SAINT PAUL REGIONAL WATER SERVICES

WATER SUPPLY PLAN

SAINT PAUL REGIONAL WATER SERVICES

MNDNR

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INTRODUCTION TO WATER SUPPLY PLAN

The Water Supply Plan serves as a tool to aid local water suppliers to implement long term water sustainability and conservation measures as well as to ensure preparedness for critical emergency events. The Water Supply Plan has been drafted to fulfill statutory obligations under Minnesota Statute 473.859.

Additional Benefits for completing the Water Supply Plan are listed below:

- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.
- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.

The Water Supply Plan is composed of four parts.

PART 1:WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

This segment assesses Saint Paul Regional Water Services (SPRWS) water supply and distribution system to ensure current and future demand can be sufficiently met.

PART 2:EMERGENCY RESPONSE PROCEDURES

This segment outlines emergency response procedures and actions needed in in the event of an emergency.

PART 3:WATER CONSERVATION PLAN

This segment reviews strategies and programs focused on managing water demand to ensure a sustainable water supply.

PART 4:METROPOLITAN COUNCIL ITEMS

This segment relates to requirements by Minnesota Statute 473.859 to aid comprehensive plan requirements to communities in the seven county Twin Cities Metropolitan Area.

General Information

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	**756230,756227,776229,756228,756229**
Ownership	Public
Metropolitan Council Area	Ramsey County
Street Address	**1900 Rice St**
City, State, Zip	**Saint Paul MN, 55405**
Contact Person Name	Steve Schneider
Title	General Manager
Phone Number	651-266-6274
MDH Supplier Classification	Municipal

Part 1. Water Supply System and Evaluation

A. Analysis of Water Demand

Saint Paul Regional Water Services (SPRWS) provides retail service to the cities of Saint Paul, Falcon Heights, Lauderdale, Maplewood, Mendota, Mendota Heights and West Saint Paul. SPRWS provides wholesale service to the cities of Little Canada, Roseville and Arden Hills.

Table 2 summarizes the water demand in the past 10 years.

Table 2 - Historic Water Demand

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential (MG)	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	Hydrant Permit Water Delivered (MG)	Water Supplier Services (MG)	Percent Unmetered / Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2005	416,759	95,524	6,533	5,705	114	2,389	14,738	16,139	3.5	174	8.7%	45	94	07/16/2005	51.34	106.09
2006	416,374	95,827	6,552	5,756	163	2,509	15,071	16,681	3.5	179	9.7%	46	92	07/30/2006	51.82	109.76
2007	418,213	95,693	6,766	5,893	168	2,561	15,423	17,656	3.5	190	12.6%	48	93	07/07/2007	53.27	115.66
2008	418,765	95,616	6,395	5,821	184	2,462	14,865	17,045	3.5	184	12.9%	47	87	07/30/2008	50.26	111.55
2009	419,919	96,320	6,319	5,600	175	2,472	14,570	16,422	3.5	177	11.3%	45	86	07/13/2009	49.79	107.14
2010	415,203	96,042	5,702	5,407	116	2,157	13,409	14,769	27	160	9.2%	41	72	08/29/2010	44.84	88.48
2011	417,089	95,568	5,655	5,450	118	2,215	13,456	15,358	18	166	12.4%	42	71	06/08/2011	44.47	88.39
2012	418,035	95,357	6,155	5,509	163	2,373	14,240	16,175	40	175	12.0%	44	77	07/04/2012	48.41	93.3
2013	424,660	95,400	5,741	5,306	124	2,200	13,402	15,841	31	173	15.4%	43	84	08/27/2013	44.31	86.4
2014	432,911	95,431	5,414	5,196	95	2,001	12,642	15,094	30	166	16.2%	41	68	08/27/2014	40.73	80.1
2015	435,473	95,456	5,211	5,202	95	1.991	12,427	14,508	22	166	14.4%	40	63	08/15/2015	39.05	78.18
Avg. 2010 - 2015	423,895	95,549	5,647	5,345	118	2,156	13,262	15,291	28	168	13.3%	42	73	N/A	43.65	85.79

MG – Million Gallons **MGD –** Million Gallons per Day **GPCD** – Gallons per Capita per Day

Notes:

1. "Population Served" is the estimated population served by Utility (Wholesale & Retail).
2. "Total Connections" include fire protection accounts. Wholesale accounts are not included here.
3. "Water used for Non-essential" is water from accounts solely used for lawn sprinkling.
4. "Total Water Delivered" is the water that is billed in the year. It includes the metered water usage, i.e., "residential water delivered", "C/I/I water delivered", "wholesale deliveries", "water discharge from hydrants with permits, SPRWS buildings water usage, and estimated water consumption for firefighting and training, street flushing and sprinkling, and ice rink flooding.
5. "Total Water Pumped" is the water pumped into the distribution system. Process water used for filter backwash, chemical feed, etc. has been excluded.
6. "Unmetered/Unaccounted" is "Total Water Pumped" – "Total Water Delivered".
7. "Average Daily Demand" – "Total Water Pumped" / 365 (366) days. It includes the unaccounted water.
8. "Residential gallons/capita/day = ("Residential Water Delivered" + "Estimated Residential Wholesale Delivery")/"Population Served" / 365 Days. "Estimated Residential Wholesale Delivery" = "Wholesale Deliveries" * "Residential Consumption Rate".
9. "Total gallons / capita / day" = "Total Water Pumped" / "Population Served" / 365 Days.
10. SPRWS customer categories are currently structured based on billing structure. Accounts that are billed monthly are identified as C/I/I, while accounts billed quarterly are identified as residential. Billing structure is primarily based on meter size. Services whose meter size is <1.5" are identified as quarterly, while service whose meter size 1.5" or greater are identified as C/I/I.

Table 3 - Large Volume Users

Table 3 lists top 10 customers as it pertains to water consumption. Wholesale customers have been excluded from the table.

Customer	Customer Category	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures
1. 3M	Industrial	241,901,704	1.96%	UNKNOWN
2. WALDORF CORP	Industrial	172,757,332	1.40%	UNKNOWN
3. UNIVERSITY OF MN	Institutional	118,372,496	.96%	UNKNOWN
4. CITY OF ST. PAUL – PARKS & REC	Institutional	78,436,028	.64%	UNKNOWN
5. REGIONS HOSPITIAL	Institutional	65,303,392	.53%	UNKNOWN
6. METRO COUNCIL	Institutional	59,145,108	.48%	UNKNOWN
7. UNIVERSITY OF ST THOMAS	Institutional	51,335,998	.42%	UNKNOWN
8. UNITED HOSPITAL	Institutional	39,377,712	.32%	UNKNOWN
9. DISTRICT ENERGY	Industrial	37,506,964	.30%	UNKNOWN
10. HEALTH SYSTEMS COOPERATIVE LAUNDRIES	Commercial	35,945,888	.29%	UNKNOWN

B. Treatment and Storage Capacity

Water Treatment Plant

Water Treatment Plant Capacity

Figure B-1 shows the layout of the McCarrons Water Treatment Plant. Since the water treatment plant was built in 1920-1922, it has been enlarged and modernized at frequent intervals to provide up-to-date treatment techniques that ensure high quality drinking water. The phases involved in the treatment process are described below.

Raw Water

The raw water is first treated in the supply lakes through oxygenation and the addition of ferric chloride to reduce algae growth. From the lakes, the water is conveyed by two 90-inch conduits to the treatment plant, where it is metered for flow rate. This measurement, combined with the chemical, bacteriological, and physical characteristics, is used to determine the optimal way to treat the water.

Mixing Basins

Raw water entering the plant has an average content of natural mineral "hardness compounds" of 170 milligrams per liter (or, about 10 grains per gallon). As the water enters two rapid mixer chambers, chemicals are added: lime to soften the water and aluminum sulfate as a primary coagulant. Chemical reactions begin to change certain type of the hardness compounds from soluble to insoluble precipitates called "floc." Floc absorbs color and entangles bacteria and other suspended matter. As the floc settles, the hardness is reduced, resulting in a finished water hardness of approximately 64 to 85 milligrams per liter (or, 4 to 5 grains per gallon).

Flocculators

From the mixing chambers, the water passes through three basins called flocculators. Large, motor-driven paddles rotate slowly, causing the floc to come into contact with all suspended matter. The long, narrow basins ensure that the softening and coagulation agents have sufficient time to complete the chemical reaction and prevent the floc from settling. Ferric chloride is added as a flocculant aid.

Clarifiers

Water from the flocculators enters into one of five clarifiers. These large basins are designed to reduce the velocity of the water, allowing the floc to settle rapidly to the bottom and the water to go on for further treatment. The settled floc is called spent lime and is scraped into a pit. Eventually, the spent lime flows to the dewatering facilities.

Recarbonation Chamber

As the water flows through, it enters the recarbonation chamber. Carbon dioxide gas is added to lower the pH and reduce the caustic alkalinity caused by softening. At the front of this basin, fluoride is added for dental health.

Secondary Settling Basins

Water flows through the secondary settling basins very slowly to further clarify the water before it is ready for filtration.

Filters

Twenty-four biologically active filter units are available, with a combined capacity of filtering 120 million gallons of water a day. The filters use 36 inches of granular activated carbon on top of 4 inches of sand. During filtration, the settled water is conveyed by flumes to the top of the filters, where it passes down through the media. The filtered water is collected in the clearwells under the filters via underdrain system and piped to the finished water reservoir. The filters trap remaining particles from the water, and also absorb taste and odor causing compounds. This absorption results from the action of both the granular activated carbon and the bacteria that grows on the carbon.

Finished Water Reservoir

Water in the finished water reservoir is treated with chlorine to kill harmful bacteria in the water. After a short residence time, ammonia is added to the water. The ammonia combines with the chlorine to form chloramines, which serves as the stable disinfectant in the distribution system. Finally, caustic soda is added to the water to bring it to the desired finish pH. After a short time in the reservoir, the water is ready to be pumped to the distribution system.

Dewatering Facilities

Filter presses capture 100 percent of the spent lime solids. This treatment residual is classified as an agricultural liming material. It is transported from the plant and used for soil treatment in a wide geographic area. In 2015, the treatment plant produced approximately 18,897 tons of dry solid cake from the spent lime.

Laboratory Control

The water from the Mississippi River and the lake systems, as well as the raw water entering the plant, is continuously subjected to bacteriological, biological, physical, and chemical analyses by professional laboratory staff. These analyses help determine the treatment required for softening and disinfection. They also help determine if SPRWS' lake management strategies are effectively controlling algae, and they disclose any factors that may lead to deterioration of water quality, so that preventative measures may be taken.

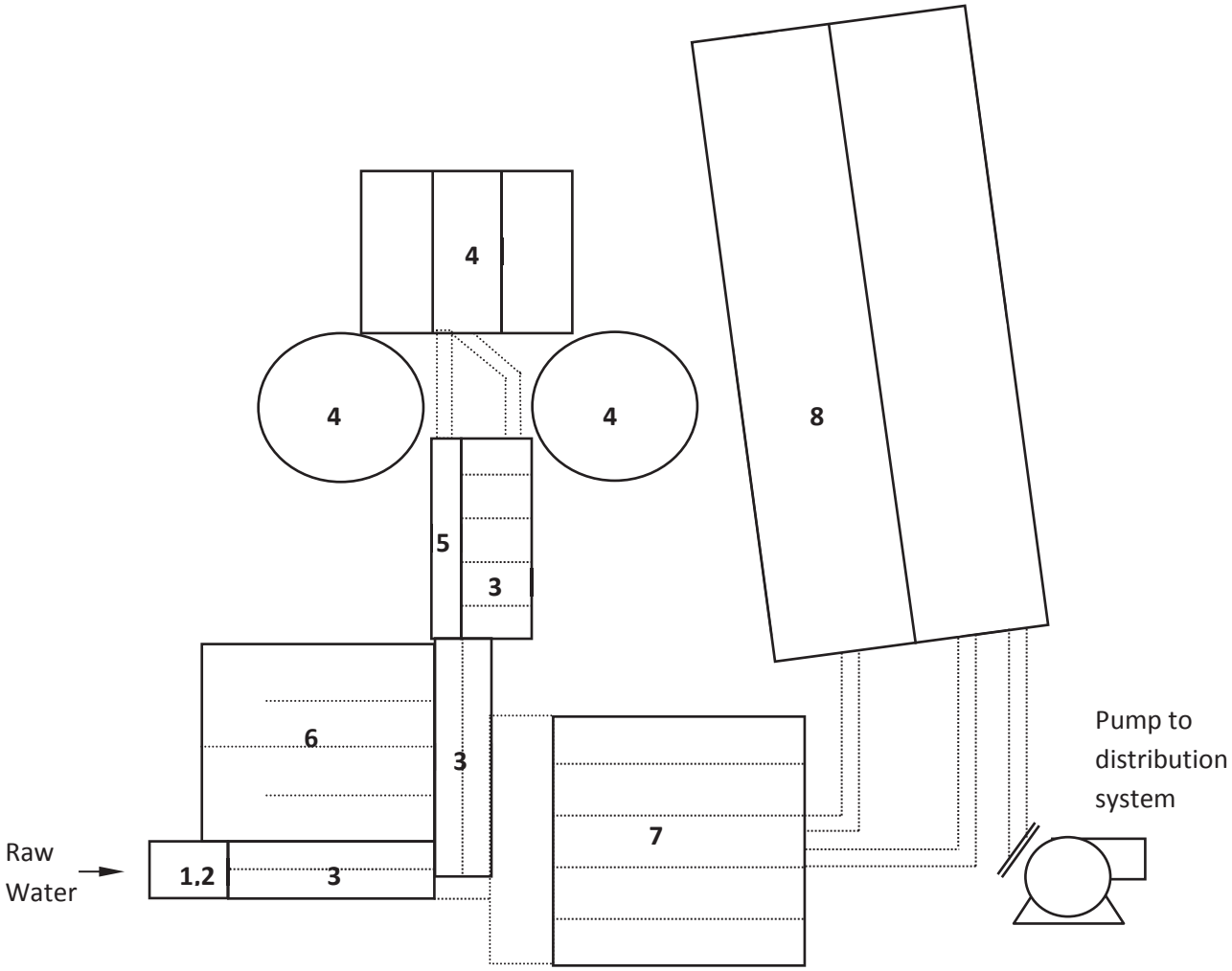
Before the finished water leaves the plant, on-line analyzers ensure compliance with the federal Surface Water Treatment Rule. The water in the distribution system is routinely examined for temperature, pH, chlorine residual and bacteriological content in accordance with standards set by the U.S. Environmental Protection Agency (USEPA) and the Minnesota Department of Health (MDH).

In addition to these analyses, SPRWS convenes a "Taste and Odor Panel" which meets on a weekly basis. The panel of SPRWS employees uses samples of both raw water and distributed water for detection of unwanted tastes and odors. The process can give SPRWS' laboratory advance warning of any problems in the water system.

Table 4 - Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
McCarrons Water Treatment Plant	1920-1922	120,000,000	Lime Softening, Recarbonation, Granular Activated Carbon, Sand Filtration & Chlorine	Lime Softening Surface Water Treatment	18,897 Tons of Dry Spent Lime	Distributed to Agricultural Service Company	No
Total		120,000,000					

Figure.B-1. SPRWS McCarrons Water Treatment Plant Layout



1. Lime Room
2. Mixing Basins
3. Flocculators
4. Clarifiers
5. Recarbonation Chamber
6. Secondary Settling Basins
7. Filters
8. Finished Water Reservoir

Water Storage Facilities

SPRWS current storage and treatment capacity exceeds the current average water demand as well as the projected average water demands for the next 30 years. As indicated in Table 2, water demand has been decreasing for the past decade. Due to decreasing demand, SPRWS has recently decommissioned several storage facilities due to excess storage capacity.

Table 5 - Storage Capacity

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
Highland Tank #2	Elevated Storage	1959	WELDED STEEL	1,000,000
Highland Tank #3	Elevated Storage	1989	WELDED STEEL	1,500,000
St. Anthony Tank	Elevated Storage	2001	WELDED STEEL	750,000
Fairground Tank	Elevated Storage	1986	WELDED STEEL	1,500,000
Cope Ave. Tank	Elevated Storage	1987	WELDED STEEL	1,500,000
Cottage Ave. Standpipe	Elevated Storage	1949	WELDED STEEL	2,000,000
Ferndale Tank	Elevated Storage	1987	WELDED STEEL	1,000,000
Sterling Tank	Elevated Storage	1988	WELDED STEEL	500,000
McKnight Ave. Standpipe	Elevated Storage	1955	WELDED STEEL	2,300,000
Stillwater Ave. Standpipe	Elevated Storage	1958	WELDED STEEL	1,500,000
West St. Paul Tank	Elevated Storage	1968	WELDED STEEL	500,000
Mendota Heights Tank	Elevated Storage	1979	WELDED STEEL	2,000,000
Sub-Total				**16,050,000**
Dale St. Reservoir	Ground Storage	2012	CONCRETE	10,000,000
Snelling Ave. Reservoir #2	Ground Storage	1959	CONCRETE	10,000,000
Hillcrest Reservoir	Ground Storage	1955	CONCRETE	10,000,000
Westside Reservoir	Ground Storage	1963	CONCRETE	6,000,000
Low Service Reservoir	Ground Storage	1922	CONCRETE	16,000,000
Sub-Total				**52,000,000**
Total Storage Capacity				**68,050,000**

C. Water Sources

Saint Paul Regional Water Services has two principal sources of supply and three reserve/emergency sources.

Principal/Emergency:

1. Mississippi River
2. Watershed of Vadnais Lake (28 Sq. Miles)

Reserve/Emergency Sources:

1. Wells B-K
2. Rice Creek Chain of Lakes
3. Otter & Bald Eagle Lakes

See Appendix 1 for copies of well records and maintenance summaries for SPRWS wells.

Table 6.1 - Water Sources and Status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Surface Water	Pleasant Lake	756227	N/A	See 1.C.1.1	N/A	Active	N/A - Gravity Fed
Surface Water	Deep Lake	756227	N/A	See 1.C.1.1	N/A	Emergency Only	N/A - Gravity Fed
Surface Water	Sucker Lake	756227	N/A	See 1.C.1.1	N/A	Active	N/A - Gravity Fed
Surface Water	Charles Lake	756227	N/A	See 1.C.1.1	N/A	Active	N/A - Gravity Fed
Surface Water	Vadnais Lake	756227	N/A	See 1.C.1.1	N/A	Active	N/A - Gravity Fed
Surface Water	Peltier Lake	756228	N/A	See 1.C.1.1	N/A	Emergency Only	NO
Surface Water	Centerville Lake	756228	N/A	See 1.C.1.1	N/A	Emergency Only	NO
Surface Water	Bald Eagle & Otter Lakes	756229	N/A	See 1.C.1.1	N/A	Inactive	N/A - Gravity Fed
Surface Water	Mississippi River	756230	N/A	See 1.C.1.1	N/A	Active	NO
Groundwater	Well B	133312	1977	2350	438	Active	NO
Groundwater	Well C	127292	1977	4000	442	Active	NO
Groundwater	Well D	151583	1981	4100	450	Active	NO
Groundwater	Well E	151579	1983	3600	463	Active	NO
Groundwater	Well F	706803	2005	3300	465	Active	NO
Groundwater	Well G	706802	2005	1850	465	Active	NO
Groundwater	Well H	753666	2012	3425	464	Active	NO
Groundwater	Well I	753667	2012	3225	465	Active	NO
Groundwater	Well J	759568	2012	3425	465	Active	NO
Groundwater	Well K	759569	2012	3425	425	Active	NO
Interconnections	South Saint Paul					Emergency Only	NO
Interconnections	Inner Grove Heights					Emergency Only	NO
Interconnections	Woodbury					Emergency Only	NO

Saint Paul Water Sources

The City of St. Paul obtains the majority of its public water supply from the Mississippi River. Water is pumped from a pumping station on the Mississippi River in Fridley to a chain of four reservoir lakes. The Mississippi River pumping station has a total capacity of 85 million gallons per day. From the river, water is pumped to Charlie Lake in North Oaks; water then flows by canal to Pleasant Lake, then on to Sucker Lake by conduit, and finally to Vadnais Lake by canal. Lambert Creek, in the Vadnais Lake watershed area, also contributes a significant amount of water supply to Vadnais Lake. Water is withdrawn from the final reservoir lake, Vadnais Lake, which supplies raw water to the treatment plant.

The Vadnais Lake Reservoir system has a water surface area of 1600 acres and contains a total volume of approximately 8 billion gallons. In addition, when the lakes are at optimum elevations, a supply of 3.6 billion gallons is available. Saint Paul Regional Water Services reservoir system has approximately 1 month storage volume based on average daily demand.

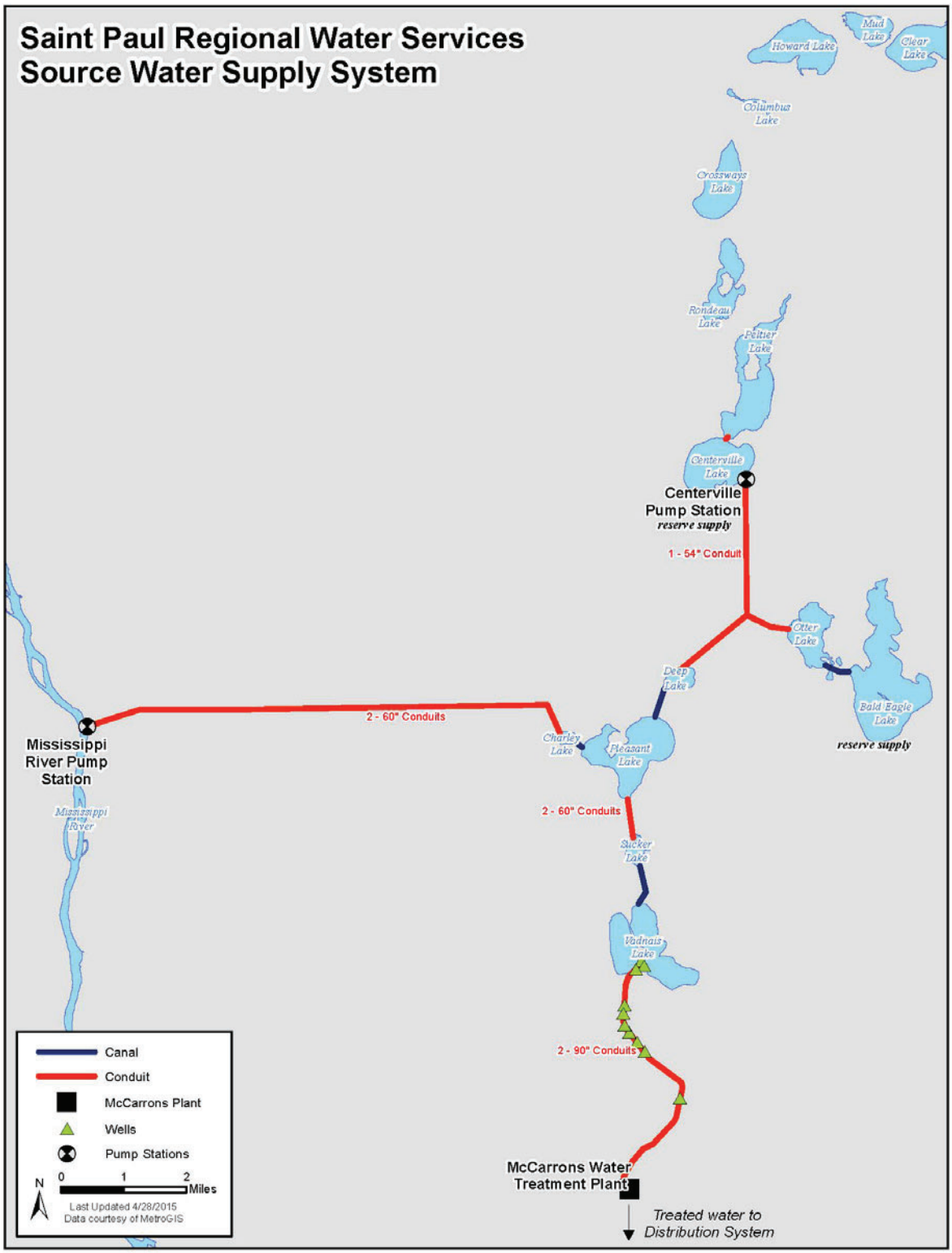
The Rice Creek chain of lakes, located approximately 18 miles north of St. Paul, includes Centerville and Peltier Lakes, as well as Rice Creek with its upstream tributary streams and lakes. This system has a watershed area of 201 square miles. These lakes have a reservoir storage area in excess of 800 acres and an available water supply of 2.3 billion gallons. As a backup source, water from the Rice Creek chain may be pumped to Deep Lake in the reservoir system by the Centerville Pumping Station, which has a pumping capacity of capacity of 40 million gallons per day. Historically the Rice Creek chain has had poor water quality with high levels of algae and nutrients. During drought, the water supply is inadequate. In addition, the 42-inch raw water conduit is in poor condition. In its current state, the Rice Creek chain is no longer considered a viable source & continues to service as only an emergency backup water source.

Refer to Table 6.2 for contributions of different sources to total water supply in the years of 2005 through 2015.

Table 6.2 - Contributions of Different Water Sources (MGD)

	Mississippi River	Vadnais Lake Watershed	Deep Wells	Rice Creek Watershed	Otter & Bald Eagle Lakes	Total
2005	11,791	3,501	1,520	0	0	16,811
2006	12,255	2,603	2,375	0	0	17,233
2007	13,788	3,097	1,411	0	0	18,296
2008	13,690	2,442	1,560	0	0	17,693
2009	14,691	1,869	461	0	0	17,021
2010	11,986	2,577	1,235	0	0	15,798
2011	11,913	3,702	303	0	0	15,918
2012	12,983	2,254	1,372	0	0	16,608
2013	11,573	3,563	725	0	0	15,861
2014	8,122	5,093	2,339	0	0	15,554
2015	10,793	3,995	0	0	0	14,787

Figure I.C-2. SPRWS Water Supply System



D. Future Demand Projections

Water Use Trends

Overall the trend in per capita demand over the past 10 years is decreasing despite population growth in communities SPRWS serves. This trend hold true for average daily demand as well as maximum daily demand. The decrease in demand is likely due to variety of factors such as climate, changes in population demographics, as well as increased conservation measures. This recent trend contradicts water supply demand projections outlined in the Twin Cities Metropolitan Area Master Water Supply Plan (2015). Accurate projected population and demand figures are often difficult to determine based on the ever evolving variables that determine these figures. Therefore, Table 7 was prepared based on projections specified in the Twin Cities Metropolitan Area Master Water Supply Plan (2015).

Table 7. Projected annual water demand

Year	Projected Total Population (Saint Paul)	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2016	303,282	436,556	82	41	80
2017	306,211	437,639	87	43	82
2018	309,141	438,721	92	44	84
2019	312,070	439,804	96	45	86
2020	315,000	440,887	101	47	88
2021	316,420	453,145	101	47	89
2022	317,840	455,280	101	48	90
2023	319,260	457,415	102	48	91
2024	320,680	459,550	102	48	92
2025	322,100	461,685	102	49	93
2030	329,200	466,560	103	49	93
2040	344,100	494,430	103	51	98

GPCD – Gallons per Capita per Day **MGD** – Million Gallons per Day

E. Resource Sustainability

Monitoring

Management plans such as monitoring water levels, pumping rates, surface water flows and aquifer testing are important strategies SPRWS has established to ensure a sustainable water supply. Daily water level readings have been taken for Pleasant Lake and Vadnais Lake, which are SPRWS's primary source water reservoirs. In addition, since 2006 SPRWS has also been measuring and recording levels for the production wells on a routine basis. See Appendix II for SPRWS Well Monitoring Program.

Table 8. Information about source water quality monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
133312	Production Well	Routine water utility readings & water quality sampling*	Bi-weekly	Gauge Tape & Grab Sampling
127292	Production Well	Routine water utility readings & water quality sampling*	Bi-weekly	Gauge Tape & Grab Sampling
151583	Production Well	Routine water utility readings & water quality sampling*	Bi-weekly	Gauge Tape & Grab Sampling
151579	Production Well	Routine water utility readings & water quality sampling*	Bi-weekly	Gauge Tape & Grab Sampling
706803	Production Well	Routine water utility readings & water quality sampling*	Continuous & Bi-weekly	SCADA & Grab Sampling
706802	Production Well	Routine water utility readings & water quality sampling*	Continuous & Bi-weekly	SCADA & Grab Sampling
753666	Production Well	Routine water utility readings & water quality sampling*	Continuous & Bi-weekly	SCADA & Grab Sampling
753667	Production Well	Routine water utility readings & water quality sampling*	Continuous & Bi-weekly	SCADA & Grab Sampling
759568	Production Well	Routine water utility readings & water quality sampling*	Continuous & Bi-weekly	SCADA & Grab Sampling
759569	Production Well	Routine water utility readings & water quality sampling*	Continuous & Bi-weekly	SCADA & Grab Sampling
756227 Pleasant Lake	Source Water Reservoir	Routine water utility readings & water quality sampling	Daily/Monthly	Gauge Tape & Grab Sampling
756227 Vadnais Lake	Source Water Reservoir	Routine water utility readings & water quality sampling	Daily/Bi-weekly	Gauge Tape & Grab Sampling

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
756230	Source Water Intake	Routine water utility readings & water quality sampling	Bi-weekly	Grab sampling

***** Water quality sampling is conducted when wells are active.

Water Level Data

SPRWS reservoirs are managed for routine augmentation from the Mississippi River. SPRWS attempts to maintain normal operating levels to ensure water supply is adequate for emergency scenarios such as a drought. When climatologic condition indicates a possible drought condition developing, these reservoirs lakes are maintained at their normal operating levels for a long as possible into the summer period. The historical high and low water elevations in Pleasant Lake and Vadnais Lake are shown in Table 9.1 demonstrating the lakes have been managed to maintain stable water elevations.

Table 9.1. Pleasant Lake & Vadnais Lake Historical Data

Pleasant Lake Level			**Vadnais Lake Level**		
	High Lake Level	Low Lake Level		High Lake Level	Low Lake Level
Year	M.S.L.	M.S.L.	Year	M.S.L.	M.S.L.
2006	894.03	891.94	2006	883.94	882.79
2007	894.21	890.89	2007	883.51	881.99
2008	894.14	891.25	2008	883.92	880.63
2009	893.17	890.91	2009	883.99	881.65
2010	894.16	891.07	2010	883.85	882.01
2011	894.14	891.47	2011	884.24	881.49
2012	894.24	891.66	2012	883.96	881.80
2013	893.97	891.40	2013	885.05	882.03
2014	894.57	891.66	2014	884.43	879.69
2015	894.19	891.35	2015	884.15	880.59

SPRWS also maintains ten wells as a supplemental water source, in the event that surface water from the Mississippi River and/or Lake Vadnais was to become temporary unavailable. Variation in water level, also known as "drawdown" occurs when wells are actively being pumped, but does return to the "static" water level after termination of pumping. See Appendix III for water level graphs for SPRWS wells B-K.

Table 9.2. Well Level Data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
133312 – Well B	PDC-Jordan	2015 – 3.3' 2014 –111.5' 2013 – 17.5'	Stable	See Appendix 3
127292 – Well C	PDC-Jordan	2015 – 3.62' 2014 – 60.2' 2013 – 17.3'	Stable	See Appendix 3
151583 – Well D	PDC-Jordan	2015 – 3.4' 2014 – 71.8' 2013 – 69.1'	Stable	See Appendix 3
151579 – Well E	PDC-Jordan	2015 – 3.3' 2014 – 14.5' 2013 – 75.8'	Stable	See Appendix 3
706803 – Well F	PDC-Jordan	2015 – 1.8' 2014 – 18.3' 2013 – 15.5'	Stable	See Appendix 3
706802 – Well G	PDC-Jordan	2015 – 17.5' 2014 – 14.5' 2013 – 15.5'	Stable	See Appendix 3
753666 – Well H	PDC-Jordan	2015 – .5' 2014 – 79.9' 2013 – No Data	Stable	See Appendix 3
753667 – Well I	PDC-Jordan	2015 – 3.4' 2014 – 86.4' 2013 – No Data	Stable	See Appendix 3
759568 – Well J	PDC-Jordan	2015 – 2.6' 2014 – 96.9' 2013 – No Data	Stable	See Appendix 3
759569 – Well K	PDC-Jordan	2015 – .7' 2014 – 16.8' 2013 – No Data	Stable	See Appendix 3

Potential Water Supply Issues & Natural Resource Impacts

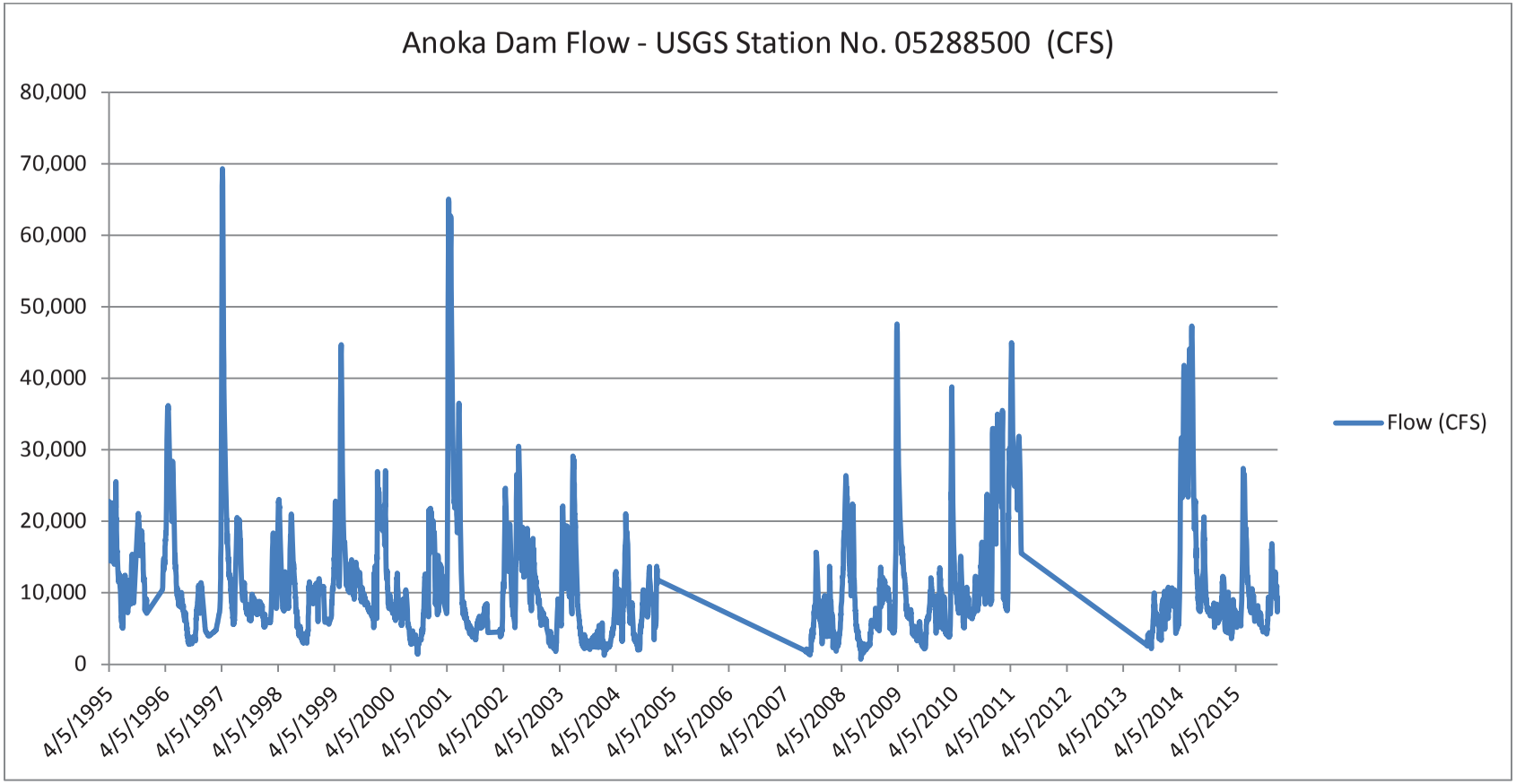
SPRWS recognizes the importance and challenges of achieving a sustainable water supply for the Twin Cities Metropolitan Area. In 2016, SPRWS reduced permitted groundwater appropriation withdrawals from 16.8 billion gallons to 2.5 billion gallons. This action, in conjunction with actions described in the conservation segment of this plan, demonstrates SPRWS efforts to address issues that exist within the North and East Metro Groundwater Management Area. Table 10 summarizes SPRWS resource types and the associated risks to natural resources.

Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
River	Mississippi River	Flow/water level decline	Monitoring	*Resource Protection Thresholds are identified as outlined in the Minnesota Statewide Drought Plan*	Change to groundwater pumping & Increase conservation	*SPRWS raw water withdrawals from the Mississippi River are a minute amount compared to the total flow volume at the Fridley Intake/Pumping Station. See Figure 10.1. Thresholds where withdrawals from the Mississippi River may be restricted to protect high priority water consumers such as energy & water suppliers are outlined in the Minnesota Statewide Drought Plan.* *DNR is responsible for monitoring & communicating drought conditions. SPRWS will implement conservation measures as required by Minnesota Statewide Drought Plan. See Emergency Demand Reduction Conditions, Triggers and Actions in Part II of the plan.*
Calcareous fen	Gun Club Lake Fen	Natural resource impacts	Other	*See "How Changes to Thresholds are Monitored"*	N/A	*SPRWS well activity and the impacts to Gun Club Lake Fen are not an issue at this time. The Mississippi River mitigates the impacts of SPRWS well activity to the Calcareous Fen.*
Lake	Vadnais Lake Reservoir System	Flow/water level decline & degrading water quality	Monitoring	*See "How Changes to Thresholds are Monitored"*	Other	*The Vadnais Lake Reservoir system is managed for routine augmentation from the Mississippi River. The reservoirs levels are maintained at a fixed level to ensure storage volumes are adequate in case of emergency situations. The Mississippi River shall continue to be optimized as the source of augmentation unless restricted as noted in the Minnesota Statewide Drought Plan. Daily water level readings have been taken for Pleasant Lake and Vadnais lake which are SPRWS primary source reservoirs. In addition, SPRWS monitors*

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
						water quality by sampling. At this time, there are no known natural resource impacts to the Vadnais Lake Reservoir System by water withdrawals from SPRWS.
Watershed	Lambert Creek	Degrading water quality trends	Monitoring	*See "How Changes to Thresholds are Monitored"*	Other	*Numerous studies and water quality data collected by SPRWS and Vadnais Lake Area Water Management Organization (VLAWMO) have identified Total Phosphorus (TP) as a major risk to the Lambert Creek Watershed. To address this issue, VLAWMO has invested in numerous retrofit projects such as adding storage and/or improving water quality by excavating pond bottoms, modifying risers, raising embankments, and/or modifying flow routing and using bio-filtration techniques to decrease TP.*
Aquifer	Prairie du Chien	Water level decline	Monitoring & Aquifer testing	*See Well Monitoring Program*	*See Well Monitoring Program*	*SPRWS monitors water level data for Wells B-K to ensure wells are at adequate levels. In the summer of 2014, SPRWS performed a pumping test to determine well drawdown interference when all ten SPRWS wells operate simultaneously. The SPRWS wells were operated for a period of two weeks providing 45MG/D of water supply. Based on the observations from the aquifer pumping test, none of the wells appeared to be in immediate danger of exceeding the available drawdown limits. Therefore in the event that surface water from the Mississippi River and/or Lake Vadnais was to become temporarily unavailable, the well field would serve as a viable emergency water supply.*
Native Plant Communities & Rare Species	Marshes, Forested Rich Peatland & Rare Species Associated with Groundwater	Natural resource impact	Other	*See "How Changes to Thresholds are Monitored"*	Other	*SPRWS is aware of native plant communities and rare species that are associated with groundwater with in the North & East Metro Groundwater Management Area. Due to this resource being managed/monitored by the DNR, SPRWS will rely on monitoring and communication from the DNR to protect these designated vulnerable populations. At this time, there is no known impact on these vulnerable populations based on SPRWS activities.*

Figure 10.1. – Mississippi River Flow



SPRWS observed an average daily demand of 40 MGD from 2010- 2015, which is equivalent to 62 CFS. Average flow (CFS) for the Mississippi River at USGS Station No. 05288500 from 1995-2015 was 11,045 CFS. Based on these averages, SPRWS average annual intake is approximately 0.5% of the total average flow available from the Mississippi River.

Wellhead Protection (WHP) and Source Water Protection (SWP) Plans

Table 11. Status of Wellhead Protection and Source Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	Completed, in the process of updating.	03/11/2008	12/2017
SWP	Completed, in the process of updating.	02/01/2008	TBD

WHP – Wellhead Protection Plan **SWP –** Source Water Protection Plan

F. Capital Improvement Plan (CIP)

Adequacy of Water Supply System

SPRWS, like many Midwest water utilities, is addressing aging infrastructure and declining water use. In 2014, The Board of Water Commissioners established a strategic goal of improving the asset management capability in order to identify major capital improvements that will be needed over the next 40 years. A copy of the SPRWS Capital Improvement Plan (CIP) can be found in Appendix 4. Table 12 illustrates the current status of the water supply system, and a synopsis of upcoming capital projects.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Mississippi River Intake Station	Repair	2017	Repairs to the foundation of the Mississippi River Intake Station
Raw Water Conduits	Repair	2015-2028	Assessments & Repairs to the Raw Water Conduits
Wells	No planned action		
Water Storage Facilities	Demolition	2017	Removal of Highland Reservoir
Water Treatment Facilities • Softening Basins • Recarbonation Basins • New Ozone System	Repair/Replacement Expansion/Addition	2018-2021	New lime softening basins, recarbonation basins & ozone system.
Distribution Systems	Repair/Replacement	Ongoing	
Pressure Zones	No planned action		

Proposed Future Water Sources

SPRWS past investments in securing a diverse water supply has positioned itself well to provide and maintain a viable water supply to the City of Saint Paul and the neighboring communities it serves. At this time, SPRWS does not anticipate requiring an alternative water source by the year 2040.

2.0 Emergency Preparedness Procedures

An Emergency Preparedness and Response (ERP) plan was prepared by CTE Engineers, Inc. for SPRWS in July 2003 to meet requirements specified by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The ERP is a critical asset to guide water utility response, recover and remediation actions required by man-made emergencies, technological failures or natural disasters.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? ■ Yes ☐ No

If yes, what was the date it was certified? July 28th, 2003

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	STEVE SCHNEIDER	651-266-6280	STEVE.SCHNEIDER@CI.STPAUL.MN.US
Alternate Emergency Response Lead	JIM GRAUPMANN	651-266-1650	JIM.GRAUPMANN@CI.STPAUL.MN.US

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? ■ Yes ☐ No

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280. Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Response Contacts

SPRWS Emergency Response Contacts are provided in Appendix 5. This document contains SPRWS key emergency response contacts, as well as appropriate local, state and federal emergency contacts. The Emergency Response Contact document is updated annually to ensure accuracy due to staff or responsibility changes.

Current Water Sources and Service Area

SPRWS maintains a geographic information system (GIS) database that illustrates water facilities in municipalities served by SPRWS. GIS maps are available as a web application that can be accessed at the office as well as in the field by mobile device. The GIS maps illustrate SPRWS facilities such as water treatment facilities, distribution/supply water mains and water storage facilities. In addition, record drawings such as as-builts and inspection documents are linked to GIS in order aid SPRWS staff in planned or emergency work. The GIS database

is regularly copied to backup servers to ensure redundancy. These records can be accessed in an online or offline environment at any day or time.

Do records and maps exist? ■ Yes ☐ No

Can staff access records and maps from a central secured location in the event of an emergency?
■ Yes ☐ No

Does the appropriate staff know where the materials are located?
■ Yes ☐ No

Procedure for Augmenting Water Supplies

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use
SOUTH ST. PAUL	UNKNOWN	SEE 16.1
WOODBURY	UNKNOWN	SEE 16.1
INVER GROVE HEIGHTS	UNKNOWN	SEE 16.1
MINNEAPOLIS	UNKNOWN	SEE 16.1

GPM – Gallons per minute MGD – million gallons per day

16.1 Limits on Emergency Interconnections

Augmentation to Systems NOT on SPRWS System

SPRWS has permitted emergency interconnections from its system to the South Saint Paul system at the intersection of Annapolis and Stickney Streets, to the Woodbury system at the intersection of Brookview Drive and Century Avenue, and to the Inver Grove Heights system on Mendota Road, approximately 300 feet west of Christensen Avenue. The purpose of the interconnections to these communities is exclusively for emergency situations to supply water for a small area near each interconnection.

Augmentation to SPRWS System

There currently exists no interconnection from a separate independent water system to SPRWS system for water supply of a size that would help SPRWS as a whole. An isolated supply could be the interconnections to South Saint Paul, Woodbury, Inver Grove Heights, and Minneapolis for a small area near each interconnection.

Saint Paul and Minneapolis Interconnection

In 2003, Saint Paul Regional Water Services and the City of Minneapolis hired CTE Engineers, Inc. to conduct an interconnection study. This was a cursory study, the purpose of which was to look at alternatives, costs and other issues of an interconnection between the two utilities. The study indicated that the overall cost of a proposal was $40,000,000. The study was never formally adopted, as discrepancies existed as to cost allocation and funding issues. Discussions regarding the interconnection between City of Minneapolis and Saint Paul Regional Water Services have discontinued.

An interconnection was constructed opportunistically with the City of Minneapolis with the Light Rail Construction Project as a possible contingency should water loss be experienced by Minneapolis and St. Paul customers within the immediate service area. The interconnection is not designed, nor was intended to service as a viable alternative to the City of Minneapolis or the City of Saint Paul, in the event of a system wide water loss. In fact, the interconnection consists of an empty vault, in which a spacer could be installed in an event of an emergency where water is to be supplied to a small service area.

Table 17. Alternative Water Sources

Alternative Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
Wells B-K (See Table 6)	31,200	45	See Section 1.B	See 17.1
Rice Creek Watershed	See 17.2	See 17.2	See Section 1.B	See 17.2
Otter and Bald Eagle Lakes	See 17.3	See 17.3	See Section 1.B	See 17.3
Headwaters Reservoirs	See 17.4	See 17.4	See Section 1.B	See 17.4

Alternative Sources of Water

17.1 Wells

SPRWS has a favorable situation for the utilization of groundwater for drought conditions. SPRWS has constructed 10 wells along two 90-inch raw water conduits that run approximately 4½ miles from Vadnais Lake to the McCarrons Treatment Plant. SPRWS wells can supply 45 MG/D of water and serves as a viable water supply source in the event that surface water from the Mississippi River and/or Lake Vadnais was to become temporarily unavailable. After the drought situation is over the groundwater could recover as the surface water is again the primary source.

This source could be depleted by long-term continuous utilization. For short-term emergency use groundwater could be limited to the duration of the emergency situations

The use of groundwater for emergency situations by a surface water supplier is logical and practical.
SPRWS also has the added advantage of a full service treatment plant. This would allow SPRWS to take advantage of groundwater that may require more treatment than would normally be available to a surface water dependent system.

17.2 Rice Creek Watershed

The Rice Creek chain of lakes, located approximately 18 miles north of St. Paul, includes Centerville and Peltier Lakes, as well as Rice Creek with its upstream tributary streams and lakes. This system has a watershed area of 201 square miles. These lakes have a reservoir storage area in excess of 800 acres and an available water supply of 2.3 billion gallons. As a backup source, water from the Rice Creek chain may be pumped to Deep Lake in the reservoir system, which has a pumping capacity of capacity of 40 million gallons per day. Historically the Rice Creek chain has had poor water quality with high levels of algae and nutrients. During drought water supply is inadequate. In addition, the 42-inch raw water conduit is in poor condition. In its current state this source is no longer being considered as a viable alternative option.

17.3 Otter and Bald Eagle Lakes

These lake sources are directly connected to the Centerville 54-inch conduit via a conduit intake on Otter Lake. The pipe from Otter Lake to the 54-inch conduit has deteriorated which allows water from wetlands that have undesirable water to mix with the Otter Lake water. In its current state this source is no longer being considered as a viable alternative option.

17.4 Headwaters Reservoirs

The Headwaters Reservoirs are an alternate source of water supply; however, they are controlled by the Army Corps of Engineers under the federal government. The Army Corps of Engineers has repeatedly stated that any actions it undertakes relative to the operation of the Headwaters Reservoir structures or the river itself are done in cooperation with and not dictated by the State. This means that even in extreme conditions the Corps will not necessarily rule in favor of the State if a request for release is made, especially if its evaluation shows that an increase above the agreed normal operation release rate of 270 cfs is likely to cause a negative impact on one of their priority users in the Headwaters area. According to the Corps of Engineers, any additional release beyond the Corps' normal operation plan of 270 cfs should be considered only in an emergency and only after conservation programs and other sources of supplemental water supply are considered. The report from the Corps of Engineers also found that the existing flow discharge rate of 270 cfs from the headwaters project lakes is adequate for present needs. This means that it is unlikely that the Corps will increase the amount of discharge on a routine basis. In addition, a major issue with relying upon additional releases from the Headwaters Reservoirs System is the travel time of 20-24 days is required for release water to flow the approximate 400 miles to reach the Metropolitan Area.

Allocation and Demand Reduction Procedures:

Six statutory water use priorities have been established by the State's Legislature to allow for emergency planning – M.S. 103 G.261.

103G.261. WATER ALLOCATION PRIORITIES.

(1) first priority, domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets the contingency planning provisions of section 103G.285, subdivision 6;

(2) second priority, a use of water that involves consumption of less than 10,000 gallons of water per day;

(3) third priority, agricultural irrigation, and processing of agricultural products involving consumption in excess of 10,000 gallons per day;

(4) fourth priority, power production in excess of the use provided for in the contingency plan developed under section 103G.285, subdivision 6;

(5) fifth priority, uses, other than agricultural irrigation, processing of agricultural products, and power production, involving consumption in excess of 10,000 gallons per day; and

(6) sixth priority, nonessential uses

In case of severe water shortages, water, from a supply basis, would be allocated by the stated first through sixth priorities. The SPRWS water-use priority system mandated under this law made domestic consumption first priority. C/I/I water use involving less than 10,000 gallons per day is identified as second priority and water use involving more than 10,000 gallons per day is third priority. Lowest priority is given to water consumption for nonessential uses such as lawn sprinkling. Priorities 3-4 outlined in M.S. 103 G.261 do not directly apply to the SPRWS system.

The general re-allocation of water during emergency situations will follow the demand reduction procedures outlined in Table 18. Circumstances requiring implementation of these restrictions will, by their nature, require extreme measures. Re-allocation of water must take into account critical demand factors and critical category needs. For example, the category "medical facilities", including hospitals, nursing homes, clinics, laboratories, etc., will be maintained in an emergency with the only reduction being control of Priority Six usage, i.e., non-essential use. Demand reductions will follow Minnesota Statutes 103G.261 and will be evaluated and analyzed on a case-by-case basis by SPRWS' management team.

Table 18. SPRWS Water Use Priorities

Customer Category	Allocation Priority	Average Daily Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	15,470,042	7,843,311
Wholesale	1	5,907,477	2,995,091
C/I/I (<10,000)	2	8,639,083	4,380,015
C/I/I (>10,000)	3	5,995,536	3,039,797
Non-Essential	4	324,441	164,492
TOTAL	NA	36,717,773	18,422,646

GPD – Gallons per Day

Table 19. Emergency Demand Reduction Conditions, Triggers and Actions

Emergency Situation	Emergency Water Reduction Trigger(s)	SPRWS Action(s)
Moderate Drought (Stage 1)	A significant portion of the Mississippi Headwater Watershed is under the classification of "Drought Watch" phase in accordance with the Statewide Drought Plan	Request voluntary water conservation measures to reduce any unnecessary use of water. Verify that flows have dropped below average for summer conditions; in anticipation of low flows, begin to pump surplus river flow into reservoir
Severe Drought (Stage 2)	A significant portion of the Mississippi Headwater Watershed is under the classification of "Severe Drought" phase in accordance with the Statewide Drought Plan. **Flow at Anoka Dam at or below 2,000 CFS for five consecutive days.**	Implement appropriate water use reduction actions as needed such as to reduce water use to 50% above winter demand.
Extreme Drought (Stage 3)	A significant portion of the Mississippi Headwater Watershed is under the classification of "Extreme Drought" phase in accordance with the Statewide Drought Plan. **Flow at Anoka Dam at or below 1,500 CFS for five consecutive days.**	Implement appropriate water use reduction actions as needed to reduce water use to 25% above winter demand. Begin coordination with City of Minneapolis to optimize river withdrawals
Exceptional Drought (Stage 4)	A significant portion of the Mississippi Headwater Watershed is under the classification of "Exceptional Drought" phase in accordance with the Statewide Drought Plan. **Flow at Anoka Dam at or below 1,000 CFS for five consecutive days.**	Implement ban on any non-essential use of water and caution all customers that consumption must be no more than their base winter consumption. Continue optimizing river versus supplemental source use. Work with Drought Task Force in regards to reductions defined in Minnesota Statues 103G.261
Contamination	Surface water from the Mississippi River and/or Lake Vadnais was to become temporarily unavailable.	Supply augmentation through Wells B-K. SPRWS Wells supply 45 MG/D of water and serves as a viable water supply source in the event that surface water from the Mississippi River and/or Lake Vadnais was to become temporarily unavailable.

Notification Procedures

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods	Update Frequency	Partners
Short-term demand reduction declared (< 1 year)	• Website • Social media • Press release (TV, radio, newspaper) • Emergency phone call program to customers	• Daily • Weekly • Monthly	• KARE • WCCO • KSTP • KMSP • MPR FM • St. Paul Pioneer Press • Star Tribune
Long-term Ongoing demand reduction declared	• Website • Social media • Press release (TV, radio, newspaper) • Emergency phone call program to customers	• Daily • Weekly • Monthly	• KARE • WCCO • KSTP • KMSP • MPR FM • St. Paul Pioneer Press • Star Tribune
Governor's Critical water deficiency declared	• Website • Social media • Press release (TV, radio, newspaper) • Emergency phone call program to customers	• Daily • Weekly • Monthly	• KARE • WCCO • KSTP • KMSP • MPR FM • St. Paul Pioneer Press • Star Tribune

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) ■ Yes ☐ No

If yes, attach the official control document to this WSP as **Appendix 7**.
If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? ■ Yes ☐ No

If yes, cite the regulatory authority reference:
See Appendix 7.

3.0 Water Conservation Plan

Progress since 2006 - Is this your community's first Water Supply Plan? ☐ Yes ■ No

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change Water Rates Structure to provide conservation pricing – See 21.1	Yes
Water Supply System Improvements (e.g. leak repairs, valve replacements, etc.) – See 21.1	Yes
Educational Efforts – See Table 31	Yes
New water conservation ordinances	No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.	No
Enforcement	No
Describe Other: Meter Replacement Project, Leak Detection Survey, Water Audit – See Section 21	Yes

What are the results you have seen from the actions in Table 21 and how were results measured?

Results due to actions listed in table 21 are difficult to identify due to the many variables that determine water consumption. Overall the trend in per capita demand over the past 10 years is decreasing. The decrease in demand is likely due to variety of factors such as climate, changes in population demographics as well as actions listed in table 21. Average residential GPCD use for the last 5 years has decreased to 43.65. This is significantly lower than the residential GPCD in 2002, which was 75 GPCD for Twin Cities Metropolitan area. In addition, the decreasing trend is evident across all SPRWS customer categories.

21.1 SPRWS Conservation Plan Commitments

Rate Structure:

SPRWS has been using a conservation rate structure that is based on higher seasonal rates in summer to curtail peak demand ever since 1994. Current rates are listed below.

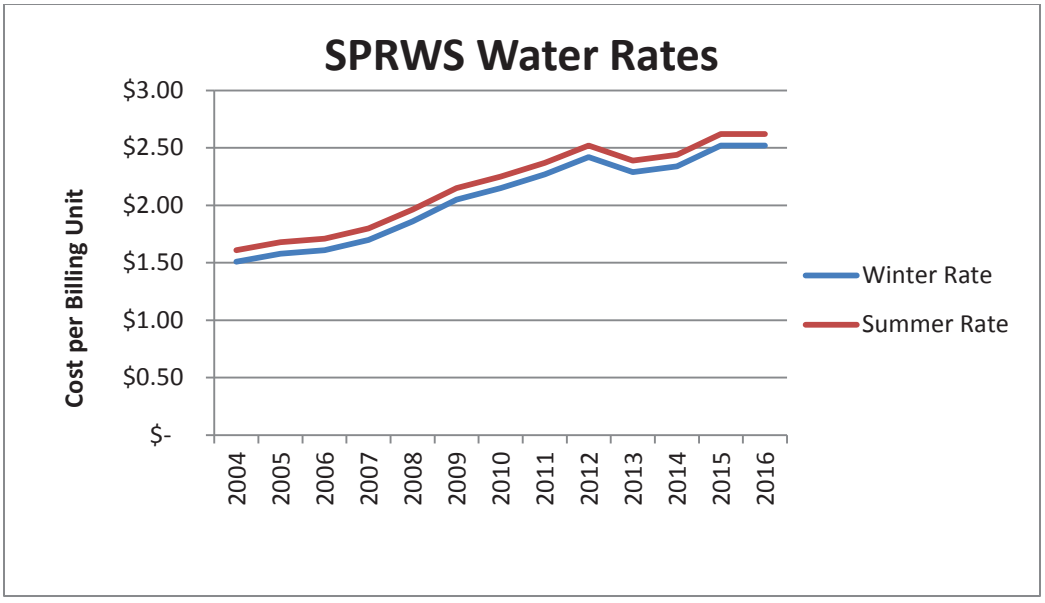
SPRWS 2016 Water Rates (Unit: dollars per 100 CF)

	St Paul, Falcon Heights Maplewood, West St. Paul	Mendota Heights, Lilydale Mendota, Sunfish Lake* Newport*, Roseville*, South Saint Paul*
Winter	$2.52	$3.02
Summer	$2.62	$3.14

*Communities where SPRWS provides water to a portion of the city

Water rates are evaluated and change periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul city council. Table 21.2 below shows the change in City of Saint Paul water rates over the last 10 years.

Table 21.2

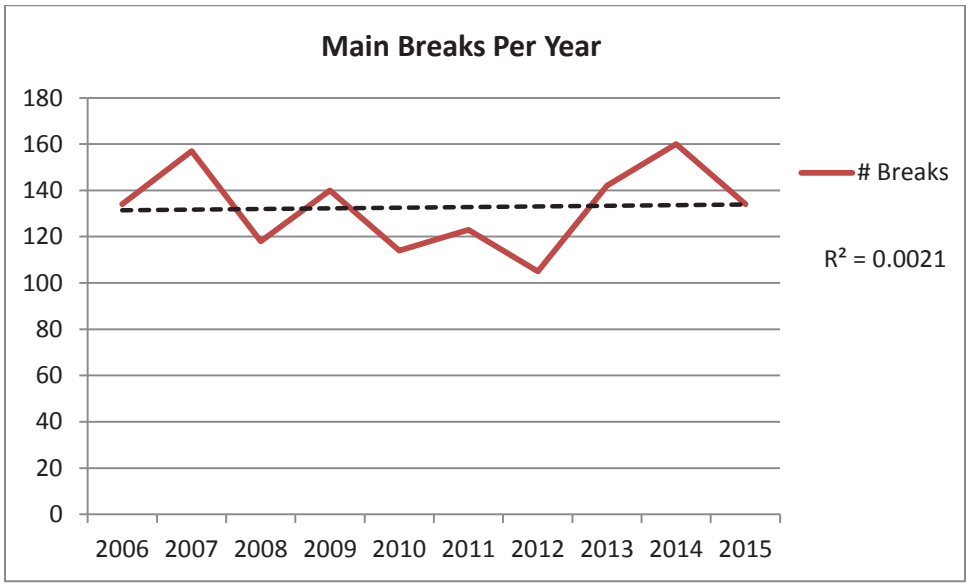


Note: Water rates decreased in 2013 due to an implementation of a fixed fee to the SPRWS rate structure. This additional fee decreased the volume rate.

Water Supply System Improvements:

SPRWS has adopted an aggressive main replacement program since 1985. The program is in place to replace mains when they meet certain criteria based on risk based model. This is intended to prevent main breaks and therefore water and revenue loss. In addition, SPRWS is aggressively replacing all lead services lines in the distribution system due to health concerns and standards on lead level in water.

Figure 21.3



* Breaks on hydrant branches were included in yearly main break totals starting in 2015

Education and Information Programs:

Programs are outlined in Education and Information Programs section of this plan.

Leak Detection Survey:

A complete water leak detection survey was conducted in 2016 for the entire SPRWS distribution system. A total of 253 possible leaks were identified during the length of the study. SPRWS is currently investigating the identified possible leaks, and conducting repairs as needed.

Water Audit:

A comprehensive water audit was conducted in 2015 for Saint Paul Regional Water Services for water pumped from the McCarrons Treatment Plant to the distribution system. The goal of this audit was to identify improvements needed to reduce future water loss in the distribution system. Results of the water audit are outlined in Conservation Objectives and Strategies section of this plan.

A. Triggers for Allocation and Demand Reduction Actions

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect Surface Water Flows	• Low river flow conditions • Reports of declining wetland and lake levels	• Increase promotion of conservation measures
Short-term demand reduction (less than 1 year	• Extremely high seasonal water demand (more than double winter demand) • Loss of treatment capacity • Lack of water in storage • State drought plan • Well interference	• Enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. • Supply augmentation through utilizing alternative sources of water (SPRWS Wells B-K) • Allocate and reduce water usage as outlined in the Minnesota Statewide Drought Plan
Long-term demand reduction (>1 year)	• No Action Planned	
Governor's "Critical Water Deficiency Order" declared	• Governor's "Critical Water Deficiency Order" declared	• Implement mandatory water use reduction actions with a goal of reducing water use to January levels. • Limit water used based on highest priorities as defined in Minnesota Statutes 103.261. • Implement measures consistent with an emergency declaration.

B. Conservation Objectives and Strategies

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

Is your ten-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

■ Yes ☐ No

What is your leak detection monitoring schedule?

Periodic as needed, no less than a 5 year interval – Future leak detection survey's to be conducted at known "at risk" areas within the SPRWS Distribution System

What is the date of your most recent water audit? 2015

Frequency of water audits: ■ yearly ☐ other (specify frequency) _____

Leak detection and survey: ☐ every year ☐ every other year ■ periodic as needed

Year last leak detection survey completed: 2015

Based on the results of the 2015 water audit, SPRWS has examined solutions in order to achieve <10% loss. Discussions with SPRWS production staff has revealed possible meter inaccuracies as it relates to a high service pump. Since this pump was used to deliver 12.5% of water supplied in 2014, any inaccuracies in measuring the volume of water pumped may have a significant effect on the water audit. In addition, SPRWS recently completed a leak detection survey and is in the process of addressing these leaks, ultimately eliminating the resulting losses. SPRWS is also considering establishing better methods and procedures to estimate water usage for distribution system activities such as flushing during water main installation & maintenance activities that is currently not metered.

Metering

Table 23. Information about customer meters

SPRWS currently maintains approximately 94,000 meters. Between the years of 2010-2013, SPRWS replaced existing water meters with Neptune Water meters. Table 23 shows numbers and maintenance schedules of customer meters of SPRWS.

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years
Residential	85,757	89,227	88,990	As needed	3/ 25
C/I/I – Meter < 3"	2,641	3,820	3,818	5	3 / 25
C/I/I – Meter ≥ 3"	549	657	657	1	3 / 25
Wholesale	2	4	4	.25	3 / 25
Irrigation meters (Seasonal)	150	285	285	1	3 / 25
TOTALS	89,089	93,993	93,754	NA	NA

Table 24. Water source meters

SPRWS uses Venturi meters & Magnetic meters at all water sources. Venturi meters are flow measurement instruments, which use a converging section of pipe to cause an increase in the flow velocity, which results in a decrease of pressure. Based on these two factors, a flow rate can be determined. Magnetic meters use a magnetic field in order to determine flow rates based on Faraday's Law.

	Type & Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years
Fridley Station Intakes	2 – Venturi	Calibrated as needed	2	74 / 20 (pressure transmitters on venturi meters)
Wells	6 – Magnetic Flow Meters	TBD	6	7 / TBD
Treatment Plant (Raw Water Intake)	4 – Venturi	Calibrated as needed	4	18/ 20 (pressure transmitters on venturi meters)

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? ☐ Yes ■ No

2005 – 2014 ten-year average residential per capita water demand - <u>48.28 g/person/day</u>

Despite the growth in population and service connections, no increase in water consumption is observed. Based on the data collected from 2005 through 2014, it can be seen that water consumption is declining. See Figure 25.1. Various factors affect per capita daily consumption, including climate and community demographics. The practice of sprinkling is more intense in newer communities that are establishing lawns and shrubs. In the older and more established communities, demand is steady or declining. In addition, high-efficiency plumbing fixtures have become more common as well as an increase awareness regarding water conservation measures among SPRWS customers.

Figure 25.1

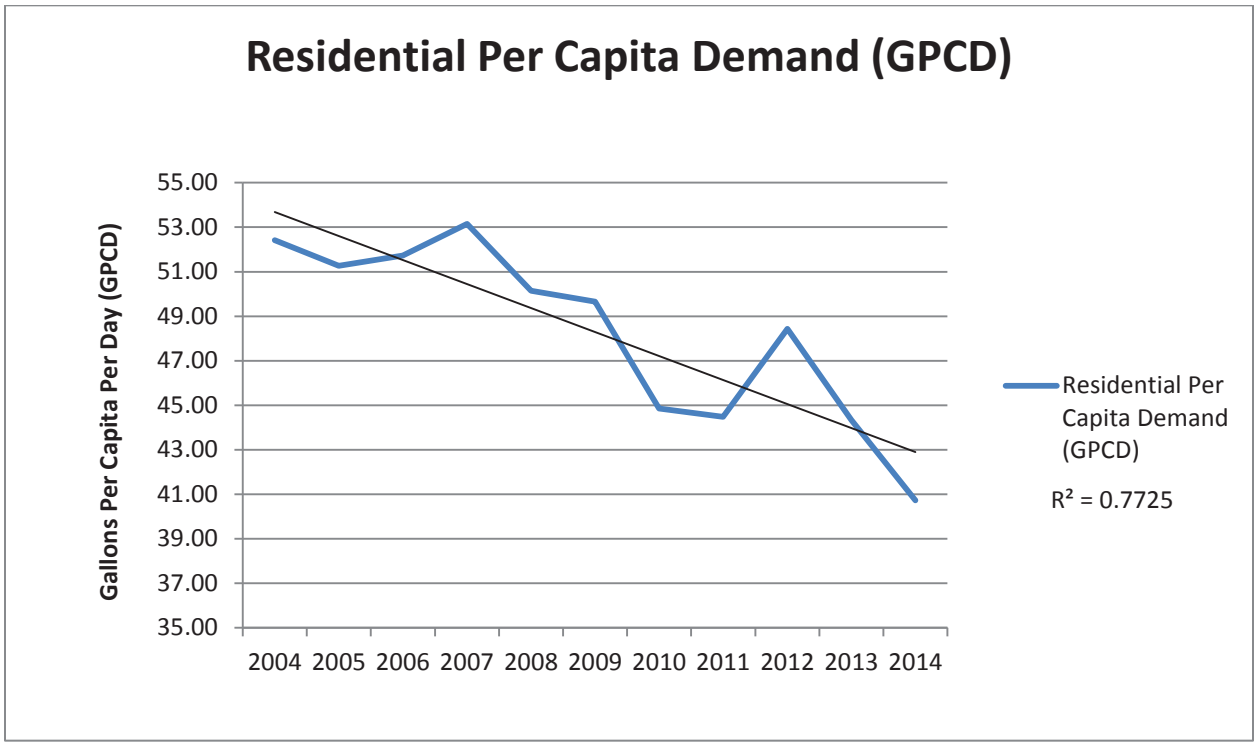


Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. *City of Saint Paul Department of Safety and Inspections in partnership with Minnesota Department of Health reviews water reuse proposals on a case to case basis to ensure health and safety of residents of the City of Saint Paul.*	In effect
Revise ordinances to limit irrigation. Describe the restricted irrigation plan: *Chapter 91. Sec. 91.05. – Sprinkling Restrictions* *The use of water for lawn sprinkling purposes shall at all times be subject to the express condition that the board of water commissioners may, at any time when in its opinion the condition of the public water supply demands it, limit the time during each day when water may be used for sprinkling purposes; and the board may forbid the use of water for lawn sprinkling for any period not exceeding thirty (30) days at one time.*	In effect
Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements. *Chapter 91. Sec. 91.03. – Water Conservation* *All automatic lawn sprinkler systems connected to the public water system must be equipped with water conserving devices. However, systems which were installed prior to the effective date of this chapter may continue in operation at their current locations.*	In effect
Make water system infrastructure improvements *See Appendix 4.*	In effect
Offer free or reduced cost water use audits for residential customers. *SPRWS technical staff provides field audits for elderly customers experiencing unexplained high-water usage. SPRWS also participates in the annual "Water's Off" program, with Saint Paul plumbers, designed to renovate poor plumbing in homes of the elderly and needy. SPRWS provides funds and waives plumbing permits.*	In effect
Implement a notification system to inform customers when water availability conditions change.	In effect
Provide rebates or incentives for installing water efficient	No longer in effect. Program expired

Strategy to reduce residential per capita demand	Timeframe for completing work
appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	
Identify supplemental Water Resources *See Table 17*	In effect
Conduct audience-appropriate water conservation education and outreach. *SPRWS provides conservation education and outreach by presenting at schools and other organizations to discuss and demonstrate drinking water sources, treatment and water conservation. SPRWS also conducts facility tours & two open houses at the Highland Water Tower to provide community education regarding water resource management.*	In effect
Other plans *SPRWS' billing unit reviews individual account consumption and notes unusual increases. The customer is sent a notice (high note) of the increase and is advised to look for leaks if there is no other explanation for the increase.* *Approximately 6,000 notices are sent each year. The quick action results in a significant reduction in water wasted.*	In effect

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.

Between the years 2004-2014, water consumption for C/I/I decreased 2.0% on an average yearly basis. As mentioned before, high-efficiency plumbing fixtures well as an increase awareness of conservation among SPRWS customers due to education and higher water rates, has led to a decrease in consumption. At this time, no additional strategies or timeliness to reduce C/I/I demand are planned.

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Despite the growth in population and service connections, no increase in water consumption among any customer category is observed. Based on the data collected from 2005 through 2014, it can be seen that water consumption is declining. Various factors affect per capita daily consumption, including climate and community demographics. For example, the practice of sprinkling is more intense in newer communities that are establishing lawns and shrubs. In the older and more established communities, demand is steady or declining. In addition, high-efficiency plumbing fixtures have become more common as well as increased awareness among SPRWS customers regarding water conservation measures due to education and higher water rates.

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6**?** **No**

Ratio of maximum day demand to average day demand for the ten year average (2005 – 2014): 1.87

Objective 6: Implement a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

Current Water Rates

A copy of the 2016 water rate structure in the City of Saint Paul and the suburbs is included in Attachment C. The water rate structure supports water conservation in customers, which can be seen from the declining water use trend over the last 10 years.

Volume included in base rate or service charge: Volume indicated as "Billing Units".

Frequency of billing: Monthly or Quarterly based on customer category.

Water Rate Evaluation Frequency: Every year

Date of last rate change: January 1, 2016

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	Seasonal rates Service charge not based on water volume		
Commercial/ Industrial/ Institutional	Monthly Billing Seasonal rates Service charge not based on water volume		

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

SPRWS adheres to the City of Saint Paul Stormwater Management Program in order to reduce the discharge of treated water to surface waters including lakes, streams, wetlands and rivers. SPRWS is also partnering with the City of Saint Paul and other municipalities SPRWS serves to update respective Comprehensive Plans.

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

SPRWS will closely review subsequent future AWWA water audits, in order to achieve unaccounted (Non-Revenue) Water loss to Less than 10%. In addition, total per capita water use, residential per capita water use and C/I/I water use will be closely monitored in order to identify trends. Data and analyses will be shared with the appropriate DNR District Hydrologist, to discuss possible improvements and successful actions as it relates to water conservation.

A. Regulation

Copies of adopted regulations are included in Appendix 10.

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
Water efficient plumbing fixtures required	New Development
Watering restriction requirements (time of day, allowable days, etc.)	Only during declared Emergencies
Water waste prohibited (for example, having a fine for irrigators spraying on the street)	Ongoing

B. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. SPRWS and the City of Saint Paul have and will continue to partner with local stakeholders to promote sustainability design features to achieve water conservation goals. An example of demonstrating that partnership is the innovative rainwater capture system at CHS Field and the integrated trench system on University Ave in the City of Saint Paul.

The CHS Field rain recapture project was a joint effort with the City of Saint Paul, The Saint Paul Saints, Capitol Region Watershed District, and the Metropolitan Council. This system reduced the sites demand for potable water and reduced runoff to the Mississippi River. The captured water then is used to irrigate the ball field and grounds, as well as for some of the stadium's toilets. The installation of tree trenches along University Ave has achieved similar conservation goals, allowing water to infiltrate and irrigate approximately 1,000 tress, preventing run off from reaching the Mississippi River. These programs have contributed to the reduction of demand as demonstrated by our decreasing water demand.

Other programs aimed at reducing water use are listed in Table 30.

Table 30. Retrofitting Programs

Water Use Targets	Outreach Methods	Partners
Low flush toilets Toilet leak tablets Low flow showerheads Faucet aerators	Educational Guides & Information Free distribution of toilet leak tablets. Rebate for low flow showerheads and faucet aerators	Xcel Energy Neighborhood Energy Connection
Water conserving actions as it pertains to washing machines, dish washers	Educational Guides & Information	
Rain gardens & Rain barrels	Educational Guides & Information	Watershed Districts & Agencies County Agencies

In the early 1990's, SPRWS implemented a Water Conservation Pilot Program to study the benefits to retrofit showerheads and toilet devises. The results showed showerheads installations were cost-effective while toilet devices were not. Accordingly, SPRWS developed a program with Northern States Power to offer high-efficiency showerheads to all customers of SPRWS.

A program to increase the efficiency of flushometer-type toilets and urinals in municipal buildings was initiated in 1994. The program spanned the cities of Saint Paul, Falcon heights, Lauderdale, and West Saint Paul. At the same time, SPRWS replaced flushometers in selected St. Paul public school buildings.

C. Education and Information Programs

Table 31 lists current and future education efforts provided by SPRWS. All these efforts are ongoing.

Table 31. Current Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill	Contents include newsletter "Customer Service Connections", solicitation for WaterWorks and direct pay, etc.	4	Ongoing
Consumer Confidence Reports	Provided in the spring, online with information in the newsletter and bill message box	1	Ongoing
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)	Regular news releases for the open house at the Highland Water Tower held twice a year, the annual Consumer Confidence Report (Water Quality Report), and others as needed.	3	Ongoing
Presentations to community groups	SPRWS provides staff to school and other organizations to discuss and demonstrate drinking water sources, supplies and treatment.	4	Ongoing
Facility tours	Information provided to groups that tour the water treatment plant.	20	Ongoing
Displays and exhibits	Display cases and brochures available in the Administration Building at the McCarrons Center		Ongoing
Information kiosk at utility and public buildings	Display cases and brochures available in the Administration Building at the McCarrons Center		Ongoing
K-12 Education programs (Project Wet, Drinking Water Institute, presentations)	SPRWS provides staff to school and other organizations to discuss and demonstrate drinking water sources, supplies and treatment.		Ongoing
Community education classes	Two open houses at the Highland water tower annually and one at McCarrons Center bi-annually.	2-3	Seasonal
Targeted efforts (large volume users, users with large increases)	SPRWS' billing unit reviews individual account consumption and notes unusual increases. The customer is sent a notice (high note) of the increase and is advised to look for leaks if there is no other explanation for the increase.	6,000	Ongoing
Emergency conservation notices	Necessary Conservation Measures		Only during declared Emergencies
Digital Public Outreach	SPRWS provides extensive information on our website in regards to a variety of topic as well as utilizing social media for notifications		Ongoing

Future Education Programs:

SPRWS will be participating in National Drinking Water Week in May of 2017. Educational and outreach programs will be initiated to increase the awareness of drinking water. Educational programs will include open houses at SPRWS facilities for schools, employee education, and public outreach via social media and press releases. In addition, the City of Saint Paul has partnered with Ramsey-Washington Metro Watershed District to participate in WaterFest 2017. WaterFest is a celebration focusing on water quality, wildlife, and special ecological features of the watershed.

4.0 Items for Metropolitan Area Communities

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.

Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The *Master Water Supply Plan* provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles).* This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Table 14 was removed from Water Supply Plan as SPRWS does not anticipating needing an alternative water source by the year 2040.

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled “low flow”. These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water “lost” by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category “Water Supplier Services”.

Population Served - The number of people who are served by the community’s public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community’s public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the

premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association

C/I/I – Commercial/Institutional/Industrial

CIP – Capital Improvement Plan

GIS – Geographic Information System

GPCD – Gallons per capita per day

GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,

MDH – Minnesota Department of Health

MGD – Million gallons per day

MG – Million gallons

MGL – Maximum Contaminant Level

MnTAP – Minnesota Technical Assistance Program (University of Minnesota)

MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)

MRWA – Minnesota Rural Waters Association

SWP – Source Water Protection

WHP – Wellhead Protection

Appendix I

Well Records and Maintenance Summaries

SINCE 1860

McCarthy Well Company

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **494** L 2-5 **495** L 3-6 **495** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **483** L 2-5 **489** L 3-6 **483** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **133.0** L2 **133.0** L3 **134.0** Utilization **94%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2500** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **32'** Pumping **181'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **485** L 2-5 **490** L 3-6 **486** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **478** L 2-5 **480** L 3-6 **479** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **150.0** L2 **163.0** L3 **154.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **4010** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **33'** Pumping **105'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **481** L 2-5 **475** L 3-6 **472** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **474** L 2-5 **468** L 3-6 **464** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **161.0** L2 **152.0** L3 **156.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Slight** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **38'** Pumping **95'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, it has been in service at least 5 years since it was last removed from the well for repair.

Report By: **Tim McCarthy**

SINCE 1860

McCarthy Well Company

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **478** L 2-5 **483** L 3-6 **478** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **470** L 2-5 **471** L 3-6 **470** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **157.0** L2 **167.0** L3 **159.0** Utilization **91%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **32'** Pumping **Good** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This pump and motor was operating properly and the motor suddenly failed. It appears the windings grounded out.

Report By: **Tim McCarthy**

SINCE 1860

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **481** L 2-5 **482** L 3-6 **480** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **476** L 2-5 **477** L 3-6 **468** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **136.0** L2 **144.0** L3 **146.0** Utilization **82%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **65'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, it has been in service at least 5 years since it was last removed from the well for repair.

Report By: **Tim McCarthy**

SINCE 1860

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **493** L 2-5 **468** L 3-6 **477** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **466** L 2-5 **464** L 3-6 **470** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **128.0** L2 **123.0** L3 **115.0** Utilization **102%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **33'** Pumping **113'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pump has been in service at least 5 years since it was last removed from the well for repair.

Report By: **Tim McCarthy**

SINCE 1860

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/4/2007

Vadnais Heights MN Well/Pump Name: A

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **245** L 2-5 **245** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **237** L 2-5 **237** L 3-6 ____ Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **11.0** L2 **10.0** L3 Utilization **105%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Fair** L2 **Fair** L3 **Fair** — ○ Good ◉ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **29'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

SINCE 1860

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Fridley Pumping Station - Saint Paul Regional Water Services Date: 4/14/2008

Fridley MN Well/Pump Name: 1

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **245** L 2-5 **245** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **241** L 2-5 **241** L 3-6 — Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **10.0** L2 **9.9** L3 — Utilization **116%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **No Access** Pumping **No Access** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pit has 10" of standing water in it and the pump has been in service over 5 years since it was last removed from the well for repair. The pit should be drained and the manhole should be sealed to prevent stagnant water contamination.

Report By: **Tim McCarthy**

SINCE 1860

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/22/2008

Vadnais Heights MN Well/Pump Name: A

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **244** L 2-5 **244** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **234** L 2-5 **235** L 3-6 — Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **11.0** L2 **10.0** L3 — Utilization **105%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Fair** L2 **Fair** L3 **Fair** — ○ Good ◉ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Access Blocked** Pumping **Access Blocked** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pump has been in service 5 years since it was last removed from the well for repair which increases the likelihood it may fail without warning.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/22/2008

Vadnais Heights MN Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **472** L 2-5 **467** L 3-6 **472** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **464** L 2-5 **460** L 3-6 **465** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **116.0** L2 **124.0** L3 **117.0** Utilization **99%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **107'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pump has been in service at least 5 years since it was last removed from the well for repair.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/22/2008

Vadnais Heights MN Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **481** L 2-5 **478** L 3-6 **481** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **475** L 2-5 **474** L 3-6 **470** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **135.0** L2 **136.0** L3 **129.0** Utilization **77%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **28'** Pumping **64'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pump has been in service over 5 years since it was last removed from the well for repair.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 5/1/2008

Vadnais Heights MN Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **478** L 2-5 **480** L 3-6 **478** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **471** L 2-5 **470** L 3-6 **474** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **160.0** L2 **167.0** L3 **161.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Slight** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **93'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pump has been in service at least 5 years since it was last removed from the well for repair. The motor was repaired recently.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/22/2008

Vadnais Heights MN Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **482** L 2-5 **472** L 3-6 **477** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **467** L 2-5 **462** L 3-6 **469** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **159.0** L2 **160.0** L3 **162.0** Utilization **94%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **34'** Pumping **96'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time, however, the pump has been in service at least 5 years since it was installed in the well.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 12/22/2008

Vadnais Heights MN Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor

2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor

3. Check Voltage Supply- L 1-4 **482** L 2-5 **486** L 3-6 **484** — ◉ Good ○ Fair ○ Poor

Hertz **60**

4. Check Voltage Running- L 1-4 **480** L 2-5 **477** L 3-6 **477** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **150.0** L2 **150.0** L3 **152.0** Utilization **89%** — ◉ Good ○ Fair ○ Poor

6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor

7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor

8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor

9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor

10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor

11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

13 Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor

14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor

15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor

16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor

17. Check Pumping Rate- **3506** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor

18. Check Water Levels-Static **34'** Pumping **111'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 11/24/2008

Vadnais Heights MN Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **497** L 2-5 **495** L 3-6 **497** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **487** L 2-5 **488** L 3-6 **487** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **139.0** L2 **132.0** L3 **135.0** Utilization **95%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2220** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **171'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional — Date: 5/4/2011

Vadnais Heights MN — Well/Pump Name: A

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **244** L 2-5 **242** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **235** L 2-5 **236** L 3-6 ____ Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **12.0** L2 **10.0** L3 Utilization **110%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Fair** L2 **Fair** L3 **Fair** — ○ Good ◉ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Access Blocked** Pumping **Access Blocked** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 5/4/2011

Vadnais Heights MN Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **471** L 2-5 **469** L 3-6 **466** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **460** L 2-5 **461** L 3-6 **462** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **116.0** L2 **121.0** L3 **116.0** Utilization **98%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **109'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 5/4/2011

Vadnais Heights MN Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **477** L 2-5 **498** L 3-6 **478** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **467** L 2-5 **471** L 3-6 **468** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **157.0** L2 **152.0** L3 **156.0** Utilization **90%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **26'** Pumping **66'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Vadnais Heights MN

Date: 5/4/2011

Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **479** L 2-5 **482** L 3-6 **479** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **467** L 2-5 **470** L 3-6 **469** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **161.0** L2 **167.0** L3 **158.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **29'** Pumping **61'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 5/4/2011

Vadnais Heights MN Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **482** L 2-5 **480** L 3-6 **480** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **473** L 2-5 **474** L 3-6 **472** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **151.0** L2 **152.0** L3 **154.0** Utilization **90%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ○ Good ◉ Fair ○ Poor
18. Check Water Levels-Static **33'** Pumping **98'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 5/4/2011

Vadnais Heights MN Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **487** L 2-5 **489** L 3-6 **488** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **482** L 2-5 **486** L 3-6 **487** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **156.0** L2 **154.0** L3 **158.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **4110** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **31'** Pumping **113'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 5/4/2011

Vadnais Heights MN Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **494** L 2-5 **496** L 3-6 **492** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **484** L 2-5 **483** L 3-6 **482** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **131.0** L2 **130.0** L3 **130.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2088** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **29'** Pumping **121'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 4/2/2012

Vadnais Heights MN Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor

2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor

3. Check Voltage Supply- L 1-4 **492** L 2-5 **493** L 3-6 **492** — ◉ Good ○ Fair ○ Poor

4. Check Voltage Running- L 1-4 **485** L 2-5 **487** L 3-6 **487** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **128.0** L2 **129.0** L3 **128.0** Utilization **90%** — ◉ Good ○ Fair ○ Poor

6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor

7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor

8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor

9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor

10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **?** — ◉ Good ○ Fair ○ Poor

11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor

14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor

15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor

16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor

17. Check Pumping Rate- **2098** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor

18. Check Water Levels-Static **33'** Pumping _____ Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit is operating properly at this time, however, the pump has been in service for over 5 years. The casing grout and the discharge line show signs of start up water hammer and/or ground heaving.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 4/2/2012

Vadnais Heights MN Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **483** L 2-5 **481** L 3-6 **483** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **481** L 2-5 **480** L 3-6 **482** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **154.0** L2 **154.0** L3 **154.0** Utilization **91%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3440** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Good** Pumping **Good** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 4/2/2012

Vadnais Heights MN Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **485** L 2-5 **489** L 3-6 **485** — ◉ Good ○ Fair ○ Poor

4. Check Voltage Running- L 1-4 **473** L 2-5 **476** L 3-6 **473** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **156.0** L2 **163.0** L3 **147.0** Utilization **88%** — ○ Good ◉ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **93'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 4/2/2012

Vadnais Heights MN Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor

2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor

3. Check Voltage Supply- L 1-4 **476** L 2-5 **481** L 3-6 **474** — ◉ Good ○ Fair ○ Poor

4. Check Voltage Running- L 1-4 **473** L 2-5 **474** L 3-6 **471** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **148.0** L2 **154.0** L3 **147.0** Utilization **87%** — ◉ Good ○ Fair ○ Poor

6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor

7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor

8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor

9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor

10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor

11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor

14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor

15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor

16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor

17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor

18. Check Water Levels-Static **52'** Pumping **61'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 4/2/2012

Vadnais Heights MN Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **469** L 2-5 **471** L 3-6 **466** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **459** L 2-5 **460** L 3-6 **457** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **122.0** L2 **118.0** L3 **114.0** Utilization **98%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **109'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station - Saint Paul Regional Water Services Date: 4/2/2012

Vadnais Heights MN Well/Pump Name: A

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor

2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor

3. Check Voltage Supply- L 1-4 **244** L 2-5 **243** L 3-6 — ◉ Good ○ Fair ○ Poor

4. Check Voltage Running- L 1-4 **235** L 2-5 **236** L 3-6 — Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **11.5** L2 **11.0** L3 — Utilization **113%** — ◉ Good ○ Fair ○ Poor

6. Check Resistance Between Line & Ground- L1 **Fair** L2 **Fair** L3 **Fair** — ○ Good ◉ Fair ○ Poor

7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor

8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor

9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor

10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor

11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor

14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor

15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor

16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor

17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor

18. Check Water Levels-Static **Access Blocked** Pumping **Access Blocked** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Fridley Pumping Station - Saint Paul Regional Water Services Date: 4/2/2012

Fridley MN Well/Pump Name: 1

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor

2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor

3. Check Voltage Supply- L 1-4 **248** L 2-5 **248** L 3-6 — ◉ Good ○ Fair ○ Poor

4. Check Voltage Running- L 1-4 **244** L 2-5 **244** L 3-6 — Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **9.5** L2 **9.2** L3 — Utilization **114%** — ◉ Good ○ Fair ○ Poor

6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor

7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor

8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor

9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor

10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor

11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor

13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor

14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor

15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor

16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor

17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor

18. Check Water Levels-Static **Access Blocked** Pumping **Access Blocked** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit is operating properly at this time, however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/4/2013

Vadnais Heights MN — Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **465** L 2-5 **468** L 3-6 **471** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **461** L 2-5 **465** L 3-6 **463** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **115.0** L2 **122.0** L3 **117.0** Utilization **98%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **25'** Pumping **100'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:

This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

"SINCE 1860"

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/4/2013
Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **482** L 2-5 **478** L 3-6 **484** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **468** L 2-5 **472** L 3-6 **467** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **154.0** L2 **150.0** L3 **146.0** Utilization **87%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered *** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **25'** Pumping **82'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years. * = Estimated flow of 3630 gpm.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) Date: 6/4/2013
Vadnais Heights MN Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **483** L 2-5 **490** L 3-6 **485** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **471** L 2-5 **474** L 3-6 **473** Hertz **60** ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **155.0** L2 **165.0** L3 **147.0** Utilization **88%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Good** Pumping **Good** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years. Estimated flow of 4000 gpm.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/4/2013
Vadnais Heights MN — Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **485** L 2-5 **487** L 3-6 **484** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **476** L 2-5 **479** L 3-6 **476** Hertz **60** — ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **142.0** L2 **156.0** L3 **146.0** Utilization **87%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **32'** Pumping **94'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) Date: 6/4/2013
Vadnais Heights MN Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **483** L 2-5 **490** L 3-6 **485** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **471** L 2-5 **474** L 3-6 **473** Hertz **60** ◉ Good ○ Fair ○ Poor

5. Check Motor Amps- L1 **155.0** L2 **165.0** L3 **147.0** Utilization **88%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **87'** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years. Estimated flow of 4000 gpm.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/4/2013

Vadnais Heights MN — Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **486** L 2-5 **489** L 3-6 **487** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **486** L 2-5 **489** L 3-6 **486** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **152.0** L2 **158.0** L3 **152.0** Utilization **91%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3232** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **28'** Pumping **140'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/2/2014
Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **466** L 2-5 **471** L 3-6 **467** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **461** L 2-5 **457** L 3-6 **462** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **126.0** L2 **120.0** L3 **115.0** Utilization **100%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2600** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **28'** Pumping **108'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/2/2014
Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **483** L 2-5 **478** L 3-6 **482** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **474** L 2-5 **472** L 3-6 **476** Hertz **60** ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **149.0** L2 **146.0** L3 **140.0** Utilization **84%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2875** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **23'** Pumping **62'** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/2/2014
Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **482** L 2-5 **486** L 3-6 **480** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **468** L 2-5 **472** L 3-6 **467** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **157.0** L2 **167.0** L3 **159.0** Utilization **91%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **4800** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **98'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/2/2014
Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **485** L 2-5 **487** L 3-6 **484** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **477** L 2-5 **475** L 3-6 **474** Hertz **60** ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **159.0** L2 **162.0** L3 **154.0** Utilization **93%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3500** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **44'** Pumping **99'** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/2/2014
Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **485** L 2-5 **490** L 3-6 **488** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **484** L 2-5 **488** L 3-6 **482** Hertz **60** ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **152.0** L2 **153.0** L3 **157.0** Utilization **91%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3500** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **32'** Pumping **115'** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/2/2014
Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **486** L 2-5 **494** L 3-6 **496** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **478** L 2-5 **479** L 3-6 **486** Hertz **60** ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **131.0** L2 **129.0** L3 **143.0** Utilization **95%** ○ Good ◉ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2147** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **29'** Pumping **No Access** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/3/2014
Well/Pump Name: H

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **491** L 2-5 **497** L 3-6 **490** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **376** L 2-5 **376** L 3-6 **376** Hertz **50** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **160.0** L2 **163.0** L3 **162.0** Utilization **73%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3000** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **28'** Pumping **86'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This pump appears to be operating satisfactorily at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/3/2014
Well/Pump Name: I

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **489** L 2-5 **491** L 3-6 **491** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **355** L 2-5 **357** L 3-6 **357** Hertz **49** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **144.0** L2 **144.0** L3 **144.0** Utilization **65%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2996** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **29** Pumping **89'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/3/2014
Well/Pump Name: J

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **489** L 2-5 **493** L 3-6 **487** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **242** L 2-5 **241** L 3-6 **242** Hertz **32** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **92.0** L2 **88.0** L3 **89.0** Utilization **40%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Sandy** — ○ Good ◉ Fair ○ Poor
17. Check Pumping Rate- **1505** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **28'** Pumping **32'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit appears to be operating properly at this time the pump is only operated between 32 & 36 hertz so is won't sand lock.

Report By: **Tim McCarthy**

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/3/2014
Well/Pump Name: K

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **495** L 2-5 **500** L 3-6 **500** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **388** L 2-5 **388** L 3-6 **388** Hertz **52** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **149.0** L2 **152.0** L3 **151.0** Utilization **75%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3306** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **51'** Pumping **92'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This pump appears to be operating satisfactorily at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Fridley Pumping Station (SPRWS)
Fridley MN

Date: 6/3/2014
Well/Pump Name: 1

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **247** L 2-5 **247** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 ____ L 2-5 ____ L 3-6 ____ Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **10.4** L2 **10.2** L3 **10.3** Utilization **126%** — ○ Good ◉ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **No Access** Pumping **No Access** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service over 5 years since it was repaired by McCarthy Well Co.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: A

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **241** L 2-5 **240** L 3-6 ____ — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **234** L 2-5 **236** L 3-6 ____ Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **11.0** L2 **10.0** L3 **10.5** Utilization **105%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Fair** L2 **Fair** L3 **Fair** — ○ Good ◉ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Access Blocked** Pumping **Access Blocked** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **467** L 2-5 **468** L 3-6 **467** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **461** L 2-5 **462** L 3-6 **464** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **116.0** L2 **120.0** L3 **124.0** Utilization **100%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken?** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ○ Good ◉ Fair ○ Poor
18. Check Water Levels-Static **24'** Pumping **107'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **478** L 2-5 **480** L 3-6 **479** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **472** L 2-5 **473** L 3-6 **475** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **130.0** L2 **136.0** L3 **140.0** Utilization **78%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **22'** Pumping **63'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **483** L 2-5 **482** L 3-6 **484** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **471** L 2-5 **473** L 3-6 **472** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **162.0** L2 **162.0** L3 **164.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **71'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **489** L 2-5 **487** L 3-6 **487** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **480** L 2-5 **482** L 3-6 **480** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **155.0** L2 **160.0** L3 **159.0** Utilization **93%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **92'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 3/25/2015
Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **496** L 2-5 **498** L 3-6 **498** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **490** L 2-5 **492** L 3-6 **490** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **155.0** L2 **156.0** L3 **157.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **30'** Pumping **128'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **493** L 2-5 **492** L 3-6 **494** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **484** L 2-5 **485** L 3-6 **485** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **134.0** L2 **133.0** L3 **132.0** Utilization **94%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2278** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **25'** Pumping **163'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: H

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **497** L 2-5 **498** L 3-6 **497** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **414** L 2-5 **414** L 3-6 **414** Hertz **54** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **186.0** L2 **187.0** L3 **185.0** Utilization **84%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **None** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3327** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **110'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This pump appears to be operating satisfactorily at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: I

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **492** L 2-5 **493** L 3-6 **495** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **404** L 2-5 **404** L 3-6 **404** Hertz **53** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **171.0** L2 **169.0** L3 **168.0** Utilization **76%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **None** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3414** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **26'** Pumping **89'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This pump appears to be operating satisfactorily at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) Date: 3/25/2015

Vadnais Heights MN Well/Pump Name: J

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **494** L 2-5 **494** L 3-6 **494** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **260** L 2-5 **260** L 3-6 **260** Hertz **34** ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **94.0** L2 **94.0** L3 **95.0** Utilization **42%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **None** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **29'** Pumping **59'** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This pump appears to be operating satisfactorily at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 3/25/2015

Vadnais Heights MN — Well/Pump Name: K

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **493** L 2-5 **495** L 3-6 **496** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **423** L 2-5 **423** L 3-6 **423** Hertz **55** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **170.0** L2 **169.0** L3 **172.0** Utilization **77%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **None** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **3650** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **46'** Pumping **90'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This pump appears to be operating satisfactorily at this time.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Fridley Pumping Station (SPRWS)
Fridley MN

Date: 3/25/2015
Well/Pump Name: 1

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **246** L 2-5 **246** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **242** L 2-5 **242** L 3-6 ____ Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **10.2** L2 **10.1** L3 **10.2** Utilization **124%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Fair** L2 **Fair** L3 **Fair** — ○ Good ◉ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Access Blocked** Pumping **Access Blocked** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service over 5 years since it was repaired by McCarthy Well Co.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/8/2016
Well/Pump Name: A

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **244** L 2-5 **244** L 3-6 — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **235** L 2-5 **235** L 3-6 ____ Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **10.7** L2 **11.5** L3 **11.1** Utilization **111%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Poor** L2 **Poor** L3 **Poor** — ○ Good ○ Fair ◉ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **3450** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **NA** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **NA** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **Good** Pumping **Good** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service over 5 years since it was repaired by McCarthy Well Co.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) Date: 6/8/2016

Vadnais Heights MN Well/Pump Name: B

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **473** L 2-5 **478** L 3-6 **472** ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **467** L 2-5 **469** L 3-6 **468** Hertz **60** ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **117.0** L2 **120.0** L3 **118.0** Utilization **99%** ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **21'** Pumping **101'** Yield **Good** GPM Per Foot of Draw Down ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/8/2016
Well/Pump Name: C

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **481** L 2-5 **483** L 3-6 **484** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **474** L 2-5 **473** L 3-6 **473** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **132.0** L2 **136.0** L3 **130.0** Utilization **77%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **Good** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **19'** Pumping **60'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/8/2016
Well/Pump Name: D

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **484** L 2-5 **484** L 3-6 **488** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **472** L 2-5 **474** L 3-6 **476** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **159.0** L2 **165.0** L3 **162.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **24'** Pumping **84'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/8/2016

Vadnais Heights MN — Well/Pump Name: E

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **483** L 2-5 **481** L 3-6 **484** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **475** L 2-5 **474** L 3-6 **475** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **158.0** L2 **156.0** L3 **159.0** Utilization **93%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **26'** Pumping **84'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for long over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/8/2016
Well/Pump Name: F

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **488** L 2-5 **491** L 3-6 **490** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **482** L 2-5 **485** L 3-6 **484** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **156.0** L2 **152.0** L3 **156.0** Utilization **92%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Meter Is Broken** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **25'** Pumping **103'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years since it was installed in the well.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/8/2016

Vadnais Heights MN — Well/Pump Name: G

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **487** L 2-5 **490** L 3-6 **488** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **480** L 2-5 **482** L 3-6 **486** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **134.0** L2 **135.0** L3 **134.0** Utilization **95%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **1800** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **Not Metered** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **NO** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **No Access** Pumping **No Access** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for long over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

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"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/8/2016

Vadnais Heights MN — Well/Pump Name: H

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **490** L 2-5 **491** L 3-6 **491** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **340** L 2-5 **340** L 3-6 **340** Hertz **45** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **142.0** L2 **140.0** L3 **141.0** Utilization **64%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **924** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **24'** Pumping **84'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

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"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS) — Date: 6/8/2016

Vadnais Heights MN — Well/Pump Name: I

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **493** L 2-5 **491** L 3-6 **494** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **340** L 2-5 **341** L 3-6 **340** Hertz **45** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **136.0** L2 **135.0** L3 **136.0** Utilization **61%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **920** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **22'** Pumping **85'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/8/2016
Well/Pump Name: J

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **488** L 2-5 **490** L 3-6 **490** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **295** L 2-5 **300** L 3-6 **301** Hertz **38** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **107.0** L2 **108.0** L3 **107.0** Utilization **48%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **2315** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **27'** Pumping **80'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit is operating properly at this time however, the pump has been in service for over 5 years.

Report By: **Tim McCarthy**

McCARTHY WELL COMPANY

590 Citation Drive - Suite I, Shakopee MN 55379-1862
Phone 952-854-5333 ~ Fax 952-445-1950

"THERE'S NO SUBSTITUTE FOR EXPERIENCE"

"18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Vadnais Heights Station (SPRWS)
Vadnais Heights MN

Date: 6/8/2016
Well/Pump Name: K

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection.

1. Check Wiring & Connections- **Good** — ◉ Good ○ Fair ○ Poor
2. Check Starter Overload Protection- **Good** — ◉ Good ○ Fair ○ Poor
3. Check Voltage Supply- L 1-4 **495** L 2-5 **490** L 3-6 **493** — ◉ Good ○ Fair ○ Poor
4. Check Voltage Running- L 1-4 **455** L 2-5 **456** L 3-6 **455** Hertz **60** — ◉ Good ○ Fair ○ Poor
5. Check Motor Amps- L1 **201.0** L2 **198.0** L3 **199.0** Utilization **90%** — ◉ Good ○ Fair ○ Poor
6. Check Resistance Between Line & Ground- L1 **Good** L2 **Good** L3 **Good** — ◉ Good ○ Fair ○ Poor
7. Check Resistance Between Motor Windings- L1-2 **Good** L2-3 **Good** L1-3 **Good** — ◉ Good ○ Fair ○ Poor
8. Check Pump & Motor Operating R.P.M.- **Variable** — ◉ Good ○ Fair ○ Poor
9. Check Temperature-Motor **Good** Well Room **Good** — ◉ Good ○ Fair ○ Poor
10. Check Bearing Lube-Motor Top **Good** Bottom **Good** Pump Prelube **OK** — ◉ Good ○ Fair ○ Poor
11. Check Bearing Noise-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
12. Check Vibration-Motor **Good** Pump **Good** Right Angle Dr **NA** — ◉ Good ○ Fair ○ Poor
13. Check Discharge Head Packing Box Bearing- **Good** — ◉ Good ○ Fair ○ Poor
14. Check Discharge Line Check Valve- **Good** Pump Foot Valve **NA** — ◉ Good ○ Fair ○ Poor
15. Check Start/Stop Cycle- **Good** Air Relief/Vacuum Breaker **Good** — ◉ Good ○ Fair ○ Poor
16. Check Condition Of Water- **Good** — ◉ Good ○ Fair ○ Poor
17. Check Pumping Rate- **4140** ◉ G.P.M. ○ C.F.P.M. Is The Pump Throttled? **Yes** — ◉ Good ○ Fair ○ Poor
18. Check Water Levels-Static **47'** Pumping **89'** Yield **Good** GPM Per Foot of Draw Down — ◉ Good ○ Fair ○ Poor

Comments:
This unit appears to be operating properly at this time.

Report By: **Tim McCarthy**

Appendix II

Water Level Monitoring Plan

SAINT PAUL REGIONAL WATER SERVICES
WELL MONITORING PROGRAM
October 24, 2016

Saint Paul Regional Water Services (SPRWS) monitors water level data for wells B-K to ensure wells are at adequate levels. All SPRWS production wells are manually measured on a bi-weekly basis, while readings from wells F-K can be monitored instantaneously by SCADA.

In the summer of 2014, SPRWS performed a pumping test to determine well drawdown interference when all ten SPRWS wells operate simultaneously. The SPRWS wells were operated for a period of two weeks providing 45MG/D of water supply. Based the report recommendations, in the event that SPRWS needs to rely on the well field for a period that exceeds two weeks, the following actions shall be taken.

1. Contingency plans shall be made to supply Five Star Mobile Home Park with emergency water, in the event their well becomes inoperable.
2. Wells shall be closely monitored to ensure that pumping levels remain with safe limits. Wells that do not have SCADA will be monitored by daily measurements.

The following report summarizes the findings of the aquifer pumping test to verify that all of the SPRWS wells can operate simultaneously under emergency conditions without significant interference or excessive drawdown.

February 20, 2015
File: 193800766

Attention: Issac Afwerke
Saint Paul Regional Water Services
1900 Rice Street
St. Paul, MN 55113-6810

Dear Mr. Afwerke,

Reference: Summary Report of SPRWS Aquifer Pumping Test

The following report summarizes the aquifer pumping test conducted on St. Paul Regional Water Services' (SPRWS) well field. The purpose of the test was to verify that all of the SPRWS wells can operate simultaneously under emergency conditions without significant interference or excessive drawdown. This pumping test was conducted to produce the following end products:

1. The test was designed to determine whether all of the wells could be run simultaneously without excessive drawdown interference.
2. Pumping levels were be compared against predicted levels, to determine if assumptions made from the model will hold up over sustained use of the well field.

All ten wells total were run during the summer of 2014 at a rate of approximately 45 million gallons per day, to meet the anticipated threshold that SPRWS would need to maintain in the event that the surface water resource became temporarily unusable.

Pumping Test Schedule

In order to test the sustainability of using all ten wells to meet St. Paul's water supply demands, the pumping test was run for two weeks. Since SPRWS only experiences sustained demands of 45 MG/day in the mid-summer months, the test was run from July 22 to August 5.

The test was conducted after all of the wells had been rested at least two weeks, in order to bring water levels back to "static" condition. The start date was July 22, 2014, with all wells being brought online on the same day, starting at 9:00am. Pumping was be sustained as consistently as possible until August 5, 2014, when all ten wells were shut off, with shutdown starting at 9:00am. At this point, the system transitioned back to surface water usage and recovery was monitored.

During the aquifer pumping test, there were no reports of well outages due to excessive interference with nearby wells.

Reference: Summary Report of SPRWS Aquifer Pumping Test

Pumping Test Data Collection

SPRWS collected manual water level information from all of the wells prior to the start of the test. These readings recorded the "static" water levels at each well. Manual measurements were also collected from each well periodically throughout the test, including measurements before the wells were shut off (to record the maximum drawdown observed) and measurements during the recovery period.

The SCADA system at Wells F, G, H, I, J, and K was programmed to record water level data at one-minute intervals throughout the pumping and recovery test.
Wells B, C, D, and E do not have SCADA readings for water levels or pumping rates. As such, SPRWS staff collected daily manual measurements of pumping water levels from these four wells. While the performance data of these four wells is already well-established, these manual measurements helped to record any additional drawdown interference that occurred when operating all ten wells simultaneously.

Monitoring Wells

For the aquifer pumping test, the ten SPRWS wells were the primary proposed monitoring points. However, additional monitoring points were selected based on conversations with DNR staff and surrounding local units of government, in order to quantify the amount of well interference seen beyond the SPRWS well field.

Before conducting the pumping test, an inventory all known Prairie du Chien and Jordan aquifer wells within the vicinity of the SPRWS well field was undertaken. The inventory used County Well Index as the primary database for a starting point, then was expanded upon by meeting with other local units of government and contacting numerous well owners to establish the current status of each identified well. Figure 1 and Table 1 show the inventory of wells that were identified.

A large number of the identified wells were found to no longer be in active service. Wells that were still in service were identified as potential monitoring locations for the aquifer pumping test. The following wells were monitored:

1. North Oaks monitoring well MW-17L at 8 Edgewater Lane (Unique Number 717787)
2. Joe's Sporting Goods well at 33 County Road B in Little Canada (Unique Number 655935)
3. Sucker Lake Park well at 2015 Van Dyke Street in Vadnais Heights (Unique Number 667962)
4. Shoreview Well 1 (Lake Judy) at 4665 Victoria Street North in Shoreview (Unique Number 206833)
5. Vadnais Heights Well 3 in the City of Vadnais Heights (Unique Number 224790).

The locations of these wells are displayed on Figure 1. Monitoring of the North Oaks monitoring well, the Sucker Lake Park well, and Shoreview Well 1 were accomplished with the installation of data loggers in each well, with the data collected and reported by the Minnesota DNR. Monitoring of the Joe's Sporting Goods well was accomplished by manual data collection, using a steel tape. And monitoring of Vadnais Heights Well 3 was accomplished by manual measurements collected by the City of Vadnais Heights staff.

Other wells that were attempted to be monitored include:

1. Five Star Mobile Home Park (Unique Number 238997) – Attempts to install a water level probe and data logger in this well were unsuccessful. The vent pipe on this well did not open directly to the inner casing. During the test, periodic contact was maintained with the well operator for the mobile home park, to ensure that well performance was not being noticeably impacted by the aquifer pumping test. Provisions were made in advance of the pumping test to ensure that an alternate water source, from the nearby hydrant, could be made available to the mobile home park in the event that the well failed during the test. No such failure occurred.
2. Independent School District well (Unique Number 205789) – Attempts to install a water level probe in this well failed, since the vent pipe makes a bend inside the well casing. This well is used as an irrigation well for the school and is not a critical well for maintain potable supply. There were no plans made by school staff to operate the well during the aquifer test, so it is not known if the aquifer test had a potential impact on the performance of this well.

In addition to the wells outlined on Table 1, there is a possibility that other active wells exist in the area that utilize the Prairie du Chien and Jordan aquifers. Contact was made with local units of government and select local well drillers to inform them of aquifer pumping test, in the event that well outages were reported during the duration of the test. No well outages were known to be reported in the vicinity of the SPRWS well field during the aquifer pumping test.

Test Observations

The key observations from the wells that were monitored during the pumping test are summarized in Table 2. A comparison of the "static" water level was made against the water level measured in each well prior to the termination of the pumping portion of the test. The difference between these measurements is the amount of "drawdown" that was observed at each well.

For the SPRWS wells, drawdown at the wells ranged between 59.0 feet (at Well K) and 179.7 feet (at Well G). The range of drawdown was between 80-110 feet for most of the other SPRWS wells.

For the monitored observation wells outside of the SPRWS well field, observed drawdown ranged between 2.70 feet (at the North Oaks monitoring well) to 9.10 feet (at Shoreview Well 1). Factors affecting the observed drawdown include the distance from the SPRWS pumping wells and the aquifer that the observation well was open to. Wells closer to the SPRWS well field showed more drawdown. Additionally, wells completed in the Jordan also tended to show more drawdown. Due to the somewhat unusual linear layout of the SPRWS well field, a simple distance-drawdown relationship is difficult to establish.

Comparison with Predicted Pumping Levels

The key performance benchmark from the pumping test was that all ten of the SPRWS wells were able to operate for a period of at least two weeks, providing 45 MG/D of water supply, without experiencing adverse well interference issues. This demonstrated the ability of the well field to serve as a viable emergency water supply source in the event that surface water from the Mississippi River and/or Lake Vadnais was to become temporarily unavailable.

Previous predictions were made regarding the potential level pumping level that might occur at each well, when the well field was run with all ten wells pumping simultaneously. These predictions were made using a combination of observed pumping levels during well development and predicted well interference from the MODFLOW model that was previously used to help site the locations Wells H, I, J, and K in 2005. Table 3 shows the predicted pumping levels based on this modeling.

Since computer groundwater models attempt to represent complex hydrologeologic system in a relatively simplistic manner, the actual pumping levels would remain unknown until the aquifer pumping test could be conducted. The primary purpose of running this test was to ensure that the actual pumping levels did not exceed the design capacity of the wells. The final four columns of Table 3 show the results of the aquifer pumping test, including the pumping rates, observed static water levels, observed pumping levels at the end of the two-week pumping test, and the remaining amount of water above each pump at the end of the aquifer test. The remaining amount of water shows that the wells could have experienced between 35 feet (at Well C) and 121 feet (at Well H) of additional drawdown, before the pumps pulled in air.

A comparison between the predicted pumping levels and the observed pumping levels shows that while some wells were relatively close to the predicted levels, other wells fell somewhat short of predictions. In all cases, the predicted pumping levels was lower (in elevation) than the observed pumping level. This was primarily because the model of the southern half of the well field was initially based on the performance test results from Well G. The 2014 aquifer pumping test has since demonstrated that the performance of the aquifer at Well G is considerably lower than it is

elsewhere in the well field. As such, the model was overly conservative in predicting the amount of drawdown.

In the event that the SPRWS were required to be run for a longer time frame, additional drawdown may be observed over time. Wells with less available drawdown could potentially require that pumping rates be reduced in order to keep water above the bowls. An alternative solution would be lower the pumps in those wells to ensure that sufficient available head remains, should there be an emergency situation that requires all of the wells to pump simultaneously for an extended period.

Based on the observations from the aquifer pumping test, however, none of the wells appeared to be in immediate danger of exceeding the available drawdown limits. Therefore, it is assumed the well field can be relied upon, if needed, to pump for a period exceeding two weeks.

Recommendations

1. Wells C, D, E, and K are the most efficient wells, with the highest amount of specific capacity. From an operational standpoint these wells will provide the greatest amount of output with the least potential for drawdown interference. When only a few wells are needed, these wells should be considered for primary use.
2. Well G has the lowest specific capacity and provides the least output with the greatest amount of drawdown. This appears to be due to somewhat lower productivity of the Prairie du Chien and Jordan aquifer at this location. This well should be utilized last whenever possible, to help maximize well field efficiency.
3. In the event that SPRWS needs to rely on the well field for a period that exceeds two weeks, contingency plans should be made to help supply the Five Star Mobile Home Park with emergency water, in the event that their well becomes inoperable. Likewise, if an extended pumping period causes adverse impact to any other wells, the DNR will require that SPRWS provide a remedy to the affected well owner. A remedy would include lowering the pump elevation in the affected well, replacing the well, or connecting the property to an alternate water supply source. SPRWS should be prepared to provide alternate water to private well owners in emergency situations that require extended use of the SPRWS well field.
4. Extended pumping of all wells should trigger close monitoring of water levels in all of the SPRWS wells to ensure that pumping levels remain within safe limits. For wells that do not have a SCADA connection, daily manual measurements of the pumping levels should be collected.

Reference: Summary Report of SPRWS Aquifer Pumping Test

5. Wells H, I, J, and K were supplied with well level monitors. Should pumping water levels drop to a pre-programmed setting, the wells will automatically shut down. These automatic pump "off" settings can be adjusted to a lower pumping level if needed.
6. Lowering the pumps in the wells can help ensure that the pumps remain submerged, decreasing the likelihood that drawdown in emergency situations could compromise well performance. The final column of Table 3 showed that the pumping water levels in Wells B, C, and D came within 50 feet of the pumps during the aquifer test. Should the wells be needed to pump longer than two weeks, that margin of safety will likely be less.

We hope this summary report provides you with useful information regarding the future operation of your well field. If you have any questions about the results of the pumping test or the performance of your wells, please contact me.

Regards,

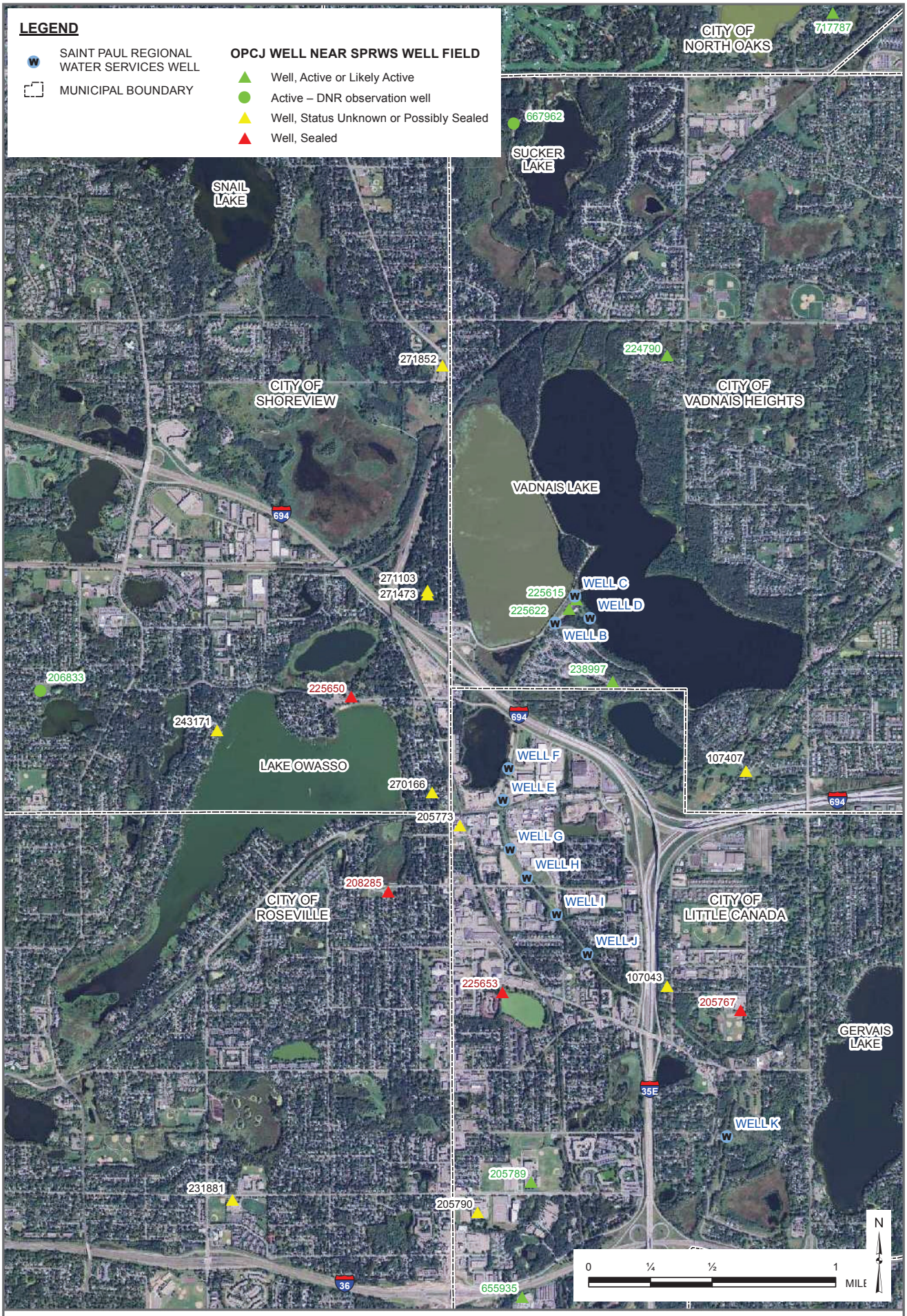
Stantec Consulting Services, Inc.

Mark Janovec, PG
Senior Scientist
Phone: 651-604-4831
Fax: 651-636-1311
mark.janovec@stantec.com

Attachment: Attachment

c. Daryl Kirshenman, Stantec

jm document3



Stantec

2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

February 2015

FIGURE 1 - PRAIRIE DU CHIEN-JORDAN AQUIFER WELLS IN THE VICINITY OF SPRWS WELL FIELD

SAINT PAUL REGIONAL WATER SERVICES

V:\1938\active\193800766\GIS\Projects\Figure 1 - Wells.mxd

Table 1 - Wells Completed in Prairie du Chien or Jordan Aquifer in Vicinity of SPRWS Well Field

Unique Number	Town-ship	Range	Section	Quarter Section	UTM E COORD	UTM N COORD	Coordinate Accuracy	Depth (ft)	Use	Aquifer	Casing Diameter (inches)	Last known status	Address	Name on File	Notes
107043	29	22	6	DABBAC	493043	4985813	GPS	440	Domestic	PDC	4	Inactive?	2875 Centerville Road, St. Paul	Philem Ducharme	Home on municipal water since 1982.
107407	30	22	32	CCADAA	493558	4987214	GPS	224	Domestic	Multiple	4	Active	3205 Centerville Road, St. Paul	Frank Frattalone	Current status unknown.
205767	29	22	5	CCAABD	493522	4985654	GPS	490	Public Supply	Jordan	8	Sealed	1967 Eli Road, Little Canada	Ind. School District 623	School on municipal water. Well is sealed.
205773	29	22	6	BBBBAA	491693	4986860	GPS	367	Industrial	PDC	5	Inactive?	3094 Rice Street	Cath Brothers Fuel	Business now on municipal water.
205789	29	22	7	BDCACD	492156	4984532	GPS	513	Public Supply	Jordan	10	Inctive	15 County Road B2	Ind. School District 623	Irrigation well, open but may soon be sealed. Unable to access with instrument.
205790	29	22	7	CBAB	491808	4984334	GPS	528	Public Supply	Jordan	10	Sealed?	70 County Road B2	Capital View Jr. High	Likely sealed, no longer school property.
206833	30	23	35	BDCDDC	488960	4987738	GPS	536	Municipal	Jordan	12	Active	4665 Victoria Street N	City of Shoreview	Well used by DNR as an observation well. DNR Obwell number is 62030.
208285	29	23	1	ACAAAA	491227	4986429	GPS	495	Public Supply	Jordan	12	Sealed?	Owasso Boulevard, Roseville	Minnesota Water	Likely sealed.
224790	30	22	30	AADBAB	493044	4989930	GPS	495	Community	PDC	16	Active		Vadnais Heights 3	Will be monitored by SCADA by Vadnais Heights.
225615	30	22	31	ABCBCD	492404	4988272	GPS	659	Municipal	Multiple	10	Active		Vadnais Station 9	Too close to wells to provide useful data.
225622	30	22	31	ABBCDA	492453	4988335	GPS	726	Community	Multiple	4	Active		Vadnais Station A	Too close to wells to provide useful data.
225650	30	23	36	DBBABD	490986	4987701	GPS	700	Municipal	Multiple	16	Sealed	375 Owasso Boulevard, Shoreview	Wabasso Unit No. 1	Well has been sealed.
225653	29	22	6	CACBCB	491971	4985774	GPS	417	Other	PDC-Jordan	10	Sealed		Round Lake Unit No. 12	Well has been sealed.
231881	29	23	12	CBBAAB	490213	4984416	GPS	464	Public Supply	Jordan	8	Not in Use	Dale Street, Roseville	Concordia Luther	Possibly sealed
238997	30	22	31	ACDCAD	492689	4987802	GPS	459	Community	Jordan	12	Active	200 Mayfair Road, Vadnais Heights	Five Star MHP 1	Well active, but inaccessible for monitoring instruments.
243171	30	23	36	CBCBDD	490112	4987482	GPS	325	Domestic	PDC	4	Active	3270 Owasso Height	Ancell Keys	Current status unknown.
270166	30	23	36	DDDBDB	491512	4987075	GPS	345	Domestic	PDC	4	Active	211 East Owasso Lane, Shoreview	Bill Gangl	Current status unknown.
271103	30	23	36		491483	4988396	Estimated	295	Domestic	PDC?	4	Active	3558 Rustic Place, Shoreview	Vernon Welch	Current status unknown.
271473	30	23	36		491483	4988367	Estimated	369	Domestic	PDC?	4	Active	3546 Rustic Place, Shoreview	WH Mikesell	Current status unknown.
271852	30	23	25		491582	4989861	Estimated	360	Unknown	PDC?	4	Active	4025 Rice Street, Shoreview	Pure Oil Station	Current status unknown.
655935	29	22	7	CDCBDA	492099	4983783	GPS	358	Industrial	PDC	4	Active	33 County Road B, Little Canada	Joe's Sporting Goods	Most likely active.
667962	30	22	19	BACCBD	492045	4991442	GPS	260	Public Supply	PDC	4	Active	2015 Van Dyke Street N	Ramsey County Parks	Well used by DNR as observation well.
717787	30	22	17	DBCDCD	494122	4992165	GPS	290	Monitoring	PDC	4	Active	8 Edgewater Lane, North Oaks	MW-17L	Will monitor with DNR instrument.

Table 2 - Drawdown Summary, SPRWS 2014 Aquifer Pumping Test

Well Name	Unique Number	Pumping or Observation Well	Average Pumping Rate (gpm)	Distance From Nearest SPRWS Well (feet)	Well Type	Aquifer	Pre-Test Readings		Pre-Shutdown Readings		Total Observed Drawdown (feet)	Manual or Logger Data
							Static Water Level (feet)	Date and Time	Depth to Water (feet)	Date and Time		
SPRWS Well B	133312	Pumping	2350		Municipal	PDC-Jordan	23.0	7/21/2014	128.8	8/4/2014	105.8	Manual
SPRWS Well C	127292	Pumping	4000		Municipal	PDC-Jordan	21.9	7/21/2014	95.3	8/4/2014	73.4	Manual
SPRWS Well D	151583	Pumping	4100		Municipal	PDC-Jordan	25.3	7/21/2014	108.8	8/4/2014	83.5	Manual
SPRWS Well E	151579	Pumping	3600		Municipal	PDC-Jordan	28.7	7/21/2014	116.5	8/4/2014	87.8	Manual
SPRWS Well F	706803	Pumping	3400		Municipal	PDC-Jordan	28.1	7/21/2014	140.5	8/4/2014	112.4	Manual
SPRWS Well G	706802	Pumping	1750		Municipal	PDC-Jordan	24.1	7/21/2014	203.8	8/4/2014	179.7	Manual
SPRWS Well H	753666	Pumping	3000		Municipal	PDC-Jordan	26.1	7/21/2014	137.1	8/4/2014	111.0	Manual
SPRWS Well I	753667	Pumping	3000		Municipal	PDC-Jordan	27.1	7/21/2014	129.9	8/4/2014	102.8	Manual
SPRWS Well J	759568	Pumping	3000		Municipal	PDC-Jordan	27.8	7/21/2014	134.5	8/4/2014	106.7	Manual
SPRWS Well K	759569	Pumping	3000		Municipal	PDC-Jordan	48.8	7/21/2014	107.8	8/4/2014	59.0	Manual
Vadnais Heights 3	224790	Observation	NA*	5,520	Municipal	PDC-Jordan	68.0	7/22/2014 7:55	76.3	8/5/2014 9:20	8.3	Manual
Joe's Sporting Goods	655935	Observation	0	5,560	Industrial	Prairie du Chien	110.17	7/21/2014 13:42	117.94	8/4/2014 16:08	7.77	Manual
Shoreview 1 (Lake Judy)	206833	Observation	0	10,150	Municipal	Jordan	841.10	7/22/2014 8:00	832.00	8/5/2014 8:00	9.10	Logger
Sucker Lake Park 1	667962	Observation	0	10,200	Public	Prairie du Chien	27.37	7/22/2014 8:00	31.64	8/5/2014 8:00	4.27	Logger
North Oaks Monitoring	717787	Observation	0	13,650	Monitoring	Prairie du Chien	32.19	7/22/2014 8:00	34.89	8/5/2014 8:00	2.70	Logger

* Well pumped periodically during pumping test, but was at rest when water level readings were collected.

Elevation Reading (feet)

Table 3 - Comparison of Predicted Pumping Levels Against Observed Pumping Levels

Current Well Conditions									Original Modeled Predictions				Summer 2014 Aquifer Test Observations			
Well Name	Well Depth (feet)	Casing Depth (feet)	Depth to Top of Aquifer (feet)	Original Static Water Level (feet)	Maximum Possible Pump Setting (feet)*	Current Depth of Pump (feet)	Remaining depth pump can be lowered (feet)	Static Column of Water Above Current Pump Setting (feet)	Original Modeled Pump Capacity (gpm)	Pumping Level Running at Original Capacity (feet)**	Predicted Drawdown Interference From All Other Wells (feet)[t]	Predicted Pumping Level With All Wells Running (feet)	Pumping Rates from Aquifer Test (gpm)	Observed July 2014 Static Water Levels (feet)	Observed 2014 Pumping Level With All Wells Running (feet)[tt]	Remaining Water Above Pump With All Wells Running (feet)
Well B	438	237	236	24	217	170	47	146	2350	112	78	190	2350	23	129	41
Well C	442	233	212	23	213	130	83	107	4000	33	66	99	4000	22	95	35
Well D	450	241	239	27	221	145	76	118	4100	69	69	138	4100	25	109	36
Well E	463	311	311	32	291	210	81	178	3600	96	86	182	3600	29	117	93
Well F	465	315	297	29	295	200	95	171	3300	121	86	207	3400	28	141	59
Well G	465	311	304	30	291	270	21	240	1850	194	93	287	1750	24	204	66
Well H	464	310	306	14	290	260	30	246	3300	101	86	187	3000	26	137	123
Well I	465	310	309	31	290	250	40	219	3300	112	81	193	3000	27	130	120
Well J	465	314	308	31	294	250	44	219	3300	113	74	187	3000	28	135	115
Well K	425	264	267	49	244	200	44	151	3300	116	27	143	3000	49	108	92
									32,400	gpm total			31,200	gpm total		
									46,656,000	gallons/day			44,928,000	gallons/day		

* assumes pump is set 20 feet above bottom of casing

** data based on initial well performance testing, with no well interference

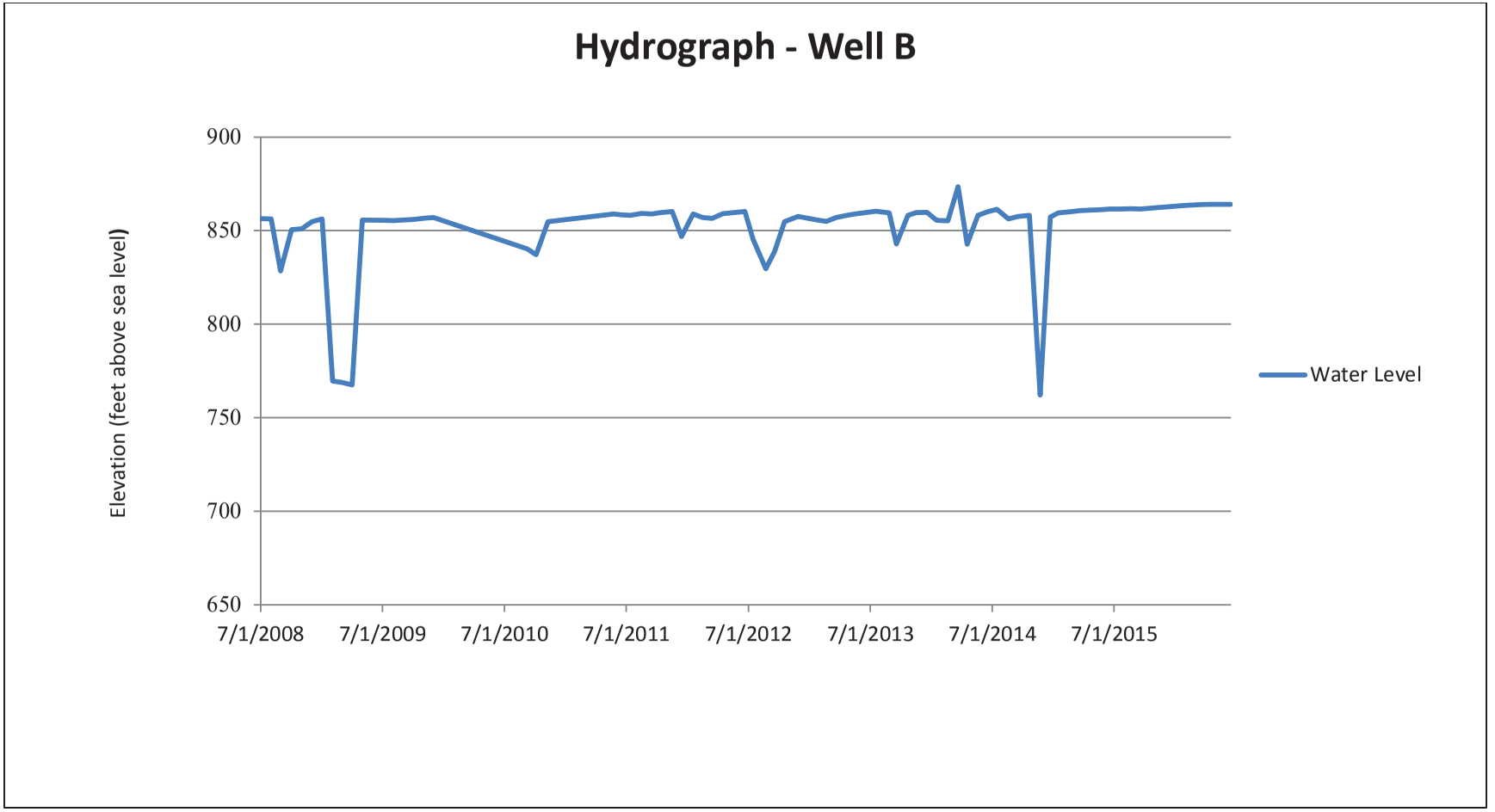
[t] dervied from computer groundwater model

[tt] levels measured at end of two-week pumping test

Appendix III

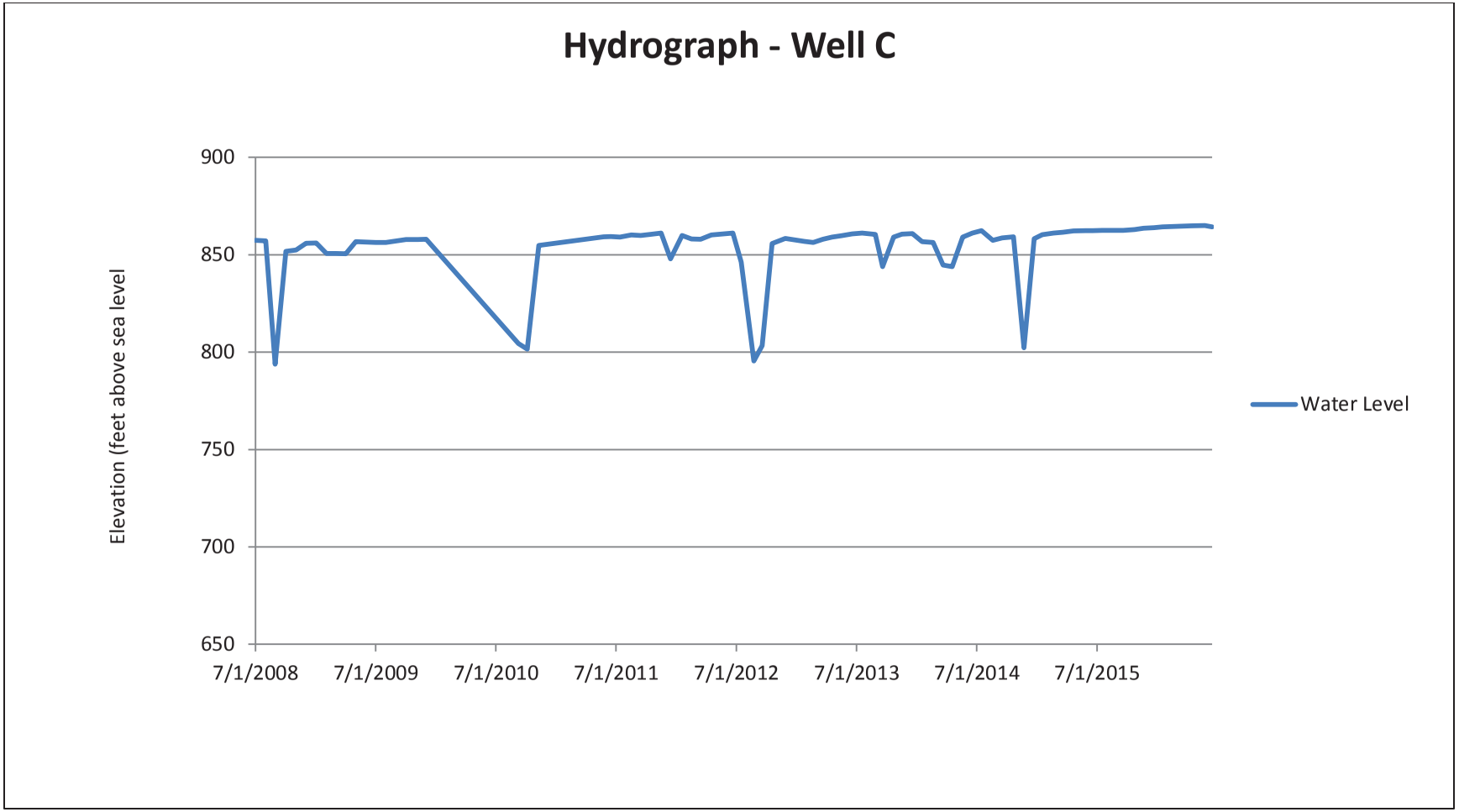
Water Level Graphs

Appendix III – Local Water Supply Plan – Water Level Graphs



*Note: Significant water level variation is associated with SPRWS well activity.

Appendix III – Local Water Supply Plan – Water Level Graphs



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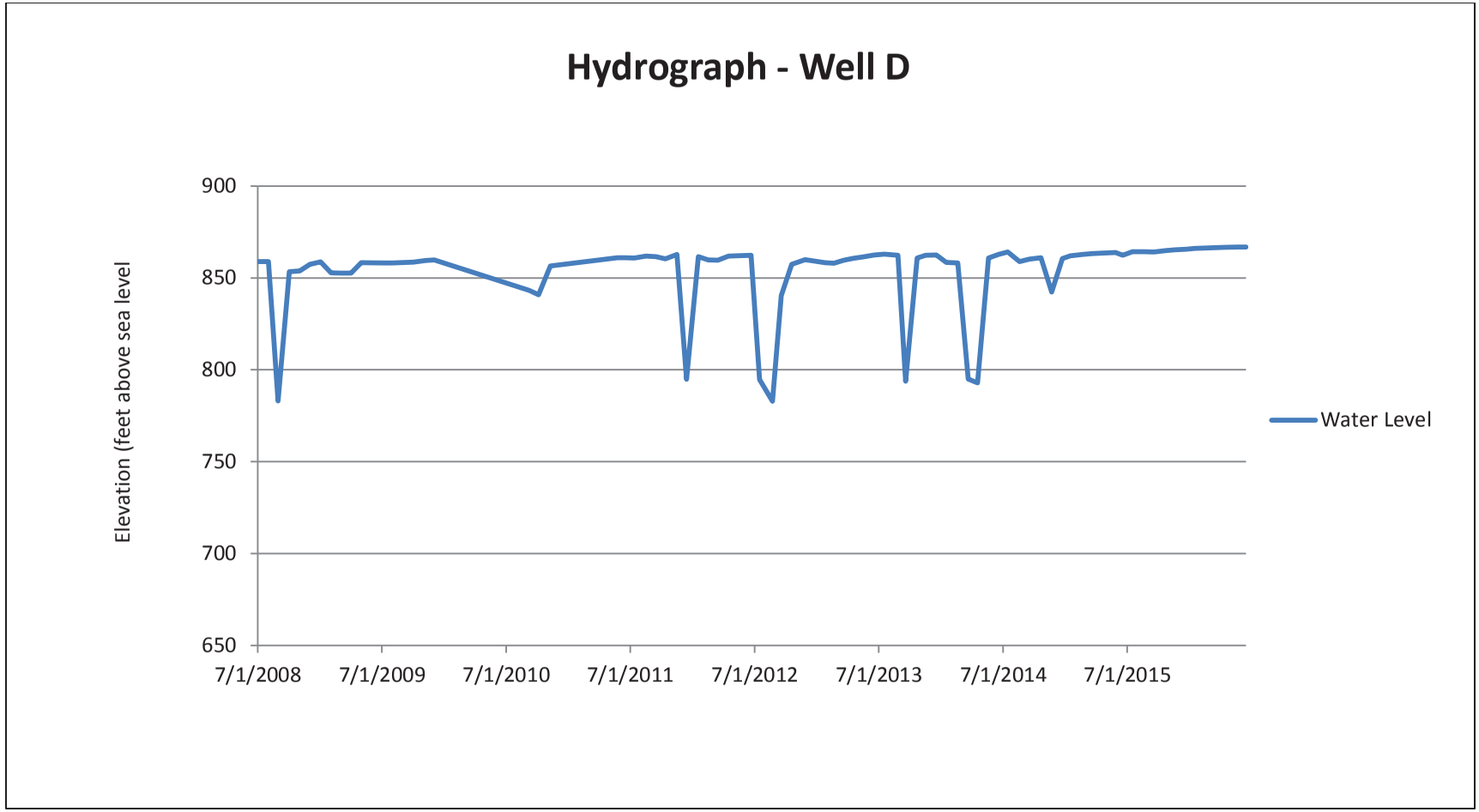

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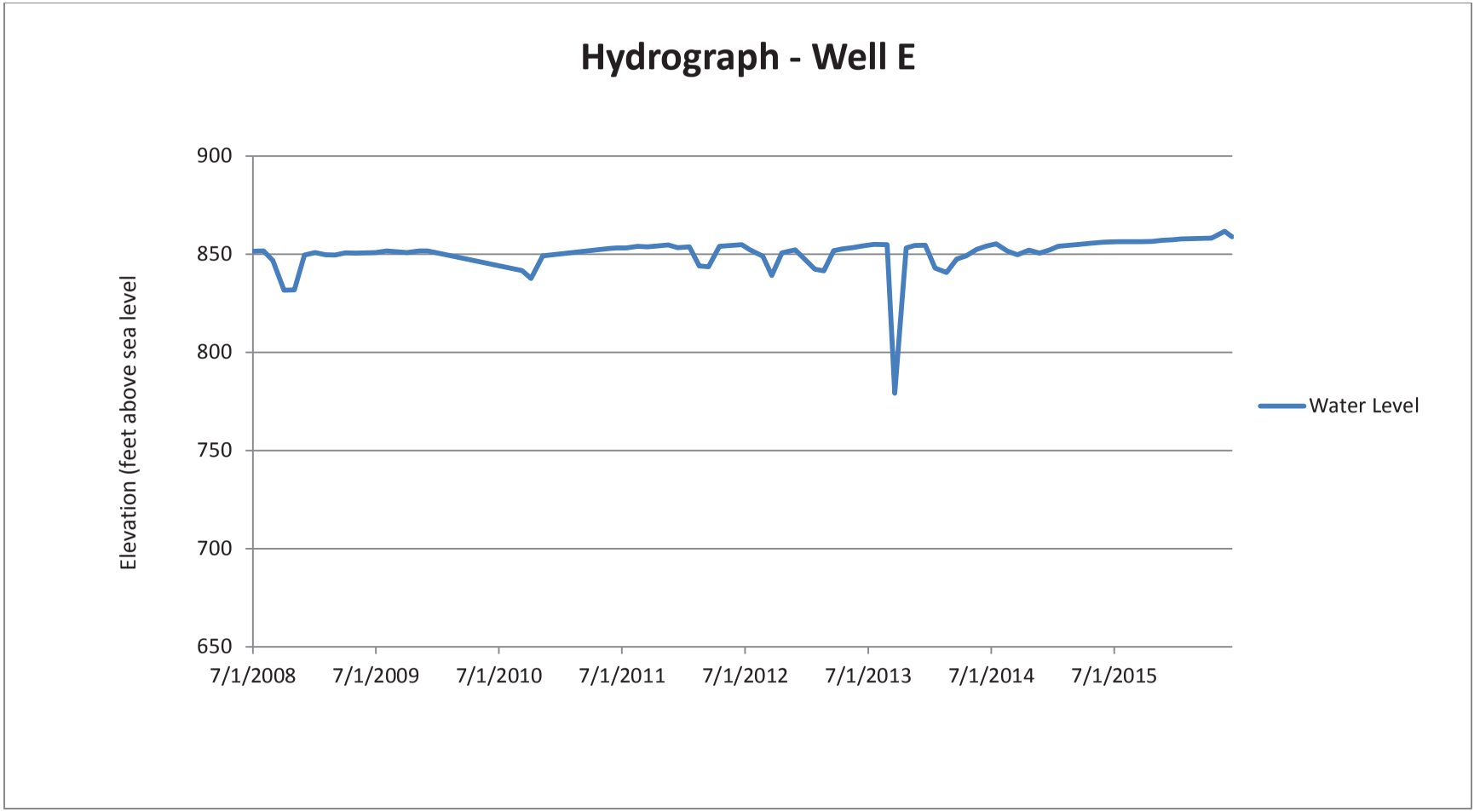

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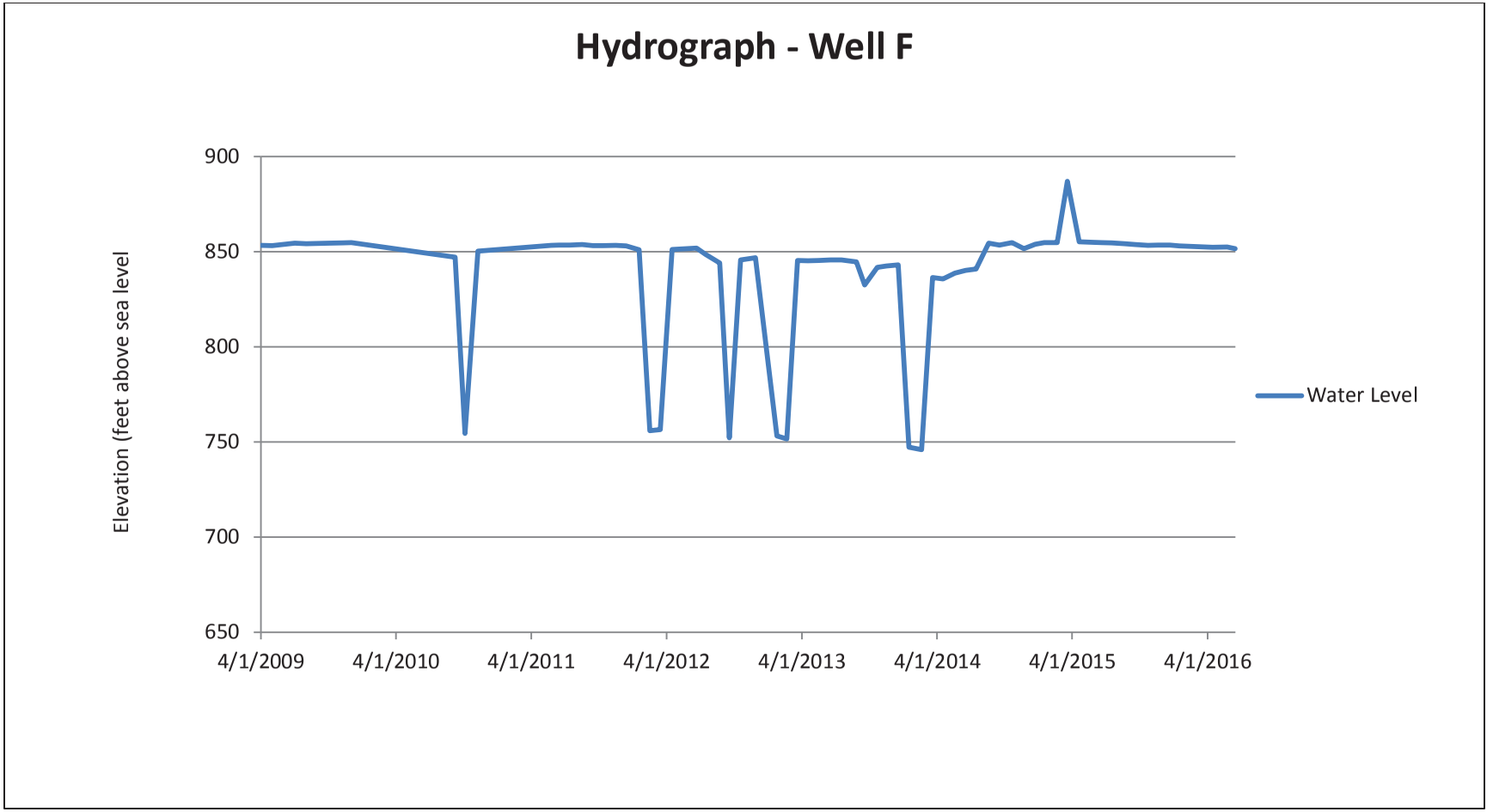

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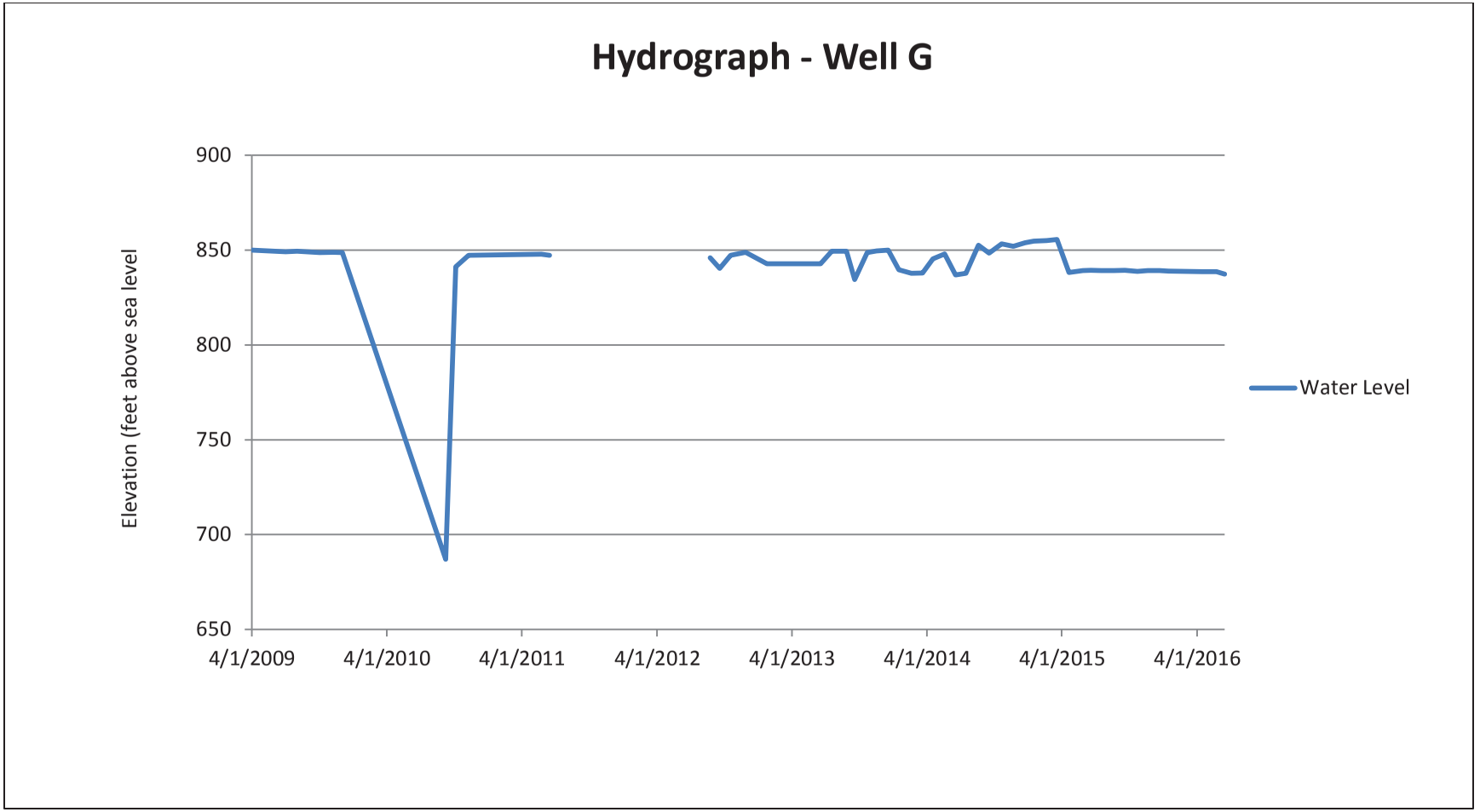

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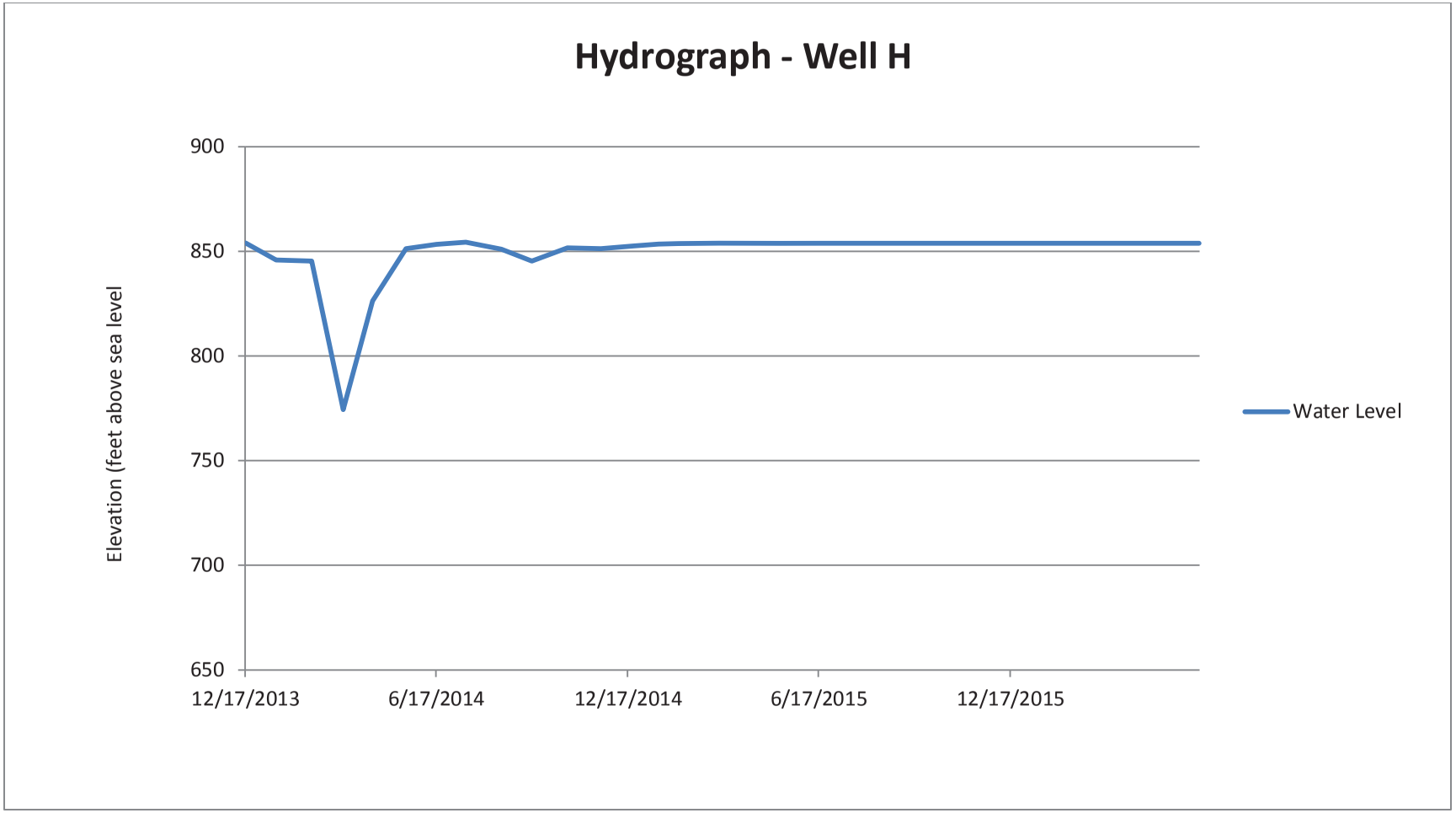

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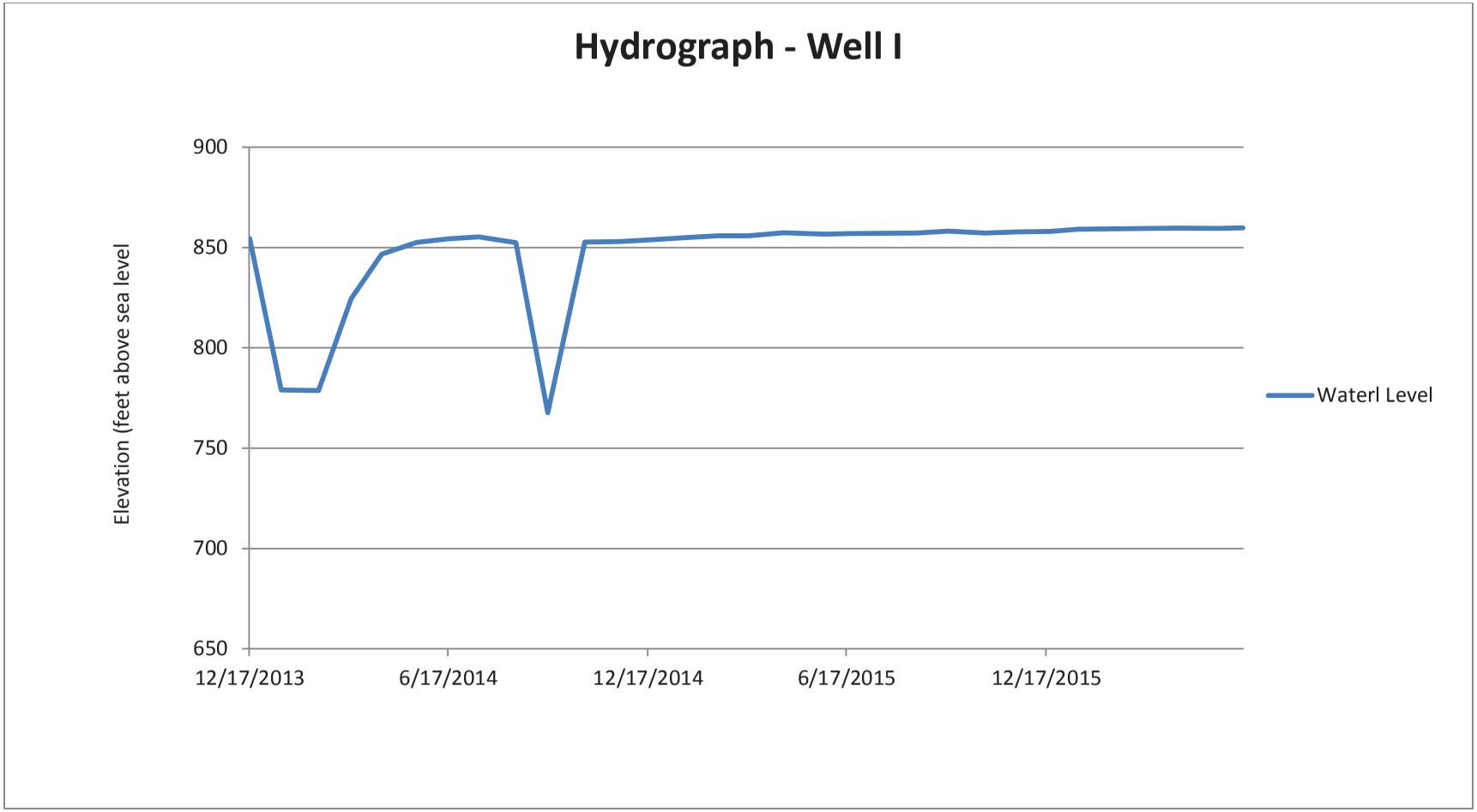

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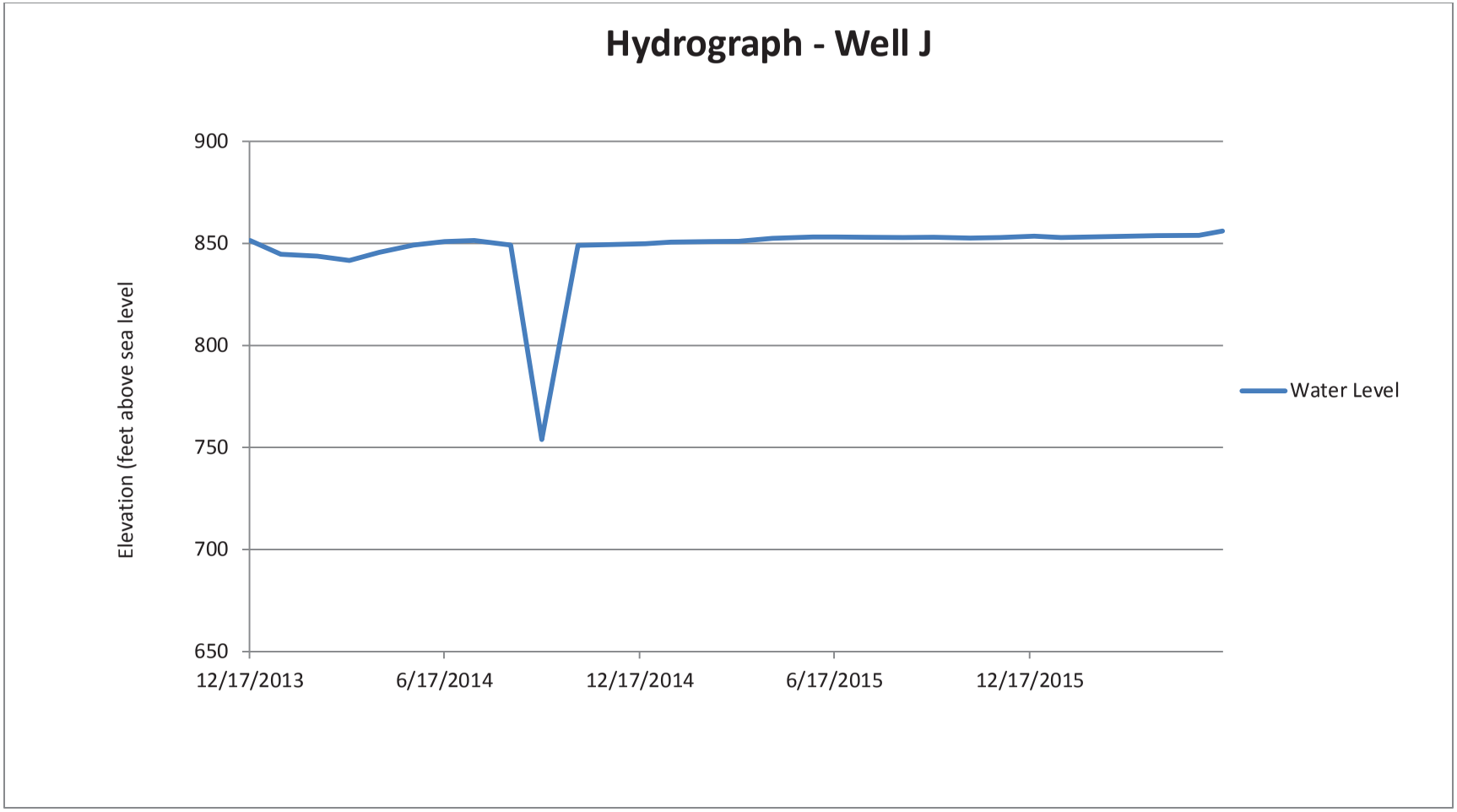

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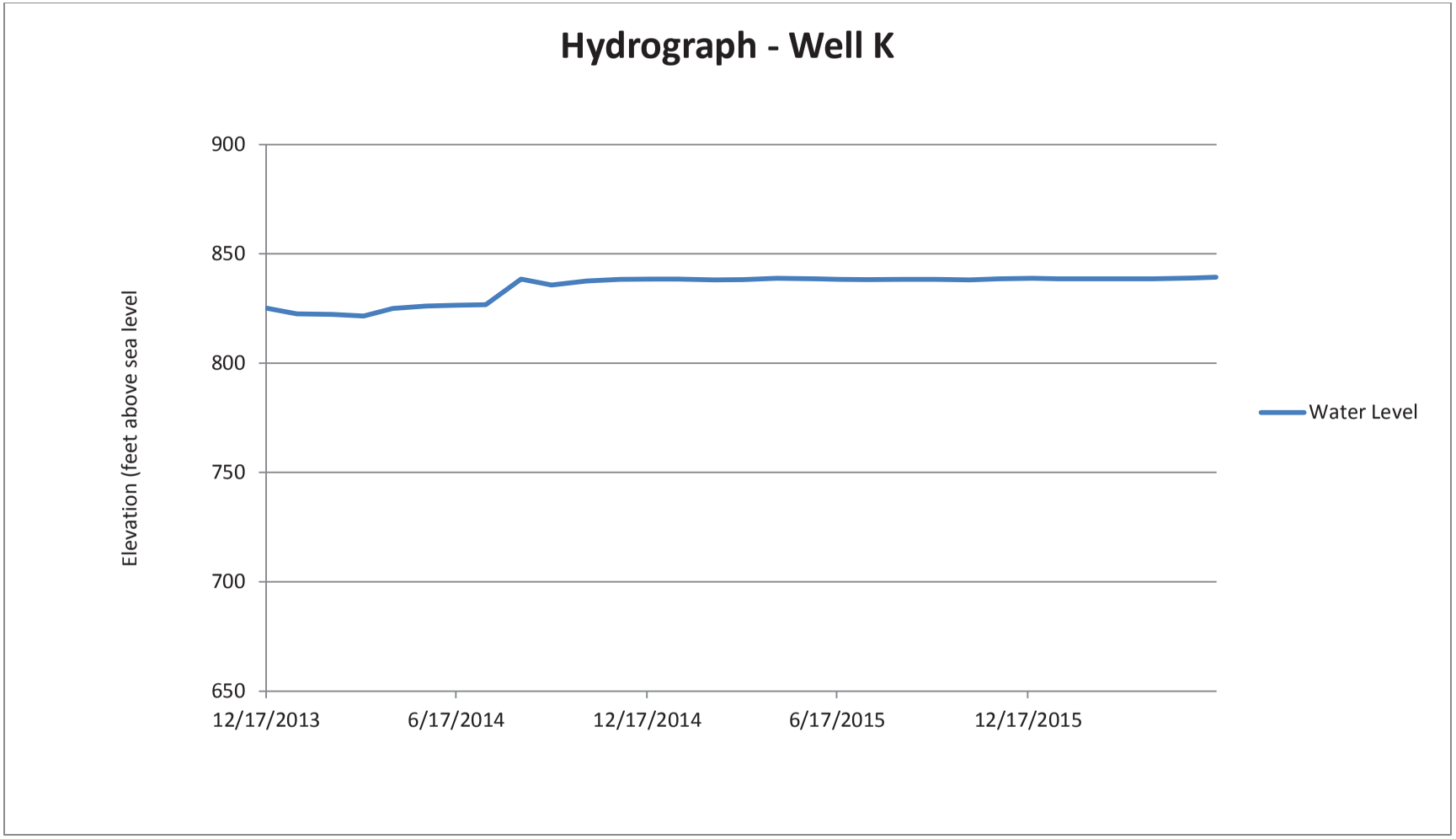


*Note: Significant water level variation is associated with SPRWS well activity.

Appendix IV

Capital Improvement Plan

Final Report

Saint Paul Regional Water Services Master Plan

Prepared for

Saint Paul Regional Water Services

August 2014

CH2MHILL®

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly registered Professional Engineer under the laws of the State of Minnesota.

Print Name: Roger Scharf

Signature: Roger Scharf

Date 8/21/14 License# 50023

Executive Summary

Purpose

The Saint Paul Regional Water Services (SPRWS) Board has established a strategic goal of improving the asset management capability of the SPRWS (Strategic Goal No. 3). This Master Plan has been developed in support of that goal. The Master Plan identifies the major capital improvements that will be needed over the 40 year planning horizon and a road map for orderly implementation.

This Master Plan focused on water supply, treatment, and pumping facilities. SPRWS has completed an assessment of their water distribution system infrastructure, including elevated tanks and distribution pipes, prior to this Master Plan in a separate report (Water Main Prioritization Technical Memorandum, AECOM 2014). The cost estimates from that report are included in this Master Plan.

Goals

SPRWS established the following major goals for this Master Plan:

- Provide a road map of improvements needed over the next 40 years to maintain a reliable, viable utility.
- Anticipate the future water demands and drinking water regulations that need to be met.
- Provide recommendations on how to improve water quality.
- Prioritize the projects that are identified.
- Provide information for the SPRWS Board on costs needed to maintain a reliable, viable utility.

Background

The SPRWS serves a population of approximately 415,000 people located in the City of Saint Paul and neighboring communities including Falcon Heights, Lauderdale, West Saint Paul, Maplewood, Mendota Heights, Mendota, Lilydale, Little Canada, Roseville, and Arden Hills.

The SPRWS obtains most of its source water from the Mississippi River, which is pumped from the Fridley Pump Station and travels through a chain of lakes located about 6 miles north of St. Paul. All water is treated at one water plant, the McCarrons Water Treatment Plant, located in the City of Maplewood. The treatment process includes lime softening, recarbonation, granular activated carbon (GAC) and sand filtration, and chlorine/chloramines for disinfection.

The distribution system serving these areas consists of about 1,100 miles of water mains, 130 million gallons (MG) of water storage, 10 booster stations, and 5 pressure zones. Annual average water use is about 45 million gallons per day (mgd). Peak daily demand is around 80 mgd.

Like many Midwest water utilities, SPRWS is addressing aging infrastructure and declining water use. This Master Plan is intended to outline needed improvements to maintain a reliable, viable water utility for the next 40 years. Recommended improvements were systematically assigned a weighted benefit score by SPRWS based on the following criteria:

- Reduce the risk of asset failure to maintain reliable service to customers
- Enhance water quality
- Improve operation and maintenance
- Maintain excellent customer service
- Provide sustainable and efficient facilities

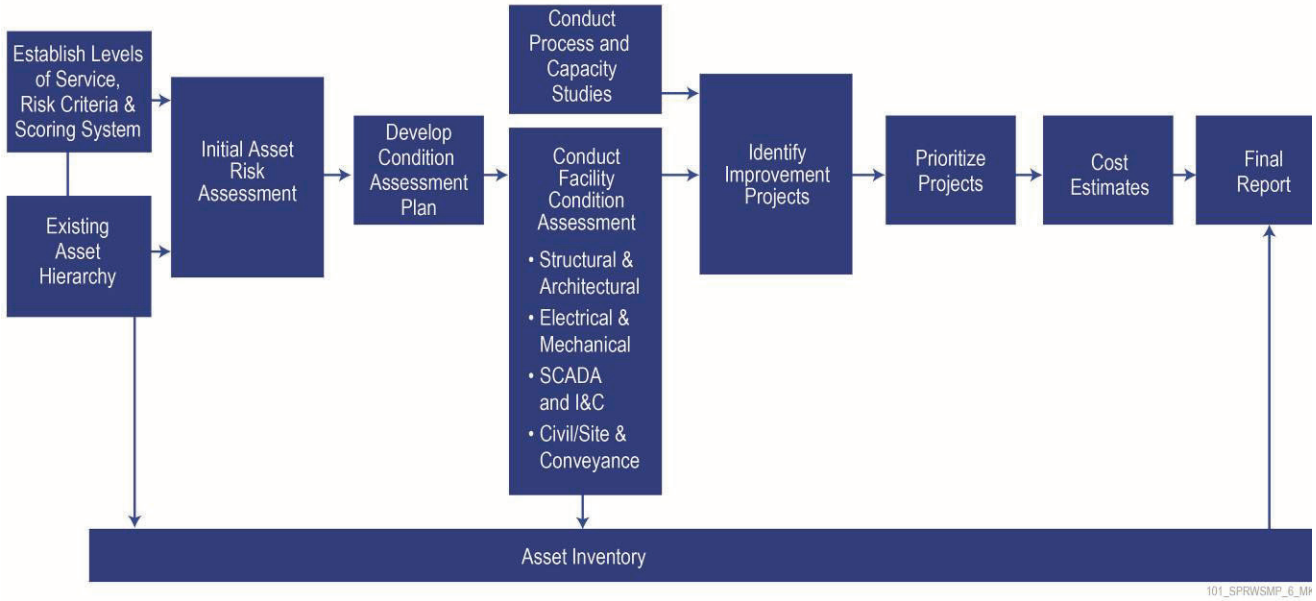
Approach

The following approach was used to meet the Master Plan goals:

1. Establish levels of service that SPRWS wants to provide to its customers.
2. Create an asset hierarchy, organizing major treatment, pumping, storage and conveyance assets.
3. Develop a risk assessment scoring system for assets, considering the consequence of failure and likelihood of failure. Then score each asset based on risk.
4. Conduct a condition assessment of some higher risk assets to provide more information on condition and likelihood of failure.
5. Conduct a process and capacity evaluation of the McCarrons water plant.
6. Develop a list of improvement projects, based on risk, the condition assessment and the process evaluation.
7. Develop project evaluation criteria and rank the projects on the basis of benefits.
8. Estimate costs for each project, study, and condition assessment.
9. Develop a prioritized implementation plan based on project benefits and costs.
10. Develop an asset inventory tool to capture the asset information in a database that can be easily updated, and used for future capital improvement planning.
11. Summarize the Master Plan results into a final report.

This approach is shown graphically in Exhibit ES-1.

EXHIBIT ES-1
Project Approach Flow Chart



Results

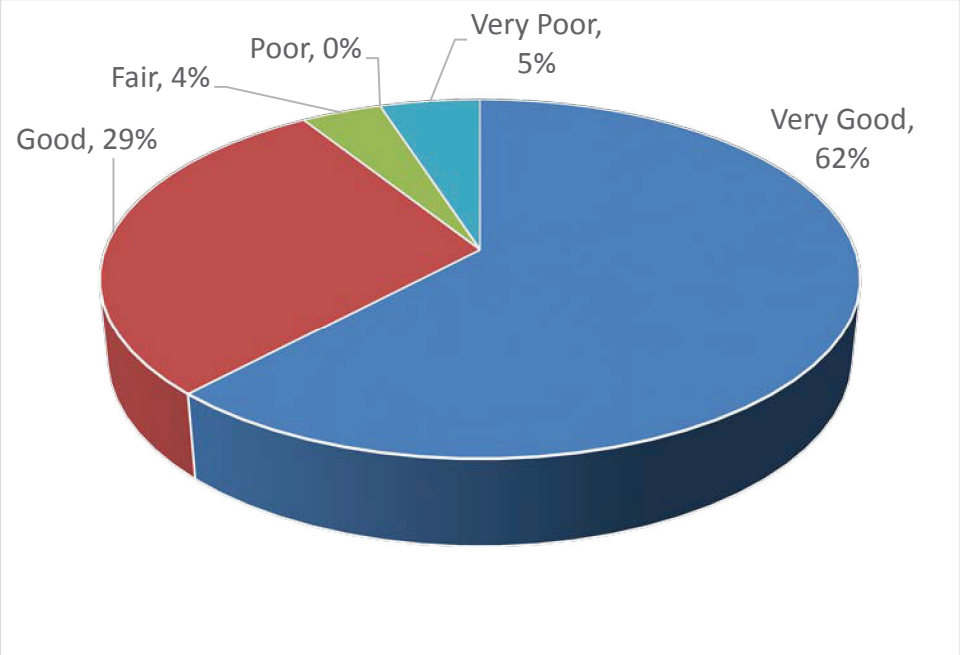
Condition Assessment

A condition assessment of selected water supply, treatment and pumping assets was conducted by professionals in electrical, mechanical, structural and controls infrastructure. CH2M HILL worked closely with SPRWS staff to identify the highest risk assets to assess.

Overall results indicated that although many assets are old, they are well maintained. Exhibit ES-2 shows that 91% of the mechanical and electrical assets evaluated were in very good or good condition. This is a testament to the excellent maintenance procedures practiced by SPRWS. Many assets are beyond their predicted useful life and still operating satisfactorily. For example, the average age of the McCarron's pump station pumps is over 40 years and a typical useful life of pumping equipment is 30 years. Although SPRWS is getting good value from their assets by taking care of the equipment, over the next 20 or 40 years replacement or major repair will be required.

The original portions of the McCarron's water plant are about 80 years old, including concrete structures and some softening basins. Certain components are aging and in need of improvements to maintain performance and reliability. There are several concrete channels where all the water needs to travel. Failure of these channels could interrupt water service (single points of failure). Repairs and redundant channels will improve reliability.

EXHIBIT ES-2
Condition Assessment Results



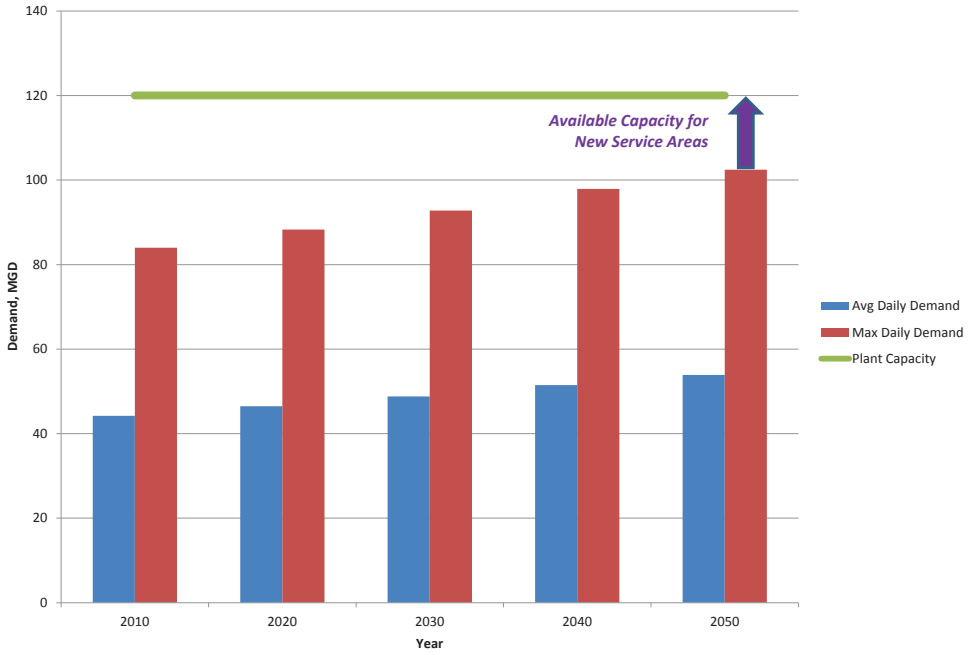
Raw water is pumped from the Mississippi river to a chain of lakes, and conveyed by gravity from the lakes to the McCarron's water plant through concrete and steel conduits that are 60 to over 80 years old. To ensure these raw water conduits remain in good condition for many years to come, an active condition assessment and repair program is recommended. This program consists of concrete conduit joint testing and inspections, concrete conduit joint repairs, and steel conduit inspections. Exterior assessment of both the concrete and steel conduits would be performed as well. Depending on the results of the inspection and repair programs, additional conduit repairs may be required. SPRWS should be prepared for the possibility that inspection program findings or an increase in the rate of joint failures may alter this re-inspection date or the repair/renewal approach. Establishing the baseline condition of the concrete conduits will be key to the long term asset management plan for these unique pipelines as they approach 100 years of service. The intent of the condition assessment and repair program is to proactively identify potential issues and resolve them as quickly as possible. This approach also reduces the risk for catastrophic failure and the high costs associated with replacement.

Capacity and Treatment Process Assessment

The capacity and treatment process performance of the SPRWS water supply and treatment facilities was evaluated. Based on water demand projections by the Metropolitan Council in 2010, SPRWS water supply and treatment facilities have adequate capacity to serve their current service area to year 2050 and beyond. SPRWS has about 20 mgd excess water supply and treatment capacity in 2050 to serve other customers (Exhibit ES-3). If additional customers are added and water demand exceeds 120 mgd, future expansion of the water supply and treatment facilities would be required.

EXHIBIT ES-3

SPRWS Service Area Projected Average Daily and Maximum Daily Water Demands (Metropolitan Council 2007)



Water quality produced by SPRWS is excellent and meets or exceeds current regulations. Since implementation of granular activated carbon (GAC) filters in 2006, customer taste and odor related complaints have been nearly eliminated. SPRWS has also gone beyond meeting regulations by striving to achieve the high performance goals of American Water Works Association Partnership for Safe Water program. SPRWS is close to meeting the highest performance goals in this voluntary program, and will be one of a few water utilities to do so.

The lime softening process is essential for maintaining SPRWS high performance goals for water quality. Some softening basins are 80 years old and in need of repairs. The lime softening basins limit water plant capacity to 120 mgd. Newer lime softening technologies are available to improve performance, efficiency and reliability. New lime softening and recarbonation facilities can also eliminate the single points of failure and provide several paths for water to flow, greatly improving reliability.

In planning for the future, new water treatment technologies may be needed to meet future regulations or water quality goals. An ozone disinfection treatment system is recommended as a means to provide safer, higher quality water while positioning for new regulations. Ozone improves the taste and smell of the water, provides an excellent pathogen barrier (including *Cryptosporidium*), and can remove many contaminants that may be regulated in the future. Ozone works well with the existing GAC filters, improving their performance and extending GAC life.

Finally, SPRWS has one water plant for the entire service area. The water plant has been producing water for many years, is well operated and maintained and has inherent reliability. However, there is no backup water

treatment plant or potable water supply in case of a disaster. Continuing to improve reliability and upgrade this water plant is essential for maintaining excellent customer service.

Project Prioritization

In accordance with the ISO 55000 asset management guide, the Master Plan team chose five criteria by which each projects' benefit was evaluated with a clear line of sight to the existing SPRWS Strategic Goals. Supply, treatment, and pumping projects were prioritized by benefit so that projects with the highest benefit score receive the greatest priority. The total benefit score of each of the 37 projects is shown in Exhibit ES-4. Each bar represents a project, with its height equaling its total benefit. The colors within each bar represent the extent to which the project contributes to achieving each benefit criterion.

New softening basins, new recarbonation basins, replacement of the electrical switchgear and rehabilitation of raw water conduits represent the top 4 priority projects for SPRWS.

In some cases, a study or condition assessment was recommended to more fully define the project. The recommended studies and condition assessments are shown in Exhibit ES-5.

EXHIBIT ES-4

Total Benefit Scores of Supply, Treatment and Pumping Projects

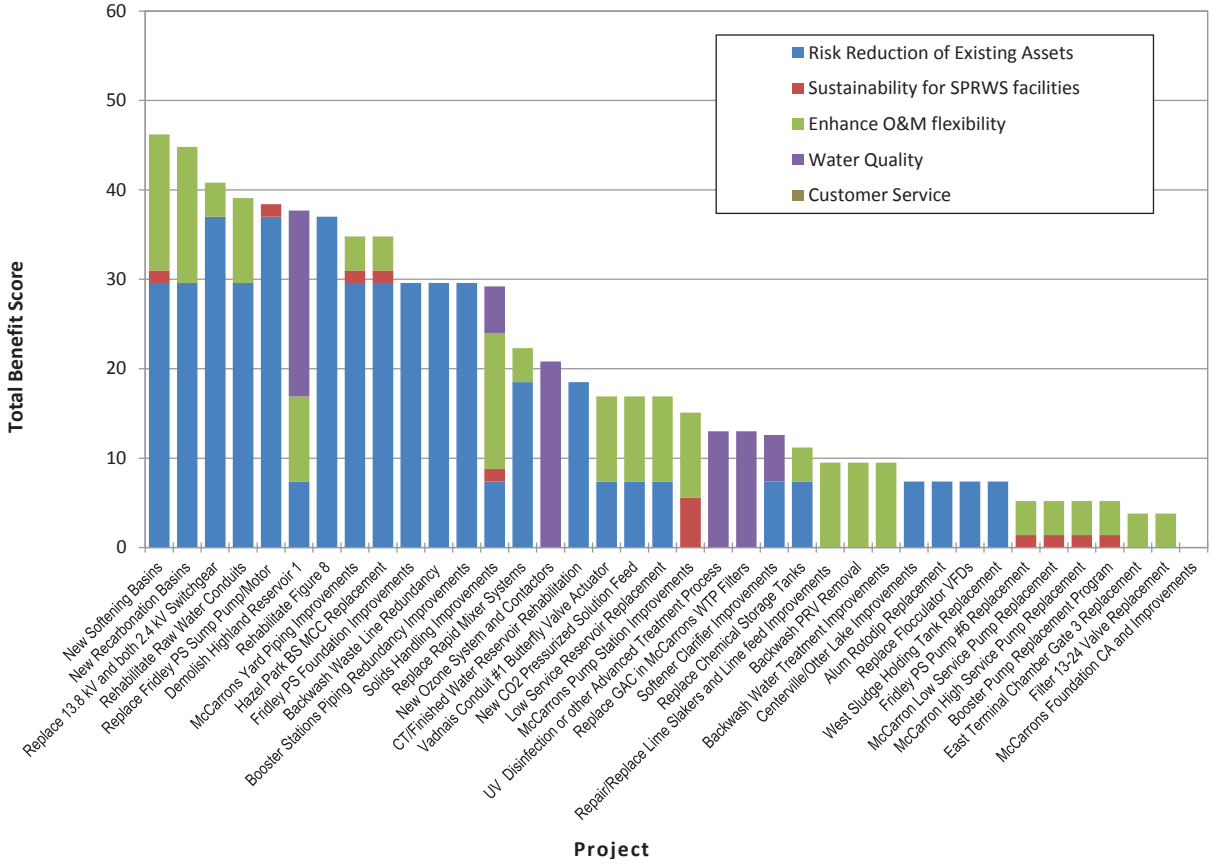


EXHIBIT ES-5
Recommended Studies and Condition Assessments

Studies	Description
Lime Sludge Study	Evaluate sludge pumping and handling efficiency.
GAC Treatment Assessment	Evaluate effectiveness and remaining life of GAC for taste and odor and other contaminants.
Strategic Asset Management Plan	Review exiting asset management practices and refine approaches based current best practices
Distribution System Model Calibration and Future Demand Analysis	Calibrate and field verify hydraulic calculations in the hydraulic model. Assess impacts of future water system demands.
Single Coagulant Evaluation	Determine if one coagulant can be used in the lime softening process instead of two.
Existing Softening Bypass Evaluation	Determine the conditions and implications of stopping lime softening and using coagulation only.
Source Water Study	Determine the best use of surface and groundwater supplies. Evaluate early contaminant warning systems.
Centerville and Otter Lake Fate	Determine the long term plan for this water supply and facilities.
McCarrons Yard Piping	Evaluate ways to simplify yard piping and Improve hydraulics.
McCarrons channels	Assess condition of critical concrete channels in the McCarrons water plant.
McCarron's Piling Evaluation	Assess condition of foundation piling.
Condition Assessment on Submerged Structures	Assess condition of submerged basins and structures.
Raw Water Conduit Condition Assessment	Assess condition of raw water conduits from the Mississippi River to the lakes.
Condition Assessment for Buried Storage Tanks	Assess the condition of several key buried storage tanks.

Cost Estimates

Conceptual level cost estimates were prepared for each recommended project and study. The total cost of all 37 projects and their related studies is about $172 million. From the perspective of benefits, the top 4 ranked projects have a total cost of about $74 million (Exhibit ES-6) and include new softening basins, new recarbonation basins, new electrical switchgear, and continued inspection and repair of the raw water conduits.

New softening basins are the most expensive project with a total estimated cost of about $60 million, but also provide the most benefit to SPRWS over the next 40 years. New recarbonation basins and carbon dioxide feed systems cost about $9.4 million total and greatly improve reliability of the water plant. New electrical switchgear costs about $5 million and replaces critical aging facilities. Estimated annual costs for the raw water conduit inspections and repairs is about $5.2 million over 40 years.

The cumulative cost of all projects, in priority order left to right based on benefit score, is shown in Exhibit ES-7. The top 15 priority projects have a cumulative cost of about $113 million.

Safe drinking water is essential for public health and economic prosperity. The economy in the SPRWS service area generates about $41 million in wages each day (Metropolitan Council data). The capital cost of the recommended improvements to the SPRWS water supply and treatment system over the next 40 years is less than one week of wages generated in the service area.

EXHIBIT ES-6

Highest Benefit Projects and Estimated Project Costs

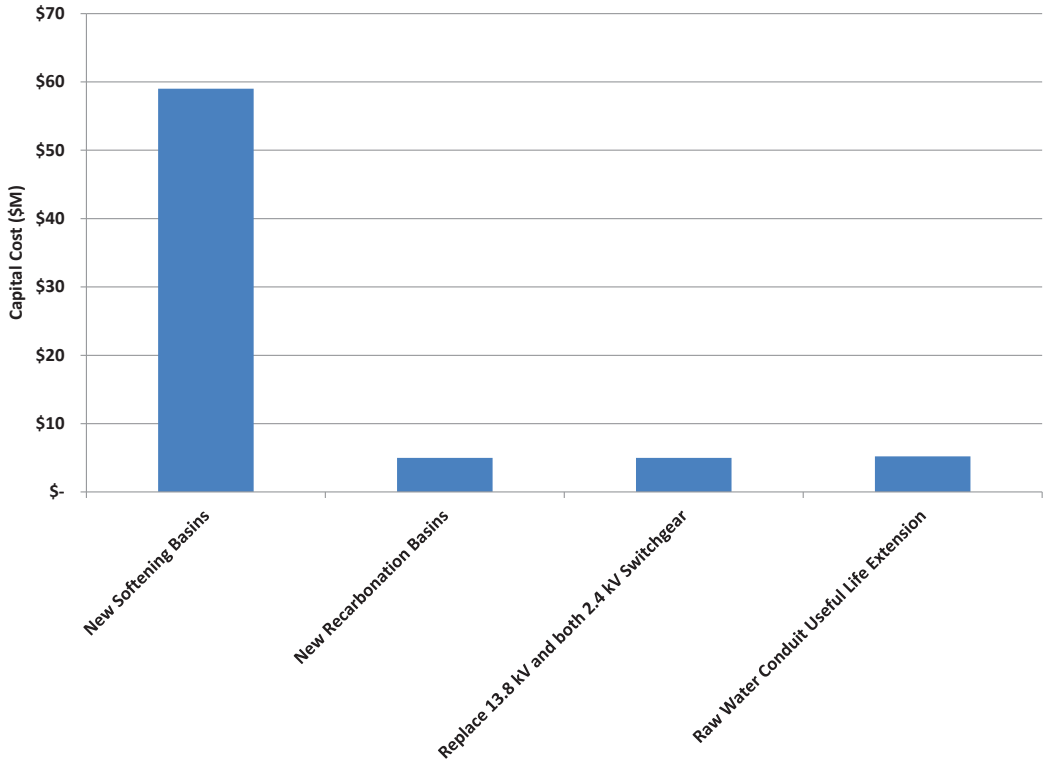
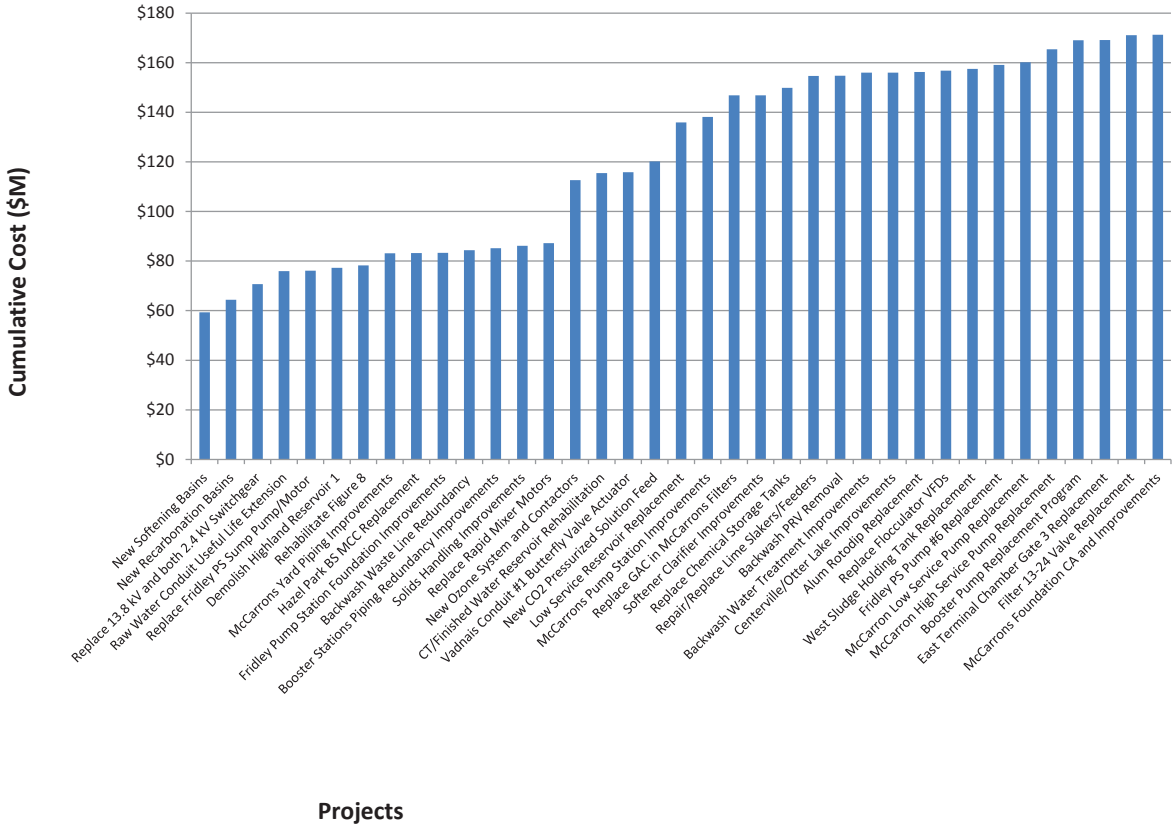


EXHIBIT ES-7

Cumulative Cost of Prioritized Projects



Water supply and treatment infrastructure is expensive to build. If the McCarron's water plant were replaced today, the capital cost would be about $500 million. Spending less than $200 million over the next 40 years to maintain and improve this important asset provides good value to water customers.

Implementation Plan

The implementation plan lays out a schedule for when projects could be done. Ideally, projects with the highest benefits should be implemented earlier in the schedule. Annual capital expenditures and rate impacts need to be considered. As with any long range plan, conditions and priorities may change over time and adjustments can be made.

New softening basins represent the largest water treatment capital expenditure, but also the highest benefit for the SPRWS treatment system in the next 40 years. The existing lime softening treatment basins were some of the original infrastructure installed at the McCarrons water plant and will surpass a 100 year life in the next 25 years. The condition and critical function of these facilities increases risk to SPRWS should they fail.

Replacing the existing lime softening and recarbonation facilities with new facilities increase reliability and are easier to maintain. It will also improve water quality, solids handling and process efficiency. Eliminating some of the existing basins to make room for new softening basins will provide additional space on site for other facilities.

Ozone provides a number of water quality benefits, including extending the useful life of GAC, providing a strong disinfection barrier (including *Cryptosporidium*), and addressing future contaminants such as algal toxins and new disinfection byproducts. When new recarbonation facilities are installed, it would be cost effective to add ozone contact basins, since they both could be incorporated into one structure. The implementation plan recommends that new lime softening basins, recarbonation and ozone be installed at the same time.

Two implementation approaches for the softening, recarbonation and ozone facilities were developed:

The first approach has new softening, recarbonation and ozone facilities constructed earlier and completed in two phases. The first phase (80 mgd softening, 120 mgd recarbonation and ozone) would start in 2018 and be completed by 2021. The second phase (40 mgd softening) would start in 2029 and be completed by 2033.

The second approach has new softening, recarbonation and ozone facilities constructed later (starting in 2029 and finishing in 2033) and completed in one phase (120 mgd).

The implementation plan that constructs new facilities earlier (starting in 2018) is recommended for the following reasons:

- The risk of water treatment and production failure is reduced earlier by adding the new infrastructure in parallel with old infrastructure.
- The total cost of softening related improvement projects is about $8 million lower because some rehabilitation projects to existing facilities are eliminated when new facilities are implemented earlier.
- The high capital cost for improvements are divided up into two phases, which reduces the amount of borrowing required for each phase of the project.
- All construction is not done at the same time (separated into two phases), reducing the risk of service interruption because fewer facilities are taken out of service during construction.
- Construction phasing is simpler and allows lessons learned from the first phase to be applied to the second phase, both construction and operations.

The recommended implementation plan for all projects, including softening, recarbonation and ozone installed earlier, is shown in Exhibit ES-8. For comparison, the implementation plan with those facilities installed later is shown in Exhibit ES-9.

EXHIBIT ES-8

Project Implementation Plan with New Softening and Recarbonation Basins Earlier

Legend:

Study
Condition Assessment
Design
Construction

Note: All costs reported as $M
tbd = to be determined

Project	Benefit Score	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024-2028	2029-2033	2034-2043	2044-2053	Total Project Cost ($M)	Cumulative Cost ($M)
New Softening Basins	46.2			$ 0.05		$ 2.7	$ 14.5	$ 14.5	$ 7.3				$ 20.2			$ 59.3	$ 59
New Recarbonation Basins	44.8					$ 0.4	$ 1.9	$ 1.9	$ 0.9							$ 5.0	$ 64
Replace 13.8 kV and both 2.4 kV Switchgear	40.8		$ 0.3 $ 2.3	$ 2.3								$ 1.4				$ 6.3	$ 71
Raw Water Conduit Useful Life Extension	39.1		$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1			$ 2.6	$ 5.2	$ 76
Replace Fridley PS Sump Pump/Motor	38.4		$ 0.01 $ 0.1	$ 0.1												$ 0.2	$ 76
Demolish Highland Reservoir 1	37.7				$ 0.2 $ 0.1	$ 0.9										$ 1.2	$ 77
Rehabilitate Figure 8	37.0			$ 0.1	$ 0.1	$ 0.8										$ 1.0	$ 78
McCarrons Yard Piping Improvements	34.8								$ 0.4 $ 2.2	$ 2.2						$ 4.9	$ 83
Hazel Park BS MCC Replacement	34.8		$ 0.01 $ 0.1													$ 0.1	$ 83
Fridley Pump Station Foundation Improvements	29.6		$ 0.1	tbd	tbd											$ 0.1	$ 83
Backwash Waste Line Redundancy	29.6								$ 0.2	$ 0.9						$ 1.1	$ 84
Booster Stations Piping Redundancy Improvements	29.6								$ 0.03 $ 0.4		$ 0.03 $ 0.4					$ 0.8	$ 85
Solids Handling Improvements	29.2			$ 0.1	$ 0.1	$ 0.8										$ 0.9	$ 86
Replace Rapid Mixer Motors	22.3			$ 0.08 $ 0.5	$ 0.5											$ 1.1	$ 87
New Ozone System and Contactors	20.8					$ 1.8	$ 9.4	$ 9.4	$ 4.7							$ 25.4	$ 113
CT/Finished Water Reservoir Rehabilitation	18.5				$ 0.2							$ 2.7				$ 2.9	$ 115
Vadnais Conduit #1 Butterfly Valve Actuator	16.9		$ 0.02 $ 0.2	$ 0.2												$ 0.4	$ 116
New CO2 Pressurized Solution Feed	16.9			$ 0.6	$ 3.8											$ 4.4	$ 120
Low Service Reservoir Replacement	16.9							$ 0.2 $ 1.1	$ 7.2	$ 7.2						$ 15.7	$ 136
McCarrons Pump Station Improvements	15.1			$ 0.2 $ 1.0	$ 1.0											$ 2.2	$ 138
Replace GAC in McCarrons Filters	13.0		$ 0.3			$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 0.7			$ 4.2		$ 8.7	$ 147
Softener Clarifier Improvements	12.6															$ -	$ 147
Replace Chemical Storage Tanks	11.2		$ 0.03 $ 0.2	$ 0.2				$ 0.0 $ 0.2	$ 0.2			$ 0.4		$ 1.7		$ 3.0	$ 150
Repair/Replace Lime Slakers/Feeders	9.5			$ 0.1 $ 0.4	$ 0.4					$ 0.1	$ 0.9		$ 1.0	$ 1.0	$ 1.0	$ 4.8	$ 155
Backwash PRV Removal	9.5		$ 0.01 $ 0.1													$ 0.1	$ 155
Backwash Water Treatment Improvements	9.5								$ 0.1	$ 1.2						$ 1.3	$ 156
Centerville/Otter Lake Improvements	7.4		tbd			tbd tbd										$ -	$ 156
Alum Rotodip Replacement	7.4		$ 0.02 $ 0.1	$ 0.1												$ 0.3	$ 156
Replace Flocculator VFDs	7.4		$ 0.04 $ 0.2	$ 0.2												$ 0.5	$ 157
West Sludge Holding Tank Replacement	7.4									$ 0.1 $ 0.7						$ 0.7	$ 157
Fridley PS Pump #6 Replacement	5.2												$ 1.6			$ 1.6	$ 159
McCarron Low Service Pump Replacement	5.2												$ 1.1			$ 1.1	$ 160
McCarron High Service Pump Replacement	5.2												$ 2.6	$ 2.6		$ 5.3	$ 165
Booster Pump Replacement Program	5.2									$ 0.0	$ 0.5	$ 0.5	$ 0.5	$ 1.0	$ 1.0	$ 3.6	$ 169
East Terminal Chamber Gate 3 Replacement	3.8			$ 0.0 $ 0.1												$ 0.1	$ 169
Filter 13-24 Valve Replacement	3.8									$ 0.1	$ 0.9	$ 0.9				$ 2.0	$ 171
McCarrons Foundation CA and Improvements	NA		$ 0.2	tbd tbd												$ 0.2	$ 171
Strategic Asset Management Plan	NA			$ 0.3												$ 0.3	$ 172
Distribution System Capacity Evaluation	NA			$ 0.1												$ 0.1	$ 172
Total Cost by Year - Supply, Treatment, and Pumping			$ 4.6	$ 7.2	$ 6.7	$ 8.4	$ 27	$ 28	$ 25	$ 13	$ 3.6	$ 1.2	$ 5	$ 1.1	$ 0.5		
Cumulative Cost - Supply, Treatment, and Pumping			$ 5	$ 12	$ 18	$ 27	$ 54	$ 82	$ 106	$ 120	$ 123	$ 130	$ 157	$ 167	$ 172		
Total Cost by Year - Including Distribution System Pipes and Elevated Tanks			$ 82	$ 66	$ 60	$ 58	$ 74	$ 73	$ 69	$ 53	$ 44	$ 39	$ 35	$ 21	$ 14		
Cumulative Cost - Including Distribution System Pipes and Elevated Tanks			$ 82	$ 149	$ 209	$ 267	$ 341	$ 414	$ 483	$ 536	$ 580	$ 774	$ 950	$ 1,160	$ 1,300		

EXHIBIT ES-9

Project Implementation Plan with New Softening and Recarbonation Basins Installed Later

Legend:

Study
Condition Assessment
Design
Construction

Note: All costs reported as $M
tbd = to be determined

Project	Benefit Score	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024-2028	2029-2033	2034-2043	2044-2053	Total Project Cost ($M)	Cumulative Cost ($M)
New Softening Basins	46.2			$ 0.05									$ 59.3			$ 59.4	$ 59
New Recarbonation Basins	44.8												$ 5.0			$ 5.0	$ 64
Replace 13.8 kV and both 2.4 kV Switchgear	40.8		$ 0.3 $ 2.3	$ 2.3								$ 1.4				$ 6.3	$ 71
Raw Water Conduit Useful Life Extension	39.1		$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.2 $ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1			$ 2.6	$ 5.2	$ 76
Replace Fridley PS Sump Pump/Motor	38.4		$ 0.01 $ 0.1	$ 0.1												$ 0.2	$ 76
Demolish Highland Reservoir 1	37.7				$ 0.2 $ 0.1	$ 0.9										$ 1.2	$ 77
Rehabilitate Figure 8	37.0			$ 0.1	$ 0.1	$ 0.8										$ 1.0	$ 78
McCarrons Yard Piping Improvements	34.8								$ 0.4 $ 2.2	$ 2.2						$ 4.9	$ 83
Hazel Park BS MCC Replacement	34.8		$ 0.01 $ 0.1													$ 0.1	$ 83
Fridley Pump Station Foundation Improvements	29.6		$ 0.1	tbd	tbd											$ 0.1	$ 83
Backwash Waste Line Redundancy	29.6								$ 0.2	$ 0.9						$ 1.1	$ 84
Booster Stations Piping Redundancy Improvements	29.6								$ 0.03 $ 0.4		$ 0.03 $ 0.4					$ 0.8	$ 85
Solids Handling Improvements	29.2			$ 0.1	$ 0.1	$ 0.8										$ 0.9	$ 86
Replace Rapid Mixer Motors	22.3			$ 0.08 $ 0.5	$ 0.5					$ 0.08	$ 1.0					$ 2.2	$ 88
New Ozone System and Contactors	20.8												$ 25.4			$ 25.4	$ 114
CT/Finished Water Reservoir Rehabilitation	18.5				$ 0.2							$ 2.7				$ 2.9	$ 117
Vadnais Conduit #1 Butterfly Valve Actuator	16.9		$ 0.02 $ 0.2	$ 0.2												$ 0.4	$ 117
New CO2 Pressurized Solution Feed	16.9			$ 0.6	$ 3.8								$ 4.4			$ 8.7	$ 126
Low Service Reservoir Replacement	16.9							$ 0.2 $ 1.1	$ 7.2	$ 7.2						$ 15.7	$ 141
McCarrons Pump Station Improvements	15.1			$ 0.2 $ 1.0	$ 1.0											$ 2.2	$ 144
Replace GAC in McCarrons Filters	13.0		$ 0.3			$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 0.7			$ 4.2		$ 8.7	$ 152
Softener Clarifier Improvements	12.6			$ 0.1 $ 0.8	$ 0.8					$ 0.1	$ 0.8					$ 2.6	$ 155
Replace Chemical Storage Tanks	11.2		$ 0.03 $ 0.2	$ 0.2				$ 0.0 $ 0.2	$ 0.2			$ 0.4		$ 1.7		$ 3.0	$ 158
Repair/Replace Lime Slakers/Feeders	9.5			$ 0.1 $ 0.4	$ 0.4					$ 0.1	$ 0.9		$ 1.0	$ 1.0	$ 1.0	$ 4.8	$ 163
Backwash PRV Removal	9.5		$ 0.01 $ 0.1													$ 0.1	$ 163
Backwash Water Treatment Improvements	9.5								$ 0.1	$ 1.2						$ 1.3	$ 164
Centerville/Otter Lake Improvements	7.4		tbd			tbd tbd										$ -	$ 164
Alum Rotodip Replacement	7.4		$ 0.02 $ 0.1	$ 0.1												$ 0.3	$ 164
Replace Flocculator VFDs	7.4		$ 0.04 $ 0.2	$ 0.2						$ 0.04	$ 0.5					$ 1.1	$ 165
West Sludge Holding Tank Replacement	7.4									$ 0.1 $ 0.7						$ 0.7	$ 166
Fridley PS Pump #6 Replacement	5.2												$ 1.6			$ 1.6	$ 168
McCarron Low Service Pump Replacement	5.2												$ 1.1			$ 1.1	$ 169
McCarron High Service Pump Replacement	5.2												$ 2.6	$ 2.6		$ 5.3	$ 174
Booster Pump Replacement Program	5.2									$ 0.0	$ 0.5	$ 0.5	$ 0.5	$ 1.0	$ 1.0	$ 3.6	$ 178
East Terminal Chamber Gate 3 Replacement	3.8			$ 0.0 $ 0.1												$ 0.1	$ 178
Filter 13-24 Valve Replacement	3.8									$ 0.1	$ 0.9	$ 0.9				$ 2.0	$ 180
McCarrons Foundation CA and Improvements	NA		$ 0.2	tbd tbd												$ 0.2	$ 180
Strategic Asset Management Plan	NA			$ 0.3												$ 0.3	$ 180
Distribution System Capacity Evaluation	NA			$ 0.1												$ 0.1	$ 180
Total Cost by Year - Supply, Treatment, and Pumping			$ 4.6	$ 8.1	$ 7.5	$ 3.6	$ 1.1	$ 2.3	$ 12	$ 14	$ 5.9	$ 1.2	$ 20	$ 1.1	$ 0.5		
Cumulative Cost - Supply, Treatment, and Pumping			$ 5	$ 13	$ 20	$ 24	$ 25	$ 27	$ 39	$ 52	$ 58	$ 64	$ 165	$ 176	$ 180		
Total Cost by Year - Including Distribution System Pipes and Elevated Tanks			$ 82	$ 67	$ 61	$ 53	$ 48	$ 47	$ 56	$ 53	$ 47	$ 39	$ 50	$ 21	$ 14		
Cumulative Cost - Including Distribution System Pipes and Elevated Tanks			$ 82	$ 150	$ 211	$ 264	$ 312	$ 359	$ 415	$ 469	$ 515	$ 709	$ 960	$ 1,170	$ 1,300		

AECOM prepared a Water Main Prioritization Technical Memorandum in 2014 to assess the distribution pipelines in SPRWS's water system. In addition, a condition assessment study was completed on the SPRWS elevated water storage tanks in 2013 by Tank Industry Consultants. The estimated annual project costs associated with rehabilitation and replacement of the elevated water storage tanks and distribution pipelines are included in Exhibits 9 and 10 to show the total SPRWS water system costs.

Exhibit ES-10 shows the total cost per year for supply, treatment, pumping and distribution system projects, assuming that the softening basins are implemented early.

Exhibit ES-11 shows the cumulative costs for supply, treatment, pumping, and distribution system projects. As shown, the total distribution system capital costs over 40 years are about 5 times more than projects for water supply, treatment, and pumping projects.

EXHIBIT ES-10
Total Annual Capital Cost for Supply, Treatment, Pumping, and Distribution System Projects

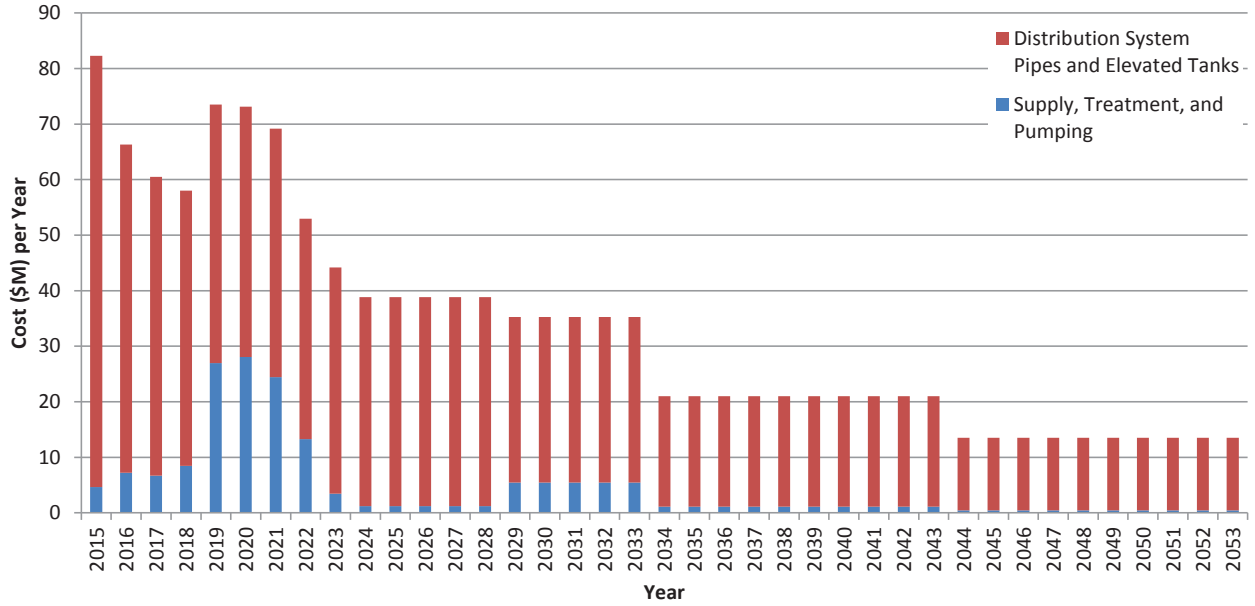
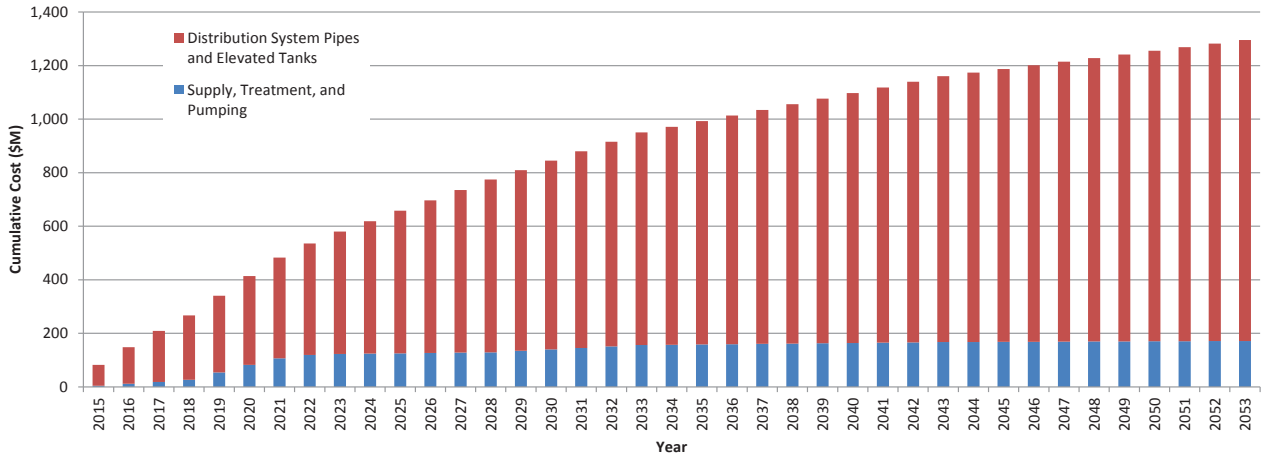


EXHIBIT ES-11
Cumulative Capital Costs for Supply, Treatment, Pumping, and Distribution System Projects



Appendix VI

Cooperative Agreements for Emergency Services

FINANCE #02-11846-I

AGREEMENT FOR EMERGENCY WATER SERVICE BETWEEN THE CITY OF INVER GROVE HEIGHTS AND THE BOARD OF WATER COMMISSIONERS

This **AGREEMENT**, made and entered into on this 26th day of July, 2001, by and between the **BOARD OF WATER COMMISSIONERS, SAINT PAUL, MINNESOTA,** a municipal corporation of the State of Minnesota, hereafter referred to as the "Board," and the **CITY OF INVER GROVE HEIGHTS**, a municipal corporation of the State of Minnesota, hereafter referred to as "Inver Grove Heights";

WITNESSETH:

WHEREAS, Inver Grove Heights has requested a connection to the Board's water system to provide Inver Grove Heights with water under limited emergency conditions; and

WHEREAS, the Board also desires such a connection to the Inver Grove Heights Water System to provide the Board with water under limited emergency conditions; and

WHEREAS, the Board and Inver Grove Heights have determined that such a connection is feasible and in both parties' interest;

NOW, THEREFORE in consideration of the respective covenants contained herein the Board and Inver Grove Heights do hereby agree as follows:

ARTICLE I

EMERGENCY WATER SERVICE

Each party shall allow for emergency water service to the other party subject to the rules and regulations enacted by either party now and in the future, and in accordance with the terms of this agreement. Any use of the water service for a period of greater than 30 days shall be

deemed a non-emergency, in which case either party may exercise the right to install a meter on the connection and charge a non-emergency rate as provided for in article IV.

ARTICLE II

CONSTRUCTION

Inver Grove Heights agrees that the construction of the connection to allow for said emergency water service shall be at its sole expense. Furthermore, the construction shall comply with the most recent revision of the Water Utility's "Standards for the Installation of Water Mains" and shall be constructed in accordance with plans approved in writing and in advance by both parties' staff. The Board reserves the right to have an inspector, at its expense, on site during construction to protect its interests.

ARTICLE III

USE OF THE CONNECTION

The parties agree that no use of the connection will occur without prior approval from the general manager/City Administrator or designee of the other party. Upon proper notice, both parties' staff will proceed to the site of the connection to set up and open the valve that will supply water to the adjacent system. Both parties agree that the system will be flushed before water is supplied between the two systems, and understand that the individual utilities cannot guarantee any pressure and volume, as that is determined by the availability of the same from each system. The supplying utility reserves the right to limit the maximum daily use. Neither party guarantees the quality of the water, although each party agrees to make practical attempts to maintain water quality. The parties agree that their use of the water shall at all times conform

to rules for usage in the adjacent system. Both parties agree that their general manager/city administrator or designee has sole discretion regarding whether approval to use the water and the connection shall be granted, and that the general manager/City Administrator or designee may consider factors such as the nature and extent of the emergency and the current status, quality and availability of the water system, in deciding whether to grant such approval.

ARTICLE IV

WATER RATES

Charges for use of the emergency connection and all water shall be $150.00 per day for each and every day or portion thereof that the connection is in use. This charge will apply to the entity that requested the service, be it Inver Grove Heights or the Board. In the event of non-emergency usage as referenced in Article I, charges for use of the connection and all water shall be at the Board's or City's current outside City rate that is in effect on the dates of usage.

ARTICLE V

MAINTENANCE OF CONNECTION

Inver Grove Heights agrees that it shall provide and pay for all routine and necessary maintenance or repairs of the connection at its sole expense.

ARTICLE VI

AREA SUPPLIED

Inver Grove Heights agrees that the area to be supplied with water from this emergency connection shall extend no further into their system than the area represented on Exhibit A,

attached hereto and incorporated herein by reference. The following roads will represent the borders of the emergency supply area: Mendota Road (north border), Highway 494 (south border), Highway 52 (east border), Highway 110 (west border). The scope of the area to be supplied with water from the emergency connection may not be modified without the express written and prior approval of the Board's general manager and the City Administrator or their designees.

ARTICLE VII

INDEMNIFICATION

The Board shall forever indemnify and save harmless, protect and defend Inver Grove Heights, its employees and agents from any or all liability, suits or demands, including the legal defense thereof, for bodily injuries, including death, or property damages, including loss of use, arising out of any activity by the Board or the Board's employees and agents under this agreement. Likewise, Inver Grove Heights shall forever indemnify and save harmless, protect and defend the Board, its employees and agents from any or all liability, suits or demands, including the legal defense thereof, for bodily injuries, including death, or property damages, including loss of use, arising out of any activity by Inver Grove Heights or Inver Grove Heights's employees and agents under this agreement.

ARTICLE VIII

EFFECTIVE DATE

This agreement shall be effective on July 26, 2001, or upon the date that the final required signature is obtained, whichever occurs later, and shall remain in effect for a

period of ten (10) years from that date, or until this agreement has been canceled or terminated, whichever occurs first. Both parties shall have a continuing obligation, however, to comply with the indemnification provisions of this agreement contained in Article VII.

ARTICLE IX

AGREEMENT AMENDMENTS

Inver Grove Heights and the Board agree that from time to time changes to this agreement may be necessary. The parties agree that any such changes shall be in the form of written amendments to this agreement and shall be valid only when duly approved and executed by both parties.

ARTICLE X

TERMINATION OF AGREEMENT

Irrespective of any other condition contained herein, the parties agree that this agreement may be canceled by either party at any time with 30 days notice to the other party.

ARTICLE XI

NOTICE

Any notice required or permitted to be given by either party is given when mailed by U.S. Mail, postage prepaid, as follows:

If to Board:

General Manager
Board of Water Commissioners
400 Commerce Building
8 East Fourth Street
Saint Paul, Minnesota 55101

If to Inver Grove Heights:

Mayor
City of Inver Grove Heights
8150 Barbara Avenue
Inver Grove Heights, Minnesota 55077

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed on the day and year first above written.

APPROVED:

Bernie R. Bullert, General Manager

Approved as to Form:

Assistant City Attorney

BOARD OF WATER COMMISSIONERS

By _____
James C. Reiter, President

By _____
Janet Lindgren, Secretary

COUNTERSIGNED:

By _____
Peter Hames, Director,
Office of Financial Services

THE CITY OF INVER GROVE HEIGHTS

City Attorney

By _____
Mayor

By _____
City Administrator

\81000\09000\Documents\Emergency Water Service Agreement.doc

BOARD OF WATER COMMISSIONERS

RESOLUTION — GENERAL FORM

No. 4788

PRESENTED BY COMMISSIONER Cardinal

DATE July 10, 2001

WHEREAS, the City of Inver Grove Heights has requested a connection to the Board's distribution system at Mendota Road and Oakdale Avenue for use in emergency situations; and

WHEREAS, such a connection potentially could be used to supply the Board's system from the Inver Grove Heights system; and

WHEREAS, Inver Grove Heights is willing to pay all costs associated with design and construction of this connection; and

WHEREAS, plans for construction of this connection have been approved by Board staff and an agreement has been drafted to govern the terms and conditions of the construction and use of the connection; and

WHEREAS, the agreement has been reviewed and approved as to form by the City Attorney's Office; now, therefore, be it

RESOLVED, that the agreement substantially in the form submitted between the Board and the City of Inver Grove Heights for emergency water service is hereby approved and that the proper officers of the Board are hereby directed to execute said agreement.

Water Commissioners

Yeas		Nays
	Anfang	
	Cardinal	
	Harris	
Vice President	Haselmann	
President	Reiter	

In favor 5 Opposed 0

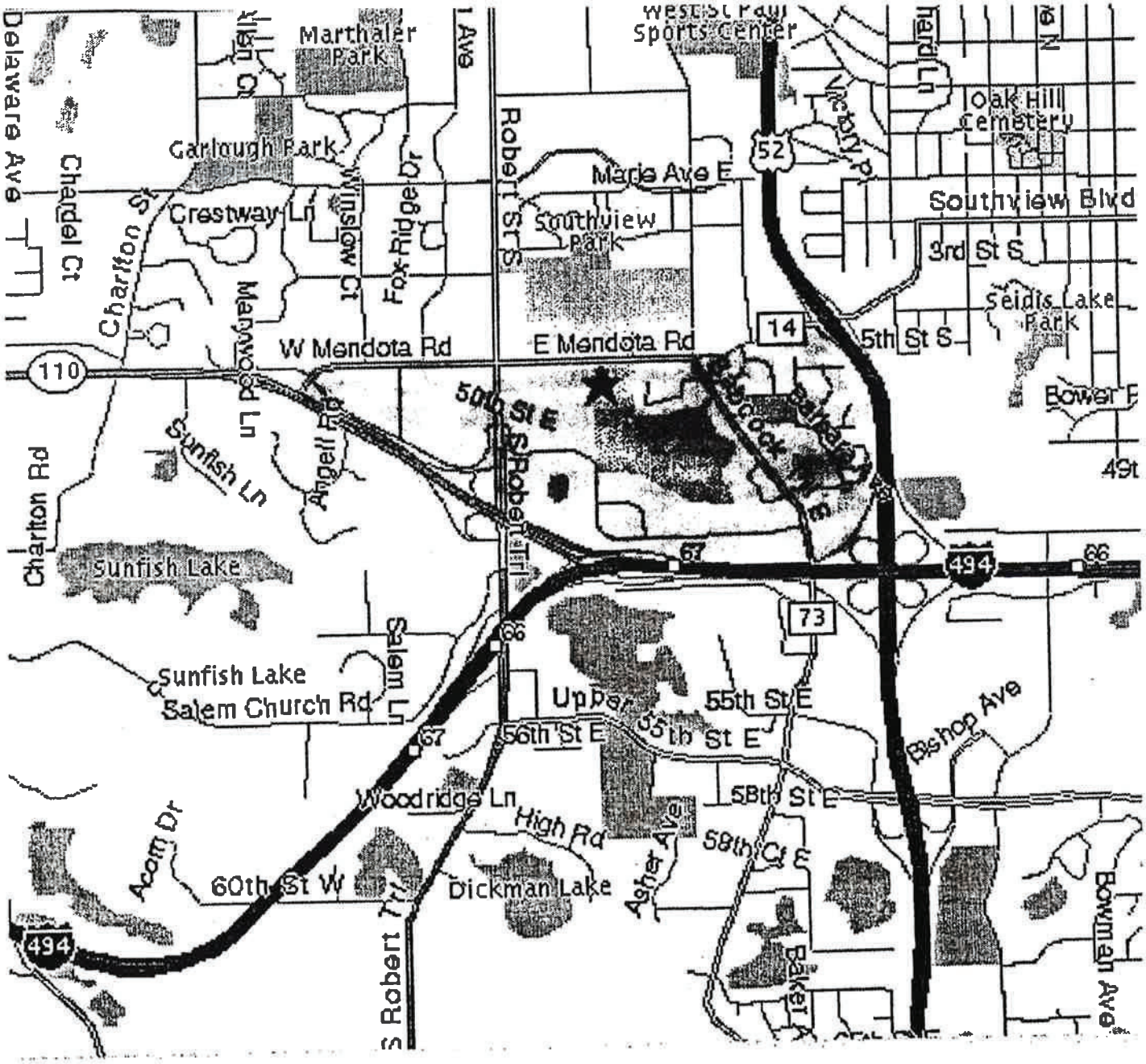
Adopted by the Board of Water Commissioners

July 10, 2001

Janet Lindgren
SECY.

EXHIBIT A

(Boundaries of Emergency Service Area)



AGREEMENT FOR THE CONVEYANCE OF A PORTION OF SOUTH ST. PAUL'S WATER SYSTEM LYING WEST OF T. H. 52 AND NORTH OF BUTLER AVENUE TO THE BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL

This **AGREEMENT**, made and entered into on this 9th day of July, 2002, by and between the **BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL**, a municipal corporation of the State of Minnesota (the "Board"), and the **CITY OF SOUTH ST. PAUL**, a municipal corporation of the State of Minnesota ("South St. Paul"), each of the forgoing entities being sometimes referred to individually as "party" or collectively as "parties".

WITNESSETH:

WHEREAS, the Board has been providing water services to properties located within the City of South St. Paul lying east of T. H. 52 and north of Butler Avenue ("Premises") continuously since 1982, pursuant to the terms of a June 23, 1982 Agreement For Water Service between the Board and South St. Paul; and

WHEREAS, the Board and South St. Paul desire to enter into an agreement whereby the Board will provide water services to properties located within the Premises, and whereby South St. Paul will convey title to its water facilities located within the Premises ("Water Facilities") to the Board, and whereby South St. Paul will permit the Board to maintain its Water Facilities located within South St. Paul's streets and easements.

NOW THEREFORE, in consideration of the respective covenants contained herein and for valuable consideration, the parties do hereby agree as follows:

ARTICLE I

Section 1. EFFECTIVE DATE

This agreement is effective on August 1, 2002, or after execution by the designated officials as authorized by resolutions of the Board and the City of South St. Paul City Council, whichever occurs later.

Section 2. EXISTING CONTRACTS SUPERSEDED

As of the effective date of this Agreement all previous water service agreements and contracts existing between the Board and South St. Paul shall be and are hereby superseded.

ARTICLE II

Section 1. BOARD TO EXTEND SERVICE TO SOUTH ST. PAUL

The Board will extend its water service to properties located within the Premises subject to the rules and regulations enacted by the Board of Water Commissioners and in accordance with the terms of this Agreement.

South St. Paul does hereby concur in the Board's extension of its water service and does hereby grant permission to the Board to construct, operate, maintain, repair and replace water mains and other appurtenances necessary therefore within the streets and rights-of-way of the City of South St. Paul situated within the Premises, including the following streets:

Waterloo Avenue, Napoleon Circle and Lewis Street

and as may in the future be added by South St. Paul City Council resolution.

Section 2. SURFACING AND EXCAVATION ORDINANCE OF SOUTH ST. PAUL

The Board shall abide by Section 805 of South St. Paul's Municipal Code when performing work in South St. Paul's rights-of-way. South St. Paul agrees to waive all permit fees required by said Section 805.

Section 3. EXISTING MAINS AND APPURTENANCES OWNED BY SOUTH ST. PAUL

In conjunction with the City of West St. Paul 2002 Street Reconstruction Project, Contract 021, the Board shall perform the following water facility work in accordance with Board standards:

1. Cut off and abandon in place the existing 6-inch water main on the east side of Waterloo Avenue between Stanley Street and Lewis Street.

2. Remove and dispose of hydrants on the east side Waterloo Avenue at Stanley Street, Roeller Street, Napoleon Circle, and Lewis Street.
3. Install a new 6-inch water main and hydrant in Napoleon Circle from new water main on the west side of Waterloo Avenue. Abandon existing 4-inch water main in place. Remove and dispose of hydrant at east end of Napoleon Circle.
4. Upgrade or replace existing service connections to 507, 508, 516, and 521 Napoleon Circle within street right-of-way as needed and reconnect each to new water main.
5. Install approximately 65 feet of 6-inch water main in Lewis Street from new water main on the west side of Waterloo Avenue and connect to existing 6-inch water main.
6. Install new service connections to 1570, 1588, 1608, and 1620 Waterloo Avenue from the new water main on the west side of Waterloo Avenue to east right-of-way line of Waterloo Avenue.
7. Provide temporary water service to the above addressed properties during construction as needed.
8. Reconnect existing service connections to 1514, 1518, 1522, 1524, 1530, 1538, 1548, 1554 and 1560 Waterloo Avenue to from new water main on the west side of Waterloo Avenue.

South St. Paul shall reimburse the Board for all actual costs related to performing work on items 1 through 7 above.

Upon the effective date of this Agreement, or upon the completion of the above work, whichever is later, the Board shall assume the maintenance and repair of all the existing water mains, fire hydrants, service connections and appurtenances, including street repair and turf maintenance on water service related property, presently owned by South St. Paul within the Premises.

Section 4. SOUTH ST. PAUL TO CONVEY TITLE TO WATER FACILITIES

South St. Paul shall, by resolution of its City Council, and by appropriate deed of conveyance acceptable to the Board, convey to the Board all of its right, title and interest to all water mains, fire hydrants, service connections and appurtenances owned by South St. Paul.

ARTICLE III

Section 1. WATER RATES

Water rates and charges made by the Board shall be the same as those charged to properties located within the City of Saint Paul, as established from time to time by the Board and the City of Saint Paul.

ARTICLE IV

Section 1. CONSOLIDATION OR ACQUISITION

In the event that the Board ceases to operate in its present form due either to consolidation with a local or regional authority or to an acquisition of its assets by another entity, it is the intent of the Board and South St. Paul to protect the right of South St. Paul properties to the continued supply of an adequate water service as well as to adequately compensate South St. Paul for its previous investments in the water facilities locate within its boundaries.

Therefore, to the extent legally permissible the Board shall insure that in the event of any such consolidation or acquisition South St. Paul may either terminate this agreement or negotiate a new water service agreement with the authority or entity.

In the event that South St. Paul elects not to terminate this Agreement, the Board shall require that the alternate authority or new owner assume the Board's contractual obligations as set forth in this Agreement, and shall require that South St. Paul be compensated for the amortized value of the facilities and real estate previously conveyed to the Board pursuant to Article II, Section 4, of this Agreement.

Section 2. SOUTH ST. PAUL TERMINATION

In the event South St. Paul should elect to terminate this agreement, then and in that event it is hereby agreed that:

a) The election to terminate shall be specified in writing to the Board.

b) The Board shall for the sum of $1.00, reconvey title to the facilities and real estate previously conveyed by South St. Paul pursuant to Article II, Section 4, of this Agreement; and

c) The Board shall convey to South St. Paul and be compensated for the depreciated value of all water mains and other water service facilities, including water meters, fire hydrants, and other appurtenances, constructed by the Board to serve the South St. Paul system from and after the date of the execution of this Agreement.

d) The Notice of Termination shall specify the effective date of termination, which in any event shall not occur until at least one (1) year following the date to election to terminate.

ARTICLE V

NEW WATER SYSTEM DEVELOPMENT

Section 1. MAINS CONSTRUCTED BY SOUTH ST. PAUL

When South St. Paul installs new water mains, service connections, and/or appurtenances for the distribution of water within the Premises, all construction shall be in accordance with the specifications and standards of the Board. Plans of all extensions to the water system by South St. Paul shall be submitted for approval to the Board before advertising for bids, awarding contracts or beginning actual construction. This initial construction for water system expansion shall be considered development costs and shall be provided at no expense to the Board. South St. Paul agrees to provide the Board with "as-built plans" of all extensions of the water system within the Premises.

Section 2. NEW FACILITIES; FURNISHED BY BOARD

The Board may construct and maintain new water service facilities and appurtenances, including any and all extensions of such facilities and appurtenances. Title to all such facilities shall be held by the Board.

Section 3. WARRANTY

The Board and South St. Paul further agree that as South St. Paul constructs and contracts for the construction of new mains, services, and/or appurtenances to be connected to the system and supplied with

water by the Board, that the Board shall not be responsible for the maintenance or repairs to such newly constructed additions to the water supply system until one (1) year from the date the same have been placed in operation, or until the Board has notified South St. Paul in writing of the acceptance of such installation, whichever date is earlier. At such time that the Board assumes responsibility for the maintenance and repair of said new water system facilities, South St. Paul shall convey said facilities to the Board according to the conditions of Article II, Section 4.

Section 4. STANDARDS

Water mains, services, and appurtenances shall be in conformity with the established standards, rules, and regulations as are in effect at the execution of the agreement or as may thereafter be established by the Board.

South St. Paul and Board staffs shall meet as may be requested by either party to discuss standards relating to water system construction. Where differences in standards are not resolved at the staff level, the Board shall have the ultimate authority for determining such standards.

Section 5. SERVICE CONNECTION APPLICATIONS

New applications for water service connections installed from mains installed by South St. Paul shall be made to and through the Board, and each applicant shall furnish the Board a certified street address established by South St. Paul. An initial $75.00 administrative fee shall be paid by the new customer to the Board for each service connection to reimburse the Board its costs to establish a new account. No new service connection work shall be performed by South St. Paul or its agent until the Board's application process has been completed and inspection of the installation work scheduled by the Board.

Section 6. SERVICE CONNECTIONS-INSTALLED BY BOARD

It is agreed that all service connections, except in designated projects, from the main to the property line shall be installed by the Board under rules identical with those in effect in the City of Saint Paul or as may hereafter be modified by the Board. The charges for such service connections shall be in accordance with the schedule of charges established from time to time by the Board for customers outside the city limits

of Saint Paul, provided, however, that the Board shall not charge South St. Paul customers more than the charges made to any customer in Saint Paul for like service. New applications for water service connections shall be made to and through the Board, and each applicant shall furnish the Board a certified street address established by South St. Paul.

Section 7. SERVICE CONNECTION GUARANTEE BY BOARD

The Board shall make all necessary repairs and maintenance to that part of the service connection located within the public right-of-way, under rules identical with those in effect in the City of Saint Paul. This requirement shall apply to all existing and future service connections constructed to Saint Paul standards. Service connections from private mains or a system not served by the Board's water supply shall not be guaranteed.

Section 8. PIPING, FIXTURE, ETC.

South St. Paul shall, by the enactment of suitable rules, regulations, or ordinances, require that all interior piping, fixtures, accessories, or on premises piping in any manner connected to the public water system supplied by the Board, shall be of the same materials, installed in the same manner and meet the same standards as are required for the same or similar work in the City of Saint Paul, currently the Minnesota Department of Health Minnesota Plumbing Code, Chapter 4715.

Section 9. RIGHT TO INSPECT

The Board, through its officers, agents, and employees, shall have the right at all times to examine, inspect, and test any materials or workmanship used or to be used in connection with the waterworks system within the Premises and supplied with water by the Board or connections thereto, for the purpose of determining whether or not they comply with the foregoing provisions. For the same purpose the Board shall have the right to examine and inspect the materials and workmanship and method of installation of house plumbing connecting with said waterworks system.

ARTICLE VI

RIGHT OF WAY

Section 1. RIGHT OF WAY

Any and all expenses or costs accruing to the water system within the Premises in connection with the maintenance, reconstruction, grinding, overlaying or paving of public streets, alleys or rights-of-way resulting from the action of South St. Paul, County of Dakota or State of Minnesota as such changes affect the water system shall be the responsibility of South St. Paul.

South St. Paul's proposed changes in the elevation of public streets, alleys, or rights-of-way over the water system shall be reviewed by the Board. The Board and South St. Paul agree that the Board's standards pertaining to elevation changes shall apply. Where elevation changes are greater than the parameters outlined in the Board's standards, any and all expenses or costs accruing to the water system within the Premises shall be the responsibility of South St. Paul.

ARTICLE VII

METERS AND METER READING

Section 1. BOARD TO FURNISH METERS

The Board shall furnish, install, retain title to and maintain all customers' water meters.

Section 2. BILLING AND COLLECTION

The Board shall have full responsibility for reading water meters, pursuant to the rules, regulations, statutes and policies of the Board. The Board shall bill South St. Paul a lump sum for the customers served with an itemized listing of consumption by address. South St. Paul shall be responsible for the billing and collection of accounts from the individual properties.

ARTICLE VIII

Section 1. RULES AND REGULATIONS

The use and distribution of water within the Premises, derived from the supply furnished from the Board, shall at all times be governed by rules, regulations, policies, and conditions which the Board has

heretofore adopted for the City of Saint Paul, or which it may hereafter adopt concerning the preservation, regulation and protection of its water supply, including water waste, water conservation, sprinkling restrictions and water use for air conditioning equipment; and as more fully detailed in Board of Water Commissioners--Water Code and Saint Paul Water Utility Standards for Installation of a Water Mains, as revised.

South St. Paul shall enact such rules, regulations, policies, and conditions into ordinances, make them legally effective and binding within sixty (60) days after the execution of this contract, and shall provide a copy thereof to the Board within 60 days of the execution of this agreement. South St. Paul shall also enact any amendments thereto adopted by the Board within sixty (60) days after being notified of such adoption, and shall adopt suitable penalties for the violation of rules, regulations, policies and conditions, and shall strictly enforce such rules, regulations and requirements.

Section 2. BOARD'S JURISDICTION WITHIN THE PREMISES

It is further agreed that the Board, through its officers, agents and employees, shall have the same authority and jurisdiction in the enforcement of such rules and regulations within the Premises that the Board has in the City of Saint Paul.

Section 3. SOUTH ST. PAUL'S PERMITTING AUTHORITY

South St. Paul does issue permits to other governmental and private agencies for the installation of natural gas, telephone, cable and other facilities. South St. Paul shall cooperate with the Board to assure no location conflicts occur. South St. Paul and the Board agree to cooperate to the fullest extent possible in protecting the water system and performing the terms and conditions of this agreement.

ARTICLE IX

FIRE PROTECTION SERVICE AND HYDRANT USE

Section 1. HYDRANTS

Hydrant use for purposes other than fire fighting by South St. Paul shall be subject to the same rules and regulations applied by the Board in the City of Saint Paul. The Board shall provide the same type of

hydrant it provides in the City of West St. Paul, currently a right-opening Waterous Pacer with one (1) large and one (1) small nozzle having Saint Paul Standard threads.

Section 2. INSPECTION OF HYDRANTS

An annual inspection of all standard public hydrants located within the Premises will be conducted by Board crews. Repair and maintenance work required on all standard public hydrants within the Premises shall be conducted by the Board in the same manner as that the same work is conducted in the City of Saint Paul.

Section 3. PAINTING OF HYDRANTS

The Board shall paint the public hydrants within the Premises, and shall do so in accordance with the Board's established standards for such work. South St. Paul may designate a hydrant cap color code to distinguish dead end mains, circulating mains and selected criteria.

Section 4. RELOCATIONS AND ADJUSTMENTS

Where relocations or adjustments of fire hydrants are necessary due to public works projects, or for other reasons, the Board shall perform the required work and South St. Paul shall reimburse the Board for all costs and expenses thereof.

Section 5. FIRE USE

South St. Paul shall not be required to pay for water used for municipal fire fighting within the Premises.

Section 6. STREET CLEANING

South St. Paul agrees to not use water taken from water facilities within the Premises for street sprinkling, street flushing, sewer maintenance and/or any related uses.

Section 7. LOCATION MARKERS

Where it is necessary for the location of fire hydrants to be marked with flags, signage, etc. for fire fighting or other purposes, South St. Paul shall pay for said markers and shall assume the costs thereof including installation, maintenance, and liability.

Section 8. SNOW REMOVAL

Any snow removal from and around fire hydrants for any purpose, shall be performed by South St. Paul at its sole expense.

ARTICLE X

AGREEMENT AMENDMENTS

Section 1. AGREEMENT AMENDMENTS

South St. Paul and the Board agree that from time to time changes to this agreement may be necessary. South St. Paul and the Board agree that said changes shall be in the form of written addendums to this agreement and shall be valid only when duly approved by and executed on behalf of the respective parties.

ARTICLE XI

BOARD'S DUTY TO SUPPLY WATER

Section 1. CAUSE FOR TERMINATION

The Board is responsible to provide an adequate quantity of water to properties located within the Premises, and to provide normal maintenance and repair to all of the facilities operated by Board in the supply of water, pursuant to the same terms, conditions and policies that it follows for the provision of the same properties located within the City of Saint Paul.

Section 2. NOTICE TO BOARD

In the event that South St. Paul should deem that the Board has failed in its obligations to supply an adequate water supply and normal maintenance of the facilities within the Premises, or should find cause that the Board is failing in its provision of services, South St. Paul shall notify the Board in writing setting forth the specific details of any such failures. Notices shall be sent by certified mail to the parties at the following addresses:

South St. Paul City Manager
125 3d Ave. N.
South St. Paul, MN 55075

Board of Water Commissioners
attn: Saint Paul Regional Water Services General Manager
400 Commerce Building
8 4th Street East
St. Paul, MN 55101

Section 3. CORRECTIVE ACTION

Board shall undertake to correct the specified faults within 60 days from the date it receives the written notification. South St. Paul shall be notified in writing within the specified 60 day period what necessary corrective actions have been taken, if any, and any explanation if the Board disagrees with any of South St. Paul's complaints.

Section 4. MEDIATION

Following the specified 60 day period, if South St. Paul deems that sufficient corrective actions have not been taken, it may require that its complaints be submitted to mediation by a panel 3 persons. South St. Paul and Board may each appoint a representative to the panel, and those two appointed representatives shall select the third member. The panel shall provide a reasonable opportunity to both South St. Paul and Board to express its opinions and facts regarding whether the Board is adequately and reasonably performing its obligations under this agreement.

The panel shall submit its findings, conclusions and recommendations, including any time frames for cures of the complaint, if needed, to South St. Paul and the Board within 60 days. The decision of the panel shall be binding. The Board shall cure the complaint in the time frame specified in the panel's recommendation, if a cure is recommended.

Section 5. OPTION TO TERMINATE; ONE YEAR NOTICE

In addition to the cure provided in Article VI, Section 4, South St. Paul may elect to terminate this Agreement by giving written notice to that effect to the Board. Notice of termination shall specify the effective date of termination, which in any event shall not occur until at least one (1) year following the date of election to terminate.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written.

Approved:

Bernie R. Bullert, General Manager

BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL

By _____
Jim Reiter, President

Approved as to Form:

By _____
Janet Lindgren, Secretary

_____
Assistant City Attorney

By _____
Peter Hames, Director,
Office of Financial Services

Approved as to form and execution:

CITY OF SOUTH ST. PAUL

_____
City Attorney

By _____
Kathleen A. Gaylord, Mayor

By _____
Christy M. Wilcox, City Clerk

BOARD OF WATER COMMISSIONERS

RESOLUTION — GENERAL FORM No. 4840

PRESENTED BY COMMISSIONER Cardinal DATE July 9, 2002

WHEREAS, the Board of Water Commissioners ("Board") has been providing water services to properties located within the City of South St. Paul ("South St. Paul") lying west of T. H. 52 and north of Butler Avenue ("Premises") continuously since 1982, pursuant to the terms of a June 23, 1982 Agreement For Water Service between the Board and South St. Paul; and

WHEREAS, the Board and South St. Paul desire to enter into an agreement whereby the Board will continue to provide water services to those properties located within the Premises, and whereby South St. Paul will convey title to its water facilities located within the Premises ("Water Facilities") to the Board, and whereby the Board will maintain said facilities so conveyed; and

WHEREAS, staff has prepared an Agreement For the Conveyance of a Portion of South St. Paul's Water System Lying West of T.H. 52 and North of Butler Avenue to the Board, and the assistant city attorney has approved said Agreement as to form, and the Saint Paul Regional Water Services General Manager does recommend approval of said Agreement; now, therefore, be it

RESOLVED, that the Agreement For the Conveyance of a Portion of South St. Paul's Water System Lying West of T.H. 52 and North of Butler Avenue between the Board of Water Commissioners and the City of South St. Paul is hereby approved and that the proper officers are hereby authorized to execute said Agreement on behalf of the Board

Water Commissioners

Yeas Anfang, Cardinal, Harris, President Reiter **Nays**

In favor 4 Opposed 0

Adopted by the Board of Water Commissioners

July 9, 19~~xx~~ 2002

Janet Lindgren
SECY.

AGREEMENT FOR EMERGENCY WATER SERVICE
BETWEEN THE CITY OF WOODBURY AND THE
BOARD OF WATER COMMISSIONERS

This **AGREEMENT**, made and entered into on this 12th day of October, 1999, by and between the **BOARD OF WATER COMMISSIONERS, SAINT PAUL, MINNESOTA,** a municipal corporation of the State of Minnesota, hereafter referred to as "Board" or "Water Utility," and the **CITY OF WOODBURY**, a municipal corporation of the State of Minnesota, hereafter referred to as "Woodbury";

WITNESSETH:

WHEREAS, Woodbury has requested a connection to the Board's water system to provide Woodbury with water under limited emergency conditions; and

WHEREAS, the Board also desires such a connection to the Woodbury Water System to provide the Board with water under limited emergency conditions; and

WHEREAS, Water Utility staff and Woodbury have determined that such a connection is feasible and in both parties' interest;

NOW, THEREFORE in consideration of the respective covenants contained herein the Board and Woodbury do hereby agree as follows:

ARTICLE I

EMERGENCY WATER SERVICE

Each party shall allow for emergency water service to the other party subject to the rules and regulations enacted by either party now and in the future, and in accordance with the terms of this agreement. Any use of the water service for a period of greater than 30 days shall be deemed a non-

8-1999-N-01

emergency, in which case either party may exercise the right to install a meter on the connection and charge a non-emergency rate as provided for in article IV.

ARTICLE II

CONSTRUCTION

Woodbury agrees that the construction of the connection to allow for said emergency water service shall be at its sole expense. Furthermore, the construction shall comply with the most recent revision of the Water Utility's "Standards for the Installation of Water Mains" and shall be constructed in accordance with plans approved in writing and in advance by both parties' staff. The Board reserves the right to have an inspector, at its expense, on site during construction to protect its interests.

ARTICLE III

USE OF THE CONNECTION

The parties agree that no use of the connection will occur without prior approval from the general manager or designee of the other party. Upon proper notice, both parties' staff will proceed to the site of the connection to set up and open the valve which will supply water to the adjacent system. Both parties agree that the system will be flushed before water is supplied between the two systems, and understand that the individual utilities cannot guarantee any pressure and volume, as that is determined by the availability of the same from each system. The supplying utility reserves the right to limit the maximum daily use. Neither party guarantees the quality of the water, although each party agrees to make practical attempts to maintain water quality. The

parties agree that their use of the water shall at all times conform to rules for usage in the adjacent system. Both parties agree that their general manager or designee has sole discretion regarding whether approval to use the water and the connection shall be granted, and that the general manager or designee may consider factors such as the nature and extent of the emergency and the current status, quality and availability of the water system, in deciding whether to grant such approval.

ARTICLE IV

WATER RATES

Charges for use of the emergency connection and all water shall be $150.00 per day for each and every day or portion thereof that the connection is in use. This charge will apply to the entity that requested the service, be it Woodbury or the Board. In the event of non-emergency usage as referenced in Article I, charges for use of the connection and all water shall be at the Board's current outside City rate that is in effect on the dates of usage.

ARTICLE V

MAINTENANCE OF CONNECTION

Woodbury agrees that it shall provide and pay for all routine and necessary maintenance or repairs of the connection at its sole expense.

ARTICLE VI

AREA SUPPLIED

Woodbury agrees that the area to be supplied with water from this emergency connection shall extend no further into their system than the intersection of Edgewood Avenue and Meadow Lane without the express written and prior approval of the Board's general manager or designee.

ARTICLE VII

INDEMNIFICATION

The Board shall forever indemnify and save harmless, protect and defend Woodbury, its employees and agents from any or all liability, suits or demands, including the legal defense thereof, for bodily injuries, including death, or property damages, including loss of use, arising out of any activity by the Board or the Board's employees and agents under this agreement. Likewise, Woodbury shall forever indemnify and save harmless, protect and defend the Board, its employees and agents from any or all liability, suits or demands, including the legal defense thereof, for bodily injuries, including death, or property damages, including loss of use, arising out of any activity by Woodbury or Woodbury's employees and agents under this agreement.

ARTICLE VIII

EFFECTIVE DATE

This agreement shall be effective on September 1, 1999, or upon the date that the final required signature is obtained, whichever occurs later, and shall remain in effect until September 1, 2009, or until this agreement has been canceled or terminated, whichever occurs first. Both parties shall have a continuing obligation, however, to comply with the indemnification provisions of this agreement contained in Article VII.

ARTICLE IX

AGREEMENT AMENDMENTS

Woodbury and the Board agree that from time to time changes to this agreement may be necessary. The parties agree that any such changes shall be in the form of written amendments to this agreement and shall be valid only when duly approved and executed by both parties.

ARTICLE X

TERMINATION OF AGREEMENT

Irrespective of any other condition contained herein, the parties agree that this agreement may be canceled by either party at any time with 30 days notice to the other party.

ARTICLE XI

NOTICE

Any notice required or permitted to be given by either party is given when mailed by U.S. Mail, postage prepaid, as follows:

If to Board:

General Manager
Board of Water Commissioners
400 Commerce Building
8 East Fourth Street
Saint Paul, Minnesota 55101

If to Woodbury:

Mayor
City of Woodbury
8301 Valley Creek Road
Woodbury, Minnesota 55125

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed on the day and year first above written.

APPROVED:

Bernie R. Bullert, General Manager

Approved as to Form:

Assistant City Attorney

N/A
City Attorney

BOARD OF WATER COMMISSIONERS

By
Michael J. Harris, President

By
Janet Lindgren, Secretary

COUNTERSIGNED:

By
Joseph M. Reid, Director,
Office of Financial Services

THE CITY OF WOODBURY

By
Mayor

By
City Administrator

BOARD OF WATER COMMISSIONERS

RESOLUTION — GENERAL FORM No. 4669

PRESENTED BY COMMISSIONER Reiter DATE October 12, 1999

WHEREAS, the City of Woodbury has requested a connection to the Board's distribution system at Century Avenue and Brookview Drive for use in emergency situations; and

WHEREAS, such a connection potentially could be used to supply the Board's system from the Woodbury system; and

WHEREAS, Woodbury is willing to pay all costs associated with design and construction of this connection; and

WHEREAS, plans for construction of this connection have been approved by Board staff and an agreement has been drafted to govern the terms and conditions of the construction and use of the connection; and

WHEREAS, the agreement has been reviewed and approved as to form by the City Attorney's Office; now, therefore, be it

RESOLVED, that the agreement substantially in the form submitted between the Board and the City of Woodbury for emergency water service is hereby approved and that the proper officers of the Board are hereby directed to execute said agreement.

Water Commissioners

Yeas	Arcand	**Nays**
	Kittridge	
	Reiter	
Vice President	Haselmann	
President	Harris	

In favor 5 Opposed 0

Adopted by the Board of Water Commissioners

October 12, 19 99

Janet Lindgren
SECY.

8-1999-N-02

Agreement # 02- 1121-I

AMENDMENT NO. 1
to
AGREEMENT BETWEEN

BOARD OF WATER COMMISSIONERS
and
CITY OF WOODBURY

This **AMENDMENT NO. 1 TO AGREEMENT** entered into this 12th day of January 2010, by and between the **BOARD OF WATER COMMISSIONERS, SAINT PAUL, MINNESOTA**, a municipal corporation of the State of Minnesota (the "Board"), and the **CITY OF WOODBURY** a municipal corporation of the State of Minnesota ("Woodbury").

WITNESSETH:

WHEREAS, Woodbury and the Board entered into an agreement dated October 12, 1999 for the provision of emergency water service by the Board to properties within Woodbury (the "Agreement"); and

WHEREAS, Article IX of the Agreement allows for amendments to the Agreement; and

WHEREAS, the parties desire at this time to amend the Agreement to extend the term of the Agreement.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the parties mutually agree to amend the Agreement as follows:

1. ARTICLE IV is hereby amended as shown below. New language is indicated by underline and deleted language is indicated by strikethrough.

ARTICLE IV

WATER RATES

Effective January 1, 2010, charges ~~Charges~~ for use of the emergency connection and all water shall be ~~$150.00 per day~~ equivalent to the charge for one hundred (100) Saint Paul Regional Water Services billing units of water per day, each billing unit being one hundred (100) cubic feet, at the Board's outside City rate in effect on the dates of use for each and every day or portion thereof that the connection is in use. This charge will apply to the entity that requested the service, be it Woodbury or the Board. In the event of non-emergency use as referenced in Article I, charges for use of the connection and all water shall be at the Board's current outside City rate that is in effect on the dates of use.

2. ARTICLE IX is hereby amended as shown below. New language is indicated by underline and deleted language is indicated by strikethrough.

ARTICLE IX

EFFECTIVE DATE

This agreement shall be effective on September 1, 1999, or upon the date that the final required signature is obtained, whichever occurs later and as to the Amendment No. 1, the same shall be effective January 1, 2010, and the entire agreement as amended shall remain in effect until ~~September 1, 2009~~ January 1, 2030, or until this agreement has been canceled or terminated, whichever occurs first. Both parties shall have a continuing obligation, however, to comply with the indemnification provisions of this agreement contained in Article VII.

3. Except as modified herein, the terms of the Agreement shall remain in full force and effect.

[Remainder of this page left intentionally blank.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment No. 1 to Agreement to be executed as of the day and year first above written.

Approved:

Stephen P. Schneider, General Manager
Saint Paul Regional Water Services

Approved as to Form:

Assistant City Attorney

BOARD OF WATER COMMISSIONERS

By _____
Patrick Harris, President

By _____
Mollie Gagnelius, Secretary

By _____
Margaret Kelly, Director
Office of Financial Services

APPROVED AS TO FORM:
City Attorney 12/18/09

CITY OF WOODBURY

By _____
Mayor

By _____
City Administrator

BOARD OF WATER COMMISSIONERS

RESOLUTION — GENERAL FORM

No. 7057

PRESENTED BY COMMISSIONER Helgen

DATE January 12, 2010

WHEREAS, the Board of Water Commissioners and the City of Woodbury entered into an agreement dated October 12, 1999 for the purpose of providing each party with an emergency water supply ("Agreement"); and

WHEREAS, the parties desire to amend the Agreement to extend the term to January 1, 2030 and to revise the charges for volume of water used; and

WHEREAS, staff has prepared an Amendment No. 1 to Agreement which provides said extension and charge revision; and

WHEREAS, the assistant city attorney has approved said Amendment No. 1 to as to form; now, therefore, be it

RESOLVED, that the Board of Water Commissioners does hereby approve Amendment No. 1 to Agreement with the City of Woodbury, and that the proper officers are hereby authorized and directed to execute said Amendment No. 1 on behalf of the Board.

Water Commissioners

Yeas	Anfang	**Nays**
	Carter, III	
	Helgen	
	Kleindl	
President	Harris	

In favor 5 Opposed 0

Adopted by the Board of Water Commissioners

January 12, 2010

Mollie Loydeus
SECY.

RESOLUTION NO. 09–234

**RESOLUTION OF THE CITY OF WOODBURY,
WASHINGTON COUNTY, MINNESOTA**

**APPROVING AMENDMENT NO. 1 TO THE AGREEMENT BETWEEN
THE ST. PAUL BOARD OF WATER COMMISSIONERS AND
THE CITY OF WOODBURY**

WHEREAS, the City of Woodbury and the St. Paul Board of Water Commissioners (Board) entered into an agreement dated October 12, 1999 for the provision of emergency water service by the Board to properties within Woodbury (Agreement); and

WHEREAS, Article IX of the Agreement allows for amendments to the Agreement; and

WHEREAS, the parties desire at this time to amend the Agreement to extend the term of the Agreement.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Woodbury, Washington County, Minnesota as follows:

1. Amendment No. 1 to the October 12, 1999 Agreement between the St. Paul Board of Water Commissioners and the City of Woodbury is hereby approved.

2. The Mayor and City Administrator are hereby authorized to execute said Amendment No. 1.

This Resolution was declared duly passed and adopted and was signed by the Mayor and attested to by the City Administrator this 9th day of December, 2009.

Attest:

William J. Hargis, Mayor

Clinton P. Gridley, City Administrator

(SEAL)

STATE OF MINNESOTA)
)
COUNTY OF WASHINGTON) ss
)
CITY OF WOODBURY)

I, Kimberlee K. Blaeser, being the duly qualified and acting City Clerk of the City of Woodbury, Minnesota, DO HEREBY CERTIFY that I have compared the attached and foregoing **Council Resolution No. 09-234, "APPROVING AMENDMENT NO. 1 TO THE AGREEMENT BETWEEN THE ST. PAUL BOARD OF WATER COMMISSIONERS AND THE CITY OF WOODBURY",** with the original thereof on file in my office, and that the same is a true and complete transcript of the resolution of the City Council of said municipality at a meeting duly called and held on the 9th day of December 2009.

WITNESS my hand and the seal of said City this 18th day of December 2009.

Kimberlee K. Blaeser
City Clerk

(SEAL)

Attachment: Resolution No. 09-234

Appendix VII

Municipal Critical Water Deficiency Ordinance

Appendix VII – Official Control Document

Chapter 91. - Water Code—Miscellaneous Provisions

Sec. 91.03. - Water conservation.

No person shall allow water to be wasted through any faucet or fixture or keep water running longer than necessary. The board of water commissioners shall discourage any wastage of water and may, when in its judgment deemed necessary, turn off any water service and require remedial action as it may in its judgment be deemed proper and necessary.

(Code 1956, § 252.03; C.F. No. 93-905, § 16, 7-15-93; C.F. No. 97-1419, § 5, 12-22-97)

Sec. 91.05. - Sprinkling restrictions.

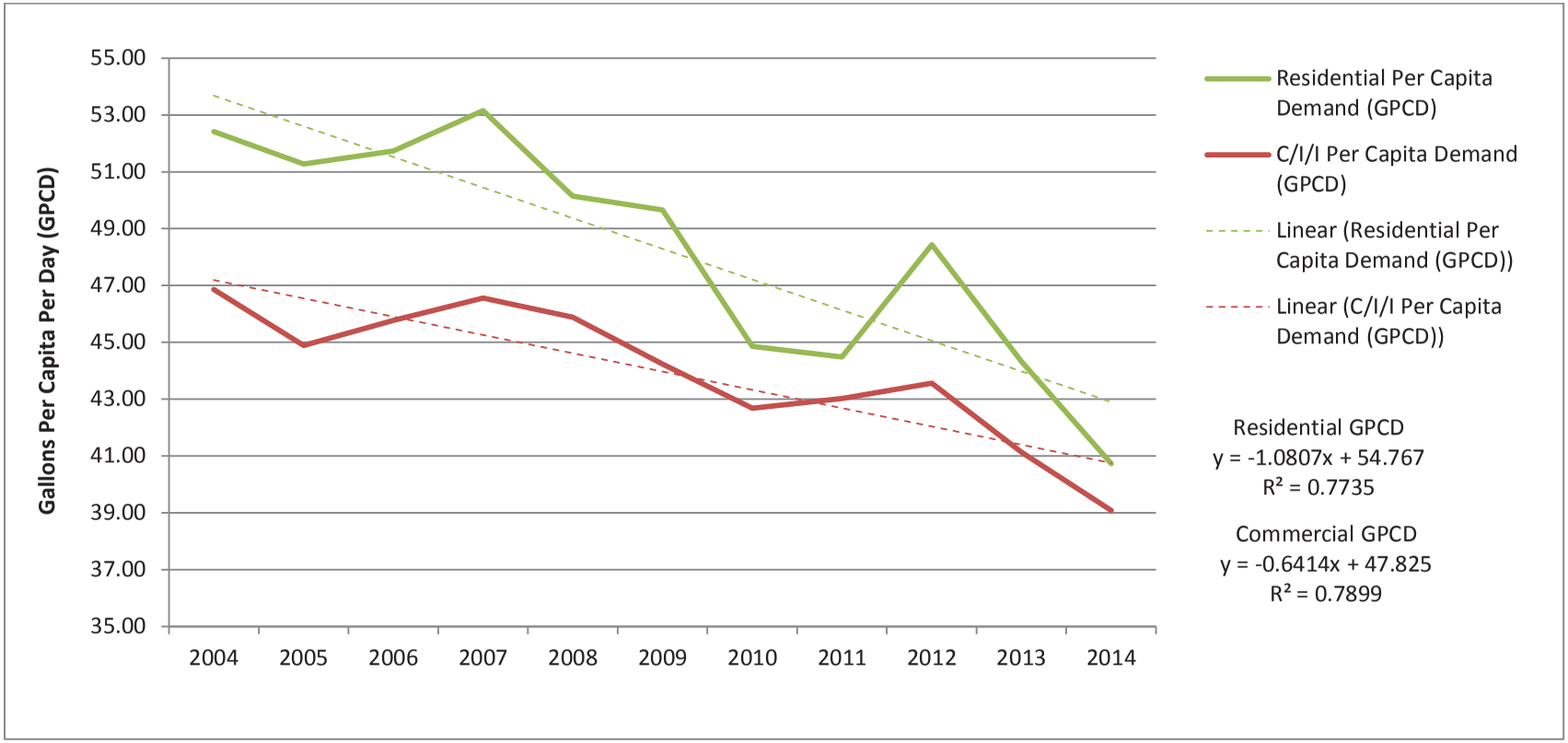
The use of water for lawn sprinkling purposes shall at all times be subject to the express condition that the board of water commissioners may, at any time when in its opinion the condition of the public water supply demands it, limit the time during each day when water may be used for sprinkling purposes; and the board may forbid the use of water for lawn sprinkling for any period not exceeding thirty (30) days at one time.

(Code 1956, § 252.06)

Appendix VIII

Annual Per Capita Water Demand (2004-2014)

Appendix 8 – Annual Per Capita Demand (2004-2014)



Linear Trend for Residential Per Capita Demand = -1.08

Linear Trend for Comercial/Industrial/Institutional Per Capita Demand = -0.64

Appendix IX

Water Rate Strucuture

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Usage Charges

Winter*	$2.52 per 100cu.ft.
Summer**	$2.62 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

** Summer rates apply to bills sent during May through October.

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	R-O-W Fee	Bill Cycle
< 1"	$15.00	$4.50	per quarter
1"	$37.50	$11.25	per quarter
1 1/2"	$75.00	$22.50	per quarter
1 1/2"	$25.00	$7.55	per month
2"	$40.00	$12.08	per month
3"	$80.00	$24.16	per month
4"	$125.00	$37.75	per month
6"	$250.00	$75.50	per month
8"	$400.00	$120.80	per month
10"	$575.00	$173.65	per month
12"	$1,075.00	$324.65	per month

Sewer Rate Settings
Sanitary sewer service charges are established annually by the Saint Paul City Council. If you have any questions regarding your sanitary sewer charges, please call:

Saint Paul Public Works
Sewer Division 651-266-6244

Sanitary Sewer Charges consist of a base charge and a water volume charge.

Base Charge: A fixed charge as determined by water meter size is applied during each regular billing cycle. Base charge is shown below.

Volume Charge: The volume of used metered water in bill units multiplied by the applicable rate in the table below.

First 100,000 cu. ft. per month	$3.90 per 100 cu. ft.
Next 400,000 cu. ft. per month	$3.85 per 100 cu. ft
Over 500,000 cu. ft. per month	$3.81 per 100 cu. ft

For single and two-family homes, the volume charge for the first quarterly billing of the year is based on the measured water consumption prorated to a 91-day standard. Sewer charges for each of the last three quarters are based on the prorated water consumption, except they will not exceed the figure used in the first quarter. For all other properties, the sewer volume charge is based on the actual water consumption for each billing period.

Minimum Volume Charge:
For properties with low or no water consumption, minimum volume charges are applied based on the size of the water meter as shown in the table below. The minimum sewer bill is the base charge plus the minimum volume charge.

Meter Size	Min Vol Charge	Base Charge	Bill Cycle
< 1"	$7.20	$3.00	per quarter
1"	$12.60	$8.31	per quarter
1 1/2"	$26.40	$11.73	per quarter
1 1/2"	$8.80	$3.91	per month
2"	$20.00	$4.95	per month
3"	$42.00	$7.00	per month
4"	$104.00	$8.75	per month
6"	$200.00	$12.37	per month
8"	$344.00	$15.65	per month
10"	$492.00	$18.77	per month
12"	$680.00	$22.48	per month
Over 12"	$1000.00	$22.48	per month

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts plus a 0.5% local sales tax is applied to non-residential accounts in the City of Saint Paul.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

R-O-W Recovery Fee
The Right of Way Recovery Fee is collected to reimburse the city of Saint Paul for costs it incurs due to water utility infrastructure that delivers water to your property. The R-O-W recovery fee is based on your meter size.

Meter Reading Fee: Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Water Main Replacement Surcharge
A charge of 20 cents per billing unit is added to pay for the replacement of water main.

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Late Charge
Water bills are considered delinquent if not paid within 30 days, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Water Usage

Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods

Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings

Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Usage Charges

Winter* $2.52 per 100cu.ft.
Summer** $2.62 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

** Summer rates apply to bills sent during May through October.

Water Service Base Fee

The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$15.00	per quarter
1"	$37.50	per quarter
1 1/2"	$75.00	per quarter
1 1/2"	$25.00	per month
2"	$40.00	per month
3"	$80.00	per month
4"	$125.00	per month
6"	$250.00	per month
8"	$400.00	per month
10"	$575.00	per month

About Sewer Charges

Saint Paul Regional Water Services handles only the billing services for Falcon Heights sewer customers.

Sewer Rate Settings

Sanitary sewer and miscellaneous service charges are established annually by your City Council. If you have any questions about your rates, please call:

City of Falcon Heights 651-792-7600

Sanitary Sewer Rates

The sanitary sewer fee for residential units is $28.75 per quarter plus $0.0207896 per cubic foot of water usage during the 3 winter months of approximately November-January, prorated to a 91 day standard. For apartment residential units, the fee is $9.58 per unit per month plus $0.0207896 per cubic foot of water usage during the winter month of approximately November prorated to a 30 day standard. For residential units, this will serve as the maximum fee for all other billing periods throughout the year, but the actual amount billed may be lower depending on water usage.

For commercial units, the fee is 0.0207896 per cubic foot of water usage during each month.

Storm Sewers Rates

A flat rate is charged for each billing period as follows:

$22.00 per residential unit quarterly
$205.32 per acre for apartment buildings and for commercial properties quarterly

Street Lighting Fee

A fee is charged for each billing period:

$6.00 per residential unit quarterly
$0.02 per lineal foot frontage for commercial properties monthly

Recycling fee: A recycling fee of $9.75 per residential unit is charged each billing period on all residential accounts.

Water/Hydrant charge: A 6 percent surcharge on current water charges (Water Service Base Fee and Water Usage Charge) is collected each billing cycle by Saint Paul Regional Water Services on behalf of the City of Falcon Heights.

Sales Tax

A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax

A 0.25% transit tax is applied to non-residential accounts.

Minnesota Safe Drinking Water Act

The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Meter Reading Fee: Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Water Main Replacement Surcharge

A charge of 20 cents per billing unit is added to pay for the replacement of water main.

Bill Problems

If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility

Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Late Charge

Water bills are considered delinquent if not paid within 30 days, at which time a 5% late charge will be added to your bill.

Returned Checks

A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

The Saint Paul Regional Water Services

SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service 651-266-6350
TDD Hearing Impaired 651-266-6299
Call: 7:30 a.m. - 4:30 p.m. Mon - Fri
EMERGENCY SERVICE 651-266-6868

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Usage Charges

Winter*	$2.52 per 100cu.ft.
Summer**	$2.62 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

** Summer rates apply to bills sent during May through October.

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$15.00	per quarter
1"	$37.50	per quarter
1 1/2"	$75.00	per quarter
1 1/2"	$25.00	per month
2"	$40.00	per month
3"	$80.00	per month
4"	$125.00	per month
6"	$250.00	per month
8"	$400.00	per month
10"	$575.00	per month

About Sewer Charges
Saint Paul Regional Water Services handles only the billing services for Lauderdale sewer customers. All other aspects of the sewer utility continue to be operated and maintained by the City of Lauderdale. Sanitary sewer charges pay for the operation, maintenance, and capital cost of Lauderdale's sewer system, and for treatment costs levied by the Metropolitan Council, Environmental Services Division.

Sewer Rate Settings
Sanitary sewer and miscellaneous service charges are established annually by your City Council. If you have any questions about your rates, please call:

City of Lauderdale 651-792-7650

Sanitary Sewer Rates
Residential Properties:
A flat rate of $52.77 per residential unit will be assessed per quarter.

Commercial Properties:
The sanitary sewer charge per month will be based on $2.60 per unit of water consumption, with a minimum monthly charge of $13.00.

Storm Sewer Rates
A flat rate of $15.27 per REF (Residential Equivalency Factor) will be assessed for all properties per quarter.

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Meter Reading Fee
Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)
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Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Water Main Replacement Surcharge
A charge of 20 cents per billing unit is added to pay for the replacement of water main.

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Late Charge
Water bills are considered delinquent if not paid within 30 days, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Consumption Charges

Winter*	$2.52 per 100cu.ft.
Summer**	$2.62 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

** Summer rates apply to bills sent during May

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$15.00	per quarter
1"	$37.50	per quarter
1 1/2"	$75.00	per quarter
1 1/2"	$25.00	per month
2"	$40.00	per month
3"	$80.00	per month
4"	$125.00	per month
6"	$250.00	per month
8"	$400.00	per month
10"	$575.00	per month

About Sewer Charges
Saint Paul Regional Water Services handles only the billing services for West St. Paul sewer customers. All other aspects of the sewer utility continue to be operated and maintained by the City of West St. Paul.

Sewer Rate Settings
Sanitary sewer and miscellaneous service charges are established annually by your City Council. If you have any questions about your rates, please call:

City of West Saint Paul 651-552-4100

Sanitary Sewer Rates
Charges for sanitary sewer services are based upon water consumption and charges from Metropolitan Council Environmental Services. Rates are approved by the West St Paul City Council.

For single and two-family homes, the sewer charges are prorated to a 91 day standard and charged at $3.85 per unit. In addition, a demand charge of $20.00 per quarter is charged. Sewer charges are based on consumption during the first calendar quarter of the year. If subsequent quarters' consumption is less, the lesser amount is charged. A minimum use of 3 units per quarter is charged.

For all other properties, the sewer charge is based upon actual consumption at $4.25 per unit. Minimum charge is $12.75 per month.

Storm Sewer Charge
A flat rate per REF(residential equivalency factor) is charged for each billing period as follows:

$12.50 per quarter for residential properties
$4.17 per month for commercial properties

Water Usage Surcharge
A 1 percent surcharge on current water charges (Water Service Base Fee and Water Usage Charge) is collected each billing cycle by the Saint Paul Regional Water Services on behalf of the City of West St Paul.

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Meter Reading Fee: Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Water Main Replacement Surcharge
A charge of 20 cents per billing unit is added to pay for the replacement of water main.

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 1st of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Late Charge
Water bills are considered delinquent if not paid within 30 days, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Usage Charges

Winter*	$2.52 per 100cu.ft.
Summer**	$2.62 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$15.00	per quarter
1"	$37.50	per quarter
1 1/2"	$75.00	per quarter
1 1/2"	$25.00	per month
2"	$40.00	per month
3"	$80.00	per month
4"	$125.00	per month
6"	$250.00	per month
8"	$400.00	per month
10"	$575.00	per month

About Sewer Charges
Saint Paul Regional Water Services handles only the billing services for Maplewood sewer customers. All other aspects of the sewer utility continue to be operated and maintained by the City of Maplewood. Sanitary sewer charges pay for the operation, maintenance, and capital cost of Maplewood's sewer system, and for treatment costs levied by the Metropolitan Council, Environmental Services Division.

Sewer, Recycling, Surcharge and Environmental Utility Rates
Sanitary sewer, recycling, surcharge, and environmental utility (storm sewer) rates are established annually by your City Council. If you have any questions about the rates, please call:

City of Maplewood 651-249-2400

Sanitary Sewer Rates
Sanitary sewer charges for Maplewood on one and two family residential accounts are based on the water consumption during the first quarter of the year, pro-rated to a 91-day standard. Sewer charges in subsequent quarters cannot be higher than the first quarter but can be lower if water consumption decreases.
Sewer charges for commercial accounts are based on actual consumption. The sanitary sewer rate for all accounts is $2.94 per unit of water. The minimum charges for sewer per billing period is $16.50 for residential accounts and $5.50 for commercial accounts.

Recycling charge
The recycling charge for residential accounts billed quarterly will be $9.78 per residential unit; for residential accounts billed monthly, the charge is $3.26 per property unit.

Surcharge
A 7.0% surcharge on current water charges (Water Service Base Fee and Water Usage Charge) is being added by the City of Maplewood to finance water system modifications not funded by SPRWS. These modifications are the result of development and reconstruction projects taking place in Maplewood.

Environmental utility rates for storm water management:
The Single Family rate is $23.10 per household per **quarter**. Per acre/**monthly** rates are: Multi-family - $48.58, Institutional - $59.02, Commercial - $75.65. If you are paying a lower rate it's because you are receiving an EUF credit.

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Meter Reading Fee: Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Water Main Replacement Surcharge
A charge of 20 cents per billing unit is added to pay for the replacement of water main.

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Late Charge
Water bills are considered delinquent if not paid within 30 days, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Consumption Charges

Winter*	$3.02 per 100cu.ft.
Summer**	$3.14 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$18.00	per quarter
1"	$45.00	per quarter
1 1/2"	$90.00	per quarter
1 1/2"	$30.00	per month
2"	$48.00	per month
3"	$96.00	per month
4"	$150.00	per month
6"	$300.00	per month
8"	$480.00	per month
10"	$690.00	per month

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Late Charge
Water bills are considered delinquent if not paid within 30 days of the Bill Date, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

Water - Surcharge
A 10% surcharge on current water charges (Water Service Base Fee and Water Usage Charge) is collected each billing cycle by the Saint Paul Regional Water Services on behalf of the City of Mendota Heights for funding modifications to the water system required to facilitate Mendota Heights development or reconstruction projects.

Water Main Replacement Surcharge
A charge of 20 cents per billing unit is added to pay for the replacement of water main.

Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Meter Reading Fee
Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Pay using Automatic Withdrawal
You can pay your water bill directly from your bank account. For further information call customer service at the numbers below.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Consumption Charges

Winter*	$3.02 per 100cu.ft.
Summer**	$3.14 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$18.00	per quarter
1"	$45.00	per quarter
1 1/2"	$90.00	per quarter
1 1/2"	$30.00	per month
2"	$48.00	per month
3"	$96.00	per month
4"	$150.00	per month
6"	$300.00	per month
8"	$480.00	per month
10"	$690.00	per month

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Late Charge
Water bills are considered delinquent if not paid within 30 days of the Bill Date, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Meter Reading Fee
Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Pay using Automatic Withdrawal
You can pay your water bill directly from your bank account. For further information call customer service at the numbers below.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Water Usage
Water usage is based on the meter reading for the current period. ESTIMATE indicates we were unable to read the meter. If your current bill is estimated, call Meter Office at 651-266-6850 to schedule an appointment as we need to get inside and troubleshoot the metering problem. **Note:** 100 cu. ft. of water equals 1 unit or 748 gallons.

Billing Periods
Accounts are billed quarterly for residential and monthly for commercial.

NOTE: "Due Date" means date to be received by the SPRWS. The SPRWS is not responsible for late payments caused by a delay in the mail service.

Water Rate Settings
Water rates are changed periodically to cover increased costs for water treatment, chemicals, electric power, fuel, maintenance of the supply and distribution systems, and other general expenses. Changes in water rates are proposed by resolution of the Board of Water Commissioners and put into effect upon confirmation by the Saint Paul City Council.

Water Consumption Charges

Winter*	$3.02 per 100cu.ft.
Summer**	$3.14 per 100cu.ft.

For accounts with 1-inch and smaller meters:

* Winter rates apply to bills sent during January through May, and December.

** Summer rates apply to bills sent during June through November.

For accounts with 1 1/2 -inch and larger meters:

* Winter rates apply to bills sent during January through April, November and December.

Water Service Base Fee
The water service base fee covers such costs as general administration, billing, accounting, customer service, etc.

Meter Size	Service Base Fee	Bill Cycle
< 1"	$18.00	per quarter
1"	$45.00	per quarter
1 1/2"	$90.00	per quarter
1 1/2"	$30.00	per month
2"	$48.00	per month
3"	$96.00	per month
4"	$150.00	per month
6"	$300.00	per month
8"	$480.00	per month
10"	$690.00	per month

Sales Tax
A 6.875% state sales tax is applied to non-residential accounts.

Transit Tax
A 0.25% transit tax is applied to non-residential accounts.

Late Charge
Water bills are considered delinquent if not paid within 30 days of the Bill Date, at which time a 5% late charge will be added to your bill.

Returned Checks
A $30.00 fee will be charged for all returned check and "Automatic Withdrawal" returns.

Minnesota Safe Drinking Water Act
The Minnesota Department of Health via the Federal Safe Drinking Water Act (Statute 144.3831) requires we charge 53 cents per month or $1.59 per quarter for testing public water supplies.

Meter Reading Fee
Per reading fee for the properties that have an exterior-mounted, non-radio metering system (Touchpad)

Bill Problems
If you dispute this bill, please call **651-266-6350.** You are entitled to a hearing before an impartial hearing officer who will make a recommendation regarding resolution of your concerns.

Payment Responsibility
Property owners are responsible for all water bills issued against their property. If a property owner desires to have the bills sent to a tenant, the SPRWS will agree to do so; however, all charges for water and sewer services are a continuing statutory lien against the property until they are paid. Unpaid charges that are delinquent as of November 15th of each year may be certified to the County Auditor, at the SPRWS' discretion, to be collected with the real estate taxes for the property.

Pay using Automatic Withdrawal
You can pay your water bill directly from your bank account. For further information call customer service at the numbers below.

The Saint Paul Regional Water Services
SPRWS is a publicly owned corporation operating as a self-supporting non-profit entity. It is financed solely by the sales of water and fees for other services. It receives no other outside financial support or tax subsidy.

WATER SERVICES PHONE NUMBERS

Customer Service	651-266-6350
TDD Hearing Impaired	651-266-6299
Call: 7:30 a.m. - 4:30 p.m.	Mon - Fri
EMERGENCY SERVICE	**651-266-6868**

Appendix X

Adopted Regulations to Reduce Demand or Improve Water Efficiency

Appendix X– Regulation

Chapter 91. - Water Code—Miscellaneous Provisions

Sec. 91.03. - Water conservation.

Plumbing fixtures installed in any new building or any retrofitted building shall be of water conserving type and shall meet requirements of the state building code. The board of water commissioners may implement a plan to promote and encourage replacement of nonconserving faucets, shower heads and toilets.

All automatic lawn sprinkler systems connected to the public water system must be equipped with water conserving devices. However, systems which were installed prior to the effective date of this chapter may continue in operation at their current locations.

No person shall allow water to be wasted through any faucet or fixture or keep water running longer than necessary. The board of water commissioners shall discourage any wastage of water and may, when in its judgment deemed necessary, turn off any water service and require remedial action as it may in its judgment be deemed proper and necessary.

(Code 1956, § 252.03; C.F. No. 93-905, § 16, 7-15-93; C.F. No. 97-1419, § 5, 12-22-97)

Appendix XI

Implementation Checklist

Appendix XI – Local Water Supply Plan – Implementation Checklist

Action Item	Action Taken	Timeframe
Conservation Water Rates Structure – Explore additional conservation billing strategies to encourage water conservation.	Yes	Ongoing
Water Supply System Improvements.	Yes	Ongoing
Educational Efforts – Continue to provide public information and outreach programs to reach conservation goals.	Yes	Ongoing
Rebate or retrofitting program – Continue to partner with organizations to promote water conservation practices.	Yes	Ongoing
Continue to achieve less than 75 Residential GPCD and to sustain a decreasing trend in GPCD across all customer categories.	Yes	Ongoing
Monitoring Water Usage and Loss – Implement and continue to perform leak detection surveys & water audits. Increase frequency at known "at risk" areas in order to achieve a decreasing trend for unaccounted water loss.	Yes	Ongoing
Revise city comprehensive plan for water resource management.	Yes	Ongoing
Consumer Water Audits – Explore marketing water audits for interested customers.	No	TBD
Metering – Pursue establishing better methods and procedures to estimate water usage for SPRWS distribution system activities.	No	TBD
Update water conservation regulations and enforcement strategies. SPRWS to create an Emergency Response Management Supervisor to address these issues.	No	TBD