12-inch water main on Hannah Avenue from Bates to Garfield

5. Construction of 12-inch water main on Veterans Drive from 14th Street to Georgetown

6. Construction of 12-inch water main on Front Street bridge between Pine and Hall Street with Bridge Project

7. Removal of the 12-inch water main across the Union Street Dam and replacing with a new 12-inch main under the Boardman River just east of Union Street bridge by directional drilling with the Fish Pass Construction Project.

8. Installation of new generator and transfer switch at LSPS for the ability to provide temporary power for raw water pumping and treatment of maximum daily flows at the WTP

9. Replacement of the surface wash pump at the WTP

10. Rehabilitation of existing backwash pump at the WTP

8.3 Water Storage Improvements

The evaluation of the existing water system capacity concludes that the need for additional storage volumes in the system is unwarranted. Addressing the suction issues associated with Wayne Hill Booster Pump Station (described in 8.5.1) would increase the City's total storage capacity from 6.7 mgal to 7.4 mgal.

The City should continue to complete tank inspections and cleaning every five years.

8.4 Water Quality Improvements

The City has completed the preliminary Distribution System Materials Inventory (DSMI) and has submitted to EGLE. Continuing to implement complete DSMI is required by January 1, 2025.

8.5 Specific Project Recommendations

8.5.1 Wayne Hill Booster Station

Several changes in this Booster Pump Station operation could be considered to enable the Wayne Hill Booster Station to function more effectively and address some of the issues pointed out earlier and address the fire flow requirements. The remedies considered to address these problems are provided as follows.

As noted in Section 3, the City has experienced pressure drops during hydrant openings within the Booster Station service area. Increasing the pressure setpoints and ensuring the bladder tanks are charged to 90 psi has improved this issue. The bladder tanks have a total volume of 720 gallons and the effective usable volume is approximately 100 gallons each since the air cushion around the water expands as the water is drawn out of the tank thus reducing the pressure if no new water is being added. This provides about 10 seconds of response time per tank to allow the pumps to maintain. The installation of a third bladder tank will help and provide additional response to allow the pumps to pressurize the system during these high flows. The PRV WCV-1300 located within the booster station should also be replaced with a pressure sustaining valve to regulate the downstream pressure and maintain a residual upstream pressure above 95 psi so that 20 psi can be maintained at the highest elevations of PD-4 during fire demands.

In addition to improvements to the pumping infrastructure, the existing pump controls should be revised to provide for more continuous and longer pump operation between cycles. This can be accomplished through programming changes that would prevent the pump from running below a speed setting that would provide only minimal flow into the system so that the pump could remain on and respond more quickly to rapid changes in demand rather than having to be called to start up fairly frequently as is currently the case. If the minimum pump setting were set at 70%, that would produce very minimal flow into the system (possibly only enough to allow the downfeed through the small bypass PRV from WCV-1300 into PD-3 to occur or about 5 gpm). The controls could be revised to shut the lead pump down only when it has run at minimum speed for a certain time duration (say one hour) which would mean that there is very little if any system demand. To prevent one pump from running for too long, a second pump could be cycled in every 24 hours so that the wear on each pump can be evened out. A second (and a third) pump could be called for once the first (or both) pump is at maximum speed and if the pressure continues to drop for more than 3-5 seconds, which is similar to the current time frame for bringing on additional pumps during hydrant opening events. The above controls changes should occur regardless of which of the pump options below are selected.

Three options were considered to address the pumping capacity and suction issues at the booster station. These are:

Option 1 – Install Three New Booster Pumps on the Lower Level

This option includes the replacement of the three pumps with one pump sized with the capability of providing the MDD and 3 pumps used for fire flow conditions. The pumps would be located on the lower level and would take suction from the existing reservoir suction line with their discharge connecting to the existing 8-inch discharge header from the skid-mounted pumps.

Option 2 - Relocate Existing Booster Pumps to Lower Level and Provide an Elevated Storage Tank

This option includes relocating the existing booster pumps to the lower level and a new suction header from the low level reservoir suction line would be installed to connect to the pumps. One pump would provide the MDD and fire flow would be provided by the three pumps. Construction of a new elevated storage tank (150,000 gallons) in PD-3 would provide the required fire flows for the proposed commercial development in PD-3 as well as PD-2. Fire flow for PD-4 would continue to be provided solely by the pumps.

Option 3 – Supplemental Booster Pumps on Lower Level

It is also possible to address the current low NPSH problem by providing a booster pump at the elevation of the suction line from the reservoir. This booster pump would operate when the reservoir level at or below elevation 732'. This booster pump should be located so that the pump volute elevation is at or below the lowest water surface in the reservoir at all times. Adding a supplemental booster pump to push water against the existing prefabricated booster pump skid would enable the existing pumps on the skid to operate adequately under any condition of reservoir elevation and thus allow the full reservoir to be utilized during fires or other high demand periods. This pump would be sized to provide enough capacity for all three of the skid-mounted pumps to be utilized, if desired The increased head would increase the capacity of the three existing pumps and provide sufficient fire flow.

8.5.2 Grand Traverse Commons

Several improvements to the water system at Grand Traverse Commons were evaluated to address low pressure issues occurring at these locations. This includes the replacement of the 10-inch cast-iron water mains in the Commons area with 10-inch and 12-inch ductile iron water mains. Additionally, establishing a higher pressure district (PD-9) through the connection of a portion of Commons Water System located within PD-1 to the adjacent Garfield Township pressure district which operates at a higher HGL than PD-1. The scope of this work includes:

- Replacement of approximately 2,400 feet of 10-inch CIP water mains in Cottage View Drive to 300 feet south of Brown Drive

- Create a new pressure district (PD-9) by the:

    - Construction of a new 8-inch PRV (Option 1) at the location of the Red Drive Booster Station to downfeed from the Garfield Township Munson Pressure District (HGL 975 feet) to PD-9 (HGL = 825 feet) The estimated water age in this proposed district would increase due to the long travel times from the City's system to Garfield Township and the eventual backfeed into PD-9 and then to the City. or

    - Rehabilitation of the Red Drive Booster Station for use by the City (Option 2). This station owned by Garfield Township is currently under plans to be abandoned but could be acquired by the City for use in the new station. This option would require evaluation and installation of new pumps as well as the construction of a new discharge water main to the Commons system.

- Installation of approximately four check valves at:

    - 12-inch DIP water main on Silver Drive South of the Commons

    - 6-inch CIP water main on Cottageview Drive south of Medical Campus Drive

    - 12-inch DIP water main and 10-inch CIP water main at in Brook Street at the intersection of Medical Campus Drive

This new pressure district (PD-9) would be maintained at an HGL of 825 feet and would increase the pressures under maximum day conditions from 33 psi to 60 psi.

Looping of this district could also be completed with the connection to the existing 8-inch water mains from Orange Drive to Franke Road within the Garfield Township system. This installation would require a second 8-inch PRV to be installed near the intersection of Silver Drive and Silver Lake Road. The cost of this looping was not included in the project cost estimate.

8.5.3 Water Treatment Plant

8.5.3.1 Low Service Pump Station

The Low Service Pump Station capacity represents the limiting factor to the City's water supply capacity. HRC evaluated the installation of a secondary 30-inch water line parallel to the existing 30-inch water line from the LSPS to the raw water flow meter. The second raw water line would also provide a redundant raw water supply to the WTP. Replacement of all four pumps is anticipated over the next 5-10 years. Replacing pumps number 1 and 2 with higher

capacity pump and operating on VFDs would provide additional capacity while allowing the pumps to vary the raw water flow rate for lower demand conditions.

New emergency power generation at the LSPS would provide the WTP the ability to increase the treatment capacity during power outages.

8.5.3.2 Raw Water Supply

Replacing the emergency access point on the 36-inch intake pipe would enable the City to supply the WTP with raw water in the event of an emergency or if the intake structure is damaged or needs repair.

A secondary raw water intake pipe and connection was also considered as part of this evaluation. This option could include installing a secondary direct intake or a buried intake structure into East Bay at the LSPS. The secondary direct intake option would require an approximate 4,000 feet of 36-inch offshore at a different location than the current intake. The buried intake would require two approximately 225' x 225' intake structures (each rated for 12 mgd each) located closer to shore (less than 1,000 feet). The structures would be equipped with perforated piping installed in deep bed filter sand media capped with native sand. The structure would be equipped with the ability for backwashing. These options would need to be considered if water demands begin to routinely exceed the current intake capacity or if water quality or other problems develop with the current intake crib and pipe.

8.5.3.3 Filter Backwash Recycle

The USEPA and EGLE typically permit the recycling of the decant water from the filter backwash and sludge lagoon through the Filter Backwash Recycling Rule given:

1. The water is treated through the processes of the existing direct filtration system and;

2. The total volume recycled is less than 10% of the influent flow. The WTP maximum discharge is 180,000 gallons per day from the WTP lagoons. At the minimum daily flow observed in the past five years, this represents less than 5% of the total raw water flow.

Because recycling backwash water may concentrate biological contaminants such as *Cryptosporidium* and *Giardia*, it is recommended to periodically monitor and/or disinfect this water before recycling in the treatment process. Disinfection by ultraviolet light is one of the most effective methods of deactivating these microorganisms and can be accomplished at lower doses and contact times (C*t) than other disinfection methods, such as chlorine.

Two options exist for implementation of UV disinfection of the recycled flow as follows:

Options 1 – UV Disinfection Only

The first option includes the installation of 12-inch discharge piping and yard valves to discharge the plant drain pump effluent pipe to the 24-inch raw water main in the yard north of the WTP. A 12-inch diameter inline medium-pressure UV equipment module rated for up to 1 mgd (instantaneous) and 0.5 mgd (daily) flow could be installed for this purpose. Monitoring of the recycle flow rate could be completed using a new magnetic flow meter installed on the recycle pipe.

Options 2 – UV Disinfection and Backwash Tank

A second option to also replace one of the open sludge and backwash lagoons with a covered concrete storage tank. Although not required, this would ensure that all recycled water is essentially isolated from exposure to the environment. This tank would provide for the reclamation of backwash water and would consist of a covered below-grade cast-in-place concrete holding tank constructed within the footprint of one of the existing backwash lagoons. The backwash supernatant would be drained and pumped back to the WTP and treated and the settled sludge would be pumped to the remaining sludge lagoon. The tank would be constructed with two cells, each sized for 200,000 gallons, to hold the volume of two backwashes plus some additional volume per cell for freeboard and extended backwash times. The backwash supernatant would be withdrawn using piping or a decanting device and recycled to the WTP raw water using a recycle pump station with an integral wet well. Solids would be drained using a sloped base slab to a collection zone and then pumped from the tank using a separate sludge pump station or submersible pumps to the remaining sludge lagoon. This option would also include the UV disinfection and flow metering as described above as well as piping, earthwork (assumed to be 30% of the tank cost) instrumentation and controls. The decant from the sludge lagoons would continue to be discharged to surface water via the plant drain pump station.

8.5.4 Increased Filter Capacity

The existing filters have a design filtration rate of 4 gpm per sf which is the maximum rate approved by EGLE. Increasing the filtration rate to 5 gpm per sf has been previously discussed and could be allowed with EGLE approval. An EGLE approved pilot study would be required to demonstrate the filtration capacity prior to conversion to high rate filtration. This would increase the filtration capacity to 25 mgd. Increasing the filtration rate would increase the headloss and reduce the filter run times but would allow the WTP to use the existing five filters to achieve treatment capacity without constructing new filters.

The estimated cost of the pilot studies can be up to $80,000 and the associated implementation costs would be $100,000 for the increased instrumentation and filter modifications.

8.6 Summary of Recommended Capital Improvements

Table 8-1 summarizes the recommended capital improvements and the estimated completion year. Cost estimates are provided in Appendix F along with a Figure F-1 depicting the locations of the recommended capital improvements. Costs are based on similar projects completed in the City and budget estimates from equipment suppliers. For the purpose of this study, project costs less than $50,000 were not included as capital improvements. The recommended improvement options for Wayne Hill Booster Station are shown in Figure F-2 and F-3.

Several of the recommended improvements are reflected in the total capital improvements cost including Wayne Hill Booster Station Option 3 – Supplemental Booster Pumps and Filter Backwash Recycle Option 1 – Existing Storage Lagoons.

Table 8-1: Recommended Water System Capital Improvements

PROJECT	DESCRIPTION	PROJECT/OPTION AMOUNT	TOTAL SELECTED	TIME FRAME
	WTP Projects			
W1	WTP and Low Service PS New Electrical Gear and VFDs	$1,204,000	$1,204,000	2020-2025
W2	Replace Sodium Hypochlorite Tanks	$405,000	$405,000	2020-2025
W3	Replace Surface Wash Pump	$47,000	$47,000	2020-2025
W4	Rehab Backwash Pump	$50,000	$50,000	2020-2025
W5	Replace HSPS Control Valves	$402,000	$402,000	2020-2025
W6	New Raw Water Main from LSPS to WTP	$770,000	$770,000	2025-2030
W7	Install New Generator at LSPS	$450,000	$450,000	2025-2030
W8	LSPS Pump Replacement	$1,347,000	$1,347,000	2030-2040
W9	HSPS Pump Replacement	$1,401,000	$1,401,000	2030-2040
W10A	Backwash Recycle	$453,000	$453,000	2030-2040
W10B	Backwash Recycle and Backwash Tank	$2,928,000		2030-2040
		WTP IMPROVEMENTS PROJECTS	$6,529,000	
	Distribution System Projects			
D1	8th Street Bridge Project, 20-inch and 24-inch from Boardman to Lake Ave (Phase 1)	$284,000	$284,000	2020-2025
D2	24-inch on Lake Avenue from Cass to Union, (Phase 3B)	$388,000	$388,000	2020-2025
D3	24-inch on 7th from Union to Wadsworth, (Phase 4)	$636,000	$636,000	2020-2025
D4	Front Street Bridge Project, 12-inch Front/Pine to Front/Hall	$200,000	$200,000	2020-2025
D5	16-inch on East Front from Franklin to Park St.	$850,000	$850,000	2020-2025
D6	24-inch from Webster/Rose to 8th/Railroad, (Phase 5B)	$1,285,000	$1,285,000	2020-2025
D7	US-31 MDOT, 16-inch from US-31/Union to US-31/Bay; 12-inch from US-31/Railroad to US-31/Garfield	$1,584,000	$1,584,000	2020-2025
D8	24-inch from Garfield/Washington to Webster/Rose, (Phase 5A)	$1,176,000	$1,176,000	2020-2025
D9A	Wayne Hill Improvements Option 1 - New Booster Pumps on Lower Level	$447,000		2020-2025
D9B	Wayne Hill Improvements Option 2 - Ex. Booster Pumps to Lower Level, New Tower	$1,603,000		2020-2025
D9C	Wayne Hill Improvements Option 3 - New Supplemental Booster Pumps on Lower Level	$432,000	$432,000	2020-2025
D10	12-inch on Hannh Avnue from Bates to Garfield	$770,000	$770,000	2025-2030
D11	Downtown, 12-inch Boardman/8th to Boardman/State; Washington/Boardman to Cass/State	$975,000	$975,000	2025-2030
D12	24-inch on 7th from Wadsworth and Spruce (Phase 6)	$1,475,000	$1,475,000	2025-2030
D13	16-inch on Spruce from 7th to Wayne St. (Phase 7)	$1,272,000	$1,272,000	2025-2030
D14	12-inch on Veterans Drive from Georgetown to 14th Street	$798,000	$798,000	2025-2030
D15A	Grand Traverse Commons Improvements Option 1 - PRV	$908,000		2030-2040
D15B	Grand Traverse Commons Improvements Option 2 - Pump Station	$1,258,000	$1,258,000	2030-2040
		DISTRIBUTION SYSTEM IMPROVEMENTS PROJECTS	$13,383,000	
		TOTAL ESTIMATED COST OF PROJECTS	**$19,912,000**	

Notes:

1. W = WTP Projects, D = Distribution System Projects
2. All pricing in 2020 dollars.
3. Pricing includes 20% contingency and 20% engineering, legal, and administrative.

9 General Plan Requirements

The purpose of this Section is to satisfy the requirements of the EGLE SWDA Rules promulgated according to the Act P.A. 399 of 1976, as amended. Part 16 of the Rules indicate that certain suppliers of water shall submit and maintain an up to date waterworks system General Plan. The principal elements of the General Plan, which are provided to satisfy these requirements, include the following:

1. General Layout of the Entire Waterworks System

    a. The City uses their GIS database to map the entire water works system including the treatment system and distribution system including valves, hydrants, storage tanks, water mains, and booster stations. Refer to Appendix A for maps of the City's Water System.

2. Pressure Contours under Peak Demands

    a. A hydraulic analysis of the distribution system was completed as part of this Reliability Study. Appendix C displays the existing conditions model pressure contours under peak demand conditions.

3. Identification of Service Area

    a. Refer to Appendix A which displays the service area for the City's Water Supply System.

4. Rated Capacity of Waterworks System

    a. Refer to Section 7 for a detailed analysis of the rated capacity of the City's Waterworks System.

5. Inventory of Water Mains

    a. Appendix F contains a complete inventory of the water mains by pipe diameter, pipe material and estimated installation year.

6. Capital Improvements

    a. This Water System Reliability Study concludes that the water supply system has adequate capacity and conveyance capabilities to provide suitable supply and pressure to its customers during existing normal operating conditions, but the 20-year maximum daily demand will be approaching 80% of

the firm supply capacity. The Fire Flow Analysis performed as part of the Reliability Study revealed minor deficiencies in the City distribution system. These fire flow deficiencies should be addressed as required to support development as needed. Section 8 identifies system improvements to upgrade the water distribution system and provides recommendations to enhance the reliability and redundancy in the existing water supply system.

7. To accommodate the anticipated expansion for the 5-year and 20-year planning periods, a Future Water System Analysis was performed. This analysis is provided in Section 6. Improvements to accommodate future system growth were identified in Section 8. Requests for system extension should continue to be reviewed on case-by-case basis as projected distribution system sizing may need to be modified based on the specific requests.

8. The City has completed an Asset Management Program which has been approved by EGLE.

9. The City has completed preliminary distribution system materials inventory by January 1, 2020 and is implementing the complete distribution system materials inventory by January 1, 2015.

10 Water Shortage Response and Interruption of Service

10.1 Electrical Power System

The City has enough emergency power generation from the 700 kW generator to operate pumping and treatment at 8.0 to 11.0 mgd should a complete power outage occur. The City recently completed the installation of a new automatic transfer switch (ATS) at the WTP in 2020 which provides reliable transfer to standby power and back to line power when service is restored. The LSPS is provided with backup power capability through the WTP 700 kW generator. The installation of a new generator at the LSPS would allow the WTP to convey and treat a higher firm capacity. The Wayne Hill Booster Station has sufficient generator capacity to power the current loads to this station.

10.2 Interruption of Water Service

The City's current Emergency Response Plan addresses the issues surrounding the process and procedures for supplying customers with potable water should water service be interrupted. Furthermore, the water supply system has been constructed with sufficient redundancy so that each pressure district can be supplied from several different sources. However, if an interruption in water service to the distribution system occurs and forces system pressures to drop below the recommended minimum levels, the water would be disinfected in a manner approved by EGLE and compliance with state drinking water standards would be demonstrated by additional bacteriological testing. In addition, the City has 6.7 million gallons of gravity supply between the three storage tank sites that can be isolated and made available for emergency use only, if necessary.

APPENDIX A:
CITY OF TRAVERSE CITY WATER SYSTEM FIGURES

West Arm of Grand Traverse Bay

PENINSULA TOWNSHIP

PD-PT_Underwood (950')

PENINSULA TANK
0.3 MG 840' (HWL)

Peninsula
Booster Station

PD-PT_1 (750')

PD-PT_Huron_Hills (920')

PD-PT_Hidden_Ridge (850')

PD-7 (920')

WCV-7

WCV-8

PD-5 (875')

PD-6 (850')

ELMWOOD TOWNSHIP

PROPOSED
MORGAN FARMS PUD
EXPANSION

PD-2 (885')

WCV-1340

WCV-1341

WCV-1328

WCV-1329

PD-3 (885')

PD-4 (1000')

WCV-1300

GRELICKVILLE
MASTER METER

WAYNE HILL GROUND
STORAGE TANK
1.3 MG 741' (HWL)

Wayne Hill
Booster Station

Low Service
Pump Station

Huron Hills
Booster Station

Water
Treatment
Plant

East Arm of Grand Traverse Bay

CEDAR RUN TANK
(APPROX. LOCATION)
1.0 MG 1200' (HWL)

Grayhawk Booster Station (Abandoned?)

Red Drive
Booster Station

PD-GT_Grayhawk (1200')

PD-GT_Munson (975')

PD-GT_TCAPS (1200')

PD-1 (750')

WTP
RESERVOIR
1.5 MG 610' (HWL)

TRAVERSE CITY

EAST BAY TOWNSHIP
INTERCONNECTION
(EMERGENCY ONLY,
NORMALLY CLOSED)

Copper Ridge PRV #2

Copper Ridge PRV #1

Herkner
Booster Station

HERITAGE ESTATES
STANDPIPE
0.3 MG 1090' (HWL)
ABANDONED IN PLACE

VETERANS DRIVE
MASTER METER
(TO CITY)

PD-8 (850')

CASS ROAD
MASTER METER

GARFIELD
MASTER METER

Boardman Lake

SummerHill PRV

Silver Lake PRV

Franke Road PRV

PD-GT_Supply (750')

StoneRidge PRV

SilverFarms PRV

PD-GT_Silver Farms (1000')

Cass Road PRV

PD-GT_Stone Ridge (875')

Garfield #1
Booster Station

Garfield #2
Booster Station

BARLOW GROUND
STORAGE TANKS
6.0 MG 751' (HWL)

EAST BAY
TOWNSHIP

Arbors PRV

McCrae PRV

PD-GT_1 (875')

PD-GT_Heritage (1090')

GARFIELD
TOWNSHIP

PD-GT_Birmley (875')

SILVER PINES
BOOSTER STATION

MCRAE HILL TANK
2.25 MG 940' (HWL)

BIRMLEY ESTATES TANK
0.3 MG 879.0' (HWL)

TRADITIONS BOOSTER
STATION

PD-GT_Traditions (1090')

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N
W E
S

0 1,250 2,500 5,000 Feet

LEGEND

- Check Valve
- PRV
- Water System Service Area
- County
- City/Township

Pressure Zone			Pressure District HGL
750	6"	18"	750
875	8"	20"	751 - 825
1000	10"	24"	826 - 884
1100	12"	30"	885 - 999
1200	16"	36, Active	1000 - 1090
			1091 - 1200

FIGURE A-1

WATER SYSTEM SERVICE AREA AND PRESSURE DISTRICTS

2020 WATER SYSTEM
RELIABILITY STUDY UPDATE

NOVEMBER 2020 | HRC #: 20200232

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N
W E
S

0 500 1,000 2,000 Feet

West Arm of Grand Traverse Bay

East Arm of Grand Traverse Bay

Boardman Lake

PD-2 (825')
WCV-1340
WCV-1341
WCV-1328
PD-3 (885')
WCV-1329
PD-4 (1000')
WCV-1300

WAYNE HILL GROUND STORAGE TANK 1.3 MG 741' (HWL)

Grayhawk Booster Station (Abandoned?)
PD-GT_Munson (975')
Grayhawk (1200')

Copper Ridge PRV #2
PD-GT_Heritage (1090')
Copper Ridge PRV #1
SummerHill PRV
Silver Lake PRV
StoneRidge PRV
PD-GT_1 (875')
PD-GT_Stone Ridge (875')

VETERANS DRIVE MASTER METER (TO CITY)
Franke Road PRV
PD-8 (850')

CASS ROAD MASTER METER
PD-GT_Supply (750')
Cass Road PRV
Garfield #1 Booster Station

PD-PT_Huron_Hills (920')
PD-PT_1 (750')
PD-7 (920')
WCV-8
WCV-7
PD-PT_Hidden_Ridge (850')
PD-6 (850')
PD-5 (875')

Huron Hills Booster Station
WTP
Low Service Pump Station
RAW WATER INTAKE CRIB
WTP RESERVOIR 1.5 MG 610' (HWL)
PD-1 (750')

EAST BAY TOWNSHIP INTERCONNECTION (EMERGENCY ONLY NORMALLY CLOSED)

GARFIELD MASTER METER

BARLOW GROUND STORAGE TANKS 6.0 MG 751' (HWL)
PD-GT_Birmley (875')
Garfield #2 Booster Station

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

Pressure District HGL

- 750
- 751 - 825
- 826 - 884
- 885 - 999
- 1000 - 1090
- 1091 - 1200

FIGURE A-2

TRAVERSE CITY WATER DISTRIBUTION SYSTEM

2020 WATER SYSTEM RELIABILITY STUDY UPDATE

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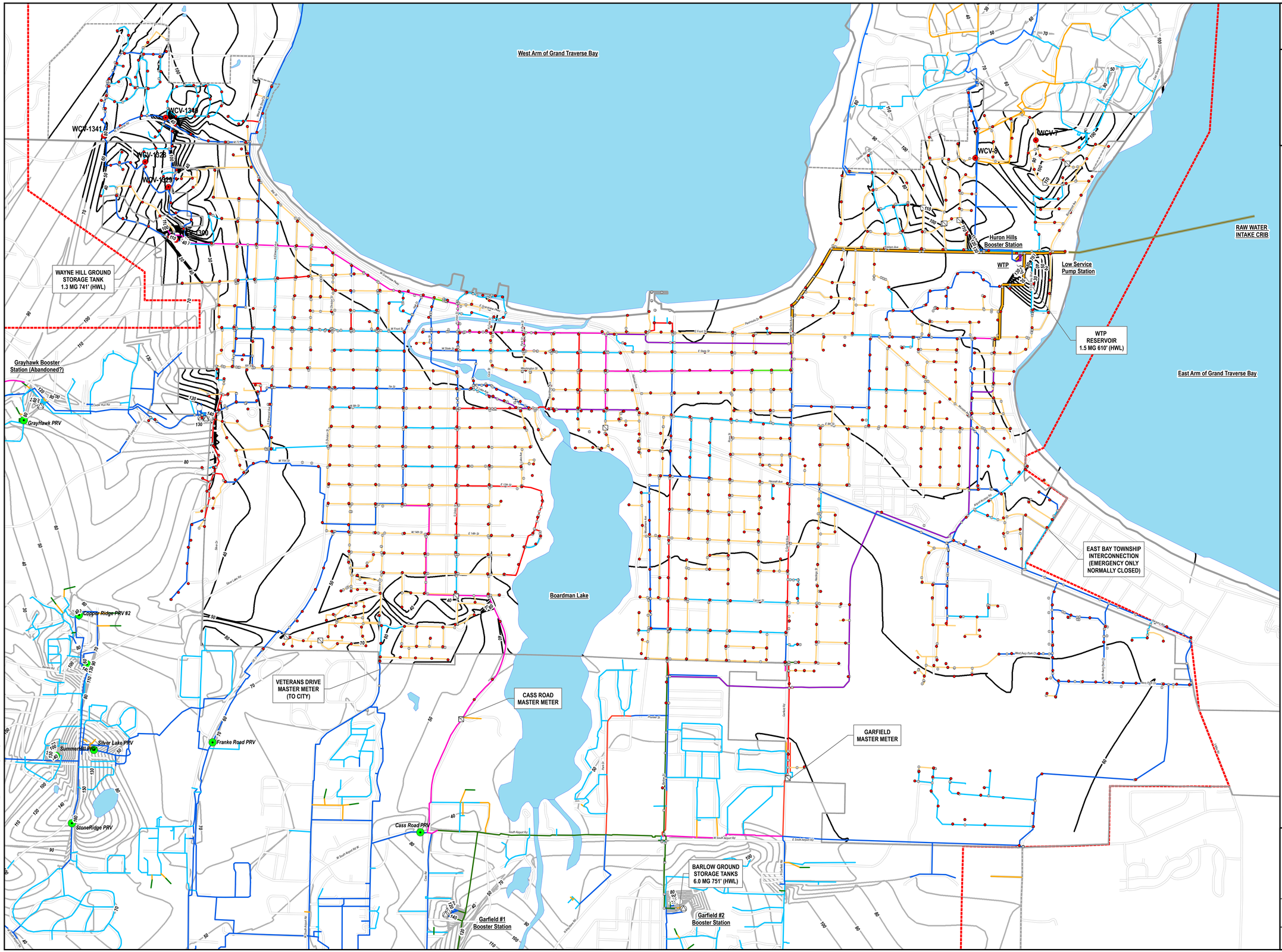
Date: 2/22/2021

APPENDIX B:
WTP PUMPAGE AND AVERAGE DAILY DEMANDS

Month	Monthly ADD (mgd)	Monthly MDD (mgd)
January-14	3.00	3.54
February-14	3.16	3.52
March-14	3.44	4.05
April-14	3.26	4.10
May-14	4.67	7.86
June-14	8.54	10.16
July-14	9.54	11.67
August-14	9.54	12.11
September-14	6.17	8.40
October-14	3.67	4.85
November-14	2.90	3.14
December-14	2.93	3.34
January-15	3.00	3.45
February-15	3.34	3.86
March-15	4.37	5.22
April-15	3.81	4.46
May-15	5.99	7.35
June-15	7.73	10.76
July-15	10.69	13.48
August-15	9.45	11.85
September-15	7.44	9.35
October-15	4.22	6.23
November-15	3.09	3.62
December-15	2.94	3.83
January-16	2.96	3.79
February-16	2.97	3.34
March-16	2.87	3.29
April-16	3.21	4.26
May-16	6.11	9.81
June-16	9.21	11.56
July-16	10.84	12.30
August-16	10.59	13.37
September-16	7.48	9.45
October-16	4.10	5.59
November-16	3.08	3.45
December-16	3.00	3.40
January-17	3.01	4.05
February-17	3.07	3.56
March-17	2.85	3.16
April-17	3.32	4.29
May-17	5.50	7.01
June-17	7.93	9.45
July-17	9.34	11.17
August-17	8.63	10.66
September-17	7.85	9.48
October-17	4.71	7.06
November-17	2.99	3.36
December-17	2.88	3.29
January-18	2.98	3.31
February-18	3.04	3.26
March-18	3.00	3.34
April-18	3.01	3.43
May-18	5.36	9.06
June-18	9.23	11.83
July-18	9.01	11.06
August-18	10.79	12.65
September-18	7.85	9.45
October-18	4.04	5.95
November-18	3.07	3.60
December-18	2.96	3.45
January-19	2.95	3.59
February-19	3.39	4.12
March-19	3.35	4.05
April-19	3.42	4.17
May-19	4.96	6.56
June-19	7.05	9.22
July-19	9.00	11.31
August-19	9.89	11.03
September-19	6.94	9.43
October-19	3.94	5.08
November-19	3.04	3.53
December-19	2.93	3.50
January-20	2.92	3.41
February-20	2.92	3.37
March-20	2.69	3.30
April-20	2.32	2.59
May-20	3.81	5.24
June-20	7.73	10.56
July-20	10.19	13.08

APPENDIX C:
HYDRAULIC MODEL SIMULATION RESULTS



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N
W E
S

0 500 1,000 2,000 Feet

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County
- Pressure Contours (psi)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

FIGURE C-1

EXISTING CONDITIONS AVERAGE DAILY DEMAND

2020 WATER SYSTEM RELIABILITY STUDY UPDATE

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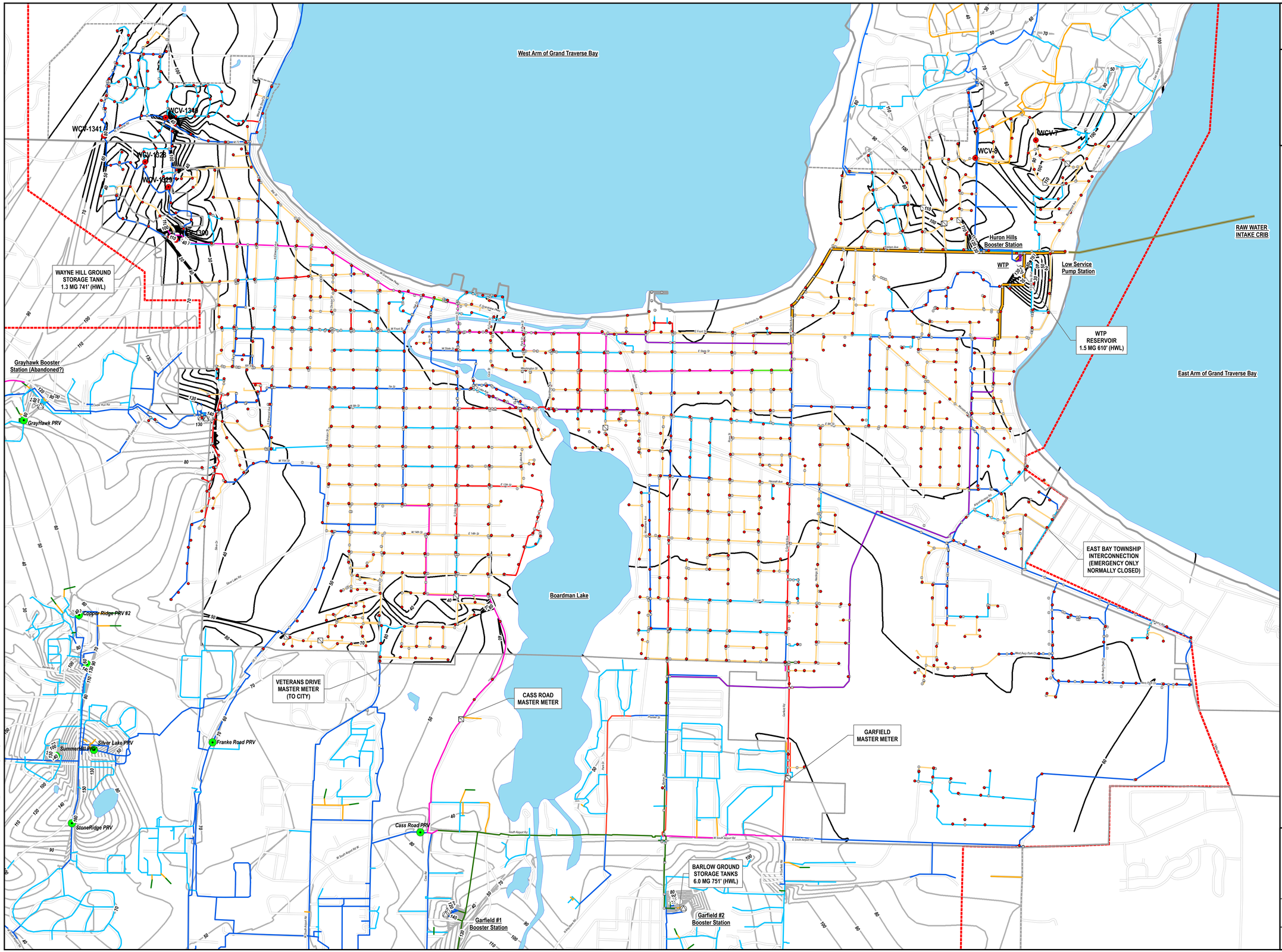

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N
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S

0 500 1,000 2,000 Feet

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County
- Pressure Contours (psi)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

FIGURE C-2

EXISTING CONDITIONS MAXIMUM DAILY DEMAND

2020 WATER SYSTEM RELIABILITY STUDY UPDATE

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W E
S

0 500 1,000 2,000 Feet

West Arm of Grand Traverse Bay

East Arm of Grand Traverse Bay

Boardman Lake

WCV-1340

WCV-1341

WCV-1328

WCV-1329

WCV-1330

WCV-2

WCV-1

WAYNE HILL GROUND STORAGE TANK 1.3 MG 741' (HWL)

Grayhawk Booster Station (Abandoned?)

GrayHawk PRV

Copper Ridge PRV #2

Copper Ridge PRV #1

Silver Lake PRV

Summer Hill PRV

StoneRidge PRV

Franke Road PRV

VETERANS DRIVE MASTER METER (TO CITY)

CASS ROAD MASTER METER

Cass Road PRV

GARFIELD MASTER METER

Garfield #1 Booster Station

Garfield #2 Booster Station

MARLOW GROUND STORAGE TANKS 6.0 MG 751' (HWL)

Huron Hills Booster Station

WTP

Low Service Pump Station

WTP RESERVOIR 1.5 MG 610' (HWL)

RAW WATER INTAKE CRIB

EAST BAY TOWNSHIP INTERCONNECTION (EMERGENCY ONLY NORMALLY CLOSED)

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County
- Pressure Contours (psi)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

FIGURE C-3

EXISTING CONDITIONS PEAK HOUR DEMAND

2020 WATER SYSTEM RELIABILITY STUDY UPDATE

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Figure C-4: Minimum Day, 120-Hour EPS Summary, Winter

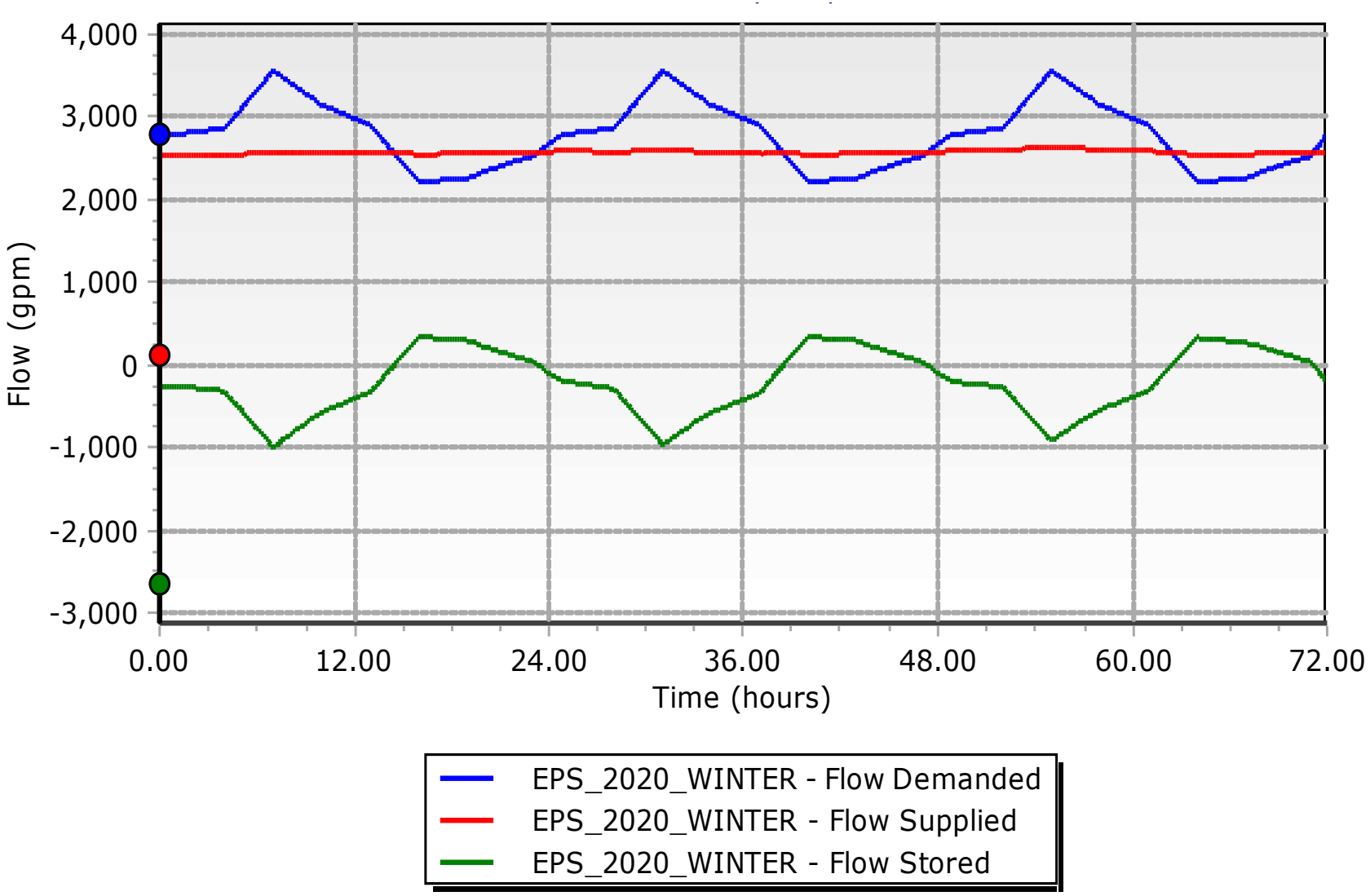
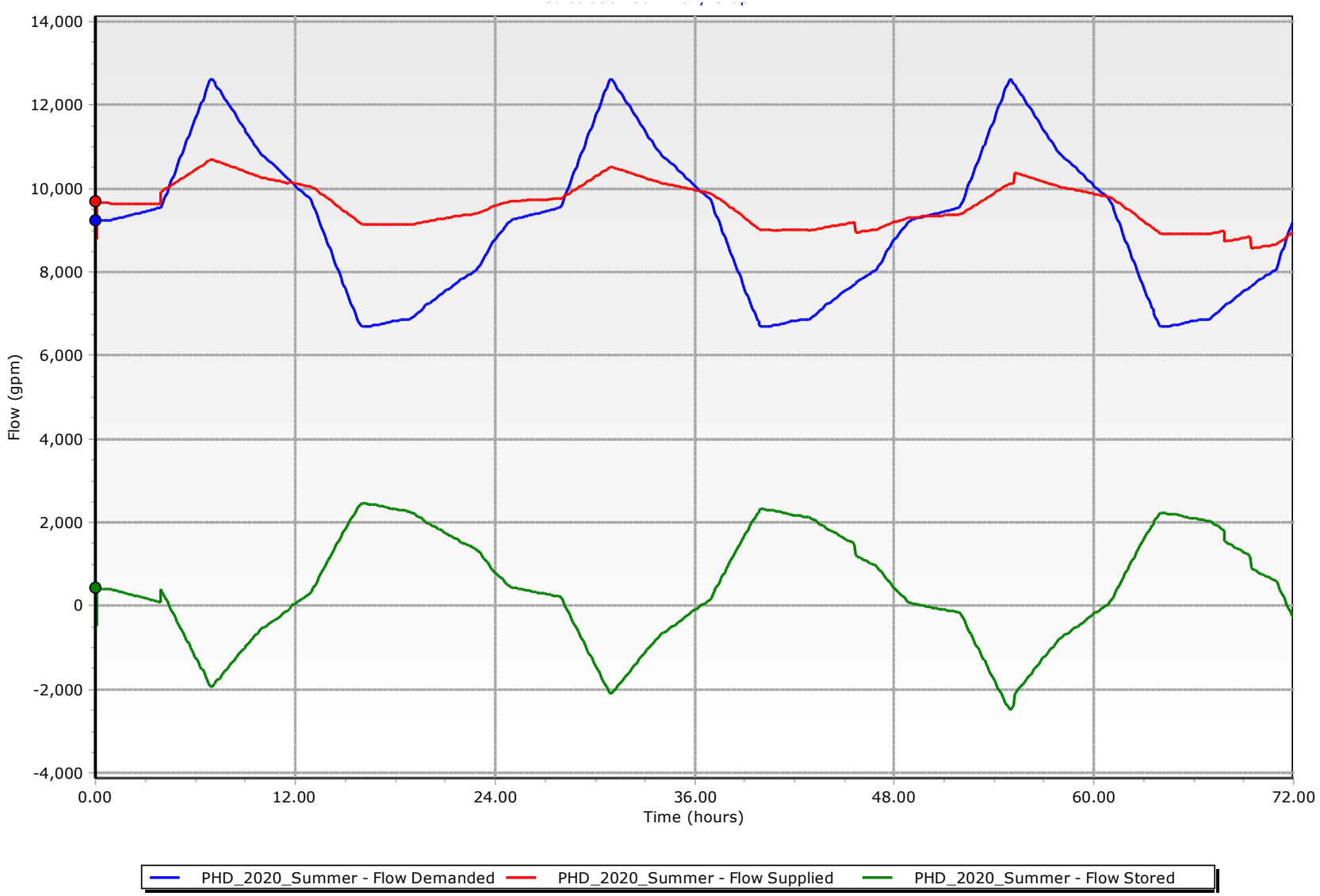


Figure C-5: Maximum Day, 120-Hour EPS Summary, Summer



West Arm of Grand Traverse Bay

East Arm of Grand Traverse Bay

Boardman Lake

WCV-1340

WCV-1341

WCV-1328

WCV-1329

WCV-1300

WCV-7

WCV-8

WAYNE HILL GROUND STORAGE TANK 1.3 MG 741' (HWL)

Grayhawk Booster Station (Abandoned?)

GrayHawk PRV

Copper Ridge PRV #2

Copper Ridge PRV #1

SummerHill PRV

Silver Lake PRV

StoneRidge PRV

Franke Road PRV

VETERANS DRIVE MASTER METER (TO CITY)

CASS ROAD MASTER METER

Cass Road PRV

Garfield #1 Booster Station

BARLOW GROUND STORAGE TANKS 6.0 MG 751' (HWL)

Garfield #2 Booster Station

GARFIELD MASTER METER

Huron Hills Booster Station

WTP

Low Service Pump Station

WTP RESERVOIR 1.5 MG 610' (HWL)

RAW WATER INTAKE CRIB

EAST BAY TOWNSHIP INTERCONNECTION (EMERGENCY ONLY NORMALLY CLOSED)

N

W E

S

0 500 1,000 2,000 Feet

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County
- Maximum Fire Flow (gpm)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

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Date: 2/22/2021

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FIGURE C-4

EXISTING CONDITIONS MAXIMUM FIRE FLOW

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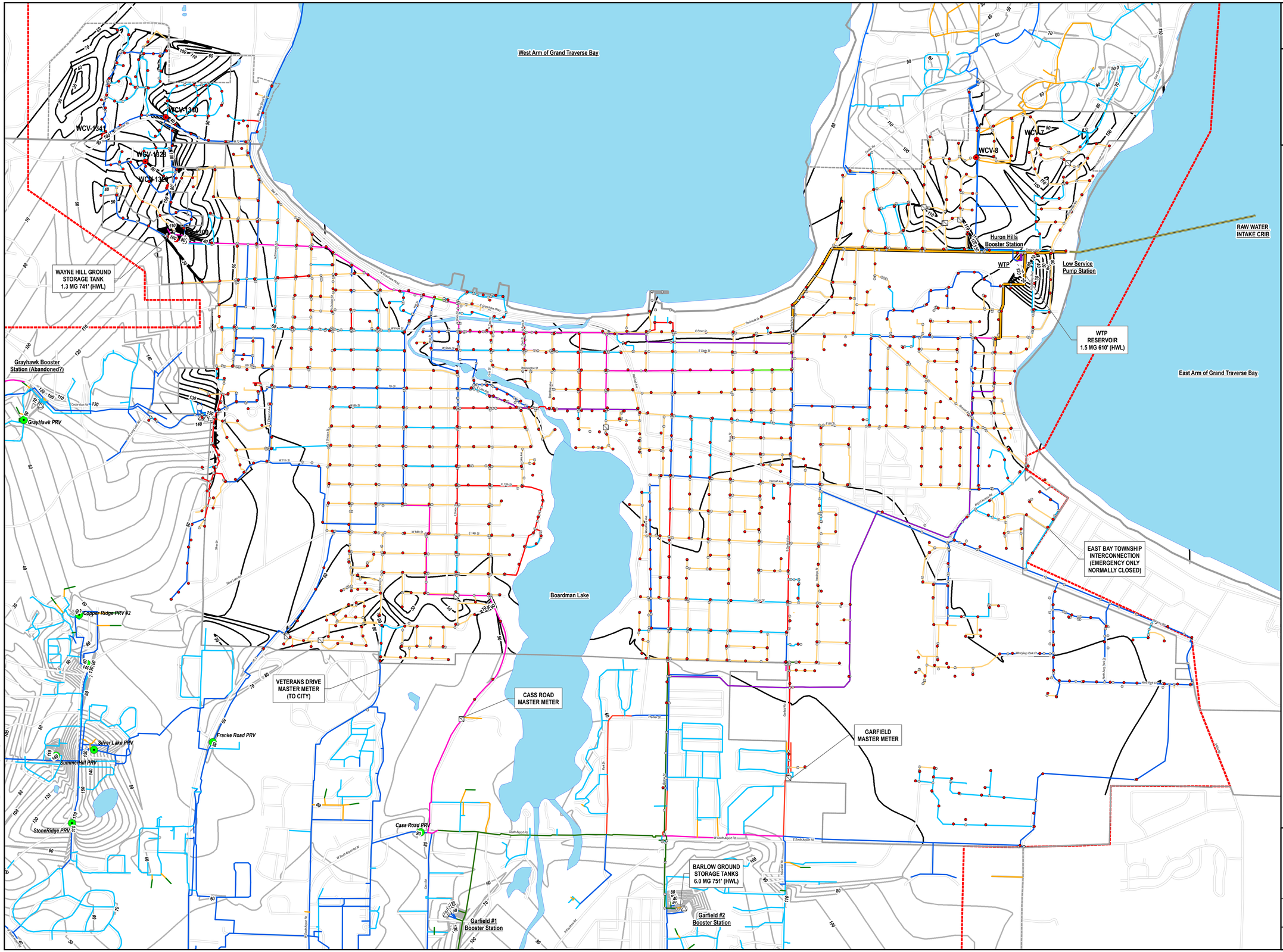

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N
W E
S

0 500 1,000 2,000 Feet

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County
- Pressure Contours (psi)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

FIGURE C-7

FUTURE CONDITIONS AVERAGE DAILY DEMAND

2020 WATER SYSTEM
RELIABILITY STUDY UPDATE

NOVEMBER 2020 | HRC #: 20200232

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N
W E
S

0 500 1,000 2,000 Feet

West Arm of Grand Traverse Bay

East Arm of Grand Traverse Bay

Boardman Lake

WCV-1340

WCV-1341

WCV-1326

WCV-1324

WCV-1330

WCV-7

WCV-8

WAYNE HILL GROUND STORAGE TANK 1.3 MG 741' (HWL)

Grayhawk Booster Station (Abandoned?)

GrayHawk PRV

Copper Ridge PRV #2

Silver Lake PRV

SummerHill PRV

StoneRidge PRV

Franke Road PRV

Cass Road PRV

VETERANS DRIVE MASTER METER (TO CITY)

CASS ROAD MASTER METER

GARFIELD MASTER METER

Huron Hills Booster Station

WTP

Low Service Pump Station

WTP RESERVOIR 1.5 MG 610' (HWL)

RAW WATER INTAKE CRIB

EAST BAY TOWNSHIP INTERCONNECTION (EMERGENCY ONLY NORMALLY CLOSED)

BARLOW GROUND STORAGE TANKS 6.0 MG 751' (HWL)

Garfield #1 Booster Station

Garfield #2 Booster Station

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County
- Pressure Contours (psi)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

FIGURE C-8

FUTURE CONDITIONS MAXIMUM DAILY DEMAND

2020 WATER SYSTEM RELIABILITY STUDY UPDATE

NOVEMBER 2020 | HRC #: 20200232

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Date: 2/22/2021

PROPOSED MORGAN FARMS PUD EXPANSION

WCV-1340

WCV-1341

WCV-1339

WCV-1338

WCV-1337

WCV-1336

WCV-1335

WCV-1334

WCV-1333

WCV-1332

WCV-1331

WCV-1330

Wayne Hill Booster Station

WAYNE HILL GROUND STORAGE TANK 1.3 MG 741' (HWL)

Grayhawk Booster Station (Abandoned?)

Red Drive Booster Station

GRELICKVILLE MASTER METER

West Arm of Grand Traverse Bay

WCV-8

WCV-X

Huron Hills Booster Station

WTP

Low Service Pump Station

RAW WATER INTAKE CRIB

WTP RESERVOIR 1.5 MG 610' (HWL)

East Arm of Grand Traverse Bay

EAST BAY TOWNSHIP INTERCONNECTION (EMERGENCY ONLY NORMALLY CLOSED)

Boardman Lake

VETERANS DRIVE MASTER METER (TO CITY)

CASS ROAD MASTER METER

GARFIELD MASTER METER

BARLOW GROUND STORAGE TANKS 6.0 MG 751' (HWL)

Garfield #1 Booster Station

Garfield #2 Booster Station

Document Path: Y:\2019\01\20\19011503_Studies\Working\Liming

Date: 2/22/2021

CITY of TRAVERSE CITY MICHIGAN

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

1925 BRETON ROAD SE SUITE 100
GRAND RAPIDS, MI 49506
(616) 454-4286
www.hrcengr.com

N
W E
S

0 500 1,000 2,000 Feet

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- Water System Service Area
- County
- City/Township
- Pressure Contour (psi)

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

FIGURE C-9

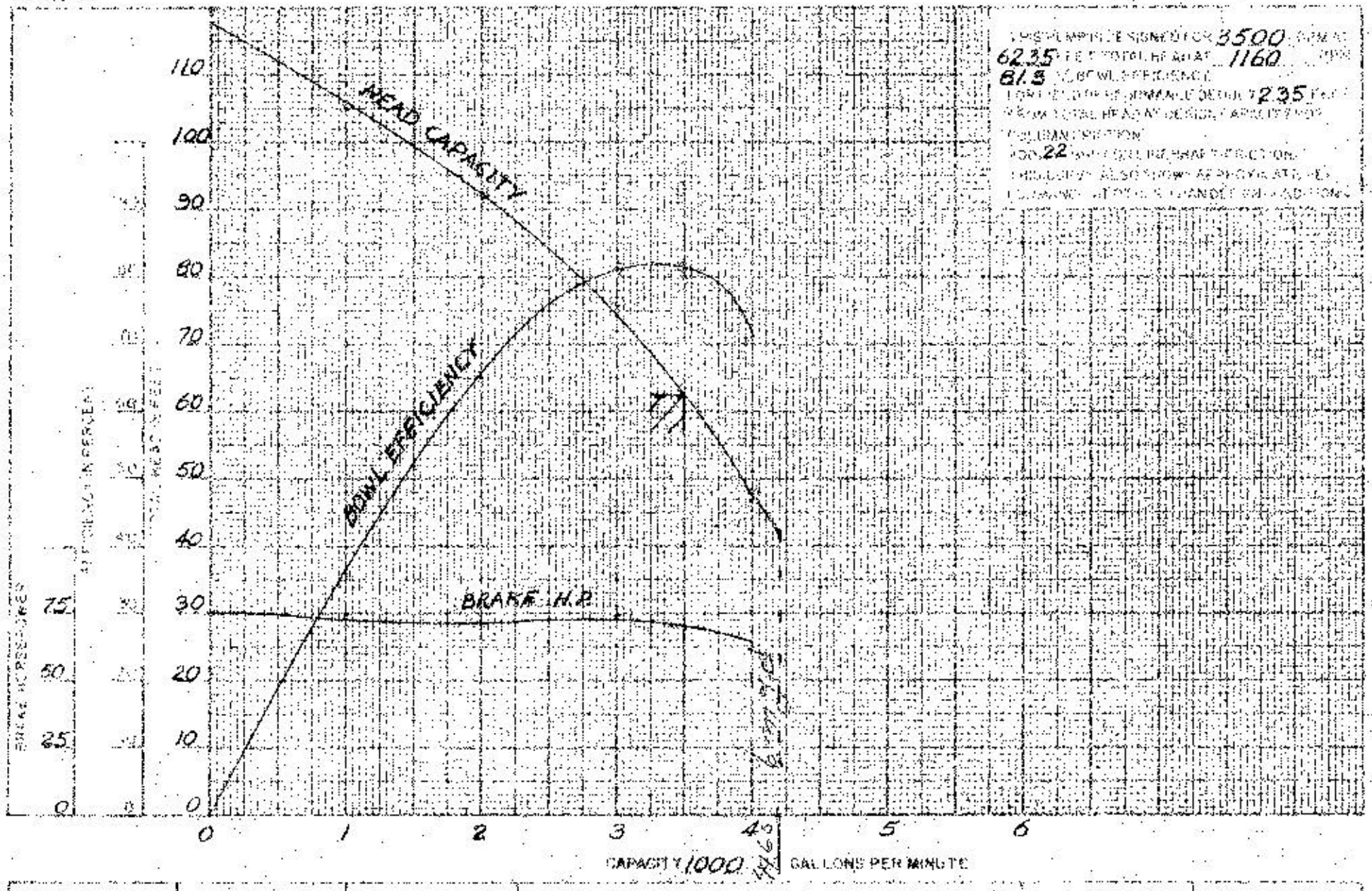
2040 CONDITIONS W/IMPROVEMENTS PEAK HOUR DEMAND

2020 WATER SYSTEM
RELIABILITY STUDY UPDATE

NOVEMBER 2020	HRC #: 20200232

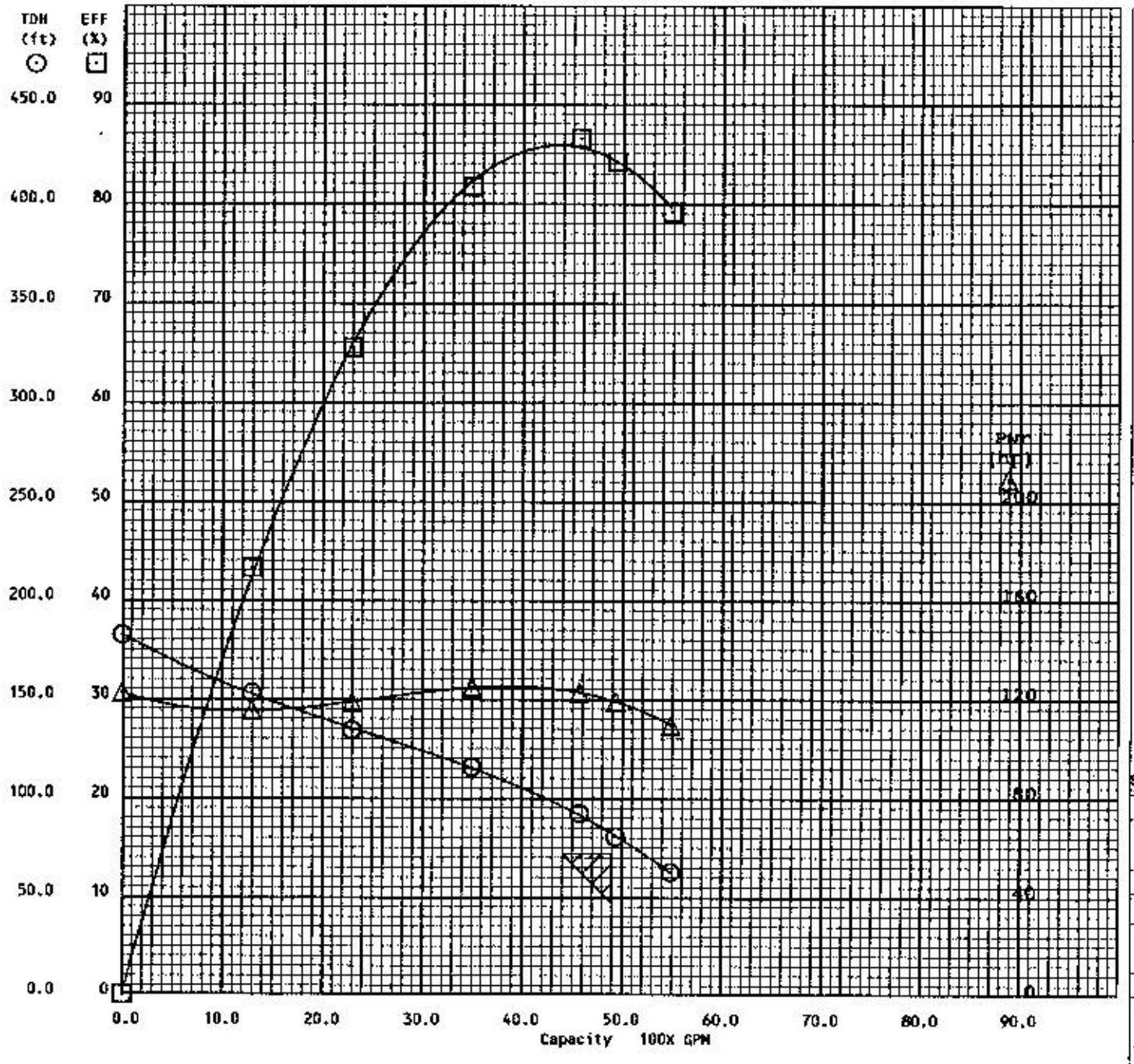
APPENDIX D:
PUMP TESTING AND CURVES

L S, # 1 ~~1~~ 2



IMPELLER	BOWL	20H500-W PUMP	WORTHINGTON CORPORATION	1-6-66 DATE	VTP-12525-26 SERIAL NO
IMP DIA	75 HP MOTOR DRIVER	2 NO OF STAGES	VERTICAL PUMP DIVISION	CUST NO	DTP-24333 ORDER NO
TEST NO	1160 R.P.M.	DRAWN BY	HARVEY, COLORADO, U.S.A. ALHAMBRA, CALIFORNIA, U.S.A.	QUOTE NO	DEN-1574-4 CURVE NO

Low Service #3 Pump



DRESSER PUMP DIVISION
DRESSER INDUSTRIES INC.
PUMP TEST DATA

RPM	GPM	TDH	BHP	EFF
1790.0	4972.1	81.7	121.9	84.2
1791.0	5533.6	63.7	112.5	79.1
1789.0	4605.3	93.5	125.6	86.5
1789.0	3524.8	117.1	127.7	81.6
1789.0	2309.4	136.3	121.5	65.5
1789.0	1301.6	155.3	118.0	43.3
1788.0	0.0	185.1	125.2	0.0

I CERTIFY THAT WITHIN THE ACCURACY OF TEST INSTRUMENTATION THIS TEST REPRESENTS THE PERFORMANCE OF 18H500-1 PUMP # TVU100921-1

James R Bin

SP.GR.: 1

CASING DATA		
CAST IRON		
MATERIAL	FINISH	TONGUE
IMPELLER DATA		
BRONZE	1A	
MATERIAL	FINISH	DISC. TIPS
VW30499		11.56
PATT.NO.	COMB.NO.	DIA

WORTHINGTON 18H500-1	1	TVU100921	TVU-100921-1	3/26/93	STA		200/1800	85	1775	E-231527
PUMP	STAGES	ORDER NO.	SERIAL NO.	DATE TESTED	TEST	APPROVED	TEST DRIVER	VENTURI	PLOTTED RPM	CURVE NO.

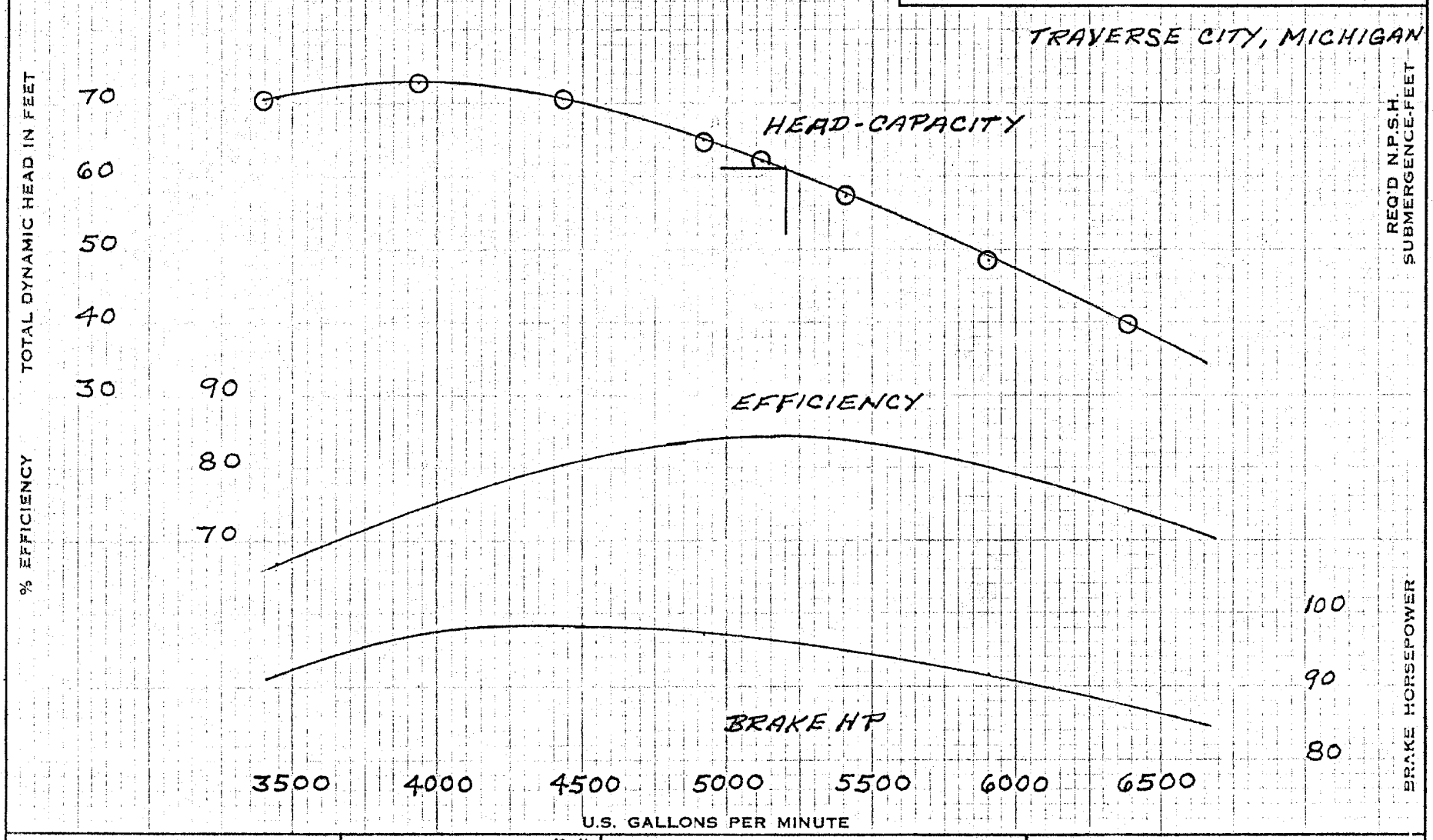
LOW SERVICE #4 PUMP TC-2218

CERTIFIED BY: R. W. Bennings DATE 11-30-72

CUSTOMER BOSCH PLUMBING & HEATING CO.

PUMP SERIAL NUMBER GE-3475

TRAVERSE CITY, MICHIGAN



THE CAPACITY, HEAD AND EFFICIENCY GUARANTEE IS FOR THE DESIGNATED POINT ONLY: IT IS BASED ON SHOP TESTS. WHEN HANDLING CLEAR, FRESH WATER AT A TEMPERATURE OF NOT OVER 85° F. AND UNDER SUCTION CONDITIONS AS SPECIFIED IN THE CONTRACT.

IMPELLER BRZ DIA. 8 15/16"

BOWLS C.I.

LIQUID WATER

SP. GR. 1.00

DATE 11-30-72 BY RWB

JOHNSTON PUMP CO.

VERTICAL PUMPS

GLENDORA • CALIFORNIA • U. S. A.

MIXED FLOW LAB PERFORMANCE

2 STAGE 14 PS PUMP

1175 R.P.M.

CURVE NO. TC-2218

JP-157

HRC

Low Service Pump Station Test

Date of Test	12/14/2020
Initial LSPS Wet Well Level	15.4
Header Pressure Gauge Elevation	593.5
Lake Michigan Level, ft IGLD 85	581.17
Lake Michigan Level, ft NAVD88	581.37

Low Service Pump	LSPS Wet Well Level	LSPS Header Pressure (psi)	Wet Well WSEL	Actual Flow (MGD)	TDH	Depth at Floc	Freeboard at Floc Weir
1	16.6	12	577.50	6.4	43.7	60.2	614.45
2	19	13.5	579.90	5.6	44.8	60	614.43
3	18.8	15	579.70	7.7	48.5	59	614.35
4	14.1	15	575.00	7.8	53.2	60	614.43
1, 2, and 3 (100%)	10.2	18	571.10	16.7	64.0	64.5	614.81
			Total Capacity (mgd)	27.6			
			Firm Capacity (mgd)	19.7			
			Operating Capacity (mgd)	16.7			

Notes:

1. Test performed with WTP personnel and HRC on 12/14/20 from 8 AM to 11 AM.
2. Flow was pumped through both flocculators during each test
3. Wet Well WSEL ft NAVD88 = Wet Well Level + 560.9 ft NAVD88 (bottom of wet well)

Project Number.Phase:	20200232
Project Name:	Low Service Pump Station
Calculations For:	Traverse City
Calculations By:	DIU
Date Started:	8/24/2020
Last Revised:	2/23/2021

General Notes:
1) Pump tests 12/14/2021
2)
3)
4)
5)

Assumptions:

1)	Calculations Based on 45.0ºF Water.
2)	
3)	
4)	
5)	
6)	
7)	

General Pump And Pump Station Design Data

Parameter	Value	Parameter	Value
Primary Design Flowrate Per Pump (gpm)	4,630	Converts to: 6.67 MGD, and 10.31 cfs	
Calculated Total Dynamic Head (ft) (Head Readings Not Adjusted For Specific Gravity)	78.7	Total Dynamic Pump Discharge Head (ft, psi) (Head Not Adjusted For SG, Only Pressure)	50.6ft, 22.0psi
Maximum Static Suction Head (ft) (Head Readings Not Adjusted For Specific Gravity)	-3.00	Maximum Static Discharge Head (ft) (Head Readings Not Adjusted For SG)	49.80
Number of Pumps Present (#)	4	Number of Pumps Running (#)	3
Minimum Capacity per Pump (gpm)	0	Maximum Capacity per Pump (gpm)	5,500
Pump Suction Port Centerline Elevation (ft)	570	Pump Impeller Centerline Elevation (ft)	562.00
Low Liquid Elevation, Suction Side (ft)	565.00	Pump Discharge Port Centerline Elevation (ft)	590.00
High Liquid Elevation, Suction Side (ft)	575.00	High Liquid Elevation, Discharge Side (ft)	614.80

General Pump Impeller Speed and Impeller Diameter Data

Parameter	Value	Parameter	Value
Maximum Pump Impeller Diameter (in) (Provided by Manufacturer)	14.0	Minimum Pump Impeller Diameter (in) (Provided by Manufacturer)	8.0
Maximum Pump Speed (rpm) (Provided by Manufacturer)	1,160	Alternate Pump Speed 1 (rpm) (For Chart Curve Plotting)	1,010
Alternate Pump Speed 2 (rpm) (For Chart Curve Plotting)	967	Minimum Pump Speed (rpm) (Provided by Manufacturer)	870
Selected Design Pump Speed (rpm) (Selected By Designer For This Application)	1,160	Selected Pump Impeller Diameter, D (in) (Selected By Designer For This Application)	8.0

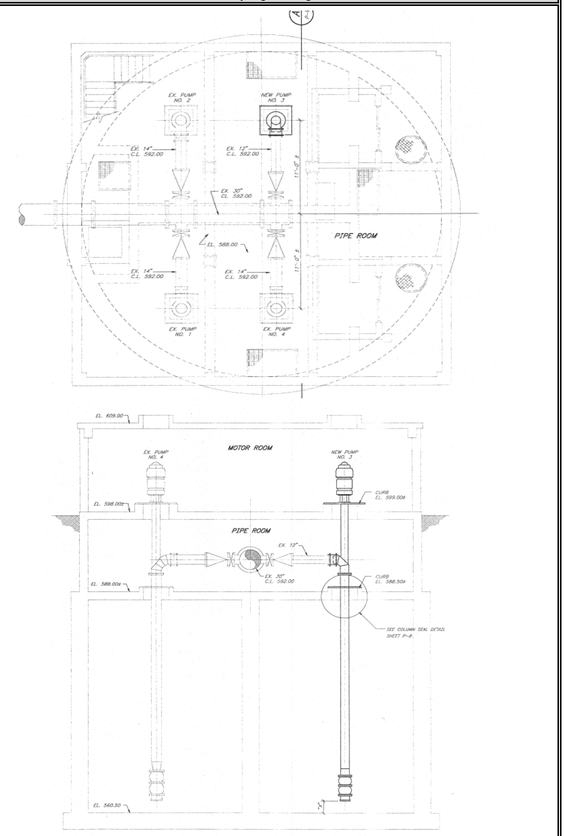
Fluid Properties

Parameter	Value	Notes & Comments
Fluid Type ()	Water	This Sheet Is For Clean Water Only.
Fluid Temperature (ºC)	7.222	For Specific Gravity of 1.0 for Water, Use 3.98ºC
Fluid SLHV (KJ/Kg)	2264.76	Enter the Specific Latent Heat of Vaporization for the Fluid Pumped. Fl
Density H_2O, ρ (kg/m^3)	999.90	Temp Adjustment For Water From "Water_Ref" Tab.
Specific Gravity H_2O, SG (g/cm^3)	0.9999	Temp Adjustment For Water From "Water_Ref" Tab.
Specific Weight H_2O, Y (kN/m^3)	9.8057	Temp Adjustment For Water From "Water_Ref" Tab.
Dynamic Viscosity H_2O, μ (mPa·s)	1.4280	Temp Adjustment For Water From "Water_Ref" Tab.
Kinematic Viscosity H_2O, μ (cP·s)	1.4280	Temp Adjustment For Water From "Water_Ref" Tab.

Net Positive Suction Head Data And Calculations

Parameter	Value	Notes & Comments
Absolute Pressure on Supply Liquid Surface, H_p or H_a (ft)	33.21	Assumes High Supply Tank Elevation, Open To Atmosphere. Adjusted For Specific Gravity.
Suction Lift Height, H_{st} or H_z (ft)	-3.00	Positive for Suction Lift, Negative for Flooded Suction. Not Adjusted for Specific Gravity.
Suction Piping Friction Losses, H_{fs} or H_f (ft)	3.07	Calculated from Suction Piping Friction Losses Below. Not Adjusted for Specific Gravity.
Fluid Vapor Pressure, H_{vpa} or H_{vp} (ft)	0.341	Temp Adjustment For Water From "Water_Ref" Tab. Adjusted for Specific Gravity of Water.
Safety Factor, SF (ft)	3.0	A Minimum Safety Factor Of 3.0 Feet Is Recommended To Ensure Reliable Pumping.
Net Positive Suction Head Available, NPSHA (ft)	29.79	Calculated Based On Selected Site Specific Conditions, As Defined On This Sheet.
Net Positive Suction Head Required, NPSHR (ft)	10.00	Enter Value Of NPSHR As Provided By Pump Manufacturer For These Specific Design Conditions.
Calculated SG & Temp Correction For NPSHR, ΔNPSHR (ft)	0.03	NPSHR Adjusted For Temperature and Specific Gravity Of Water Based On Selected Conditions.
Net Positive Suction Head, NPSH (ft)	19.76	Okay - NPSHA >> NPSHR Low Risk of Cavitation
Net Positive Suction Head Ratio, NPSHA/NPSHR (#)	2.97	Target 1.1-1.3 for Low SE, 1.3-2.0 for High SE, and 2.0-2.5 for Very High SE. Values ≥4.0 Provide Best Reliability.

Modeled Piping Configuration



Piping Input Data

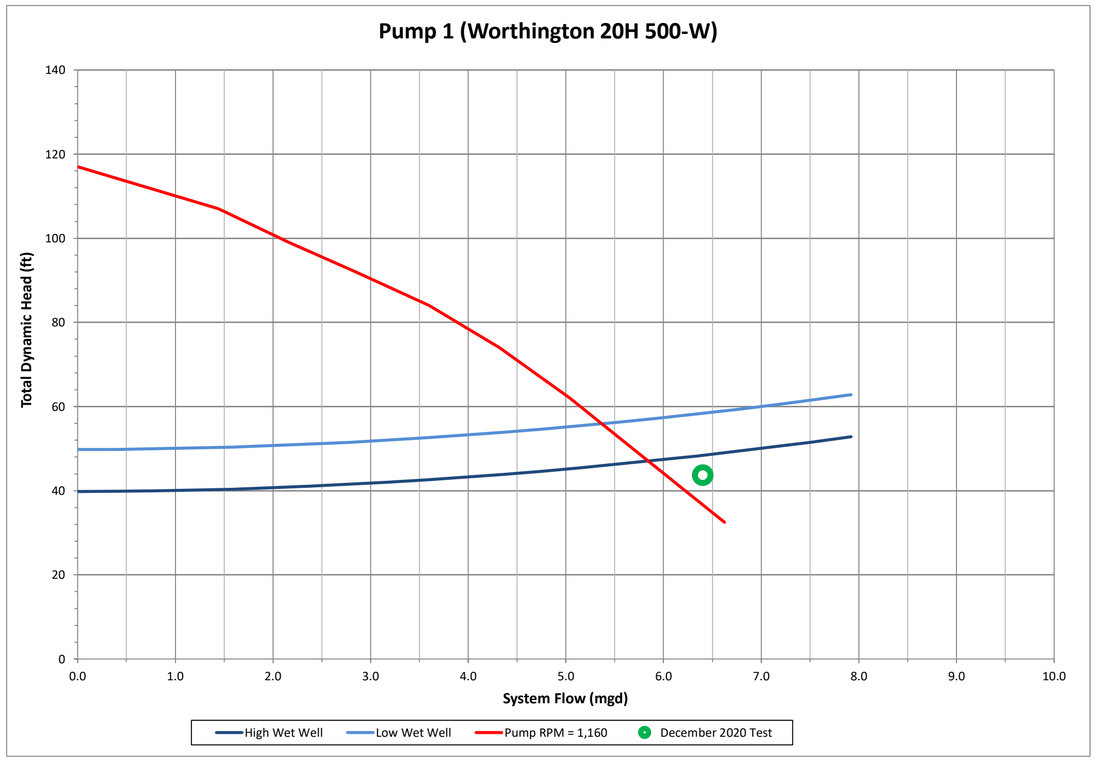
Pipe Segment	Actual Inner Diameter, ID (in)	Pipe Segment Length, ft	Pipe Segment Material	Design Friction Factor, C	Alternate Friction Factor, C
A1	14	30.00	CS	80	80
A2				0	0
A3				0	0
A4				0	0
B1	14	11	CIP	80	80
B2				0	0
B3				0	0
B4				0	0
M1	30	10	CIP	80	80
M2	30	1,215	CIP	80	80
M3	24	10	CIP	80	80
M4	30	30	CIP	80	80
M5	24	49	CIP	80	80
M6	24	25	CIP	80	80
M7	108	15	CS	80	80
M8				0	0
AD1				0	0

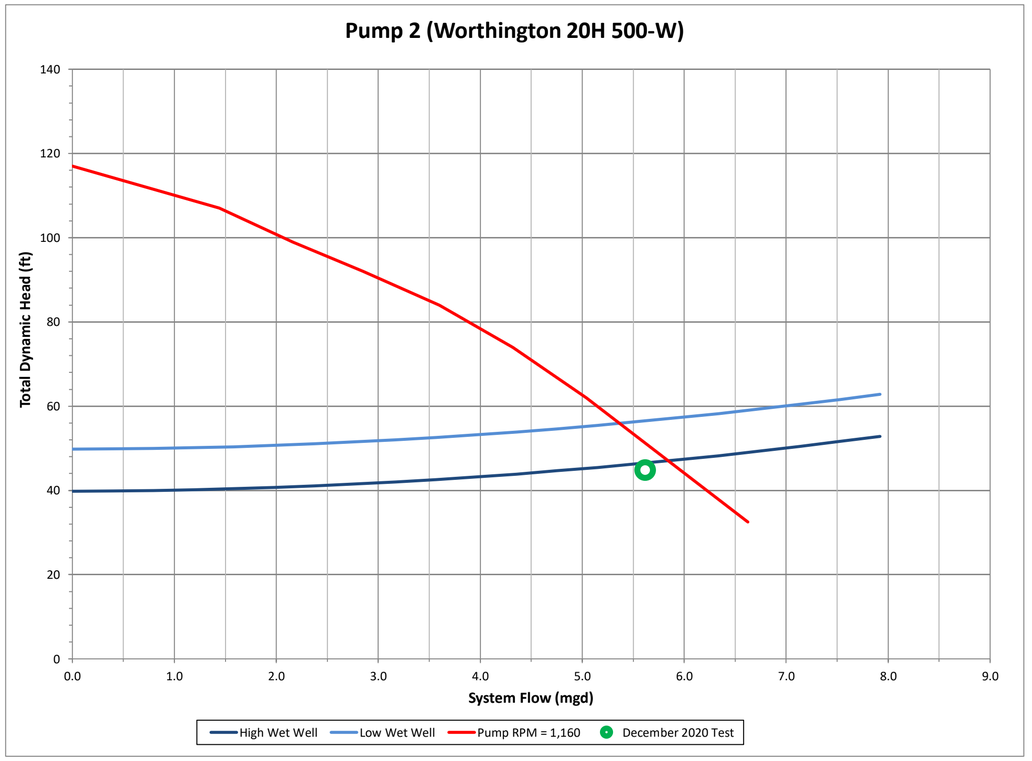
Piping Headloss Calculations - By Hazen-Williams with Multiplier Based on Solids Content

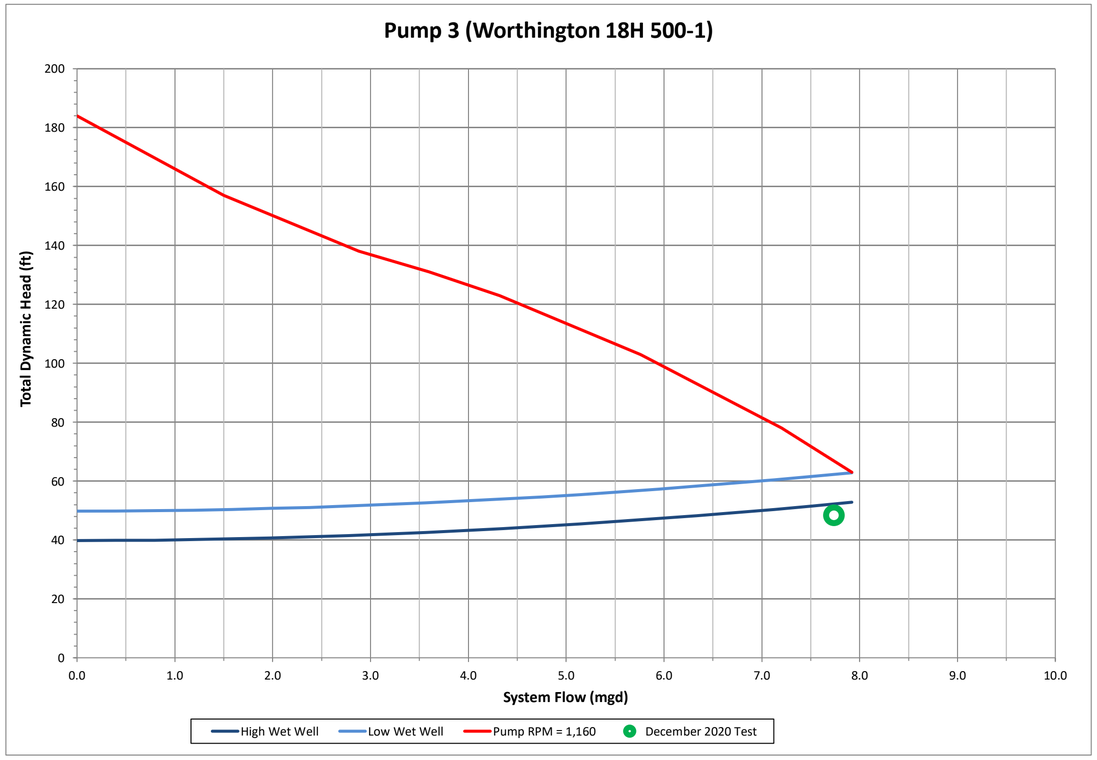
Pipe Segment	% of Flow	Flow in Pipe at Primary Design Flowrate (gpm)	Design h_f per ft of pipe / $Q^{1.85}$	Alternate h_f per ft of pipe / $Q^{1.85}$	Pipe Cross-Sectional Area, ft^2	Velocity at Primary Design Flowrate (fps)	Velocity Head at Primary Design Flowrate (ft/100ft)	Pipe Segment Total K Factor	Minor Headloss at Primary Design Flowrate (ft)	Major Headloss at Primary Design Flowrate (ft)
A1	35%	4,861	8.35E-09	8.35E-09	1.07	10.131	1.59	0.890	1.42	1.66
A2	0%	0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
A3	0%	0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
A4	0%	0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
B1	35%	4,861	8.35E-09	8.35E-09	1.07	10.131	1.59	1.650	2.63	0.61
B2	0%	0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
B3	0%	0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
B4	0%	0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
M1	67%	9,259	2.05E-10	2.05E-10	4.91	4.203	0.27	2.000	0.55	0.04
M2	100%	13,889	2.05E-10	2.05E-10	4.91	6.304	0.62	1.390	0.86	11.47
M3	100%	13,889	6.06E-10	6.06E-10	3.14	9.850	1.51	1.670	2.52	0.28
M4	100%	13,889	2.05E-10	2.05E-10	4.91	6.304	0.62	0.130	0.08	0.28
M5	100%	13,889	6.06E-10	6.06E-10	3.14	9.850	1.51	2.000	3.01	1.37
M6	50%	6,944	6.06E-10	6.06E-10	3.14	4.925	0.38	5.190	1.95	0.19
M7	50%	6,944	4.02E-13	4.02E-13	63.62	0.243	0.00	0.000	0.00	0.00
M8		0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00
AD1		0	0.00E+00	0.00E+00	10,000.00	0.000	0.00	0.000	0.00	0.00

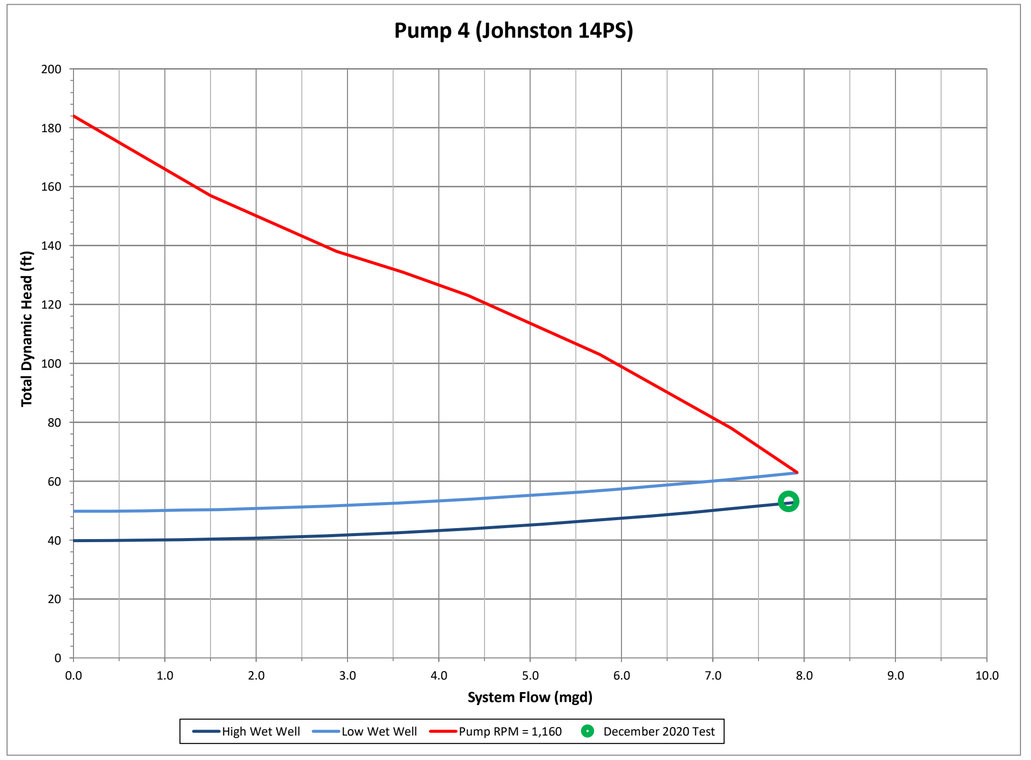
		Static Head (ft):	49.80 / 21.59 PSI
		Suction Head (ft):	3.07 / 1.33 PSI
		Discharge Head (ft):	25.85 / 11.2 PSI
		Total Head (ft):	78.72 / 34.12 PSI

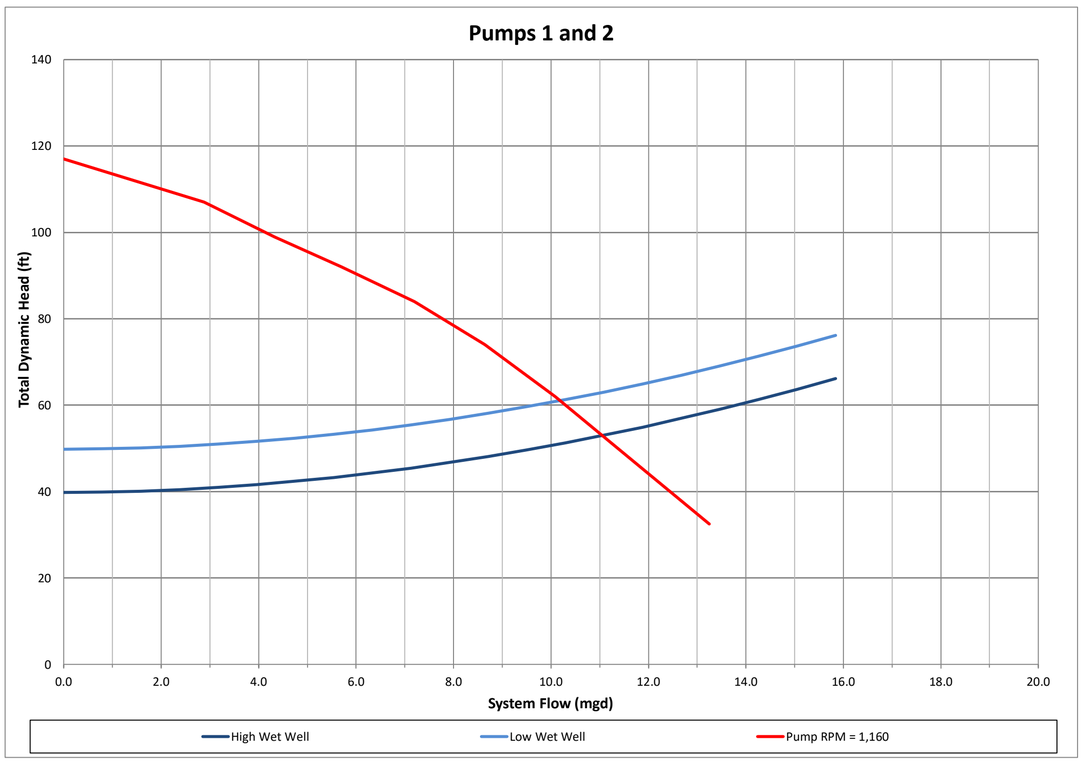
1) If Piping Segment Is Not Used, Leave Cells Blank.
2) For Pipe Segments A1-A4 And B1-B4 Enter Length In Per Pump Terms. Use The Worst Case Scenario.
3) For Pipe Segments M1-M4, Ensure The Proper "% of Flow" For Each Segment Based On The Pipe Layout And Number Of Pumps Running.
4) Pipe Segment AD1 (Additional Piping) Always Assumes One Pump Flow In Graphs. "% of Flow" Valves Greater Than 100% Will Multiply Single Pump Flow Value By The Entered Percentage For Any Pipe Segment.

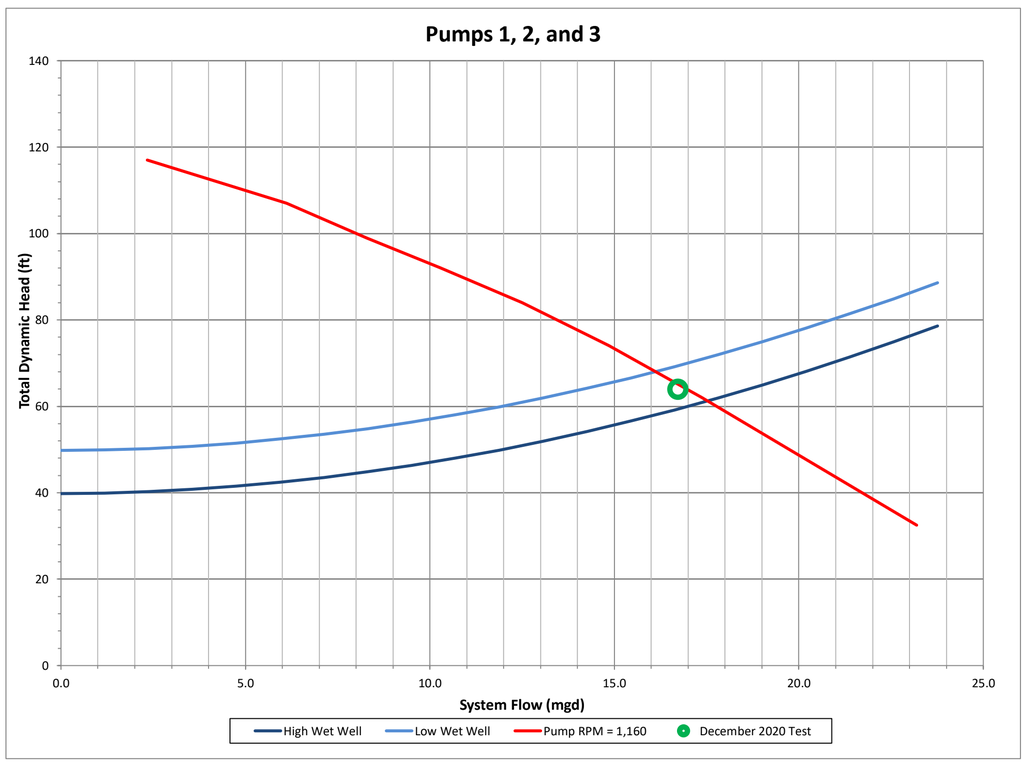

Pump 1 (Worthington 20H 500-W)
Total Dynamic Head (ft)
0
20
40
60
80
100
120
140
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160
December 2020 Test

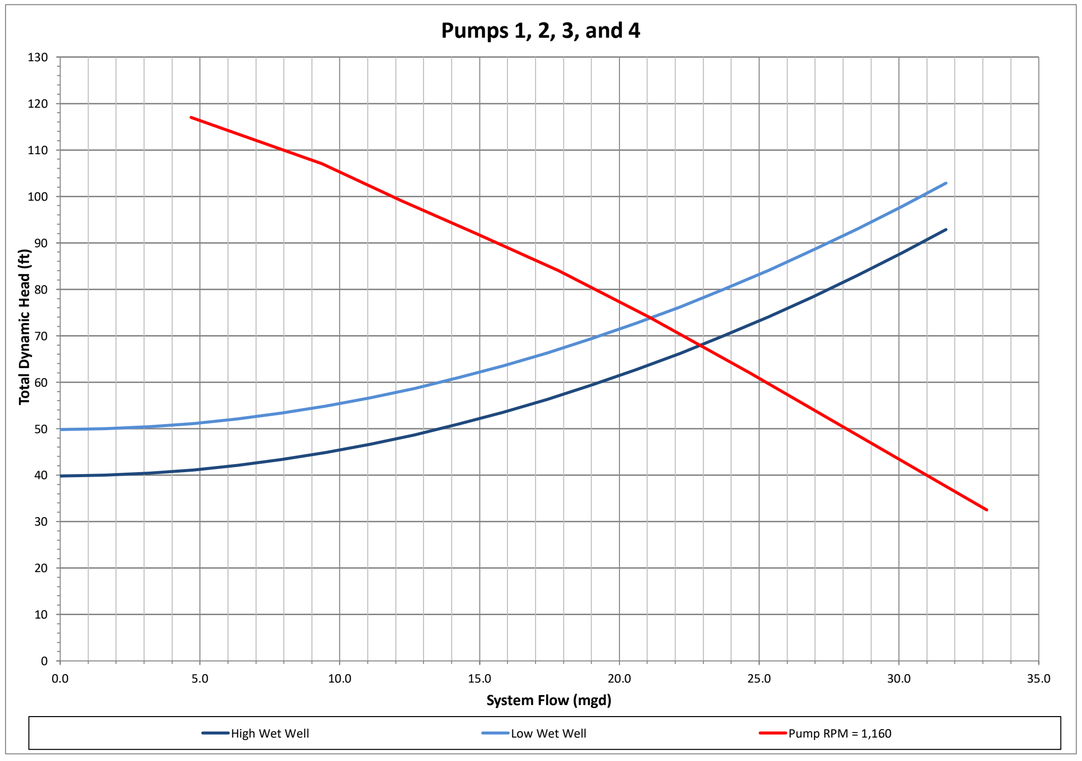

Pump 2 (Worthington 20H 500-W)
Total Dynamic Head (ft)
0
20
40
60
80
100
120
140
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160
December 2020 Test


Pump 3 (Worthington 18H 500-1)
Total Dynamic Head (ft)
0
20
40
60
80
100
120
140
160
180
200
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160
December 2020 Test

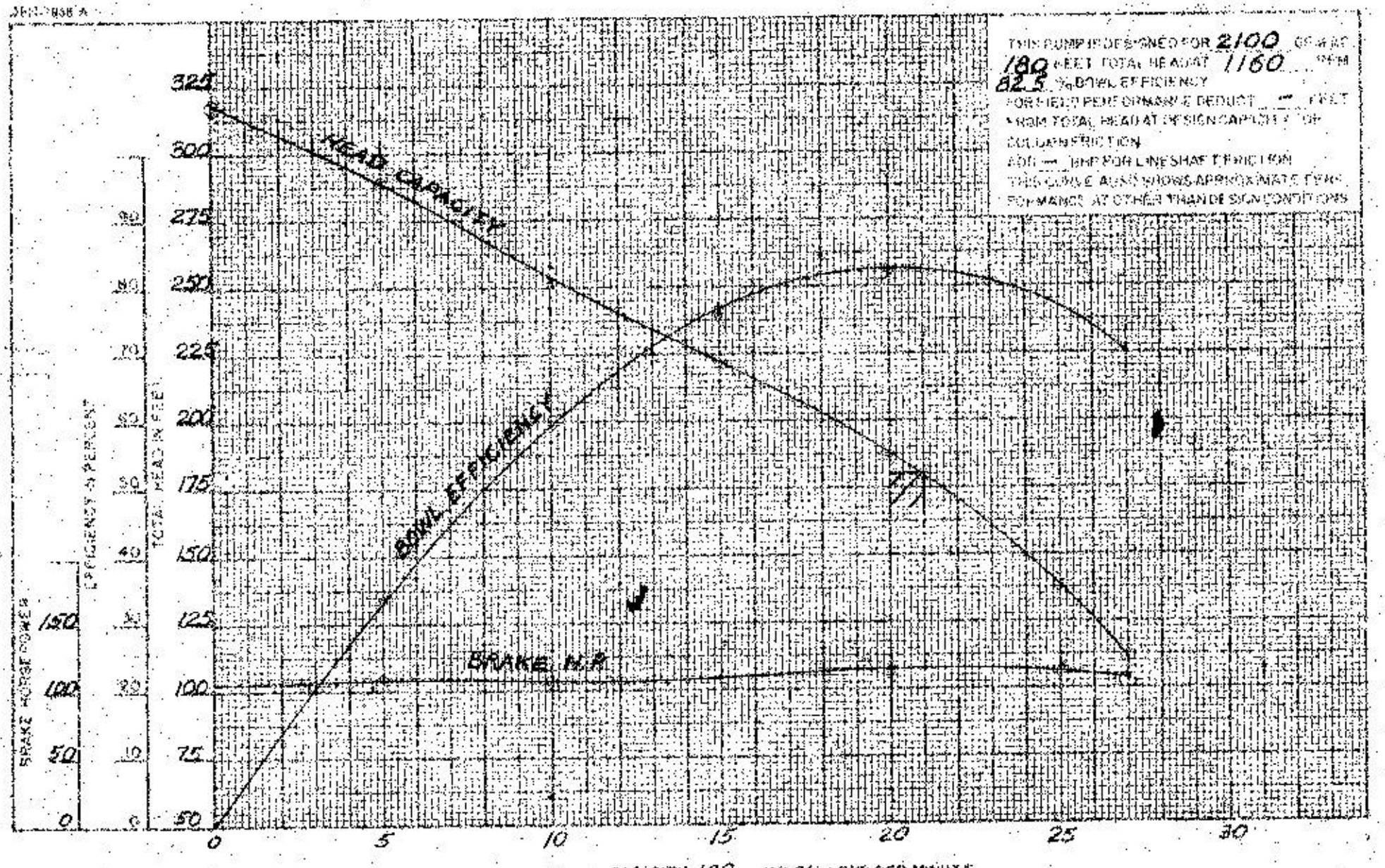

Pump 4 (Johnston 14PS)
Total Dynamic Head (ft)
0
20
40
60
80
100
120
140
160
180
200
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160
December 2020 Test


Pumps 1 and 2
Total Dynamic Head (ft)
0
20
40
60
80
100
120
140
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160


Pumps 1, 2, and 3
Total Dynamic Head (ft)
0
20
40
60
80
100
120
140
0.0
5.0
10.0
15.0
20.0
25.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160
December 2020 Test


Pumps 1, 2, 3, and 4
Total Dynamic Head (ft)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
System Flow (mgd)
High Wet Well
Low Wet Well
Pump RPM = 1,160

H.S. #1

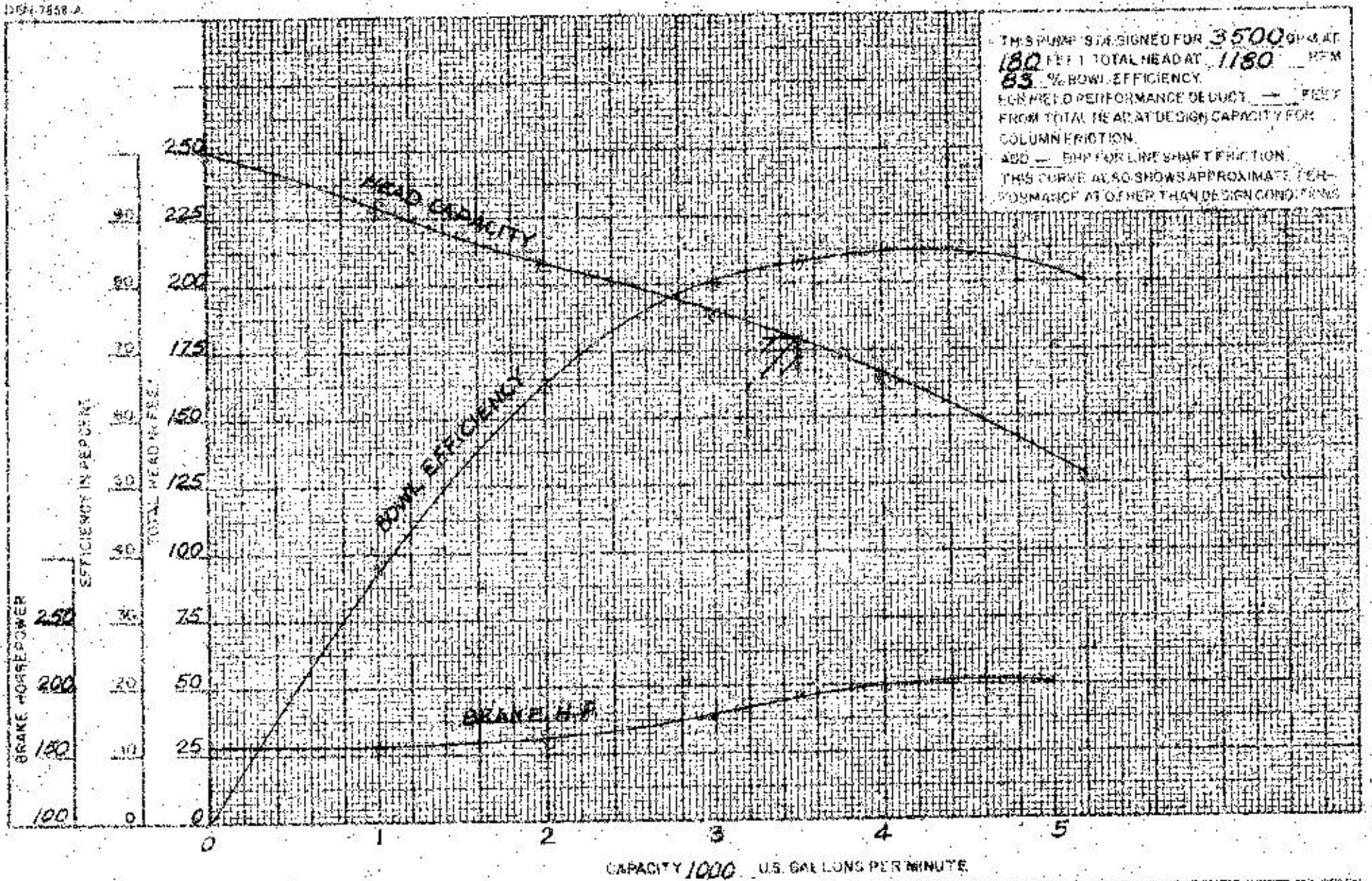


IMPELLER	BOWL	15HM-340 PUMP	WORTHINGTON CORPORATION	1-7-65 DATE	VTP-12527 SERIAL NO.
IMP. DIA.	125 HP MOTOR DRIVER	6 NO. OF STAGES	VERTICAL PUMP DIVISION	CUST. NO.	OTP-24334 ORDER NO.
TEST NO.	1160 R.P.M.	E.E. Jackson DRAWN BY	DENVER, COLORADO, U.S.A. ALHAMBRA, CALIFORNIA, U.S.A.	QUOTE NO.	DEN-15745 CURVE NO.

HS, # 2-3

DSN-7558-A

THIS PUMP IS DESIGNED FOR 3500 GPM AT 180 FEET TOTAL HEAD AT 1180 RPM
83 % BOWL EFFICIENCY.
FOR FIELD PERFORMANCE DEDUCT — FEET FROM TOTAL HEAD AT DESIGN CAPACITY FOR COLUMN FRICTION.
ADD — BHP FOR LINE SHAFT FRICTION.
THIS CURVE ALSO SHOWS APPROXIMATE PERFORMANCE AT OTHER THAN DESIGN CONDITIONS.

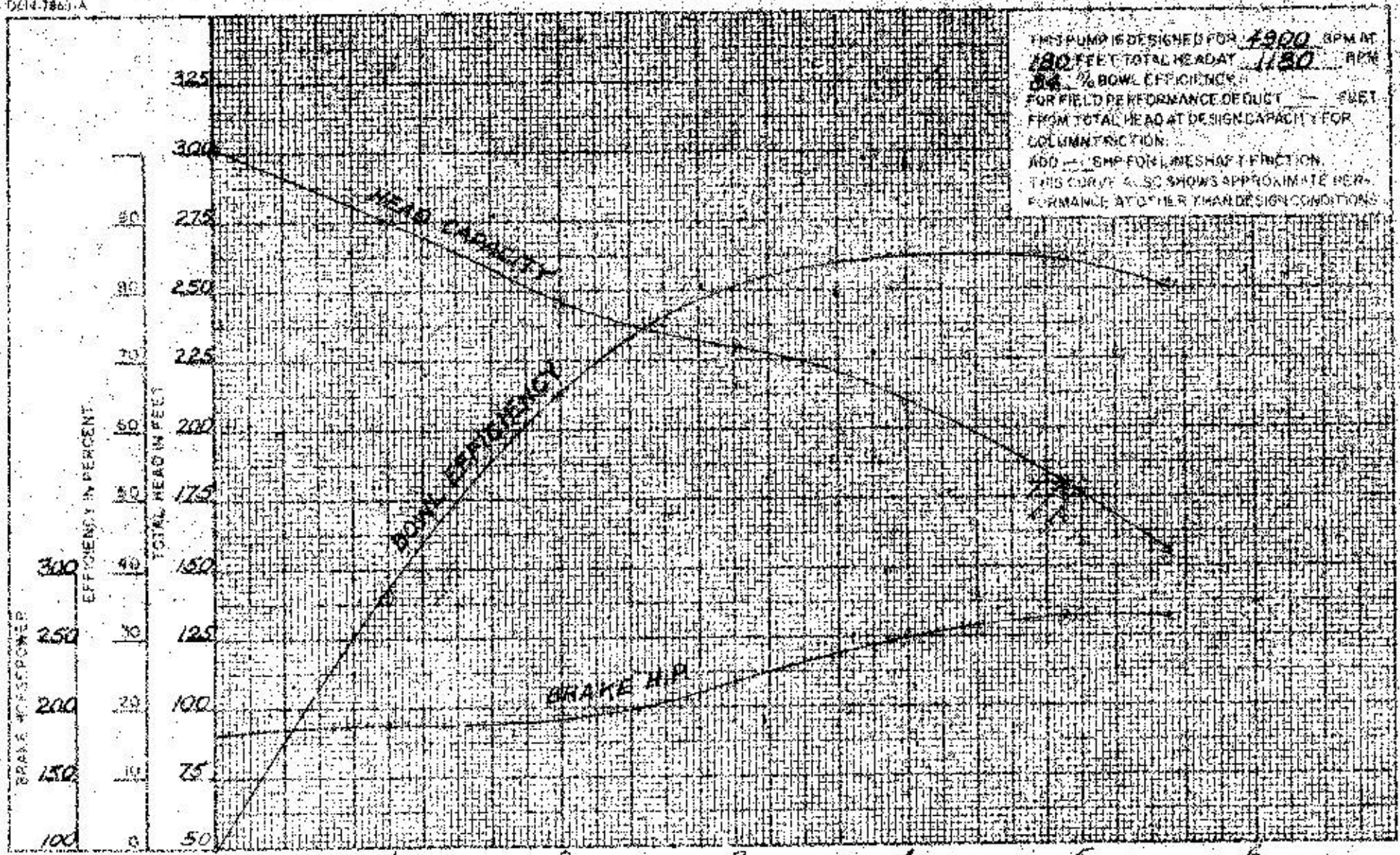


CAPACITY 1000 U.S. GALLONS PER MINUTE

IMPELLER	BOWL	24 M 425-W PUMP	WORTHINGTON CORPORATION	1-8-65 DATE	VTP-12528-29 SERIAL NO.
SHP. DIA.	200 HP MOTOR DRIVER	2 NO. OF STAGES	VERTICAL PUMP DIVISION	CUST NO.	DTP-24335 ORDER NO.
TEST NO.	1150 R.P.M.	DRAWN BY	DENVER, COLORADO, U.S.A. ALHAMBRA, CALIFORNIA, U.S.A.	QUOTE NO.	DEN-15754 CURVE NO.

H.S. # 4

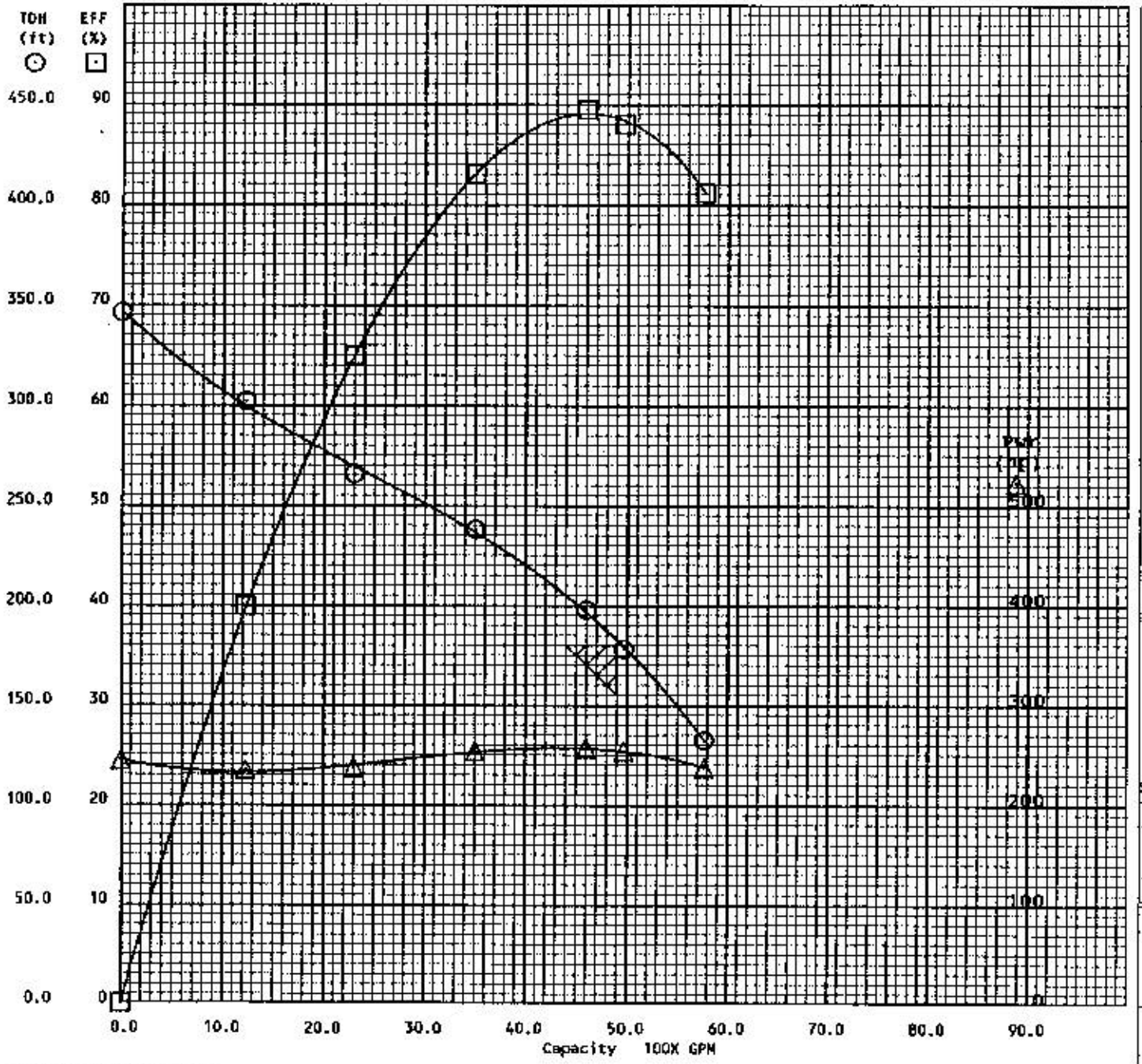
D014-7861-A



CAPACITY 1000 U.S. GALLONS PER MINUTE

IMPELLER	BOWL	24 M 425 - W PUMP	WORTHINGTON CORPORATION	1-11-65 DATE	VTP-12590 SERIAL NO.
IMP DIA	300 H.P. MOTOR DRIVER	2 NO. OF STAGES	VERTICAL PUMP DIVISION	CUST NO.	DTP-24336 ORDER NO.
TEST NO.	1180 R.P.M.	DRAWN BY	DENVER, COLORADO, U.S.A. ALHAMBRA, CALIFORNIA, U.S.A.	QUOTE NO.	DEN-15755 CURVE NO.

High Service #5 Pump



DRESSER PUMP DIVISION
DRESSER INDUSTRIES INC.
PUMP TEST DATA

RPM	GPM	TDH	BHP	EFF
1773.0	4959.5	177.6	252.7	88.0
1776.0	5772.2	132.2	237.5	81.1
1773.0	4591.6	197.2	255.8	89.4
1773.0	3497.9	237.3	252.4	83.0
1775.0	2295.8	265.7	237.2	65.0
1775.0	1227.2	301.8	234.6	39.9
1773.0	0.0	345.3	243.5	0.0

I CERTIFY THAT WITHIN THE ACCURACY OF TEST INSTRUMENTATION THIS TEST REPRESENTS THE PERFORMANCE OF 18H500-2 PUMP # TVU100922-1

James Bin

SP.GR.:1

CASING DATA		
CAST IRON		
MATERIAL	FINISH	TONGUE

IMPELLER DATA		
BRONZE	1A	12X.12X2.00
MATERIAL	FINISH	DISC. TIPS
VW30499		11.21
PATT.NO.	COMB.NO.	DIA

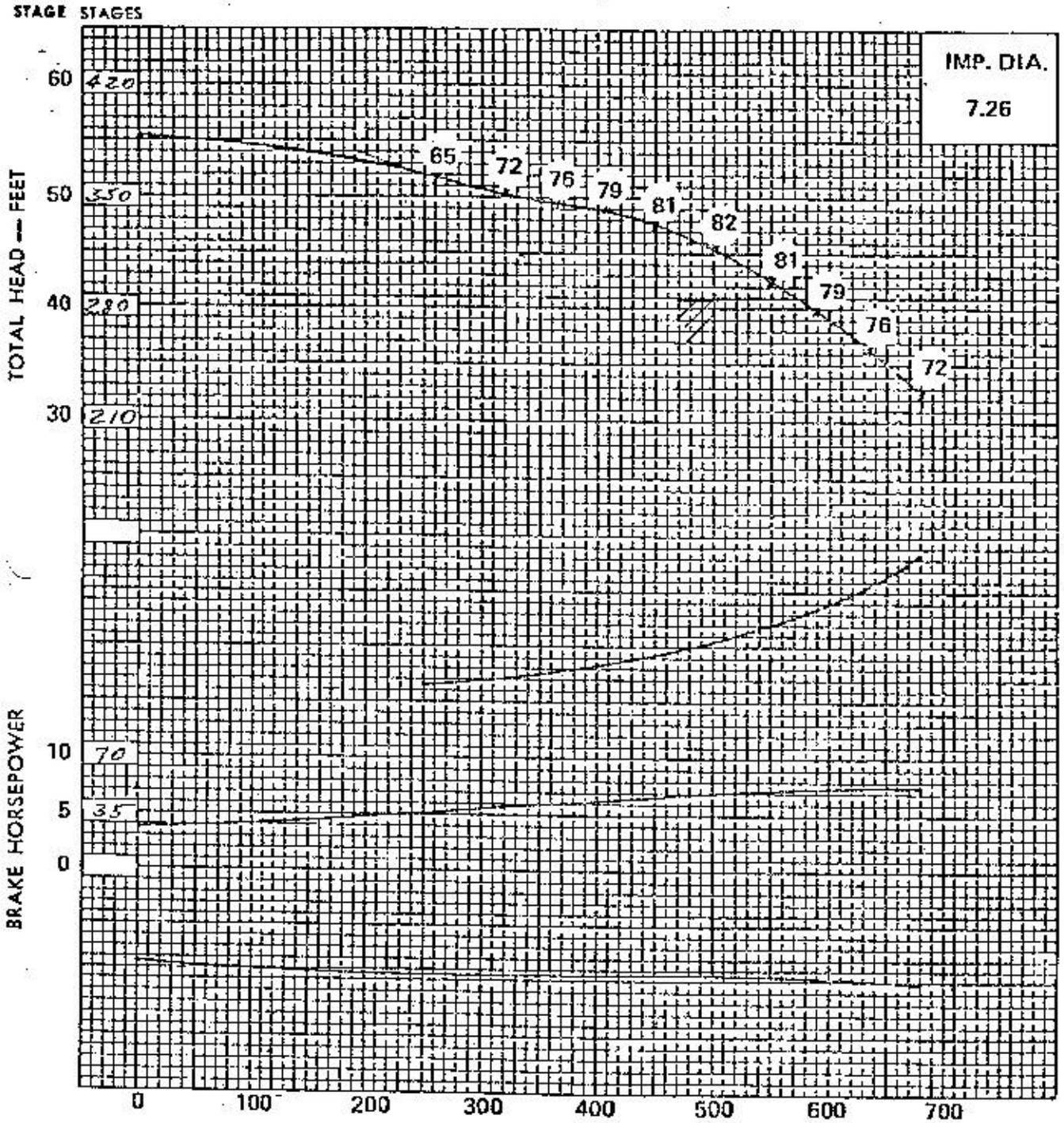
WORTHINGTON 18H500-2	1	TVU100922	TVU-100922-1	3/26/93	STA		200/1800	85	1775	E-231526
PUMP	STAGES	ORDER NO.	SERIAL NO.	DATE TESTED	TEST	APPROVED	TEST DRIVER	VENTURI	PLOTTED RPM	CURVE NO.

SECTION 8100
CURVE NO. 18-077

LAYNE & BOWLER, INC.
MEMPHIS, TENN.

BOWL 9 BEH
STAGES 7 INITIAL, 8 FOR
RPM 1750

ONE STAGE | 7 | STAGES



CUSTOMER: City of Traverse City	CUSTOMER NO:	LIQUID: H_2O
NAME: Huron Hills Water Syst.	REF JOB NO:	GPM: 500
LOCATION:	REF QUOTE NO:	TDH: 285
APPLICATION:	SALES ORDER NO:	EFF.: 81.5 W-W = 72.6
CONSULTING ENGR: Richards Assoc.	PUMP SERIAL NO:	BHP: 44.5
FOR APPROVAL:		SP. GR.: 1.0
CERTIFIED:		Motor Eff F.L. 89% - 3% = 86%

Model: VIC-CLTM	Size: 9RCHC	60Hz	RPM: 1770	Stages: 7

Job/Inq.No. : TRAVERSE CITY
End User : LAYNE CHRISTENSEN COMPANY
Item/Equip.No. : ITEM 001
Service : Traverse City
Order No. :

Purchaser : LAYNE CHRISTENSEN COMPANY
Issued by : Alan Ross
Quotation No. : AR12-01-03 01

Rev. : 0
Date : 01/26/2012

Certified By :

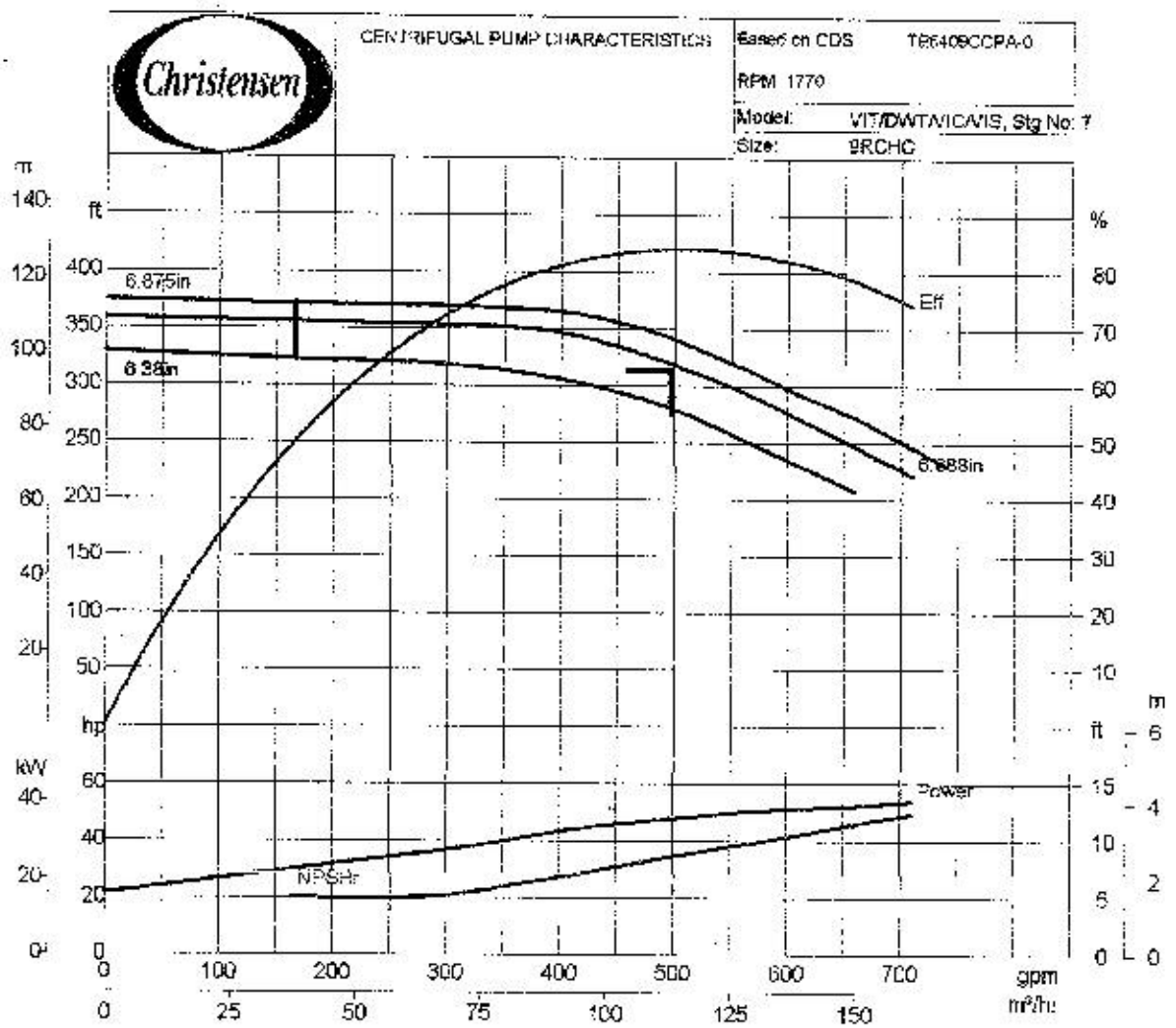
Operating Conditions

Liquid:	
Temp.:	70.0 deg F
S.G./Visc.:	1.000/1.000 cp
Flow:	500.0 gpm
TDH:	316.0 ft
NPSHa:	20.0 ft
Solid size:	
Vapor Press:	

Pump Performance

Published Efficiency:	85.1 %	Suction Specific Speed:	7,660 gpm(US) ft
Rated Pump Efficiency:	84.2 %	Min. Hydraulic Flow:	165.9 gpm
Rated Total Power:	47.40 hp	Min. Thermal Flow:	N/A
Non-Overloading Power:	53.6 hp (@ R.O. Flow: 708.4 gpm)	Imp. Dia. First 1 Stg(s):	6.6875 in
Shut off Head:	358.4 ft	Imp. Dia. Addt'l Stg(s):	6.6875 in
NPSHr:	6.6 ft	Max. Solids Size:	0.0000 in
Bowl Material:	Cast iron with glass enamel	Thrust K factor:	4.90
Impeller Material:	Bronze		

Notes: 1. Bowl Performance Curve based on Pumping Clear, non-Aerated Water. Rated Point only is guaranteed.



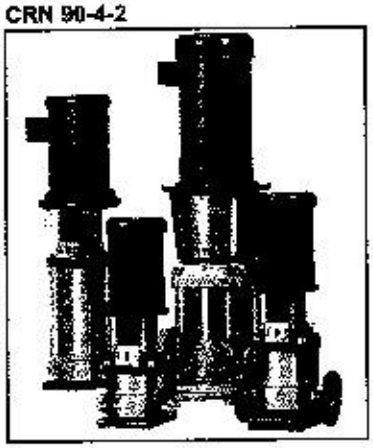
GRUNDFOS

Company name: Integrated Controls Inc
Created by: Jay Norris
Phone: 231-941-1030
Fax: 231-941-5380
Date: 2/3/06

Project: Wayne Hill Booster
Reference number: -

Client: Morgan Farms LLC
Client number: -
Contact: Arms & Cole

Position	Count	Description	Unit price
	1	**CRN 90-4-2**	On request



Product photo could vary from the actual product

Product No.: 96458308
Vertical, non-self-priming, multistage, in-line, centrifugal pump for installation in pipe systems and mounting on a foundation.

The pump has the following characteristics:

- Impellers, intermediate chambers and outer sleeve are made of

Stainless steel DIN W.-Nr. 1.4401 DIN W.-Nr..

- Pump head cover and base are made of

Stainless steel DIN W.-Nr. 1.4408 DIN W.-Nr..

- The shaft seal has assembly length according to DIN 24960.
- Power transmission is via cast iron split coupling.
- Pipework connection is via ANSI flanges/couplings.

The motor is a 3-phase AC motor.

Liquid:

Liquid temperature range:	32 .. 194 °F

Technical:

Speed for pump data:	3550 rpm
Rated flow:	440.3 US GPM
Rated head:	375 ft
Type of shaft seal:	KUBV
Approvals on motor nameplate:	UL Recognized Component, CSA

Materials:

Material, pump housing:	Stainless steel 1.4408 DIN W.-Nr.

930 DUELL ROAD
TRAVERSE CITY, MI 49686

(231) 941-1030
WWW.ICIPROCESS.COM

GRUNDFOS

Company name: Integrated Controls Inc
Created by: Jay Norris
Phone: 231-941-1030
Fax: 231-941-5380
Date: 2/3/06

Project: Wayne Hill Booster
Reference number: -

Client: Morgan Farms LLC
Client number: -
Contact: Arms & Cole

Position	Count	Description		Unit price
		Material, impeller:	316 LN AISI Stainless steel 1.4401 DIN W.-Nr. 316 AISI	
		Installation:		
		Maximum ambient temperature:	104 °F	
		Max pressure at stated temp:	363 / 194 psi/°F	
		Standard, pipe connection:	ANSI	
		Size, pipe connection:	4"	
		Pressure stage, pipe connec.:	300 Lb.	
		Flange size for motor:	324TC	
		Electrical data:		
		Motor type:	Baldor, ODP	
		P2 :	60 HP	
		Mains frequency:	60 Hz	
		Rated voltage:	3 x 230 / 460 V	
		Service factor:	1.15	
		Rated current:	140 / 70 A	
		Starting current:	914 / 457 A	
		Cos phi - power factor:	0,87	
		Rated speed:	3550 rpm	
		Full load motor efficiency:	91,7 %	
		Insulation class (IEC 85):	F	

930 DUELL ROAD
TRAVERSE CITY, MI 49686

(231) 941-1030
WWW.ICIPROCESS.COM

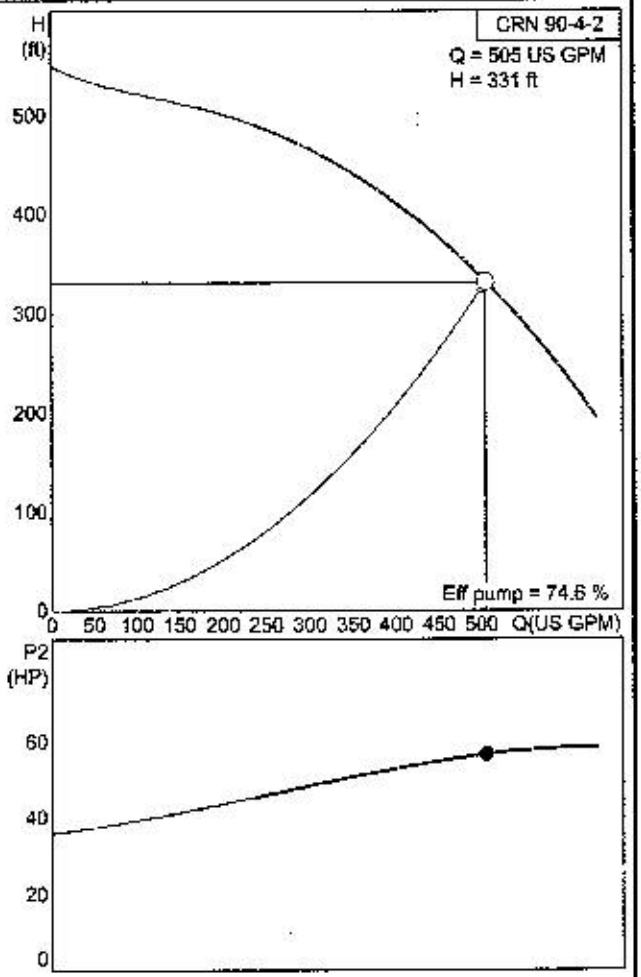
GRUNDFOS

Company name: Integrated Controls Inc
Created by: Jay Norris
Phone: 231-941-1030
Fax: 231-941-5380
Date: 2/3/06

Project: Wayne Hill Booster
Reference number: -
Position:

Client: Morgan Farms LLC
Client number: -
Contact: Arms & Cole

Description	Value
Product name:	CRN 90-4-2 A-G-G-V KUBV
Product Number:	96458308
EAN number:	5700394628921
Technical:	
Speed for pump data:	3550 rpm
Rated flow:	440.3 US GPM
Rated head:	375 ft
Impellers:	4
Impeller reduc.:	2
Type of shaft seal:	KUBV
Approvals on motor nameplate:	UL Recognized Component, CSA
Stages:	4
Pump version:	A
Model:	A
Materials:	
Material, pump housing:	Stainless steel 1.4408 DIN W.-Nr. 316 LN AISI
Material, impeller:	Stainless steel 1.4401 DIN W.-Nr. 316 AISI
Material code:	G
Code for rubber:	V
Installation:	
Maximum ambient temperature:	104 °F
Max pressure at stated temp:	363 / 194 psi/°F
Standard, pipe connection:	ANSI
Connect code:	G
Size, pipe connection:	4"
Pressure stage, pipe connec.:	300 Lb.
Flange size for motor:	324TC
Liquid:	
Liquid temperature range:	32 .. 194 °F
Electrical data:	
Motor type:	Baldor, ODP
P2:	60 HP
KVA code:	G
Mains frequency:	60 Hz
Rated voltage:	3 x 230 / 460 V
Service factor:	1.15
Rated current:	140 / 70 A
Starting current:	914 / 457 A
Load current:	161 / 80.5 A
Cos phi - power factor:	0,87
Rated speed:	3550 rpm
Full load motor efficiency:	91,7 %
Insulation class (IEC 85):	F
Motor protection:	None
Motor Number:	84Z03368



930 DUFFY ROAD
TRAVERSE CITY, MI 49686
(231) 941-1030
WWW.ICIPROCESS.COM

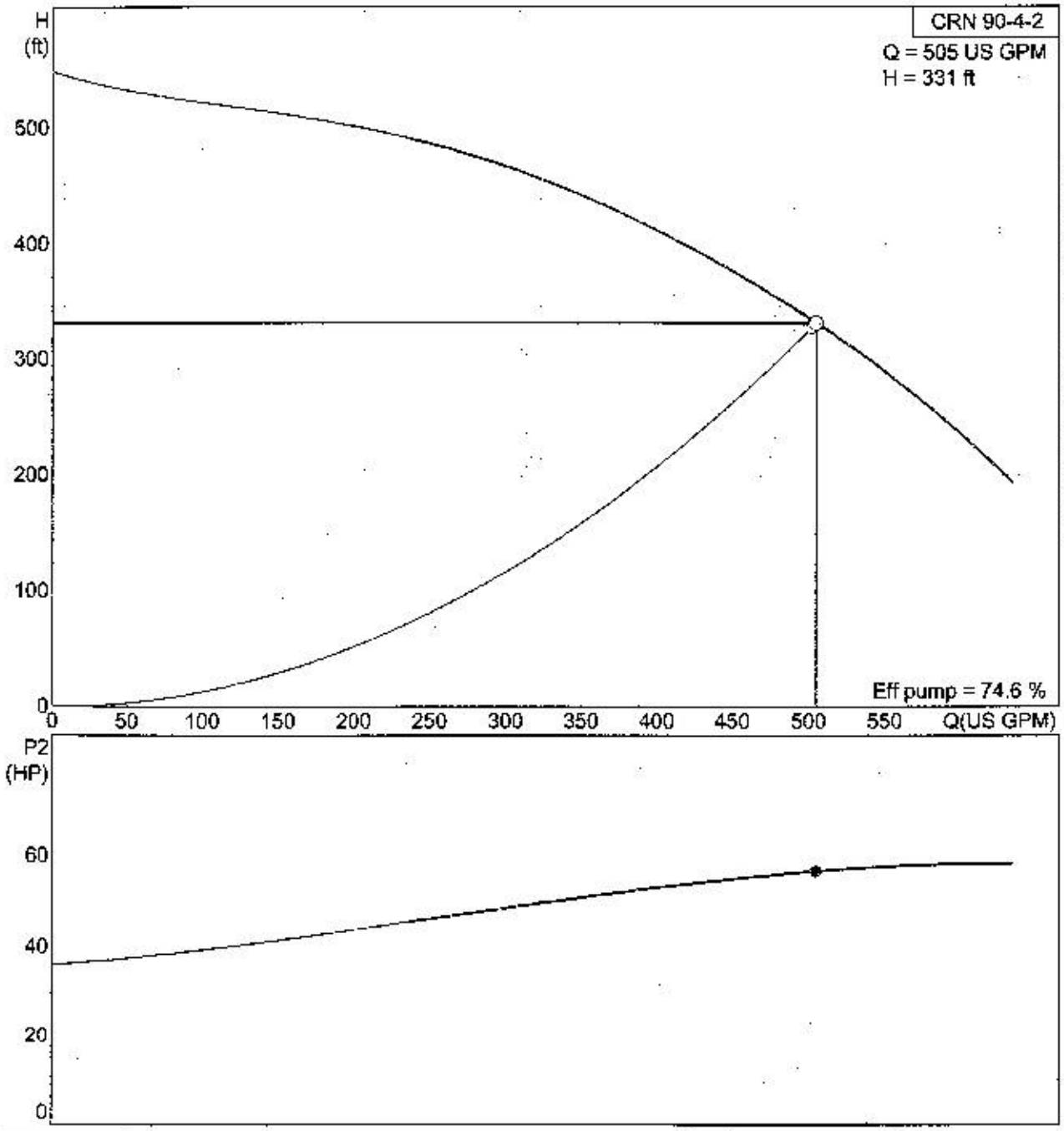
GRUNDFOS

Company name: Integrated Controls Inc
Created by: Jay Norris
Phone: 231-941-1030
Fax: 231-941-5380
Date: 2/3/06

Project: Wayne Hill Booster
Reference number: -
Position:

Client: Morgan Farms LLC
Client number: -
Contact: Arms & Cole

96458308 CRN 90-4-2



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GRUNDFOS 3/6

APPENDIX E:
INVENTORY OF SYSTEM WATER MAINS

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-17	6	495	Cast Iron	1966
WM-19	6	13	Cast Iron	1947
WM-20	16	26	Cast Iron	1947
WM-24	16	9	Cast Iron	1947
WM-25	16	415	Cast Iron	1947
WM-29	12	3	Ductile Iron	1990
WM-31	6	24	Cast Iron	1966
WM-32	6	24	Cast Iron	1966
WM-33	6	43	Cast Iron	1966
WM-34	6	42	Cast Iron	1966
WM-47	6	53	Cast Iron	1947
WM-48	6	697	Cast Iron	1966
WM-58	6	427	Cast Iron	1966
WM-59	6	21	Cast Iron	1966
WM-65	6	397	Cast Iron	1966
WM-66	6	3	Cast Iron	1966
WM-67	6	548	Cast Iron	1966
WM-68	6	38	Cast Iron	1966
WM-82	6	11	Cast Iron	1970
WM-83	6	3	Cast Iron	1970
WM-84	6	23	Cast Iron	1970
WM-85	6	404	Cast Iron	1966
WM-86	6	22	Cast Iron	1966
WM-87	6	25	Cast Iron	1970
WM-90	6	415	Cast Iron	1970
WM-91	6	45	Cast Iron	1970
WM-92	6	348	Cast Iron	1966
WM-94	6	395	Cast Iron	1966
WM-98	6	4	Cast Iron	1966
WM-99	6	735	Cast Iron	1966
WM-101	6	11	Cast Iron	1970
WM-102	6	25	Cast Iron	1966
WM-103	6	13	Cast Iron	1970
WM-105	16	19	Cast Iron	1947
WM-107	6	2	Cast Iron	1970
WM-114	6	10	Cast Iron	1970
WM-116	6	25	Cast Iron	1966
WM-117	6	6	Cast Iron	1966
WM-129	6	24	Cast Iron	1966
WM-131	6	343	Cast Iron	1966
WM-134	6	2	Cast Iron	1966

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-139	6	18	Cast Iron	1966
WM-141	6	43	Cast Iron	1966
WM-144	4	62	Cast Iron	1966
WM-145	6	18	Cast Iron	1966
WM-146	6	2	Cast Iron	1966
WM-147	6	510	Cast Iron	1970
WM-148	6	54	Cast Iron	1970
WM-150	8	10	Cast Iron	1970
WM-156	8	6	Cast Iron	1970
WM-157	8	382	Cast Iron	1970
WM-158	4	359	Cast Iron	1966
WM-172	4	24	Cast Iron	1966
WM-178	6	13	Cast Iron	1966
WM-179	6	7	Cast Iron	1966
WM-181	8	14	Cast Iron	1970
WM-184	8	8	Cast Iron	1970
WM-187	8	7	Cast Iron	1966
WM-188	8	415	Cast Iron	1966
WM-191	6	5	Cast Iron	1966
WM-207	4	18	Cast Iron	1966
WM-208	6	439	Cast Iron	1966
WM-209	6	423	Cast Iron	1966
WM-225	6	6	Cast Iron	1964
WM-227	6	45	Cast Iron	1964
WM-228	6	6	Cast Iron	
WM-236	12	3	Cast Iron	1988
WM-237	16	173	Cast Iron	1947
WM-238	16	235	Cast Iron	1947
WM-239	6	16	Cast Iron	1966
WM-241	6	18	Cast Iron	1966
WM-254	12	623	Ductile Iron	1988
WM-271	12	193	Ductile Iron	1988
WM-272	12	3	Ductile Iron	1988
WM-274	6	245	Cast Iron	1955
WM-278	6	37	Ductile Iron	1988
WM-279	6	3	Ductile Iron	1988
WM-280	6	6	Cast Iron	1955
WM-281	6	9	Cast Iron	1966
WM-286	6	3	Ductile Iron	1988
WM-290	6	2	Cast Iron	
WM-293	6	4	Cast Iron	1955

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-295	6	7	Cast Iron	1955
WM-306	6	327	Cast Iron	1966
WM-307	8	378	Ductile Iron	2011
WM-309	8	5	Ductile Iron	2011
WM-312	8	24	Ductile Iron	2011
WM-313	8	28	Ductile Iron	2014
WM-314	6	362	Cast Iron	1966
WM-315	6	5	Cast Iron	1966
WM-316	6	368	Cast Iron	1966
WM-317	6	5	Cast Iron	1966
WM-320	6	12	Cast Iron	1966
WM-322	6	360	Cast Iron	1966
WM-323	6	3	Cast Iron	1966
WM-332	6	5	Cast Iron	1966
WM-333	6	10	Cast Iron	1966
WM-335	6	366	Cast Iron	1966
WM-338	6	23	Cast Iron	1966
WM-339	6	29	Cast Iron	1966
WM-341	6	14	Cast Iron	1966
WM-354	6	13	Cast Iron	1966
WM-356	10	381	Cast Iron	1966
WM-357	6	39	Cast Iron	1966
WM-358	10	17	Cast Iron	1966
WM-368	6	2	Cast Iron	1966
WM-369	6	373	Cast Iron	1966
WM-372	6	382	Cast Iron	1966
WM-373	6	431	Cast Iron	1966
WM-374	6	32	Cast Iron	1966
WM-377	6	417	Cast Iron	1966
WM-380	6	27	Cast Iron	1956
WM-382	6	31	Cast Iron	1966
WM-387	6	32	Cast Iron	1966
WM-392	8	570	Ductile Iron	2011
WM-393	8	13	Ductile Iron	2011
WM-396	8	31	Ductile Iron	2011
WM-399	8	49	Ductile Iron	2011
WM-405	8	651	Ductile Iron	2011
WM-411	8	54	Ductile Iron	2011
WM-413	8	18	Ductile Iron	2011
WM-417	6	6	Cast Iron	2011
WM-428	6	13	Cast Iron	2011

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-430	6	386	Cast Iron	1966
WM-431	6	10	Cast Iron	2011
WM-434	8	53	Ductile Iron	2011
WM-444	6	550	Cast Iron	1931
WM-446	6	614	Cast Iron	1966
WM-452	6	20	Cast Iron	1931
WM-458	6	75	Cast Iron	1966
WM-459	6	316	Cast Iron	1966
WM-460	6	432	Cast Iron	1966
WM-469	6	66	Cast Iron	1966
WM-471	6	3	Cast Iron	1966
WM-472	6	345	Cast Iron	1966
WM-488	10	279	Cast Iron	1966
WM-490	10	4	Cast Iron	1966
WM-491	6	12	Cast Iron	1966
WM-494	6	60	Cast Iron	1966
WM-496	6	59	Ductile Iron	1961
WM-498	6	269	Cast Iron	1966
WM-509	6	338	Cast Iron	1966
WM-510	6	53	Cast Iron	1966
WM-511	6	8	Cast Iron	1966
WM-513	6	67	Cast Iron	1950
WM-523	6	44	Cast Iron	1966
WM-527	6	162	Ductile Iron	1966
WM-532	6	23	Cast Iron	1961
WM-533	6	267	Cast Iron	1961
WM-535	6	220	Cast Iron	1966
WM-540	6	14	Ductile Iron	1961
WM-543	6	216	Cast Iron	1961
WM-547	6	66	Cast Iron	1966
WM-548	6	390	Cast Iron	1966
WM-549	6	5	Cast Iron	1966
WM-550	6	9	Cast Iron	1966
WM-553	6	46	Cast Iron	1961
WM-555	6	254	Cast Iron	1966
WM-556	6	147	Cast Iron	1966
WM-558	6	43	Cast Iron	1966
WM-568	6	49	Cast Iron	1966
WM-576	6	392	Cast Iron	1961
WM-578	6	12	Cast Iron	1966
WM-581	6	34	Cast Iron	1966

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-582	6	21	Cast Iron	1961
WM-583	6	9	Cast Iron	1961
WM-584	6	23	Cast Iron	1961
WM-587	6	322	Cast Iron	1966
WM-593	10	45	Cast Iron	1955
WM-598	4	333	Cast Iron	1966
WM-600	6	68	Cast Iron	1966
WM-602	12	5	Cast Iron	1966
WM-603	6	524	Cast Iron	1966
WM-604	12	45	Cast Iron	1966
WM-607	12	11	Cast Iron	1966
WM-608	12	6	Cast Iron	1966
WM-609	12	10	Cast Iron	1966
WM-610	12	6	Cast Iron	1966
WM-614	6	207	Cast Iron	1931
WM-616	6	12	Cast Iron	1966
WM-617	6	54	Cast Iron	1931
WM-629	12	172	Cast Iron	1947
WM-630	12	53	Cast Iron	1947
WM-637	16	32	Ductile Iron	1950
WM-639	12	15	Ductile Iron	1947
WM-641	12	14	Ductile Iron	1947
WM-649	6	497	Ductile Iron	1966
WM-652	4	46	Ductile Iron	1966
WM-653	4	344	Cast Iron	1966
WM-657	4	12	Ductile Iron	1966
WM-670	6	42	Ductile Iron	1966
WM-672	4	78	Ductile Iron	1966
WM-700	6	2	Cast Iron	1966
WM-701	6	2	Cast Iron	1966
WM-702	6	12	Cast Iron	
WM-703	6	335	Cast Iron	
WM-711	6	421	Cast Iron	1966
WM-715	6	35	Cast Iron	1966
WM-716	16	12	Ductile Iron	2011
WM-717	16	401	Cast Iron	1947
WM-721	6	378	Cast Iron	1956
WM-724	6	410	Cast Iron	1966
WM-725	6	22	Cast Iron	1966
WM-726	6	4	Cast Iron	1966
WM-727	6	278	Cast Iron	1950

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-728	6	56	Ductile Iron	1966
WM-730	6	4	Cast Iron	1966
WM-733	16	19	Ductile Iron	1950
WM-736	16	254	Ductile Iron	1950
WM-739	16	38	Ductile Iron	1950
WM-747	6	5	Ductile Iron	1955
WM-748	6	11	Ductile Iron	1955
WM-749	6	244	Ductile Iron	1955
WM-750	6	99	Ductile Iron	1955
WM-753	6	13	Ductile Iron	1955
WM-754	6	58	Ductile Iron	1955
WM-758	6	7	Cast Iron	1966
WM-759	6	449	Cast Iron	1966
WM-761	6	439	Ductile Iron	1955
WM-771	6	85	Ductile Iron	1971
WM-777	6	61	Ductile Iron	1971
WM-786	6	69	Cast Iron	1948
WM-787	6	527	Cast Iron	1966
WM-789	6	5	Cast Iron	1948
WM-790	6	17	Cast Iron	1948
WM-791	6	624	Cast Iron	1948
WM-793	10	620	Cast Iron	1955
WM-803	6	4	Cast Iron	1948
WM-804	6	18	Cast Iron	1948
WM-805	6	405	Cast Iron	1966
WM-807	6	23	Cast Iron	1948
WM-808	6	47	Cast Iron	1966
WM-810	6	23	Cast Iron	1966
WM-811	6	365	Cast Iron	1966
WM-820	6	95	Cast Iron	
WM-821	6	180	Cast Iron	1966
WM-830	6	42	Cast Iron	1966
WM-831	10	22	Cast Iron	1955
WM-832	10	44	Cast Iron	1955
WM-834	6	24	Cast Iron	1966
WM-838	10	461	Cast Iron	1948
WM-839	10	198	Cast Iron	1948
WM-846	10	427	Cast Iron	1955
WM-847	10	359	Cast Iron	1955
WM-848	10	23	Cast Iron	1955
WM-849	10	44	Cast Iron	1955

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-851	10	46	Cast Iron	1948
WM-852	6	21	Cast Iron	1948
WM-853	10	2	Cast Iron	1948
WM-855	12	1	Cast Iron	1966
WM-856	6	349	Cast Iron	1943
WM-857	6	15	Cast Iron	1966
WM-858	10	308	Cast Iron	1955
WM-861	6	521	Cast Iron	1948
WM-862	6	6	Cast Iron	1948
WM-871	6	524	Cast Iron	1966
WM-872	6	67	Cast Iron	1966
WM-873	12	368	Cast Iron	1966
WM-874	12	422	Cast Iron	1966
WM-875	6	518	Cast Iron	1966
WM-876	6	8	Cast Iron	1966
WM-879	6	521	Cast Iron	1966
WM-882	6	65	Cast Iron	1966
WM-883	6	5	Cast Iron	1966
WM-889	6	75	Cast Iron	1966
WM-893	6	43	Cast Iron	1966
WM-894	6	23	Cast Iron	1966
WM-900	6	3	Cast Iron	1966
WM-904	10	5	Cast Iron	1966
WM-906	10	11	Cast Iron	1966
WM-907	10	14	Cast Iron	1966
WM-910	6	37	Cast Iron	1966
WM-911	10	4	Cast Iron	1966
WM-915	6	5	Cast Iron	1966
WM-916	6	522	Cast Iron	1948
WM-918	6	589	Cast Iron	1964
WM-919	6	65	Cast Iron	1948
WM-920	6	3	Cast Iron	1948
WM-924	12	12	Cast Iron	1966
WM-925	12	20	Cast Iron	1966
WM-927	12	5	Ductile Iron	2004
WM-929	12	64	Cast Iron	1966
WM-931	12	580	Cast Iron	1966
WM-934	6	11	Cast Iron	1948
WM-935	6	44	Cast Iron	1956
WM-936	6	18	Cast Iron	1956
WM-938	6	55	Cast Iron	1948

City of Traverse City
Inventory of Water Mains
11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-940	6	6	Cast Iron	1948
WM-941	6	519	Cast Iron	1948
WM-942	6	591	Cast Iron	1956
WM-943	12	405	Ductile Iron	1966
WM-944	12	1	Cast Iron	1966
WM-946	12	9	Cast Iron	1966
WM-947	6	1	Cast Iron	1956
WM-956	6	3	Cast Iron	1966
WM-959	6	456	Cast Iron	1966
WM-960	6	581	Cast Iron	1966
WM-963	6	3	Cast Iron	1964
WM-965	6	1	Cast Iron	1964
WM-966	6	7	Cast Iron	1964
WM-967	6	27	Cast Iron	1964
WM-969	6	1	Cast Iron	1964
WM-970	6	22	Cast Iron	1964
WM-971	6	359	Cast Iron	1964
WM-974	6	2	Cast Iron	1964
WM-1003	12	20	Ductile Iron	1994
WM-1004	12	510	Ductile Iron	1994
WM-1005	12	5	Ductile Iron	1994
WM-1007	6	129	Cast Iron	1964
WM-1010	6	10	Cast Iron	1964
WM-1012	6	10	Cast Iron	1964
WM-1013	6	52	Cast Iron	1964
WM-1015	12	139	Cast Iron	1966
WM-1017	12	580	Cast Iron	1966
WM-1019	12	12	Cast Iron	1994
WM-1020	12	580	Cast Iron	1994
WM-1021	12	5	Cast Iron	1994
WM-1026	6	1	Cast Iron	1954
WM-1027	6	32	Cast Iron	1954
WM-1028	6	490	Cast Iron	1954
WM-1029	6	7	Cast Iron	1954
WM-1030	6	60	Cast Iron	1954
WM-1031	6	94	Ductile Iron	1954
WM-1033	6	47	Ductile Iron	1966
WM-1035	6	3	Cast Iron	1966
WM-1036	6	427	Cast Iron	1966
WM-1037	6	12	Cast Iron	1966
WM-1038	6	51	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1039	10	1	Cast Iron	1966
WM-1040	10	1	Cast Iron	1966
WM-1041	6	526	Cast Iron	1966
WM-1044	6	3	Cast Iron	1966
WM-1045	6	71	Cast Iron	1966
WM-1046	6	518	Cast Iron	1966
WM-1048	6	3	Cast Iron	1966
WM-1053	6	22	Cast Iron	1966
WM-1054	6	4	Cast Iron	1966
WM-1058	6	10	Ductile Iron	1966
WM-1059	6	33	Cast Iron	1966
WM-1060	6	1	Cast Iron	1966
WM-1061	12	41	Cast Iron	1966
WM-1063	12	5	Ductile Iron	1966
WM-1067	8	1	Ductile Iron	1996
WM-1068	8	644	Ductile Iron	1996
WM-1069	8	3	Cast Iron	1996
WM-1070	8	525	Ductile Iron	1996
WM-1073	4	1	Ductile Iron	
WM-1074	4	8	Cast Iron	
WM-1078	10	3	Cast Iron	1955
WM-1081	10	41	Cast Iron	1955
WM-1082	10	4	Cast Iron	1955
WM-1085	6	44	Cast Iron	1966
WM-1089	8	25	Ductile Iron	1996
WM-1091	6	200	Cast Iron	1966
WM-1092	6	461	Cast Iron	1966
WM-1093	6	66	Cast Iron	1966
WM-1094	6	66	Cast Iron	1966
WM-1095	6	10	Cast Iron	1966
WM-1097	6	650	Cast Iron	1966
WM-1100	6	18	Cast Iron	1966
WM-1101	6	44	Cast Iron	1966
WM-1103	6	12	Cast Iron	1966
WM-1105	6	44	Cast Iron	1966
WM-1108	6	178	Cast Iron	1966
WM-1110	6	156	Cast Iron	1966
WM-1111	6	513	Cast Iron	1966
WM-1115	10	360	Cast Iron	1955
WM-1116	6	529	Cast Iron	1966
WM-1120	6	66	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1121	6	3	Cast Iron	1966
WM-1124	6	522	Cast Iron	1966
WM-1128	6	3	Cast Iron	1966
WM-1131	6	522	Cast Iron	1966
WM-1132	12	384	Cast Iron	1966
WM-1134	6	66	Cast Iron	1966
WM-1136	6	12	Cast Iron	1966
WM-1138	6	54	Cast Iron	1966
WM-1139	6	3	Cast Iron	1966
WM-1140	6	415	Cast Iron	1966
WM-1141	10	1	Cast Iron	1966
WM-1142	10	1	Cast Iron	1966
WM-1143	6	525	Cast Iron	1966
WM-1147	6	475	Cast Iron	1966
WM-1148	6	3	Cast Iron	1966
WM-1151	6	519	Cast Iron	1966
WM-1155	6	3	Cast Iron	1966
WM-1156	6	63	Cast Iron	1966
WM-1159	6	526	Cast Iron	1966
WM-1162	12	383	Cast Iron	1964
WM-1163	6	2	Cast Iron	1966
WM-1165	6	48	Cast Iron	1966
WM-1166	6	2	Cast Iron	1966
WM-1178	6	65	Cast Iron	1966
WM-1181	10	67	Cast Iron	1955
WM-1182	10	363	Cast Iron	1955
WM-1183	6	235	Cast Iron	1966
WM-1188	6	483	Cast Iron	1966
WM-1189	6	730	Cast Iron	1966
WM-1190	6	8	Cast Iron	1966
WM-1192	6	451	Cast Iron	1966
WM-1193	6	22	Cast Iron	1966
WM-1197	6	377	Cast Iron	1966
WM-1198	6	40	Cast Iron	1966
WM-1199	6	9	Cast Iron	1955
WM-1203	10	11	Cast Iron	1955
WM-1204	10	55	Cast Iron	1955
WM-1205	6	45	Cast Iron	1955
WM-1206	6	21	Cast Iron	1955
WM-1232	6	1	Cast Iron	1966
WM-1233	6	2	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1234	6	1	Ductile Iron	1966
WM-1235	8	176	Ductile Iron	2015
WM-1240	6	397	Cast Iron	1966
WM-1241	6	304	Ductile Iron	1966
WM-1242	8	1	Cast Iron	1996
WM-1244	12	762	Ductile Iron	1988
WM-1252	10	45	Cast Iron	1931
WM-1254	10	43	Cast Iron	1955
WM-1257	10	1	Cast Iron	1955
WM-1258	12	21	Cast Iron	1955
WM-1259	10	1	Cast Iron	
WM-1260	6	21	Cast Iron	1966
WM-1266	6	4	Cast Iron	1966
WM-1267	6	515	Cast Iron	1966
WM-1270	6	56	Cast Iron	1966
WM-1271	6	15	Cast Iron	1966
WM-1272	12	46	Cast Iron	1964
WM-1273	12	385	Cast Iron	1961
WM-1276	6	532	Cast Iron	1966
WM-1280	6	239	Cast Iron	1966
WM-1281	6	290	Cast Iron	1966
WM-1283	6	7	Cast Iron	1966
WM-1285	8	22	Cast Iron	1966
WM-1287	8	16	Ductile Iron	1966
WM-1288	6	48	Ductile Iron	1966
WM-1289	8	1	Ductile Iron	1966
WM-1290	8	526	Cast Iron	1966
WM-1291	8	413	Cast Iron	1966
WM-1292	8	4	Cast Iron	1966
WM-1293	8	67	Cast Iron	1966
WM-1296	8	371	Cast Iron	1966
WM-1310	12	332	Ductile Iron	1998
WM-1311	12	4	Poly Vinyl Chloride	1998
WM-1317	12	506	Ductile Iron	1998
WM-1318	12	9	Ductile Iron	1998
WM-1319	12	3	Ductile Iron	1998
WM-1323	8	6	Ductile Iron	1998
WM-1324	8	8	Ductile Iron	1998
WM-1327	8	29	Ductile Iron	1966
WM-1328	8	364	Cast Iron	1966
WM-1330	6	3	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1331	6	16	Cast Iron	1966
WM-1334	12	43	Cast Iron	1961
WM-1335	12	4	Cast Iron	1961
WM-1336	12	386	Cast Iron	1961
WM-1341	6	50	Cast Iron	1966
WM-1343	6	8	Cast Iron	1966
WM-1347	6	527	Cast Iron	1966
WM-1360	6	585	Cast Iron	1966
WM-1369	12	47	Cast Iron	1966
WM-1370	12	44	Cast Iron	1955
WM-1371	12	14	Cast Iron	1955
WM-1373	6	20	Cast Iron	1966
WM-1374	12	2	Cast Iron	1966
WM-1375	12	219	Cast Iron	1966
WM-1378	12	3	Ductile Iron	1998
WM-1381	12	3	Ductile Iron	1998
WM-1382	12	10	Ductile Iron	1998
WM-1383	12	25	Ductile Iron	1998
WM-1387	12	2	Ductile Iron	1998
WM-1388	6	3	Ductile Iron	2015
WM-1390	8	100	Ductile Iron	2015
WM-1391	12	48	Ductile Iron	1998
WM-1392	12	11	Ductile Iron	1998
WM-1393	12	29	Ductile Iron	1998
WM-1394	12	4	Ductile Iron	1998
WM-1400	12	62	Ductile Iron	1998
WM-1401	12	9	Ductile Iron	1998
WM-1406	12	29	Ductile Iron	1998
WM-1407	12	4	Ductile Iron	1998
WM-1410	12	3	Ductile Iron	1998
WM-1414	12	107	Ductile Iron	1998
WM-1415	12	17	Ductile Iron	1998
WM-1416	12	88	Ductile Iron	1998
WM-1417	12	4	Ductile Iron	1998
WM-1419	12	1	Ductile Iron	1998
WM-1425	12	2	Ductile Iron	1998
WM-1426	12	92	Ductile Iron	1998
WM-1428	12	55	Ductile Iron	1998
WM-1429	12	6	Ductile Iron	1998
WM-1430	12	8	Ductile Iron	1998
WM-1433	12	264	Cast Iron	1955

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1435	12	29	Cast Iron	1955
WM-1436	6	19	Cast Iron	1966
WM-1437	12	54	Cast Iron	1955
WM-1441	6	345	Cast Iron	1966
WM-1443	12	46	Cast Iron	1966
WM-1444	12	1	Cast Iron	1966
WM-1445	12	361	Cast Iron	1966
WM-1448	6	10	Cast Iron	1966
WM-1449	6	87	Cast Iron	1966
WM-1453	12	18	Cast Iron	1966
WM-1454	6	23	Cast Iron	1966
WM-1456	6	9	Cast Iron	1966
WM-1457	8	35	Cast Iron	1966
WM-1458	6	469	Cast Iron	1966
WM-1459	8	293	Cast Iron	1966
WM-1460	8	368	Cast Iron	1966
WM-1461	12	186	Cast Iron	1966
WM-1462	12	24	Cast Iron	1966
WM-1464	12	5	Cast Iron	1955
WM-1465	6	3	Cast Iron	1966
WM-1466	12	182	Cast Iron	1955
WM-1467	12	36	Cast Iron	1955
WM-1474	6	1	Cast Iron	
WM-1478	12	8	Cast Iron	1955
WM-1480	12	4	Ductile Iron	1998
WM-1483	12	10	Ductile Iron	1998
WM-1484	12	7	Ductile Iron	1998
WM-1495	12	157	Cast Iron	1966
WM-1497	12	21	Cast Iron	1955
WM-1498	12	43	Cast Iron	1955
WM-1511	12	2	Cast Iron	1966
WM-1513	16	41	Cast Iron	1955
WM-1514	16	2	Cast Iron	1955
WM-1515	16	48	Cast Iron	1955
WM-1516	16	62	Cast Iron	1955
WM-1517	16	61	Cast Iron	1955
WM-1520	16	51	Cast Iron	1955
WM-1529	12	15	Cast Iron	1961
WM-1530	12	8	Cast Iron	1961
WM-1531	6	4	Cast Iron	1966
WM-1532	6	6	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1533	12	409	Cast Iron	1955
WM-1535	6	637	Cast Iron	1966
WM-1538	12	197	Cast Iron	1955
WM-1546	8	1	Ductile Iron	1996
WM-1548	8	539	Ductile Iron	1996
WM-1549	12	15	Cast Iron	1955
WM-1550	12	13	Cast Iron	1955
WM-1562	12	8	Cast Iron	1955
WM-1563	6	18	Cast Iron	1966
WM-1566	12	31	Cast Iron	1955
WM-1570	6	3	Cast Iron	1966
WM-1571	6	192	Cast Iron	1966
WM-1572	12	220	Cast Iron	1955
WM-1573	12	169	Cast Iron	1955
WM-1581	8	17	Ductile Iron	2006
WM-1583	8	2	Ductile Iron	2006
WM-1585	8	5	Ductile Iron	2006
WM-1593	6	21	Cast Iron	1966
WM-1594	8	2	Cast Iron	1966
WM-1595	8	2	Cast Iron	1966
WM-1596	8	3	Ductile Iron	2015
WM-1597	8	1	Cast Iron	1966
WM-1599	6	37	Cast Iron	1966
WM-1600	8	7	Cast Iron	1966
WM-24069	8	15	Cast Iron	1966
WM-1602	8	4	Cast Iron	1966
WM-1603	8	5	Cast Iron	1966
WM-1604	8	7	Cast Iron	1966
WM-1605	8	8	Cast Iron	1966
WM-1606	8	14	Cast Iron	1966
WM-1607	6	27	Cast Iron	1966
WM-1608	6	1	Cast Iron	1966
WM-1609	6	19	Cast Iron	1966
WM-1611	8	14	Cast Iron	1966
WM-1612	8	1	Cast Iron	1966
WM-1613	8	345	Cast Iron	1966
WM-1614	8	361	Cast Iron	1966
WM-1616	6	194	Cast Iron	1966
WM-1618	6	1	Cast Iron	
WM-1619	6	573	Cast Iron	1967
WM-1622	6	4	Cast Iron	1967

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1626	8	304	Ductile Iron	1999
WM-1627	8	3	Ductile Iron	1999
WM-1628	8	11	Ductile Iron	1999
WM-1629	8	80	Ductile Iron	1999
WM-1630	8	4	Ductile Iron	1999
WM-1631	8	3	Ductile Iron	1999
WM-1632	8	53	Ductile Iron	1999
WM-1633	12	7	Cast Iron	1955
WM-1637	12	4	Cast Iron	1955
WM-1638	12	31	Cast Iron	1955
WM-1639	16	24	Cast Iron	1950
WM-1640	16	25	Cast Iron	1950
WM-1641	16	12	Cast Iron	1950
WM-1642	16	18	Cast Iron	1950
WM-1643	16	18	Cast Iron	1950
WM-1644	16	12	Cast Iron	1950
WM-1645	16	18	Cast Iron	1950
WM-1646	16	35	Cast Iron	1950
WM-1648	16	22	Cast Iron	1955
WM-1650	16	162	Cast Iron	1950
WM-1651	16	71	Cast Iron	1950
WM-1652	8	60	Cast Iron	1999
WM-1653	8	83	Ductile Iron	1999
WM-1654	8	7	Ductile Iron	1999
WM-1657	8	15	Ductile Iron	1999
WM-1658	8	2	Ductile Iron	1999
WM-1659	16	113	Cast Iron	1950
WM-1660	16	10	Ductile Iron	1950
WM-1665	6	4	Cast Iron	1966
WM-1666	6	4	Cast Iron	1966
WM-1667	6	2	Ductile Iron	1996
WM-1670	6	4	Ductile Iron	1996
WM-1671	8	6	Ductile Iron	1996
WM-1672	6	3	Cast Iron	1966
WM-1676	6	9	Cast Iron	1966
WM-1679	12	191	Cast Iron	1966
WM-1682	8	515	Cast Iron	1966
WM-1684	16	36	Cast Iron	1955
WM-1685	12	22	Cast Iron	1966
WM-1686	16	2	Cast Iron	1966
WM-1687	12	24	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1688	16	5	Cast Iron	1966
WM-1691	8	53	Ductile Iron	1996
WM-1692	8	18	Ductile Iron	1996
WM-1696	4	2	Cast Iron	1966
WM-1697	4	1	Cast Iron	1966
WM-1699	8	383	Cast Iron	1966
WM-1702	8	2	Ductile Iron	1996
WM-1703	8	2	Ductile Iron	1996
WM-1704	8	4	Ductile Iron	1996
WM-1705	8	3	Ductile Iron	1996
WM-1706	8	516	Ductile Iron	1996
WM-1708	8	57	Ductile Iron	1996
WM-1709	8	353	Ductile Iron	1996
WM-1713	6	17	Cast Iron	1966
WM-1714	6	51	Cast Iron	1966
WM-1715	8	44	Ductile Iron	1966
WM-1716	8	11	Ductile Iron	1966
WM-1718	6	534	Cast Iron	1966
WM-1720	6	521	Ductile Iron	1966
WM-1721	6	3	Ductile Iron	1966
WM-1722	6	421	Cast Iron	1966
WM-1723	10	7	Cast Iron	1955
WM-1724	10	369	Cast Iron	1955
WM-1727	6	51	Cast Iron	1966
WM-1728	6	15	Cast Iron	1966
WM-1729	10	10	Cast Iron	1955
WM-1730	10	42	Cast Iron	1955
WM-24047	6	304	Cast Iron	1966
WM-1732	6	213	Cast Iron	1966
WM-1733	6	6	Cast Iron	1966
WM-1736	6	2	Ductile Iron	1941
WM-1740	6	7	Cast Iron	1966
WM-1741	8	9	Cast Iron	1966
WM-1744	6	12	Cast Iron	1966
WM-1746	6	22	Cast Iron	1966
WM-1748	6	174	Cast Iron	1966
WM-1750	6	44	Cast Iron	1941
WM-1751	6	5	Cast Iron	1966
WM-1752	6	30	Cast Iron	1966
WM-1753	8	36	Cast Iron	1966
WM-1754	8	11	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1755	6	56	Cast Iron	1966
WM-1757	12	44	Cast Iron	1966
WM-1758	12	386	Cast Iron	1964
WM-1760	6	10	Cast Iron	1966
WM-1761	6	22	Cast Iron	1966
WM-1762	6	44	Cast Iron	1966
WM-1764	10	2	Cast Iron	1955
WM-1765	10	423	Cast Iron	1955
WM-1766	10	25	Cast Iron	1955
WM-1767	6	56	Cast Iron	1948
WM-1768	6	10	Cast Iron	1966
WM-1769	6	43	Cast Iron	1964
WM-1770	6	30	Cast Iron	1964
WM-1771	6	54	Cast Iron	1966
WM-1772	6	12	Cast Iron	1966
WM-1773	6	387	Cast Iron	1964
WM-1774	6	43	Cast Iron	1964
WM-1775	6	388	Cast Iron	1966
WM-1776	6	43	Cast Iron	1966
WM-1777	6	43	Cast Iron	1966
WM-1778	6	23	Cast Iron	1966
WM-1779	12	127	Cast Iron	1955
WM-1780	12	222	Cast Iron	1955
WM-1781	6	206	Cast Iron	1966
WM-1782	6	12	Cast Iron	1966
WM-1783	6	37	Cast Iron	1966
WM-1784	6	24	Cast Iron	1966
WM-1786	6	196	Cast Iron	1941
WM-1789	6	8	Cast Iron	1941
WM-1792	6	10	Cast Iron	1941
WM-1793	6	61	Ductile Iron	1941
WM-1796	6	79	Ductile Iron	1941
WM-1797	4	274	Ductile Iron	1966
WM-1799	4	46	Ductile Iron	1966
WM-1800	6	4	Ductile Iron	1941
WM-1801	6	98	Cast Iron	1966
WM-1802	6	400	Cast Iron	1966
WM-1805	6	12	Cast Iron	1931
WM-1807	6	13	Cast Iron	1966
WM-1809	6	42	Cast Iron	1966
WM-1810	6	11	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1811	6	254	Cast Iron	1966
WM-1814	6	47	Cast Iron	1966
WM-1816	6	178	Cast Iron	1931
WM-1818	6	11	Cast Iron	1966
WM-1819	6	52	Cast Iron	1966
WM-1823	8	37	Cast Iron	1966
WM-1826	8	498	Ductile Iron	2006
WM-1833	16	89	Cast Iron	1950
WM-1835	16	1	Cast Iron	1950
WM-1836	16	128	Cast Iron	1950
WM-1840	6	1	Cast Iron	1966
WM-1841	6	3	Cast Iron	1966
WM-1842	6	1	Cast Iron	1966
WM-1843	6	40	Cast Iron	1966
WM-1844	6	3	Cast Iron	1966
WM-1846	6	1	Cast Iron	1966
WM-1847	16	2	Cast Iron	1966
WM-1854	16	7	Cast Iron	1950
WM-1855	16	100	Cast Iron	1950
WM-1856	16	250	Cast Iron	1950
WM-1857	6	15	Cast Iron	1931
WM-1858	6	1	Cast Iron	1931
WM-1859	6	16	Cast Iron	1931
WM-1866	16	384	Ductile Iron	1950
WM-1868	16	8	Cast Iron	1947
WM-1869	16	23	Cast Iron	1947
WM-1871	6	3	Ductile Iron	1950
WM-1873	6	5	Ductile Iron	1950
WM-1875	16	8	Cast Iron	1950
WM-1876	16	18	Cast Iron	1950
WM-1878	16	1	Cast Iron	1950
WM-1879	16	35	Cast Iron	1950
WM-1882	16	190	Cast Iron	1947
WM-1883	16	362	Cast Iron	1947
WM-1884	6	53	Cast Iron	1966
WM-1885	6	13	Cast Iron	1931
WM-1886	16	24	Cast Iron	1947
WM-1887	16	298	Cast Iron	1947
WM-1888	4	5	Cast Iron	1966
WM-1889	6	3	Cast Iron	1966
WM-1899	4	489	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1900	4	1	Cast Iron	1966
WM-1903	6	1	Cast Iron	1966
WM-1908	6	1	Cast Iron	1931
WM-1909	6	2	Cast Iron	1931
WM-1910	6	4	Cast Iron	1931
WM-1911	16	31	Cast Iron	1950
WM-1912	16	295	Cast Iron	1950
WM-1915	6	7	Cast Iron	1966
WM-1920	6	32	Cast Iron	1966
WM-1923	6	10	Cast Iron	1966
WM-1924	6	4	Cast Iron	1966
WM-1926	6	5	Cast Iron	1966
WM-1927	6	70	Cast Iron	1966
WM-1928	6	248	Cast Iron	1931
WM-1929	6	8	Cast Iron	1931
WM-1935	6	4	Cast Iron	1966
WM-1936	6	1	Ductile Iron	1966
WM-1937	6	29	Ductile Iron	1966
WM-1938	6	14	Cast Iron	1966
WM-1939	6	1	Cast Iron	1966
WM-1940	6	1	Cast Iron	1966
WM-1941	6	5	Cast Iron	1966
WM-1943	6	592	Cast Iron	1966
WM-1945	6	5	Cast Iron	1966
WM-1948	6	57	Cast Iron	1966
WM-1949	6	11	Cast Iron	1976
WM-1950	6	132	Cast Iron	1976
WM-1951	6	800	Cast Iron	1966
WM-1955	6	13	Cast Iron	1966
WM-1956	6	23	Cast Iron	1966
WM-1957	6	32	Cast Iron	1966
WM-1963	8	12	Cast Iron	1966
WM-1965	6	47	Cast Iron	1966
WM-1966	8	14	Cast Iron	1966
WM-1967	8	44	Cast Iron	1966
WM-1969	6	298	Cast Iron	1966
WM-1971	8	331	Cast Iron	1966
WM-1972	8	328	Cast Iron	1966
WM-1974	6	6	Cast Iron	1966
WM-1975	6	303	Ductile Iron	1966
WM-1976	6	15	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-1977	6	29	Cast Iron	1966
WM-1980	6	1	Cast Iron	1966
WM-1981	6	125	Ductile Iron	1966
WM-1983	6	4	Cast Iron	1966
WM-1984	16	103	Cast Iron	1955
WM-1986	16	211	Cast Iron	1955
WM-1988	6	23	Cast Iron	1966
WM-1989	16	44	Cast Iron	1955
WM-1990	16	196	Cast Iron	1955
WM-1991	6	223	Cast Iron	1966
WM-1992	6	160	Cast Iron	1966
WM-1999	16	251	Cast Iron	1955
WM-2000	16	238	Cast Iron	1955
WM-2001	6	25	Cast Iron	1966
WM-2002	6	4	Cast Iron	1966
WM-2003	6	435	Cast Iron	1966
WM-2005	16	42	Cast Iron	1955
WM-2017	16	1	Ductile Iron	2002
WM-2018	16	5	Ductile Iron	
WM-2019	16	32	Ductile Iron	2002
WM-2020	16	8	Ductile Iron	2002
WM-2021	16	130	Ductile Iron	2002
WM-2022	16	10	Ductile Iron	2002
WM-2024	6	28	Cast Iron	1966
WM-2025	6	8	Cast Iron	1966
WM-2027	6	24	Cast Iron	1966
WM-2028	6	39	Cast Iron	1966
WM-2030	16	7	Ductile Iron	2002
WM-2034	16	4	Ductile Iron	2002
WM-2035	16	13	Ductile Iron	2002
WM-2037	16	5	Ductile Iron	2002
WM-2039	16	79	Ductile Iron	2002
WM-2040	16	89	Ductile Iron	2002
WM-2041	8	33	Ductile Iron	1966
WM-2044	16	10	Ductile Iron	2002
WM-2045	16	5	Ductile Iron	2002
WM-2048	16	3	Ductile Iron	2002
WM-2050	16	19	Ductile Iron	2002
WM-2052	16	197	Ductile Iron	2002
WM-2055	16	72	Ductile Iron	2002
WM-2056	6	2	Ductile Iron	2002

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-2058	6	3	Ductile Iron	2002
WM-2059	16	8	Ductile Iron	2002
WM-2060	16	18	Ductile Iron	2002
WM-2062	6	1	Ductile Iron	2002
WM-2064	8	37	Ductile Iron	1966
WM-2065	16	5	Ductile Iron	2002
WM-2066	6	10	Ductile Iron	2002
WM-2072	6	1	Ductile Iron	1966
WM-2073	6	251	Ductile Iron	1966
WM-2076	6	62	Cast Iron	1966
WM-2077	6	186	Cast Iron	1966
WM-2079	6	9	Cast Iron	1966
WM-2080	6	32	Cast Iron	1966
WM-2083	6	363	Cast Iron	1966
WM-2092	6	23	Ductile Iron	1966
WM-2093	16	353	Ductile Iron	1985
WM-2095	16	48	Ductile Iron	1985
WM-2096	16	13	Ductile Iron	1985
WM-2097	16	547	Cast Iron	1931
WM-2098	6	21	Cast Iron	1966
WM-2101	6	23	Cast Iron	1966
WM-2102	6	43	Cast Iron	1966
WM-2103	6	39	Cast Iron	1966
WM-2104	6	39	Cast Iron	1966
WM-2105	6	279	Cast Iron	1966
WM-24164	6	542	Cast Iron	1966
WM-2114	6	386	Cast Iron	1966
WM-2121	6	2	Ductile Iron	1966
WM-2126	6	11	Cast Iron	1966
WM-2127	6	4	Cast Iron	1966
WM-2129	6	14	Cast Iron	1966
WM-2130	10	260	Cast Iron	1955
WM-2132	6	2	Ductile Iron	2001
WM-2133	6	208	Cast Iron	1966
WM-2135	6	1	Ductile Iron	2001
WM-2136	10	3	Ductile Iron	2001
WM-2137	10	2	Ductile Iron	2001
WM-2532	10	72	Ductile Iron	2001
WM-2533	10	129	Ductile Iron	2001
WM-2538	6	545	Ductile Iron	1966
WM-2540	16	17	Cast Iron	1931

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-2542	10	5	Cast Iron	1964
WM-2543	10	417	Cast Iron	1964
WM-2544	6	19	Cast Iron	1966
WM-2545	6	525	Cast Iron	1966
WM-2547	6	7	Cast Iron	1966
WM-2548	6	522	Cast Iron	1966
WM-2549	6	380	Cast Iron	1966
WM-2550	10	397	Cast Iron	1938
WM-2552	10	30	Cast Iron	1964
WM-2553	10	27	Ductile Iron	1938
WM-2555	6	10	Cast Iron	1966
WM-2556	6	57	Cast Iron	1966
WM-2557	6	10	Ductile Iron	
WM-2558	6	1	Ductile Iron	
WM-2560	6	4	Cast Iron	1966
WM-2561	6	17	Cast Iron	1966
WM-2562	6	24	Cast Iron	1966
WM-2564	8	2	Ductile Iron	2016
WM-2565	6	269	Ductile Iron	1966
WM-2566	6	551	Cast Iron	1966
WM-2567	6	11	Cast Iron	1966
WM-2568	6	39	Cast Iron	1966
WM-2574	6	49	Cast Iron	1961
WM-2575	10	414	Cast Iron	1938
WM-2578	6	31	Cast Iron	1966
WM-2586	6	3	Cast Iron	1966
WM-2587	6	19	Cast Iron	1966
WM-2588	6	3	Cast Iron	1966
WM-2589	6	10	Cast Iron	1966
WM-2591	6	60	Cast Iron	1966
WM-2600	6	3	Cast Iron	1966
WM-2601	6	11	Ductile Iron	1966
WM-2602	6	2	Ductile Iron	1966
WM-2603	6	82	Cast Iron	1966
WM-2605	6	43	Cast Iron	1966
WM-2606	6	39	Cast Iron	1966
WM-2607	6	192	Cast Iron	1966
WM-2608	6	207	Cast Iron	1966
WM-2609	6	265	Cast Iron	1966
WM-2610	6	259	Cast Iron	1966
WM-2613	6	3	Ductile Iron	2000

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-2614	6	539	Ductile Iron	2000
WM-2615	6	3	Ductile Iron	2000
WM-2618	6	3	Ductile Iron	2000
WM-2620	16	53	Ductile Iron	1966
WM-2621	10	379	Ductile Iron	1966
WM-2623	6	49	Ductile Iron	2000
WM-2624	6	553	Ductile Iron	2000
WM-2625	16	385	Ductile Iron	1966
WM-2629	6	162	Cast Iron	1966
WM-2630	6	658	Cast Iron	1966
WM-2632	6	74	Cast Iron	1966
WM-2635	6	1	Cast Iron	1966
WM-2639	6	2	Ductile Iron	2000
WM-2640	6	7	Ductile Iron	2000
WM-2643	16	44	Cast Iron	1955
WM-2646	10	41	Cast Iron	1966
WM-2647	16	2	Cast Iron	
WM-2649	16	2	Cast Iron	
WM-2650	16	25	Cast Iron	1955
WM-2651	16	390	Ductile Iron	1955
WM-2652	6	16	Cast Iron	1966
WM-2653	6	8	Cast Iron	1966
WM-2654	16	438	Cast Iron	1955
WM-2655	6	99	Cast Iron	1966
WM-2656	6	198	Cast Iron	1966
WM-2659	16	292	Cast Iron	1955
WM-2660	16	116	Cast Iron	1955
WM-2662	6	16	Cast Iron	1964
WM-2663	6	354	Cast Iron	1964
WM-2665	16	573	Cast Iron	1955
WM-2666	6	16	Cast Iron	1958
WM-2668	6	12	Cast Iron	1958
WM-2669	6	2	Cast Iron	1958
WM-2670	6	31	Cast Iron	1964
WM-2671	6	10	Cast Iron	1966
WM-2672	6	60	Cast Iron	1966
WM-2673	6	18	Cast Iron	1958
WM-2675	16	506	Cast Iron	1931
WM-2676	16	15	Cast Iron	1931
WM-2678	16	13	Cast Iron	1931
WM-2680	6	92	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-2681	6	445	Cast Iron	1966
WM-2691	6	7	Cast Iron	1966
WM-2692	16	4	Cast Iron	1955
WM-2696	16	69	Cast Iron	1955
WM-2697	16	2	Cast Iron	1955
WM-2698	16	7	Cast Iron	1978
WM-2700	24	1	Cast Iron	1978
WM-2701	24	24	Ductile Iron	1978
WM-2708	6	522	Cast Iron	1966
WM-2709	6	6	Cast Iron	1966
WM-2710	6	11	Cast Iron	1966
WM-2711	6	55	Cast Iron	1966
WM-2712	6	662	Cast Iron	1966
WM-2714	8	23	Cast Iron	1948
WM-2948	6	3	Cast Iron	1966
WM-2954	6	36	Ductile Iron	2002
WM-2955	6	13	Cast Iron	1966
WM-2956	6	45	Cast Iron	1966
WM-2959	8	28	Cast Iron	1948
WM-2960	8	1	Cast Iron	1948
WM-2961	6	675	Cast Iron	1966
WM-2962	6	2	Ductile Iron	2002
WM-2963	6	2	Ductile Iron	2002
WM-2964	10	177	Ductile Iron	2002
WM-2971	10	1	Cast Iron	1948
WM-2973	8	193	Cast Iron	1948
WM-2976	24	507	Steel	1966
WM-2979	12	43	Cast Iron	1948
WM-2980	16	9	Cast Iron	1955
WM-2981	16	57	Cast Iron	1955
WM-2982	8	20	Cast Iron	1948
WM-2983	12	3	Cast Iron	1948
WM-2985	6	594	Cast Iron	1966
WM-2988	6	4	Cast Iron	1966
WM-2991	6	524	Cast Iron	1966
WM-2992	6	5	Cast Iron	1966
WM-2993	6	497	Ductile Iron	1966
WM-2994	6	225	Cast Iron	1966
WM-2995	12	452	Cast Iron	1948
WM-2996	12	44	Cast Iron	1948
WM-2997	6	57	Ductile Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-2998	6	11	Ductile Iron	1966
WM-2999	12	430	Cast Iron	1948
WM-3002	6	14	Cast Iron	1966
WM-3003	6	384	Cast Iron	1966
WM-3004	6	33	Cast Iron	1966
WM-3005	16	22	Cast Iron	1955
WM-3008	6	25	Cast Iron	1966
WM-3009	6	331	Cast Iron	1966
WM-3010	24	126	Steel	1978
WM-3011	24	66	Steel	1978
WM-3014	6	22	Cast Iron	1966
WM-3015	6	42	Cast Iron	1966
WM-3016	6	68	Cast Iron	1966
WM-3017	6	44	Cast Iron	1966
WM-3019	6	3	Cast Iron	1966
WM-3021	6	13	Cast Iron	1966
WM-3022	6	54	Cast Iron	1966
WM-3023	6	12	Cast Iron	1966
WM-3024	6	43	Cast Iron	1966
WM-3025	6	419	Cast Iron	1966
WM-3026	6	369	Cast Iron	1966
WM-3027	6	386	Cast Iron	1964
WM-3030	6	11	Cast Iron	1964
WM-3031	6	24	Cast Iron	1964
WM-3032	6	17	Cast Iron	1964
WM-3033	6	11	Cast Iron	1966
WM-3034	6	55	Cast Iron	1966
WM-3036	6	43	Cast Iron	1964
WM-3037	6	420	Cast Iron	1964
WM-3038	6	12	Cast Iron	1928
WM-3039	6	43	Cast Iron	1964
WM-3040	6	54	Cast Iron	1928
WM-3042	6	375	Cast Iron	1928
WM-3043	6	2	Cast Iron	1928
WM-3044	6	365	Ductile Iron	1928
WM-3045	6	300	Cast Iron	1966
WM-3046	6	11	Cast Iron	1966
WM-3047	6	21	Cast Iron	1964
WM-3049	6	162	Cast Iron	1964
WM-3051	6	13	Cast Iron	
WM-3054	6	11	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3055	6	32	Cast Iron	1966
WM-3056	6	332	Cast Iron	1966
WM-3058	24	684	Cast Iron	1978
WM-3059	24	168	Cast Iron	1978
WM-3060	24	6	Cast Iron	1978
WM-3061	6	19	Cast Iron	1964
WM-3062	6	43	Cast Iron	1964
WM-3063	6	14	Cast Iron	
WM-3065	6	43	Cast Iron	1955
WM-3066	6	47	Cast Iron	1955
WM-3067	6	414	Cast Iron	1955
WM-3068	6	2	Cast Iron	1964
WM-3069	6	348	Cast Iron	1964
WM-3071	6	13	Cast Iron	1964
WM-3072	6	23	Cast Iron	1964
WM-3073	6	44	Cast Iron	1966
WM-3074	6	8	Cast Iron	1966
WM-3077	16	23	Cast Iron	1955
WM-3078	16	1	Cast Iron	1955
WM-3080	16	1	Cast Iron	1955
WM-3081	18	416	Cast Iron	1955
WM-3082	16	1	Cast Iron	1955
WM-3083	18	407	Cast Iron	1955
WM-3084	6	386	Cast Iron	1964
WM-3085	8	1	Cast Iron	
WM-3086	8	1	Cast Iron	
WM-3087	6	8	Cast Iron	
WM-3088	6	1	Cast Iron	1964
WM-3089	6	20	Cast Iron	1964
WM-3090	6	30	Cast Iron	1964
WM-3091	6	11	Cast Iron	1966
WM-3092	6	55	Cast Iron	1966
WM-3093	6	43	Cast Iron	1964
WM-3095	6	420	Cast Iron	1964
WM-3096	6	2	Cast Iron	1966
WM-3097	6	377	Cast Iron	1966
WM-3100	12	374	Cast Iron	1954
WM-3101	6	19	Cast Iron	1966
WM-3102	12	43	Cast Iron	1954
WM-3103	12	12	Cast Iron	1954
WM-3104	12	7	Cast Iron	1954

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3105	12	25	Cast Iron	1954
WM-3107	6	355	Cast Iron	1954
WM-3112	12	47	Cast Iron	1954
WM-3115	16	7	Cast Iron	
WM-3116	16	2	Cast Iron	
WM-3117	24	36	Cast Iron	1966
WM-3118	16	8	Cast Iron	1966
WM-3120	24	1	Cast Iron	1966
WM-3122	24	4	Cast Iron	1966
WM-3123	24	550	Cast Iron	1966
WM-3125	6	24	Cast Iron	1954
WM-3127	6	13	Cast Iron	1966
WM-3128	6	12	Cast Iron	1966
WM-3136	16	332	Cast Iron	1955
WM-3138	16	453	Cast Iron	1955
WM-3139	16	473	Cast Iron	1955
WM-3140	6	45	Ductile Iron	1974
WM-3141	6	5	Cast Iron	1974
WM-3144	24	2	Cast Iron	1978
WM-3145	6	11	Cast Iron	1928
WM-3146	6	43	Cast Iron	1964
WM-3147	6	55	Cast Iron	1928
WM-3148	6	210	Cast Iron	1964
WM-3149	6	375	Cast Iron	1928
WM-3150	6	272	Cast Iron	1966
WM-3151	6	167	Cast Iron	1966
WM-3152	6	19	Cast Iron	1964
WM-3153	6	57	Cast Iron	1966
WM-3154	6	365	Cast Iron	1966
WM-3155	6	27	Cast Iron	1928
WM-3157	12	281	Cast Iron	1954
WM-3160	12	256	Cast Iron	1954
WM-3161	12	111	Cast Iron	1954
WM-3162	12	1	Ductile Iron	1950
WM-3163	12	8	Cast Iron	1950
WM-3164	12	38	Cast Iron	1950
WM-3165	6	43	Cast Iron	1954
WM-3166	6	6	Cast Iron	1966
WM-3167	6	23	Cast Iron	1966
WM-3168	6	44	Cast Iron	1966
WM-3170	6	3	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3171	6	13	Cast Iron	1966
WM-3172	6	1	Cast Iron	
WM-3174	6	4	Cast Iron	1954
WM-3177	12	11	Cast Iron	1954
WM-3178	12	12	Cast Iron	1954
WM-3180	8	3	Cast Iron	1948
WM-3182	30	260	Cast Iron	1966
WM-3189	8	169	Cast Iron	1948
WM-3190	8	1	Cast Iron	1948
WM-3192	6	17	Cast Iron	1966
WM-3195	6	9	Cast Iron	1966
WM-3196	6	8	Cast Iron	1966
WM-3199	6	405	Cast Iron	1966
WM-3201	6	43	Cast Iron	
WM-3203	6	25	Cast Iron	1966
WM-3204	6	1	Cast Iron	
WM-3207	6	31	Cast Iron	1966
WM-3211	8	61	Ductile Iron	2003
WM-3215	8	0	Ductile Iron	2003
WM-3217	6	600	Cast Iron	1966
WM-3219	6	3	Cast Iron	1950
WM-3220	6	43	Cast Iron	1966
WM-3221	6	28	Cast Iron	1966
WM-3222	6	517	Cast Iron	1966
WM-3223	6	284	Cast Iron	1951
WM-3224	6	3	Cast Iron	
WM-3225	6	27	Cast Iron	1951
WM-3226	6	16	Cast Iron	1951
WM-3227	6	9	Cast Iron	1950
WM-3228	6	16	Cast Iron	1950
WM-3239	8	6	Ductile Iron	2010
WM-3242	6	2	Cast Iron	1966
WM-3243	4	43	Cast Iron	
WM-3244	4	1	Cast Iron	
WM-3245	6	22	Cast Iron	1966
WM-3246	8	59	Ductile Iron	2003
WM-3247	8	437	Ductile Iron	2003
WM-3249	6	1	Ductile Iron	2003
WM-3251	8	1	Ductile Iron	2003
WM-3252	6	400	Cast Iron	1966
WM-3253	6	2	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3256	6	2	Ductile Iron	2003
WM-3257	8	3	Ductile Iron	2003
WM-3258	8	1	Ductile Iron	2003
WM-3259	6	4	Cast Iron	1966
WM-3260	6	341	Cast Iron	1966
WM-3264	12	398	Cast Iron	1948
WM-3265	6	13	Cast Iron	1966
WM-3266	12	31	Cast Iron	1948
WM-3267	12	43	Cast Iron	1948
WM-3268	6	53	Cast Iron	1966
WM-3276	6	22	Cast Iron	1966
WM-3277	6	170	Ductile Iron	1966
WM-3278	6	13	Cast Iron	1940
WM-3284	24	34	Ductile Iron	1940
WM-3285	6	42	Cast Iron	1966
WM-3286	24	297	Ductile Iron	1955
WM-3288	10	11	Cast Iron	1955
WM-3289	10	20	Cast Iron	1955
WM-3290	24	35	Ductile Iron	1955
WM-3291	10	21	Cast Iron	1938
WM-3293	8	45	Cast Iron	1955
WM-3296	6	5	Ductile Iron	1961
WM-3297	6	360	Ductile Iron	1961
WM-3298	8	1	Poly Vinyl Chloride	
WM-3299	6	20	Cast Iron	1961
WM-3300	8	164	Ductile Iron	1955
WM-3301	6	22	Cast Iron	1966
WM-3303	10	40	Ductile Iron	1955
WM-3304	10	45	Cast Iron	1955
WM-3305	10	13	Cast Iron	1955
WM-3306	10	69	Cast Iron	1955
WM-3307	10	59	Cast Iron	1948
WM-3308	10	111	Cast Iron	1948
WM-3309	10	64	Cast Iron	1948
WM-3310	10	2	Cast Iron	1955
WM-3313	12	3	Cast Iron	1954
WM-3314	12	3	Cast Iron	1954
WM-3315	12	37	Cast Iron	1954
WM-3316	12	261	Cast Iron	1954
WM-3317	6	3	Cast Iron	1966
WM-3318	6	37	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3319	6	22	Cast Iron	1966
WM-3320	6	4	Cast Iron	1966
WM-3322	12	31	Cast Iron	1954
WM-3323	6	17	Ductile Iron	1950
WM-3324	12	13	Cast Iron	1954
WM-3325	12	43	Cast Iron	1954
WM-3326	6	202	Cast Iron	1950
WM-3327	12	293	Cast Iron	1954
WM-3328	6	389	Cast Iron	1950
WM-3329	6	10	Cast Iron	1950
WM-3330	6	56	Cast Iron	1950
WM-3331	6	12	Cast Iron	1961
WM-3332	6	35	Cast Iron	1961
WM-3334	6	1	Cast Iron	1950
WM-3335	6	600	Cast Iron	1950
WM-3336	6	42	Cast Iron	1950
WM-3337	6	13	Cast Iron	1966
WM-3338	6	43	Cast Iron	1966
WM-3341	6	43	Cast Iron	1966
WM-3342	6	317	Cast Iron	1966
WM-3346	6	4	Cast Iron	1966
WM-3347	6	596	Cast Iron	1966
WM-3348	6	11	Cast Iron	1966
WM-3349	6	55	Cast Iron	1966
WM-3350	6	22	Cast Iron	1961
WM-3353	6	44	Cast Iron	1961
WM-3356	6	6	Cast Iron	1966
WM-3358	6	11	Cast Iron	1966
WM-3359	12	24	Cast Iron	1954
WM-3360	12	597	Cast Iron	1955
WM-3361	12	43	Cast Iron	1955
WM-3362	6	1	Cast Iron	1991
WM-3363	6	10	Cast Iron	1991
WM-3364	6	8	Cast Iron	1991
WM-3365	6	80	Cast Iron	1991
WM-3366	6	76	Ductile Iron	1991
WM-3369	6	28	Ductile Iron	1991
WM-3370	6	130	Ductile Iron	1991
WM-3371	6	13	Cast Iron	1966
WM-3372	6	25	Ductile Iron	1961
WM-3373	6	263	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3374	6	1	Ductile Iron	1961
WM-3375	6	43	Cast Iron	1966
WM-3376	6	53	Cast Iron	1966
WM-3377	6	335	Cast Iron	1966
WM-3378	8	3	Cast Iron	1948
WM-3379	8	53	Cast Iron	1948
WM-3380	6	13	Cast Iron	1957
WM-3381	8	603	Cast Iron	1948
WM-3382	8	590	Cast Iron	1948
WM-3385	12	280	Cast Iron	1955
WM-3386	10	394	Cast Iron	1955
WM-3387	10	1	Cast Iron	1955
WM-3388	12	48	Cast Iron	1955
WM-3390	10	46	Cast Iron	1955
WM-3391	12	3	Cast Iron	1955
WM-3392	12	6	Cast Iron	1955
WM-3394	6	30	Cast Iron	1966
WM-3395	6	17	Cast Iron	1966
WM-3396	6	3	Cast Iron	1966
WM-3397	6	13	Cast Iron	1951
WM-3398	6	18	Cast Iron	1966
WM-3399	6	53	Cast Iron	1966
WM-3402	6	600	Cast Iron	1951
WM-3403	6	53	Cast Iron	1951
WM-3404	6	53	Cast Iron	1951
WM-3406	6	314	Cast Iron	1951
WM-3407	6	13	Cast Iron	1968
WM-3408	6	54	Cast Iron	1966
WM-3409	6	196	Cast Iron	1966
WM-3413	6	53	Cast Iron	1968
WM-3414	6	13	Cast Iron	1955
WM-3415	6	399	Cast Iron	1955
WM-3416	6	15	Cast Iron	1951
WM-3417	6	53	Cast Iron	1955
WM-3418	6	3	Cast Iron	1955
WM-3420	6	556	Cast Iron	1955
WM-3421	6	279	Cast Iron	1968
WM-3422	6	375	Cast Iron	1968
WM-3423	6	308	Cast Iron	1968
WM-3424	6	5	Cast Iron	1968
WM-3425	6	12	Cast Iron	1957

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3426	6	14	Cast Iron	
WM-3427	6	54	Cast Iron	1957
WM-3428	6	56	Cast Iron	1957
WM-3429	6	644	Cast Iron	1957
WM-3430	6	566	Cast Iron	1957
WM-3431	6	593	Cast Iron	1957
WM-3433	6	53	Cast Iron	1966
WM-3434	6	12	Cast Iron	1957
WM-3435	6	54	Cast Iron	1957
WM-3436	6	627	Cast Iron	1957
WM-3438	6	16	Cast Iron	1955
WM-3439	6	13	Cast Iron	1955
WM-3440	6	413	Cast Iron	1955
WM-3441	6	53	Cast Iron	1950
WM-3442	6	272	Cast Iron	1950
WM-3443	6	4	Cast Iron	1957
WM-3444	6	4	Cast Iron	1957
WM-3445	6	13	Cast Iron	1955
WM-3446	6	16	Cast Iron	1950
WM-3447	6	400	Cast Iron	1955
WM-3448	6	53	Cast Iron	1950
WM-3450	6	13	Cast Iron	1955
WM-3452	6	12	Cast Iron	1950
WM-3453	6	3	Cast Iron	1950
WM-3454	6	400	Cast Iron	1955
WM-3455	6	78	Cast Iron	1950
WM-3457	6	3	Cast Iron	1950
WM-3458	6	229	Cast Iron	1950
WM-3459	6	360	Cast Iron	1950
WM-3460	6	1	Cast Iron	1950
WM-3461	6	187	Cast Iron	1950
WM-3462	6	52	Cast Iron	1950
WM-3463	6	1	Cast Iron	1950
WM-3464	8	8	Cast Iron	1948
WM-3466	8	51	Cast Iron	1948
WM-3467	6	51	Cast Iron	1966
WM-3469	8	379	Cast Iron	1948
WM-3470	6	13	Cast Iron	1950
WM-3471	8	5	Cast Iron	1955
WM-3473	8	53	Cast Iron	1955
WM-3475	6	46	Cast Iron	1957

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3476	8	371	Cast Iron	1955
WM-3477	6	293	Cast Iron	1957
WM-3481	10	558	Cast Iron	1955
WM-3482	6	594	Cast Iron	1953
WM-3483	6	49	Cast Iron	1953
WM-3484	10	54	Cast Iron	1955
WM-3485	6	17	Cast Iron	1957
WM-3486	10	13	Cast Iron	1955
WM-3488	10	459	Cast Iron	1955
WM-3489	10	3	Cast Iron	1955
WM-3490	10	391	Cast Iron	1955
WM-3492	10	43	Cast Iron	1955
WM-3493	6	298	Cast Iron	1966
WM-3495	6	3	Cast Iron	1966
WM-3496	6	1	Cast Iron	
WM-3497	6	19	Cast Iron	1966
WM-3498	10	26	Cast Iron	1955
WM-3499	10	5	Cast Iron	1955
WM-3500	10	19	Ductile Iron	1955
WM-3501	8	14	Cast Iron	1948
WM-3502	8	1	Cast Iron	
WM-3503	10	54	Cast Iron	1951
WM-3504	6	48	Cast Iron	1951
WM-3508	8	477	Ductile Iron	2003
WM-3509	8	277	Ductile Iron	2003
WM-3510	8	3	Ductile Iron	2003
WM-3512	6	304	Cast Iron	1961
WM-3513	6	3	Cast Iron	1966
WM-3514	6	361	Cast Iron	1966
WM-3516	12	35	Ductile Iron	2003
WM-3517	6	1	Cast Iron	1950
WM-3519	12	5	Ductile Iron	2003
WM-3520	12	3	Ductile Iron	2003
WM-3521	12	10	Ductile Iron	2003
WM-3522	6	1	Ductile Iron	2003
WM-3523	6	3	Ductile Iron	2003
WM-3524	6	46	Cast Iron	1961
WM-3525	6	11	Ductile Iron	2003
WM-3526	8	1	Ductile Iron	2003
WM-3527	12	426	Ductile Iron	2003
WM-3528	6	5	Cast Iron	1955

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3529	6	357	Cast Iron	1955
WM-3530	6	13	Cast Iron	1955
WM-3531	6	53	Cast Iron	1955
WM-3532	6	53	Cast Iron	1955
WM-3533	6	565	Cast Iron	1955
WM-3534	6	3	Cast Iron	1955
WM-3538	6	369	Cast Iron	1955
WM-3539	6	3	Cast Iron	1955
WM-3540	6	53	Cast Iron	1955
WM-3542	6	293	Cast Iron	1955
WM-3543	6	254	Cast Iron	1955
WM-3544	6	52	Cast Iron	1955
WM-3545	6	13	Cast Iron	1955
WM-3546	6	3	Cast Iron	1955
WM-3547	6	52	Cast Iron	1955
WM-3548	6	395	Cast Iron	1955
WM-3549	6	321	Cast Iron	1961
WM-3550	6	2	Cast Iron	1961
WM-3552	8	2	Ductile Iron	2003
WM-3553	6	6	Ductile Iron	2003
WM-3554	12	4	Ductile Iron	2003
WM-3555	12	378	Ductile Iron	2003
WM-3556	8	422	Ductile Iron	2003
WM-3557	8	15	Ductile Iron	2003
WM-3558	6	1	Ductile Iron	2003
WM-3560	6	50	Cast Iron	1961
WM-3562	6	2	Ductile Iron	2003
WM-3563	6	10	Ductile Iron	2003
WM-3564	6	330	Cast Iron	1961
WM-3566	6	13	Cast Iron	1961
WM-3567	6	53	Cast Iron	1955
WM-3568	6	53	Cast Iron	1955
WM-3569	6	17	Cast Iron	1961
WM-3570	6	363	Cast Iron	1961
WM-3571	6	574	Cast Iron	1955
WM-3572	6	2	Cast Iron	1955
WM-3573	6	7	Cast Iron	1955
WM-3574	6	54	Cast Iron	1955
WM-3576	6	373	Cast Iron	1966
WM-3577	12	3	Cast Iron	1948
WM-3578	6	3	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3579	6	13	Cast Iron	1966
WM-3580	6	1	Ductile Iron	1966
WM-3581	6	56	Cast Iron	1966
WM-3582	6	6	Cast Iron	1966
WM-3583	6	152	Cast Iron	1966
WM-3584	6	3	Cast Iron	1948
WM-3585	12	6	Cast Iron	1948
WM-3587	12	239	Ductile Iron	2001
WM-3588	12	2	Ductile Iron	2001
WM-3591	12	2	Cast Iron	1948
WM-3593	12	6	Cast Iron	1948
WM-3594	12	3	Ductile Iron	2001
WM-3595	12	1	Ductile Iron	2001
WM-3596	12	1	Cast Iron	1948
WM-3597	10	49	Cast Iron	1948
WM-3599	12	54	Ductile Iron	2003
WM-3600	12	10	Cast Iron	1948
WM-3601	12	1	Ductile Iron	2003
WM-3602	12	4	Ductile Iron	2003
WM-3604	12	83	Cast Iron	1948
WM-3605	6	23	Cast Iron	1961
WM-3608	10	41	Cast Iron	1948
WM-3609	10	684	Cast Iron	1948
WM-3610	10	614	Cast Iron	1948
WM-3612	6	3	Cast Iron	1966
WM-3613	6	15	Cast Iron	1961
WM-3614	6	210	Cast Iron	1966
WM-3615	6	40	Cast Iron	1966
WM-3616	6	13	Cast Iron	1951
WM-3617	6	56	Cast Iron	1956
WM-3618	6	13	Cast Iron	1953
WM-3619	6	480	Cast Iron	1956
WM-3621	6	70	Cast Iron	1953
WM-3622	6	392	Cast Iron	1953
WM-3623	6	258	Cast Iron	1953
WM-3624	6	40	Cast Iron	
WM-3625	6	34	Cast Iron	
WM-3627	6	10	Cast Iron	1953
WM-3628	6	15	Cast Iron	1953
WM-3629	6	13	Cast Iron	1966
WM-3630	6	55	Cast Iron	1953

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3631	6	51	Cast Iron	1952
WM-3632	6	162	Cast Iron	1952
WM-3635	6	116	Cast Iron	1953
WM-3637	6	6	Cast Iron	1953
WM-3638	6	467	Cast Iron	1953
WM-3639	6	7	Cast Iron	1953
WM-3640	6	388	Cast Iron	1953
WM-3642	6	4	Cast Iron	1953
WM-3647	6	389	Cast Iron	1953
WM-3651	6	52	Cast Iron	1953
WM-3656	6	50	Cast Iron	1968
WM-3657	6	399	Cast Iron	1968
WM-3658	6	12	Cast Iron	1968
WM-3659	6	15	Cast Iron	1968
WM-3660	6	54	Cast Iron	1969
WM-3661	6	458	Cast Iron	1969
WM-3662	6	1	Cast Iron	1969
WM-3663	6	367	Cast Iron	1968
WM-3664	6	593	Cast Iron	1966
WM-3665	6	9	Cast Iron	1955
WM-3670	6	27	Cast Iron	1966
WM-3671	6	46	Cast Iron	1955
WM-3672	6	11	Unknown	1955
WM-3674	6	13	Cast Iron	1966
WM-3675	6	13	Cast Iron	1955
WM-3676	6	21	Cast Iron	1966
WM-3677	6	1	Cast Iron	1966
WM-3678	6	10	Cast Iron	1966
WM-3679	6	83	Cast Iron	1966
WM-3682	6	8	Cast Iron	1966
WM-3683	6	726	Cast Iron	1966
WM-3684	6	7	Cast Iron	1966
WM-3686	6	40	Cast Iron	1966
WM-3687	6	2	Cast Iron	1966
WM-3688	6	29	Cast Iron	1966
WM-3689	6	299	Cast Iron	1950
WM-3690	6	1	Cast Iron	1950
WM-3691	6	54	Cast Iron	1966
WM-3692	6	21	Cast Iron	1966
WM-3693	6	15	Cast Iron	1966
WM-3695	6	328	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3698	6	43	Cast Iron	1954
WM-3700	6	43	Cast Iron	1966
WM-3701	6	21	Cast Iron	1954
WM-3702	6	364	Cast Iron	1954
WM-3703	6	573	Cast Iron	1966
WM-3704	6	44	Cast Iron	1966
WM-3706	6	196	Cast Iron	1966
WM-3708	6	3	Cast Iron	1966
WM-3709	6	350	Cast Iron	1966
WM-3710	6	60	Cast Iron	1966
WM-3711	6	375	Cast Iron	1966
WM-3712	6	12	Cast Iron	1966
WM-3713	6	54	Cast Iron	1966
WM-3714	8	23	Cast Iron	1950
WM-3715	8	118	Cast Iron	1950
WM-3716	6	79	Cast Iron	
WM-3717	6	45	Cast Iron	
WM-3718	8	264	Cast Iron	1950
WM-3721	6	148	Cast Iron	1966
WM-3722	6	21	Cast Iron	1951
WM-3723	6	2	Cast Iron	1951
WM-3724	6	417	Cast Iron	1966
WM-3726	6	23	Cast Iron	1966
WM-3727	6	13	Cast Iron	1966
WM-3728	6	53	Cast Iron	1966
WM-3729	6	318	Cast Iron	1966
WM-3730	6	346	Cast Iron	1966
WM-3731	6	402	Cast Iron	1966
WM-3732	6	12	Cast Iron	1966
WM-3734	6	59	Cast Iron	1951
WM-3735	6	45	Cast Iron	1966
WM-3736	6	23	Cast Iron	1951
WM-3739	6	397	Cast Iron	1951
WM-3741	6	397	Cast Iron	1951
WM-3742	6	3	Cast Iron	1951
WM-3743	6	400	Cast Iron	1951
WM-3744	6	4	Cast Iron	1951
WM-3745	6	63	Cast Iron	1951
WM-3746	6	398	Cast Iron	1951
WM-3748	6	61	Cast Iron	1951
WM-3749	6	54	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3750	6	367	Cast Iron	1966
WM-3752	6	396	Cast Iron	1951
WM-3753	6	397	Cast Iron	1951
WM-3754	6	5	Cast Iron	1951
WM-3756	6	65	Cast Iron	1950
WM-3757	6	48	Cast Iron	1966
WM-3758	6	355	Cast Iron	1950
WM-3759	6	4	Cast Iron	1950
WM-3760	6	400	Cast Iron	1950
WM-3761	6	4	Cast Iron	1950
WM-3762	6	397	Cast Iron	1950
WM-3763	6	7	Cast Iron	1950
WM-3764	6	10	Cast Iron	1950
WM-3766	6	8	Ductile Iron	1950
WM-3767	6	42	Cast Iron	1950
WM-3768	6	6	Cast Iron	1950
WM-3769	6	43	Ductile Iron	1950
WM-3771	6	19	Cast Iron	1950
WM-3772	6	12	Cast Iron	1950
WM-3775	6	371	Cast Iron	1966
WM-3776	6	36	Cast Iron	1950
WM-3777	6	411	Cast Iron	1950
WM-3778	6	4	Cast Iron	1951
WM-3779	6	58	Cast Iron	1951
WM-3780	6	430	Cast Iron	1951
WM-3781	6	1	Cast Iron	1951
WM-3782	4	1	Cast Iron	1951
WM-3784	8	10	Cast Iron	1951
WM-3785	12	1	Cast Iron	1951
WM-3786	8	363	Cast Iron	1951
WM-3787	12	13	Cast Iron	1951
WM-3788	12	7	Cast Iron	1951
WM-3790	12	392	Cast Iron	1951
WM-3791	12	5	Cast Iron	1951
WM-3793	8	13	Cast Iron	1951
WM-3794	6	53	Cast Iron	1951
WM-3795	6	13	Cast Iron	1951
WM-3796	8	416	Cast Iron	1951
WM-3797	6	4	Cast Iron	1951
WM-3798	6	447	Cast Iron	1951
WM-3799	6	30	Cast Iron	1951

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3800	6	311	Cast Iron	1951
WM-3801	6	6	Cast Iron	1951
WM-3802	6	429	Cast Iron	1951
WM-3803	8	13	Cast Iron	1951
WM-3804	6	13	Cast Iron	1966
WM-3805	6	53	Cast Iron	1966
WM-3807	6	5	Cast Iron	1966
WM-3808	6	549	Cast Iron	1966
WM-3809	6	3	Cast Iron	1951
WM-3810	6	13	Cast Iron	1951
WM-3811	6	53	Cast Iron	1951
WM-3812	6	211	Cast Iron	1951
WM-3815	6	3	Cast Iron	1951
WM-3817	6	343	Cast Iron	1951
WM-3818	6	399	Cast Iron	1951
WM-3819	8	416	Cast Iron	1951
WM-3820	6	423	Cast Iron	1951
WM-3821	8	13	Cast Iron	1955
WM-3822	6	18	Cast Iron	1991
WM-3823	6	62	Cast Iron	1955
WM-3825	6	306	Cast Iron	1991
WM-3826	6	388	Cast Iron	1955
WM-3827	8	2	Cast Iron	1955
WM-3828	8	389	Cast Iron	1959
WM-3829	8	10	Cast Iron	1955
WM-3830	8	337	Cast Iron	1955
WM-3831	8	1	Ductile Iron	1991
WM-3832	8	1	Ductile Iron	1991
WM-3833	12	496	Ductile Iron	1991
WM-3834	8	15	Cast Iron	1955
WM-3835	6	66	Cast Iron	1961
WM-3836	6	10	Cast Iron	1951
WM-3837	6	3	Cast Iron	1951
WM-3839	6	540	Cast Iron	1961
WM-3842	6	294	Cast Iron	1961
WM-3843	6	38	Cast Iron	1961
WM-3844	6	7	Cast Iron	1961
WM-3845	6	8	Cast Iron	1961
WM-3846	8	15	Cast Iron	1955
WM-3847	8	16	Cast Iron	1955
WM-3849	6	8	Cast Iron	1948

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3850	6	9	Cast Iron	1948
WM-3851	8	15	Cast Iron	1955
WM-3852	6	64	Cast Iron	1948
WM-3853	8	426	Cast Iron	1955
WM-3854	8	541	Cast Iron	1955
WM-3855	6	328	Cast Iron	1948
WM-3856	6	258	Cast Iron	1948
WM-3857	8	301	Cast Iron	1961
WM-3858	8	17	Cast Iron	1961
WM-3859	6	15	Cast Iron	1957
WM-3860	6	10	Cast Iron	1957
WM-3862	6	65	Cast Iron	1966
WM-3863	6	363	Cast Iron	1966
WM-3865	8	38	Cast Iron	1966
WM-3866	8	11	Cast Iron	1966
WM-3867	30	162	Cast Iron	1966
WM-3868	30	521	Cast Iron	1966
WM-3869	30	830	Cast Iron	1966
WM-3870	6	4	Cast Iron	1966
WM-3871	6	5	Cast Iron	1966
WM-3873	6	258	Cast Iron	1959
WM-3874	6	5	Cast Iron	1959
WM-3875	6	27	Cast Iron	1959
WM-3876	6	30	Cast Iron	1959
WM-3879	6	2	Ductile Iron	1966
WM-3881	6	4	Ductile Iron	1966
WM-3882	6	11	Ductile Iron	1966
WM-3883	6	359	Ductile Iron	1966
WM-3884	6	15	Cast Iron	1948
WM-3885	6	53	Cast Iron	1957
WM-3886	6	19	Cast Iron	1957
WM-3887	6	134	Cast Iron	1957
WM-3888	6	365	Cast Iron	1948
WM-3891	6	238	Cast Iron	1966
WM-4291	6	6	Cast Iron	1948
WM-4293	6	54	Cast Iron	1948
WM-4295	6	2	Cast Iron	1951
WM-4296	6	2	Ductile Iron	1951
WM-4297	6	5	Cast Iron	1951
WM-4298	6	523	Cast Iron	1951
WM-4300	6	2	Cast Iron	1950

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4301	6	51	Cast Iron	1950
WM-4302	6	53	Cast Iron	1961
WM-4303	6	583	Cast Iron	1950
WM-4304	6	263	Cast Iron	1961
WM-4306	6	8	Cast Iron	1961
WM-4307	6	11	Cast Iron	1955
WM-4308	6	433	Cast Iron	1955
WM-4310	6	24	Cast Iron	1950
WM-4311	6	593	Cast Iron	1950
WM-4312	6	2	Cast Iron	1950
WM-4313	6	6	Cast Iron	1948
WM-4314	6	51	Cast Iron	1950
WM-4315	6	4	Cast Iron	1950
WM-4316	6	3	Cast Iron	1955
WM-4317	6	10	Cast Iron	1955
WM-4318	6	1	Cast Iron	1955
WM-4319	6	52	Cast Iron	1955
WM-4320	6	18	Cast Iron	1959
WM-4321	6	13	Cast Iron	1959
WM-4322	6	55	Cast Iron	1965
WM-4323	6	34	Cast Iron	1959
WM-4324	6	366	Cast Iron	1959
WM-4325	6	411	Cast Iron	1965
WM-4326	30	194	Cast Iron	1966
WM-4329	8	3	Cast Iron	1975
WM-4330	6	5	Cast Iron	1975
WM-4331	6	58	Cast Iron	1965
WM-4332	6	3	Cast Iron	1965
WM-4333	8	392	Cast Iron	1975
WM-4334	6	18	Cast Iron	1965
WM-4335	6	565	Cast Iron	1965
WM-4336	8	55	Ductile Iron	1975
WM-4338	8	4	Cast Iron	
WM-4340	8	19	Ductile Iron	2012
WM-4341	6	643	Cast Iron	
WM-4342	6	3	Cast Iron	
WM-4343	6	580	Cast Iron	
WM-4344	8	55	Cast Iron	
WM-4345	8	62	Cast Iron	
WM-4346	8	111	Cast Iron	1978
WM-4350	8	98	Cast Iron	1975

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4352	8	5	Cast Iron	1975
WM-4354	12	1	Cast Iron	1975
WM-4355	12	1	Cast Iron	1975
WM-4357	12	1	Cast Iron	1975
WM-4362	6	8	Ductile Iron	1966
WM-4363	8	5	Cast Iron	1975
WM-4364	8	389	Cast Iron	1975
WM-4365	30	1090	Cast Iron	1966
WM-4366	30	65	Cast Iron	1966
WM-4367	30	263	Cast Iron	1966
WM-4368	30	463	Cast Iron	1966
WM-4369	30	53	Cast Iron	1966
WM-4372	30	15	Cast Iron	1966
WM-4373	30	13	Cast Iron	1966
WM-4374	30	62	Cast Iron	1976
WM-4375	30	12	Cast Iron	1966
WM-4376	30	18	Cast Iron	1966
WM-4377	30	8	Ductile Iron	1976
WM-4379	8	953	Cast Iron	1975
WM-4382	8	221	Cast Iron	1978
WM-4383	8	16	Cast Iron	1978
WM-4384	8	330	Cast Iron	1978
WM-4389	8	173	Ductile Iron	1978
WM-4390	8	28	Cast Iron	1978
WM-4391	8	105	Cast Iron	1978
WM-4392	8	37	Ductile Iron	1978
WM-4395	6	10	Cast Iron	1966
WM-4396	6	3	Ductile Iron	
WM-4398	6	421	Cast Iron	1966
WM-4399	6	8	Cast Iron	1966
WM-4400	6	186	Cast Iron	1966
WM-4401	6	13	Cast Iron	1966
WM-4402	6	297	Cast Iron	1955
WM-4404	6	172	Cast Iron	1955
WM-4405	6	118	Cast Iron	1955
WM-4407	8	7	Ductile Iron	1999
WM-4408	8	4	Ductile Iron	1999
WM-4409	8	9	Ductile Iron	1999
WM-4411	6	13	Cast Iron	1955
WM-4412	6	13	Cast Iron	1978
WM-4413	6	19	Cast Iron	1978

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4414	6	53	Cast Iron	1961
WM-4415	6	270	Cast Iron	1961
WM-4416	6	53	Cast Iron	1966
WM-4417	6	584	Cast Iron	1966
WM-4418	6	293	Cast Iron	1966
WM-4433	8	263	Ductile Iron	1999
WM-4435	6	72	Ductile Iron	1999
WM-4436	6	38	Ductile Iron	1999
WM-4437	6	7	Ductile Iron	1999
WM-4438	8	150	Ductile Iron	1999
WM-4440	6	3	Ductile Iron	1999
WM-4441	6	3	Cast Iron	1964
WM-4442	6	3	Cast Iron	1964
WM-4443	6	15	Cast Iron	1964
WM-4444	6	394	Cast Iron	1964
WM-4445	6	4	Cast Iron	1964
WM-4446	6	53	Cast Iron	1964
WM-4447	6	219	Cast Iron	1964
WM-4449	6	2	Cast Iron	1955
WM-4450	6	19	Cast Iron	1964
WM-4451	6	52	Cast Iron	1955
WM-4453	6	493	Cast Iron	1955
WM-4454	8	45	Ductile Iron	1999
WM-4455	8	2	Ductile Iron	1999
WM-4456	8	140	Cast Iron	1978
WM-4457	30	5216	Cast Iron	1964
WM-4458	30	210	Cast Iron	1964
WM-4459	30	40	Cast Iron	1964
WM-4460	24	252	Other	1964
WM-4461	24	285	Other	1964
WM-4462	30	1	Cast Iron	1976
WM-4463	6	1	Cast Iron	1961
WM-4464	6	53	Cast Iron	1965
WM-4465	6	3	Cast Iron	1959
WM-4466	6	3	Cast Iron	1959
WM-4469	6	142	Cast Iron	1965
WM-4470	6	8	Cast Iron	1966
WM-4471	6	390	Cast Iron	1966
WM-4472	8	19	Cast Iron	1966
WM-4473	6	32	Cast Iron	1966
WM-4474	8	328	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4475	6	6	Cast Iron	1966
WM-4476	6	388	Cast Iron	1966
WM-4477	8	13	Cast Iron	1966
WM-4478	6	12	Cast Iron	
WM-4479	6	1	Ductile Iron	
WM-4480	6	60	Cast Iron	
WM-4481	6	313	Cast Iron	
WM-4482	6	149	Cast Iron	1966
WM-4483	6	43	Cast Iron	1966
WM-4484	6	43	Cast Iron	
WM-4485	6	4	Cast Iron	
WM-4486	6	24	Cast Iron	
WM-4487	6	86	Cast Iron	1966
WM-4488	12	13	Cast Iron	1955
WM-4489	16	53	Cast Iron	1957
WM-4490	12	31	Cast Iron	1958
WM-4491	12	299	Cast Iron	1958
WM-4492	16	4	Cast Iron	1957
WM-4493	16	379	Cast Iron	1955
WM-4494	6	70	Cast Iron	1959
WM-4495	12	34	Cast Iron	1955
WM-4498	6	11	Cast Iron	1958
WM-4499	6	1	Cast Iron	1959
WM-4500	6	3	Cast Iron	1958
WM-4501	6	498	Cast Iron	1958
WM-4502	6	275	Cast Iron	1959
WM-4503	6	4	Cast Iron	1959
WM-4506	6	1	Cast Iron	1995
WM-4507	6	176	Cast Iron	1995
WM-4508	6	343	Cast Iron	1958
WM-4509	6	45	Cast Iron	1958
WM-4513	6	278	Cast Iron	1954
WM-4514	6	13	Cast Iron	1954
WM-4516	6	7	Cast Iron	1966
WM-4517	6	18	Cast Iron	1966
WM-4518	12	50	Cast Iron	1955
WM-4519	6	26	Cast Iron	1954
WM-4520	12	53	Cast Iron	1955
WM-4521	12	21	Cast Iron	1955
WM-4522	6	74	Cast Iron	1954
WM-4524	6	1	Cast Iron	

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4526	6	243	Cast Iron	1966
WM-4527	6	245	Cast Iron	1954
WM-4528	12	98	Cast Iron	1955
WM-4529	12	25	Cast Iron	1955
WM-4530	6	207	Cast Iron	1954
WM-4532	30	1	Cast Iron	1976
WM-4533	16	8	Cast Iron	1976
WM-4534	30	13	Cast Iron	1976
WM-4535	30	153	Cast Iron	1992
WM-4536	24	188	Cast Iron	1992
WM-4537	6	281	Cast Iron	1966
WM-4538	6	2	Cast Iron	1966
WM-4539	6	4	Cast Iron	1966
WM-4540	16	44	Cast Iron	1955
WM-4541	6	21	Cast Iron	1966
WM-4543	30	100	Cast Iron	1976
WM-4544	30	11	Cast Iron	1976
WM-4545	30	15	Cast Iron	1976
WM-4546	6	2	Cast Iron	1966
WM-4547	6	3	Cast Iron	1966
WM-4548	6	3	Cast Iron	1966
WM-4549	6	34	Cast Iron	1966
WM-4551	6	35	Cast Iron	
WM-4552	6	75	Cast Iron	1966
WM-4553	6	435	Cast Iron	1966
WM-4554	6	214	Cast Iron	1966
WM-4555	6	41	Cast Iron	1966
WM-4556	6	69	Cast Iron	1966
WM-4557	6	10	Cast Iron	1948
WM-4558	6	275	Cast Iron	1948
WM-4559	6	6	Cast Iron	1948
WM-4560	6	379	Cast Iron	1954
WM-4561	6	47	Cast Iron	1954
WM-4562	6	6	Cast Iron	1966
WM-4563	6	13	Cast Iron	1966
WM-4564	6	19	Cast Iron	
WM-4565	6	342	Cast Iron	1966
WM-4566	6	4	Cast Iron	1966
WM-4567	6	366	Cast Iron	1948
WM-4568	24	37	Cast Iron	1992
WM-4569	24	269	Cast Iron	1992

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4570	6	4	Cast Iron	1954
WM-4571	6	53	Cast Iron	1954
WM-4572	12	274	Cast Iron	1958
WM-4573	6	4	Cast Iron	1966
WM-4574	6	66	Cast Iron	1966
WM-4575	6	258	Cast Iron	1966
WM-4576	6	334	Cast Iron	1966
WM-4577	6	1	Cast Iron	1992
WM-4578	6	379	Cast Iron	1954
WM-4579	6	63	Cast Iron	1954
WM-4580	24	474	Ductile Iron	1992
WM-4581	6	52	Cast Iron	1963
WM-4582	6	406	Cast Iron	1963
WM-4583	6	2	Cast Iron	1963
WM-4584	6	3	Cast Iron	1954
WM-4585	6	88	Cast Iron	1954
WM-4586	12	2	Cast Iron	1958
WM-4588	12	71	Cast Iron	1958
WM-4589	12	12	Cast Iron	1958
WM-4590	12	53	Cast Iron	1958
WM-4591	12	232	Cast Iron	1959
WM-4592	12	61	Cast Iron	1959
WM-4593	6	2	Cast Iron	1948
WM-4594	6	11	Cast Iron	1948
WM-4595	12	55	Cast Iron	1959
WM-4596	6	457	Cast Iron	1948
WM-4597	12	275	Cast Iron	1959
WM-4598	6	3	Cast Iron	1966
WM-4599	6	11	Cast Iron	1966
WM-4600	12	55	Cast Iron	1959
WM-4601	6	468	Cast Iron	1966
WM-4602	12	239	Cast Iron	1959
WM-4603	6	4	Cast Iron	1966
WM-4605	6	23	Cast Iron	1948
WM-4606	6	341	Cast Iron	1948
WM-4607	6	11	Cast Iron	1966
WM-4608	6	55	Cast Iron	1966
WM-4609	6	202	Cast Iron	1966
WM-4610	24	54	Ductile Iron	1992
WM-4611	24	423	Ductile Iron	1992
WM-4612	24	37	Ductile Iron	1992

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4613	24	420	Cast Iron	1992
WM-4614	6	4	Cast Iron	1966
WM-4615	6	10	Cast Iron	1966
WM-4616	6	7	Cast Iron	1966
WM-4617	6	407	Cast Iron	1966
WM-4620	12	8	Cast Iron	1959
WM-4621	24	8	Ductile Iron	1992
WM-4623	12	31	Cast Iron	1959
WM-4626	12	84	Cast Iron	1955
WM-4627	24	1720	Ductile Iron	1992
WM-4628	12	6	Ductile Iron	1992
WM-4629	12	5	Ductile Iron	1992
WM-4631	6	15	Ductile Iron	2000
WM-4632	24	858	Ductile Iron	2000
WM-4633	24	733	Ductile Iron	2000
WM-4635	6	311	Cast Iron	1966
WM-4638	6	11	Cast Iron	1966
WM-4639	6	1	Cast Iron	1966
WM-4640	12	25	Cast Iron	1955
WM-4641	12	204	Cast Iron	1955
WM-4643	6	1	Cast Iron	1966
WM-4644	6	72	Cast Iron	1966
WM-4645	6	33	Cast Iron	1966
WM-4647	12	114	Cast Iron	1955
WM-4648	12	11	Cast Iron	1955
WM-4649	12	103	Cast Iron	1955
WM-4651	12	293	Cast Iron	1948
WM-4652	6	140	Cast Iron	1966
WM-4653	6	90	Cast Iron	1966
WM-4655	24	15	Ductile Iron	1992
WM-4656	24	527	Ductile Iron	1992
WM-4659	10	243	Cast Iron	1955
WM-4660	24	285	Ductile Iron	1955
WM-4661	10	389	Cast Iron	1955
WM-4662	10	216	Cast Iron	1955
WM-4663	6	315	Cast Iron	1966
WM-4664	6	477	Cast Iron	1966
WM-4665	6	369	Cast Iron	1966
WM-4666	6	2	Cast Iron	1966
WM-4667	12	533	Cast Iron	1948
WM-4670	6	7	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4671	6	37	Cast Iron	1966
WM-4672	6	11	Cast Iron	1966
WM-4673	6	11	Cast Iron	1966
WM-4674	6	55	Cast Iron	1961
WM-4675	6	1	Cast Iron	1966
WM-4676	6	16	Cast Iron	1966
WM-4678	6	50	Cast Iron	1966
WM-4679	6	152	Cast Iron	1966
WM-4680	6	277	Cast Iron	1961
WM-4681	6	55	Cast Iron	1952
WM-4682	6	12	Ductile Iron	1952
WM-4683	6	213	Cast Iron	1952
WM-4684	6	17	Cast Iron	1952
WM-4685	6	284	Cast Iron	1966
WM-4686	6	13	Cast Iron	1966
WM-4687	6	3	Cast Iron	1966
WM-4688	6	1	Cast Iron	
WM-4691	6	13	Cast Iron	1966
WM-4692	6	12	Cast Iron	1966
WM-4693	6	353	Cast Iron	1966
WM-4694	6	12	Cast Iron	1966
WM-4696	6	2	Cast Iron	1966
WM-4697	6	1	Cast Iron	1966
WM-4698	6	57	Cast Iron	1966
WM-4699	6	1	Cast Iron	
WM-4700	6	1	Cast Iron	
WM-4701	6	3	Cast Iron	1948
WM-4703	6	2	Cast Iron	1966
WM-4704	6	376	Cast Iron	1966
WM-4705	6	154	Cast Iron	1966
WM-4706	6	1	Cast Iron	
WM-4708	6	15	Cast Iron	1990
WM-4709	6	290	Cast Iron	1990
WM-4710	6	50	Cast Iron	1990
WM-4711	6	133	Cast Iron	1990
WM-4712	6	1	Ductile Iron	1990
WM-4713	6	62	Cast Iron	1990
WM-4714	6	82	Cast Iron	1990
WM-4715	6	87	Ductile Iron	1990
WM-4716	6	42	Cast Iron	1990
WM-4718	6	1	Cast Iron	1951

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4719	6	39	Cast Iron	1951
WM-4720	6	621	Cast Iron	1966
WM-4721	6	46	Cast Iron	1966
WM-4722	6	40	Cast Iron	1966
WM-4724	6	8	Cast Iron	1954
WM-4727	6	248	Cast Iron	1954
WM-4728	6	21	Cast Iron	1954
WM-4729	6	3	Cast Iron	1954
WM-4730	6	3	Cast Iron	1966
WM-4731	6	42	Cast Iron	1966
WM-4732	6	22	Cast Iron	1966
WM-4733	6	485	Cast Iron	1966
WM-4734	6	32	Cast Iron	1966
WM-4735	6	534	Cast Iron	1966
WM-4736	6	1	Cast Iron	1951
WM-4737	6	53	Cast Iron	1951
WM-4740	6	13	Cast Iron	1955
WM-4741	6	52	Cast Iron	1966
WM-4742	6	213	Cast Iron	1966
WM-4743	6	3	Cast Iron	1955
WM-4745	6	416	Cast Iron	1955
WM-4746	6	372	Cast Iron	1955
WM-4748	6	51	Cast Iron	1955
WM-4751	6	332	Cast Iron	1954
WM-4752	6	3	Cast Iron	1966
WM-4753	6	11	Cast Iron	1966
WM-4754	6	488	Cast Iron	1966
WM-4755	6	3	Cast Iron	1966
WM-4756	6	148	Cast Iron	1966
WM-4757	6	22	Cast Iron	1954
WM-4758	6	11	Cast Iron	1954
WM-4759	6	3	Cast Iron	1954
WM-4760	6	99	Cast Iron	1954
WM-4762	12	571	Cast Iron	1957
WM-4763	6	18	Cast Iron	1954
WM-4764	6	1	Cast Iron	1954
WM-4765	6	29	Cast Iron	1954
WM-4766	6	45	Cast Iron	1954
WM-4767	12	161	Cast Iron	1957
WM-4768	12	53	Cast Iron	1957
WM-4769	12	1	Ductile Iron	2001

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4770	12	1	Ductile Iron	2001
WM-4773	8	295	Cast Iron	1997
WM-4775	8	33	Cast Iron	1997
WM-4776	8	13	Cast Iron	1961
WM-4777	8	22	Cast Iron	1961
WM-4779	8	8	Cast Iron	1966
WM-4781	8	303	Cast Iron	1966
WM-4782	6	19	Cast Iron	1957
WM-4783	6	8	Cast Iron	1957
WM-4784	8	362	Cast Iron	1961
WM-4785	8	22	Cast Iron	1961
WM-4788	8	187	Cast Iron	1961
WM-4790	8	52	Cast Iron	1961
WM-4791	24	1	Ductile Iron	1992
WM-4794	24	1	Ductile Iron	1992
WM-4795	8	52	Cast Iron	1966
WM-4796	8	167	Cast Iron	1966
WM-4797	6	1	Cast Iron	
WM-4801	6	1	Cast Iron	1940
WM-4804	6	50	Ductile Iron	1940
WM-4805	6	4	Cast Iron	1940
WM-4806	6	2	Ductile Iron	
WM-4807	6	23	Cast Iron	
WM-4808	6	510	Cast Iron	1940
WM-4809	6	3	Cast Iron	1940
WM-4811	8	55	Cast Iron	
WM-4812	6	1	Cast Iron	
WM-4813	8	291	Cast Iron	1966
WM-4814	12	195	Ductile Iron	1992
WM-4815	12	14	Ductile Iron	1992
WM-4816	12	1	Ductile Iron	1992
WM-4817	12	12	Ductile Iron	1992
WM-4819	12	1	Ductile Iron	1948
WM-4820	12	1	Ductile Iron	1948
WM-4821	12	1	Ductile Iron	1948
WM-4822	12	1	Ductile Iron	1948
WM-4823	12	6	Cast Iron	1960
WM-4824	12	11	Cast Iron	1961
WM-4825	12	97	Cast Iron	1960
WM-4826	12	37	Cast Iron	1961
WM-4827	8	195	Cast Iron	1961

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4829	12	26	Cast Iron	1960
WM-4830	12	62	Cast Iron	1948
WM-4831	12	2	Cast Iron	1948
WM-4833	12	11	Cast Iron	1948
WM-4834	12	432	Cast Iron	1948
WM-4835	12	3	Cast Iron	1948
WM-4836	12	394	Cast Iron	1948
WM-4837	12	5	Cast Iron	1948
WM-4839	12	1	Ductile Iron	1955
WM-4840	8	51	Cast Iron	1961
WM-4843	6	59	Cast Iron	1997
WM-4845	6	1	Cast Iron	
WM-4846	6	112	Cast Iron	1997
WM-4847	6	252	Ductile Iron	1997
WM-4849	8	103	Ductile Iron	1997
WM-4850	6	143	Cast Iron	1997
WM-4851	6	1	Cast Iron	1997
WM-4853	12	244	Cast Iron	1960
WM-4854	12	16	Cast Iron	1960
WM-4855	12	10	Cast Iron	1960
WM-4856	12	12	Cast Iron	1960
WM-4859	12	106	Cast Iron	1960
WM-4861	8	3	Cast Iron	
WM-4862	8	130	Ductile Iron	
WM-4863	8	147	Cast Iron	1961
WM-4864	8	441	Ductile Iron	1961
WM-4865	24	61	Ductile Iron	1992
WM-4866	24	111	Ductile Iron	1992
WM-4873	12	5	Ductile Iron	1992
WM-4874	12	2	Cast Iron	1992
WM-4876	12	1	Ductile Iron	1992
WM-4877	12	8	Ductile Iron	1992
WM-4878	12	5	Ductile Iron	1966
WM-4879	12	5	Ductile Iron	1992
WM-4880	12	48	Ductile Iron	1992
WM-4881	12	145	Ductile Iron	1992
WM-4882	24	8	Ductile Iron	1992
WM-4883	24	8	Ductile Iron	1992
WM-4884	24	487	Ductile Iron	1992
WM-4885	8	5	Ductile Iron	1961
WM-4886	12	23	Ductile Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4887	8	24	Ductile Iron	1961
WM-4888	12	121	Cast Iron	1966
WM-4889	12	10	Ductile Iron	1966
WM-4890	12	6	Ductile Iron	1966
WM-4891	12	3	Ductile Iron	1966
WM-4892	12	10	Ductile Iron	1966
WM-4893	12	94	Ductile Iron	1966
WM-4894	12	615	Ductile Iron	1966
WM-4895	24	11	Ductile Iron	1992
WM-4896	24	73	Ductile Iron	2000
WM-4897	24	1541	Ductile Iron	2000
WM-4898	24	17	Ductile Iron	2000
WM-4899	24	90	Ductile Iron	2000
WM-4900	24	2196	Ductile Iron	2000
WM-4901	6	1	Cast Iron	1956
WM-4902	24	4	Ductile Iron	2000
WM-4904	12	2	Ductile Iron	2000
WM-4905	12	2	Ductile Iron	2000
WM-4906	6	23	Ductile Iron	2000
WM-4908	24	101	Ductile Iron	2000
WM-4909	24	185	Ductile Iron	2000
WM-4911	20	5	Cast Iron	1968
WM-4912	20	10	Cast Iron	1968
WM-4913	16	36	Cast Iron	1968
WM-4914	10	1	Cast Iron	1968
WM-4915	10	185	Cast Iron	1968
WM-4916	10	5	Cast Iron	1968
WM-4917	6	3	Cast Iron	1962
WM-4918	6	76	Cast Iron	1962
WM-4920	16	4	Cast Iron	1968
WM-4921	16	5	Cast Iron	1968
WM-4922	20	3	Cast Iron	1968
WM-4923	12	11	Cast Iron	1967
WM-4924	16	2	Cast Iron	1967
WM-4927	20	72	Cast Iron	1968
WM-4928	16	53	Ductile Iron	1967
WM-4929	16	132	Ductile Iron	1967
WM-4930	16	1	Cast Iron	1967
WM-4931	12	1	Cast Iron	1968
WM-4932	6	2	Cast Iron	1968
WM-4933	20	119	Cast Iron	1968

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4934	6	2	Cast Iron	1968
WM-4935	6	2	Cast Iron	1968
WM-4936	6	29	Cast Iron	1968
WM-4937	6	52	Cast Iron	1968
WM-4938	6	6	Cast Iron	1962
WM-4939	6	3	Cast Iron	1962
WM-4940	6	144	Cast Iron	1962
WM-4941	6	193	Cast Iron	1962
WM-4942	6	216	Ductile Iron	1962
WM-4943	6	2	Cast Iron	1962
WM-4944	12	5	Cast Iron	1960
WM-4945	12	6	Cast Iron	1960
WM-4946	6	92	Cast Iron	
WM-4949	12	130	Cast Iron	1960
WM-4950	12	115	Cast Iron	1960
WM-4951	12	293	Cast Iron	1960
WM-4953	10	3	Cast Iron	
WM-4955	12	31	Cast Iron	1960
WM-4958	6	70	Cast Iron	
WM-4959	6	13	Cast Iron	
WM-4961	6	270	Cast Iron	1957
WM-4962	6	89	Cast Iron	1957
WM-4963	6	337	Cast Iron	1957
WM-4964	6	85	Cast Iron	1957
WM-4965	6	63	Cast Iron	1957
WM-4966	6	1	Cast Iron	1957
WM-4967	6	278	Cast Iron	1957
WM-4968	6	241	Cast Iron	1957
WM-4969	8	113	Cast Iron	1997
WM-4970	6	31	Cast Iron	1997
WM-4971	6	90	Cast Iron	1957
WM-4972	6	542	Cast Iron	1957
WM-4973	6	20	Cast Iron	1957
WM-4974	6	81	Cast Iron	1957
WM-4975	6	426	Cast Iron	1957
WM-4976	6	3	Cast Iron	1957
WM-4977	6	525	Cast Iron	1974
WM-4978	8	207	Cast Iron	1966
WM-4979	8	10	Cast Iron	1966
WM-4980	6	9	Cast Iron	1974
WM-4981	6	3	Cast Iron	1974

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-4982	6	1	Cast Iron	1974
WM-4983	6	20	Cast Iron	1974
WM-4987	6	4	Cast Iron	1966
WM-4989	6	2	Cast Iron	1966
WM-4990	6	1	Cast Iron	1966
WM-4992	6	64	Cast Iron	1966
WM-4993	6	8	Cast Iron	1973
WM-4994	6	519	Cast Iron	1973
WM-4995	6	136	Cast Iron	1973
WM-4999	6	66	Cast Iron	1973
WM-5003	6	10	Ductile Iron	2015
WM-5005	8	144	Cast Iron	1966
WM-5007	8	86	Cast Iron	1966
WM-5008	8	896	Cast Iron	1966
WM-5009	8	150	Cast Iron	1966
WM-5010	8	2	Cast Iron	1966
WM-5011	8	10	Cast Iron	1966
WM-5013	12	27	Cast Iron	1960
WM-5014	12	1110	Cast Iron	1960
WM-5015	12	5	Cast Iron	1960
WM-5018	6	1	Cast Iron	1960
WM-5019	8	42	Cast Iron	
WM-5020	8	39	Cast Iron	
WM-5021	8	187	Cast Iron	
WM-5022	8	194	Cast Iron	
WM-5023	8	5	Cast Iron	
WM-5024	8	144	Cast Iron	
WM-5025	8	48	Cast Iron	
WM-5027	8	24	Cast Iron	
WM-5028	8	160	Cast Iron	
WM-5029	4	25	Cast Iron	
WM-5030	4	65	Cast Iron	
WM-5031	4	20	Cast Iron	
WM-5032	4	35	Cast Iron	
WM-5034	8	5	Cast Iron	
WM-5035	8	159	Cast Iron	
WM-5036	8	20	Ductile Iron	
WM-5037	8	10	Cast Iron	
WM-5040	24	1441	Ductile Iron	2000
WM-5048	10	3	Ductile Iron	2000
WM-5054	6	2	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5055	6	23	Cast Iron	1956
WM-5056	8	11	Cast Iron	1966
WM-5057	6	12	Cast Iron	1956
WM-5058	6	440	Cast Iron	1956
WM-5061	6	3	Cast Iron	1956
WM-5062	6	13	Cast Iron	1956
WM-5063	6	13	Cast Iron	1956
WM-5065	6	417	Cast Iron	1956
WM-5066	6	3	Cast Iron	1954
WM-5067	6	147	Cast Iron	1954
WM-5068	6	88	Cast Iron	1954
WM-5070	6	13	Cast Iron	1954
WM-5071	6	47	Cast Iron	1954
WM-5073	6	3	Cast Iron	1954
WM-5074	6	477	Cast Iron	1954
WM-5075	6	2	Cast Iron	1954
WM-5081	6	4	Cast Iron	1954
WM-5085	6	165	Ductile Iron	2008
WM-5086	6	16	Ductile Iron	2008
WM-5087	6	6	Ductile Iron	2008
WM-5088	6	19	Cast Iron	1958
WM-5089	6	202	Cast Iron	1958
WM-5090	6	54	Cast Iron	1958
WM-5091	6	177	Cast Iron	1956
WM-5093	6	132	Cast Iron	1956
WM-5096	6	268	Cast Iron	1958
WM-5098	6	14	Cast Iron	1958
WM-5100	6	5	Ductile Iron	2008
WM-5101	6	97	Cast Iron	1958
WM-5102	6	714	Cast Iron	1957
WM-5103	6	65	Cast Iron	1957
WM-5104	6	245	Cast Iron	1948
WM-5105	30	272	Cast Iron	1966
WM-5106	6	182	Cast Iron	1955
WM-5107	6	70	Cast Iron	1955
WM-5109	6	198	Cast Iron	1948
WM-5110	30	248	Cast Iron	1966
WM-5112	6	10	Cast Iron	1966
WM-5113	30	7	Cast Iron	1966
WM-5114	6	47	Cast Iron	1948
WM-5117	12	92	Cast Iron	1955

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5118	12	46	Cast Iron	1955
WM-5119	12	3	Cast Iron	
WM-5120	12	3	Cast Iron	1954
WM-5121	6	1	Cast Iron	1954
WM-5124	12	9	Cast Iron	1955
WM-5126	6	560	Cast Iron	1966
WM-5127	6	17	Cast Iron	1954
WM-5128	6	19	Cast Iron	1954
WM-5129	6	394	Cast Iron	1954
WM-5130	6	4	Cast Iron	1954
WM-5131	6	2	Cast Iron	1954
WM-5132	6	84	Cast Iron	1954
WM-5133	6	335	Cast Iron	1954
WM-5136	6	129	Cast Iron	1966
WM-5137	6	156	Cast Iron	1966
WM-5139	6	5	Cast Iron	
WM-5140	12	6	Cast Iron	1955
WM-5142	6	42	Cast Iron	1966
WM-5143	8	480	Cast Iron	1955
WM-5144	8	8	Cast Iron	1955
WM-5145	12	39	Cast Iron	1955
WM-5146	12	2392	Cast Iron	1955
WM-5149	8	4	Cast Iron	1955
WM-5150	6	4	Cast Iron	1966
WM-5151	6	13	Cast Iron	1966
WM-5152	6	1	Cast Iron	1971
WM-5153	6	3	Cast Iron	1971
WM-5154	6	2	Cast Iron	1971
WM-5155	6	25	Cast Iron	1971
WM-5156	6	620	Cast Iron	1971
WM-5158	6	3	Cast Iron	1966
WM-5159	6	13	Cast Iron	1966
WM-5160	6	55	Cast Iron	1971
WM-5161	6	186	Cast Iron	1971
WM-5162	6	28	Cast Iron	1971
WM-5163	6	541	Cast Iron	1966
WM-5164	6	34	Cast Iron	1954
WM-5165	6	43	Cast Iron	1966
WM-5166	6	10	Cast Iron	1966
WM-5167	6	14	Cast Iron	1966
WM-5168	10	148	Cast Iron	1976

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5169	10	98	Cast Iron	1976
WM-5175	10	66	Ductile Iron	2000
WM-5176	24	1121	Ductile Iron	2000
WM-5178	24	20	Ductile Iron	2000
WM-5179	12	2	Ductile Iron	2000
WM-5180	10	10	Ductile Iron	2000
WM-5181	10	21	Ductile Iron	2000
WM-5182	24	258	Ductile Iron	2000
WM-5183	6	602	Cast Iron	1966
WM-5184	6	53	Cast Iron	1966
WM-5186	8	22	Cast Iron	1948
WM-5187	8	24	Cast Iron	1948
WM-5188	8	3	Cast Iron	1955
WM-5189	6	6	Cast Iron	1971
WM-5190	6	13	Cast Iron	1971
WM-5191	6	439	Cast Iron	1971
WM-5192	6	11	Cast Iron	1948
WM-5193	6	416	Cast Iron	1971
WM-5195	6	23	Cast Iron	1966
WM-5196	8	46	Cast Iron	1955
WM-5197	8	408	Cast Iron	1955
WM-5198	6	44	Cast Iron	1948
WM-5199	6	3	Cast Iron	1961
WM-5200	6	11	Cast Iron	1961
WM-5201	6	11	Cast Iron	1961
WM-5202	6	601	Cast Iron	1961
WM-5203	6	360	Cast Iron	1961
WM-5204	6	43	Cast Iron	1961
WM-5205	6	23	Cast Iron	1951
WM-5206	8	55	Cast Iron	1955
WM-5207	8	3	Cast Iron	1955
WM-5208	8	375	Cast Iron	1955
WM-5209	6	604	Cast Iron	1951
WM-5210	8	5	Cast Iron	1955
WM-5212	8	17	Cast Iron	1955
WM-5214	8	407	Cast Iron	1946
WM-5216	20	16	Cast Iron	1972
WM-5217	8	3	Cast Iron	1972
WM-5218	12	16	Cast Iron	1972
WM-5219	12	2	Cast Iron	1972
WM-5221	20	8	Cast Iron	1972

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5222	20	18	Cast Iron	1972
WM-5226	6	11	Cast Iron	1972
WM-5227	6	5	Cast Iron	1948
WM-5229	10	12	Cast Iron	1972
WM-5230	12	12	Cast Iron	1972
WM-5231	12	2	Cast Iron	1972
WM-5232	20	1	Cast Iron	1972
WM-5233	20	37	Cast Iron	1972
WM-5239	10	22	Cast Iron	1948
WM-5240	6	373	Cast Iron	1966
WM-5243	10	46	Cast Iron	1948
WM-5245	6	10	Cast Iron	1958
WM-5246	6	1	Cast Iron	1958
WM-5247	6	69	Cast Iron	1958
WM-5250	6	4	Ductile Iron	
WM-5251	6	4	Cast Iron	2008
WM-5255	6	119	Ductile Iron	2008
WM-5256	6	260	Cast Iron	1958
WM-5257	6	300	Cast Iron	1958
WM-5258	6	61	Cast Iron	1958
WM-5259	6	235	Cast Iron	1957
WM-5260	6	203	Cast Iron	1957
WM-5261	12	76	Ductile Iron	2001
WM-5262	12	220	Ductile Iron	2001
WM-5265	12	34	Ductile Iron	2001
WM-5267	12	52	Ductile Iron	2001
WM-5270	12	2	Ductile Iron	2001
WM-5271	12	362	Ductile Iron	2001
WM-5273	12	59	Ductile Iron	2001
WM-5275	12	109	Ductile Iron	2001
WM-5277	12	3	Ductile Iron	2001
WM-5281	6	44	Cast Iron	1962
WM-5287	4	7	Ductile Iron	1962
WM-5304	8	2	Ductile Iron	2002
WM-5306	8	23	Ductile Iron	2002
WM-5307	8	57	Ductile Iron	2002
WM-5308	8	27	Ductile Iron	2002
WM-5311	8	153	Ductile Iron	2002
WM-5313	8	21	Ductile Iron	2002
WM-5314	8	16	Ductile Iron	2002
WM-5315	8	61	Ductile Iron	2002

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5316	8	2	Ductile Iron	2002
WM-5317	8	12	Ductile Iron	2002
WM-5319	8	17	Ductile Iron	2002
WM-5320	8	1	Ductile Iron	2002
WM-5321	8	1	Ductile Iron	2002
WM-5325	8	3	Ductile Iron	2002
WM-5326	8	1	Ductile Iron	2002
WM-5330	8	116	Ductile Iron	2002
WM-5331	8	4	Ductile Iron	2002
WM-5334	8	2	Ductile Iron	2002
WM-5335	8	1	Ductile Iron	2002
WM-5336	6	14	Ductile Iron	2002
WM-5337	8	99	Ductile Iron	2002
WM-5338	8	19	Ductile Iron	2002
WM-5339	8	3	Ductile Iron	2002
WM-5340	8	25	Ductile Iron	2002
WM-5342	8	107	Ductile Iron	2002
WM-5343	8	19	Ductile Iron	2002
WM-5344	6	4	Ductile Iron	2002
WM-5346	8	125	Ductile Iron	2002
WM-5348	8	166	Ductile Iron	2002
WM-5349	8	49	Ductile Iron	2002
WM-5350	8	8	Ductile Iron	2002
WM-5351	8	26	Ductile Iron	2002
WM-5352	8	12	Ductile Iron	2002
WM-5353	10	55	Ductile Iron	2002
WM-5354	10	60	Ductile Iron	2002
WM-5356	10	283	Ductile Iron	2002
WM-5357	10	1	Ductile Iron	2002
WM-5358	10	1	Ductile Iron	2002
WM-5359	10	1	Ductile Iron	2002
WM-5360	10	1	Ductile Iron	2002
WM-5361	6	2	Ductile Iron	2002
WM-5363	10	162	Ductile Iron	2002
WM-5364	10	110	Ductile Iron	2002
WM-5367	12	415	Cast Iron	1960
WM-5368	12	51	Cast Iron	1960
WM-5369	6	1	Cast Iron	1960
WM-5371	6	1	Ductile Iron	1960
WM-5372	12	52	Ductile Iron	1960
WM-5373	12	388	Ductile Iron	1960

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5374	12	429	Ductile Iron	1960
WM-5375	12	51	Ductile Iron	1960
WM-5377	12	55	Ductile Iron	1960
WM-5378	6	1	Ductile Iron	1960
WM-5379	12	375	Cast Iron	1960
WM-5380	12	51	Cast Iron	1960
WM-5381	6	1	Cast Iron	1960
WM-5382	12	382	Cast Iron	1960
WM-5383	8	75	Cast Iron	1960
WM-5384	12	82	Cast Iron	1966
WM-5385	8	1	Cast Iron	
WM-5386	12	3	Cast Iron	1969
WM-5388	12	402	Cast Iron	1969
WM-5390	12	69	Cast Iron	1969
WM-5391	12	15	Cast Iron	1969
WM-5392	12	226	Cast Iron	1969
WM-5393	12	311	Cast Iron	1969
WM-5394	12	208	Cast Iron	1969
WM-5395	12	178	Cast Iron	1969
WM-5396	12	2	Cast Iron	1969
WM-5397	12	1	Cast Iron	1980
WM-5398	12	80	Cast Iron	1969
WM-5399	12	2	Cast Iron	1969
WM-5402	12	169	Cast Iron	1969
WM-5403	12	9	Cast Iron	1969
WM-5404	12	4	Cast Iron	1969
WM-5405	12	240	Cast Iron	1969
WM-5406	12	287	Cast Iron	1969
WM-5408	12	301	Cast Iron	1969
WM-5410	12	298	Cast Iron	1960
WM-5411	12	96	Cast Iron	1960
WM-5412	12	220	Cast Iron	1969
WM-5413	12	3	Cast Iron	1969
WM-5415	12	3	Cast Iron	1969
WM-5416	12	129	Cast Iron	1969
WM-5417	12	106	Cast Iron	1969
WM-5418	12	1	Ductile Iron	2003
WM-5422	12	31	Ductile Iron	2003
WM-5423	12	19	Ductile Iron	2003
WM-5425	12	286	Cast Iron	1969
WM-5427	6	59	Cast Iron	1969

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5428	6	88	Cast Iron	2000
WM-5429	12	150	Cast Iron	1969
WM-5430	12	145	Cast Iron	1969
WM-5431	12	7	Cast Iron	1969
WM-5434	12	292	Cast Iron	1969
WM-5435	12	305	Cast Iron	1969
WM-5436	12	4	Ductile Iron	1969
WM-5437	12	176	Cast Iron	1969
WM-5438	12	126	Cast Iron	1969
WM-5439	12	1	Cast Iron	1982
WM-5440	12	328	Cast Iron	1982
WM-5441	12	382	Cast Iron	1982
WM-5443	12	242	Cast Iron	1969
WM-5444	12	284	Cast Iron	1969
WM-5445	12	3	Cast Iron	1969
WM-5446	12	309	Cast Iron	1969
WM-5448	12	296	Cast Iron	1969
WM-5449	12	3	Cast Iron	1969
WM-5451	12	284	Cast Iron	1969
WM-5452	12	3	Cast Iron	1969
WM-5453	12	43	Cast Iron	1969
WM-5454	12	52	Cast Iron	1969
WM-5455	12	1	Cast Iron	1969
WM-5456	12	441	Cast Iron	1969
WM-5457	12	178	Ductile Iron	2003
WM-5458	12	91	Ductile Iron	2003
WM-5459	12	70	Ductile Iron	2003
WM-5460	12	46	Ductile Iron	2003
WM-5461	12	18	Ductile Iron	2003
WM-5462	12	1	Ductile Iron	2003
WM-5463	12	20	Cast Iron	1982
WM-5464	12	289	Cast Iron	1982
WM-5466	12	218	Ductile Iron	1960
WM-5467	12	167	Ductile Iron	1960
WM-5468	12	206	Cast Iron	1982
WM-5469	12	1	Cast Iron	1982
WM-5471	12	8	Cast Iron	1982
WM-5472	12	30	Cast Iron	1982
WM-5473	12	58	Cast Iron	1982
WM-5474	12	4	Cast Iron	1982
WM-5476	12	122	Cast Iron	1982

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5477	12	137	Cast Iron	1982
WM-5478	12	228	Ductile Iron	2003
WM-5479	12	10	Ductile Iron	2003
WM-5480	12	38	Ductile Iron	2003
WM-5481	12	7	Ductile Iron	2003
WM-5482	12	3	Ductile Iron	2003
WM-5483	12	73	Ductile Iron	2003
WM-5485	12	66	Ductile Iron	2003
WM-5486	12	153	Ductile Iron	2003
WM-5487	12	189	Ductile Iron	2003
WM-5488	12	403	Cast Iron	1969
WM-5489	12	83	Cast Iron	1969
WM-5490	8	49	Ductile Iron	1966
WM-5492	8	200	Cast Iron	1966
WM-5493	8	45	Cast Iron	1966
WM-5494	8	10	Cast Iron	1966
WM-5495	6	30	Cast Iron	1955
WM-5497	6	190	Cast Iron	1955
WM-5498	8	10	Cast Iron	1966
WM-5499	8	248	Cast Iron	1966
WM-5501	8	3	Cast Iron	1966
WM-5502	8	2	Cast Iron	1966
WM-5503	12	130	Cast Iron	1955
WM-5505	12	42	Cast Iron	1955
WM-5506	12	150	Cast Iron	1955
WM-5507	12	68	Cast Iron	1955
WM-5510	12	4	Cast Iron	1955
WM-5512	12	20	Cast Iron	1955
WM-5513	6	17	Cast Iron	1984
WM-5514	12	3	Cast Iron	1955
WM-5515	12	27	Cast Iron	1955
WM-5516	12	6	Cast Iron	1955
WM-5517	12	4	Cast Iron	1955
WM-5519	6	2	Cast Iron	
WM-5521	6	1	Cast Iron	
WM-5522	6	3	Cast Iron	
WM-5523	6	1	Cast Iron	
WM-5524	12	292	Cast Iron	1955
WM-5525	12	1	Cast Iron	1955
WM-5526	6	1	Cast Iron	
WM-5527	6	300	Ductile Iron	1984

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5528	6	2	Cast Iron	1984
WM-5529	6	3	Cast Iron	1984
WM-5530	6	154	Cast Iron	1984
WM-5534	6	61	Cast Iron	1984
WM-5536	6	154	Cast Iron	1984
WM-5537	6	10	Cast Iron	1984
WM-5538	6	33	Cast Iron	1984
WM-5540	6	552	Cast Iron	1984
WM-5541	6	59	Cast Iron	1984
WM-5545	8	10	Cast Iron	1966
WM-5546	12	70	Cast Iron	1955
WM-5547	12	177	Cast Iron	1955
WM-5549	12	120	Cast Iron	1955
WM-5551	12	360	Cast Iron	1955
WM-5554	12	34	Cast Iron	1955
WM-5555	10	61	Cast Iron	1955
WM-5556	10	40	Cast Iron	1955
WM-5557	6	195	Cast Iron	1966
WM-5559	10	5	Cast Iron	1966
WM-5560	6	185	Cast Iron	1966
WM-5562	10	1	Cast Iron	1966
WM-5563	6	413	Cast Iron	1966
WM-5564	6	10	Cast Iron	1966
WM-5565	6	10	Cast Iron	1966
WM-5566	6	2	Cast Iron	1966
WM-5567	6	60	Cast Iron	1966
WM-5568	6	3	Cast Iron	1966
WM-5569	6	1	Cast Iron	1966
WM-5571	6	2	Cast Iron	1966
WM-5572	6	1	Cast Iron	1966
WM-5573	6	8	Cast Iron	1966
WM-5939	6	69	Cast Iron	1966
WM-5943	6	2	Ductile Iron	1997
WM-5944	6	509	Ductile Iron	1997
WM-5946	6	230	Ductile Iron	1966
WM-5947	6	210	Ductile Iron	1973
WM-5948	6	17	Ductile Iron	1966
WM-5950	6	103	Ductile Iron	1973
WM-5951	6	45	Ductile Iron	1973
WM-5952	6	80	Cast Iron	1973
WM-5953	6	20	Cast Iron	1973

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5954	6	39	Cast Iron	1973
WM-5955	6	17	Cast Iron	1973
WM-5957	6	190	Cast Iron	1985
WM-5958	6	185	Cast Iron	1985
WM-5959	6	11	Cast Iron	1970
WM-5960	6	10	Cast Iron	1970
WM-5961	6	121	Cast Iron	1970
WM-5962	6	89	Cast Iron	1970
WM-5963	6	179	Cast Iron	1970
WM-5964	4	40	Cast Iron	1980
WM-5965	4	250	Cast Iron	1980
WM-5966	6	2	Cast Iron	1970
WM-5967	6	145	Cast Iron	1980
WM-5968	6	2	Cast Iron	
WM-5969	6	2	Cast Iron	
WM-5970	6	394	Cast Iron	1980
WM-5971	6	10	Ductile Iron	1990
WM-5972	6	110	Ductile Iron	1990
WM-5973	6	5	Ductile Iron	1990
WM-5975	6	2	Ductile Iron	1990
WM-5976	6	1	Ductile Iron	1990
WM-5977	6	1	Ductile Iron	1990
WM-5979	6	187	Cast Iron	1980
WM-5980	6	160	Cast Iron	1980
WM-5982	6	61	Ductile Iron	1985
WM-5983	6	5	Cast Iron	1985
WM-5984	6	4	Cast Iron	1985
WM-5985	6	185	Ductile Iron	1997
WM-5986	6	5	Ductile Iron	1997
WM-5987	6	2	Ductile Iron	1997
WM-5988	6	8	Ductile Iron	1997
WM-5989	6	48	Cast Iron	1985
WM-5990	6	1	Cast Iron	1985
WM-5991	6	10	Cast Iron	1985
WM-5992	6	3	Cast Iron	1985
WM-5993	6	15	Cast Iron	1985
WM-5994	6	28	Cast Iron	1985
WM-5995	6	11	Cast Iron	1985
WM-5996	6	30	Cast Iron	1985
WM-5997	6	25	Cast Iron	1985
WM-5998	6	1	Cast Iron	1985

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-5999	6	30	Cast Iron	1985
WM-6000	6	25	Cast Iron	1985
WM-6001	6	10	Ductile Iron	1985
WM-6002	6	97	Ductile Iron	1997
WM-6005	12	106	Cast Iron	1969
WM-6006	12	1706	Ductile Iron	2002
WM-6007	12	2	Ductile Iron	2002
WM-6008	12	111	Cast Iron	1969
WM-6010	12	750	Ductile Iron	2002
WM-6011	12	15	Ductile Iron	2002
WM-6013	12	11	Ductile Iron	2002
WM-6014	12	2061	Ductile Iron	2002
WM-6015	12	6	Ductile Iron	2002
WM-6016	12	136	Ductile Iron	2002
WM-6020	8	701	Ductile Iron	2003
WM-6022	12	283	Ductile Iron	2002
WM-6023	12	292	Ductile Iron	2002
WM-6025	8	12	Ductile Iron	2002
WM-6026	8	1056	Ductile Iron	2003
WM-6030	12	379	Ductile Iron	2002
WM-6031	12	100	Ductile Iron	2002
WM-6034	8	443	Ductile Iron	2003
WM-6035	8	12	Ductile Iron	2003
WM-6036	8	262	Ductile Iron	2003
WM-6037	8	230	Ductile Iron	2003
WM-6038	8	193	Ductile Iron	2003
WM-6039	8	259	Ductile Iron	2003
WM-6040	8	128	Ductile Iron	2003
WM-6041	8	231	Ductile Iron	2003
WM-6042	8	10	Ductile Iron	2003
WM-6043	8	17	Ductile Iron	2003
WM-6044	8	183	Ductile Iron	2003
WM-6048	8	348	Ductile Iron	2003
WM-6050	8	7	Ductile Iron	2003
WM-6054	8	91	Ductile Iron	2003
WM-6055	8	143	Ductile Iron	2003
WM-6058	6	1	Ductile Iron	2003
WM-6059	8	23	Ductile Iron	2003
WM-6060	8	477	Ductile Iron	2003
WM-6061	8	174	Ductile Iron	2003
WM-6062	8	326	Ductile Iron	2003

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6063	8	13	Ductile Iron	2003
WM-6064	8	181	Ductile Iron	2003
WM-6065	8	2	Ductile Iron	2003
WM-6066	8	105	Ductile Iron	2003
WM-6067	8	1	Ductile Iron	2003
WM-6068	8	376	Ductile Iron	2003
WM-6069	8	1	Ductile Iron	2003
WM-6070	8	10	Ductile Iron	2002
WM-6071	8	10	Ductile Iron	2002
WM-6072	12	5	Ductile Iron	2002
WM-6073	8	10	Ductile Iron	2002
WM-6074	8	10	Ductile Iron	2002
WM-6075	12	5	Ductile Iron	2002
WM-6076	12	5	Ductile Iron	2002
WM-6077	8	10	Ductile Iron	2002
WM-6078	8	10	Ductile Iron	2002
WM-6079	12	5	Ductile Iron	2002
WM-6080	12	15	Ductile Iron	2002
WM-6082	12	2	Ductile Iron	2002
WM-6083	6	1	Ductile Iron	2002
WM-6084	6	2	Ductile Iron	2002
WM-6085	6	3	Ductile Iron	2002
WM-6086	16	97	Cast Iron	1955
WM-6090	6	13	Cast Iron	1943
WM-6094	16	46	Cast Iron	
WM-6095	16	8	Cast Iron	
WM-6096	18	11	Cast Iron	
WM-6097	18	6	Cast Iron	
WM-6098	18	12	Cast Iron	
WM-6100	18	6	Cast Iron	
WM-6101	16	2	Cast Iron	
WM-6103	18	29	Cast Iron	1955
WM-6104	16	2	Cast Iron	
WM-6106	18	14	Ductile Iron	
WM-6107	8	7	Cast Iron	
WM-6108	16	1	Cast Iron	
WM-6109	18	114	Cast Iron	1955
WM-6110	8	3	Cast Iron	
WM-6112	18	41	Cast Iron	
WM-6114	8	41	Cast Iron	
WM-6115	8	64	Cast Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6116	8	3	Cast Iron	
WM-6118	8	5	Ductile Iron	
WM-6119	8	40	Ductile Iron	
WM-6120	8	5	Ductile Iron	
WM-6121	6	3	Cast Iron	
WM-6122	6	120	Cast Iron	
WM-6123	6	10	Cast Iron	
WM-6126	16	4	Cast Iron	1955
WM-6127	16	1	Cast Iron	
WM-6128	6	1	Cast Iron	
WM-6130	4	22	Cast Iron	1943
WM-6133	16	1	Cast Iron	
WM-6134	6	22	Cast Iron	1943
WM-6136	16	103	Cast Iron	1955
WM-6138	16	3	Cast Iron	1955
WM-6139	16	23	Cast Iron	1955
WM-6141	12	60	Cast Iron	
WM-6142	12	1	Ductile Iron	1998
WM-6143	12	8	Ductile Iron	1998
WM-6144	12	316	Other	1998
WM-6149	12	7	Ductile Iron	1998
WM-6150	12	4	Ductile Iron	1998
WM-6151	12	9	Ductile Iron	1998
WM-6152	12	10	Ductile Iron	1998
WM-6153	12	56	Cast Iron	1955
WM-6154	12	80	Cast Iron	1955
WM-6155	6	4	Cast Iron	
WM-6157	12	15	Cast Iron	1955
WM-6158	12	174	Cast Iron	1955
WM-6159	18	4	Cast Iron	1955
WM-6160	18	210	Cast Iron	1955
WM-6161	6	1	Cast Iron	
WM-6183	6	2	Cast Iron	
WM-6184	6	12	Cast Iron	1966
WM-6185	6	1	Cast Iron	
WM-6195	6	5	Ductile Iron	1994
WM-6196	12	385	Ductile Iron	1994
WM-6198	6	5	Ductile Iron	1994
WM-6199	6	4	Ductile Iron	1994
WM-6200	6	378	Cast Iron	1966
WM-6201	6	8	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6202	6	1	Ductile Iron	1994
WM-6205	12	4	Ductile Iron	2005
WM-6206	12	107	Ductile Iron	1994
WM-6208	12	40	Ductile Iron	2005
WM-6227	10	11	Ductile Iron	2005
WM-6228	10	167	Ductile Iron	2005
WM-6229	12	15	Ductile Iron	1994
WM-6230	12	210	Cast Iron	1994
WM-6231	12	10	Ductile Iron	1994
WM-6232	12	41	Ductile Iron	1994
WM-6233	12	16	Ductile Iron	1994
WM-6234	12	596	Ductile Iron	1994
WM-6235	12	13	Ductile Iron	1994
WM-6236	12	216	Ductile Iron	1994
WM-6237	6	3	Ductile Iron	1994
WM-6238	6	26	Ductile Iron	1994
WM-6239	6	41	Cast Iron	1956
WM-6240	6	319	Cast Iron	1956
WM-6241	12	371	Cast Iron	1994
WM-6242	12	5	Cast Iron	1994
WM-6243	12	10	Cast Iron	1994
WM-6246	12	242	Ductile Iron	1988
WM-6247	12	299	Ductile Iron	1988
WM-6248	6	30	Ductile Iron	1994
WM-6251	6	25	Ductile Iron	1994
WM-6252	6	4	Ductile Iron	1994
WM-6253	6	4	Cast Iron	1994
WM-6254	6	11	Cast Iron	1994
WM-6259	6	5	Cast Iron	1966
WM-6260	6	5	Cast Iron	1966
WM-6261	6	36	Cast Iron	1966
WM-6264	6	3	Cast Iron	1966
WM-6265	6	15	Cast Iron	1966
WM-6266	6	13	Cast Iron	1966
WM-6267	6	5	Cast Iron	1994
WM-6268	6	2	Cast Iron	1994
WM-6269	6	4	Cast Iron	1994
WM-6270	6	41	Cast Iron	1966
WM-6271	6	5	Cast Iron	1966
WM-6272	6	3	Cast Iron	1994
WM-6273	6	113	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6274	6	142	Cast Iron	1966
WM-6275	6	5	Cast Iron	1966
WM-6279	12	46	Ductile Iron	1994
WM-6280	6	4	Ductile Iron	1994
WM-6281	6	10	Ductile Iron	1994
WM-6282	6	5	Ductile Iron	1994
WM-6284	8	43	Cast Iron	1966
WM-6285	8	47	Cast Iron	1966
WM-6286	8	35	Cast Iron	1966
WM-6287	8	23	Cast Iron	1966
WM-6288	8	48	Cast Iron	1966
WM-6290	6	81	Cast Iron	1966
WM-6292	12	272	Ductile Iron	1994
WM-6293	12	6	Cast Iron	1994
WM-6294	12	1	Ductile Iron	1994
WM-6295	12	8	Ductile Iron	1994
WM-6296	12	80	Ductile Iron	1994
WM-6298	12	386	Ductile Iron	1994
WM-6300	12	1	Ductile Iron	1994
WM-6301	12	66	Ductile Iron	1994
WM-6302	12	225	Ductile Iron	1994
WM-6303	12	216	Ductile Iron	1994
WM-6304	12	155	Ductile Iron	1994
WM-6305	12	8	Ductile Iron	1994
WM-6306	12	5	Ductile Iron	1994
WM-6307	12	41	Ductile Iron	1994
WM-6308	12	542	Ductile Iron	1994
WM-6309	12	20	Ductile Iron	1994
WM-6310	12	100	Ductile Iron	1994
WM-6311	12	1	Ductile Iron	1994
WM-6312	12	113	Ductile Iron	1994
WM-6313	12	1	Ductile Iron	1994
WM-6315	6	387	Cast Iron	1966
WM-6316	6	3	Cast Iron	1966
WM-6318	6	45	Cast Iron	1966
WM-6319	6	43	Cast Iron	1966
WM-6320	6	387	Cast Iron	1966
WM-6322	6	9	Cast Iron	1966
WM-6323	6	10	Cast Iron	1966
WM-6326	4	1	Cast Iron	
WM-6328	12	54	Ductile Iron	2015

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6350	12	6	Cast Iron	1996
WM-6351	12	151	Cast Iron	1996
WM-6352	12	25	Cast Iron	1996
WM-6353	12	32	Cast Iron	1996
WM-6356	12	224	Cast Iron	1996
WM-6358	12	8	Cast Iron	1996
WM-6359	12	6	Cast Iron	1996
WM-6360	12	6	Cast Iron	1996
WM-6361	12	160	Cast Iron	1996
WM-6362	12	20	Cast Iron	1996
WM-6363	12	20	Cast Iron	1996
WM-6366	12	13	Cast Iron	1996
WM-6367	12	158	Cast Iron	1996
WM-6368	12	2	Cast Iron	1996
WM-6369	12	46	Cast Iron	1996
WM-6370	12	3	Cast Iron	1996
WM-6371	12	5	Cast Iron	1996
WM-6372	12	2	Ductile Iron	1996
WM-6373	12	4	Cast Iron	1996
WM-6374	10	4	Cast Iron	
WM-6375	10	52	Cast Iron	1953
WM-6380	10	112	Cast Iron	1953
WM-6382	6	19	Cast Iron	1938
WM-6393	10	23	Cast Iron	1953
WM-6394	6	10	Cast Iron	1938
WM-6395	6	23	Cast Iron	1938
WM-6396	6	7	Cast Iron	1938
WM-6398	6	6	Cast Iron	1938
WM-6399	6	129	Cast Iron	1938
WM-6401	6	11	Cast Iron	1938
WM-6402	6	18	Cast Iron	1996
WM-6403	6	3	Cast Iron	1996
WM-6404	6	1	Cast Iron	1996
WM-6405	6	16	Cast Iron	1996
WM-6406	6	280	Cast Iron	1996
WM-6407	12	483	Ductile Iron	1994
WM-6408	12	471	Ductile Iron	1994
WM-6409	6	5	Ductile Iron	1996
WM-6417	6	168	Ductile Iron	1996
WM-6421	6	6	Cast Iron	1996
WM-6422	6	32	Cast Iron	1929

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6424	10	193	Cast Iron	1953
WM-6428	10	34	Cast Iron	1953
WM-6429	10	95	Cast Iron	1953
WM-6430	10	5	Cast Iron	1953
WM-6431	6	5	Cast Iron	1953
WM-6432	6	21	Cast Iron	1953
WM-6433	6	5	Cast Iron	1953
WM-6435	6	1	Cast Iron	1953
WM-6436	6	60	Cast Iron	1953
WM-6437	6	130	Cast Iron	1953
WM-6438	6	17	Cast Iron	1953
WM-6439	6	7	Cast Iron	1953
WM-6440	6	11	Cast Iron	1953
WM-6441	6	19	Cast Iron	1953
WM-6443	12	7	Cast Iron	1996
WM-6444	12	9	Cast Iron	1996
WM-6445	12	113	Cast Iron	1996
WM-6449	12	10	Cast Iron	1996
WM-6450	12	236	Cast Iron	1996
WM-6451	12	68	Cast Iron	1996
WM-6452	12	19	Cast Iron	1996
WM-6453	6	632	Ductile Iron	1996
WM-6455	10	140	Cast Iron	1953
WM-6456	6	1	Cast Iron	
WM-6460	6	55	Cast Iron	1960
WM-6463	6	7	Cast Iron	1965
WM-6464	6	188	Cast Iron	1965
WM-6465	6	265	Ductile Iron	1965
WM-6466	12	320	Ductile Iron	1996
WM-6468	6	330	Ductile Iron	1975
WM-6470	6	237	Cast Iron	1975
WM-6471	6	63	Ductile Iron	1975
WM-6473	6	46	Cast Iron	1975
WM-6474	6	213	Cast Iron	1975
WM-6475	6	23	Cast Iron	1975
WM-6476	6	343	Cast Iron	1975
WM-6477	6	214	Cast Iron	1975
WM-6479	6	5	Cast Iron	1975
WM-6480	6	44	Cast Iron	1975
WM-6482	6	51	Cast Iron	1975
WM-6483	6	230	Cast Iron	1975

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6485	6	8	Cast Iron	1975
WM-6486	6	161	Cast Iron	1975
WM-6487	6	12	Cast Iron	1975
WM-6488	6	406	Cast Iron	1963
WM-6491	6	3	Cast Iron	1963
WM-6492	6	335	Cast Iron	1963
WM-6494	6	85	Cast Iron	1963
WM-6495	6	54	Cast Iron	1963
WM-6496	6	304	Cast Iron	1963
WM-6497	6	3	Cast Iron	1963
WM-6498	6	249	Cast Iron	1963
WM-6501	6	4	Cast Iron	1963
WM-6503	6	70	Cast Iron	1963
WM-6504	6	13	Cast Iron	1963
WM-6505	6	62	Cast Iron	1963
WM-6506	6	254	Cast Iron	1963
WM-6507	6	290	Cast Iron	1963
WM-6508	6	31	Cast Iron	1963
WM-6509	6	1	Cast Iron	
WM-6510	6	552	Cast Iron	1963
WM-6511	6	4	Cast Iron	1963
WM-6512	6	53	Cast Iron	1963
WM-6513	6	22	Cast Iron	1963
WM-6517	12	2	Cast Iron	1999
WM-6518	12	18	Cast Iron	1999
WM-6521	12	1	Cast Iron	1999
WM-6522	12	155	Ductile Iron	1999
WM-6523	12	258	Ductile Iron	1999
WM-6524	12	64	Ductile Iron	1999
WM-6526	12	125	Ductile Iron	1999
WM-6528	12	32	Ductile Iron	1999
WM-6530	12	182	Ductile Iron	1999
WM-6531	12	6	Ductile Iron	1999
WM-6537	6	266	Cast Iron	1966
WM-6540	6	3	Cast Iron	1966
WM-6541	6	12	Cast Iron	1966
WM-6542	6	54	Cast Iron	1963
WM-6543	6	1	Cast Iron	
WM-6544	6	125	Cast Iron	1992
WM-6545	6	176	Cast Iron	1966
WM-6546	6	3	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6550	6	509	Cast Iron	1966
WM-6551	6	12	Cast Iron	1966
WM-6554	6	9	Cast Iron	1966
WM-6555	6	13	Cast Iron	1966
WM-6556	6	54	Cast Iron	1966
WM-6558	6	2	Cast Iron	1966
WM-6559	6	173	Cast Iron	1966
WM-6563	12	23	Ductile Iron	1996
WM-6564	12	4	Ductile Iron	1996
WM-6565	12	4	Ductile Iron	1996
WM-6567	12	4	Ductile Iron	1996
WM-6568	12	6	Ductile Iron	1996
WM-6569	12	28	Ductile Iron	1996
WM-6570	12	26	Ductile Iron	1996
WM-6571	12	97	Ductile Iron	1996
WM-6572	12	94	Ductile Iron	1996
WM-6574	6	2	Ductile Iron	1956
WM-6575	6	2	Ductile Iron	1956
WM-6576	6	15	Cast Iron	1956
WM-6577	6	15	Cast Iron	1956
WM-6578	6	13	Cast Iron	1956
WM-6580	6	166	Cast Iron	1956
WM-6581	6	183	Cast Iron	1956
WM-6585	6	34	Cast Iron	1951
WM-6586	6	18	Cast Iron	1951
WM-6587	12	38	Ductile Iron	1988
WM-6590	6	80	Cast Iron	1956
WM-6591	6	1	Cast Iron	1951
WM-6592	6	15	Cast Iron	1951
WM-6594	6	3	Cast Iron	1956
WM-6596	6	2	Cast Iron	1956
WM-6599	6	8	Cast Iron	1956
WM-6601	12	290	Ductile Iron	1988
WM-6605	12	19	Ductile Iron	1988
WM-6609	6	7	Cast Iron	1956
WM-6612	6	5	Ductile Iron	1988
WM-6614	6	5	Cast Iron	1953
WM-6615	6	7	Cast Iron	1953
WM-6617	6	1	Ductile Iron	
WM-6618	6	57	Ductile Iron	1966
WM-6619	6	20	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6621	6	2	Ductile Iron	1966
WM-6623	6	1	Cast Iron	1994
WM-6624	6	1	Ductile Iron	1994
WM-6625	12	367	Ductile Iron	1994
WM-6626	12	4	Ductile Iron	1994
WM-6627	12	1	Ductile Iron	1988
WM-6628	6	1	Ductile Iron	1988
WM-6629	12	1	Ductile Iron	1988
WM-6630	12	1	Ductile Iron	1988
WM-6631	6	13	Cast Iron	1955
WM-6633	6	11	Cast Iron	1956
WM-6634	6	11	Cast Iron	1956
WM-6635	6	3	Cast Iron	1956
WM-6636	8	45	Cast Iron	1988
WM-6637	8	17	Cast Iron	1988
WM-6638	8	53	Cast Iron	1988
WM-6643	8	26	Cast Iron	1988
WM-6644	8	46	Cast Iron	1988
WM-6646	6	5	Ductile Iron	1986
WM-6648	8	11	Cast Iron	1988
WM-6649	8	108	Cast Iron	1988
WM-6651	6	73	Cast Iron	1986
WM-6652	6	62	Cast Iron	1953
WM-6654	6	14	Cast Iron	1953
WM-6655	6	4	Cast Iron	1953
WM-6656	6	1	Cast Iron	1953
WM-6657	6	23	Ductile Iron	1986
WM-6658	6	224	Ductile Iron	1986
WM-6659	6	1	Cast Iron	1986
WM-6660	6	254	Cast Iron	1986
WM-6661	6	6	Cast Iron	1986
WM-6663	6	146	Cast Iron	1986
WM-6664	6	20	Cast Iron	1986
WM-6674	16	133	Cast Iron	1947
WM-6675	6	9	Cast Iron	
WM-6676	6	12	Cast Iron	
WM-6678	6	7	Cast Iron	
WM-6679	6	2	Cast Iron	
WM-6680	16	25	Cast Iron	1947
WM-6681	16	80	Cast Iron	1947
WM-6683	16	552	Cast Iron	1947

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6684	16	509	Cast Iron	1947
WM-6692	6	33	Cast Iron	1978
WM-6693	6	447	Ductile Iron	1968
WM-6694	6	313	Cast Iron	1968
WM-6695	8	4	Cast Iron	1993
WM-6697	8	245	Cast Iron	1993
WM-6698	8	263	Cast Iron	1993
WM-6699	8	1	Cast Iron	1993
WM-6700	6	143	Cast Iron	1968
WM-6701	6	2	Cast Iron	1978
WM-6702	6	578	Cast Iron	1978
WM-6720	12	6	Cast Iron	1948
WM-6722	6	1	Cast Iron	1948
WM-6723	6	12	Cast Iron	1948
WM-6724	12	11	Cast Iron	1948
WM-6725	12	237	Cast Iron	1948
WM-6726	6	43	Cast Iron	1961
WM-6727	6	13	Cast Iron	1966
WM-6729	6	65	Cast Iron	1966
WM-6730	6	18	Cast Iron	1961
WM-6737	6	71	Cast Iron	1971
WM-6738	6	19	Cast Iron	1971
WM-6742	6	313	Cast Iron	1976
WM-6746	6	52	Ductile Iron	1976
WM-6749	6	94	Ductile Iron	1976
WM-6751	6	1	Cast Iron	1976
WM-6752	6	62	Cast Iron	1976
WM-6756	6	62	Cast Iron	1976
WM-6757	6	50	Cast Iron	1976
WM-6758	6	48	Cast Iron	1976
WM-6759	6	122	Cast Iron	1976
WM-6760	6	5	Cast Iron	1976
WM-6761	6	1	Cast Iron	1976
WM-6762	6	183	Ductile Iron	1976
WM-6763	6	93	Cast Iron	1976
WM-6764	12	1	Cast Iron	1969
WM-6765	6	479	Cast Iron	1967
WM-6767	12	3	Cast Iron	1955
WM-6768	12	219	Cast Iron	1955
WM-6769	16	9	Cast Iron	1955
WM-6771	8	139	Cast Iron	1988

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6773	6	10	Ductile Iron	2000
WM-6774	6	4	Ductile Iron	2000
WM-6785	6	22	Cast Iron	1966
WM-6786	6	4	Cast Iron	1966
WM-6787	8	388	Cast Iron	1948
WM-6789	8	246	Ductile Iron	2003
WM-6790	8	148	Ductile Iron	2003
WM-6791	16	22	Cast Iron	1955
WM-6792	16	418	Cast Iron	1955
WM-6793	30	1	Steel	1966
WM-6795	16	10	Cast Iron	1966
WM-6796	6	18	Cast Iron	1954
WM-6797	12	1	Cast Iron	1954
WM-6798	6	375	Cast Iron	1966
WM-6799	10	603	Cast Iron	1948
WM-6801	6	602	Cast Iron	1948
WM-6803	6	566	Ductile Iron	1953
WM-6808	12	15	Ductile Iron	2002
WM-6809	8	12	Ductile Iron	2002
WM-6811	12	500	Ductile Iron	2002
WM-6813	12	49	Ductile Iron	2003
WM-6814	6	4	Cast Iron	1973
WM-6815	4	477	Cast Iron	1940
WM-6816	12	236	Cast Iron	1955
WM-6819	6	314	Cast Iron	1954
WM-6821	6	534	Cast Iron	1966
WM-6823	6	5	Cast Iron	1966
WM-6825	6	6	Cast Iron	
WM-6846	6	41	Cast Iron	1966
WM-6848	6	1	Cast Iron	1966
WM-6860	6	12	Cast Iron	1961
WM-6861	6	9	Cast Iron	1961
WM-6862	6	4	Cast Iron	1961
WM-6863	6	1	Cast Iron	1961
WM-6866	6	201	Ductile Iron	1997
WM-6869	10	10	Cast Iron	1948
WM-6870	10	40	Cast Iron	1948
WM-6871	10	1	Ductile Iron	2001
WM-6873	12	11	Ductile Iron	2001
WM-6874	12	375	Ductile Iron	2001
WM-6886	12	376	Ductile Iron	2001

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6887	12	280	Ductile Iron	2001
WM-6888	6	4	Ductile Iron	2001
WM-6889	6	5	Ductile Iron	2001
WM-6890	6	1	Ductile Iron	2001
WM-6891	12	12	Ductile Iron	2001
WM-6892	6	7	Ductile Iron	1966
WM-6893	6	187	Cast Iron	1966
WM-6895	6	11	Cast Iron	1966
WM-6896	6	17	Cast Iron	1966
WM-6899	6	164	Ductile Iron	1957
WM-6900	6	1	Cast Iron	1957
WM-6901	12	197	Ductile Iron	2001
WM-6904	6	16	Cast Iron	1966
WM-6905	6	25	Cast Iron	1957
WM-6906	6	3	Cast Iron	1957
WM-6908	6	56	Ductile Iron	1957
WM-6909	6	311	Cast Iron	1957
WM-6911	6	200	Cast Iron	1966
WM-6912	12	442	Ductile Iron	2001
WM-6913	12	429	Ductile Iron	2001
WM-6914	12	295	Ductile Iron	2001
WM-6916	6	1	Ductile Iron	2001
WM-6917	6	10	Ductile Iron	2001
WM-6919	6	71	Cast Iron	1966
WM-6922	6	3	Ductile Iron	2001
WM-6924	6	2	Cast Iron	1966
WM-6926	6	93	Cast Iron	1966
WM-6927	6	526	Cast Iron	1966
WM-6928	6	232	Cast Iron	1966
WM-6929	12	409	Ductile Iron	2001
WM-6930	12	356	Ductile Iron	2001
WM-6931	12	9	Ductile Iron	2001
WM-6932	12	1	Ductile Iron	2001
WM-6934	12	216	Ductile Iron	2001
WM-6935	12	236	Ductile Iron	2001
WM-6936	6	393	Cast Iron	1950
WM-6937	6	8	Cast Iron	1950
WM-6938	6	1	Ductile Iron	2003
WM-6940	6	2	Ductile Iron	2003
WM-6942	6	4	Ductile Iron	2003
WM-6943	6	1	Ductile Iron	2003

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-6944	8	494	Ductile Iron	2003
WM-6945	8	17	Ductile Iron	2003
WM-6946	6	11	Ductile Iron	1966
WM-6947	6	7	Cast Iron	1966
WM-6948	6	43	Cast Iron	1966
WM-6949	6	1	Cast Iron	
WM-6951	6	48	Cast Iron	1954
WM-6952	6	23	Cast Iron	1954
WM-6953	6	656	Cast Iron	1954
WM-6954	6	9	Cast Iron	1966
WM-6955	6	355	Cast Iron	1966
WM-6956	6	5	Cast Iron	1954
WM-6957	6	10	Cast Iron	1954
WM-6958	6	581	Cast Iron	1954
WM-6959	6	21	Cast Iron	1964
WM-6960	6	15	Cast Iron	1954
WM-6961	6	41	Cast Iron	1956
WM-6962	6	60	Ductile Iron	1954
WM-6963	6	9	Cast Iron	1954
WM-6964	6	464	Cast Iron	1954
WM-6965	6	399	Cast Iron	1956
WM-6966	6	363	Cast Iron	1966
WM-6969	6	37	Cast Iron	1954
WM-6970	6	47	Cast Iron	1954
WM-6971	6	400	Cast Iron	1954
WM-6972	6	52	Cast Iron	1966
WM-6974	6	26	Cast Iron	1954
WM-6975	6	42	Cast Iron	1954
WM-6988	6	5	Cast Iron	1954
WM-6989	12	15	Cast Iron	1966
WM-6990	6	1	Ductile Iron	1954
WM-6991	6	6	Cast Iron	1954
WM-6993	12	1	Ductile Iron	1954
WM-6995	12	25	Cast Iron	1966
WM-6996	6	55	Cast Iron	1966
WM-6997	6	1	Cast Iron	1966
WM-7001	6	45	Cast Iron	2004
WM-7002	6	55	Cast Iron	2004
WM-7003	6	3	Cast Iron	2004
WM-7005	6	2	Cast Iron	1966
WM-7006	6	407	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7007	6	2	Cast Iron	1966
WM-7012	6	19	Cast Iron	1966
WM-7013	6	26	Cast Iron	1966
WM-7014	6	18	Ductile Iron	1966
WM-7015	6	9	Cast Iron	1966
WM-7016	6	18	Cast Iron	1966
WM-7017	6	57	Cast Iron	1966
WM-7019	6	495	Cast Iron	1966
WM-7020	6	5	Cast Iron	1966
WM-7021	6	11	Cast Iron	1966
WM-7022	6	55	Cast Iron	1966
WM-7023	6	43	Ductile Iron	1956
WM-7025	6	388	Cast Iron	1956
WM-7047	6	43	Cast Iron	1966
WM-7048	6	46	Cast Iron	1966
WM-7049	6	13	Cast Iron	1966
WM-7050	6	356	Cast Iron	1966
WM-7051	6	647	Cast Iron	1966
WM-7052	6	18	Cast Iron	1966
WM-7053	6	600	Cast Iron	1966
WM-7054	6	11	Cast Iron	1966
WM-7055	6	44	Cast Iron	1956
WM-7056	6	55	Cast Iron	1966
WM-7057	6	5	Cast Iron	1966
WM-7058	6	597	Cast Iron	1966
WM-7059	6	387	Cast Iron	1956
WM-7060	6	494	Cast Iron	1966
WM-7061	6	23	Cast Iron	1966
WM-7062	6	27	Cast Iron	1966
WM-7063	6	46	Cast Iron	1966
WM-7064	6	42	Cast Iron	1966
WM-7065	6	645	Cast Iron	1966
WM-7066	6	392	Cast Iron	1966
WM-7067	6	17	Cast Iron	1966
WM-7068	6	47	Cast Iron	1966
WM-7069	6	44	Cast Iron	1966
WM-7070	6	8	Cast Iron	1966
WM-7071	6	389	Cast Iron	1966
WM-7072	6	393	Cast Iron	1966
WM-7075	6	286	Cast Iron	1966
WM-7077	6	9	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7078	6	1	Cast Iron	1978
WM-7079	6	437	Cast Iron	1978
WM-7080	6	11	Cast Iron	1956
WM-7082	6	38	Cast Iron	1956
WM-7083	6	12	Cast Iron	1956
WM-7084	6	1	Cast Iron	1956
WM-7085	6	28	Cast Iron	1956
WM-7086	6	288	Cast Iron	1956
WM-7088	6	22	Cast Iron	1956
WM-7089	6	18	Cast Iron	1966
WM-7090	6	39	Cast Iron	1956
WM-7092	6	47	Cast Iron	1966
WM-7094	6	462	Cast Iron	1963
WM-7097	6	4	Cast Iron	1963
WM-7098	6	110	Cast Iron	1966
WM-7102	6	95	Cast Iron	1966
WM-7104	6	3	Cast Iron	1966
WM-7105	6	376	Cast Iron	1966
WM-7109	6	1	Cast Iron	1966
WM-7110	6	279	Cast Iron	1966
WM-7111	6	3	Cast Iron	1966
WM-7112	6	8	Cast Iron	1966
WM-7113	6	13	Cast Iron	1966
WM-7124	6	216	Cast Iron	1966
WM-7125	6	11	Cast Iron	1966
WM-7126	6	54	Cast Iron	1966
WM-7127	6	15	Cast Iron	1966
WM-7128	6	127	Cast Iron	1966
WM-7130	6	13	Cast Iron	1966
WM-7131	6	127	Cast Iron	1955
WM-7133	6	351	Ductile Iron	1955
WM-7136	6	3	Cast Iron	1966
WM-7137	6	393	Cast Iron	1966
WM-7143	6	4	Cast Iron	1966
WM-7145	8	184	Cast Iron	1978
WM-7146	8	14	Cast Iron	1978
WM-7147	8	61	Cast Iron	1978
WM-7158	8	54	Cast Iron	1978
WM-7160	6	28	Cast Iron	1966
WM-7163	6	373	Cast Iron	1966
WM-7165	6	1	Cast Iron	1978

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7166	8	254	Cast Iron	1978
WM-7167	8	2	Cast Iron	1978
WM-7169	8	369	Cast Iron	1978
WM-7170	8	8	Cast Iron	1978
WM-7171	8	1	Cast Iron	1978
WM-7172	8	2	Cast Iron	1978
WM-7173	8	1	Cast Iron	1978
WM-7175	6	3	Cast Iron	1966
WM-7176	6	283	Cast Iron	1966
WM-7178	6	3	Cast Iron	1966
WM-7179	6	3	Cast Iron	1955
WM-7180	6	208	Cast Iron	1966
WM-7182	6	82	Cast Iron	1966
WM-7183	6	68	Cast Iron	1966
WM-7184	6	33	Cast Iron	1966
WM-7185	6	250	Cast Iron	1966
WM-7188	6	3	Cast Iron	1966
WM-7190	6	1	Cast Iron	1966
WM-7191	6	1	Cast Iron	1966
WM-7192	6	1	Cast Iron	1966
WM-7193	6	1	Cast Iron	1966
WM-7194	6	3	Cast Iron	1966
WM-7205	6	378	Cast Iron	1963
WM-7216	6	4	Cast Iron	1963
WM-7217	6	400	Cast Iron	1963
WM-7218	6	3	Cast Iron	1963
WM-7259	6	1	Cast Iron	1963
WM-7260	6	1	Cast Iron	1963
WM-7261	6	3	Ductile Iron	1999
WM-7263	6	4	Ductile Iron	1999
WM-7264	6	3	Ductile Iron	1999
WM-7270	6	3	Ductile Iron	1999
WM-7274	12	576	Ductile Iron	1999
WM-7276	12	20	Ductile Iron	1999
WM-7277	12	23	Ductile Iron	1999
WM-7278	6	2	Cast Iron	1963
WM-7289	6	32	Cast Iron	1963
WM-7290	6	2	Cast Iron	
WM-7294	6	3	Cast Iron	
WM-7295	6	8	Cast Iron	
WM-7296	6	1	Cast Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7297	6	2	Cast Iron	1963
WM-7298	6	34	Cast Iron	1963
WM-7300	6	13	Ductile Iron	
WM-7311	12	3	Ductile Iron	1999
WM-7314	12	41	Ductile Iron	1980
WM-7315	8	9	Cast Iron	
WM-7317	12	6	Ductile Iron	1999
WM-7319	6	1	Cast Iron	1963
WM-7320	6	1	Cast Iron	
WM-7322	8	7	Ductile Iron	
WM-7323	6	1	Ductile Iron	
WM-7326	4	1	Ductile Iron	
WM-7329	6	395	Cast Iron	1975
WM-7330	12	358	Ductile Iron	1980
WM-7331	6	20	Cast Iron	1963
WM-7332	6	54	Cast Iron	1963
WM-7333	6	1	Cast Iron	1963
WM-7334	6	7	Cast Iron	1963
WM-7336	6	3	Cast Iron	1963
WM-7337	6	6	Cast Iron	1963
WM-7339	6	4	Cast Iron	1965
WM-7340	6	233	Cast Iron	1965
WM-7341	6	117	Cast Iron	1965
WM-7342	6	118	Ductile Iron	1985
WM-7353	6	5	Ductile Iron	1985
WM-7354	6	71	Ductile Iron	1985
WM-7355	6	57	Ductile Iron	1985
WM-7357	6	24	Ductile Iron	1985
WM-7360	6	222	Ductile Iron	1985
WM-7363	6	124	Ductile Iron	1985
WM-7366	6	18	Cast Iron	1965
WM-7367	6	37	Cast Iron	
WM-7369	6	2	Ductile Iron	1985
WM-7370	6	24	Ductile Iron	1985
WM-7383	6	3	Cast Iron	1963
WM-7385	6	4	Cast Iron	1963
WM-7387	6	192	Cast Iron	1975
WM-7389	6	11	Cast Iron	1975
WM-7391	6	10	Cast Iron	1975
WM-7392	6	41	Cast Iron	1975
WM-7393	6	187	Cast Iron	1975

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7395	6	115	Cast Iron	1975
WM-7397	6	37	Cast Iron	1975
WM-7399	6	27	Cast Iron	1975
WM-7410	6	29	Cast Iron	1975
WM-7411	6	254	Cast Iron	1965
WM-7412	6	3	Cast Iron	1965
WM-7413	6	503	Cast Iron	1965
WM-7422	6	8	Cast Iron	1965
WM-7423	6	11	Cast Iron	1965
WM-7424	6	23	Cast Iron	1965
WM-7426	6	3	Cast Iron	1965
WM-7437	6	2	Cast Iron	1965
WM-7438	6	2	Cast Iron	1965
WM-7439	6	3	Cast Iron	1965
WM-7441	6	59	Cast Iron	1965
WM-7444	6	273	Cast Iron	1965
WM-7445	6	61	Cast Iron	
WM-7446	6	54	Cast Iron	
WM-7447	6	522	Cast Iron	1959
WM-7448	6	3	Cast Iron	1963
WM-7449	6	5	Cast Iron	1963
WM-7450	6	4	Cast Iron	1963
WM-7452	6	12	Cast Iron	1963
WM-7453	6	392	Cast Iron	1963
WM-7454	6	8	Cast Iron	1963
WM-7455	6	239	Cast Iron	1963
WM-7456	6	3	Cast Iron	1971
WM-7457	6	38	Cast Iron	1971
WM-7459	6	42	Cast Iron	1965
WM-7460	6	3	Cast Iron	1963
WM-7461	6	488	Cast Iron	1963
WM-7462	6	15	Cast Iron	1965
WM-7465	6	18	Ductile Iron	
WM-7467	6	69	Cast Iron	1965
WM-7468	6	10	Cast Iron	
WM-7469	6	5	Cast Iron	1965
WM-7470	6	2	Cast Iron	1965
WM-7472	6	181	Ductile Iron	1965
WM-7474	6	35	Cast Iron	1966
WM-7475	6	394	Cast Iron	1966
WM-7476	6	19	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7478	6	133	Cast Iron	1963
WM-7480	6	5	Cast Iron	1963
WM-7481	6	272	Cast Iron	1963
WM-7482	6	172	Cast Iron	1971
WM-7483	6	144	Cast Iron	1971
WM-7484	6	154	Cast Iron	1971
WM-7485	6	38	Cast Iron	1966
WM-7486	6	10	Cast Iron	1966
WM-7487	6	535	Cast Iron	1958
WM-7492	6	31	Cast Iron	1958
WM-7493	6	3	Cast Iron	1958
WM-7494	6	262	Cast Iron	1957
WM-7495	6	48	Cast Iron	1957
WM-7497	6	12	Cast Iron	1957
WM-7498	6	13	Cast Iron	1971
WM-7499	6	53	Cast Iron	1958
WM-7501	6	351	Cast Iron	1958
WM-7502	6	349	Cast Iron	1958
WM-7503	6	132	Cast Iron	1958
WM-7504	6	1	Cast Iron	
WM-7505	6	44	Cast Iron	1959
WM-7506	6	259	Cast Iron	1959
WM-7507	6	3	Cast Iron	1959
WM-7508	6	285	Cast Iron	1958
WM-7509	6	12	Cast Iron	1958
WM-7510	6	4	Cast Iron	1959
WM-7511	6	299	Cast Iron	1959
WM-7512	6	46	Ductile Iron	1959
WM-7515	8	681	Cast Iron	1955
WM-7517	8	409	Cast Iron	1955
WM-7519	6	3	Cast Iron	1966
WM-7520	6	131	Cast Iron	1966
WM-7521	6	53	Cast Iron	1955
WM-7522	6	292	Cast Iron	1955
WM-7534	6	3	Cast Iron	1966
WM-7535	6	211	Cast Iron	1966
WM-7536	6	124	Cast Iron	1966
WM-7538	6	53	Cast Iron	1955
WM-7539	6	299	Cast Iron	1955
WM-7542	6	14	Cast Iron	1955
WM-7543	6	14	Cast Iron	1955

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7548	8	37	Ductile Iron	1955
WM-7549	8	3	Ductile Iron	1955
WM-7552	6	41	Cast Iron	1966
WM-7554	8	13	Cast Iron	1955
WM-7556	8	179	Cast Iron	1955
WM-7557	6	64	Cast Iron	1966
WM-7558	4	44	Cast Iron	1955
WM-7569	8	13	Cast Iron	1955
WM-7572	6	42	Cast Iron	1955
WM-7573	6	53	Cast Iron	1955
WM-7574	6	371	Cast Iron	1955
WM-7575	6	108	Cast Iron	1966
WM-7576	6	146	Cast Iron	1966
WM-7577	2	45	Cast Iron	1955
WM-7578	2	11	Cast Iron	1955
WM-7579	6	30	Cast Iron	1973
WM-7580	30	696	Ductile Iron	1976
WM-7583	30	128	Ductile Iron	1976
WM-7586	30	54	Ductile Iron	1976
WM-7587	30	406	Ductile Iron	1976
WM-7588	12	7	Ductile Iron	2001
WM-7589	12	12	Ductile Iron	2001
WM-7590	12	50	Ductile Iron	2001
WM-7591	12	213	Ductile Iron	2001
WM-7592	12	55	Ductile Iron	2001
WM-7593	8	11	Ductile Iron	2001
WM-7594	8	4	Ductile Iron	2001
WM-7596	8	62	Ductile Iron	2001
WM-7597	8	1	Ductile Iron	2001
WM-7598	30	300	Ductile Iron	1976
WM-7600	12	115	Ductile Iron	2001
WM-7604	12	47	Ductile Iron	2001
WM-7618	12	19	Ductile Iron	2001
WM-7619	12	60	Ductile Iron	2001
WM-7620	12	108	Ductile Iron	2001
WM-7621	12	89	Ductile Iron	2001
WM-7622	12	366	Ductile Iron	2001
WM-7623	12	4	Ductile Iron	2001
WM-7624	12	4	Ductile Iron	2001
WM-7625	12	336	Ductile Iron	2001
WM-7626	12	77	Ductile Iron	2001

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-7627	12	38	Ductile Iron	2001
WM-7628	12	2	Ductile Iron	2001
WM-7629	12	2	Ductile Iron	2001
WM-8022	12	5	Ductile Iron	2001
WM-8024	12	262	Ductile Iron	2001
WM-8026	12	10	Ductile Iron	2001
WM-8027	6	113	Cast Iron	1963
WM-8028	6	1	Cast Iron	1963
WM-8029	6	43	Cast Iron	1963
WM-8030	6	92	Cast Iron	1963
WM-8032	6	4	Ductile Iron	1985
WM-8033	6	4	Ductile Iron	1985
WM-8034	6	1	Ductile Iron	1985
WM-8035	6	11	Ductile Iron	2001
WM-8036	10	5	Ductile Iron	2001
WM-8037	10	47	Ductile Iron	2001
WM-8038	10	80	Ductile Iron	2001
WM-8039	10	7	Ductile Iron	2001
WM-8040	10	242	Ductile Iron	2001
WM-8042	10	254	Ductile Iron	2001
WM-8044	10	1	Ductile Iron	2008
WM-8045	10	4	Ductile Iron	2001
WM-8046	10	246	Ductile Iron	2001
WM-8048	10	4	Ductile Iron	2001
WM-8050	6	1	Ductile Iron	2001
WM-8051	4	5	Ductile Iron	2001
WM-8053	10	101	Ductile Iron	2001
WM-8054	10	19	Ductile Iron	2001
WM-8055	10	5	Ductile Iron	2001
WM-8056	6	1	Ductile Iron	2001
WM-8057	4	5	Ductile Iron	2001
WM-8071	10	94	Ductile Iron	2001
WM-8072	10	5	Ductile Iron	2001
WM-8073	10	112	Ductile Iron	2001
WM-8074	10	19	Ductile Iron	2001
WM-8075	10	3	Ductile Iron	2001
WM-8077	10	37	Ductile Iron	2001
WM-8078	10	3	Ductile Iron	2001
WM-8083	10	5	Ductile Iron	2001
WM-8084	10	10	Ductile Iron	2001
WM-8085	6	3	Cast Iron	1965

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-8086	6	11	Cast Iron	1965
WM-8087	6	31	Cast Iron	1975
WM-8089	6	174	Cast Iron	1965
WM-8092	6	10	Cast Iron	1965
WM-8094	6	3	Cast Iron	1965
WM-8095	6	6	Cast Iron	1965
WM-8096	6	131	Cast Iron	1966
WM-8098	6	62	Cast Iron	1966
WM-8100	6	189	Cast Iron	1966
WM-8102	6	3	Cast Iron	1966
WM-8103	6	158	Cast Iron	1966
WM-8112	6	214	Cast Iron	1966
WM-8113	6	12	Cast Iron	1966
WM-8116	10	40	Ductile Iron	2001
WM-8118	10	5	Ductile Iron	2001
WM-8119	10	5	Ductile Iron	2001
WM-8510	10	158	Ductile Iron	2001
WM-8511	10	7	Ductile Iron	2001
WM-8512	10	8	Ductile Iron	2001
WM-8513	10	5	Ductile Iron	2001
WM-8514	10	89	Ductile Iron	2001
WM-8515	10	6	Ductile Iron	2001
WM-8516	10	39	Ductile Iron	2001
WM-8517	10	10	Ductile Iron	2001
WM-8518	10	75	Ductile Iron	2001
WM-8519	10	6	Ductile Iron	2001
WM-8520	10	95	Ductile Iron	2001
WM-8522	10	14	Ductile Iron	2001
WM-8523	10	52	Ductile Iron	2001
WM-8524	10	5	Ductile Iron	2001
WM-8525	10	63	Ductile Iron	2001
WM-8526	10	5	Ductile Iron	2001
WM-8527	10	5	Ductile Iron	2001
WM-8530	10	136	Ductile Iron	2001
WM-8532	10	8	Ductile Iron	2001
WM-8533	10	13	Ductile Iron	2001
WM-8534	10	29	Ductile Iron	2001
WM-8535	10	35	Ductile Iron	2001
WM-8536	10	7	Ductile Iron	2001
WM-8537	10	244	Ductile Iron	2001
WM-8544	6	19	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-8545	6	14	Cast Iron	1966
WM-8547	6	315	Ductile Iron	1966
WM-8548	6	227	Cast Iron	1971
WM-8549	6	144	Cast Iron	1971
WM-8550	6	4	Cast Iron	1971
WM-8552	6	8	Cast Iron	
WM-8553	6	14	Cast Iron	
WM-8554	6	1	Cast Iron	
WM-8555	6	13	Cast Iron	1963
WM-8556	6	32	Cast Iron	1971
WM-8557	6	2	Cast Iron	1971
WM-8558	6	462	Cast Iron	1963
WM-8962	6	55	Ductile Iron	1963
WM-8963	6	14	Cast Iron	1966
WM-8964	6	378	Cast Iron	1992
WM-8966	6	6	Cast Iron	1992
WM-8967	6	436	Ductile Iron	1992
WM-8968	6	2	Ductile Iron	1992
WM-8969	6	10	Ductile Iron	1992
WM-8983	6	44	Cast Iron	1966
WM-8984	6	23	Cast Iron	1966
WM-8985	6	4	Cast Iron	1966
WM-8986	6	25	Cast Iron	1966
WM-8988	6	51	Cast Iron	1966
WM-8989	6	404	Ductile Iron	1966
WM-8990	6	113	Cast Iron	1966
WM-8991	6	144	Cast Iron	1966
WM-8992	6	19	Cast Iron	1966
WM-8993	6	49	Cast Iron	1966
WM-8994	6	387	Cast Iron	1966
WM-8995	6	3	Ductile Iron	1996
WM-8996	6	2	Ductile Iron	1996
WM-8997	8	1	Ductile Iron	1996
WM-8998	8	6	Ductile Iron	1996
WM-8999	8	6	Ductile Iron	1996
WM-9020	6	25	Cast Iron	1966
WM-9021	6	19	Cast Iron	1966
WM-9022	6	55	Cast Iron	1966
WM-9023	6	3	Cast Iron	1966
WM-9024	6	25	Cast Iron	1966
WM-9025	6	383	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9026	6	22	Cast Iron	1966
WM-9027	6	6	Cast Iron	2015
WM-9029	6	41	Cast Iron	1966
WM-9044	12	14	Ductile Iron	1998
WM-9048	6	3	Ductile Iron	1998
WM-9049	6	25	Ductile Iron	1998
WM-9050	12	125	Ductile Iron	1998
WM-9052	6	4	Ductile Iron	
WM-9053	6	1	Ductile Iron	1998
WM-9054	4	1	Ductile Iron	1998
WM-9055	6	22	Cast Iron	1966
WM-9057	4	2	Ductile Iron	1998
WM-9058	4	25	Ductile Iron	1998
WM-9060	6	12	Cast Iron	1966
WM-9061	4	2	Cast Iron	1998
WM-9063	6	15	Ductile Iron	1998
WM-9064	6	1	Ductile Iron	1998
WM-9065	12	2	Ductile Iron	1998
WM-9066	12	2	Ductile Iron	1998
WM-9067	12	21	Ductile Iron	1998
WM-9068	12	48	Ductile Iron	1998
WM-9079	12	25	Ductile Iron	1998
WM-9080	12	403	Ductile Iron	1998
WM-9081	12	40	Ductile Iron	1998
WM-9082	12	38	Ductile Iron	1998
WM-9084	6	3	Ductile Iron	1998
WM-9085	6	40	Ductile Iron	1998
WM-9086	6	5	Ductile Iron	1998
WM-9087	6	1	Ductile Iron	1998
WM-9088	4	1	Ductile Iron	1998
WM-9090	12	320	Ductile Iron	1998
WM-9096	6	2	Ductile Iron	1998
WM-9098	6	4	Ductile Iron	1998
WM-9100	12	31	Ductile Iron	1998
WM-9104	6	16	Ductile Iron	1998
WM-9105	6	10	Cast Iron	1966
WM-9107	6	1	Ductile Iron	1998
WM-9111	6	5	Ductile Iron	1998
WM-9112	12	351	Ductile Iron	1998
WM-9113	6	6	Ductile Iron	1998
WM-9114	12	17	Ductile Iron	1998

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9116	4	55	Ductile Iron	1966
WM-9117	6	1	Ductile Iron	1998
WM-9118	12	43	Ductile Iron	1998
WM-9119	12	22	Ductile Iron	1994
WM-9120	12	9	Ductile Iron	1994
WM-9131	12	1	Ductile Iron	1998
WM-9133	12	5	Ductile Iron	1994
WM-9134	4	4	Ductile Iron	1998
WM-9135	4	4	Ductile Iron	1998
WM-9136	8	4	Cast Iron	1966
WM-9137	8	51	Cast Iron	1966
WM-9142	6	386	Cast Iron	1966
WM-9145	6	385	Cast Iron	1966
WM-9146	6	45	Cast Iron	1966
WM-9147	6	44	Cast Iron	1966
WM-9148	6	41	Ductile Iron	1966
WM-9149	6	3	Cast Iron	1966
WM-9150	6	3	Cast Iron	1966
WM-9152	6	46	Cast Iron	1966
WM-9153	6	42	Cast Iron	1966
WM-9154	6	381	Cast Iron	1966
WM-9155	6	3	Cast Iron	1966
WM-9156	6	43	Cast Iron	1966
WM-9157	6	8	Cast Iron	1964
WM-9158	6	2	Cast Iron	
WM-9159	6	51	Cast Iron	1964
WM-9160	6	2	Cast Iron	1964
WM-9162	6	5	Cast Iron	1964
WM-9163	6	8	Cast Iron	1964
WM-9164	12	298	Cast Iron	1954
WM-9170	12	5	Cast Iron	1954
WM-9172	12	4	Cast Iron	1954
WM-9173	6	16	Cast Iron	1954
WM-9174	6	6	Cast Iron	1954
WM-9177	12	4	Cast Iron	1966
WM-9178	6	3	Cast Iron	1954
WM-9179	6	28	Cast Iron	1954
WM-9180	6	1	Cast Iron	1954
WM-9181	12	72	Cast Iron	1966
WM-9182	12	148	Cast Iron	1966
WM-9184	12	458	Cast Iron	1966

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9185	12	64	Cast Iron	1976
WM-9186	12	116	Cast Iron	1976
WM-9187	12	512	Cast Iron	1976
WM-9188	6	11	Cast Iron	1966
WM-9189	6	260	Cast Iron	1966
WM-9190	6	1	Cast Iron	1975
WM-9191	12	569	Cast Iron	1976
WM-9192	12	234	Cast Iron	1976
WM-9195	6	340	Cast Iron	1966
WM-9196	6	73	Cast Iron	1966
WM-9200	6	22	Cast Iron	1966
WM-9201	6	44	Cast Iron	1966
WM-9202	6	3	Cast Iron	1966
WM-9203	6	378	Cast Iron	1966
WM-9204	6	44	Cast Iron	1966
WM-9205	6	400	Cast Iron	1966
WM-9206	6	1	Cast Iron	1966
WM-9208	6	3	Cast Iron	1954
WM-9210	6	22	Cast Iron	1954
WM-9211	6	46	Cast Iron	1954
WM-9212	6	42	Cast Iron	1966
WM-9213	6	467	Cast Iron	1954
WM-9214	6	2	Cast Iron	1955
WM-9215	6	19	Cast Iron	1955
WM-9217	6	29	Cast Iron	1966
WM-9218	6	90	Cast Iron	1966
WM-9223	6	2	Ductile Iron	
WM-9224	6	2	Ductile Iron	1958
WM-9225	6	2	Ductile Iron	1955
WM-9226	6	1	Ductile Iron	1955
WM-9227	4	134	Ductile Iron	1955
WM-9229	4	5	Ductile Iron	1955
WM-9230	4	3	Ductile Iron	1955
WM-9231	4	3	Ductile Iron	1955
WM-9232	4	210	Cast Iron	1955
WM-9237	8	2	Cast Iron	1955
WM-9238	8	1	Cast Iron	1955
WM-9239	8	1	Cast Iron	1955
WM-9241	6	1	Cast Iron	1955
WM-9243	6	1	Cast Iron	1955
WM-9244	4	68	Cast Iron	1955

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9245	6	10	Ductile Iron	1958
WM-9248	6	68	Ductile Iron	1958
WM-9250	6	74	Ductile Iron	1991
WM-9251	6	46	Ductile Iron	1991
WM-9252	6	167	Ductile Iron	1958
WM-9253	6	11	Ductile Iron	1991
WM-9254	6	3	Ductile Iron	
WM-9256	6	17	Ductile Iron	1958
WM-9257	6	86	Ductile Iron	1958
WM-9258	6	114	Ductile Iron	1958
WM-9259	6	302	Ductile Iron	1958
WM-9260	6	77	Ductile Iron	1958
WM-9262	4	4	Ductile Iron	1958
WM-9265	6	8	Cast Iron	1940
WM-9266	6	17	Cast Iron	1940
WM-9267	6	28	Cast Iron	1966
WM-9269	6	75	Cast Iron	1966
WM-9270	6	28	Cast Iron	1966
WM-9281	6	137	Cast Iron	1966
WM-9282	6	308	Ductile Iron	2000
WM-9285	8	170	Cast Iron	1966
WM-9286	6	151	Cast Iron	1966
WM-9287	6	1	Ductile Iron	2000
WM-9288	6	5	Ductile Iron	2000
WM-9290	6	2	Ductile Iron	2000
WM-9291	6	33	Ductile Iron	2000
WM-9293	6	1	Ductile Iron	2000
WM-9294	6	294	Ductile Iron	1966
WM-9295	6	16	Ductile Iron	2000
WM-9296	6	19	Ductile Iron	2000
WM-9297	6	16	Ductile Iron	2000
WM-9298	6	25	Ductile Iron	2000
WM-9299	6	17	Ductile Iron	2000
WM-9311	6	27	Ductile Iron	2000
WM-9312	6	4	Ductile Iron	2000
WM-9313	6	22	Ductile Iron	2000
WM-9314	6	5	Ductile Iron	2000
WM-9315	6	35	Ductile Iron	2000
WM-9316	6	13	Ductile Iron	2000
WM-9317	6	5	Ductile Iron	2000
WM-9318	6	38	Ductile Iron	2000

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9319	6	41	Ductile Iron	2000
WM-9320	6	8	Ductile Iron	2000
WM-9321	6	2	Ductile Iron	2000
WM-9322	6	31	Ductile Iron	2000
WM-9323	6	311	Ductile Iron	1940
WM-9324	24	345	Ductile Iron	1940
WM-9325	6	33	Ductile Iron	2000
WM-9326	6	1	Ductile Iron	1997
WM-9327	6	25	Ductile Iron	1997
WM-9328	6	2	Ductile Iron	1997
WM-9329	6	4	Ductile Iron	1997
WM-9330	6	1	Ductile Iron	1997
WM-9331	6	2	Ductile Iron	1997
WM-9333	6	11	Ductile Iron	1997
WM-9335	6	68	Ductile Iron	1997
WM-9347	6	17	Ductile Iron	1966
WM-9348	6	10	Ductile Iron	1997
WM-9349	6	1	Ductile Iron	1997
WM-9350	6	152	Ductile Iron	1966
WM-9351	6	2	Ductile Iron	1997
WM-9354	6	54	Ductile Iron	1966
WM-9355	6	100	Ductile Iron	1966
WM-9366	6	92	Ductile Iron	1966
WM-9368	6	2	Ductile Iron	1997
WM-9370	6	33	Ductile Iron	1997
WM-9371	6	4	Ductile Iron	1997
WM-9372	6	106	Ductile Iron	1966
WM-9374	8	5	Cast Iron	1955
WM-9381	10	44	Cast Iron	1951
WM-9382	10	25	Cast Iron	1951
WM-9383	10	2	Cast Iron	1951
WM-9386	8	33	Cast Iron	1951
WM-9387	6	1	Cast Iron	1951
WM-9388	6	48	Ductile Iron	2004
WM-9389	6	164	Ductile Iron	2004
WM-9390	6	71	Ductile Iron	2004
WM-9391	6	27	Ductile Iron	2004
WM-9392	6	1	Ductile Iron	2004
WM-9403	12	404	Cast Iron	1951
WM-9406	12	36	Cast Iron	1950
WM-9410	12	1	Cast Iron	1950

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9411	12	1	Cast Iron	1950
WM-9413	8	12	Cast Iron	1950
WM-9414	12	317	Cast Iron	1950
WM-9415	12	3	Cast Iron	1950
WM-9418	12	14	Cast Iron	1950
WM-9419	6	373	Cast Iron	1966
WM-9420	6	9	Cast Iron	
WM-9421	12	399	Cast Iron	1950
WM-9422	12	53	Cast Iron	1950
WM-9424	12	446	Cast Iron	1950
WM-9425	12	398	Cast Iron	1950
WM-9426	12	3	Cast Iron	1950
WM-9427	4	1	Cast Iron	1966
WM-9428	6	10	Cast Iron	
WM-9430	6	254	Cast Iron	1950
WM-9431	6	7	Cast Iron	
WM-9432	6	2	Cast Iron	
WM-9433	12	37	Cast Iron	1966
WM-9434	12	185	Cast Iron	1966
WM-9436	12	203	Cast Iron	1966
WM-9437	16	98	Cast Iron	1955
WM-9438	16	1	Cast Iron	1955
WM-9440	10	1	Cast Iron	1966
WM-9441	10	2	Cast Iron	1966
WM-9442	4	4	Cast Iron	
WM-9443	12	1	Cast Iron	1966
WM-9455	12	325	Cast Iron	1955
WM-9457	6	105	Ductile Iron	1998
WM-9458	6	2	Ductile Iron	1998
WM-9459	4	1	Ductile Iron	1998
WM-9460	6	308	Ductile Iron	1998
WM-9461	6	1	Ductile Iron	1998
WM-9463	6	421	Cast Iron	1966
WM-9464	6	170	Cast Iron	1966
WM-9465	6	221	Ductile Iron	1998
WM-9466	6	3	Ductile Iron	1998
WM-9477	6	8	Ductile Iron	1998
WM-9478	6	21	Ductile Iron	1998
WM-9479	6	5	Ductile Iron	1998
WM-9480	6	41	Ductile Iron	1998
WM-9481	6	8	Ductile Iron	1998

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9482	6	68	Ductile Iron	1998
WM-9483	6	25	Ductile Iron	1998
WM-9484	6	94	Ductile Iron	1998
WM-9486	6	10	Ductile Iron	1998
WM-9489	6	23	Ductile Iron	2002
WM-9490	6	10	Ductile Iron	2002
WM-9493	6	147	Ductile Iron	2002
WM-9495	6	1	Ductile Iron	2002
WM-9497	6	5	Ductile Iron	2002
WM-9498	6	145	Ductile Iron	2002
WM-9499	6	3	Ductile Iron	2002
WM-9500	12	2	Ductile Iron	2001
WM-9501	6	117	Cast Iron	1962
WM-9503	6	3	Cast Iron	1962
WM-9504	6	18	Cast Iron	1962
WM-9505	6	247	Cast Iron	1962
WM-9506	6	10	Cast Iron	1962
WM-9507	6	24	Cast Iron	1968
WM-9508	6	426	Cast Iron	1962
WM-9509	6	12	Cast Iron	1962
WM-9513	6	8	Cast Iron	1962
WM-9514	6	161	Ductile Iron	1962
WM-9516	6	42	Cast Iron	1972
WM-9517	6	1	Cast Iron	1972
WM-9518	4	43	Cast Iron	1972
WM-9520	4	71	Cast Iron	1972
WM-9523	4	1	Cast Iron	
WM-9524	6	266	Cast Iron	1968
WM-9525	6	140	Cast Iron	1962
WM-9527	6	118	Cast Iron	1962
WM-9528	6	80	Cast Iron	1962
WM-9529	6	10	Cast Iron	1954
WM-9530	6	129	Cast Iron	1954
WM-9531	6	89	Cast Iron	1954
WM-9532	6	1	Cast Iron	
WM-9533	12	61	Ductile Iron	2001
WM-9534	12	165	Ductile Iron	2002
WM-9535	12	77	Ductile Iron	2002
WM-9536	6	1	Ductile Iron	2002
WM-9538	12	9	Ductile Iron	2002
WM-9539	12	3	Ductile Iron	2002

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9540	12	2	Ductile Iron	2002
WM-9541	12	1	Ductile Iron	2002
WM-9542	12	3	Ductile Iron	2002
WM-9543	12	2	Ductile Iron	2002
WM-9544	6	25	Ductile Iron	1990
WM-9545	12	157	Ductile Iron	2002
WM-9546	12	1	Ductile Iron	2002
WM-9547	12	49	Ductile Iron	2002
WM-9548	12	72	Ductile Iron	2002
WM-9549	12	413	Ductile Iron	2002
WM-9550	12	3	Ductile Iron	2002
WM-9551	12	2	Ductile Iron	2002
WM-9555	8	31	Cast Iron	1955
WM-9557	8	10	Cast Iron	1955
WM-9559	8	1	Cast Iron	
WM-9560	6	4	Cast Iron	
WM-9561	6	26	Cast Iron	1966
WM-9562	6	289	Cast Iron	1966
WM-9567	6	1	Ductile Iron	1990
WM-9568	12	350	Cast Iron	1951
WM-9569	6	1	Cast Iron	1951
WM-9570	12	7	Cast Iron	1951
WM-9571	12	29	Cast Iron	1951
WM-9572	12	40	Cast Iron	1951
WM-9573	12	151	Cast Iron	1955
WM-9574	8	393	Cast Iron	1955
WM-9575	8	189	Cast Iron	1955
WM-9576	12	351	Cast Iron	1951
WM-9586	6	5	Ductile Iron	1995
WM-9587	6	10	Ductile Iron	1995
WM-9589	6	3	Ductile Iron	1976
WM-9590	6	2	Ductile Iron	1976
WM-9591	30	18	Cast Iron	1976
WM-9592	30	602	Cast Iron	1976
WM-9593	6	6	Ductile Iron	1995
WM-9595	6	45	Ductile Iron	1995
WM-9596	6	1	Ductile Iron	1995
WM-9597	6	183	Cast Iron	
WM-9598	6	36	Cast Iron	
WM-9599	6	4	Ductile Iron	1990
WM-9600	6	66	Ductile Iron	1990

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9601	6	88	Ductile Iron	1990
WM-9602	6	81	Ductile Iron	1990
WM-9603	30	163	Ductile Iron	1976
WM-9606	12	55	Ductile Iron	2001
WM-9608	6	1	Ductile Iron	1962
WM-9611	4	1	Cast Iron	
WM-9612	6	394	Cast Iron	1955
WM-9613	6	58	Ductile Iron	1985
WM-9615	12	20	Ductile Iron	1980
WM-9616	12	1	Ductile Iron	1999
WM-9619	12	24	Ductile Iron	1980
WM-9621	12	415	Ductile Iron	1980
WM-9622	12	1226	Ductile Iron	1980
WM-9623	12	8	Ductile Iron	1980
WM-9624	12	836	Ductile Iron	1980
WM-9626	6	53	Cast Iron	1958
WM-9627	8	5	Cast Iron	1955
WM-9628	8	151	Cast Iron	1955
WM-9629	6	350	Cast Iron	1966
WM-9633	6	11	Ductile Iron	2001
WM-9636	6	87	Cast Iron	2004
WM-9638	6	148	Cast Iron	1954
WM-9639	12	294	Ductile Iron	1964
WM-9641	4	1	Ductile Iron	
WM-9642	4	4	Ductile Iron	
WM-9643	6	8	Cast Iron	
WM-9644	6	1	Cast Iron	
WM-9645	1	1	Ductile Iron	
WM-9646	1	1	Ductile Iron	
WM-9657	6	1	Ductile Iron	
WM-9658	6	1	Ductile Iron	
WM-9659	1	1	Ductile Iron	
WM-9660	1	1	Ductile Iron	
WM-9661	1	1	Ductile Iron	
WM-9662	1	1	Ductile Iron	
WM-9663	1	1	Ductile Iron	
WM-9674	1	1	Ductile Iron	
WM-9675	4	1	Ductile Iron	
WM-9676	4	1	Ductile Iron	
WM-9677	4	1	Ductile Iron	
WM-9678	4	1	Ductile Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-9679	4	1	Ductile Iron	
WM-9680	4	1	Ductile Iron	
WM-9681	1	1	Ductile Iron	
WM-9682	1	1	Ductile Iron	
WM-9683	1	1	Ductile Iron	
WM-10074	6	4	Cast Iron	1928
WM-10075	6	48	Cast Iron	1928
WM-10076	6	353	Cast Iron	1966
WM-10077	6	186	Cast Iron	1966
WM-10081	6	151	Cast Iron	1951
WM-10082	12	9	Cast Iron	1955
WM-10083	12	28	Cast Iron	1955
WM-10094	12	42	Cast Iron	1955
WM-10095	12	3	Cast Iron	1955
WM-10096	12	571	Cast Iron	1958
WM-10097	12	77	Cast Iron	1966
WM-10098	12	328	Cast Iron	1966
WM-10100	12	111	Ductile Iron	1998
WM-10101	12	4	Ductile Iron	1998
WM-10102	12	1	Ductile Iron	2004
WM-10103	12	2	Ductile Iron	2004
WM-10104	12	9	Ductile Iron	2004
WM-10107	12	15	Ductile Iron	2004
WM-10108	12	3	Ductile Iron	2004
WM-10112	12	3	Ductile Iron	2004
WM-10113	12	8	Ductile Iron	2004
WM-10114	12	9	Ductile Iron	2004
WM-10115	12	3	Ductile Iron	2004
WM-10124	10	184	Cast Iron	1955
WM-10127	12	13	Ductile Iron	2004
WM-10129	12	3	Ductile Iron	2004
WM-10130	12	1	Ductile Iron	2004
WM-10132	12	4	Ductile Iron	2004
WM-10133	10	72	Cast Iron	1955
WM-10134	10	89	Cast Iron	1955
WM-10143	12	91	Ductile Iron	2004
WM-10171	12	257	Ductile Iron	2004
WM-10210	12	74	Ductile Iron	2004
WM-10234	12	73	Ductile Iron	2004
WM-10245	12	15	Ductile Iron	2004
WM-10250	12	126	Ductile Iron	2004

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10267	12	174	Ductile Iron	2004
WM-10268	12	11	Ductile Iron	2004
WM-10270	6	188	Ductile Iron	1955
WM-10271	6	44	Ductile Iron	1955
WM-10272	6	236	Cast Iron	1955
WM-10273	6	1	Cast Iron	1955
WM-10274	6	1	Cast Iron	
WM-10275	6	214	Cast Iron	1966
WM-10276	6	36	Cast Iron	1966
WM-10278	6	34	Cast Iron	1966
WM-10280	6	33	Cast Iron	1966
WM-10283	6	99	Cast Iron	1966
WM-10284	6	132	Cast Iron	1966
WM-10285	6	39	Cast Iron	1966
WM-10286	8	1	Ductile Iron	2002
WM-10288	8	2	Ductile Iron	2002
WM-10289	8	110	Ductile Iron	2002
WM-10290	8	2	Ductile Iron	2002
WM-10293	8	150	Ductile Iron	2002
WM-10294	6	5	Ductile Iron	2002
WM-10295	4	5	Ductile Iron	2002
WM-10296	6	10	Ductile Iron	2002
WM-10297	6	35	Cast Iron	1967
WM-10298	6	6	Cast Iron	
WM-10300	6	6	Cast Iron	
WM-10301	6	2	Cast Iron	
WM-10302	6	77	Cast Iron	
WM-10303	6	10	Cast Iron	
WM-10304	6	2	Cast Iron	
WM-10305	6	2	Ductile Iron	
WM-10306	6	64	Cast Iron	
WM-10307	6	108	Cast Iron	
WM-10308	6	110	Cast Iron	
WM-10310	6	157	Cast Iron	
WM-10311	6	30	Cast Iron	1967
WM-10312	6	3	Cast Iron	1967
WM-10313	6	400	Cast Iron	1966
WM-10314	6	5	Ductile Iron	1967
WM-10315	6	3	Cast Iron	1967
WM-10316	6	66	Cast Iron	1967
WM-10317	6	288	Cast Iron	1967

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10319	6	6	Cast Iron	1966
WM-10330	12	2	Cast Iron	1976
WM-10331	12	4	Cast Iron	1976
WM-10332	12	2	Cast Iron	1976
WM-10333	12	27	Cast Iron	1976
WM-10334	12	109	Cast Iron	1976
WM-10335	12	16	Cast Iron	1976
WM-10336	12	2	Cast Iron	1976
WM-10337	12	504	Cast Iron	1976
WM-10339	12	1	Cast Iron	1976
WM-10341	12	3	Cast Iron	1976
WM-10342	12	1	Cast Iron	1976
WM-10343	12	7	Cast Iron	1976
WM-10344	12	7	Cast Iron	1976
WM-10345	12	3	Cast Iron	1976
WM-10346	12	1	Cast Iron	1994
WM-10347	12	2	Cast Iron	1976
WM-10348	12	21	Cast Iron	1976
WM-10349	6	29	Cast Iron	1971
WM-10350	6	43	Cast Iron	1971
WM-10351	6	19	Cast Iron	1971
WM-10352	6	9	Cast Iron	1971
WM-10353	6	15	Cast Iron	1971
WM-10354	6	24	Ductile Iron	1971
WM-10357	6	17	Cast Iron	1971
WM-10358	6	39	Cast Iron	1971
WM-10360	6	156	Cast Iron	1966
WM-10362	6	43	Cast Iron	1966
WM-10363	6	159	Cast Iron	1966
WM-10364	6	366	Cast Iron	1966
WM-10365	6	1	Cast Iron	
WM-10366	6	55	Cast Iron	
WM-10367	6	314	Cast Iron	1966
WM-10370	6	3	Cast Iron	1966
WM-10371	6	204	Cast Iron	1966
WM-10373	6	1	Cast Iron	1971
WM-10374	6	54	Cast Iron	1971
WM-10375	6	149	Cast Iron	1971
WM-10377	6	10	Cast Iron	1971
WM-10378	6	139	Cast Iron	1971
WM-10379	6	12	Cast Iron	1971

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10380	6	110	Cast Iron	1971
WM-10381	6	97	Ductile Iron	1971
WM-10384	6	53	Cast Iron	1971
WM-10385	6	76	Cast Iron	1971
WM-10386	6	123	Cast Iron	1971
WM-10388	6	163	Cast Iron	1981
WM-10389	6	20	Cast Iron	1981
WM-10390	6	38	Cast Iron	1981
WM-10391	6	1	Cast Iron	1981
WM-10392	6	1	Cast Iron	1981
WM-10393	6	1	Cast Iron	1981
WM-10394	6	1	Cast Iron	1981
WM-10395	6	3	Cast Iron	1981
WM-10397	6	296	Cast Iron	1981
WM-10398	6	87	Cast Iron	1981
WM-10399	6	264	Cast Iron	1981
WM-10400	6	10	Cast Iron	1981
WM-10402	6	77	Cast Iron	1981
WM-10403	6	1	Cast Iron	1981
WM-10404	6	1	Cast Iron	1981
WM-10405	6	155	Cast Iron	1981
WM-10407	6	59	Cast Iron	1981
WM-10409	6	21	Cast Iron	1981
WM-10411	6	28	Cast Iron	1981
WM-10412	6	159	Cast Iron	1981
WM-10413	6	3	Cast Iron	1971
WM-10414	4	4	Cast Iron	1971
WM-10415	6	55	Cast Iron	1971
WM-10416	6	115	Cast Iron	1971
WM-10417	6	1	Cast Iron	1971
WM-10419	6	1	Cast Iron	1971
WM-10420	6	1	Cast Iron	1971
WM-10421	6	139	Cast Iron	1971
WM-10422	6	62	Cast Iron	1971
WM-10423	6	1	Cast Iron	1971
WM-10424	6	5	Ductile Iron	1998
WM-10425	6	66	Ductile Iron	1998
WM-10426	6	40	Ductile Iron	1998
WM-10427	6	165	Ductile Iron	1998
WM-10431	6	24	Ductile Iron	1998
WM-10434	6	3	Ductile Iron	1998

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10435	6	2	Ductile Iron	1998
WM-10438	6	4	Ductile Iron	1998
WM-10441	6	47	Ductile Iron	1998
WM-10444	6	25	Ductile Iron	1998
WM-10447	6	28	Cast Iron	1966
WM-10448	6	113	Cast Iron	1966
WM-10449	6	141	Cast Iron	1966
WM-10450	6	122	Cast Iron	1966
WM-10452	6	1	Cast Iron	1966
WM-10455	6	10	Cast Iron	1966
WM-10456	6	90	Cast Iron	1966
WM-10457	6	183	Cast Iron	1966
WM-10458	6	12	Cast Iron	1966
WM-10460	6	295	Cast Iron	1966
WM-10461	6	2	Cast Iron	1966
WM-10463	6	4	Cast Iron	1966
WM-10466	6	1	Cast Iron	1966
WM-10467	8	18	Cast Iron	1998
WM-10468	8	202	Cast Iron	1998
WM-10470	8	22	Cast Iron	1998
WM-10471	8	203	Cast Iron	1998
WM-10472	6	1	Ductile Iron	1998
WM-10473	6	17	Ductile Iron	1998
WM-10474	6	20	Ductile Iron	1998
WM-10478	6	1	Ductile Iron	1998
WM-10480	6	3	Ductile Iron	1998
WM-10481	6	11	Ductile Iron	1998
WM-10484	6	4	Ductile Iron	1998
WM-10485	6	6	Ductile Iron	1998
WM-10486	6	1	Ductile Iron	1998
WM-10488	6	34	Ductile Iron	1998
WM-10491	6	5	Ductile Iron	1998
WM-10492	6	47	Ductile Iron	1998
WM-10494	6	49	Ductile Iron	1998
WM-10495	6	20	Ductile Iron	1998
WM-10497	6	2	Ductile Iron	1998
WM-10498	6	8	Ductile Iron	1998
WM-10499	6	104	Ductile Iron	1998
WM-10500	6	48	Ductile Iron	1998
WM-10502	6	8	Ductile Iron	1998
WM-10503	6	7	Ductile Iron	1998

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10504	6	61	Ductile Iron	1998
WM-10506	6	68	Ductile Iron	1998
WM-10507	6	51	Ductile Iron	1998
WM-10508	6	170	Ductile Iron	1998
WM-10509	6	40	Ductile Iron	1998
WM-10510	6	6	Ductile Iron	1998
WM-10511	6	95	Ductile Iron	1998
WM-10512	6	189	Ductile Iron	1998
WM-10513	6	57	Ductile Iron	1998
WM-10514	6	72	Ductile Iron	1998
WM-10515	6	68	Ductile Iron	1998
WM-10516	6	50	Ductile Iron	1998
WM-10517	6	1	Cast Iron	1981
WM-10518	6	218	Ductile Iron	1996
WM-10520	6	7	Ductile Iron	1996
WM-10522	6	19	Ductile Iron	1996
WM-10528	6	24	Ductile Iron	1996
WM-10529	6	48	Ductile Iron	1996
WM-10530	6	27	Ductile Iron	1996
WM-10537	6	1	Ductile Iron	1996
WM-10538	6	69	Ductile Iron	1996
WM-10539	6	121	Ductile Iron	1996
WM-10542	6	1	Ductile Iron	1996
WM-10544	6	43	Ductile Iron	1996
WM-10547	6	1	Ductile Iron	1996
WM-10558	6	30	Ductile Iron	1996
WM-10559	6	93	Ductile Iron	1996
WM-10560	6	30	Ductile Iron	1996
WM-10561	6	126	Ductile Iron	1996
WM-10566	6	60	Ductile Iron	1996
WM-10567	6	5	Ductile Iron	1996
WM-10569	6	16	Cast Iron	1981
WM-10570	6	587	Cast Iron	1981
WM-10571	6	19	Ductile Iron	1996
WM-10572	6	2	Ductile Iron	1996
WM-10573	6	2	Ductile Iron	1996
WM-10574	6	27	Ductile Iron	1996
WM-10577	6	6	Ductile Iron	1996
WM-10579	6	66	Ductile Iron	1996
WM-10581	6	7	Ductile Iron	1996
WM-10582	6	89	Ductile Iron	1996

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10584	6	2	Ductile Iron	1996
WM-10585	6	81	Ductile Iron	1996
WM-10586	6	13	Ductile Iron	1996
WM-10588	6	80	Ductile Iron	1996
WM-10590	6	10	Ductile Iron	1996
WM-10591	6	17	Ductile Iron	1996
WM-10593	6	5	Ductile Iron	1996
WM-10594	6	126	Ductile Iron	1996
WM-10596	6	74	Ductile Iron	1996
WM-10597	6	2	Ductile Iron	1996
WM-10598	6	3	Ductile Iron	1996
WM-10599	6	37	Ductile Iron	1996
WM-10601	6	4	Ductile Iron	1996
WM-10602	6	111	Ductile Iron	1996
WM-10603	6	74	Ductile Iron	1996
WM-10605	6	7	Ductile Iron	1996
WM-10608	6	47	Ductile Iron	1996
WM-10609	6	80	Ductile Iron	1996
WM-10610	6	7	Ductile Iron	1996
WM-10611	6	74	Ductile Iron	1996
WM-10613	6	6	Ductile Iron	1996
WM-10614	6	41	Ductile Iron	1996
WM-10615	6	33	Ductile Iron	1996
WM-10616	6	3	Ductile Iron	1996
WM-10617	6	14	Ductile Iron	1996
WM-10618	6	3	Ductile Iron	1996
WM-10621	6	8	Ductile Iron	1996
WM-10622	6	40	Ductile Iron	1996
WM-10623	6	31	Ductile Iron	1996
WM-10625	6	12	Ductile Iron	1996
WM-10626	6	7	Ductile Iron	1996
WM-10627	6	3	Ductile Iron	1996
WM-10629	6	47	Ductile Iron	1996
WM-10631	6	11	Ductile Iron	1996
WM-10632	6	97	Ductile Iron	1996
WM-10634	12	22	Ductile Iron	1996
WM-10635	8	6	Ductile Iron	1996
WM-10636	8	7	Ductile Iron	1996
WM-10637	8	349	Ductile Iron	1996
WM-10638	8	4	Ductile Iron	1996
WM-10639	8	1	Ductile Iron	1996

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10640	8	3	Ductile Iron	1996
WM-10641	8	3	Ductile Iron	1996
WM-10643	8	55	Ductile Iron	1996
WM-10644	12	44	Ductile Iron	1994
WM-10645	12	3	Ductile Iron	1994
WM-10646	12	131	Ductile Iron	1997
WM-10647	12	164	Ductile Iron	1997
WM-10648	12	101	Ductile Iron	1997
WM-10649	12	38	Ductile Iron	1997
WM-10650	12	119	Ductile Iron	1997
WM-10651	12	36	Ductile Iron	1997
WM-10652	6	3	Ductile Iron	1997
WM-10653	6	80	Ductile Iron	1997
WM-10655	6	30	Ductile Iron	1997
WM-10656	6	102	Cast Iron	1929
WM-10657	6	340	Cast Iron	1929
WM-10661	6	5	Cast Iron	1938
WM-10662	6	4	Cast Iron	1929
WM-10663	6	4	Cast Iron	1929
WM-10664	12	254	Ductile Iron	1997
WM-10675	12	36	Ductile Iron	1997
WM-10676	10	175	Cast Iron	1953
WM-10677	10	178	Cast Iron	1953
WM-10678	10	8	Cast Iron	1953
WM-10680	6	1	Cast Iron	1929
WM-10681	6	13	Cast Iron	1929
WM-10683	6	1	Cast Iron	1997
WM-10684	6	4	Ductile Iron	1997
WM-10685	12	3	Ductile Iron	1997
WM-10686	12	8	Ductile Iron	1997
WM-10687	12	205	Ductile Iron	1997
WM-10688	4	45	Cast Iron	1929
WM-10690	4	4	Cast Iron	1929
WM-10692	6	172	Cast Iron	1929
WM-10693	4	5	Cast Iron	
WM-10694	6	89	Cast Iron	1938
WM-10695	10	5	Cast Iron	1953
WM-10696	10	4	Cast Iron	1953
WM-10697	10	5	Cast Iron	1953
WM-10698	10	9	Cast Iron	1953
WM-10699	10	48	Cast Iron	1953

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10700	10	120	Cast Iron	1950
WM-10702	6	3	Cast Iron	1956
WM-10703	10	74	Cast Iron	1950
WM-10704	10	17	Cast Iron	1950
WM-10705	10	5	Cast Iron	1956
WM-10707	10	191	Cast Iron	1956
WM-10708	10	1	Cast Iron	1956
WM-10709	6	20	Cast Iron	1956
WM-10710	10	95	Cast Iron	1950
WM-10711	10	88	Cast Iron	1950
WM-10712	10	21	Cast Iron	1950
WM-10713	6	5	Cast Iron	1938
WM-10714	10	159	Cast Iron	1950
WM-10715	6	79	Cast Iron	1938
WM-10716	6	1	Cast Iron	1938
WM-10717	6	43	Cast Iron	1938
WM-10718	6	1	Cast Iron	1938
WM-10719	6	185	Cast Iron	1938
WM-10720	6	87	Cast Iron	1938
WM-10721	6	89	Cast Iron	1938
WM-10722	6	5	Cast Iron	1938
WM-10723	6	145	Cast Iron	1938
WM-10724	6	6	Cast Iron	1929
WM-10725	10	172	Cast Iron	1950
WM-10726	6	28	Cast Iron	1929
WM-10727	6	6	Cast Iron	1950
WM-10728	10	303	Cast Iron	1950
WM-10729	6	13	Cast Iron	1950
WM-10730	6	22	Cast Iron	1950
WM-10732	6	6	Cast Iron	1950
WM-10734	6	13	Cast Iron	1950
WM-10735	6	17	Cast Iron	1950
WM-10736	6	163	Cast Iron	1950
WM-10738	6	41	Cast Iron	1929
WM-10739	6	22	Cast Iron	1929
WM-10740	6	160	Cast Iron	1929
WM-10741	6	48	Cast Iron	1929
WM-10742	6	18	Cast Iron	1929
WM-10743	6	1	Cast Iron	
WM-10744	6	3	Cast Iron	1950
WM-10745	6	87	Cast Iron	1950

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10749	10	394	Cast Iron	1953
WM-10750	10	48	Cast Iron	1953
WM-10753	10	20	Cast Iron	1951
WM-10755	10	9	Cast Iron	1951
WM-10766	10	34	Ductile Iron	1992
WM-10767	10	102	Ductile Iron	1992
WM-10768	10	14	Ductile Iron	1992
WM-10769	10	209	Cast Iron	1951
WM-10775	8	1	Ductile Iron	
WM-10776	10	150	Cast Iron	1950
WM-10778	10	122	Cast Iron	1950
WM-10779	10	16	Cast Iron	1951
WM-10780	10	18	Cast Iron	1951
WM-10781	6	3	Cast Iron	1929
WM-10782	6	1	Cast Iron	1929
WM-10783	6	170	Cast Iron	1929
WM-10784	6	95	Cast Iron	1929
WM-10785	6	3	Cast Iron	1929
WM-10789	6	18	Cast Iron	1938
WM-10790	6	651	Cast Iron	1938
WM-10793	6	5	Cast Iron	1929
WM-10794	6	6	Cast Iron	1929
WM-10795	6	5	Cast Iron	1929
WM-10796	6	44	Ductile Iron	1966
WM-10797	8	1	Ductile Iron	1966
WM-10798	6	4	Cast Iron	
WM-10799	6	1	Cast Iron	
WM-10800	6	2	Cast Iron	
WM-10801	6	29	Cast Iron	1938
WM-10802	6	645	Cast Iron	1938
WM-10804	6	1	Cast Iron	
WM-10805	10	24	Cast Iron	1953
WM-10806	10	159	Cast Iron	1953
WM-10808	12	75	Cast Iron	1969
WM-10809	8	129	Cast Iron	1960
WM-10810	8	49	Cast Iron	1960
WM-10817	6	50	Cast Iron	1960
WM-10818	6	23	Cast Iron	1960
WM-10820	6	159	Cast Iron	1960
WM-10822	6	109	Cast Iron	1960
WM-10823	6	88	Cast Iron	1960

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-10824	6	5	Ductile Iron	1960
WM-10825	6	67	Cast Iron	1960
WM-10826	6	25	Cast Iron	1960
WM-10833	8	40	Cast Iron	1960
WM-10834	12	47	Cast Iron	1969
WM-10836	12	4	Cast Iron	1969
WM-10837	12	4	Cast Iron	1969
WM-10838	12	160	Cast Iron	1969
WM-10840	12	24	Cast Iron	1969
WM-10841	12	7	Cast Iron	1969
WM-10842	10	4	Cast Iron	1966
WM-10844	24	91	Steel	1966
WM-10845	10	2	Cast Iron	1966
WM-10846	10	38	Cast Iron	1966
WM-10847	12	17	Ductile Iron	2002
WM-10849	4	2	Ductile Iron	1962
WM-10852	6	1	Ductile Iron	2000
WM-10853	6	9	Ductile Iron	2000
WM-10854	10	55	Cast Iron	1955
WM-10855	10	606	Cast Iron	1931
WM-10856	6	1	Cast Iron	1966
WM-10857	4	131	Cast Iron	1966
WM-11256	6	2	Ductile Iron	1996
WM-11257	8	2	Ductile Iron	1996
WM-11258	8	568	Ductile Iron	1996
WM-11259	8	7	Ductile Iron	1996
WM-11260	6	2	Cast Iron	1966
WM-11262	12	598	Ductile Iron	1998
WM-11263	12	1	Ductile Iron	1998
WM-11264	12	398	Cast Iron	1955
WM-11265	12	5	Cast Iron	1955
WM-11266	6	8	Cast Iron	1966
WM-11267	6	339	Cast Iron	1966
WM-11275	12	424	Ductile Iron	1988
WM-11276	12	29	Ductile Iron	1988
WM-11277	6	4	Cast Iron	1967
WM-11278	6	516	Cast Iron	1968
WM-11279	6	7	Cast Iron	1978
WM-11297	6	203	Cast Iron	1950
WM-11299	6	10	Cast Iron	1950
WM-11300	24	68	Steel	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11301	24	2533	Steel	1966
WM-11303	6	5	Cast Iron	1977
WM-11305	6	440	Cast Iron	1977
WM-11306	6	288	Cast Iron	1977
WM-11307	6	2	Cast Iron	1977
WM-11308	6	2	Cast Iron	1977
WM-11309	6	53	Cast Iron	1919
WM-11312	6	637	Cast Iron	1966
WM-11313	6	12	Cast Iron	1966
WM-11314	6	7	Cast Iron	1919
WM-11315	4	53	Cast Iron	1919
WM-11316	6	471	Cast Iron	1966
WM-11317	6	157	Cast Iron	1966
WM-11318	4	186	Cast Iron	1919
WM-11319	4	2	Cast Iron	1919
WM-11321	6	332	Cast Iron	1966
WM-11322	6	2	Cast Iron	1966
WM-11323	8	7	Ductile Iron	1967
WM-11324	8	18	Ductile Iron	1999
WM-11327	6	359	Cast Iron	1954
WM-11338	6	774	Cast Iron	1966
WM-11351	6	59	Cast Iron	1950
WM-11353	6	28	Cast Iron	1966
WM-11358	6	25	Cast Iron	1948
WM-11359	6	9	Cast Iron	1950
WM-11360	6	468	Cast Iron	1966
WM-11368	6	2	Cast Iron	1950
WM-11369	6	146	Cast Iron	1950
WM-11374	6	380	Cast Iron	1950
WM-11375	6	479	Cast Iron	1950
WM-11377	6	4	Cast Iron	1950
WM-11381	6	542	Cast Iron	1950
WM-11387	6	170	Cast Iron	1991
WM-11401	6	88	Cast Iron	1950
WM-11402	6	9	Cast Iron	1950
WM-11403	6	154	Cast Iron	1950
WM-11405	6	3	Cast Iron	1950
WM-11406	6	411	Cast Iron	1950
WM-11407	6	148	Cast Iron	1950
WM-11414	6	3	Cast Iron	1966
WM-11415	6	324	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11417	6	3	Ductile Iron	1966
WM-11418	6	392	Cast Iron	1957
WM-11419	6	3	Cast Iron	
WM-11420	6	3	Cast Iron	1966
WM-11422	30	651	Cast Iron	1966
WM-11423	30	721	Cast Iron	1966
WM-11424	6	1	Cast Iron	1966
WM-11425	6	1	Cast Iron	1966
WM-11427	6	129	Cast Iron	1966
WM-11428	6	283	Cast Iron	1966
WM-11429	6	7	Cast Iron	1965
WM-11430	6	58	Cast Iron	1954
WM-11431	6	373	Cast Iron	1966
WM-11432	6	143	Cast Iron	1966
WM-11434	18	7	Cast Iron	1955
WM-11436	6	23	Cast Iron	1943
WM-11437	6	3	Cast Iron	1943
WM-11438	6	88	Cast Iron	1943
WM-11439	6	210	Cast Iron	1943
WM-11440	6	56	Cast Iron	1943
WM-11441	6	142	Cast Iron	1943
WM-11442	6	1	Ductile Iron	1943
WM-11444	4	20	Cast Iron	1943
WM-11445	4	8	Cast Iron	1943
WM-11446	4	36	Cast Iron	1943
WM-11447	4	66	Cast Iron	1943
WM-11448	6	1	Ductile Iron	1943
WM-11452	6	15	Cast Iron	1943
WM-11453	6	75	Cast Iron	1943
WM-11455	6	1	Cast Iron	1943
WM-11456	6	1	Cast Iron	1943
WM-11460	8	10	Ductile Iron	2002
WM-11462	8	6	Ductile Iron	2002
WM-11464	8	6	Ductile Iron	2002
WM-11465	8	469	Ductile Iron	2002
WM-11466	8	2	Ductile Iron	2002
WM-11472	8	8	Ductile Iron	2011
WM-11473	6	65	Cast Iron	1966
WM-11475	6	5	Cast Iron	1966
WM-11476	6	3	Cast Iron	1966
WM-11477	12	53	Ductile Iron	1990

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11478	6	1	Ductile Iron	1966
WM-11480	12	3	Ductile Iron	1990
WM-11481	12	1439	Ductile Iron	1990
WM-11482	6	2	Ductile Iron	1990
WM-11483	6	2	Ductile Iron	1990
WM-11484	6	2	Ductile Iron	1990
WM-11486	6	53	Cast Iron	1966
WM-11487	6	601	Cast Iron	1966
WM-11489	6	12	Ductile Iron	1966
WM-11491	6	44	Ductile Iron	1966
WM-11493	6	8	Cast Iron	1966
WM-11496	12	540	Ductile Iron	1990
WM-11497	12	3	Ductile Iron	1990
WM-11498	6	25	Cast Iron	1966
WM-11510	6	3	Cast Iron	1966
WM-11511	6	18	Cast Iron	1966
WM-11512	6	9	Ductile Iron	1966
WM-11513	6	252	Cast Iron	1966
WM-11515	6	43	Cast Iron	1966
WM-11516	6	28	Cast Iron	1961
WM-11519	12	304	Ductile Iron	1990
WM-11520	6	8	Cast Iron	1960
WM-11521	6	235	Cast Iron	1966
WM-11535	6	8	Cast Iron	1966
WM-11536	6	17	Cast Iron	1966
WM-11537	6	28	Cast Iron	1966
WM-11539	4	5	Cast Iron	1961
WM-11540	4	4	Cast Iron	1961
WM-11542	6	127	Cast Iron	1961
WM-11543	6	123	Cast Iron	1961
WM-11544	6	39	Cast Iron	1961
WM-11546	6	7	Cast Iron	1960
WM-11547	6	197	Cast Iron	1960
WM-11548	6	2	Cast Iron	1990
WM-11549	6	3	Cast Iron	
WM-11550	6	2	Cast Iron	1990
WM-11552	6	20	Ductile Iron	1990
WM-11553	12	30	Ductile Iron	1990
WM-11554	12	27	Ductile Iron	1990
WM-11558	12	1	Ductile Iron	1990
WM-11560	12	359	Ductile Iron	1990

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11562	12	1	Ductile Iron	1990
WM-11563	6	2	Cast Iron	1990
WM-11564	6	1	Cast Iron	1990
WM-11567	12	183	Ductile Iron	1991
WM-11568	12	108	Ductile Iron	1991
WM-11569	12	1	Ductile Iron	1991
WM-11581	6	8	Ductile Iron	1991
WM-11582	12	1	Ductile Iron	1991
WM-11583	12	1	Ductile Iron	1991
WM-11584	12	25	Ductile Iron	1991
WM-11586	12	445	Ductile Iron	1991
WM-11588	12	360	Ductile Iron	1991
WM-11590	12	25	Ductile Iron	1994
WM-11591	12	365	Ductile Iron	1994
WM-11592	12	219	Ductile Iron	1994
WM-11593	12	3	Ductile Iron	1994
WM-11594	12	9	Ductile Iron	2005
WM-11595	12	402	Ductile Iron	1994
WM-11596	12	197	Ductile Iron	1994
WM-11602	8	371	Ductile Iron	2011
WM-11604	8	5	Ductile Iron	2011
WM-11605	8	474	Ductile Iron	2011
WM-11607	6	439	Cast Iron	1966
WM-11608	6	23	Cast Iron	1966
WM-11609	6	25	Cast Iron	1966
WM-11610	6	187	Cast Iron	1966
WM-11615	6	39	Cast Iron	1966
WM-11616	6	1286	Cast Iron	1966
WM-11618	6	29	Cast Iron	1966
WM-11620	6	47	Cast Iron	1966
WM-11621	6	4	Cast Iron	1966
WM-11622	6	14	Cast Iron	1966
WM-11623	6	216	Cast Iron	1966
WM-11625	10	449	Cast Iron	1948
WM-11626	10	3	Cast Iron	1948
WM-11628	10	32	Cast Iron	1948
WM-11630	6	1	Cast Iron	1948
WM-11631	10	427	Cast Iron	1948
WM-11632	10	2	Cast Iron	1948
WM-11633	10	396	Cast Iron	1948
WM-11634	10	3	Cast Iron	1948

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11635	12	15	Ductile Iron	2001
WM-11636	12	349	Ductile Iron	2001
WM-11637	8	4	Cast Iron	1946
WM-11638	8	47	Cast Iron	1946
WM-11639	6	296	Cast Iron	1957
WM-11644	6	21	Cast Iron	1957
WM-11645	8	1	Cast Iron	
WM-11647	6	1	Poly Vinyl Chloride	1946
WM-11648	6	38	Cast Iron	1967
WM-11650	6	10	Cast Iron	1966
WM-11651	6	872	Cast Iron	1912
WM-11653	8	1	Cast Iron	1958
WM-11655	8	1	Cast Iron	1958
WM-11656	8	8	Cast Iron	1951
WM-11657	8	33	Cast Iron	1959
WM-11658	8	11	Cast Iron	1959
WM-11659	6	10	Cast Iron	
WM-11660	6	4	Cast Iron	1966
WM-11661	6	41	Cast Iron	1966
WM-11662	6	43	Ductile Iron	1955
WM-11663	6	9	Cast Iron	1955
WM-11664	6	57	Cast Iron	1955
WM-11665	6	53	Cast Iron	1955
WM-11666	6	13	Cast Iron	1954
WM-11667	6	222	Cast Iron	1954
WM-11668	6	445	Cast Iron	1954
WM-11669	6	8	Cast Iron	1966
WM-11671	6	2	Cast Iron	1966
WM-11673	6	1	Cast Iron	1954
WM-11674	6	24	Cast Iron	1954
WM-11675	6	53	Cast Iron	1961
WM-11676	8	463	Cast Iron	1948
WM-11677	8	3	Cast Iron	1948
WM-11678	8	29	Cast Iron	1955
WM-11679	6	4	Cast Iron	1966
WM-11680	6	2	Cast Iron	1966
WM-11681	8	13	Ductile Iron	
WM-11682	6	62	Cast Iron	1961
WM-11684	20	549	Cast Iron	1972
WM-11686	6	584	Cast Iron	1948
WM-11688	6	422	Cast Iron	1967

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11689	6	6	Cast Iron	1967
WM-11690	20	339	Ductile Iron	1972
WM-11691	10	354	Cast Iron	1965
WM-11695	6	14	Cast Iron	1948
WM-11701	24	1095	Ductile Iron	2000
WM-11705	20	19	Cast Iron	1972
WM-11706	20	51	Cast Iron	1972
WM-11707	20	1	Ductile Iron	1972
WM-11708	20	1	Ductile Iron	1972
WM-11713	6	3	Ductile Iron	1972
WM-11714	20	1239	Ductile Iron	1972
WM-11716	20	458	Ductile Iron	1972
WM-11718	6	8	Ductile Iron	1972
WM-11719	8	19	Ductile Iron	1972
WM-11720	20	556	Ductile Iron	1972
WM-11723	20	520	Ductile Iron	1972
WM-11724	6	12	Ductile Iron	1972
WM-11725	20	13	Ductile Iron	1972
WM-11726	20	63	Ductile Iron	1972
WM-11728	20	53	Ductile Iron	1972
WM-11729	20	94	Ductile Iron	1972
WM-11730	20	3	Ductile Iron	1972
WM-11731	20	423	Ductile Iron	1972
WM-11732	20	83	Ductile Iron	1972
WM-11733	6	6	Ductile Iron	1972
WM-11739	20	305	Ductile Iron	1972
WM-11740	20	1	Ductile Iron	1972
WM-11741	20	230	Ductile Iron	1972
WM-11743	20	35	Ductile Iron	1972
WM-11744	20	1	Ductile Iron	1972
WM-11745	20	1	Ductile Iron	1972
WM-11746	20	5	Ductile Iron	
WM-11747	20	1	Ductile Iron	
WM-11748	12	10	Ductile Iron	
WM-11750	6	2	Cast Iron	2007
WM-11753	6	1	Cast Iron	2007
WM-11754	6	3	Cast Iron	2007
WM-11755	6	1	Cast Iron	2007
WM-11756	6	1	Cast Iron	2007
WM-11757	4	7	Cast Iron	2007
WM-11758	4	2	Cast Iron	2007

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11759	6	103	Cast Iron	2007
WM-11761	6	1	Cast Iron	2007
WM-11762	2	1	Cast Iron	2007
WM-11763	8	40	Cast Iron	2007
WM-11764	10	350	Cast Iron	1951
WM-11765	10	236	Cast Iron	1951
WM-11766	4	7	Cast Iron	2007
WM-11767	4	1	Cast Iron	2007
WM-11768	4	57	Cast Iron	2007
WM-11769	4	97	Cast Iron	2007
WM-11770	4	1	Cast Iron	2007
WM-11773	1	0	Cast Iron	2007
WM-11774	1	0	Cast Iron	2007
WM-11775	4	2	Cast Iron	2007
WM-11776	4	2	Cast Iron	2007
WM-11777	4	1	Cast Iron	2007
WM-11778	4	2	Cast Iron	2007
WM-11779	4	1	Cast Iron	2007
WM-11780	8	76	Cast Iron	1963
WM-11781	8	11	Cast Iron	1963
WM-11782	8	4	Ductile Iron	1963
WM-11783	8	32	Ductile Iron	1963
WM-11784	8	72	Ductile Iron	1963
WM-11785	8	47	Ductile Iron	1963
WM-11786	8	3	Ductile Iron	1963
WM-11787	8	57	Cast Iron	1963
WM-11788	8	63	Cast Iron	1963
WM-11790	10	5	Cast Iron	1976
WM-11791	10	1398	Cast Iron	1976
WM-11794	10	19	Cast Iron	1976
WM-11796	10	18	Cast Iron	1976
WM-11798	10	18	Cast Iron	1976
WM-11799	10	11	Cast Iron	1976
WM-11800	10	1	Cast Iron	1976
WM-11801	10	1	Cast Iron	1976
WM-11803	10	131	Cast Iron	1976
WM-11804	10	162	Cast Iron	1976
WM-11806	6	8	Cast Iron	1976
WM-11808	6	5	Ductile Iron	1976
WM-11809	6	203	Cast Iron	1976
WM-11810	6	1	Cast Iron	1976

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11812	6	160	Ductile Iron	1976
WM-11813	6	3	Cast Iron	1976
WM-11816	10	3	Cast Iron	1976
WM-11817	10	149	Cast Iron	1976
WM-11818	10	44	Cast Iron	1976
WM-11819	8	1	Cast Iron	1976
WM-11821	10	15	Cast Iron	1976
WM-11822	8	10	Cast Iron	
WM-11823	8	9	Cast Iron	
WM-11824	6	398	Cast Iron	1954
WM-11825	6	249	Cast Iron	1954
WM-11826	6	4	Cast Iron	1954
WM-11827	30	149	Cast Iron	1966
WM-11828	6	3	Cast Iron	1966
WM-11829	30	583	Cast Iron	1966
WM-11830	30	12	Cast Iron	1966
WM-11831	6	1	Cast Iron	1966
WM-11835	10	2	Ductile Iron	1991
WM-11836	10	2	Ductile Iron	1991
WM-11837	12	9	Ductile Iron	1991
WM-11838	12	5	Ductile Iron	1991
WM-11839	6	4	Ductile Iron	1991
WM-11840	12	2	Ductile Iron	1991
WM-11841	12	13	Ductile Iron	1991
WM-11843	6	5	Ductile Iron	1991
WM-11844	6	3	Ductile Iron	1991
WM-11845	6	7	Ductile Iron	1991
WM-11846	6	3	Cast Iron	1991
WM-11847	10	3	Ductile Iron	1991
WM-11848	10	3	Ductile Iron	1991
WM-11851	10	7	Ductile Iron	1991
WM-11852	10	7	Ductile Iron	1991
WM-11853	6	24	Ductile Iron	1991
WM-11856	6	9	Cast Iron	1966
WM-11857	6	37	Cast Iron	1966
WM-11858	6	23	Cast Iron	1966
WM-11859	6	49	Cast Iron	1966
WM-11862	6	408	Cast Iron	1966
WM-11863	6	111	Ductile Iron	1966
WM-11864	6	291	Cast Iron	1966
WM-11865	6	5	Cast Iron	1978

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11866	6	161	Cast Iron	1978
WM-11867	6	3	Cast Iron	1978
WM-11868	6	192	Cast Iron	1978
WM-11869	6	3	Cast Iron	1978
WM-11870	6	313	Cast Iron	1978
WM-11873	6	153	Ductile Iron	1966
WM-11875	6	29	Cast Iron	1966
WM-11877	6	19	Cast Iron	1966
WM-11882	6	416	Ductile Iron	1966
WM-11884	6	14	Cast Iron	1966
WM-11885	6	297	Cast Iron	1966
WM-11886	6	10	Cast Iron	1966
WM-11888	2	146	Cast Iron	1966
WM-11889	2	39	Cast Iron	1966
WM-11890	2	4	Cast Iron	1966
WM-11891	6	19	Cast Iron	1966
WM-11894	6	9	Cast Iron	1955
WM-11895	6	7	Cast Iron	1966
WM-11896	6	281	Cast Iron	1966
WM-11897	6	3	Cast Iron	1966
WM-11898	6	158	Cast Iron	1966
WM-11899	6	422	Cast Iron	1955
WM-11900	6	42	Cast Iron	1957
WM-11902	6	168	Cast Iron	1966
WM-11903	6	17	Cast Iron	1955
WM-11904	6	12	Cast Iron	1955
WM-11906	6	4	Cast Iron	1955
WM-11908	6	10	Cast Iron	1955
WM-11910	6	5	Cast Iron	1955
WM-11911	6	568	Cast Iron	1955
WM-11912	6	67	Cast Iron	1955
WM-11913	6	3	Cast Iron	1966
WM-11917	6	5	Cast Iron	1955
WM-11918	6	5	Cast Iron	1955
WM-11919	6	39	Cast Iron	1955
WM-11920	6	2	Cast Iron	1955
WM-11921	6	297	Cast Iron	1955
WM-11922	6	77	Cast Iron	1955
WM-11924	8	95	Cast Iron	1955
WM-11925	8	3	Cast Iron	1955
WM-11926	8	10	Cast Iron	1955

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11927	8	6	Cast Iron	1966
WM-11928	8	3	Cast Iron	1966
WM-11929	8	22	Ductile Iron	1966
WM-11933	8	373	Cast Iron	1966
WM-11934	8	42	Ductile Iron	1966
WM-11935	8	3	Cast Iron	1966
WM-11936	8	165	Cast Iron	1966
WM-11940	8	19	Cast Iron	1966
WM-11942	6	352	Ductile Iron	1996
WM-11943	6	1	Ductile Iron	1966
WM-11944	6	355	Cast Iron	1981
WM-11945	6	1	Cast Iron	1981
WM-11946	8	156	Cast Iron	1966
WM-11948	8	28	Cast Iron	1966
WM-11949	8	35	Cast Iron	1966
WM-11950	8	376	Cast Iron	1955
WM-11951	6	1	Cast Iron	1955
WM-11952	8	12	Cast Iron	1955
WM-11953	8	5	Cast Iron	1966
WM-11954	8	23	Cast Iron	1966
WM-11955	8	4	Cast Iron	1966
WM-11957	8	1	Cast Iron	1966
WM-11958	6	9	Cast Iron	1966
WM-11959	6	10	Cast Iron	1966
WM-11960	8	2	Cast Iron	1966
WM-11962	8	1	Cast Iron	1966
WM-11963	4	1	Cast Iron	1966
WM-11964	8	10	Cast Iron	1966
WM-11965	6	10	Cast Iron	1966
WM-11966	4	1	Ductile Iron	1966
WM-11967	6	35	Cast Iron	1966
WM-11970	6	10	Cast Iron	1966
WM-11971	6	12	Cast Iron	1966
WM-11973	8	123	Ductile Iron	1966
WM-11977	8	4	Cast Iron	1966
WM-11978	6	445	Cast Iron	1957
WM-11979	6	189	Cast Iron	1957
WM-11980	6	213	Cast Iron	1957
WM-11982	6	142	Cast Iron	1957
WM-11983	6	371	Cast Iron	1957
WM-11984	6	357	Cast Iron	1957

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-11985	6	1	Cast Iron	1957
WM-11986	6	3	Cast Iron	1957
WM-11987	6	9	Cast Iron	1957
WM-11989	6	1	Ductile Iron	1994
WM-11990	12	8	Ductile Iron	1994
WM-11992	12	4	Ductile Iron	1994
WM-11993	6	1	Cast Iron	1966
WM-11994	6	51	Cast Iron	1966
WM-11995	12	8	Ductile Iron	1994
WM-11996	12	5	Ductile Iron	1994
WM-11997	12	4	Ductile Iron	1994
WM-11998	12	16	Ductile Iron	1994
WM-11999	12	27	Ductile Iron	1994
WM-12000	12	1	Cast Iron	1994
WM-12001	12	1	Ductile Iron	1994
WM-12002	6	4	Ductile Iron	1994
WM-12003	6	8	Ductile Iron	1994
WM-12004	6	2	Ductile Iron	1994
WM-12005	6	5	Ductile Iron	1994
WM-12006	6	7	Ductile Iron	1994
WM-12007	12	21	Ductile Iron	1994
WM-12008	12	1	Ductile Iron	1994
WM-12014	12	3	Ductile Iron	1994
WM-12015	12	7	Ductile Iron	1994
WM-12019	12	12	Ductile Iron	1994
WM-12021	12	497	Ductile Iron	1994
WM-12028	12	544	Ductile Iron	1994
WM-12042	6	3	Cast Iron	
WM-12044	8	9	Ductile Iron	2015
WM-12045	6	12	Cast Iron	1955
WM-12046	6	3	Cast Iron	1966
WM-12047	6	19	Cast Iron	1966
WM-12048	6	48	Ductile Iron	1966
WM-12049	6	18	Cast Iron	1966
WM-12050	6	251	Cast Iron	1955
WM-12055	6	11	Cast Iron	1966
WM-12058	6	30	Ductile Iron	
WM-12061	6	4	Ductile Iron	
WM-12062	6	61	Cast Iron	
WM-12063	6	1	Cast Iron	
WM-12064	6	17	Cast Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12065	6	12	Cast Iron	
WM-12066	6	3	Cast Iron	
WM-12067	6	33	Ductile Iron	
WM-12069	8	3	Ductile Iron	2015
WM-12077	6	3	Ductile Iron	1998
WM-12083	6	145	Ductile Iron	1998
WM-12087	6	61	Ductile Iron	1998
WM-12088	6	123	Ductile Iron	1998
WM-12089	6	3	Cast Iron	1966
WM-12090	6	1	Cast Iron	1966
WM-12091	12	21	Cast Iron	1966
WM-12093	6	195	Cast Iron	1959
WM-12094	6	6	Cast Iron	1959
WM-12096	4	653	Cast Iron	1956
WM-12097	6	1	Cast Iron	1966
WM-12098	6	20	Cast Iron	1959
WM-12099	6	5	Cast Iron	1966
WM-12100	6	5	Cast Iron	1959
WM-12101	6	37	Cast Iron	1959
WM-12106	16	10	Cast Iron	2004
WM-12111	12	240	Cast Iron	2000
WM-12112	12	30	Ductile Iron	2000
WM-12113	12	4	Ductile Iron	2000
WM-12114	12	1	Ductile Iron	2000
WM-12115	12	1	Ductile Iron	2000
WM-12116	12	4	Ductile Iron	2000
WM-12117	12	1	Ductile Iron	2000
WM-12118	12	1	Ductile Iron	2000
WM-12119	12	4	Ductile Iron	2000
WM-12120	12	62	Ductile Iron	2000
WM-12121	12	4	Ductile Iron	2000
WM-12122	12	15	Ductile Iron	2000
WM-12123	12	37	Ductile Iron	2000
WM-12127	6	62	Ductile Iron	1991
WM-12128	6	3	Cast Iron	1950
WM-12129	6	31	Cast Iron	1950
WM-12130	6	140	Cast Iron	1991
WM-12131	6	3	Cast Iron	1991
WM-12132	6	2	Cast Iron	1991
WM-12133	6	1	Cast Iron	1950
WM-12134	6	3	Cast Iron	1991

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12135	6	1	Cast Iron	1991
WM-12136	6	1	Ductile Iron	1991
WM-12138	12	1	Cast Iron	1991
WM-12139	6	14	Ductile Iron	1991
WM-12140	6	1	Ductile Iron	1991
WM-12141	12	28	Ductile Iron	1991
WM-12142	12	127	Ductile Iron	1991
WM-12143	12	5	Ductile Iron	2000
WM-12147	10	4	Ductile Iron	2000
WM-12149	10	4	Ductile Iron	2000
WM-12150	10	4	Ductile Iron	2000
WM-12151	10	4	Ductile Iron	2000
WM-12152	10	5	Ductile Iron	2000
WM-12153	10	5	Ductile Iron	2000
WM-12154	6	67	Cast Iron	1966
WM-12156	6	31	Cast Iron	1966
WM-12157	6	12	Cast Iron	1966
WM-12158	6	110	Cast Iron	1966
WM-12159	6	24	Cast Iron	1966
WM-12160	6	75	Cast Iron	1940
WM-12161	6	648	Cast Iron	1940
WM-12162	8	4	Cast Iron	1959
WM-12163	6	1	Cast Iron	1959
WM-12165	8	70	Cast Iron	1959
WM-12166	4	4	Cast Iron	1959
WM-12167	8	1	Cast Iron	1959
WM-12168	4	78	Cast Iron	1959
WM-12170	8	26	Ductile Iron	2002
WM-12171	8	20	Ductile Iron	2002
WM-12173	8	148	Ductile Iron	2002
WM-12175	8	90	Ductile Iron	2002
WM-12179	8	58	Ductile Iron	2002
WM-12180	8	79	Ductile Iron	2002
WM-12182	8	3	Ductile Iron	2002
WM-12184	16	217	Cast Iron	1955
WM-12185	16	20	Cast Iron	1955
WM-12186	8	56	Ductile Iron	2002
WM-12187	8	1	Ductile Iron	2002
WM-12188	4	6	Ductile Iron	2002
WM-12190	8	87	Ductile Iron	2002
WM-12191	8	89	Ductile Iron	2002

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12192	8	113	Ductile Iron	2002
WM-12193	4	7	Ductile Iron	2002
WM-12194	4	4	Ductile Iron	2002
WM-12196	6	3	Ductile Iron	2002
WM-12198	6	2	Ductile Iron	2002
WM-12199	6	2	Ductile Iron	2002
WM-12200	6	25	Ductile Iron	2002
WM-12202	4	10	Ductile Iron	2002
WM-12203	4	5	Ductile Iron	2002
WM-12204	8	114	Ductile Iron	2002
WM-12205	8	125	Ductile Iron	2002
WM-12207	6	12	Ductile Iron	2002
WM-12209	12	3	Ductile Iron	1991
WM-12213	10	2	Ductile Iron	
WM-12215	12	7	Ductile Iron	
WM-12216	10	1	Ductile Iron	
WM-12217	10	5	Ductile Iron	
WM-12218	10	6	Ductile Iron	
WM-12219	12	5	Ductile Iron	
WM-12230	12	6	Ductile Iron	
WM-12231	10	5	Ductile Iron	
WM-12232	10	9	Ductile Iron	
WM-12233	10	3	Ductile Iron	
WM-12234	10	3	Ductile Iron	
WM-12235	12	215	Cast Iron	1976
WM-12237	6	6	Ductile Iron	2004
WM-12238	6	1	Ductile Iron	2004
WM-12239	6	296	Ductile Iron	2004
WM-12242	6	4	Ductile Iron	2004
WM-12243	6	58	Ductile Iron	2004
WM-12244	6	22	Ductile Iron	2004
WM-12246	6	3	Ductile Iron	2004
WM-12247	6	103	Ductile Iron	2004
WM-12248	6	66	Ductile Iron	2004
WM-12249	6	2	Ductile Iron	2004
WM-12250	6	3	Ductile Iron	2004
WM-12254	6	100	Ductile Iron	2004
WM-12255	6	7	Ductile Iron	2004
WM-12256	6	41	Ductile Iron	2004
WM-12257	6	4	Ductile Iron	2004
WM-12259	6	1	Ductile Iron	2004

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12262	6	72	Ductile Iron	2004
WM-12263	6	53	Ductile Iron	2004
WM-12266	6	12	Ductile Iron	2004
WM-12267	6	4	Ductile Iron	2004
WM-12268	6	128	Ductile Iron	2004
WM-12269	6	10	Ductile Iron	2004
WM-12270	6	39	Ductile Iron	2004
WM-12272	6	2	Ductile Iron	2005
WM-12273	6	35	Ductile Iron	2005
WM-12274	6	38	Ductile Iron	2005
WM-12275	6	6	Ductile Iron	2005
WM-12276	6	24	Ductile Iron	2005
WM-12277	6	4	Ductile Iron	2005
WM-12278	6	60	Ductile Iron	2005
WM-12279	6	24	Ductile Iron	2005
WM-12280	6	3	Ductile Iron	2005
WM-12283	6	50	Ductile Iron	2005
WM-12285	6	51	Ductile Iron	1986
WM-12286	6	52	Ductile Iron	1986
WM-12288	6	3	Ductile Iron	1986
WM-12289	6	8	Ductile Iron	2005
WM-12290	6	140	Ductile Iron	1986
WM-12291	6	201	Ductile Iron	1986
WM-12292	6	87	Ductile Iron	1986
WM-12293	6	90	Ductile Iron	1986
WM-12294	6	23	Ductile Iron	1986
WM-12296	6	129	Ductile Iron	1986
WM-12298	6	15	Ductile Iron	1986
WM-12299	6	9	Ductile Iron	1986
WM-12300	6	2	Ductile Iron	1986
WM-12301	6	3	Cast Iron	1966
WM-12302	6	473	Cast Iron	1966
WM-12303	6	41	Cast Iron	1978
WM-12304	6	153	Cast Iron	1978
WM-12305	6	12	Cast Iron	1978
WM-12306	6	113	Cast Iron	1978
WM-12307	6	16	Cast Iron	1978
WM-12308	6	11	Cast Iron	1983
WM-12309	6	71	Cast Iron	1983
WM-12310	6	6	Cast Iron	1983
WM-12311	6	43	Cast Iron	1978

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12312	6	1	Cast Iron	1983
WM-12313	6	122	Cast Iron	1983
WM-12314	6	4	Cast Iron	1978
WM-12316	6	3	Cast Iron	1978
WM-12317	6	62	Cast Iron	1978
WM-12319	16	1	Ductile Iron	2004
WM-12322	6	550	Cast Iron	1966
WM-12324	6	88	Ductile Iron	1998
WM-12325	6	12	Ductile Iron	1998
WM-12326	12	11	Cast Iron	1969
WM-12327	12	217	Cast Iron	1969
WM-12329	12	32	Ductile Iron	2000
WM-12330	12	259	Ductile Iron	2000
WM-12331	6	3	Ductile Iron	2000
WM-12332	12	20	Ductile Iron	2000
WM-12333	12	3	Ductile Iron	2000
WM-12334	12	1	Ductile Iron	2000
WM-12335	6	207	Ductile Iron	2000
WM-12336	6	4	Ductile Iron	2000
WM-12337	6	3	Ductile Iron	2000
WM-12338	6	47	Ductile Iron	2000
WM-12339	6	2	Ductile Iron	2000
WM-12340	6	0	Cast Iron	1966
WM-12341	2	0	Cast Iron	1966
WM-12343	12	205	Ductile Iron	2004
WM-12344	12	40	Ductile Iron	2004
WM-12345	8	2	Ductile Iron	2004
WM-12346	8	15	Ductile Iron	2004
WM-12347	12	3	Ductile Iron	2004
WM-12348	12	5	Ductile Iron	2004
WM-12349	12	15	Ductile Iron	2004
WM-12350	12	3	Ductile Iron	2004
WM-12351	8	175	Ductile Iron	2004
WM-12354	12	70	Ductile Iron	2004
WM-12355	12	36	Ductile Iron	2004
WM-12356	12	35	Ductile Iron	2004
WM-12357	12	5	Ductile Iron	2004
WM-12358	12	6	Ductile Iron	2004
WM-12359	12	32	Ductile Iron	2004
WM-12360	12	8	Ductile Iron	2004
WM-12361	8	46	Ductile Iron	2004

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12362	8	116	Ductile Iron	2004
WM-12363	12	87	Ductile Iron	2004
WM-12364	12	119	Ductile Iron	2004
WM-12365	12	52	Ductile Iron	2004
WM-12366	12	5	Ductile Iron	2004
WM-12367	12	82	Ductile Iron	2004
WM-12368	12	4	Ductile Iron	2004
WM-12369	8	4	Ductile Iron	2004
WM-12370	8	158	Ductile Iron	2004
WM-12371	12	32	Ductile Iron	2004
WM-12372	12	96	Ductile Iron	2004
WM-12373	6	25	Ductile Iron	2004
WM-12375	12	113	Ductile Iron	2004
WM-12376	12	58	Ductile Iron	2004
WM-12377	12	16	Ductile Iron	2004
WM-12378	6	10	Ductile Iron	2004
WM-12379	8	95	Ductile Iron	2004
WM-12380	8	134	Ductile Iron	2004
WM-12381	8	67	Ductile Iron	2004
WM-12382	8	107	Ductile Iron	2004
WM-12383	8	116	Ductile Iron	2004
WM-12384	8	28	Ductile Iron	2004
WM-12385	8	70	Ductile Iron	2004
WM-12386	8	15	Ductile Iron	2004
WM-12387	8	46	Ductile Iron	2004
WM-12388	8	6	Ductile Iron	2004
WM-12389	8	6	Ductile Iron	2004
WM-12390	8	6	Ductile Iron	2004
WM-12391	8	6	Ductile Iron	2004
WM-12392	8	32	Ductile Iron	2004
WM-12393	8	33	Ductile Iron	2004
WM-12394	8	22	Ductile Iron	2004
WM-12395	8	42	Ductile Iron	2004
WM-12396	8	35	Ductile Iron	2004
WM-12397	8	19	Ductile Iron	2004
WM-12398	8	204	Ductile Iron	2004
WM-12399	8	129	Ductile Iron	2004
WM-12400	8	70	Ductile Iron	2004
WM-12401	8	83	Ductile Iron	2004
WM-12402	8	29	Ductile Iron	2004
WM-12403	8	28	Ductile Iron	2004

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12404	8	89	Ductile Iron	2004
WM-12405	8	71	Ductile Iron	2004
WM-12407	12	5	Ductile Iron	2004
WM-12411	12	5	Ductile Iron	2004
WM-12412	12	4	Ductile Iron	2004
WM-12417	12	84	Ductile Iron	2004
WM-12418	12	17	Ductile Iron	2004
WM-12419	12	43	Ductile Iron	2004
WM-12420	12	86	Ductile Iron	2004
WM-12421	12	63	Ductile Iron	2004
WM-12422	12	45	Ductile Iron	2004
WM-12423	12	57	Ductile Iron	2004
WM-12424	12	29	Ductile Iron	2004
WM-12425	12	13	Ductile Iron	2004
WM-12426	12	8	Ductile Iron	2004
WM-12427	12	6	Ductile Iron	2004
WM-12428	12	3	Ductile Iron	2004
WM-12429	12	6	Ductile Iron	2004
WM-12430	12	6	Ductile Iron	2004
WM-12431	12	3	Ductile Iron	2004
WM-12432	12	47	Ductile Iron	2004
WM-12433	8	35	Ductile Iron	2004
WM-12434	8	14	Ductile Iron	2004
WM-12435	8	39	Ductile Iron	2004
WM-12436	8	5	Ductile Iron	2004
WM-12437	8	26	Ductile Iron	2004
WM-12438	8	5	Ductile Iron	2004
WM-12439	12	396	Ductile Iron	2004
WM-12440	12	8	Ductile Iron	2004
WM-12441	12	230	Ductile Iron	2004
WM-12442	12	290	Ductile Iron	2004
WM-12443	12	10	Ductile Iron	2004
WM-12444	12	3	Ductile Iron	2004
WM-12445	12	102	Ductile Iron	2004
WM-12446	12	6	Ductile Iron	2004
WM-12447	8	6	Ductile Iron	2004
WM-12448	12	127	Ductile Iron	2004
WM-12449	8	42	Ductile Iron	2004
WM-12450	8	42	Ductile Iron	2004
WM-12451	12	24	Ductile Iron	2005
WM-12452	12	239	Ductile Iron	2005

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12456	8	281	Ductile Iron	2004
WM-12457	8	31	Ductile Iron	2004
WM-12458	8	140	Ductile Iron	2004
WM-12459	8	70	Ductile Iron	2004
WM-12460	8	24	Ductile Iron	2004
WM-12461	8	6	Ductile Iron	2004
WM-12462	8	6	Ductile Iron	2004
WM-12463	8	18	Ductile Iron	2004
WM-12464	8	80	Ductile Iron	2004
WM-12465	8	67	Ductile Iron	2004
WM-12466	8	21	Ductile Iron	2004
WM-12467	8	6	Ductile Iron	2004
WM-12468	8	6	Ductile Iron	2004
WM-12469	8	152	Ductile Iron	2004
WM-12470	8	11	Ductile Iron	2004
WM-12471	8	21	Ductile Iron	2004
WM-12472	8	111	Ductile Iron	2004
WM-12473	8	49	Ductile Iron	2004
WM-12474	8	10	Ductile Iron	2004
WM-12475	8	76	Ductile Iron	2004
WM-12476	8	158	Ductile Iron	2004
WM-12478	8	11	Ductile Iron	2004
WM-12479	8	152	Ductile Iron	2004
WM-12480	8	161	Ductile Iron	2004
WM-12481	8	16	Ductile Iron	2004
WM-12482	8	41	Ductile Iron	2004
WM-12483	12	6	Ductile Iron	2004
WM-12484	12	40	Ductile Iron	2004
WM-12485	12	109	Ductile Iron	2004
WM-12486	12	157	Ductile Iron	2004
WM-12487	12	211	Ductile Iron	2004
WM-12488	8	370	Ductile Iron	2005
WM-12491	16	32	Ductile Iron	2004
WM-12492	16	20	Ductile Iron	2004
WM-12493	12	17	Cast Iron	1966
WM-12495	16	5	Ductile Iron	2004
WM-12498	16	3	Ductile Iron	2004
WM-12499	16	3	Ductile Iron	2004
WM-12501	16	640	Ductile Iron	2004
WM-12502	16	374	Ductile Iron	2004
WM-12503	16	197	Ductile Iron	2004

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12507	16	57	Ductile Iron	2004
WM-12509	16	236	Ductile Iron	2004
WM-12510	16	190	Ductile Iron	2004
WM-12512	6	3	Ductile Iron	2004
WM-12513	6	3	Ductile Iron	2004
WM-12514	6	4	Ductile Iron	2004
WM-12515	6	1	Ductile Iron	2004
WM-12516	16	815	Ductile Iron	2004
WM-12517	16	77	Ductile Iron	2004
WM-12518	16	52	Ductile Iron	2004
WM-12519	16	597	Ductile Iron	2004
WM-12520	16	23	Ductile Iron	2004
WM-12521	16	563	Ductile Iron	2004
WM-12522	16	10	Ductile Iron	2004
WM-12524	16	3	Ductile Iron	2004
WM-12525	12	3	Ductile Iron	2004
WM-12536	8	196	Ductile Iron	2005
WM-12537	8	54	Ductile Iron	2005
WM-12538	8	56	Ductile Iron	2005
WM-12539	8	13	Ductile Iron	2005
WM-12540	8	77	Ductile Iron	2005
WM-12541	8	7	Ductile Iron	2004
WM-12542	8	4	Ductile Iron	2004
WM-12543	8	7	Ductile Iron	2004
WM-12544	8	6	Ductile Iron	2004
WM-12545	8	8	Ductile Iron	2004
WM-12546	8	21	Ductile Iron	2004
WM-12547	8	20	Ductile Iron	2004
WM-12548	8	90	Ductile Iron	2004
WM-12549	8	26	Ductile Iron	2004
WM-12550	8	160	Ductile Iron	2004
WM-12551	8	135	Ductile Iron	2004
WM-12552	8	36	Ductile Iron	2004
WM-12553	8	21	Ductile Iron	2004
WM-12554	8	5	Ductile Iron	2004
WM-12555	8	26	Ductile Iron	2004
WM-12558	12	3	Ductile Iron	2004
WM-12559	8	3	Ductile Iron	2004
WM-12560	12	7	Ductile Iron	2004
WM-12561	12	26	Ductile Iron	2004
WM-12563	12	89	Ductile Iron	2004

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12564	12	59	Ductile Iron	2004
WM-12565	12	33	Ductile Iron	2004
WM-12566	12	17	Ductile Iron	2004
WM-12567	12	6	Ductile Iron	2004
WM-12568	12	2	Ductile Iron	2004
WM-12569	8	8	Ductile Iron	2004
WM-12570	8	196	Ductile Iron	2004
WM-12571	12	6	Ductile Iron	2004
WM-12572	8	209	Ductile Iron	2004
WM-12583	8	6	Ductile Iron	2004
WM-12584	8	109	Ductile Iron	2004
WM-12585	8	115	Ductile Iron	2004
WM-12586	8	123	Ductile Iron	2004
WM-12587	8	69	Ductile Iron	2004
WM-12588	8	4	Ductile Iron	2004
WM-12589	8	30	Ductile Iron	2004
WM-12590	8	5	Ductile Iron	2004
WM-12591	6	12	Ductile Iron	1994
WM-12592	6	3	Ductile Iron	1994
WM-12593	6	6	Ductile Iron	1994
WM-12594	6	10	Ductile Iron	1994
WM-12595	6	55	Ductile Iron	1994
WM-12596	6	289	Ductile Iron	1994
WM-12598	12	6	Ductile Iron	2004
WM-12599	12	241	Ductile Iron	2004
WM-12600	8	1	Ductile Iron	2004
WM-12601	8	119	Ductile Iron	2004
WM-12602	8	2	Ductile Iron	2004
WM-12603	8	23	Ductile Iron	2004
WM-12604	8	3	Ductile Iron	2004
WM-12605	6	149	Ductile Iron	2004
WM-12606	8	1	Ductile Iron	2004
WM-12607	6	282	Ductile Iron	1994
WM-12608	6	9	Ductile Iron	1994
WM-12610	6	2	Ductile Iron	2001
WM-12611	6	2	Ductile Iron	2001
WM-12613	6	159	Ductile Iron	2001
WM-12614	6	2	Ductile Iron	2001
WM-12619	8	12	Ductile Iron	2003
WM-12621	8	181	Ductile Iron	2003
WM-12622	8	1	Ductile Iron	2003

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12623	8	209	Ductile Iron	2003
WM-12625	6	3	Ductile Iron	2003
WM-12626	6	36	Ductile Iron	2003
WM-12627	6	3	Ductile Iron	2003
WM-12628	6	3	Ductile Iron	2003
WM-12629	6	2	Ductile Iron	2003
WM-12630	6	2	Ductile Iron	2003
WM-12631	6	327	Ductile Iron	2003
WM-12632	6	1	Ductile Iron	2003
WM-12633	6	1	Ductile Iron	2003
WM-12634	8	1	Ductile Iron	2003
WM-12635	12	64	Ductile Iron	2002
WM-12636	6	187	Cast Iron	1951
WM-12637	6	407	Cast Iron	1951
WM-12638	6	5	Ductile Iron	2005
WM-12639	6	3	Ductile Iron	2005
WM-12640	8	81	Ductile Iron	2005
WM-12641	8	13	Ductile Iron	2005
WM-12642	8	305	Ductile Iron	2005
WM-12643	8	23	Ductile Iron	2005
WM-12644	8	82	Ductile Iron	2005
WM-12645	8	4	Ductile Iron	2005
WM-12646	8	20	Ductile Iron	2005
WM-12647	8	15	Ductile Iron	2005
WM-12648	8	94	Ductile Iron	2005
WM-12649	8	70	Ductile Iron	2005
WM-12650	8	54	Ductile Iron	2005
WM-12651	8	4	Ductile Iron	2005
WM-12652	10	125	Cast Iron	1955
WM-12653	10	490	Cast Iron	1955
WM-12656	6	42	Ductile Iron	1988
WM-12657	6	3	Ductile Iron	1988
WM-12658	6	253	Ductile Iron	1988
WM-12659	6	165	Ductile Iron	1988
WM-12660	6	19	Ductile Iron	1988
WM-12661	6	222	Ductile Iron	1988
WM-12662	6	2	Ductile Iron	1988
WM-12663	6	2	Ductile Iron	1988
WM-12664	6	2	Ductile Iron	1988
WM-12665	6	60	Ductile Iron	1988
WM-12666	6	40	Ductile Iron	1988

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12667	6	71	Ductile Iron	1988
WM-12668	6	182	Ductile Iron	1988
WM-12669	6	1	Ductile Iron	1988
WM-12670	6	1	Ductile Iron	1988
WM-12672	6	18	Ductile Iron	1988
WM-12673	6	286	Cast Iron	1977
WM-12674	6	135	Cast Iron	1975
WM-12675	6	87	Cast Iron	1975
WM-12677	6	82	Cast Iron	1975
WM-12678	6	26	Cast Iron	1975
WM-12679	6	255	Cast Iron	1966
WM-12680	6	81	Cast Iron	1966
WM-12681	6	100	Cast Iron	1966
WM-12682	6	298	Cast Iron	1966
WM-12683	8	62	Cast Iron	1966
WM-12685	8	288	Cast Iron	1966
WM-12686	8	5	Cast Iron	1966
WM-12687	8	189	Cast Iron	1966
WM-12688	8	13	Cast Iron	1966
WM-12689	12	7	Cast Iron	1955
WM-12690	12	66	Cast Iron	1955
WM-12691	6	120	Ductile Iron	1978
WM-12692	6	52	Ductile Iron	1966
WM-12693	6	304	Ductile Iron	1966
WM-12696	6	215	Cast Iron	1966
WM-12697	6	158	Cast Iron	1966
WM-12699	6	1	Ductile Iron	1978
WM-12700	6	339	Ductile Iron	1978
WM-12702	6	284	Cast Iron	1978
WM-12703	6	4	Ductile Iron	1978
WM-12704	6	220	Ductile Iron	1978
WM-12706	6	20	Cast Iron	1919
WM-12707	6	94	Cast Iron	1919
WM-12708	6	180	Cast Iron	1919
WM-12712	6	1	Ductile Iron	2001
WM-12713	6	1	Ductile Iron	2001
WM-12716	6	2	Ductile Iron	2001
WM-12717	6	123	Ductile Iron	2001
WM-12718	6	41	Ductile Iron	2001
WM-12719	6	267	Ductile Iron	2001
WM-12721	12	43	Ductile Iron	1990

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12723	6	5	Ductile Iron	1960
WM-12727	6	2	Ductile Iron	1960
WM-12728	6	338	Ductile Iron	1960
WM-12729	12	21	Ductile Iron	1990
WM-12730	12	3	Ductile Iron	1990
WM-12732	12	6	Ductile Iron	1990
WM-12733	12	43	Ductile Iron	1990
WM-12734	12	5	Ductile Iron	1990
WM-12743	6	1	Ductile Iron	1958
WM-12744	6	232	Ductile Iron	1958
WM-12745	6	371	Ductile Iron	1946
WM-12746	6	15	Ductile Iron	1958
WM-12747	8	207	Ductile Iron	1951
WM-12748	8	3	Ductile Iron	1951
WM-12749	8	9	Ductile Iron	1951
WM-12750	6	42	Ductile Iron	1951
WM-12751	6	111	Ductile Iron	1951
WM-12752	6	95	Ductile Iron	1951
WM-12753	6	68	Ductile Iron	1951
WM-12754	6	102	Ductile Iron	1951
WM-12755	6	19	Ductile Iron	1951
WM-12757	6	12	Ductile Iron	1951
WM-12758	6	9	Ductile Iron	1951
WM-12759	6	52	Ductile Iron	1951
WM-12762	6	153	Cast Iron	1966
WM-12763	6	390	Cast Iron	1966
WM-12764	6	3	Ductile Iron	1996
WM-12765	6	66	Ductile Iron	1996
WM-12766	6	2	Ductile Iron	1996
WM-12767	6	114	Ductile Iron	1996
WM-12768	6	2	Ductile Iron	1996
WM-12769	6	47	Ductile Iron	1996
WM-12770	6	303	Cast Iron	1966
WM-12771	6	61	Cast Iron	1966
WM-12772	12	33	Ductile Iron	1998
WM-12773	12	6	Ductile Iron	1998
WM-12784	20	221	Ductile Iron	1972
WM-12785	20	496	Ductile Iron	1972
WM-12786	6	2	Cast Iron	
WM-12787	6	50	Cast Iron	
WM-12788	6	2	Cast Iron	1951

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12789	6	500	Cast Iron	1951
WM-12790	6	4	Cast Iron	1955
WM-12791	6	350	Cast Iron	1955
WM-12792	12	445	Cast Iron	1955
WM-12793	12	49	Cast Iron	1955
WM-12795	12	229	Cast Iron	1955
WM-12796	6	36	Cast Iron	1965
WM-12797	6	33	Cast Iron	1965
WM-12798	6	2	Cast Iron	1966
WM-12799	6	359	Cast Iron	1966
WM-12800	6	603	Cast Iron	1966
WM-12801	6	20	Cast Iron	1966
WM-12804	8	2	Cast Iron	1966
WM-12805	8	2	Cast Iron	1966
WM-12806	6	107	Cast Iron	1966
WM-12807	6	2	Cast Iron	1966
WM-12808	12	2	Cast Iron	2000
WM-12809	12	50	Cast Iron	2000
WM-12812	24	60	Ductile Iron	2000
WM-12813	24	1	Ductile Iron	2000
WM-12814	6	126	Cast Iron	1968
WM-12815	6	1	Cast Iron	1968
WM-12816	6	330	Cast Iron	1978
WM-12817	6	264	Cast Iron	1978
WM-12818	6	12	Ductile Iron	1961
WM-12820	6	65	Ductile Iron	1953
WM-12821	6	18	Ductile Iron	1953
WM-12822	6	18	Ductile Iron	1953
WM-12824	12	8	Cast Iron	1955
WM-12825	12	6	Cast Iron	1955
WM-12826	6	27	Ductile Iron	1996
WM-12827	6	1	Ductile Iron	1996
WM-12828	6	169	Cast Iron	1955
WM-12829	6	89	Cast Iron	1955
WM-12830	4	63	Cast Iron	1956
WM-12831	6	123	Cast Iron	1966
WM-12832	6	167	Cast Iron	1966
WM-12833	6	2	Cast Iron	1991
WM-12834	6	262	Ductile Iron	1991
WM-12840	6	94	Ductile Iron	2001
WM-12841	6	77	Ductile Iron	2001

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12842	6	4	Ductile Iron	2001
WM-12843	6	106	Ductile Iron	2001
WM-12844	6	2	Ductile Iron	2001
WM-12845	6	2	Ductile Iron	2001
WM-12846	6	77	Ductile Iron	2001
WM-12847	6	4	Ductile Iron	2001
WM-12848	6	11	Ductile Iron	2001
WM-12849	6	1	Cast Iron	1986
WM-12850	6	25	Cast Iron	1986
WM-12851	6	77	Cast Iron	1986
WM-12852	6	173	Cast Iron	1956
WM-12853	6	107	Cast Iron	1956
WM-12854	6	1	Cast Iron	1956
WM-12855	6	1	Cast Iron	1956
WM-12856	6	165	Cast Iron	1943
WM-12858	6	43	Cast Iron	1943
WM-12859	6	6	Cast Iron	1943
WM-12861	8	4	Ductile Iron	2002
WM-12862	8	53	Ductile Iron	2002
WM-12863	6	107	Cast Iron	1943
WM-12865	6	36	Cast Iron	1955
WM-12867	16	1	Cast Iron	1955
WM-12868	6	2	Ductile Iron	
WM-12869	16	85	Cast Iron	1955
WM-12870	16	75	Cast Iron	1955
WM-12871	16	214	Ductile Iron	1985
WM-12873	12	113	Cast Iron	1955
WM-12874	12	249	Cast Iron	1955
WM-12875	8	6	Ductile Iron	2011
WM-12877	8	39	Cast Iron	1966
WM-12878	10	12	Cast Iron	1966
WM-12879	10	33	Cast Iron	1966
WM-12880	6	2	Cast Iron	1966
WM-12881	6	37	Cast Iron	1966
WM-12882	6	194	Cast Iron	1966
WM-12883	8	383	Cast Iron	1966
WM-12885	8	12	Cast Iron	1948
WM-12886	6	2	Cast Iron	
WM-12887	12	2	Cast Iron	1975
WM-12888	6	27	Cast Iron	1975
WM-12889	6	337	Cast Iron	1980

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12890	12	2	Cast Iron	1980
WM-12891	6	2	Cast Iron	
WM-12892	6	41	Cast Iron	1966
WM-12893	4	240	Cast Iron	1956
WM-12894	6	371	Cast Iron	1966
WM-12895	10	1	Cast Iron	
WM-12896	6	81	Cast Iron	1966
WM-12897	6	448	Cast Iron	1966
WM-12899	6	430	Cast Iron	1948
WM-12900	6	92	Cast Iron	1948
WM-12901	6	1	Cast Iron	1966
WM-12902	6	10	Cast Iron	1966
WM-12905	12	8	Ductile Iron	1976
WM-12906	12	178	Cast Iron	1976
WM-12907	6	3	Cast Iron	
WM-12908	6	22	Cast Iron	1966
WM-12910	6	17	Cast Iron	2004
WM-12911	6	251	Cast Iron	2004
WM-12912	6	62	Cast Iron	1966
WM-12914	6	333	Cast Iron	1929
WM-12915	4	52	Cast Iron	1966
WM-12917	6	139	Cast Iron	1951
WM-12919	12	162	Ductile Iron	1996
WM-12921	6	78	Cast Iron	1929
WM-12923	8	2	Ductile Iron	2002
WM-12925	6	34	Cast Iron	1960
WM-12930	8	288	Cast Iron	1966
WM-12931	6	0	Ductile Iron	1991
WM-12932	6	17	Cast Iron	1991
WM-12933	6	2	Cast Iron	1991
WM-12934	6	31	Cast Iron	1954
WM-12937	6	3	Ductile Iron	2006
WM-12938	6	2	Ductile Iron	2006
WM-12939	6	27	Cast Iron	1966
WM-12940	6	359	Cast Iron	1966
WM-12941	6	16	Ductile Iron	2006
WM-12945	6	12	Ductile Iron	2006
WM-12946	6	101	Ductile Iron	2006
WM-12947	6	100	Ductile Iron	1966
WM-12948	6	471	Ductile Iron	1966
WM-12949	10	1	Cast Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12950	6	2	Ductile Iron	2006
WM-12951	6	216	Ductile Iron	2006
WM-12952	6	2	Cast Iron	1996
WM-12953	4	11	Cast Iron	1996
WM-12954	6	11	Cast Iron	1996
WM-12955	6	21	Cast Iron	1996
WM-12956	8	21	Cast Iron	1996
WM-12957	6	21	Cast Iron	1996
WM-12958	6	33	Cast Iron	1996
WM-12959	6	41	Cast Iron	1996
WM-12960	6	35	Cast Iron	1996
WM-12971	6	185	Cast Iron	1966
WM-12972	6	136	Cast Iron	1966
WM-12973	12	384	Cast Iron	1951
WM-12974	12	222	Cast Iron	1951
WM-12975	6	65	Cast Iron	1966
WM-12976	6	315	Cast Iron	1966
WM-12977	6	598	Cast Iron	1956
WM-12978	6	10	Cast Iron	1956
WM-12979	6	52	Ductile Iron	2004
WM-12980	6	24	Cast Iron	1974
WM-12981	6	122	Cast Iron	1974
WM-12983	12	98	Cast Iron	1966
WM-12984	8	10	Ductile Iron	2003
WM-12985	8	376	Ductile Iron	2003
WM-12986	6	434	Ductile Iron	2000
WM-12987	8	1151	Cast Iron	1966
WM-12989	6	485	Cast Iron	1966
WM-12990	6	182	Cast Iron	1966
WM-12991	6	1	Cast Iron	1966
WM-12992	4	420	Cast Iron	1966
WM-12993	6	1	Cast Iron	1966
WM-12994	4	587	Cast Iron	1966
WM-12995	16	241	Cast Iron	1955
WM-12996	18	1	Cast Iron	1955
WM-12999	8	1	Cast Iron	1955
WM-13000	6	26	Cast Iron	1955
WM-13001	12	21	Ductile Iron	2005
WM-13002	12	10	Ductile Iron	2005
WM-13003	12	11	Ductile Iron	2005
WM-13005	12	6	Ductile Iron	2005

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13006	12	5	Ductile Iron	2016
WM-13007	12	3	Ductile Iron	2005
WM-13008	12	3	Ductile Iron	2005
WM-13009	12	2	Ductile Iron	2005
WM-13010	12	2	Ductile Iron	2005
WM-13011	12	26	Ductile Iron	2005
WM-13012	12	3	Ductile Iron	2005
WM-13013	12	4	Ductile Iron	2005
WM-13014	12	221	Ductile Iron	2005
WM-13015	12	26	Ductile Iron	2005
WM-13016	12	20	Ductile Iron	2006
WM-13017	6	42	Ductile Iron	1958
WM-13018	6	41	Ductile Iron	1958
WM-13019	6	35	Ductile Iron	1958
WM-13020	6	20	Ductile Iron	1958
WM-13021	12	64	Ductile Iron	2006
WM-13022	12	332	Ductile Iron	2006
WM-13023	12	54	Ductile Iron	2006
WM-13024	12	8	Ductile Iron	2006
WM-13025	12	38	Ductile Iron	2006
WM-13026	12	5	Ductile Iron	2006
WM-13027	8	5	Ductile Iron	2006
WM-13028	12	5	Ductile Iron	2006
WM-13029	12	115	Ductile Iron	2006
WM-13030	12	97	Ductile Iron	2006
WM-13031	12	200	Ductile Iron	2006
WM-13032	12	9	Ductile Iron	2006
WM-13034	12	3	Ductile Iron	2006
WM-13035	12	35	Ductile Iron	2006
WM-13036	8	287	Ductile Iron	2006
WM-13037	12	64	Ductile Iron	2006
WM-13038	12	4	Ductile Iron	2006
WM-13039	8	4	Ductile Iron	2006
WM-13040	12	48	Ductile Iron	2006
WM-13042	12	6	Ductile Iron	2006
WM-13043	12	197	Ductile Iron	2006
WM-13045	12	7	Ductile Iron	2006
WM-13047	12	106	Ductile Iron	2006
WM-13048	8	1	Ductile Iron	2006
WM-13049	8	47	Ductile Iron	2006
WM-13050	8	18	Ductile Iron	2006

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13051	8	260	Ductile Iron	2006
WM-13053	12	82	Ductile Iron	2006
WM-13056	12	19	Ductile Iron	2006
WM-13057	12	63	Ductile Iron	2006
WM-13058	8	38	Ductile Iron	2006
WM-13059	12	72	Ductile Iron	2006
WM-13060	12	86	Ductile Iron	2006
WM-13063	12	16	Ductile Iron	2006
WM-13064	12	4	Ductile Iron	2006
WM-13066	12	4	Ductile Iron	2006
WM-13067	12	5	Ductile Iron	2006
WM-13068	12	41	Ductile Iron	2006
WM-13069	8	16	Ductile Iron	2006
WM-13070	8	15	Ductile Iron	2006
WM-13071	12	8	Ductile Iron	2006
WM-13072	12	82	Ductile Iron	2006
WM-13075	12	4	Ductile Iron	2006
WM-13080	12	47	Ductile Iron	2006
WM-13082	12	70	Ductile Iron	2006
WM-13083	12	81	Ductile Iron	2006
WM-13084	12	296	Ductile Iron	2006
WM-13087	12	144	Ductile Iron	2006
WM-13089	12	90	Ductile Iron	2006
WM-13090	12	87	Ductile Iron	2006
WM-13091	12	6	Ductile Iron	2006
WM-13093	12	139	Ductile Iron	2006
WM-13095	12	50	Ductile Iron	2006
WM-13096	12	241	Ductile Iron	2006
WM-13099	10	5	Ductile Iron	2006
WM-13101	12	73	Ductile Iron	2006
WM-13102	12	138	Ductile Iron	2006
WM-13103	12	69	Ductile Iron	2006
WM-13105	12	2	Ductile Iron	2006
WM-13107	12	2	Ductile Iron	2006
WM-13108	8	8	Ductile Iron	2006
WM-13109	8	2	Ductile Iron	2008
WM-13110	12	87	Ductile Iron	2006
WM-13112	12	213	Ductile Iron	2006
WM-13113	12	29	Ductile Iron	2006
WM-13115	6	3	Ductile Iron	1947
WM-13116	6	3	Ductile Iron	1947

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13117	6	3	Ductile Iron	1947
WM-13118	6	2	Ductile Iron	1947
WM-13119	6	10	Ductile Iron	2008
WM-13120	6	43	Ductile Iron	1947
WM-13121	6	36	Ductile Iron	1947
WM-13135	6	3	Ductile Iron	2006
WM-13136	12	259	Ductile Iron	2006
WM-13138	12	2	Ductile Iron	2006
WM-13140	6	2	Ductile Iron	2006
WM-13144	6	19	Cast Iron	1978
WM-13147	6	4	Ductile Iron	2006
WM-13148	6	4	Ductile Iron	2006
WM-13149	6	1	Ductile Iron	2006
WM-13150	8	102	Ductile Iron	2006
WM-13151	8	17	Ductile Iron	2006
WM-13152	8	29	Ductile Iron	2006
WM-13153	6	53	Ductile Iron	1961
WM-13154	6	357	Ductile Iron	1961
WM-13155	6	6	Cast Iron	
WM-13160	16	58	Cast Iron	1955
WM-13161	16	79	Cast Iron	1955
WM-13162	6	38	Cast Iron	1984
WM-13164	12	180	Cast Iron	1966
WM-13165	12	17	Cast Iron	1966
WM-13166	6	234	Cast Iron	1966
WM-13167	6	196	Cast Iron	1966
WM-13168	16	3	Ductile Iron	2004
WM-13169	6	1	Ductile Iron	1997
WM-13170	6	18	Ductile Iron	1997
WM-13173	6	5	Ductile Iron	1998
WM-13174	6	30	Ductile Iron	1998
WM-13176	6	1	Cast Iron	
WM-13177	6	1	Ductile Iron	2006
WM-13182	8	29	Ductile Iron	2006
WM-13183	8	162	Ductile Iron	2006
WM-13184	8	18	Ductile Iron	2006
WM-13185	8	47	Ductile Iron	2006
WM-13186	8	45	Ductile Iron	2006
WM-13187	8	53	Ductile Iron	2006
WM-13188	8	72	Ductile Iron	2003
WM-13189	8	7	Ductile Iron	2003

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13198	12	55	Ductile Iron	2005
WM-13199	12	92	Ductile Iron	2005
WM-13200	12	28	Ductile Iron	2005
WM-13201	12	43	Ductile Iron	2005
WM-13202	10	122	Ductile Iron	2005
WM-13204	12	3	Ductile Iron	2005
WM-13205	12	10	Ductile Iron	1996
WM-13206	12	8	Ductile Iron	1996
WM-13207	12	3	Ductile Iron	2005
WM-13208	6	1	Ductile Iron	2005
WM-13209	6	18	Ductile Iron	2005
WM-13210	6	44	Ductile Iron	2005
WM-13211	6	260	Ductile Iron	2005
WM-13213	6	3	Ductile Iron	2005
WM-13214	6	47	Ductile Iron	2005
WM-13217	12	17	Ductile Iron	1996
WM-13220	12	7	Ductile Iron	2005
WM-13221	12	1	Ductile Iron	2005
WM-13225	6	3	Ductile Iron	2005
WM-13226	6	118	Ductile Iron	2005
WM-13227	10	7	Ductile Iron	2005
WM-13228	6	21	Cast Iron	1978
WM-13230	6	3	Cast Iron	1978
WM-13231	6	18	Cast Iron	1978
WM-13232	12	46	Ductile Iron	1947
WM-13233	6	14	Cast Iron	1978
WM-13235	16	27	Ductile Iron	1947
WM-13236	16	24	Ductile Iron	1947
WM-13237	12	2	Ductile Iron	1947
WM-13238	12	18	Ductile Iron	1947
WM-13239	6	6	Cast Iron	1947
WM-13240	16	169	Cast Iron	1947
WM-13242	16	5	Ductile Iron	1947
WM-13244	16	61	Ductile Iron	1947
WM-13245	16	146	Ductile Iron	1947
WM-13246	6	21	Ductile Iron	1947
WM-13247	12	61	Ductile Iron	2004
WM-13248	12	95	Ductile Iron	2004
WM-13254	12	15	Ductile Iron	2006
WM-13257	12	5	Ductile Iron	2006
WM-13258	12	5	Ductile Iron	2006

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13259	12	15	Ductile Iron	2006
WM-13260	6	1	Ductile Iron	2006
WM-13261	6	1	Ductile Iron	2006
WM-13272	12	10	Ductile Iron	2006
WM-13273	6	1	Ductile Iron	2006
WM-13274	12	127	Ductile Iron	2006
WM-13295	12	527	Ductile Iron	2006
WM-13296	12	8	Ductile Iron	2006
WM-13297	12	116	Ductile Iron	2006
WM-13308	12	127	Ductile Iron	2006
WM-13309	12	40	Ductile Iron	2006
WM-13310	12	29	Ductile Iron	2006
WM-13311	12	8	Ductile Iron	2006
WM-13313	12	6	Ductile Iron	2006
WM-13314	8	8	Ductile Iron	2006
WM-13317	8	1	Ductile Iron	2006
WM-13318	8	215	Ductile Iron	2006
WM-13319	12	7	Ductile Iron	2006
WM-13321	12	7	Ductile Iron	2006
WM-13322	8	7	Ductile Iron	2006
WM-13323	8	125	Ductile Iron	2006
WM-13324	8	20	Ductile Iron	2006
WM-13325	8	31	Ductile Iron	2006
WM-13327	12	189	Ductile Iron	2006
WM-13328	12	9	Ductile Iron	2006
WM-13329	12	48	Ductile Iron	2006
WM-13330	12	171	Ductile Iron	2006
WM-13342	12	35	Ductile Iron	2006
WM-13343	12	177	Ductile Iron	2006
WM-13344	12	46	Ductile Iron	2006
WM-13345	12	81	Ductile Iron	2006
WM-13346	8	226	Ductile Iron	2006
WM-13347	8	67	Ductile Iron	2006
WM-13348	8	10	Ductile Iron	2006
WM-13349	8	271	Ductile Iron	2006
WM-13350	12	293	Ductile Iron	2006
WM-13351	12	313	Ductile Iron	2006
WM-13352	6	92	Ductile Iron	2006
WM-13353	6	127	Ductile Iron	2006
WM-13354	6	514	Ductile Iron	2006
WM-13355	6	17	Ductile Iron	2006

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13366	6	82	Ductile Iron	2006
WM-13367	6	42	Ductile Iron	2006
WM-13369	6	32	Ductile Iron	2006
WM-13370	6	1	Ductile Iron	2006
WM-13371	16	313	Ductile Iron	2004
WM-13372	16	353	Ductile Iron	2004
WM-13373	6	5	Ductile Iron	2006
WM-13374	6	438	Ductile Iron	2006
WM-13375	6	30	Ductile Iron	1998
WM-13376	6	10	Ductile Iron	2006
WM-13377	6	9	Ductile Iron	1998
WM-13378	10	1	Ductile Iron	2005
WM-13379	10	3	Ductile Iron	2005
WM-13380	10	34	Ductile Iron	2005
WM-13381	4	4	Cast Iron	1966
WM-13382	6	3	Cast Iron	1966
WM-13383	8	7	Ductile Iron	2006
WM-13384	8	6	Ductile Iron	2006
WM-13385	8	6	Ductile Iron	2006
WM-13396	8	2	Ductile Iron	2006
WM-13397	8	5	Cast Iron	1966
WM-13398	4	20	Ductile Iron	
WM-13399	8	32	Ductile Iron	2006
WM-13732	12	4	Ductile Iron	2006
WM-13733	12	4	Ductile Iron	2006
WM-13736	8	3	Ductile Iron	2006
WM-13737	12	8	Ductile Iron	2006
WM-13738	8	3	Ductile Iron	2006
WM-13739	12	12	Ductile Iron	2006
WM-13740	12	9	Ductile Iron	2006
WM-13741	12	5	Ductile Iron	2006
WM-13742	12	79	Ductile Iron	2006
WM-13744	12	5	Ductile Iron	2006
WM-13745	12	27	Ductile Iron	2006
WM-13746	12	67	Ductile Iron	2006
WM-13747	12	56	Ductile Iron	2006
WM-13749	12	54	Ductile Iron	2006
WM-13763	6	114	Cast Iron	1940
WM-13764	8	1	Cast Iron	1966
WM-13765	12	44	Cast Iron	1964
WM-13766	6	12	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-13777	6	85	Ductile Iron	2007
WM-13778	12	263	Ductile Iron	1991
WM-13779	6	1	Ductile Iron	2007
WM-13780	6	111	Ductile Iron	2007
WM-13781	6	66	Ductile Iron	2007
WM-13782	6	8	Cast Iron	1966
WM-13783	6	26	Cast Iron	1966
WM-13784	6	414	Cast Iron	1966
WM-13796	6	2	Ductile Iron	2005
WM-13797	6	44	Ductile Iron	2005
WM-13798	6	6	Ductile Iron	2005
WM-13799	6	240	Ductile Iron	2005
WM-13801	6	53	Ductile Iron	2002
WM-13802	24	235	Ductile Iron	1955
WM-13803	6	121	Cast Iron	1966
WM-13804	12	40	Cast Iron	1955
WM-13805	10	1	Ductile Iron	2006
WM-13806	12	305	Ductile Iron	2006
WM-13807	6	1	Ductile Iron	2007
WM-13808	6	1	Ductile Iron	2007
WM-13809	10	1	Ductile Iron	2006
WM-13810	6	14	Ductile Iron	2006
WM-13811	6	16	Ductile Iron	2006
WM-13812	6	5	Ductile Iron	2006
WM-13813	6	3	Ductile Iron	2006
WM-13814	6	256	Ductile Iron	2006
WM-13815	6	156	Ductile Iron	2006
WM-13816	6	109	Ductile Iron	2006
WM-13817	6	19	Ductile Iron	2006
WM-13818	6	3	Ductile Iron	2006
WM-13819	6	4	Ductile Iron	2006
WM-13820	6	22	Ductile Iron	2006
WM-13821	6	175	Cast Iron	1954
WM-13822	6	162	Cast Iron	1966
WM-14164	8	2	Ductile Iron	1998
WM-14165	12	1	Cast Iron	1950
WM-14166	12	1	Ductile Iron	2007
WM-14167	12	105	Ductile Iron	2004
WM-14169	6	4	Cast Iron	1975
WM-14170	6	6	Ductile Iron	1975
WM-14171	6	1	Ductile Iron	2007

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-14172	6	1	Ductile Iron	2007
WM-14173	6	3	Ductile Iron	2007
WM-14174	6	3	Ductile Iron	2007
WM-14175	6	10	Ductile Iron	2007
WM-14187	6	7	Cast Iron	2007
WM-14188	6	3	Ductile Iron	2007
WM-14189	6	10	Ductile Iron	2007
WM-14192	6	6	Ductile Iron	2007
WM-14193	6	9	Ductile Iron	2006
WM-14194	6	10	Ductile Iron	2006
WM-14195	6	8	Ductile Iron	2006
WM-14196	6	10	Ductile Iron	2006
WM-14197	6	11	Ductile Iron	2006
WM-14198	6	5	Ductile Iron	2006
WM-14199	6	7	Ductile Iron	2006
WM-14200	8	1	Ductile Iron	2006
WM-14201	6	4	Ductile Iron	2006
WM-14202	8	1	Ductile Iron	2006
WM-14203	8	1	Ductile Iron	2006
WM-14204	8	1	Ductile Iron	2006
WM-14215	12	1	Ductile Iron	2006
WM-14216	12	1	Ductile Iron	2006
WM-14217	6	5	Ductile Iron	2006
WM-14218	6	5	Ductile Iron	2006
WM-14219	6	8	Ductile Iron	2006
WM-14220	6	13	Ductile Iron	2006
WM-14221	6	9	Ductile Iron	2006
WM-14222	6	9	Ductile Iron	2006
WM-14223	6	5	Ductile Iron	2006
WM-14224	6	5	Ductile Iron	2006
WM-14225	8	113	Ductile Iron	2006
WM-14226	8	22	Ductile Iron	2006
WM-14227	8	139	Ductile Iron	2006
WM-14228	8	52	Ductile Iron	2006
WM-14229	8	39	Ductile Iron	2006
WM-14230	8	13	Ductile Iron	2006
WM-14231	8	65	Ductile Iron	2006
WM-14232	8	95	Ductile Iron	2006
WM-14233	8	123	Ductile Iron	2006
WM-14234	6	5	Ductile Iron	2006
WM-14235	6	1	Ductile Iron	2006

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-14236	8	5	Ductile Iron	2006
WM-14238	6	1	Cast Iron	1940
WM-14249	12	68	Cast Iron	1966
WM-14250	12	2	Ductile Iron	1997
WM-14251	12	32	Ductile Iron	1997
WM-14252	12	3	Ductile Iron	2007
WM-14253	12	10	Ductile Iron	2007
WM-14254	12	10	Ductile Iron	2007
WM-14255	12	8	Ductile Iron	2007
WM-14259	12	4	Ductile Iron	2012
WM-14260	6	9	Ductile Iron	2006
WM-14261	12	269	Cast Iron	1969
WM-14283	6	3	Cast Iron	1985
WM-14285	6	5	Cast Iron	1975
WM-14706	10	38	Ductile Iron	2001
WM-14707	8	5	Ductile Iron	2008
WM-14708	8	30	Ductile Iron	2008
WM-14709	8	409	Ductile Iron	2008
WM-14710	10	1	Ductile Iron	2008
WM-15111	6	648	Cast Iron	1966
WM-15112	6	3	Ductile Iron	2007
WM-15113	6	2	Ductile Iron	2007
WM-15114	8	8	Ductile Iron	2007
WM-15115	8	5	Ductile Iron	2007
WM-15116	8	14	Ductile Iron	2007
WM-15117	8	4	Ductile Iron	2007
WM-15118	8	26	Ductile Iron	2007
WM-15119	8	285	Ductile Iron	2007
WM-15120	6	1	Ductile Iron	2007
WM-15121	6	17	Ductile Iron	2006
WM-15122	6	12	Ductile Iron	2006
WM-15123	6	55	Ductile Iron	2006
WM-15124	6	3	Ductile Iron	2006
WM-15125	6	1	Ductile Iron	2003
WM-15126	6	1	Ductile Iron	2003
WM-15128	8	15	Ductile Iron	2006
WM-15129	6	6	Ductile Iron	2006
WM-15130	8	32	Ductile Iron	2006
WM-15141	8	14	Ductile Iron	2006
WM-15142	8	165	Ductile Iron	2006
WM-15143	8	5	Ductile Iron	2006

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-15144	8	4	Ductile Iron	2007
WM-15145	8	75	Ductile Iron	2007
WM-15146	8	3	Ductile Iron	2007
WM-15149	8	299	Ductile Iron	2007
WM-15150	8	111	Ductile Iron	2003
WM-15151	8	5	Ductile Iron	2007
WM-15152	8	3	Ductile Iron	2007
WM-15153	8	2	Ductile Iron	2007
WM-15154	8	2	Ductile Iron	2007
WM-15155	6	48	Cast Iron	1956
WM-15156	12	59	Cast Iron	1969
WM-15157	12	41	Cast Iron	1969
WM-15158	12	22	Cast Iron	1969
WM-15159	10	9	Ductile Iron	2001
WM-15161	12	188	Cast Iron	1982
WM-15162	12	76	Cast Iron	1969
WM-15163	12	63	Cast Iron	1969
WM-15164	6	1	Ductile Iron	1966
WM-15165	6	2	Ductile Iron	2008
WM-15166	6	4	Ductile Iron	2008
WM-15167	6	4	Ductile Iron	2008
WM-15168	6	2	Ductile Iron	2008
WM-15169	6	2	Ductile Iron	2008
WM-15170	6	50	Ductile Iron	1975
WM-15171	6	8	Ductile Iron	1966
WM-15172	2	30	Ductile Iron	2008
WM-15173	12	2	Ductile Iron	2003
WM-15174	6	59	Ductile Iron	2008
WM-15175	6	6	Ductile Iron	2008
WM-15178	6	3	Ductile Iron	2008
WM-15179	6	3	Ductile Iron	2008
WM-15180	6	25	Ductile Iron	2008
WM-15181	6	2	Ductile Iron	2008
WM-15182	12	88	Cast Iron	1969
WM-15194	6	252	Cast Iron	1961
WM-12196	6	2	Ductile Iron	2002
WM-15196	6	25	Cast Iron	1968
WM-5965	4	1	Cast Iron	1980
WM-15198	6	3	Ductile Iron	1994
WM-13232	12	0	Ductile Iron	1947
WM-3377	6	224	Cast Iron	1966

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-12883	8	9	Cast Iron	1966
WM-6765	6	64	Cast Iron	1967
WM-15208	6	10	Ductile Iron	2008
WM-15209	6	5	Ductile Iron	2008
WM-15210	12	2	Ductile Iron	2008
WM-15211	12	159	Ductile Iron	2008
WM-15212	12	22	Ductile Iron	2008
WM-15213	12	1	Ductile Iron	2008
WM-15214	12	32	Ductile Iron	2008
WM-15216	6	442	Cast Iron	1978
WM-15217	6	133	Cast Iron	1978
WM-15218	6	4	Ductile Iron	2008
WM-15219	6	2	Ductile Iron	2008
WM-15220	12	2	Ductile Iron	2008
WM-15221	12	3	Ductile Iron	2008
WM-15222	12	67	Ductile Iron	2008
WM-15223	12	94	Ductile Iron	2008
WM-15224	8	12	Ductile Iron	2008
WM-15225	8	22	Ductile Iron	2008
WM-15226	8	564	Ductile Iron	2008
WM-15227	8	4	Ductile Iron	2008
WM-472	6	235	Cast Iron	1966
WM-15229	6	2	Ductile Iron	2008
WM-15230	8	464	Ductile Iron	2008
WM-15231	8	10	Ductile Iron	2008
WM-15232	8	9	Ductile Iron	2008
WM-15233	8	91	Ductile Iron	2008
WM-15234	8	155	Ductile Iron	2008
WM-15235	8	21	Ductile Iron	2008
WM-15236	8	28	Ductile Iron	2008
WM-15237	8	38	Ductile Iron	2008
WM-15238	8	31	Ductile Iron	2008
WM-15235	8	22	Ductile Iron	2008
WM-15235	8	6	Ductile Iron	2008
WM-15237	8	1	Ductile Iron	2008
WM-15242	8	564	Ductile Iron	2008
WM-15243	8	19	Ductile Iron	2008
WM-15243	6	1	Ductile Iron	2008
WM-15245	8	1	Ductile Iron	2008
WM-15246	8	5	Ductile Iron	2008
WM-15247	8	5	Ductile Iron	2008

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-15249	8	23	Ductile Iron	2008
WM-15250	8	187	Ductile Iron	2008
WM-15251	8	5	Ductile Iron	2008
WM-15253	8	39	Ductile Iron	2008
WM-15254	8	147	Ductile Iron	2008
WM-15255	8	38	Ductile Iron	2008
WM-15256	8	18	Ductile Iron	2008
WM-15257	8	1	Ductile Iron	2008
WM-4529	12	15	Cast Iron	1955
WM-15263	12	4	Ductile Iron	2008
WM-15264	12	3	Ductile Iron	2008
WM-15265	12	221	Ductile Iron	2008
WM-15266	12	303	Ductile Iron	2008
WM-15267	12	10	Ductile Iron	2008
WM-15268	12	396	Ductile Iron	2008
WM-15269	12	354	Ductile Iron	2008
WM-15270	12	4	Ductile Iron	2008
WM-15271	12	156	Ductile Iron	2008
WM-15272	12	341	Ductile Iron	2008
WM-15273	12	27	Ductile Iron	2008
WM-15274	12	31	Ductile Iron	2008
WM-15275	12	271	Ductile Iron	2008
WM-15276	12	3	Ductile Iron	2008
WM-15277	10	3	Ductile Iron	2008
WM-15278	10	2	Ductile Iron	2008
WM-15235	8	6	Ductile Iron	2008
WM-15280	8	2	Ductile Iron	2009
WM-15281	8	2	Ductile Iron	2009
WM-15283	8	59	Ductile Iron	2009
WM-15284	8	26	Ductile Iron	2009
WM-15285	8	322	Ductile Iron	2009
WM-15286	8	122	Ductile Iron	2009
WM-15287	8	33	Ductile Iron	2009
WM-15288	6	2	Ductile Iron	2009
WM-15289	6	2	Ductile Iron	2009
WM-9548	12	18	Ductile Iron	2002
WM-5253	6	69	Cast Iron	2008
WM-15292	6	66	Ductile Iron	2008
WM-15293	6	38	Ductile Iron	2008
WM-15294	6	2	Ductile Iron	2008
WM-15295	6	50	Ductile Iron	2008

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-15296	6	4	Ductile Iron	2008
WM-15297	6	30	Ductile Iron	2008
WM-15298	6	26	Ductile Iron	2008
WM-15299	6	5	Ductile Iron	2008
WM-5254	6	71	Ductile Iron	2008
WM-12951	6	34	Ductile Iron	2006
WM-9437	16	89	Cast Iron	1955
WM-9437	16	27	Cast Iron	1955
WM-15307	6	12	Ductile Iron	2004
WM-15308	12	19	Ductile Iron	1996
WM-15309	12	127	Ductile Iron	1996
WM-15310	12	17	Ductile Iron	1996
WM-15311	12	441	Ductile Iron	1996
WM-15312	12	42	Ductile Iron	1996
WM-15313	12	324	Ductile Iron	1996
WM-15314	12	54	Ductile Iron	1996
WM-15315	12	103	Ductile Iron	1996
WM-15316	8	3	Ductile Iron	1996
WM-15317	8	3	Ductile Iron	1996
WM-15320	8	94	Ductile Iron	1996
WM-15321	8	47	Ductile Iron	1996
WM-15322	6	7	Ductile Iron	1996
WM-15323	8	9	Ductile Iron	1996
WM-15324	8	4	Ductile Iron	1996
WM-15325	8	83	Ductile Iron	1996
WM-15326	6	1	Ductile Iron	1996
WM-15327	8	5	Ductile Iron	1996
WM-15328	12	5	Ductile Iron	1996
WM-15329	10	10	Ductile Iron	
WM-15335	6	1	Ductile Iron	
WM-15336	4	1	Cast Iron	
WM-15337	4	1	Cast Iron	
WM-15338	4	1	Cast Iron	
WM-15339	4	1	Cast Iron	
WM-15340	4	1	Cast Iron	
WM-15341	4	1	Cast Iron	
WM-15342	4	2	Cast Iron	
WM-15343	4	2	Ductile Iron	
WM-15344	8	2	Cast Iron	
WM-15345	8	2	Cast Iron	
WM-15346	8	1	Cast Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-15347	8	10	Cast Iron	
WM-15348	8	9	Cast Iron	
WM-15349	10	14	Ductile Iron	
WM-15350	10	1	Cast Iron	
WM-15351	16	10	Cast Iron	1976
WM-15352	16	18	Cast Iron	1976
WM-15353	12	13	Cast Iron	1976
WM-15354	12	13	Cast Iron	1976
WM-15355	12	9	Cast Iron	1976
WM-15356	12	9	Cast Iron	1976
WM-15357	12	1	Cast Iron	1976
WM-15358	12	1	Cast Iron	1976
WM-15359	8	10	Cast Iron	1976
WM-15360	8	10	Cast Iron	1976
WM-15363	8	1	Cast Iron	1976
WM-15364	8	1	Cast Iron	1976
WM-15368	6	1	Ductile Iron	
WM-15373	8	2	Cast Iron	1976
WM-15374	8	2	Cast Iron	1976
WM-15375	4	1	Cast Iron	1976
WM-15376	4	1	Cast Iron	1976
WM-15377	4	2	Cast Iron	1976
WM-15378	4	1	Cast Iron	1976
WM-15379	4	2	Ductile Iron	1976
WM-15392	8	11	Cast Iron	1976
WM-15393	8	11	Cast Iron	1976
WM-15394	8	1	Cast Iron	1976
WM-15395	8	1	Cast Iron	1976
WM-15396	8	2	Cast Iron	1976
WM-15397	8	2	Cast Iron	1976
WM-15398	4	1	Cast Iron	1976
WM-15399	4	1	Cast Iron	1976
WM-15400	4	1	Cast Iron	1976
WM-15401	4	1	Cast Iron	1976
WM-15402	4	2	Cast Iron	1976
WM-15403	4	2	Cast Iron	1976
WM-15404	16	1378	Ductile Iron	1976
WM-15405	16	595	Ductile Iron	1976
WM-15406	16	517	Ductile Iron	1976
WM-15408	12	3	Ductile Iron	
WM-15409	12	7	Ductile Iron	

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-15410	16	20	Ductile Iron	
WM-15411	16	10	Ductile Iron	
WM-15412	16	7	Ductile Iron	
WM-15413	16	27	Ductile Iron	
WM-15418	12	2	Ductile Iron	
WM-15419	12	2	Ductile Iron	
WM-15422	6	2	Ductile Iron	
WM-15423	6	2	Ductile Iron	
WM-15424	6	2	Ductile Iron	
WM-15425	6	2	Ductile Iron	
WM-15426	12	7	Ductile Iron	
WM-15427	12	7	Ductile Iron	
WM-15418	12	1	Ductile Iron	
WM-15419	12	1	Ductile Iron	
WM-15431	6	2	Ductile Iron	
WM-15432	6	2	Ductile Iron	
WM-15434	12	10	Ductile Iron	2004
WM-15435	12	4	Ductile Iron	2009
WM-15436	12	5	Ductile Iron	2009
WM-15437	12	3	Ductile Iron	2009
WM-15438	12	5	Ductile Iron	2009
WM-15439	12	20	Ductile Iron	2004
WM-15440	12	72	Ductile Iron	2009
WM-15441	12	164	Ductile Iron	2009
WM-15442	6	4	Ductile Iron	2009
WM-15444	6	68	Ductile Iron	2009
WM-15445	12	1	Ductile Iron	2004
WM-15447	8	8	Cast Iron	1960
WM-15448	6	4	Cast Iron	1960
WM-15449	8	25	Cast Iron	1960
WM-15450	8	71	Ductile Iron	1960
WM-15451	8	373	Cast Iron	1960
WM-15452	12	9	Ductile Iron	2004
WM-15453	12	5	Ductile Iron	2004
WM-15454	6	81	Ductile Iron	1958
WM-15455	10	123	Cast Iron	1976
WM-15456	10	15	Cast Iron	1976
WM-15458	10	12	Cast Iron	1976
WM-15459	6	35	Ductile Iron	1990
WM-15460	12	105	Cast Iron	1969
WM-3605	6	16	Cast Iron	1961

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-3605	6	5	Cast Iron	2011
WM-188	8	12	Ductile Iron	2011
WM-15464	8	78	Ductile Iron	2011
WM-15466	8	2	Ductile Iron	2011
WM-15470	8	8	Ductile Iron	2011
WM-15472	8	28	Ductile Iron	2011
WM-15476	8	3	Ductile Iron	2011
WM-15477	8	5	Ductile Iron	2011
WM-15478	16	10	Cast Iron	1947
WM-15479	16	4	Ductile Iron	2011
WM-431	8	4	Ductile Iron	2011
WM-15481	8	3	Ductile Iron	2011
WM-15482	6	5	Ductile Iron	2011
WM-15483	6	1	Ductile Iron	2011
WM-15484	8	6	Ductile Iron	2011
WM-15485	12	3	Cast Iron	1955
WM-15486	12	4	Ductile Iron	2012
WM-15487	6	1	Cast Iron	1966
WM-15488	12	4	Ductile Iron	2012
WM-15489	12	4	Ductile Iron	2012
WM-15490	12	459	Ductile Iron	2012
WM-15491	12	47	Ductile Iron	2012
WM-15493	12	13	Ductile Iron	2012
WM-15494	12	2	Ductile Iron	2012
WM-15495	6	5	Ductile Iron	2010
WM-15496	6	5	Ductile Iron	2010
WM-15497	6	44	Ductile Iron	2010
WM-15498	6	7	Ductile Iron	2010
WM-15499	6	10	Ductile Iron	2010
WM-15500	6	28	Ductile Iron	2010
WM-15501	6	3	Ductile Iron	2010
WM-15502	6	45	Cast Iron	1970
WM-15503	6	42	Cast Iron	1970
WM-15504	6	14	Ductile Iron	1966
WM-15505	6	6	Ductile Iron	2010
WM-15506	6	4	Ductile Iron	
WM-15507	6	4	Ductile Iron	
WM-15508	6	4	Ductile Iron	
WM-15509	6	4	Ductile Iron	
WM-15510	6	3	Ductile Iron	
WM-15511	6	4	Ductile Iron	

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-15512	6	4	Ductile Iron	
WM-24130	8	598	Ductile Iron	2012
WM-15907	8	49	Ductile Iron	2012
WM-15909	8	38	Ductile Iron	2012
WM-15910	8	39	Ductile Iron	2012
WM-15912	8	16	Ductile Iron	2012
WM-15913	8	3	Ductile Iron	2012
WM-15914	8	10	Ductile Iron	2012
WM-4474	8	2	Cast Iron	1966
WM-15917	6	2	Ductile Iron	2000
WM-15918	6	135	Ductile Iron	2003
WM-15920	6	16	Ductile Iron	2003
WM-15921	6	18	Ductile Iron	2003
WM-15922	6	52	Ductile Iron	2003
WM-16316	6	2	Ductile Iron	2003
WM-16317	4	99	Ductile Iron	2003
WM-16318	4	2	Ductile Iron	2003
WM-16319	10	51	Ductile Iron	2001
WM-16320	10	63	Ductile Iron	2001
WM-16321	10	41	Ductile Iron	2001
WM-16322	10	18	Ductile Iron	2001
WM-16323	10	49	Ductile Iron	2001
WM-16324	10	47	Ductile Iron	2001
WM-16325	6	2	Ductile Iron	2004
WM-16326	6	12	Ductile Iron	2004
WM-16727	8	2	Ductile Iron	2010
WM-3260	8	7	Ductile Iron	2010
WM-16729	6	3	Ductile Iron	2010
WM-16730	8	334	Ductile Iron	2010
WM-16731	8	12	Ductile Iron	2010
WM-16732	6	3	Cast Iron	1966
WM-16733	8	5	Ductile Iron	2010
WM-16734	8	28	Ductile Iron	2010
WM-16735	8	8	Ductile Iron	2010
WM-16736	8	3	Ductile Iron	2010
WM-16737	8	2	Ductile Iron	2010
WM-17127	6	6	Ductile Iron	2010
WM-17128	8	5	Ductile Iron	2010
WM-17129	6	8	Cast Iron	1966
WM-17130	8	362	Ductile Iron	2010
WM-17131	8	55	Ductile Iron	2010

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-17132	8	159	Ductile Iron	2010
WM-17134	6	2	Ductile Iron	2010
WM-17135	6	7	Ductile Iron	2010
WM-17136	6	2	Ductile Iron	2010
WM-17137	6	6	Cast Iron	1964
WM-17138	8	284	Ductile Iron	2010
WM-17139	8	5	Ductile Iron	2010
WM-17140	8	305	Ductile Iron	2010
WM-17141	8	117	Ductile Iron	2010
WM-17143	8	9	Ductile Iron	2010
WM-17145	8	414	Ductile Iron	2010
WM-17146	8	10	Ductile Iron	2010
WM-17147	8	26	Ductile Iron	2010
WM-17148	8	3	Ductile Iron	2010
WM-17149	8	2	Ductile Iron	2010
WM-17150	6	2	Ductile Iron	2010
WM-17151	6	12	Ductile Iron	2010
WM-3051	6	4	Cast Iron	
WM-17153	6	9	Ductile Iron	2010
WM-3055	6	10	Cast Iron	1966
WM-17155	8	7	Ductile Iron	2010
WM-17156	8	34	Ductile Iron	2010
WM-17157	8	417	Ductile Iron	2010
WM-17158	8	12	Ductile Iron	2010
WM-17160	10	12	Cast Iron	1972
WM-17161	10	2	Cast Iron	1972
WM-17162	20	2	Cast Iron	1972
WM-17163	8	2	Ductile Iron	2010
WM-17165	8	46	Ductile Iron	2010
WM-17166	8	117	Ductile Iron	2010
WM-17966	8	8	Ductile Iron	2013
WM-17967	6	6	Ductile Iron	2013
WM-17968	8	9	Ductile Iron	2013
WM-17969	8	113	Ductile Iron	2013
WM-17970	8	40	Ductile Iron	2013
WM-18365	6	4	Cast Iron	1969
WM-18366	6	75	Ductile Iron	1969
WM-18764	8	147	Ductile Iron	2013
WM-18765	8	39	Ductile Iron	2013
WM-18766	8	3	Ductile Iron	2013
WM-18767	8	13	Ductile Iron	2013

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-18768	8	3	Ductile Iron	2013
WM-18769	8	303	Ductile Iron	2013
WM-18770	8	3	Ductile Iron	2013
WM-18771	6	26	Cast Iron	1950
WM-18772	8	2	Ductile Iron	2013
WM-18773	8	2	Ductile Iron	2013
WM-18774	6	2	Cast Iron	1961
WM-19164	6	2	Cast Iron	1961
WM-19564	8	18	Ductile Iron	2013
WM-19565	8	575	Ductile Iron	2013
WM-19566	8	14	Ductile Iron	2013
WM-19964	8	3	Ductile Iron	2013
WM-19965	8	3	Ductile Iron	2013
WM-20364	8	15	Ductile Iron	2013
WM-20764	8	9	Ductile Iron	2013
WM-20765	8	2	Ductile Iron	2013
WM-21965	8	3	Ductile Iron	2013
WM-21966	6	14	Ductile Iron	2013
WM-21967	8	45	Ductile Iron	2013
WM-21968	8	3	Ductile Iron	2013
WM-21969	8	13	Ductile Iron	2013
WM-21970	8	2	Ductile Iron	2013
WM-22365	6	19	Ductile Iron	2013
WM-22366	6	3	Ductile Iron	2013
WM-22767	8	342	Ductile Iron	2013
WM-22768	8	4	Cast Iron	1955
WM-22769	8	12	Ductile Iron	2013
WM-22770	8	3	Ductile Iron	2013
WM-22771	8	3	Ductile Iron	2013
WM-22772	8	4	Cast Iron	1955
WM-22773	6	7	Cast Iron	1978
WM-22774	6	3	Ductile Iron	2013
WM-22775	12	14	Ductile Iron	2013
WM-22776	12	2	Ductile Iron	2013
WM-22777	12	2	Ductile Iron	2013
WM-22778	12	386	Ductile Iron	2013
WM-22779	12	61	Ductile Iron	2013
WM-23179	12	61	Ductile Iron	2013
WM-23180	12	86	Ductile Iron	2013
WM-23181	12	341	Ductile Iron	2013
WM-23182	12	252	Ductile Iron	2013

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-23183	12	427	Ductile Iron	2013
WM-15218	6	3	Ductile Iron	2008
WM-15218	6	1	Ductile Iron	2008
WM-23582	10	4	Ductile Iron	2013
WM-23583	10	1	Ductile Iron	2013
WM-23584	10	5	Ductile Iron	2013
WM-23585	6	52	Cast Iron	1966
WM-23586	8	3	Ductile Iron	2012
WM-23587	8	17	Ductile Iron	2012
WM-23588	8	3	Ductile Iron	2012
WM-23589	8	62	Ductile Iron	2012
WM-23590	8	16	Ductile Iron	2012
WM-23592	8	1	Ductile Iron	2012
WM-23593	8	11	Ductile Iron	2012
WM-23594	8	3	Ductile Iron	2012
WM-23595	6	6	Cast Iron	1966
WM-23596	8	51	Ductile Iron	2012
WM-23597	8	27	Ductile Iron	2012
WM-23598	6	240	Ductile Iron	2012
WM-23600	12	15	Ductile Iron	2013
WM-23601	6	5	Ductile Iron	2013
WM-23602	6	1	Ductile Iron	2013
WM-23603	6	2	Cast Iron	1956
WM-23604	12	6	Ductile Iron	2013
WM-23607	12	13	Ductile Iron	2013
WM-23608	12	6	Ductile Iron	2013
WM-23609	6	3	Ductile Iron	2013
WM-23610	6	10	Ductile Iron	2013
WM-23611	8	10	Ductile Iron	2013
WM-23612	6	1	Ductile Iron	2013
WM-24012	6	97	Ductile Iron	2013
WM-24013	8	6	Ductile Iron	2014
WM-24014	8	6	Ductile Iron	2014
WM-24015	8	427	Ductile Iron	2014
WM-24016	8	4	Ductile Iron	2014
WM-24018	8	2	Ductile Iron	2014
WM-24019	8	11	Ductile Iron	2014
WM-24020	6	5	Ductile Iron	
WM-24021	4	3	Ductile Iron	2014
WM-24022	8	1	Ductile Iron	2014
WM-24023	8	9	Ductile Iron	2014

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24024	8	4	Ductile Iron	2014
WM-24025	8	13	Ductile Iron	2014
WM-24027	8	26	Ductile Iron	2014
WM-24028	8	12	Ductile Iron	2014
WM-24029	8	1	Ductile Iron	2014
WM-24030	8	8	Ductile Iron	2014
WM-24031	8	39	Ductile Iron	2014
WM-24032	8	3	Ductile Iron	2014
WM-24033	8	3	Ductile Iron	2014
WM-24034	8	48	Ductile Iron	2014
WM-24036	6	22	Cast Iron	
WM-24037	4	2	Ductile Iron	1998
WM-9060	4	4	Cast Iron	1966
WM-24043	4	1	Cast Iron	
WM-24044	4	8	Cast Iron	
WM-1276	6	52	Cast Iron	1966
WM-1731	6	46	Cast Iron	1966
WM-24048	8	4	Ductile Iron	2015
WM-24052	8	2	Ductile Iron	2015
WM-24053	8	67	Ductile Iron	2015
WM-24054	8	18	Ductile Iron	2015
WM-24049	8	216	Ductile Iron	2015
WM-24051	8	38	Ductile Iron	2015
WM-24055	8	14	Ductile Iron	2015
WM-24056	8	21	Ductile Iron	2015
WM-24057	8	5	Ductile Iron	2015
WM-24058	8	1	Ductile Iron	2015
WM-24059	8	54	Ductile Iron	2015
WM-24060	10	3	Cast Iron	1955
WM-24061	8	398	Ductile Iron	2015
WM-24062	8	105	Ductile Iron	2015
WM-24063	12	49		
WM-24064	12	8		
WM-24065	6	2	Cast Iron	1974
WM-24066	8	29	Ductile Iron	2015
WM-1601	8	14	Cast Iron	1966
WM-24071	8	74	Ductile Iron	2015
WM-24070	8	42	Ductile Iron	2015
WM-24072	8	134	Ductile Iron	2015
WM-24073	8	1	Ductile Iron	2015
WM-24075	8	329	Ductile Iron	2015

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24076	8	17	Ductile Iron	2015
WM-24074	12	1	Ductile Iron	2015
WM-24077	8	44	Ductile Iron	2015
WM-24078	8	5	Ductile Iron	2015
WM-24079	8	2	Ductile Iron	2015
WM-24082	6	20	Cast Iron	1967
WM-24084	12	5	Cast Iron	1955
WM-24085	6	1	Cast Iron	
WM-24086	12	3	Ductile Iron	2015
WM-24087	8	6	Ductile Iron	2015
WM-24088	8	2	Ductile Iron	2015
WM-24089	8	321	Ductile Iron	2015
WM-24090	8	49	Ductile Iron	2015
WM-24091	8	42	Ductile Iron	2015
WM-24092	8	33	Ductile Iron	2015
WM-24093	8	20	Ductile Iron	2015
WM-24094	8	3	Ductile Iron	2015
WM-24095	12	2	Ductile Iron	2015
WM-24096	8	9	Ductile Iron	2015
WM-24097	8	9	Ductile Iron	2015
WM-24099	8	6	Ductile Iron	2015
WM-24098	8	5	Ductile Iron	2015
WM-24100	8	350	Ductile Iron	2015
WM-24101	8	36	Ductile Iron	2015
WM-24102	12	50	Ductile Iron	2015
WM-24103	8	354	Ductile Iron	2015
WM-24104	8	56	Ductile Iron	2015
WM-24105	8	17	Ductile Iron	2015
WM-24106	12	2	Ductile Iron	2015
WM-24107	8	4	Ductile Iron	2015
WM-24108	8	5	Ductile Iron	2015
WM-24109	8	7	Ductile Iron	2015
WM-24110	8	8	Ductile Iron	2015
WM-24111	8	18	Ductile Iron	2015
WM-24112	8	19	Ductile Iron	2015
WM-24113	8	16	Ductile Iron	2015
WM-24114	6	3		
WM-24115	8	10	Ductile Iron	2015
WM-24116	8	3	Ductile Iron	2015
WM-24117	8	19	Ductile Iron	2015
WM-24118	8	13	Ductile Iron	2015

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24119	8	18	Ductile Iron	2015
WM-24120	8	12	Ductile Iron	2015
WM-24121	8	9	Ductile Iron	2015
WM-24122	8	3	Ductile Iron	2015
WM-24123	16	31	Ductile Iron	2004
WM-24124	8	23	Ductile Iron	2012
WM-24125	8	43	Ductile Iron	2012
WM-24126	8	6	Ductile Iron	2012
WM-15906	8	593	Ductile Iron	2012
WM-24129	8	3	Ductile Iron	2012
WM-24131	6	2	Ductile Iron	2013
WM-24132	6	3	Cast Iron	1948
WM-24133	6	8	Cast Iron	1950
WM-24134	12	3		
WM-24135	12	7		
WM-24136	12	3		
WM-24137	12	75		
WM-24139	8	6	Ductile Iron	2016
WM-24140	8	8	Ductile Iron	2016
WM-24138	12	1	Ductile Iron	2016
WM-24141	8	13	Ductile Iron	2016
WM-24142	8	9	Ductile Iron	2016
WM-24143	8	1	Ductile Iron	2016
WM-24144	6	7		1966
WM-24145	12	5	Ductile Iron	2016
WM-24146	8	504	Ductile Iron	2016
WM-24147	8	3	Ductile Iron	2014
WM-24148	8	11	Ductile Iron	2014
WM-24149	8	1	Ductile Iron	2014
WM-24150	6	43	Cast Iron	1966
WM-24151	8	348	Ductile Iron	2014
WM-24153	6	5	Cast Iron	1966
WM-24152	8	2	Ductile Iron	2014
WM-24154	8	7	Ductile Iron	2014
WM-24155	8	1		2014
WM-24156	8	265	Ductile Iron	2014
WM-24157	6	4	Ductile Iron	2014
WM-24158	8	2	Ductile Iron	2014
WM-24159	8	6	Ductile Iron	2014
WM-24160	8	1	Ductile Iron	2014
WM-24162	8	43	Ductile Iron	2014

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24163	6	2	Ductile Iron	2014
WM-24161	8	11	Ductile Iron	2014
WM-2107	6	32	Cast Iron	1966
WM-24166	8	1	Ductile Iron	2016
WM-24167	8	5	Ductile Iron	2016
WM-24168	8	18	Ductile Iron	2016
WM-24169	8	3	Ductile Iron	2016
WM-24165	8	467	Ductile Iron	2016
WM-24170	8	3	Ductile Iron	2016
WM-24171	8	25	Ductile Iron	2016
WM-24172	8	2	Ductile Iron	2016
WM-24173	8	12	Ductile Iron	2016
WM-24174	8	2	Ductile Iron	2016
WM-24175	8	5	Ductile Iron	2016
WM-24176	8	26	Ductile Iron	2017
WM-24177	8	5	Ductile Iron	2016
WM-24178	8	7	Ductile Iron	2016
WM-24179	8	3	Ductile Iron	2016
WM-24180	10	396	Cast Iron	1964
WM-24181	8	516	Ductile Iron	2016
WM-24182	8	4	Ductile Iron	2016
WM-24183	6	7	Cast Iron	1966
WM-24184	16	359	Cast Iron	1955
WM-24185	16	8	Ductile Iron	2016
WM-24186	8	42	Ductile Iron	2016
WM-24187	8	2	Ductile Iron	2016
WM-24188	8	6	Ductile Iron	2016
WM-24189	8	5	Ductile Iron	2016
WM-24190	16	9	Ductile Iron	2016
WM-24191	8	40	Ductile Iron	2016
WM-24192	8	252	Ductile Iron	2016
WM-24193	8	8	Ductile Iron	2016
WM-24194	8	5	Ductile Iron	2016
WM-24195	8	3	Ductile Iron	2016
WM-24196	8	7	Ductile Iron	2016
WM-24197	8	1	Ductile Iron	2016
WM-24198	6	2	Ductile Iron	2016
WM-24199	12	31	Cast Iron	1955
WM-24200	12	4	Ductile Iron	2015
WM-24201	12	34	Ductile Iron	2015
WM-24202	12	4	Ductile Iron	2015

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24204	8	1	Cast Iron	1970
WM-24208	20	5	Ductile Iron	2015
WM-24209	20	10	Ductile Iron	2015
WM-24210	20	700	Ductile Iron	2015
WM-24211	20	10	Ductile Iron	2015
WM-24212	20	11	Ductile Iron	2015
WM-24213	20	7	Ductile Iron	2015
WM-24214	20	3	Ductile Iron	2015
WM-24218	20	1	Ductile Iron	2015
WM-24220	20	7	Ductile Iron	2015
WM-24221	20	3	Ductile Iron	2015
WM-24222	20	1	Ductile Iron	2015
WM-24215	8	35	Ductile Iron	2002
WM-24216	8	26	Ductile Iron	2002
WM-24217	6	76	Ductile Iron	2013
WM-24219	6	1	Ductile Iron	2013
WM-24223	4	239	Steel	2009
WM-24224	4	336	Steel	1984
WM-24225	4	3	Steel	1984
WM-24226	4	282	Steel	1984
WM-24227	4	1206	Steel	2008
WM-24228	4	494	Steel	1984
WM-24229	4	103	Steel	1984
WM-24230	4	117	Steel	1984
WM-24231	1.5	64	Steel	1984
WM-24232	1.5	40	Steel	1984
WM-24233	4	28	Steel	2009
WM-24227	4	353	Steel	2004
WM-24227	4	327	Steel	1984
WM-24234	10	299	Poly Vinyl Chloride	2013
WM-24235	8	52	Ductile Iron	2013
WM-24236	8	16	Ductile Iron	2013
WM-24237	8	154	Ductile Iron	2013
WM-24238	8	7	Ductile Iron	2013
WM-24239	8	20	Ductile Iron	2013
WM-24240	8	165	Ductile Iron	2013
WM-24241	8	8	Ductile Iron	2013
WM-24242	8	15	Ductile Iron	2013
WM-24243	4	98	Steel	2009
WM-24244	4	4	Steel	2009
WM-24245	6	4	Steel	2009

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24246	4	2	Steel	2009
WM-24247	8	4	Ductile Iron	2017
WM-24248	8	13	Ductile Iron	2017
WM-24249	8	339	Ductile Iron	2017
WM-24250	8	41	Ductile Iron	2017
WM-24251	16	33	Ductile Iron	2017
WM-24252	16	5	Ductile Iron	2017
WM-24253	6	4	Ductile Iron	2017
WM-24254	6	16	Ductile Iron	2017
WM-24255	6	5	Ductile Iron	2017
WM-24256	6	5	Ductile Iron	2017
WM-24257	16	30	Ductile Iron	2017
WM-24258	16	3	Ductile Iron	2017
WM-24259	16	3	Ductile Iron	2017
WM-24260	6	3	Ductile Iron	2017
WM-24261	6	12	Ductile Iron	2017
WM-24262	6	6	Ductile Iron	2017
WM-24263	6	3	Ductile Iron	2017
WM-24264	6	2	Ductile Iron	2017
WM-24265	8	29	Ductile Iron	2017
WM-24266	8	314	Ductile Iron	2017
WM-24267	8	60	Ductile Iron	2017
WM-24268	8	35	Ductile Iron	2017
WM-24269	6	3	Ductile Iron	2017
WM-24270	8	30	Ductile Iron	2017
WM-24271	8	3	Ductile Iron	2017
WM-24272	8	4	Ductile Iron	2017
WM-24273	8	20	Ductile Iron	2017
WM-24274	8	7	Ductile Iron	2017
WM-24275	8	2	Ductile Iron	2017
WM-24276	6	2	Ductile Iron	2017
WM-24277	8	202	Ductile Iron	2017
WM-24278	8	7	Ductile Iron	2017
WM-24279	8	10	Ductile Iron	2017
WM-24280	8	30	Ductile Iron	2017
WM-24281	8	4	Ductile Iron	2017
WM-24282	8	20	Ductile Iron	2017
WM-24283	8	3	Ductile Iron	2017
WM-24284	8	20	Ductile Iron	2017
WM-24285	8	14	Ductile Iron	2017
WM-24286	8	5	Ductile Iron	2017

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Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24287	8	5	Ductile Iron	2017
WM-24288	8	82	Ductile Iron	2017
WM-24289	8	20	Ductile Iron	2017
WM-24290	8	9	Ductile Iron	2017
WM-24291	8	8	Ductile Iron	2017
WM-24292	8	3	Ductile Iron	2017
WM-24293	6	3	Ductile Iron	2017
WM-24294	8	7	Ductile Iron	2017
WM-24295	8	4	Ductile Iron	2017
WM-24296	6	13	Cast Iron	1966
WM-24297	6	1	Cast Iron	1966
WM-24298	6	10	Cast Iron	1966
WM-24299	6	37	Cast Iron	1966
WM-24300	6	27	Unknown	
WM-24301	6	3	Ductile Iron	2013
WM-24302	4	1	Ductile Iron	2013
WM-24303	8	9	Ductile Iron	2017
WM-24304	8	2	Ductile Iron	2017
WM-24305	8	4	Ductile Iron	2017
WM-24306	8	17	Ductile Iron	2017
WM-24307	8	3	Ductile Iron	2017
WM-24308	6	7	Ductile Iron	2015
WM-24309	12	185	Ductile Iron	2015
WM-24310	12	125	Ductile Iron	2015
WM-24311	12	5	Ductile Iron	2015
WM-24312	12	5	Ductile Iron	2015
WM-24313	6	13	Ductile Iron	2016
WM-24314	6	26	Ductile Iron	2016
WM-24315	6	66	Ductile Iron	2016
WM-24316	6	37	Ductile Iron	2016
WM-24317	6	14	Ductile Iron	2016
WM-24318	12	11	Cast Iron	1955
WM-24319	12	4	Ductile Iron	2015
WM-24320	12	19	Ductile Iron	2017
WM-24321	12	25	Ductile Iron	2017
WM-24322	12	260	Ductile Iron	2017
WM-24323	12	3	Ductile Iron	2017
WM-24324	12	7	Ductile Iron	2017
WM-24325	6	11	Ductile Iron	2017
WM-24326	8	1	Other	2018
WM-24328	8	3	HDPE	2018

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24329	6	1	Other	2018
WM-24330	6	5	HDPE	2018
WM-24331	6	5	HDPE	2018
WM-24332	8	159	HDPE	2018
WM-24333	12	1	Ductile Iron	2017
WM-24334	24	3	Ductile Iron	2018
WM-24335	24	76	Ductile Iron	2018
WM-24336	24	34	Ductile Iron	2018
WM-24337	24	5	Ductile Iron	2018
WM-24338	24	5	Ductile Iron	2018
WM-24339	24	5	Ductile Iron	2018
WM-24340	24	23	Ductile Iron	2018
WM-24341	24	6	Ductile Iron	2018
WM-24342	24	111	Ductile Iron	2018
WM-24343	24	154	Ductile Iron	2018
WM-24344	24	81	Ductile Iron	2018
WM-24345	24	149	Ductile Iron	2018
WM-24346	24	73	Ductile Iron	2018
WM-24347	24	13	Ductile Iron	2018
WM-24348	24	49	Ductile Iron	2018
WM-24349	24	52	Ductile Iron	2018
WM-24350	24	169	Ductile Iron	2018
WM-24351	24	7	Ductile Iron	2018
WM-24352	24	15	Ductile Iron	2018
WM-24353	24	11	Ductile Iron	2018
WM-24354	24	3	Ductile Iron	2018
WM-24355	8	3	Ductile Iron	2018
WM-24356	8	6	Ductile Iron	2018
WM-24357	8	15	Ductile Iron	2018
WM-24358	8	2	Ductile Iron	2018
WM-24359	12	2	Ductile Iron	2018
WM-24360	10	1	Ductile Iron	2018
WM-24361	10	1	Ductile Iron	2018
WM-24362	10	1	Ductile Iron	2018
WM-24363	10	4	Ductile Iron	2018
WM-24364	10	6	Ductile Iron	2018
WM-24365	10	3	Ductile Iron	2018
WM-24366	10	18	Ductile Iron	2018
WM-24367	10	2	Ductile Iron	2018
WM-24368	6	2	Ductile Iron	2018
WM-24369	6	2	Ductile Iron	2018

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24370	10	8	Ductile Iron	2018
WM-24371	10	6	Ductile Iron	2018
WM-24372	12	1	Ductile Iron	2018
WM-24373	12	1	Ductile Iron	2018
WM-24374	12	4	Ductile Iron	2018
WM-24375	12	3	Ductile Iron	2018
WM-24376	12	4	Ductile Iron	2018
WM-1235	6	115	Cast Iron	1966
WM-24377	8	2	Cast Iron	
WM-1388	8	2	Ductile Iron	2015
WM-24378	8	3	Ductile Iron	2015
WM-24379	8	3	Ductile Iron	2015
WM-24380	8	4	Ductile Iron	2015
WM-1235	8	71	Ductile Iron	2015
WM-24381	-1	2		
WM-24382	10	7	Cast Iron	
WM-24383	10	2	Cast Iron	1953
WM-24384	10	1	Cast Iron	1953
WM-24385	4	75	Steel	2018
WM-24386	6	49	Steel	2018
WM-24233	4	7	Steel	2009
WM-24387	6	1	Steel	2018
WM-24388	6	32	Steel	2018
WM-24389	6	246	Steel	2018
WM-24390	6	1	Steel	2018
WM-24391	4	91	Steel	2018
WM-24392	4	299	Steel	2018
WM-24393	4	318	Steel	2018
WM-24394	4	208	Steel	2018
WM-24227	4	48	Steel	2008
WM-24395	4	200	Steel	2018
WM-24396	6	209	Steel	2018
WM-24396	6	154	Steel	2018
WM-24398	6	30	Steel	2018
WM-24399	6	5	Steel	2018
WM-24400	6	6	Steel	2018
WM-24401	6	5	Steel	2018
WM-24402	6	123	Steel	2018
WM-24403	4	381	Steel	2018
WM-24403	4	39	Steel	2018
WM-24404	4	8	Steel	2018

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24405	4	36	Steel	2018
WM-24406	4	298	Steel	2018
WM-24407	4	18	Steel	2018
WM-24408	4	348	Steel	2018
WM-24409	12	6	Ductile Iron	2015
WM-24410	12	139	Ductile Iron	2015
WM-6240	12	205	Ductile Iron	2015
WM-24411	12	3	Ductile Iron	2015
WM-6240	12	3	Ductile Iron	2015
WM-24410	12	121	Ductile Iron	2015
WM-24410	12	73	Ductile Iron	2015
WM-24410	12	75	Ductile Iron	2015
WM-23600	12	7	Ductile Iron	2015
WM-23600	12	6	Ductile Iron	2015
WM-24412	6	12	Ductile Iron	
WM-24413	6	4	Cast Iron	1955
WM-24414	12	1	Ductile Iron	2019
WM-24415	12	1	Ductile Iron	2019
WM-24416	12	16	Ductile Iron	2019
WM-24417	8	33	Ductile Iron	2019
WM-24418	8	2	Ductile Iron	2019
WM-24419	8	157	Ductile Iron	2019
WM-24420	6	18	Ductile Iron	2019
WM-24421	6	2	Ductile Iron	2019
WM-24422	8	115	Ductile Iron	2019
WM-24423	8	83	Ductile Iron	2019
WM-24424	6	2	Ductile Iron	2019
WM-24425	6	15	Ductile Iron	2019
WM-24426	6	2	Ductile Iron	2019
WM-24427	8	23	Ductile Iron	2019
WM-24428	8	38	Ductile Iron	2019
WM-24429	8	75	Ductile Iron	2019
WM-24430	8	107	Ductile Iron	2019
WM-24431	6	2	Ductile Iron	2018
WM-24432	6	2	Ductile Iron	2018
WM-24433	8	3	Ductile Iron	2018
WM-24434	8	0	Ductile Iron	2018
WM-24435	8	5	Ductile Iron	2018
WM-24436	8	0	Ductile Iron	2018
WM-24437	8	7	Ductile Iron	2018
WM-24438	8	3	Ductile Iron	2018

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24439	8	7	Ductile Iron	2018
WM-24440	8	14	Ductile Iron	2018
WM-24441	8	77	Ductile Iron	2018
WM-24442	8	6	Ductile Iron	2018
WM-24443	8	5	Ductile Iron	2018
WM-24444	8	4	Ductile Iron	2016
WM-24445	8	3	Ductile Iron	2016
WM-24446	8	3	Ductile Iron	2016
WM-24447	8	59	Ductile Iron	2016
WM-24448	8	3	Ductile Iron	2016
WM-24449	8	184	Ductile Iron	2016
WM-24450	8	8	Ductile Iron	2016
WM-24451	8	3	Ductile Iron	2016
WM-24452	8	18	Ductile Iron	2016
WM-24453	8	3	Ductile Iron	2016
WM-24454	8	3	Ductile Iron	2016
WM-24455	8	37	Ductile Iron	2016
WM-24456	8	94	Ductile Iron	2016
WM-24460	8	20	Ductile Iron	2016
WM-24461	8	22	Ductile Iron	2016
WM-24462	8	22	Ductile Iron	2016
WM-24463	8	171	Ductile Iron	2016
WM-24464	8	31	Ductile Iron	2016
WM-24465	8	31	Ductile Iron	2016
WM-24466	8	92	Ductile Iron	2016
WM-24467	8	10	Ductile Iron	2016
WM-24457	8	10	Ductile Iron	2016
WM-24458	8	21	Ductile Iron	2016
WM-24459	8	135	Ductile Iron	2016
WM-24468	8	9	Ductile Iron	2016
WM-24469	8	8	Ductile Iron	2016
WM-24470	8	101	Ductile Iron	2016
WM-24471	8	48	Ductile Iron	2016
WM-24472	8	27	Ductile Iron	2016
WM-24473	8	26	Ductile Iron	2016
WM-24474	8	5	Ductile Iron	2016
WM-24475	8	4	Ductile Iron	2016
WM-24476	8	25	Ductile Iron	2016
WM-24477	8	4	Ductile Iron	2016
WM-24478	8	29	Ductile Iron	2016
WM-24479	8	2	Ductile Iron	2016

City of Traverse City
Inventory of Water Mains

11/29/2020

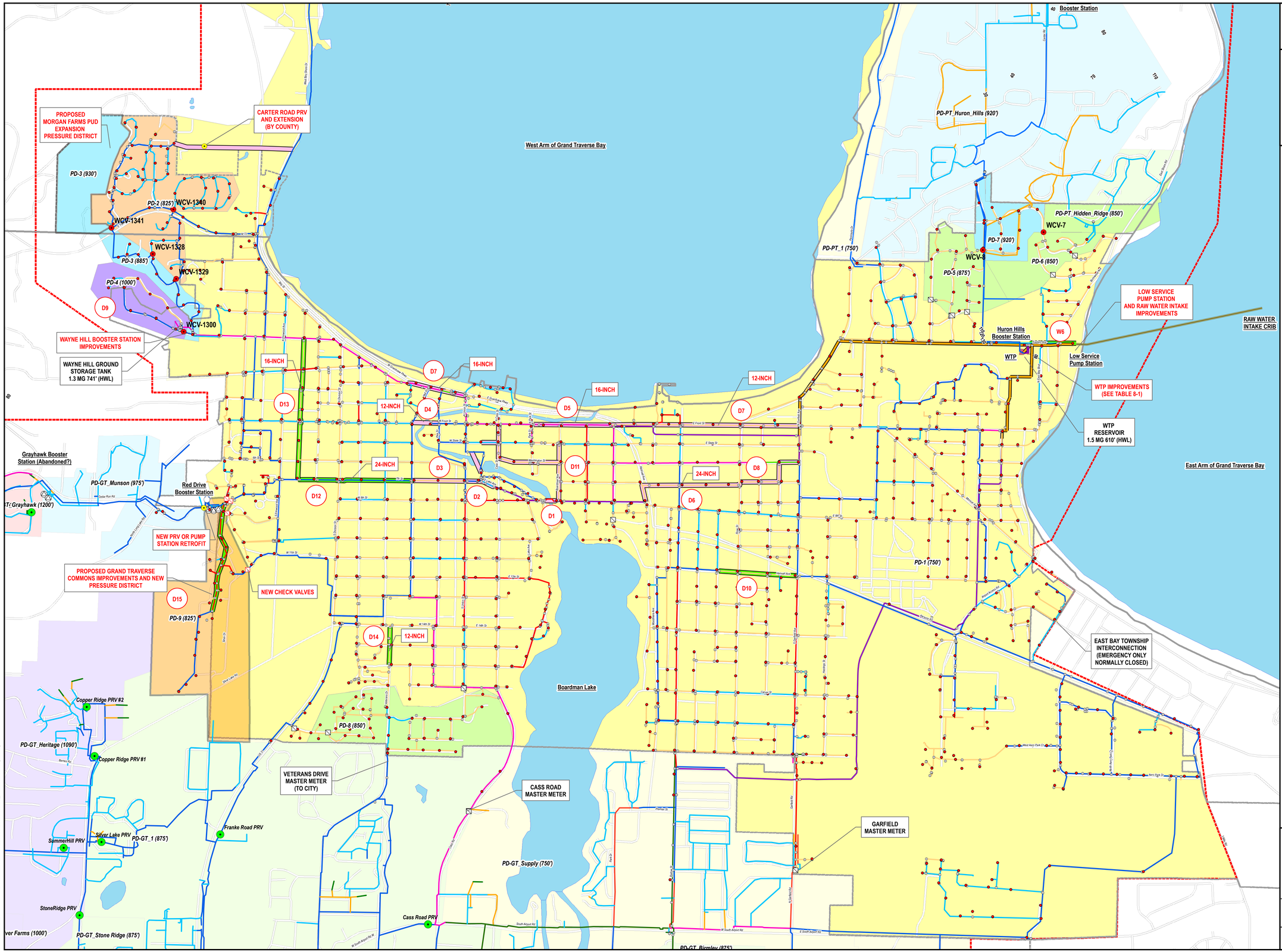
Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24480	8	2	Ductile Iron	2016
WM-24483	8	132	Ductile Iron	2016
WM-24482	8	2	Ductile Iron	2016
WM-24481	8	2	Ductile Iron	2016
WM-24484	8	13	Ductile Iron	2016
WM-24485	8	37	Ductile Iron	2016
WM-24486	8	38	Ductile Iron	2016
WM-24487	8	168	Ductile Iron	2016
WM-24488	8	38	Ductile Iron	2016
WM-24489	8	3	Ductile Iron	2016
WM-24490	8	67	Ductile Iron	2016
WM-24493	8	128	Ductile Iron	2016
WM-24492	8	3	Ductile Iron	2016
WM-24491	8	3	Ductile Iron	2016
WM-24494	8	192	Ductile Iron	2016
WM-24498	8	275	Ductile Iron	2016
WM-24497	8	3	Ductile Iron	2016
WM-24496	8	3	Ductile Iron	2016
WM-24495	8	23	Ductile Iron	2016
WM-24499	8	45	Ductile Iron	2016
WM-24500	8	58	Ductile Iron	2016
WM-24501	8	35	Ductile Iron	2016
WM-24505	8	53	Ductile Iron	2016
WM-24506	8	165	Ductile Iron	2016
WM-24504	8	32	Ductile Iron	2016
WM-24509	8	17	Ductile Iron	2016
WM-24510	8	33	Ductile Iron	2016
WM-24508	8	3	Ductile Iron	2016
WM-24507	8	3	Ductile Iron	2016
WM-24503	8	3	Ductile Iron	2016
WM-24502	8	3	Ductile Iron	2016
WM-24511	8	29	Ductile Iron	2016
WM-24512	8	35	Ductile Iron	2016
WM-24513	8	199	Ductile Iron	2016
WM-24518	8	42	Ductile Iron	2016
WM-24519	8	42	Ductile Iron	2016
WM-24520	8	43	Ductile Iron	2016
WM-24521	8	37	Ductile Iron	2016
WM-24517	8	68	Ductile Iron	2016
WM-24514	8	153	Ductile Iron	2016
WM-24516	8	3	Ductile Iron	2016

City of Traverse City
Inventory of Water Mains

11/29/2020

Pipe ID	Diameter (in)	Length (ft)	Material	Year
WM-24515	8	3	Ductile Iron	2016
WM-24522	8	26	Ductile Iron	2016
WM-24523	8	110	Ductile Iron	2016
WM-24528	8	54	Ductile Iron	2016
WM-24527	8	141	Ductile Iron	2016
WM-24524	8	27	Ductile Iron	2016
WM-24525	8	5	Ductile Iron	2016
WM-24526	8	29	Ductile Iron	2016
WM-24529	8	20	Ductile Iron	2016
WM-24530	8	6	Ductile Iron	2016
WM-24531	8	17	Ductile Iron	2016
WM-24532	8	15	Ductile Iron	2016
WM-24533	8	34	Ductile Iron	2016
WM-24535	8	91	Ductile Iron	2016
WM-24536	8	25	Ductile Iron	2016
WM-24537	8	69	Ductile Iron	2016
WM-24534	8	9	Ductile Iron	2016
WM-24538	8	210	Ductile Iron	2016
WM-24540	8	31	Ductile Iron	2016
WM-24541	8	219	Ductile Iron	2016
WM-24539	8	63	Ductile Iron	2016
WM-24542	8	34	Ductile Iron	2016
WM-24543	8	32	Ductile Iron	2016
WM-24544	8	281	Ductile Iron	2016
WM-24545	8	27	Ductile Iron	2016
WM-24546	8	18	Ductile Iron	2016

APPENDIX F:
RECOMMENDED IMPROVEMENTS AND COST ESTIMATES



CITY of TRAVERSE CITY MICHIGAN

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

1925 BRETON ROAD SE SUITE 100
GRAND RAPIDS, MI 49506
(616) 454-4286
www.hrcengr.com

N
W E
S

0 500 1,000 2,000 Feet

LEGEND

- Check Valve
- PRV
- Hydrant
- System Valve
- City/Township
- Water System Service Area
- County

Water Main

- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"
- 36"

Pressure District HGL

- 750
- 751 - 825
- 826 - 884
- 885 - 999
- 1000 - 1090
- 1091 - 1200

Recommended Project

- 5-Year CIP
- 10-Year CIP

FIGURE F-1

TRAVERSE CITY RECOMMENDED IMPROVEMENTS

2020 WATER SYSTEM RELIABILITY STUDY UPDATE

NOVEMBER 2020 | HRC #: 20200232

Document Path: Y:\2019\01\20190115\03_Studies\Working\Living

Date: 2/25/2021

Date: 11/30/2020 Document Path: \\hrc-engr\General\Projdocs\20200232\20200232\03_Studies\Working\GIS\Figures\Wayne_Hill_Evaluation.mxd

PRV to PD-2

Proposed 12-inch WM

Hillside Estates
16 Single Family Homes

Proposed Hillside Estates Hydrant (Elev. 810')

Proposed PD-3 (930')

Proposed Hillside Estates Hydrant (Elev. 870')

Proposed Storage Tank (Option 2a)

Morgan Farms Phase III
Apartment Complex (222 Apartments)
Commercial Building (51,936 sf)

Proposed Storage Tank (Option 2b)

New Booster Pumps
on Lower Level (Option 1)
New Supplemental Booster Pumps
on Lower Level (Option 3)

Replace PRV WCV-1300
With Pressure Sustaining Valve
Raise Pressure Setting to PD-3

Thorn Creek
14 Single Family Homes

Leelenau Flats
34 Single Family Homes

Future PRV to PD-1

The Moorings
91 Single Family Homes
58 Condominiums

M-72 Condominiums
21 Single Family Homes

Connections Requiring PRVs

Future 12-inch WM to Elmwood Township

PD-2 (825')

PD-3 (885')
(930', proposed)

PD-4 (1000')

WCV-1340

WCV-1344

WCV-1328

WCV-1329

WCV-1300

WHYD-926

Wayne Hill Tank
Booster Station

Tiarah Essence
Abby
Sinclair
Camrose
Leelanau
Shrewbury
Waterford
Old Morgan
Candleton
Whittington
Thorncreek
Rennie
West Bay Shore
Highpoint Valley
Carter
Campanile
Bayview
Valley
Morgan Hill
Aston
Leelanau
Traverse
Incochee Woods
M 72
US Route 31
Wind Drift
Lodge Pine
Incochee
Ramsdell
Incochee Farm
Kingston
Cherokee
Water Hill
Willow
Tart Trail
Bay
Hill
Benzonia State
Hickory Hill
Hickory Hills
Madison
Monroe
Elmwood
Spruce
Wayne
Cedar
Xavier
Cypress
Division
Grandview
Maple

CITY of TRAVERSE CITY MICHIGAN

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N
W E
S

0 250 500 1,000 Feet

LEGEND
- PRV
- Hydrant
- System Valve
- Water System Service Area
- County
- City/Township

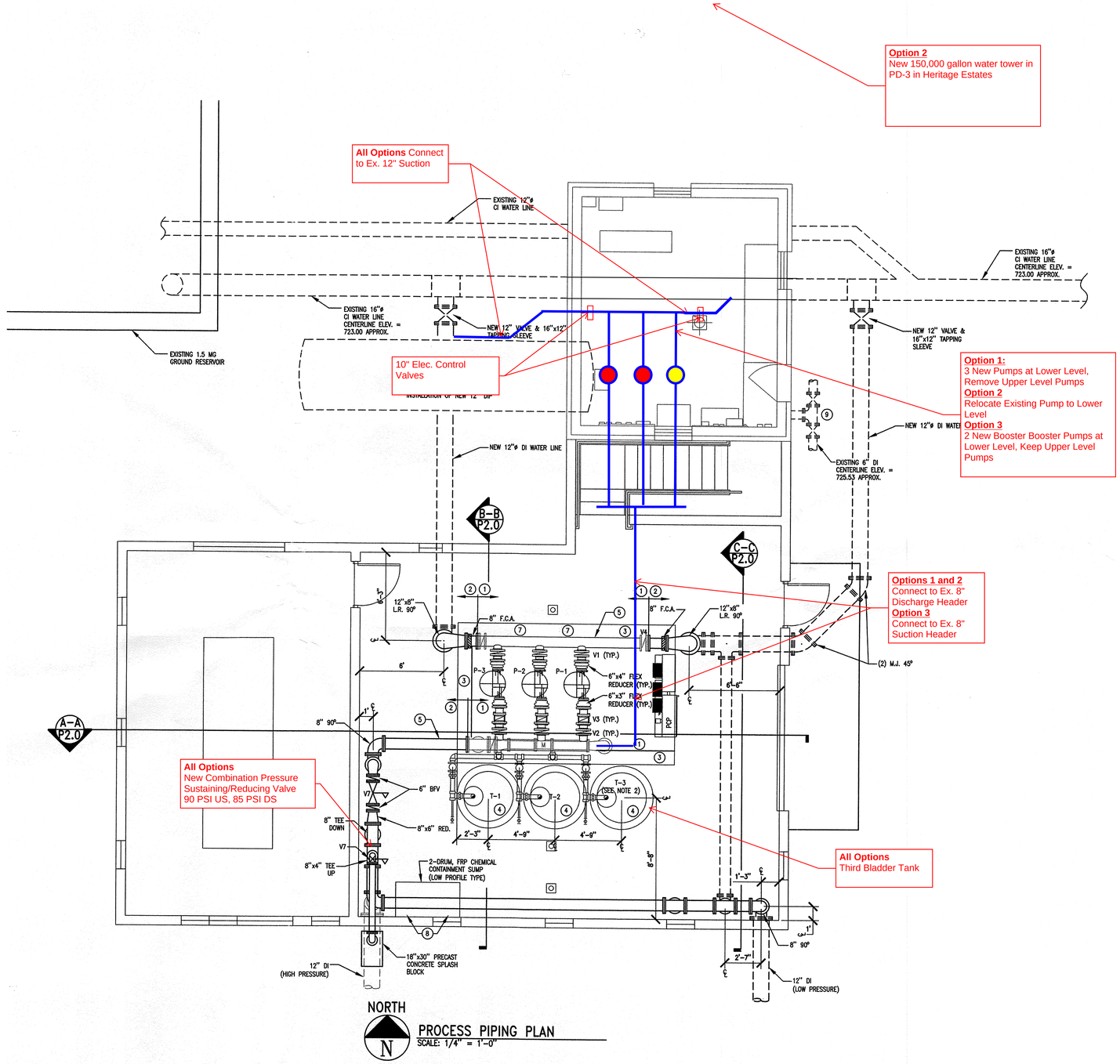
Water Main
- 6"
- 8"
- 10"
- 12"
- 16"
- 18"
- 20"
- 24"
- 30"

Pressure District HGL
- 750
- 751 - 825
- 826 - 884
- 885 - 999
- 1000 - 1090
- 1091 - 1200
- Proposed Water Main
- Recommended Project

FIGURE F-2
WAYNE HILL SERVICE AREA RECOMMENDED IMPROVEMENTS

2020 WATER SYSTEM
RELIABILITY STUDY UPDATE

NOVEMBER 2020 | HRC #: 20200232



CONCEPT DRAWING

Figure F-3 - Wayne Hill Evaluation Options	N No Scale
City of Traverse City **Wayne Hill Evaluation** **December 2020**	CITY of TRAVERSE CITY MICHIGAN HRC HUBBELL, ROTH & CLARK, INC CONSULTING ENGINEERS SINCE 1915

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1925 Breton Road SE, Suite 100; Grand Rapids, MI 49506

Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W1: WTP and Low Service PS New Electrical Gear and VFDs**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY:

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	Install VFDs on HSPS Pumps 2 and 4	2	EA	$100,000	$200,000
2	Install VFDs on LSPS Pumps 1, 2, and 4	3	EA	$85,000	$255,000
3	Replace basement switchgear	1	LS	$125,000	$125,000
4	Equipment Installation	20	%	$455,000	$91,000
5					
6					
7	Misc Metal	1	%	$7,000	$7,000
8	Misc Mechanical	1	%	$7,000	$7,000
9	Misc Painting	1	%	$7,000	$7,000
10	Electrical and SCADA Allowance	25	%	$168,000	$168,000
11	**Construction Subtotal**			`	**$860,000**
12	Contingencies	20	%		$172,000
13	Engineering, Legal, and Administrative	20	%		$172,000
	TOTAL PROJECT COST				**$1,204,000**

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Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**
LOCATION: **Traverse City, Michigan**
BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
PROJECT: **W2: Replace Sodium Hypochlorite Tanks**

DATE: **12/23/2020**
PROJECT NO. **20200232**
ESTIMATOR: **DIU**
CHECKED BY: **DJB**
CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	Demo existing wall	1	LS	$10,000	$10,000
2	New 15' x 15' FRP Panel Wall	225	SF	$100	$22,500
3	Wall header and jams	1	LS	$25,000	$25,000
4	8100 Gallon Polyethylene Tank	2	EA	$25,000	$50,000
5	Level Transducers	2	EA	$2,000	$4,000
6	Transfer pumps	2	EA	$10,000	$20,000
7					
8	Chemical resistant coating	1,200	SF	$25	$30,000
9	Concrete surface repairs	200	SF	$50	$10,000
10	4" Fill piping	50	LF	$40	$2,000
11	4" Ball Valves	2	EA	$1,000	$2,000
12	4" Camlock Fittings	2	EA	$500	$1,000
13	Equipment Installation	40	%	$118,000	$47,200
14					
15	Misc Metal	1	%	$3,000	$3,000
16	Misc Mechanical	1	%	$3,000	$3,000
17	Misc Painting	1	%	$3,000	$3,000
18	Electrical and SCADA Allowance	25	%	$56,000	$56,000
19	**Construction Subtotal**				**$289,000**
20	Contingencies	20	%	$289,000	$58,000
21	Engineering, Legal, and Administrative	20	%	$289,000	$58,000
	TOTAL PROJECT COST				**$405,000**

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Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W3: Replace Surface Wash Pump**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New Surface Wash Pump	1	EA	$12,000	$12,000
2	4" Gate Valves	2	EA	$3,000	$6,000
3					
4	Equipment Installation	50	%	$18,000	$9,000
5					
6					
7	Misc Metal	1	%	$1,000	$1,000
8	Misc Mechanical	1	%	$1,000	$1,000
9	Misc Painting	1	%	$1,000	$1,000
10	Electrical and SCADA Allowance	25	%	$7,000	$7,000
11	**Construction Subtotal**			`	**$37,000**
12	Contingencies	20	%		$8,000
13	Engineering, Legal, and Administrative	5	%		$2,000
	TOTAL PROJECT COST				**$47,000**

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Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W5: Replace HSPS Control Valves**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	14-inch Plug Valve (100% Port)	3	EA	$15,000	$45,000
2	12-inch Plug Valve (100% Port)	1	EA	$12,000	$12,000
3	Electro-Pneumatic Actuators	4	EA	$20,000	$80,000
4	14-inch Bfly Valve	3	EA	$12,000	$36,000
5	12-inch Bfly Valve	1	EA	$10,000	$10,000
6					
7	Equipment Installation	40	%	$183,000	$73,200
8					
9	Misc Metal	1	%	$3,000	$3,000
10	Misc Mechanical	1	%	$3,000	$3,000
11	Misc Painting	1	%	$3,000	$3,000
12	Electrical and SCADA Allowance	25	%	$80,000	$20,000
13	**Construction Subtotal**			`	**$286,000**
14	Contingencies	20	%		$58,000
15	Engineering, Legal, and Administrative	20	%		$58,000
	TOTAL PROJECT COST				**$402,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W6: New Raw Water Main from LSPS to WTP**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	30" DIP Buried	1,000	LF	$350	$350,000
2	30" DIP Gate Valves	3	EA	$30,000	$90,000
3	Connection to Existing 30"	1	LS	$50,000	$50,000
4	Pavement Replacement	1,000	LF	$50	$50,000
5	Traffic Control	1	LS	$10,000	$10,000
6					
7	**Construction Subtotal**			`	**$550,000**
8	Contingencies	20	%		$110,000
9	Engineering, Legal, and Administrative	20	%		$110,000
	TOTAL PROJECT COST				**$770,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W7: Install New Generator at LSPS**

DATE: **2/15/2021**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **MJR**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 500 kW Generator, Exterior	1	LS	$265,000	$265,000
2	Generator Switchgear for New Generator and ATS	1	LS	$25,000	$25,000
3	Concrete pad and site work	1	LS	$20,000	$20,000
4	Equipment Installation	1	LS	$10,000	$10,000
5					
6					
7	Misc Metal	1.0	%	$4,000	$2,000
8	Misc Mechanical	1.0	%	$4,000	$2,000
9	Misc Painting	0.5	%	$2,000	$1,000
10	Electrical and SCADA Allowance	20	%	$64,000	$31,000
11	**Construction Subtotal**			`	**$356,000**
12	Contingencies	20	%		$72,000
13	Engineering, Legal, and Administrative	1	LS		$20,000
	TOTAL PROJECT COST				**$450,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W8: LSPS Pump Replacement**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	Replace Pumps	4	EA	$150,000	$600,000
2					
3	Equipment Installation	40	%	$600,000	$240,000
4					
5	Misc Metal	1	%	$9,000	$9,000
6	Misc Mechanical	1	%	$9,000	$9,000
7	Misc Painting	1	%	$9,000	$9,000
8	Electrical and SCADA Allowance	25	%	$210,000	$210,000
9	**Construction Subtotal**			`	**$1,077,000**
10	Contingencies	20	%		$216,000
11	Engineering, Legal, and Administrative	5	%		$54,000
	TOTAL PROJECT COST				**$1,347,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W9: HSPS Pump Replacement**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New High Service Pumps (2, 3, 4)	3	EA	$200,000	$600,000
2					
3	Equipment Installation	40	%	$600,000	$240,000
4					
5					
6	Misc Metal	1	%	$9,000	$9,000
7	Misc Mechanical	1	%	$9,000	$9,000
8	Misc Painting	1	%	$9,000	$9,000
9	Electrical and SCADA Allowance	25	%	$210,000	$210,000
10	**Construction Subtotal**			`	**$1,077,000**
11	Contingencies	20	%		$216,000
12	Engineering, Legal, and Administrative	10	%		$108,000
	TOTAL PROJECT COST				**$1,401,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **W10A: Backwash Recycle**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	12" Inline UV (Trojan Swift)	1	EA	$126,000	$126,000
2	12" Magnetic Flow Meter	1	EA	$14,000	$14,000
3	12" Plug Valve	2	EA	$9,000	$18,000
4	12" DIP	50	LF	$200	$10,000
5	12" Plug Valve (buried)	1	LS	$15,000	$15,000
6	Equipment Installation	40	%	$168,000	$67,200
7					
8					
9	Misc Metal	1	%	$3,000	$3,000
10	Misc Mechanical	1	%	$3,000	$3,000
11	Misc Painting	1	%	$3,000	$3,000
12	Electrical and SCADA Allowance	25	%	$63,000	$63,000
13	**Construction Subtotal**				**$323,000**
14					
15	Engineering, Legal, Administrative and Contingencies	40	%		$130,000
	TOTAL PROJECT COST				**$453,000**

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REPORT: **Traverse City Water Reliability Study Update**
LOCATION: **Traverse City, Michigan**
BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
PROJECT: **W10B: Backwash Recycle and Backwash Tank**

DATE: **9/16/2020**
PROJECT NO. **20200232**
ESTIMATOR: **DIU**
CHECKED BY: **DJB**
CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	12" Inline UV (Trojan Swift)	1	EA	$126,000	$126,000
2	12" Magnetic Flow Meter	1	EA	$14,000	$14,000
3	12" Plug Valve	3	EA	$9,000	$27,000
4	12" DIP	100	LF	$200	$20,000
5					
6	Sludge Pumps	2	EA	$35,000	$70,000
7					
8	New 400,000 gallon tank, 2 cells and wet well	400,000	GAL	$2.5	$1,000,000
9	Earthwork	30	% of Tank	$1,000,000	$300,000
10					
11	Equipment Installation	40	%	$187,000	$74,800
12					
13	Misc Metal	1	%	$17,000	$17,000
14	Misc Mechanical	1	%	$17,000	$17,000
15	Misc Painting	1	%	$17,000	$17,000
16	Electrical and SCADA Allowance	25	%	$408,000	$408,000
17	**Construction Subtotal**				**$2,091,000**
18					
19	Engineering, Legal, Administrative and Contingencies	40	%		$837,000
	TOTAL PROJECT COST				**$2,928,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D1: 8th Street Bridge Project, 20-inch and 24-inch from Boardman to Lake Ave (Phase 1)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 24 inch Water Main (RJ,CL 52, DIP, 5' Cover)	261	LF	$350	$91,350
2	Hydrants (1 every 350 ft)	3	EA	$5,000	$15,000
3	24-inch Gate Valve and Box (1 every 500 ft)	2	EA	$10,000	$15,220
4	Water Service Connection	3	EA	$2,000	$5,220
5	Connection to Existing Main	5	EA	$5,000	$25,000
6	Traffic Control	1	LS	$50,000	$50,000
7					
8	**Construction Subtotal**			`	**$202,000**
9	Contingencies	20	%		$41,000
10	Engineering, Legal, and Administrative	20	%		$41,000
	TOTAL PROJECT COST				**$284,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D2: 24-inch on Lake Avenue from Cass to Union, (Phase 3B)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 24 inch Water Main (RJ,CL 52, DIP, 5' Cover)	664	LF	$200	$132,800
2	Hydrants (1 every 350 ft)	3	EA	$5,000	$15,000
3	24-inch Gate Valve and Box (1 every 500 ft)	2	EA	$10,000	$23,280
4	Water Service Connection	2	EA	$5,000	$11,640
5	Connection to Existing Main	5	EA	$10,000	$50,000
6	Pavement Replacement	664	LF	$50	$33,200
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$276,000**
10	Contingencies	20	%		$56,000
11	Engineering, Legal, and Administrative	20	%		$56,000
	TOTAL PROJECT COST				**$388,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D3: 24-inch on 7th from Union to Wadsworth, (Phase 4)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 24 inch Water Main (RJ,CL 52, DIP, 5' Cover)	1,190	LF	$200	$238,000
2	Hydrants (1 every 350 ft)	4	EA	$5,000	$22,000
3	24-inch Gate Valve and Box (1 every 500 ft)	3	EA	$10,000	$33,800
4	Water Service Connection	8	EA	$5,000	$40,000
5	Connection to Existing Main	5	EA	$10,000	$50,000
6	Pavement Replacement	1,190	LF	$50	$59,500
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$454,000**
10	Contingencies	20	%		$91,000
11	Engineering, Legal, and Administrative	20	%		$91,000
	TOTAL PROJECT COST				**$636,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D5: 16-inch on East Front from Franklin to Park St.**

DATE: **2/15/2021**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 16-inch Water Main (RJ,CL 52, DIP, 5' Cover)	1,800	LF	$100	$180,000
2	Hydrants	4	EA	$5,000	$20,000
3	24-inch Gate Valve and Box (1 every 500 ft)	5	EA	$10,000	$46,000
4	Water Service Connection	42	EA	$5,000	$210,000
5	Connection to Existing Main	5	EA	$10,000	$50,000
6	Pavement Replacement	1,800	LF	$50	$90,000
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$606,000**
10	Contingencies	20	%		$122,000
11	Engineering, Legal, and Administrative	20	%		$122,000
	TOTAL PROJECT COST				**$850,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D6: 24-inch from Webster/Rose to 8th/Railroad, (Phase 5B)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 24 inch Water Main (RJ,CL 52, DIP, 5' Cover)	2,610	LF	$200	$522,000
2	Hydrants (1 every 350 ft)	8	EA	$5,000	$42,286
3	24-inch Gate Valve and Box (1 every 500 ft)	6	EA	$10,000	$62,200
4	Water Service Connection	20	EA	$5,000	$100,000
5	Connection to Existing Main	5	EA	$10,000	$50,000
6	Pavement Replacement	2,610	LF	$50	$130,500
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$917,000**
10	Contingencies	20	%		$184,000
11	Engineering, Legal, and Administrative	20	%		$184,000
	TOTAL PROJECT COST				**$1,285,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D8: 24-inch from Garfield/Washington to Webster/Rose, (Phase 5A)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 24 inch Water Main (RJ,CL 52, DIP, 5' Cover)	1,720	LF	$200	$344,000
2	Hydrants (1 every 350 ft)	6	EA	$5,000	$29,571
3	24-inch Gate Valve and Box (1 every 500 ft)	5	EA	$10,000	$50,000
4	Water Service Connection	40	EA	$5,000	$200,000
5	Connection to Existing Main	12	EA	$10,000	$120,000
6	Pavement Replacement	1,720	LF	$50	$86,000
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$840,000**
10	Contingencies	20	%		$168,000
11	Engineering, Legal, and Administrative	20	%		$168,000
	TOTAL PROJECT COST				**$1,176,000**

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REPORT: **Traverse City Water Reliability Study Update** DATE: **2/26/2021**

LOCATION: **Traverse City, Michigan** PROJECT NO. **20200232**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL ESTIMATOR: **DIU/DJB**

PROJECT: **D9A: Wayne Hill Improvements Option 1 - New Booster Pumps on Lower Level** CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
	Pump Station Upgrades				
1	Excavate for New Suction Line	26	CY	$1,000	$25,926
2	Live Tap 12" Line (TS&V)	2	LS	$2,000	$4,000
3	12" Suction Line	40	LF	$400	$16,000
4	Core thru PS Wall	2	EA	$800	$1,600
5	Saw cut floor	20	LF	$60	$1,200
6	Excavate for discharge Line (Hand)	5	CY	$2,000	$9,481
7	New 60-hp Pumps and Valves, Relocate to Lower Level	3	EA	$31,980	$95,940
8	Discharge Header 10"	24	LF	$300	$7,200
9	Isolation Valves or Blind Flanges	3	EA	$1,000	$3,000
10	Concrete Bases for Pumps	3	EA	$1,200	$3,600
11	Lifting Eyes for Motors/ Pumps	3	EA	$600	$1,800
12	Connection to existing header	1	LS	$10,000	$10,000
13	Lower Level rehab and concrete repairs	1	LS	$20,000	$10,000
14	10" Suction Control Valves	2	EA	$5,000	$10,000
15	Reprogramming Control Scheme	1	LS	$20,000	$20,000
16					
17	Wayne Hill 8" Combination Pressure Sustaining/Reducing Valve	1	EA	$20,000	$20,000
18	New 726 Gallon Bladder Tank	1	LS	$10,000	$10,000
19					
20	Misc Metal	1	%	$3,000	$3,000
21	Misc Mechanical	1	%	$3,000	$3,000
22	Misc Painting	1	%	$3,000	$3,000
23	Electrical Allowance	15	%	$38,000	$38,000
24	**Pump Station Construction Subtotal**				**$297,000**
25	Contingencies	30	%		$90,000
26	Engineering, Legal, and Administrative	20	%		$60,000
	TOTAL PROJECT COST				**$447,000**

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REPORT: **Traverse City Water Reliability Study Update** DATE: **2/26/2021**

LOCATION: **Traverse City, Michigan** PROJECT NO. **20200232**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL ESTIMATOR: **DIU/DJB**

PROJECT: **D9B: Wayne Hill Improvements Option 2 - Ex. Booster Pumps to Lower Level, New Tower** CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
	Pump Station Upgrades				
1	Excavate for New Suction Line	26	CY	$1,000	$25,926
2	Live Tap 12" Line (TS&V)	2	LS	$2,000	$4,000
3	12" Suction Line	40	LF	$400	$16,000
4	Core thru PS Wall	2	EA	$800	$1,600
5	Saw cut floor	20	LF	$60	$1,200
6	Excavate for discharge Line (Hand)	5	CY	$2,000	$9,481
7	Relocate Ex. 60-hp Pumps and Valves, Relocate to Lower Level	3	EA	$7,980	$23,940
8	Discharge Header 10"	24	LF	$300	$7,200
9	Discharge Pipe fittings 10-inch	6	EA	$1,000	$6,000
9	Isolation Valves or Blind Flanges	3	EA	$1,000	$3,000
10	Concrete Bases for Pumps	3	EA	$1,200	$3,600
11	Lifting Eyes for Motors/ Pumps	3	EA	$600	$1,800
12	Connection to existing header	1	LS	$10,000	$10,000
13	Lower Level rehab and concrete repairs	1	LS	$20,000	$10,000
14	10" Suction Control Valves	2	EA	$5,000	$10,000
15	Reprogramming Control Scheme	1	LS	$20,000	$20,000
16					
17	Wayne Hill 8" Combination Pressure Sustaining/Reducing Valve	1	EA	$20,000	$20,000
18	New 726 Gallon Bladder Tank	1	LS	$10,000	$10,000
19					
20	New 150,000 Gallon Water Tower + Site Work	1	LS	$850,000	$850,000
21					
22	Misc Metal	1	%	$2,000	$2,000
23	Misc Mechanical	1	%	$2,000	$2,000
24	Misc Painting	1	%	$2,000	$2,000
25	Electrical Allowance	15	%	$28,000	$28,000
26	**Pump Station Construction Subtotal**				$1,068,000
27	Contingencies	30	%		$321,000
28	Engineering, Legal, and Administrative	20	%		$214,000
	TOTAL PROJECT COST				**$1,603,000**

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REPORT: **Traverse City Water Reliability Study Update** DATE: **9/16/2020**

LOCATION: **Traverse City, Michigan** PROJECT NO. **20200232**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL ESTIMATOR: **DJB**

PROJECT: **D9C: Wayne Hill Improvements Option 3 - New Supplemental Booster Pumps on Lower Level** CHECKED BY: **DIU**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	Excavate for New Suction Line	26	CY	$1,000	$25,926
2	Live Tap 12-inch Line (TS&V)	1	LS	$2,000	$2,000
3	12-inch Suction Line	20	LF	$400	$8,000
4	Core thur PS Wall	2	EA	$800	$1,600
5	Saw cut floor	20	LF	$60	$1,200
6	Excavate for discharge Line (Hand)	5	CY	$2,000	$9,481
7	New Booster Booster Pumps	2	EA	$39,000	$78,000
8	Discharge Header 10"	24	LF	$300	$7,200
9	Discharge Pipe fittings 10-inch	6	EA	$1,000	$6,000
10	Lifting Eyes for Motor & Pump	2	EA	$600	$1,200
11	New Genset	0	LS	$150,000	$0
16	New Booster Booster Pump Starters	2	EA	$25,000	$50,000
17	Reprogramming Control Scheme	1	LS	$20,000	$20,000
18	New 726 Gallon Bladder Tank	1	LS	$10,000	$10,000
19					
20	Wayne Hill 8-inch Combination Pressure Sustaining/Reducing Valve	1	EA	$20,000	$20,000
21					
22	Misc Metal	1	%	$3,000	$3,000
23	Misc Mechanical	1	%	$3,000	$3,000
24	Misc Painting	1	%	$3,000	$3,000
25	Electrical Allowance	15	%	$37,000	$37,000
26	**Pump Station Construction Subtotal**				**$287,000**
27	Contingencies	30	%		$87,000
28	Engineering, Legal, and Administrative	20	%		$58,000
	TOTAL PROJECT COST				**$432,000**

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1925 Breton Road SE, Suite 100; Grand Rapids, MI 49506

Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D10: 12-inch on Hannh Avnue from Bates to Garfield**

DATE: **2/15/2021**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 12-inch Water Main (RJ,CL 52, DIP, 5' Cover)	1,900	LF	$80	$152,000
2	Hydrants	2	EA	$5,000	$10,000
3	24-inch Gate Valve and Box (1 every 500 ft)	5	EA	$10,000	$48,000
4	Water Service Connection	35	EA	$5,000	$175,000
5	Connection to Existing Main	6	EA	$10,000	$60,000
6	Pavement Replacement	1,900	LF	$50	$95,000
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$550,000**
10	Contingencies	20	%		$110,000
11	Engineering, Legal, and Administrative	20	%		$110,000
	TOTAL PROJECT COST				**$770,000**

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REPORT: **Traverse City Water Reliability Study Update** DATE: **2/15/2021**

LOCATION: **Traverse City, Michigan** PROJECT NO. **20200232**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL ESTIMATOR: **DIU**

PROJECT: **D11: Downtown, 12-inch Boardman/8th to Boardman/State; Washington/Boardman to Cass/Stat** CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 12-inch Water Main (RJ,CL 52, DIP, 5' Cover)	3,800	LF	$80	$304,000
2	Hydrants	4	EA	$5,000	$20,000
3	24-inch Gate Valve and Box	4	EA	$10,000	$40,000
4	Water Service Connection	18	EA	$5,000	$90,000
5	Connection to Existing Main	4	EA	$10,000	$40,000
6	Pavement Replacement	3,800	LF	$50	$190,000
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$694,000**
10	Contingencies	20	%		$139,000
11	Engineering, Legal, and Administrative	20	%		$139,000
	TOTAL PROJECT COST				**$972,000**

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Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D12: 24-inch on 7th from Wadsworth and Spruce (Phase 6)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 24 inch Water Main (RJ,CL 52, DIP, 5' Cover)	2,525	LF	$200	$505,000
2	Hydrants (1 every 350 ft)	8	EA	$5,000	$41,071
3	24-inch Gate Valve and Box (1 every 500 ft)	6	EA	$10,000	$60,500
4	Water Service Connection	42	EA	$5,000	$210,000
5	Connection to Existing Main	10	EA	$10,000	$100,000
6	Pavement Replacement	2,525	LF	$50	$126,250
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$1,053,000**
10	Contingencies	20	%		$211,000
11	Engineering, Legal, and Administrative	20	%		$211,000
	TOTAL PROJECT COST				**$1,475,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D13: 16-inch on Spruce from 7th to Wayne St. (Phase 7)**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 16-inch Water Main (RJ,CL 52, DIP, 5' Cover)	3,162	LF	$100	$316,200
2	Hydrants (1 every 350 ft)	10	EA	$5,000	$50,171
3	24-inch Gate Valve and Box (1 every 500 ft)	7	EA	$10,000	$73,240
4	Water Service Connection	40	EA	$5,000	$200,000
5	Connection to Existing Main	10	EA	$10,000	$100,000
6	Pavement Replacement	3,162	LF	$50	$158,100
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$908,000**
10	Contingencies	20	%		$182,000
11	Engineering, Legal, and Administrative	20	%		$182,000
	TOTAL PROJECT COST				**$1,272,000**

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REPORT: **Traverse City Water Reliability Study Update**
LOCATION: **Traverse City, Michigan**
BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
PROJECT: **D14: 12-inch on Veterans Drive from Georgetown to 14th Street**

DATE: **2/15/2021**
PROJECT NO. **20200232**
ESTIMATOR: **DIU**
CHECKED BY: **DJB**
CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 12-inch Water Main (RJ,CL 52, DIP, 5' Cover)	2,600	LF	$80	$208,000
2	Hydrants	2	EA	$5,000	$10,000
3	24-inch Gate Valve and Box (1 every 500 ft)	6	EA	$10,000	$62,000
4	Water Service Connection	20	EA	$5,000	$100,000
5	Connection to Existing Main	5	EA	$10,000	$50,000
6	Pavement Replacement	2,600	LF	$50	$130,000
7	Traffic Control	1	LS	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$570,000**
10	Contingencies	20	%		$114,000
11	Engineering, Legal, and Administrative	20	%		$114,000
	TOTAL PROJECT COST				**$798,000**

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REPORT: **Traverse City Water Reliability Study Update**

LOCATION: **Traverse City, Michigan**

BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL

PROJECT: **D15A: Grand Traverse Commons Improvements Option 1 - PRV**

DATE: **9/16/2020**

PROJECT NO. **20200232**

ESTIMATOR: **DIU**

CHECKED BY: **DJB**

CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 10 inch Water Main (RJ,CL 52, DIP, 5' Cover)	2,600	LF	$80	$208,000
2	PRV and Vault	2	LS	$50,000	$100,000
3	Flowmeter (Garfield to City) and Vault	1	LS	$50,000	$50,000
4	Check Valves and Vault	4	EA	$25,000	$100,000
5	Connection to Existing Main	5	EA	$10,000	$50,000
6	Pavement Replacement	2,600	LF	$50	$130,000
7	Traffic Control	1	LF	$10,000	$10,000
8					
9	**Construction Subtotal**			`	**$648,000**
10	Contingencies	20	%		$130,000
11	Engineering, Legal, and Administrative	20	%		$130,000
	TOTAL PROJECT COST				**$908,000**

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Telephone: (616) 454-4286

REPORT: **Traverse City Water Reliability Study Update**
LOCATION: **Traverse City, Michigan**
BASIS FOR ESTIMATE: [X] CONCEPTUAL [ ] PRELIMINARY [ ] FINAL
PROJECT: **D15B: Grand Traverse Commons Improvements Option 2 - Pump Station**

DATE: **9/16/2020**
PROJECT NO. **20200232**
ESTIMATOR: **DIU**
CHECKED BY: **DJB**
CURRENT ENR: **11896**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	New 10 inch Water Main (RJ,CL 52, DIP, 5' Cover)	2,600	LF	$80	$208,000
2	New 12 inch Water Main (RJ,CL 52, DIP, 5' Cover)	500	LF	$100	$50,000
3	Replace Pumps	3	EA	$50,000	$150,000
4	Pump Station Acquisition/Rehabilitation	1	LS	$200,000	$200,000
5	Check Valves and Vaults	4	EA	$25,000	$100,000
6	Connection to Existing Main	5	EA	$10,000	$50,000
7	Pavement Replacement	2,600	LF	$50	$130,000
8	Traffic Control	1	LF	$10,000	$10,000
9					
10	**Construction Subtotal**				**$898,000**
11	Contingencies	20	%		$180,000
12	Engineering, Legal, and Administrative	20	%		$180,000
	TOTAL PROJECT COST				**$1,258,000**

APPENDIX G:
SUPPLEMENTAL REPORTS

ART

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
GRAND RAPIDS DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

October 31, 2019

CITY MANAGER'S OFFICE

NOV 04 2019

RECEIVED

Mr. Martin Colburn, City Manager
City of Traverse City
400 Boardman Avenue
Traverse City, Michigan 49684

WSSN: **06640**

Dear Mr. Colburn:

SUBJECT: Traverse City Water System – Community Water Supply Sanitary Survey

This letter will confirm visits with Mr. Art Krueger, Ms. Jacqueline Johnson, and Mr. Justin Roy on various dates in 2019 from representatives of the Department of Environment, Great Lakes, and Energy (EGLE), and summarize the subsequent review and discussion of the water supply facilities. The purpose of these meetings was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399).

Since the 2016 Sanitary Survey review, several improvements have occurred including but not limited to the following:

- Changed primary coagulant to ferric sulfate to better suit raw water pH range.
- Chemical receiving procedure was overhauled to increase plant safety.
- Developed and submitted an Asset Management Program.
- Increased water plant site security by upgrading fence/gate system.
- Installation of a variable frequency drive on one low service pump (ongoing).
- Constructed a new two million gallon reservoir at Barlow/Lafranier location.
- Rehabilitated the four million gallon reservoir at Barlow/Lafranier location.
- Construction of more than 4,000 feet of 24-inch transmission line.

These improvements were made to address previous findings, improve operations of the water system, and prevent future problems. Proactive planning for the system is to be commended.

It is a finding of this review the rated capacity of the water system will be reduced to 17.8 million gallons per day (MGD). This is based on the capacity of the low service pumps as tested by Kennedy Industries in June of 2014. For supporting data, please reference the attachments to this letter. All other water treatment unit capacities are known to be at 20 MGD at this time. The City may wish to restore the rated capacity of 20 MGD by studying the low service pumping and transmission system. At this time, the demands of the system are not high enough to require the City to increase the rated capacity.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	Recommendations Made
Treatment	**Deficiency Identified**
Distribution System	No Recommendations/Deficiencies
Finished Water Storage	Recommendations Made
Pumps	Recommendations Made
Monitoring & Reporting	Recommendations Made
Management & Operations	Recommendations Made
Operator Compliance	No Recommendations/Deficiencies
Security	Recommendations Made
Financial	No Recommendations/Deficiencies
Other	No Recommendations/Deficiencies

A complete list of deficiencies and recommendations may be found in the enclosed documents. Below is a summary of higher priority findings.

Deficiencies:
Deficiencies indicate non-compliance with one or more Act 399 requirements, which include defects in a water system's infrastructure, design, operation, maintenance, or management that cause, or may cause, interruptions to the "multiple barrier" protection system and adversely affect the system's ability to produce safe and reliable drinking water in adequate quantities.

During the Survey, one deficiency was identified and is listed below:

1. During our inspection, a cross connection was identified in the chlorination system. By connecting the pre-treatment piping to the post-treatment piping without a backflow preventor, there is an increased risk of siphoning untreated water. This common manifold can be corrected by the City operators by physically removing the connection or providing adequate backflow protection.

There are several recommendations that are intended to enhance the operation and maintenance of the water supply. Below are a select few of the recommendations. Please find a complete list in the attached documents.

2. The City must study the controls of the fluoride feed system to ensure there is adequate secondary controls to prevent an overfeed per Section 9.o. of *Michigan's Suggested Practice for Water Works Design, Construction, and Operation for Type 1 Public Water Supplies.*
3. The reservoirs at the water plant and Wayne Hill do not have overflow facilities. As such, when water is overfilled it escapes through non-traditional and uncontrolled methods. At the water plant, this results in backing up through the Huron pump suction well and flooding the water plant basement into the sump, which is then

pumped to the east bay through a stormwater pipe. This increases vulnerability of the water plant since electrical gear for the backwash pump and surface wash pump are located in the basement and at risk of flooding. For the Wayne Hill reservoir, overfilled water escapes through an access hatch and into the storm sewer system, which is not a controlled flow path. The City must conduct an investigation into feasibility of constructing an overflow on these reservoirs to meet present-day design standards, and be prepared to do so (if feasible) when the reservoir is next removed from service.

4. The last reliability study was conducted in 2014, and is now due for a five year update according to Rule 1203 of Act 399. The study must include the required elements from Rule 1203 for the water system.
5. Following the mixing of bulk chemicals incident on January 4, 2019, a revised chemical delivery procedure is now being practiced including verification by two staff. To further ensure safe transfer of bulk chemicals, the City should revise the written forms used for receipt of bulk chemicals to include a written verification of two staff, and incorporate the lessons learned into an updated Emergency Response Plan.
6. For a direct filtration facility, proper coagulation and flocculation is essential to meeting filtration goals and turbidity reduction. Studying the effects of temperature, organics, and turbidity on the addition of coagulant chemical and flocculator mixing speeds will help the City meet treatment goals during a variety of conditions. In particular, jar testing for direct filtration can be a useful tool, particularly when paired with a replicated benchtop filtration step. A good reference for process control of coagulation and flocculation is AWWA's Manual 37 on *Operational Control of Coagulation and Filtration Processes*.
7. The City is currently washing filters about every 50 hours of run time, typically based on an increase in headloss. To optimize the filter runs and reduce costs, the City may wish to conduct a set of studies on various items related to the filters, such as backwash practices and filter media. A good reference for filter evaluations is the American Water Works Association's (AWWA's) *Filter Evaluation Procedures for Granular Media* which contains procedures and sample forms for filter evaluations.
8. Currently, the operators of the water plant rely on previously determined worst-case scenario to ensure they meet disinfection requirements. A much more accurate method is to determine disinfection credit every day, using actual data from that day. This allows a more optimized disinfection that will balance the requirements to limit disinfection byproduct development, while meeting disinfection requirements and also maintaining a detectable residual in the distribution system. The water supply should work to develop a method for determining disinfection credit each day using operational data. This study must be formally conducted in order to change disinfection practices in the plant.
9. One way to track the efficiency of the water system is to track the percent of unaccounted for water (UFW). The previous estimates from the City were very high, yet have been reduced by replacing water meters and verifying accuracy. The tracking of UFW should continually be refined by ensuring accurate meters and also

by estimating known un-metered use such as hydrant flushing. A good target for a well-maintained water system is a UFW below 10 percent.

10. The water supply's treatment plant has been adapted over the years to match the pristine water quality from the East Grand Traverse Bay. While a high quality source water is an important barrier to contamination, incidents may occur which require the City to adapt. As part of an upcoming risk and resiliency assessment, options for alternate raw water supply should be studied. As part of this, the emergency access for the existing intake should be located and verified to be in working condition.

If you have any questions, feel free to contact me at 616-307-0261; sarkipatoe@michigan.gov; or EGLE - Drinking Water and Environmental Health Division, Grand Rapids District Office, 350 Ottawa Avenue NW, Unit 10, Grand Rapids, Michigan 49503.

Sincerely,

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Engineering Unit
Drinking Water and Environmental
Health Division

Enclosure

cc/encl: Mr. Art Kreuger, Director of Utilities, Traverse City
Ms. Jacqueline Johnson, Water Treatment Plant Superintendent, Traverse City
Mr. Justin Roy, Public Works Supervisor, Traverse City
cc: Grand Traverse County Health Department
Ms. Shannon Henderson, EGLE-Engineering Unit

Demand Data - Traverse City Water System

Pumpage Data (Million Gallons)

Year	Max Demand (MGD)	ADMM (MGD)	Ave Day Demand (MGD)	Min Day Demand (MGD)
2009	11.652	8.376	4.81	
2010	11.120	9.261	4.94	
2011	12.290	10.155	4.876	
2012	14.060	11.565	5.995	
2013	12.830	11.060	5.16	
2014	11.670	9.540	5.082	
2015	13.480		5	
2016	13.370			
2017	11.170		5.186	
2018	13.100		5.55	
2019	11.310			
Maximum:	**14.060**	*(could be outlier)*		

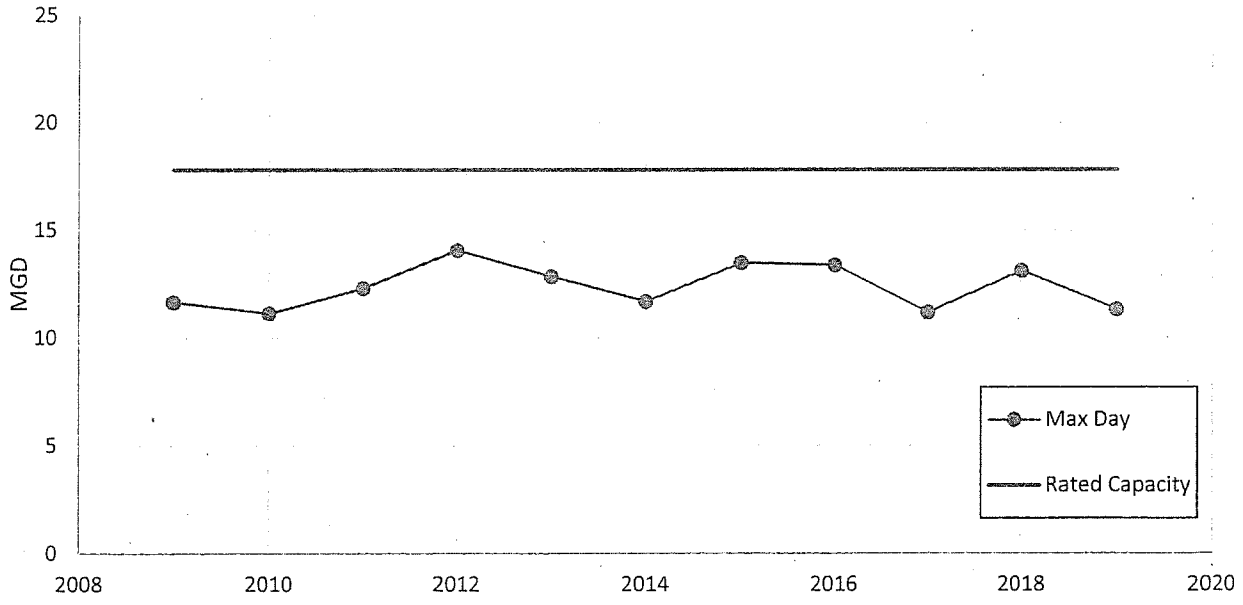
Treatment Plant Unit Process Capacity

The water system capacities are:

Water Intake	20	mgd
Low Service Pumps	17.8	mgd
High Service Pumps	20	mgd
Flocculation	20	mgd
Sedimentation	20	mgd
Filtration	20	mgd
Rated Capacity:	**17.8**	**mgd**

Maximum Day Demand / Rated Capacity: 79.0% Year: 2012

Highest Average Day Demand / Rated Capacity: 55.9%



Comments

High service & Low Service pump ratings are based on firm capacity of actual pump output from Kennedy tests in 2014 (see next page). Still unsure of hydraulic transmission capability to produce 20 mgd from the high service pumps.

2014 Pump Test Data Summary

Data presented here were taken from the August 25, 2014 report from Prein & Newhof regarding a *Low Service Pump and High Service Pump Test Supplement to the Water System Reliability Study* . All flow testing done by Kennedy Industries on 6/5/2014.

Low Service

	Rated Capacity		Current Capacity		Rated Firm	Current Firm
Pump #	Flow	Pressure	Flow	Pressure	**(mgd)**	**(mgd)**
1	3500	62	3580	55		
2	3500	62	3720	55		
3	4900	72	5975	55		
4	5200	62	5062	55	**17.15**	**17.81**

High Service

	Rated Capacity		Current Capacity		Rated Firm	Current Firm
Pump #	Flow	Pressure	Flow	Pressure	**(mgd)**	**(mgd)**
1	2100	180	2210	140		
2	3500	180	3275	142		
3	3500	180	3485	144		
4	4900	180	4855	148		
5	4900	180	5185	152	**20.17**	**19.92075**

TRAVERSE CITY WATER SYSTEM SANITARY SURVEY FINDINGS

Key	
	Red Deficiencies are highest priority, and require a compliance schedule to be approved.
	Orange recommendations (1-10) are higher priority and/or shorter implementation time items
	Yellow recommendations (11-18) are lower priority and/or longer implementation time items

	Deficiencies / Regulatory Mandates:
1	Common Manifold on chlorine system is a cross connection, must be disconnected or protected

	Recommendations:
1	Ensure secondary controls on electrical feed to fluoride feed pump
2	Investigate feasibility of constructing overflows for the WTP/Wayne Hill reservoirs
3	5-year update due for Reliability study in 2019
4	Continue tracking unaccounted water, ensure WTP master meters are calibrated and accurate
5	Submit updated Emergency Response Plan within 6 months
6	Ensure standards and reagants in the lab are replaced before they expire
7	Conduct chlorine contact time calculations daily based on actual treatment parameters
8	Study filters and treatment process to optimize filtered water turbidity and head loss
9	Flooding of basement is at risk, and some electrical switchgear is located in basement
10	Address leakage through floc basin wall, likely need new coating and full rehab due to age
11	Chem transfer pumps are not "dead-man" switches, overflow on day tanks can go to bulk
12	Conduct chemical scale calibration routinely
13	Generator at WTP is capable of running a limited number of pumps
14	Update filter SOP including backwash, reference target turbidity goals
15	Calculate and track detention time in the supply line feeding the CFE turbidimeter
16	Annual pump testing by contractor may increase pump reliability
17	Study the resiliency of raw water intake system, locate emergency access in existing pipe
18	Continue fencing or vehicle barriers to further increase site security
19	Update sample site plans with new contact information

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: Traverse City
County: Grand Traverse
Evaluator: Sarkipato, Henderson

WSSN: 6640
District: 93
Date: 10/31/2019

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source					X		
Construction & Maintenance							
Standby Power							
Isolation							
Source Water Protection							
Capacity	*Study options for redundant intake facilities*				X		
Treatment							
Disinfection	*Cross connection in common manifold for Cl2*					X	
Fluoride	*Investigate secondary control system on fluoride*				X		
Phosphate Addition							
Softening							
Iron/Manganese Removal							
Arsenic Removal							
Pretreatment	*Conduct study of coagulation in variety of conditions*				X		
Filtration (gravity or membranes)	*Create a filter assessment program*				X		
C*T	*Conduct CT calcs in-house daily*				X		
Other	*Address leakage through wall of flocculator*				X		
Distribution System							
Interconnections w/ Other WS							
Hydrants & Valves							
Service Lines & Metering	*Preliminary Materials Inventory due 12/31/2019*				X		
General Plan							
Cross Connections							
Construction & Maintenance							
Capacity							
Finished Water Storage							
Construction & Maintenance	*Investigate construction of overflows for reservoirs*				X		
Controls							
Capacity							
Pumps (All Pumping Facilities)							
Construction & Maintenance	*Annual testing may result in more reliable operation*				X		
Controls							
Capacity	*Low Service pumping firm capacity less than 20 MGD*				X		
Monitoring & Reporting							
Bacteriological Monitoring	*Update sample site plan*				X		
Chemical Monitoring							
MOR or Annual Pumpage Report							
Consumer Confidence Report							
Analytical Capabilities	*Track detention time in CFE line to adjust flow rate*				X		
System Management & Operations							
Owner Responsibility							
Capacity Development							
Reliability Study	*5-year update is due in 2019*				X		
Operations Oversight							
Permits							
Operator Compliance							
Operator Certification							
Technical Knowledge & Training							
Security							
Emergency Response Plan	*Update ERP*				X		
Site Security (Fences, Alarms...)	*Continue fencing/vehicular access restrictions at wtp*				X		
Financial							
Rates							
Budget & Capital Imp. Plan							
Other	*Continue tracking unaccounted water, strive for <10%*				X		

N/A - Not Applicable
Rec - Recommendations Made
NotEv - Not Evaluated
Def - Deficiencies Identified
NoD/R - No Deficiencies/Recommendations Made
SigDef - Significant Deficiencies Identified

Sanitary Survey Summary Sheet Instructions

The summary sheet is set up to capture the major categories that are evaluated during a sanitary survey. EPA's elements are highlighted in blue and will be coded with our findings, which will then be transferred to SDWIS. The green and white rows are items within each element that will be used to clarify the mark for each element.

The categories used to record your findings have been changed to match the options provided in SDWIS. We will no longer be providing a rating (satisfactory, marginal, deficient), but will simply be reflecting our findings. The category labels are explained below.

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

Here is the rule-of-thumb for how to use the different options:

N/A	This item does not apply to the water system.
NotEv	This item applies to the water system, but was not evaluated with this survey
NoD/R	No Deficiencies were identified and no recommendations were made
Rec	Recommendations are made for items that are not directly referenced in the Act & Rules
Def	Deficiencies are issues that are referenced in the Act & Rules, but are not SigDef
SigDef	See the significant deficiency policy for appropriate usage

Staff are still able to use their professional discretion to take recurring or extensive recommendations and call them deficiencies or vice versa if appropriate.

The summary sheet looks like this:

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source						X	
Construction & Maintenance	*No pump to waste provisions*					X	
Standby Power	*Run generator 1/week*				X		
Isolation				X			
Source Water Protection				X			
Capacity				X			

When filling out the form, the items under each element should be marked with your findings. An "X" should be entered into the corresponding cell. Once all of the items are marked, the worst mark (furthest right) from the sub-categories should be transferred to the blue row and become the indicator for that element. This is what will be entered into SDWIS.

The 8 required elements (identified below) MUST receive a mark other than "Not Evaluated". Technically, multiple partial surveys can be entered within a 3 year period. As long as all of the required elements are marked within the 3 year period, EPA will count a full sanitary survey. However, typical practice should be to mark all categories under a single survey.

These 8 elements are required by EPA for a complete sanitary survey:
Source
Treatment
Distribution System
Finished Water Storage
Pumps (All Pumping Facilities)
Monitoring & Reporting
System Management & Operations
Operator Compliance

EPA considers these elements optional:
Security
Financial
Other

Comments should be entered into column D to clarify why that particular mark was made. For example, if the generator is not being tested appropriately, something like "Run generator 1/week" should be written into the comment column and the "Rec" column should be marked with an "X" on the "Standby Power" line.

Sanitary Survey Deficiency Codes for SDWIS

Source

SO	CM	Construction & Maintenance
SO	SP	Standby Power
SO	IS	Isolation
SO	PR	Source Water Protection
SO	CP	Capacity

Treatment

TR	DF	Disinfection
TR	FL	Fluoride
TR	PO	Phosphate Addition
TR	SF	Softening
TR	IR	Iron/Manganese Removal
TR	AS	Arsenic Removal
TR	PT	Pretreatment
TR	FT	Filtration (gravity or membranes)
TR	CT	C*T
TR	OT	Other

Distribution System

DS	IC	Interconnections w/ Other WS
DS	HV	Hydrants & Valves
DS	SM	Service Lines & Metering
DS	GP	General Plan
DS	XC	Cross Connections
DS	CM	Construction & Maintenance
DS	CP	Capacity

Finished Water Storage

FW	CM	Construction & Maintenance
FW	CN	Controls
FW	CP	Capacity

Pumps (All Pumping Facilities)

PU	CM	Construction & Maintenance
PU	CN	Controls
PU	CP	Capacity

Monitoring & Reporting

MR	BT	Bacteriological Monitoring
MR	CH	Chemical Monitoring
MR	OR	MOR or Annual Pumpage Report
MR	CC	Consumer Confidence Report
MR	AN	Analytical Capabilities

System Management & Operations

SM	OW	Owner Responsibility
SM	CD	Capacity Development
SM	RS	Reliability Study
SM	OP	Operations Oversight
SM	PR	Permits

Operator Compliance

OC	OC	Operator Certification
OC	TR	Technical Knowledge & Training

Security

SE	RP	Emergency Response Plan
SE	SS	Site Security (Fences, Alarms...)

Financial

FI	RT	Rates
FI	BG	Budget & Capital Imp. Plan

Other

OT	OT	All Other

MI0006640 TRAVERSE CITY, CITY OF

Alt. State No. (WSSN):	06640	*Activity Status:*	A	*% SW:* 100	*% GW:* 0	*% GWUI:* 0
Local Name (District):	DISTRICT 93	*Activity Date:*	1/1/1800	*% SWP:* 0	*% GWP:* 0	*% GWUIP:* 0
Principle County:	GRAND TRAVERSE	*Op Category:*	F1,S2			
Billable Population:	14532	*Owner Type:*	L			
Service Connections:	7738	*Primary Source:*	SW	*Last Sanitary Survey:*	2/23/2016	

Population History

Type	Pop Count	Begin Date	End Date
R	14532	4/27/2016	
R	14736	1/1/2014	4/26/2016
R	14674	1/1/2010	12/31/2013
R	14532	1/1/2000	12/31/2009

Water System Flow Rates

Flow Rate Type		Quantity	Units
BSLN	Baseline Capacity	27.4	MGD
EMRG	Total Emergency Capacity	19000000	GPD
TLDS	Total Design Capacity	19000000	GPD

Regulating Agency

DISTRICT 93
DISTRICT 9
MDEQ

Points of Contact

PL		2010 Eastern Avenue TRAVERSE CITY, MI 49684
OP	Mr. LAVERN COBLENTZ CITY OF TRAVERSE CITY OPERATOR	400 Bordman Ave P.O. Box 592 TRAVERSE CITY, MI 49684
	BUS 231-922-4920 x FAX 231-922-2097 x	
OW	Mr. MARTIN COLBURN CITY OF TRAVERSE CITY CITY MANAGER	Governmental Center 2nd Floor 400 Boardman Avenue TRAVERSE CITY, MI 49684
	BUS 231-922-4440 x FAX 231-922-4476 x	mcolburn@traversecitymi.gov
DO	JACQUELINE JOHNSON CITY OF TRAVERSE CITY WTP SUPERINTENDENT	,
	BUS 231-922-4920 x	jjohnson@traversecitymi.gov
CC	JACQUELINE JOHNSON CITY OF TRAVERSE CITY WTP SUPERINTENDENT	,
	BUS 231-922-4920 x	jjohnson@traversecitymi.gov
AC	Mr. ARTHUR KRUEGER CITY OF TRAVERSE CITY DIR. OF UTILITIES	400 Boardman Ave. TRAVERSE CITY, MI 49684
	BUS 231-922-4920 x	akrueger@traversecitymi.gov
EC	Mr. ARTHUR KRUEGER CITY OF TRAVERSE CITY DIR. OF UTILITIES	400 Boardman Ave. TRAVERSE CITY, MI 49684
	BUS 231-922-4920 x	akrueger@traversecitymi.gov

DS	Mr. JUSTIN ROY		
	CITY OF TRAVERSE CITY	507 HANNAH AVE	
	DPW SUPERVISOR	TRAVERSE CITY, MI 49686	
	BUS 231-922-4923 x	jroy@traversecitymi.gov	
CC	Mr. JUSTIN ROY		
	CITY OF TRAVERSE CITY	507 HANNAH AVE	
	DPW SUPERVISOR	TRAVERSE CITY, MI 49686	
	BUS 231-922-4923 x	jroy@traversecitymi.gov	
EC	Mr. JUSTIN ROY		
	CITY OF TRAVERSE CITY	507 HANNAH AVE	
	DPW SUPERVISOR	TRAVERSE CITY, MI 49686	
	BUS 231-922-4923 x	jroy@traversecitymi.gov	
FC	Mr. BILL TWIETMEYER	Governmental Center 1st Floor	
	CITY OF TRAVERSE CITY	400 Boardman Avenue	
	CITY TREASURER	TRAVERSE CITY, MI 49684	
	BUS 231-922-4431 x		

AC-Administrative; OW-Owner; DO-Operator in Charge; DS-Distribution Operator; OP-Operator; FC-Financial; PM-Property Manager; EC-Emergency; LE-Lead Engineer; SA-Sampler; LC-Legal; OT-Other; CC-Carbon Copy

Violations and Enforcement Actions - Last 10 Years

Type	Violation Name	Code	Analyte Name	Period End	Period Begin	RTC Date
38	MONITORING, ROUTINE (IESWTR/LT1), MINOR	0100	TURBIDITY	11/1/2017	11/30/2017	11/4/2017
27	MONITORING, ROUTINE (DBP), MAJOR	2456	TOTAL HALOACETIC ACIDS (	1/1/2012	3/31/2012	4/16/2012
27	MONITORING, ROUTINE (DBP), MAJOR	2950	TTHM	1/1/2012	3/31/2012	4/16/2012

MI0006640 TRAVERSE CITY, CITY OF

Storage Facilities

Site Code ST300 Facility Name: WTP GROUND STORAGE Local Name: WATER PLANT STORAGE
Type: GR Material: CC Coating: Status: A Constructed Date: 1/1/1965
Comments: 1.62 MG fully baffled reservoir for C.T.

Indicator Type		Value and/or Date	
ALTV	Altitude Valve Indicator	NO	
COVD	Covered Indicator	YES	
PRES	Pressurized Indicator	YES	
EMER	Emergency Power	YES	
CAPR	Cathodic Protection	NO	
MXSY	Mixing System	NO	
DTIN	Date Last Inspected	YES	1/1/2002
ISVL	Isolation Valve	YES	
DRAI	Drain Present	YES	
MUDV	Mud Valve	NO	
EMPT	Emergency Power Type	PERM	
METR	Metered	YES	
TBPS	Tank Bypass	YES	
TABG	Tank Above Grade	NO	

Measure Type		Quantity / Units	
NLWE	Normal Low Water Elevation/Pressure (pump cut-in)	9	FT

Flow Rate Type		Quantity / Units	
EFTV	Effective Volume	1620000	GAL

Comments / Corrections / Updates

MI0006640 TRAVERSE CITY, CITY OF

Site Code ST301 Facility Name: WAYNE HILL RESERVIOR Local Name: WAYNE HILL RESERVOIR
Type: GR Material: CC Coating: Status: A Constructed Date: 1/1/1958
Comments:

Indicator Type		Value and/or Date	
ALTV	Altitude Valve Indicator	YES	
COVD	Covered Indicator	YES	
PRES	Pressurized Indicator	YES	
EMER	Emergency Power	YES	
CAPR	Cathodic Protection	NO	
MXSY	Mixing System	NO	
DTIN	Date Last Inspected	YES	1/1/2006
DTIN	Date Last Inspected	YES	11/14/2018
DTPT	Date Last Painted (wet interior)	NA	
ISVL	Isolation Valve	YES	
DRAI	Drain Present	YES	
MUDV	Mud Valve	NO	
EMPT	Emergency Power Type	PERM	
METR	Metered	YES	
TBPS	Tank Bypass	YES	
TABG	Tank Above Grade	NO	

Comments / Corrections / Updates

Measure Type		Quantity / Units	
OFEL	Overflow Elevation	14.6	FT

Flow Rate Type		Quantity / Units	
EFTV	Effective Volume	1300000	GAL

MI0006640 TRAVERSE CITY, CITY OF

Site Code ST302 Facility Name: LAFRAINER ROAD RESERVOIR Local Name: BARLOW STORAGE
Type: GR Material: ST Coating: ER Status: A Constructed Date: 1/1/1971
Comments:

Indicator Type		Value and/or Date		Comments / Corrections / Updates
ALTV	Altitude Valve Indicator	NO		
COVD	Covered Indicator	YES		
PRES	Pressurized Indicator	YES		
EMER	Emergency Power	YES		
CAPR	Cathodic Protection	YES		
MXSY	Mixing System	YES		
DTIN	Date Last Inspected	YES	1/1/2002	
DTPT	Date Last Painted (wet interior)	YES	1/1/1972	
ISVL	Isolation Valve	YES		
DRAI	Drain Present	YES		
MUDV	Mud Valve	NA		
TBPS	Tank Bypass	YES		
TABG	Tank Above Grade	YES		

Measure Type		Quantity / Units	
OFEL	Overflow Elevation	39.5	FT

Flow Rate Type		Quantity / Units	
EFTV	Effective Volume	4000000	GAL

Site Code ST303 Facility Name: LAFRAINER 2 MG Local Name: BARLOW 2 MG
Type: RS Material: ST Coating: ER Status: A Constructed Date: 7/1/2019
Comments:

Indicator Type		Value and/or Date		Comments / Corrections / Updates
ALTV	Altitude Valve Indicator	NO		
COVD	Covered Indicator	YES		
CAPR	Cathodic Protection	YES		
MXSY	Mixing System	YES		
DTIN	Date Last Inspected	YES	7/1/2019	
ISVL	Isolation Valve	YES		
DRAI	Drain Present	YES		
TABG	Tank Above Grade	YES		

Measure Type		Quantity / Units	
OFEL	Overflow Elevation	40.5	FT

Flow Rate Type		Quantity / Units	
APCD	Approved Design Capacity	2	MGD
EFTV	Effective Volume	2	MGL

Type: EL=elevated GR=ground HD=hydropneumatic BL=bladder ST=standpipe UN=underground
Material: ST=steel CC=concrete AC=asbestos cement AS=asphalt CP=copper ER=earth FG=fiberglass PL=plastic WD=wood
Coating: AP=approved paint ER=epoxy resin FG=fiberglass GR=greased GS=glass-lined steel PL=plastic UN=unlined

MI0006640 TRAVERSE CITY, CITY OF

Pump Facilities

Site Code PF001 Facility Name: LOW SERVICE PUMP STATION Local Name:
Pump Type: VT Status: A Availability P Constructed: 1/1/1965 Modified:
Comments:
Pump Description

Indicator Type		Value and/or Date
EMER	Emergency Power	YES
EMPT	Emergency Power Type	PERM
METR	Metered	YES

Comments / Corrections / Updates

Flow Rate Type		Quantity / Units	
APCD	Approved Design Capacity	27.4	MGD
FIRM	Firm Capacity	19.4	MGD

Site Code PF002 Facility Name: HIGH SERVICE PUMP STATION Local Name:
Pump Type: VT Status: A Availability P Constructed: 1/1/1965 Modified:
Comments:
Pump Description #1: 125 HP, 3 MGD; #2 and #3: 200 HP, 5.7 MGD; #4: 300 HP, 8 MGD; #5: 300 HP, 8 MGD

Indicator Type		Value and/or Date
EMER	Emergency Power	YES
EMPT	Emergency Power Type	PERM
METR	Metered	YES

Comments / Corrections / Updates

Flow Rate Type		Quantity / Units	
APCD	Approved Design Capacity	28	MGD
FIRM	Firm Capacity	20.5	MGD

Site Code PF003 Facility Name: HURON HILLS PUMP STATION Local Name:
Pump Type: VT Status: A Availability P Constructed: 1/1/1983 Modified:
Comments:
Pump Description #1, 2, 3: 500 GPM

Indicator Type		Value and/or Date
EMER	Emergency Power	YES
BSCA	Basis for Current Capacity	FOTE
EMPT	Emergency Power Type	PERM
METR	Metered	YES

Comments / Corrections / Updates

Flow Rate Type		Quantity / Units	
APCD	Approved Design Capacity	1200	GPM
EMCP	Capacity Under Emergency Power	1200	GPM
FIRM	Firm Capacity	700	GPM

MI0006640 TRAVERSE CITY, CITY OF

Site Code PF004 Facility Name: WAYNE HILL PUMP STATION Local Name:
Pump Type: PD Status: A Availability P Constructed: 1/1/1967 Modified: 1/1/2006
Comments:
Pump Description #1, 2, 3: 500 GPM

Indicator Type		Value and/or Date
EMER	Emergency Power	YES
EMPT	Emergency Power Type	PERM
METR	Metered	YES

Comments / Corrections / Updates

Flow Rate Type		Quantity / Units	
APCD	Approved Design Capacity	1500	GPM
EMCP	Capacity Under Emergency Power	1500	GPM
FIRM	Firm Capacity	1000	GPM

Type: CF=centrifugal JT=jet PD=positive displacement SC=screw SU=submersible VT=vertical turbine

Distribution System

Site Code DIST Facility Name: DISTRIBUTION SYSTEM Status: A
Comments:

Comments / Corrections / Updates

MI0006640 TRAVERSE CITY, CITY OF

Intake Facilities

Site Code IN001 Facility Name: EAST BAY INTAKE Status: A Availability P

Local Name DIA 36 IN; LGT 4220 FT; SUB 30 FT Constructed: 1/1/1965 Modified:

Water Body: LAKE MICHIGAN Latitude: 44.7694 Longitude: -85.5379

Comments:

Comments / Corrections / Updates

Indicator Type		Value and/or Date
EMER	Emergency Power	NO
INEM	Emergency Intake Provisions	YES
INMC	Mussel Control Provisions	YES
INBK	Intake Backflush Provisions	YES

Measure Type		Quantity / Units	
INLW	Low Water Elevation of Source	576	FT
INSB	Submergence at Low Water Elevation	25	FT
INDA	Intake Pipe Diameter	36	IN
INLT	Intake Pipe Length	4220	FT

Flow Rate Type		Quantity / Units	
APCD	Approved Design Capacity	20	MGD

MI0006640 TRAVERSE CITY, CITY OF

Treatment Facilities

Site Code: TP100 Facility Name: DIRECT FILTRATION WATER TREATM Status/Date: A 1/1/1800

Availability: P Constructed Date: 1/1/1965 Lat / Long 44.768681 -85.576249

Local Name:

Comments / Corrections / Updates

Treatment Process and Objective Pairings	
FLUORIDATION	OTHER
HYPOCHLORINATION, PRE	TASTE / ODOR CONTROL
RAPID MIX	PARTICULATE REMOVAL
FLOCCULATION	PARTICULATE REMOVAL
FILTRATION, RAPID SAND	PARTICULATE REMOVAL
COAGULATION	PARTICULATE REMOVAL
HYPOCHLORINATION, PRE	DISINFECTION
HYPOCHLORINATION, POST	DISINFECTION

Indicator Type	Value and/or Date
EMER Emergency Power	YES

Flow Rate Type	Quantity / Units
APCD Approved Design Capacity	20 MGD

This report covers the drinking water quality for the Traverse City Water System for the calendar year 2019. Included are details about where your water comes from, what it contains and how it compares to Environmental Protection Agency (EPA) and state standards.

Your water is surface water and comes from the East arm of Grand Traverse Bay. The State performed an assessment of our source water in 2004. A determination of sensitivity and susceptibility to contamination was made by reviewing our source water geology, intake location, water chemistry, and potential contaminant sources within the source water area. The State has determined that our source water has a moderate geologic sensitivity with a moderate susceptibility to contamination. A copy of this report, *Source Water Assessment Report for the City of Traverse City Water Supply April 2004* may be reviewed on the City of Traverse City website *www.traversecitymi.gov* or by contacting the Traverse City Utility Accounting Office at the Governmental Center located at 400 Boardman Avenue, Traverse City, MI 49684 (231) 922-4431.

Contaminants and their presence in water: Drinking Water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the **EPA's Safe Drinking Water Hotline (800) 426-4791**.

Vulnerability of sub-populations: Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800) 426-4791.

Sources of drinking water: The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. Our water comes from Lake Michigan. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

* **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
* **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
* **Pesticides and herbicides**, which may come from a variety of sources such as agriculture and residential uses.
* **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.
* **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes, petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which provide the same protection for public health.

Information about lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Traverse City Water Plant is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at (800) 426-4791 or *http://www.epa.gov/safewater/lead*.

There are no known lead service lines in the city of Traverse City and two lead goosenecks connected to galvanized service lines.

Water Quality Data

The table below lists all the drinking water contaminants that were detected during the 2019 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing performed January 1, 2019 to December 31, 2019. The State allows monitoring for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. All of the data is representative of the water quality, but some of the data is more than one year old.

Samples collected at the Water Plant

Regulated Contaminant	MCL	MCLG	Level Detected	Range	Year Sampled	Vioation Yes/No	Typical Source of Contaminant
Cyanide (ppm)	0.2	0.2	0.006	N/A	2019	No	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride (ppm)	4	4	0.68	N/A	2019	No	Water additive that promotes strong teeth; erosion
Nitrate (ppm)	10	10	0.19	N/A	2019	No	Erosion of natural deposits
*Special Monitoring and Unregulated Contaminants			Level Detected	Range	Year Sampled	Typical Source of Contaminant	
Chloride (ppm)			15	N/A	2019	Erosion of natural deposits	
Chlorate (ppm)			0.050	0.033 - 0.066	2015	Byproduct of drinking water disinfection	
Chromium-6 (ppb)			0.193	0.018 - 0.27	2015	Erosion of natural deposits	
Molybdenum (ppb)			1.05	1 - 1.1	2015	Erosion of natural deposits	
Sodium (ppm)			7.8	N/A	2019	Erosion of natural deposits	
Strontium (ppb)			98.52	1.09 - 122	2015	Erosion of natural deposits	
Sulfate (ppm)			26	N/A	2019	Erosion of natural deposits	
Vanadium (ppb)			0.49	0.34 - 0.64	2015	Erosion of natural deposits	

* Unregulated contaminants are those for which EPA has not established drinking water standards. Monitoring helps EPA to determine where certain contaminants occur and whether it needs to regulate those contaminants.

Samples collected at the Water Plant

Regulated Substance	MCL/MCLG	Turbidity lowest monthly % of samples meeting limit of 0.3 NTU (minimum 95%)	Range	Sample Frequency	Vioation Yes/No	Typical Source of Contaminant
Turbidity (NTU)	TT	100%	0.6 - 0.18	Daily	No	Soil runoff

Regulated Substance	MCL/MCLG	Sample Frequency	Vioation Yes/No	Typical Source of Contaminant
4-hour CFE Turbidity	TT	Daily - four hour intervals	No	Soil runoff

Samples collected in the Distribution System

Regulated Contaminant	MCL	MCLG	Level Detected	Range	Year Sampled	Vioation Yes/No	Typical Source of Contaminant
TTHM - Total Trihalomethanes (ppb)	80	N/A	25.7	16.8 - 38.5	2019	No	By-products of drinking water disinfection
HAA5 - Haloacetic Acids (ppb)	60	N/A	11.3	8.3 - 14.0	2019	No	By-products of drinking water disinfection
Chlorine (ppm)	4	4	1.14	1.02 - 1.31	2019	No	Water additive used to control microbes

Samples collected at Customer Tap

Regulated Contaminant	Action Level	MCLG	90th Percentile Value	Range of Individual Results	Year Sampled	Number of Samples Above AL	Typical Source of Contaminant
Lead (ppb)	15	0	1	0 - 23	2019	1**	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives
Copper (ppm)	1.3	1.3	0.1	0.0 - 0.3	2019	0	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

**Sample was taken from a faucet that was rarely used.

Terms and abbreviations used in tables:

- **Maximum Contaminant Level Goal (MCLG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **Maximum Contaminant Level (MCL)**: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- **Maximum Residual Disinfectant Level (MRDL)**: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **Maximum Residual Disinfectant Level Goal (MRDLG)**: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- **N/A**: Not Applicable
- **ppb**: parts per billion or micrograms per liter
- **ppm**: parts per million or milligrams per liter
- **Action Level (AL)**: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Combined Filter Effluent (CFE):** Treated water after filtration.
- **Nephelometric Turbidity Units (NTU)**: The measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.
- **Treatment Technique (TT)**: A required process intended to reduce the level of a contaminant in drinking water.

Service Line Material Present in Distribution System

Lead	Galvanized with Previous Lead	Unknown Likely Lead	Unknown Likely Not Lead	Unknown	No Lead or Galvanized Previous Lead	Total
2	806	249	1530	0	4876	7463

Water System Improvements: In 2019, the City completed following improvements to the Water Treatment Plant and Water Distribution System. These improvements help to protect public health, safety and welfare and serve to enhance water reliability. 2019 projects included:

- **Began rehabilitation of the Barlow 4 MG reservoir:** Maintenance and repair of the existing Barlow reservoir began in the fall of 2019. The project included complete interior and exterior coatings removal and replacement, installation of a new 24-inch outlet pipe to connect to the outlet works of the newly constructed adjacent 2 MG reservoir, a new tank mixer, new cathodic protection system and upgraded safety features for a total cost $1.1M. The project will be completed in May 2020.

- **Water system leak detection field analysis**: The west half of the City water mains (59 miles) were completed. Results were good overall with only one substantial leak being found and repaired in the Grand Traverse Commons. Several minor leaks were detected at hydrants and repaired. The City plans to complete the other half of the water mains in the spring 2020.

- **High and low service pump repairs/upgrades:** Provides for the replacement/rewinding of motors and the installation of variable frequency drives (VFDs) on pumps. VFDs allow significant energy savings and versatile operation to meet varying water demands. $171,000 was invested to repair a high service pump and install a VFD and repair a low service pump in 2019 to restore reliability.

- **8th Street Reconstruction Project**: Installed 2,000 feet of 24-inch water transmission main and 825 feet of 16-inch water main on Franklin Street with this major construction project investing $1.34M from the Water fund.

- **Replaced main electrical transformer**: The Water Treatment Plant had the main transformer replaced to increase electrical reliability for $30,000.

We will update the Water Quality Report annually and will keep you informed if there are any issues that occur during the year, as required. Copies of this report are available at the Governmental Center at 400 Boardman Avenue, the Traverse City Water Plant at 2010 Eastern Avenue and the Department of Public Services Building at 625 Woodmere Avenue in Traverse City.

We invite public participation in decisions that affect drinking water quality. City Commission meetings are conducted on the first and third Mondays of each month in the Commission Chambers of the Governmental Center at 400 Boardman Avenue, where public comment is welcome.

For more information about your water, or the contents of this report, contact Jacqueline Johnson, Water Plant Superintendent at (231) 922-4920 or email at *jjohnson@traversecitymi.gov*. For more information about safe drinking water, visit the US Environmental Protection Agency at *www.epa.gov/safewater/.*

EMERGENCY RESPONSE

(CONTINGENCY) PLAN

WATER TREATMENT PLANT

AND

WATER DISTRIBUTION SYSTEM

CITY OF TRAVERSE CITY

400 BOARDMAN AVE

TRAVERSE CITY, MI 49684

REVISED: APRIL 2018