Department of Public Works
Environmental Engineering Section

Review of City of Milwaukee Sanitary Bypass Pumps, Sewer Overflow (SSO) Permit
and
SCADA Monitoring

DISCUSSION OUTLINE

Bypass pump and lift station locations

SSO Background

Typical bypass pump sites

SCADA monitoring

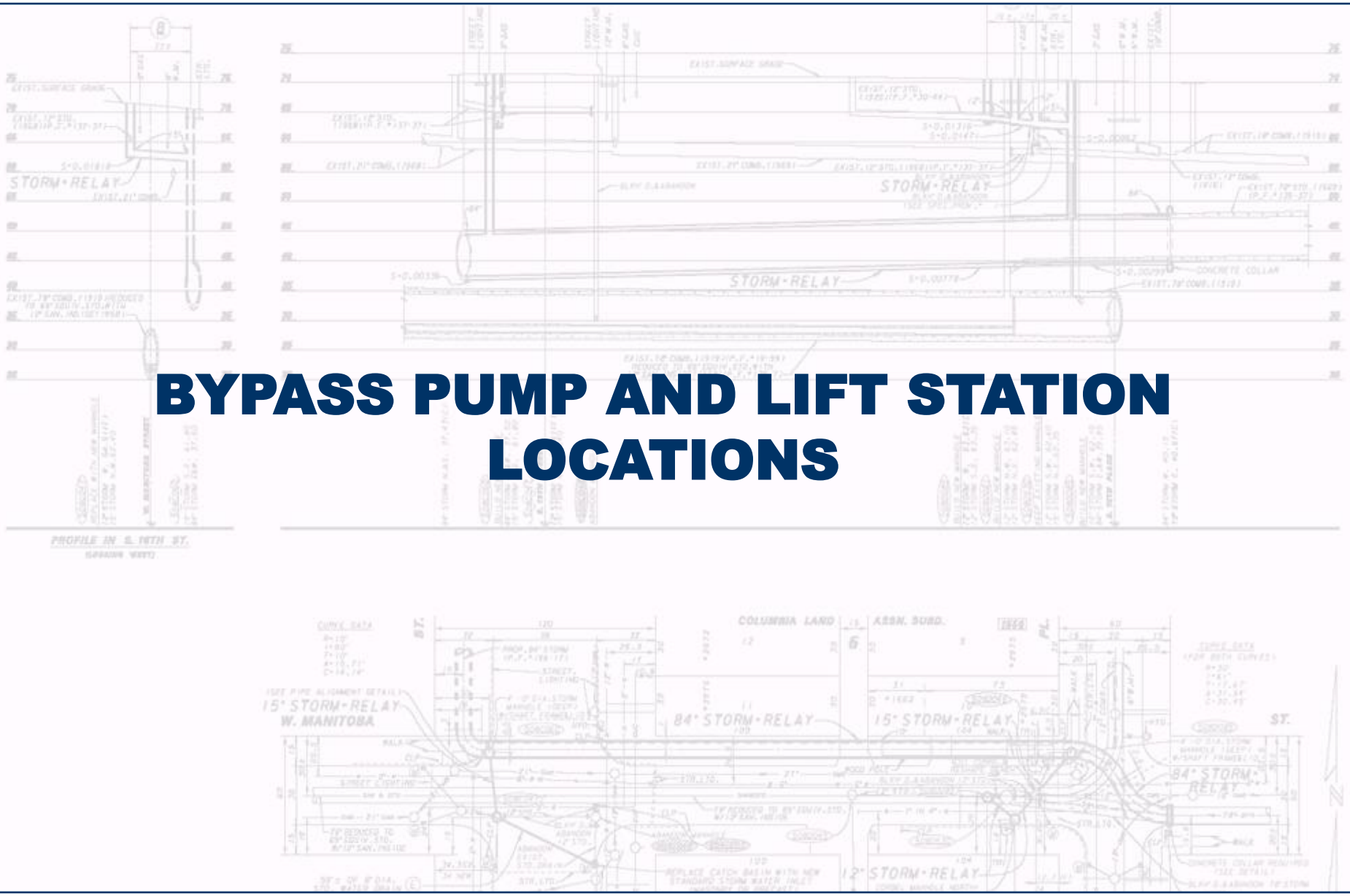
Why do we need bypass pumps?

What are we doing to improve our pump system?

What are we doing to reduce the risks of basement backups?

Questions

BYPASS PUMP AND LIFT STATION LOCATIONS



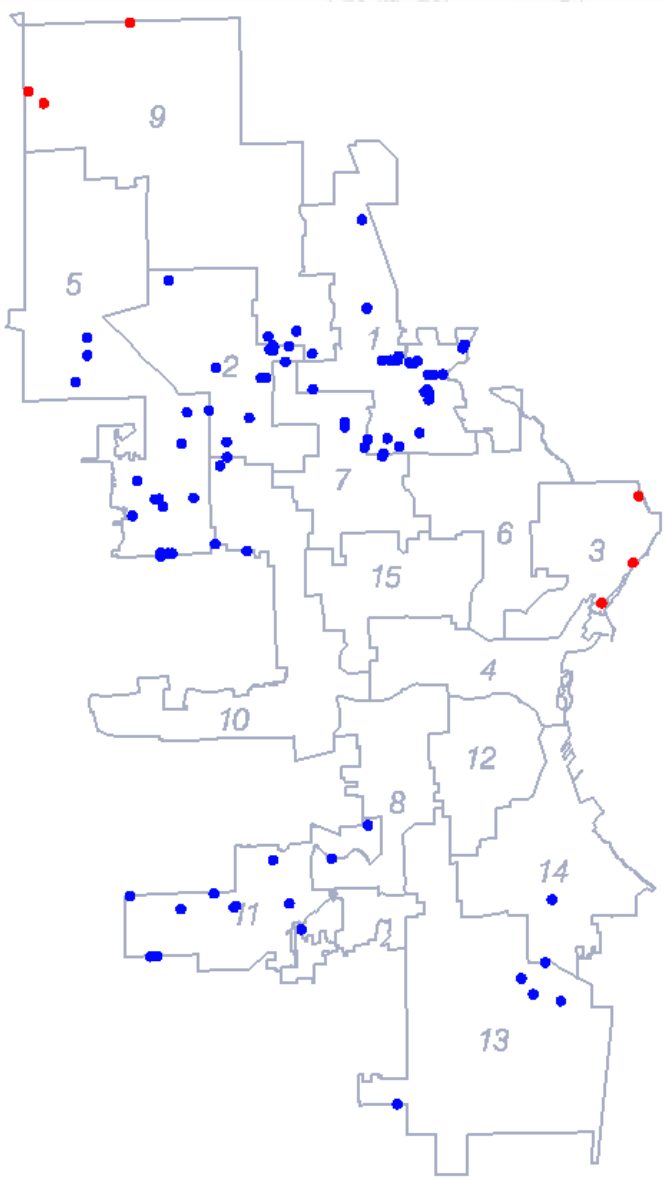
SANITARY BYPASS PUMP AND LIFT STATION LOCATIONS

The City owns and maintains two types of pumping facilities, sanitary bypass pumps and sanitary lift stations.

- Bypass Pumping Stations (83)
- Lift Stations (6)

Bypass pumps are located in areas where there has been a history of backwaters.

Lift stations are located where gravity sewer service is not available, usually in low-lying areas.



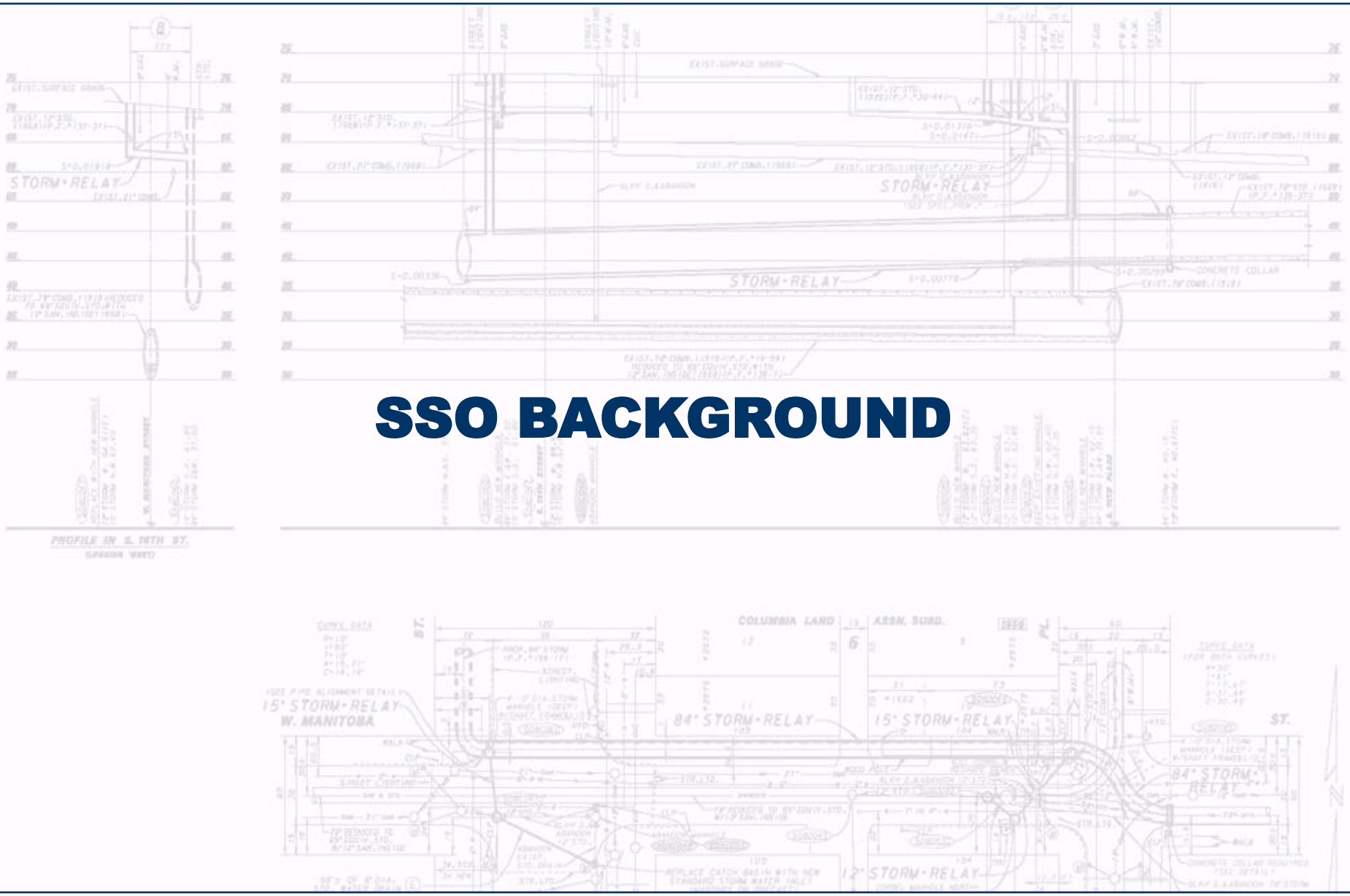
SANITARY BYPASS PUMP STATION LOCATIONS

Our records indicate that the original pumps were installed in the 1960s and 1970s

Bypass pumps are located in areas where there has been a history of backwaters.

Generally pumps are programmed to turn on approximately 2 to 4 feet below the low basement elevation in the vicinity of the pump.

SSO BACKGROUND



FEDERAL WATER POLLUTION CONTROL ACT

(33 U.S.C. 1251 et seq.)

AN ACT To provide for water pollution control activities in the Public Health Service of the Federal Security Agency and in the Federal Works Agency, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—RESEARCH AND RELATED PROGRAMS

DECLARATION OF GOALS AND POLICY

SEC. 101. (a) The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this Act—

(1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;

(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;

(3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;

(4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works;

(5) it is the national policy that areawide treatment man-

CLEAN WATER ACT (1972)

(33 U.S.C. 1341)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

SEC. 402. (a)(1) Except as provided in sections 318 and 404 of this Act, the Administrator may, after opportunity for public hearing, issue a permit for the discharge of any pollutant, or combination of pollutants, notwithstanding section 301(a), upon condition that such discharge will meet either (A) all applicable requirements under sections 301, 302, 306, 307, 308, and 403 of this Act, or (B) prior to the taking of such action, such other conditions as the Administrator determines are necessary to carry out the provisions of this Act.

(2) The Administrator shall prescribe conditions for such permits to assure compliance with the requirements of paragraph (1) of this subsection, including conditions on data and information collection, reporting, and such other requirements as he deems appropriate.

(3) The permit program of the Administrator under paragraph (1) of this subsection, and permits issued thereunder, shall be subject to the same terms, conditions, and requirements as apply to a State permit program and permits issued thereunder under subsection (b) of this section.

NPDES

1974

SUBCHAPTER IV

PERMITS

283.31 Water pollutant discharge elimination system; permits, terms and conditions. (1) The discharge of any pollutant into any waters of the state or the disposal of sludge from a treatment work by any person is unlawful unless such discharge or disposal is done under a permit issued by the department under this section or s. 283.33. The department may by rule exempt certain classes or categories of sources from the requirement of obtaining a permit. Except as provided in s. 283.[illegible] the department may issue only one permit for a publicly owned treatment works or disposal facility or system, regardless of the number of point sources from such facility or system.

(2) No permit shall be issued by the department for the discharge into the waters of the state of any of the following:

(a) Any radiological, chemical or biological warfare agent or

WPDES

WISCONSIN DEPT. OF NATURAL RESOURCES

SANITARY SEWER OVERFLOW (SSO) DEFINITION

Any discharge from the sanitary sewer system to the storm sewers, streams and rivers.

This includes discharges from bypass pump stations.

SSO's during rain events are generally caused by too much rain water in the sanitary system (infiltration and inflow).

SANITARY SEWER OVERFLOW (SSO) NOTIFICATION


A sanitary sewer overflow

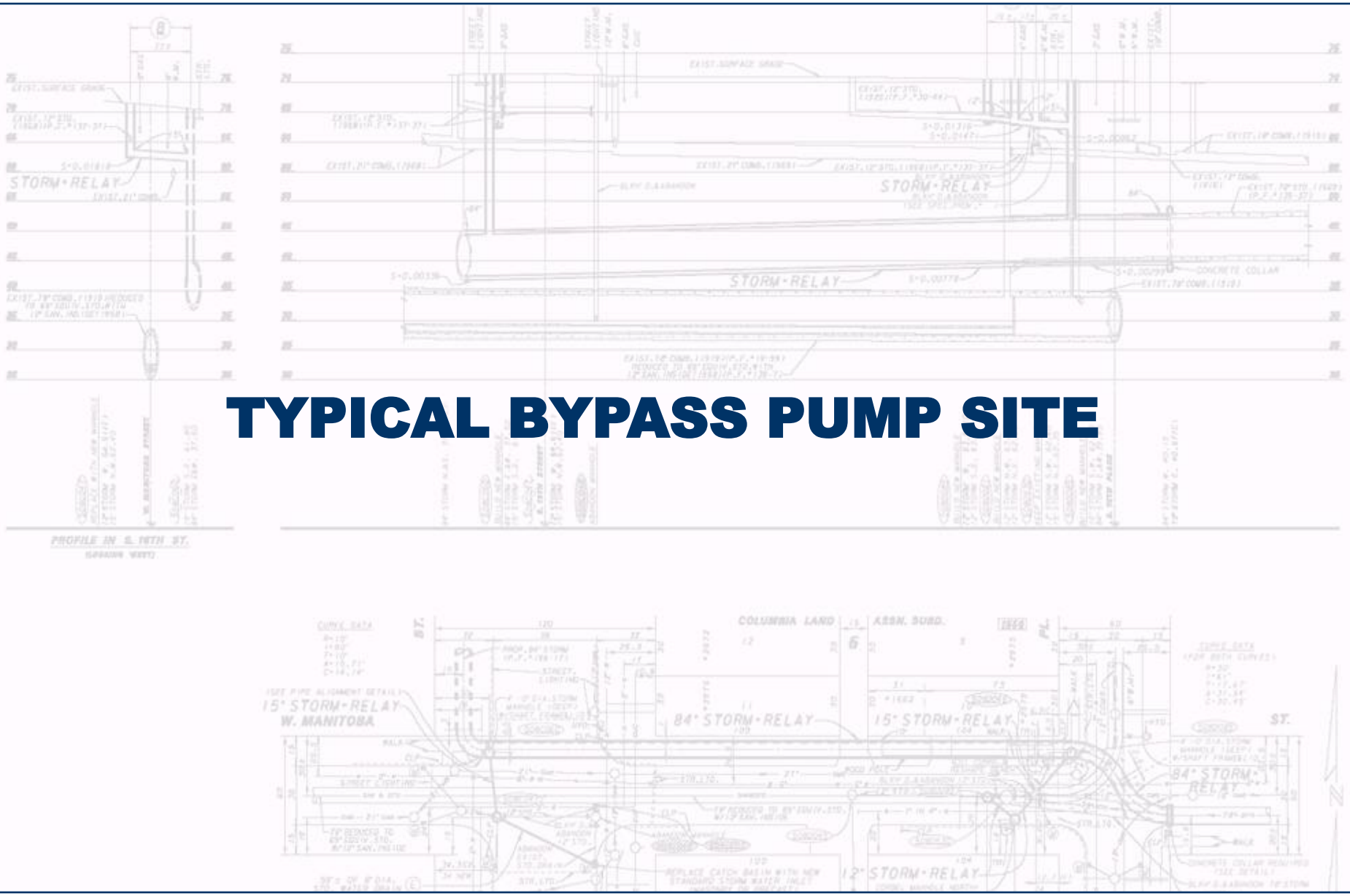
When an SSO has occurred, we must contact the DNR, MMSD, and local water works operators within 24 hours.

Within 5 days of an SSO, we submit a written report to the DNR.

PUMP OPERATIONS DURING RAIN EVENTS

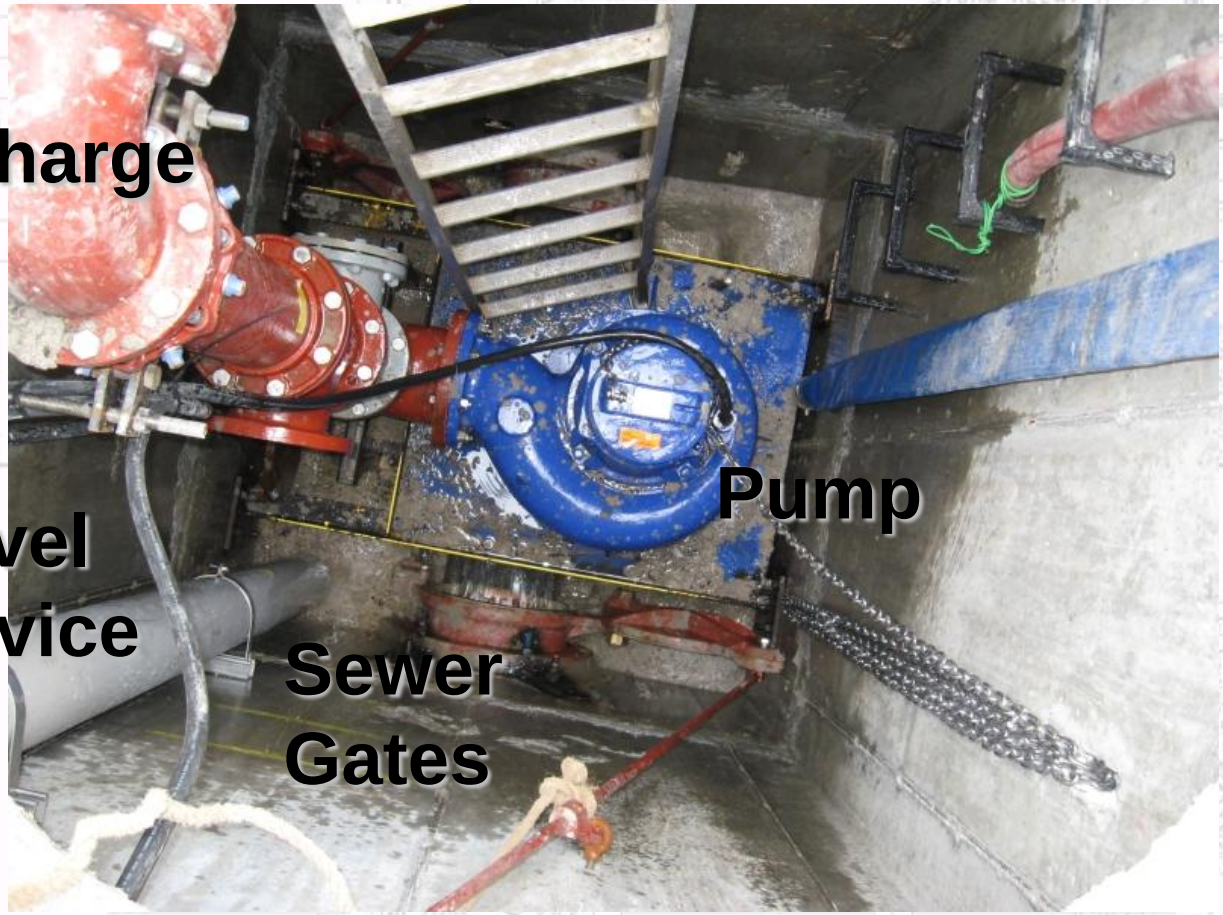
Year	Rain Events	Pump Runs
2001	1	1
2002	1	1
2003	0	0
2004	2	19
2005	1	3
2006	1	1
2007	0	0
2008	1	30
2009	1	7
Total		**62**

TYPICAL BYPASS PUMP SITE



TYPICAL BYPASS PUMP LAYOUT

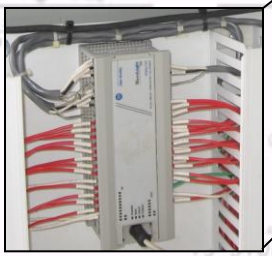
TYPICAL BYPASS PUMP LAYOUT (POST-REHAB)



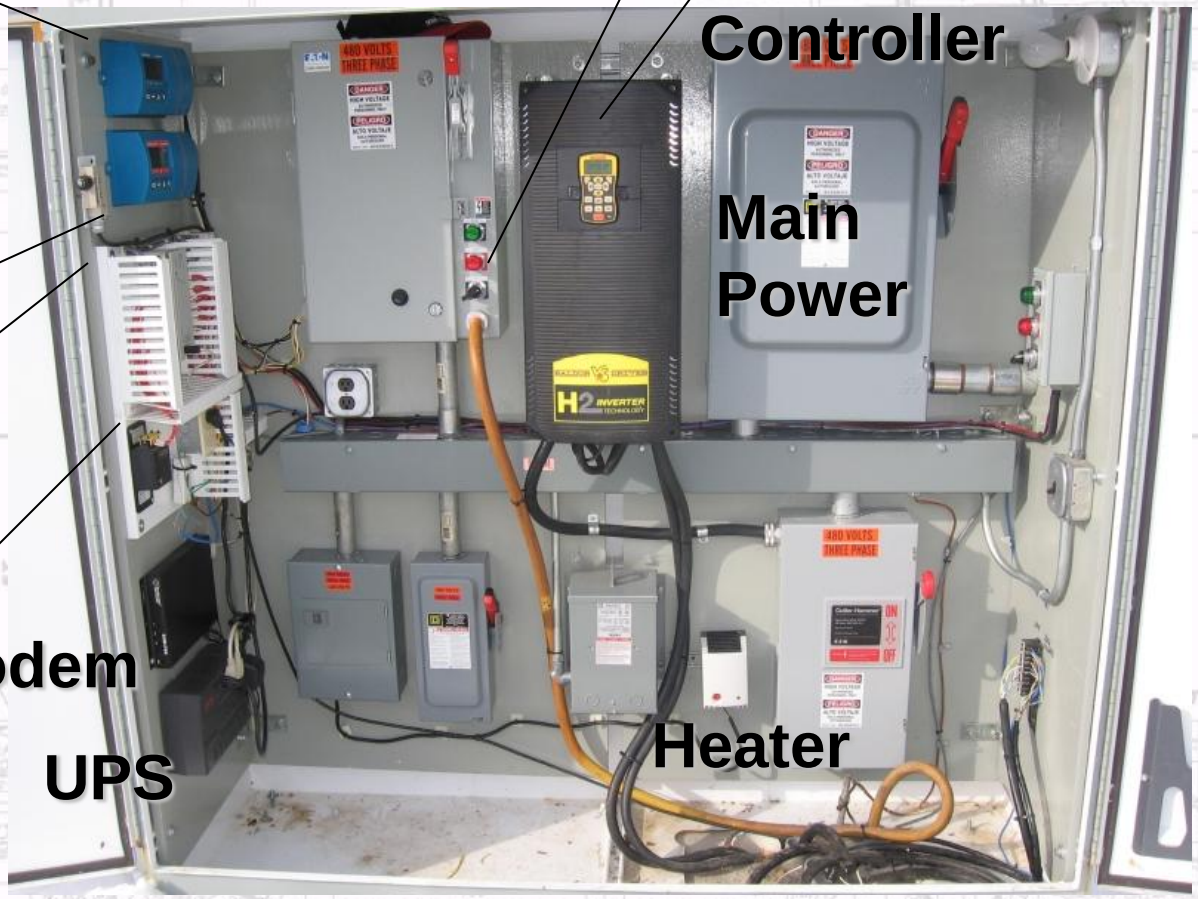
TYPICAL BYPASS PUMP ELECTRICAL CABINET

TYPICAL BYPASS PUMP ELECTRICAL CABINET

Multiranger



Controller (PLC)



On/Off/Auto Switch

Motor Controller

Main Power

Modem

UPS

Heater

PUMP REHAB PROJECTS SINCE 2001

Year	No. of Pumps Rehabbed (Partial)	No. of Pumps Rehabbed (Full)	Cost
2001	2	2	$187,796
2002	5	0	$99,990
2003	1	7	$554,910
2004	6	4	$569,569
2005	2	4	$281,154
2006	3	2	$545,413
2007	1	0	$266,094
2008	0	4	$329,065
2009	6	3	$365,217
2010 (Est.)	5	4	$450,000
Total	**31**	**30**	**$3,649,208**

SCADA MONITORING

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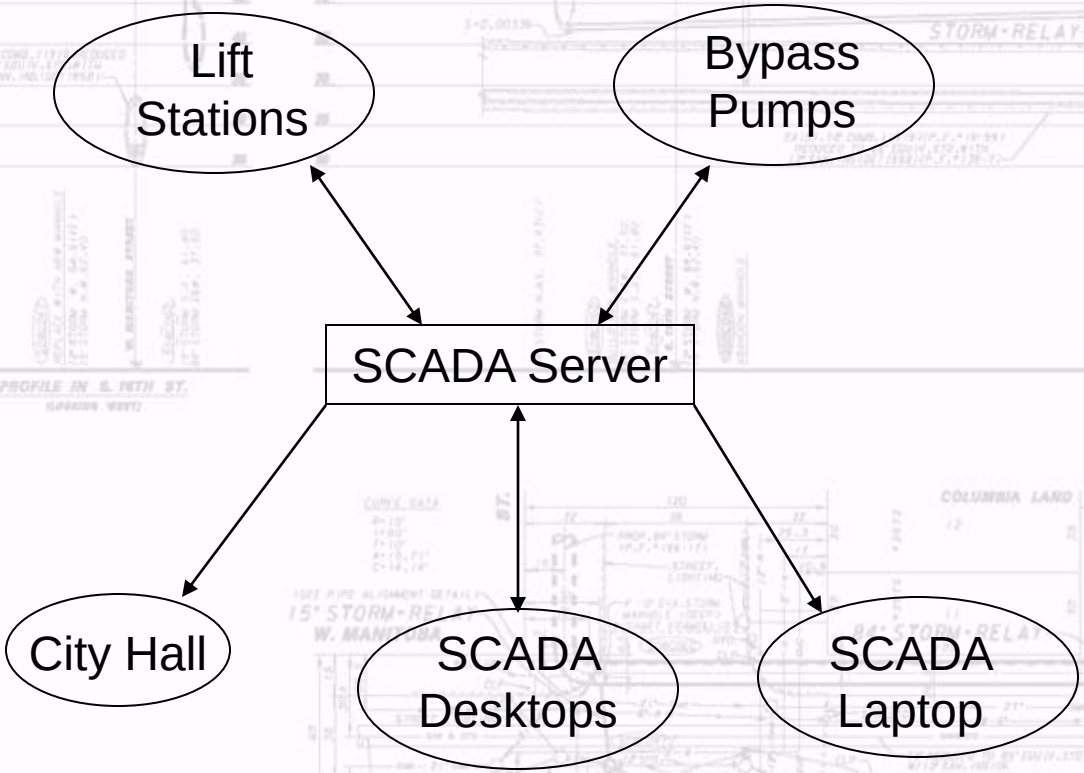
Supervisory Control And Data Acquisition

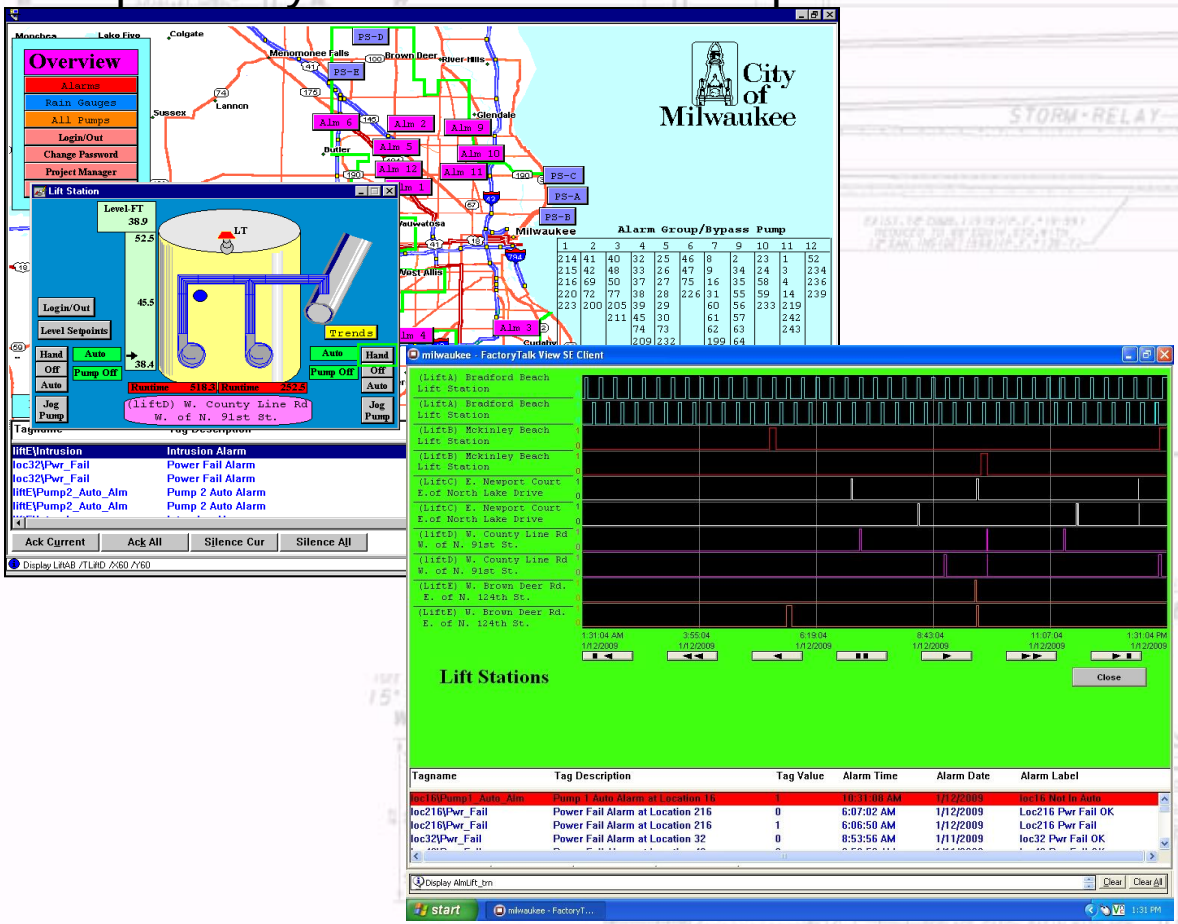


SCADA is the tool we use to monitor all bypass pump and lift stations.

City staff monitor SCADA during rain events and non-business hours using laptop computers.

SCADA MONITORING

Supervisory Control And Data Acquisition

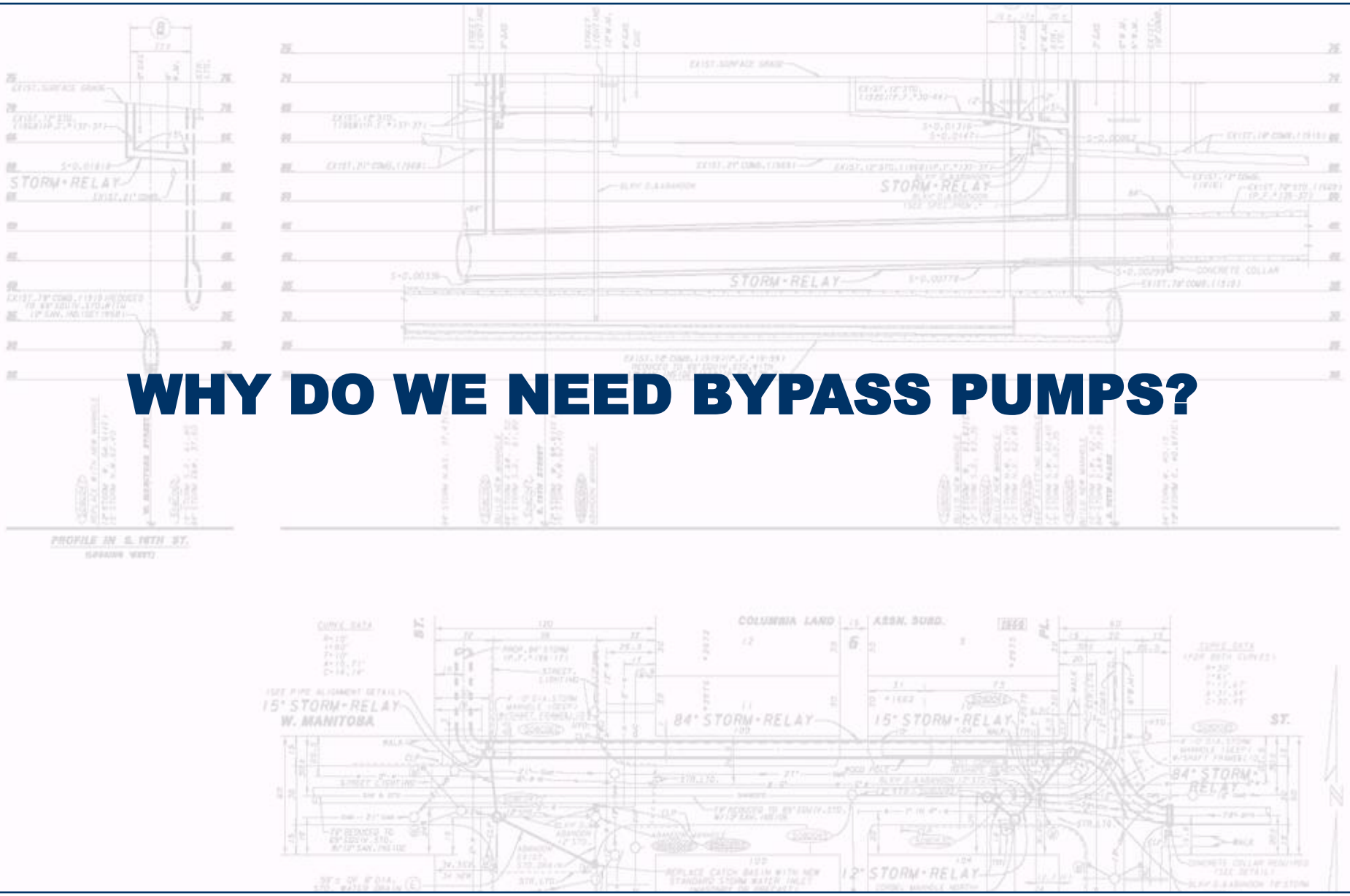


SCADA displays an alarm when something is wrong at a site.

Typical alarms include, intrusion, pump running, pump fail, power fail, and high water.

SCADA also provides graphical representations of pump runs that help detect potential issues at lift stations.

WHY DO WE NEED BYPASS PUMPS?



SOURCES OF INFILTRATION AND INFLOW (I/I)

Excessive rain water enters the sanitary system through both public and private sources.

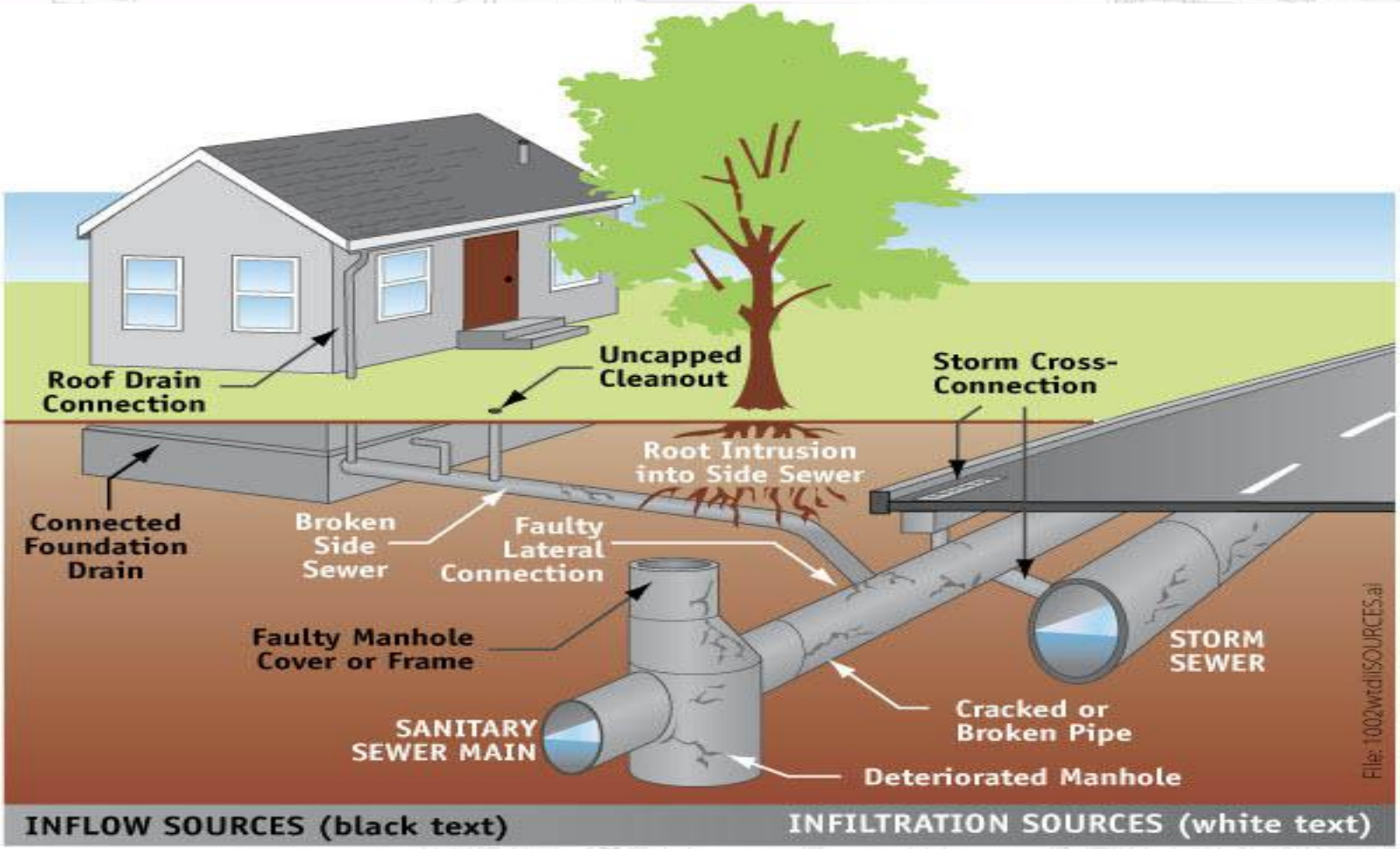
Private:

- Improper downspout connections and improper grading
- Foundation drains (pre-1954)
- Sump pumps discharging to floor drain or basement sink
- Cracks and open joints in sanitary building lateral

Public:

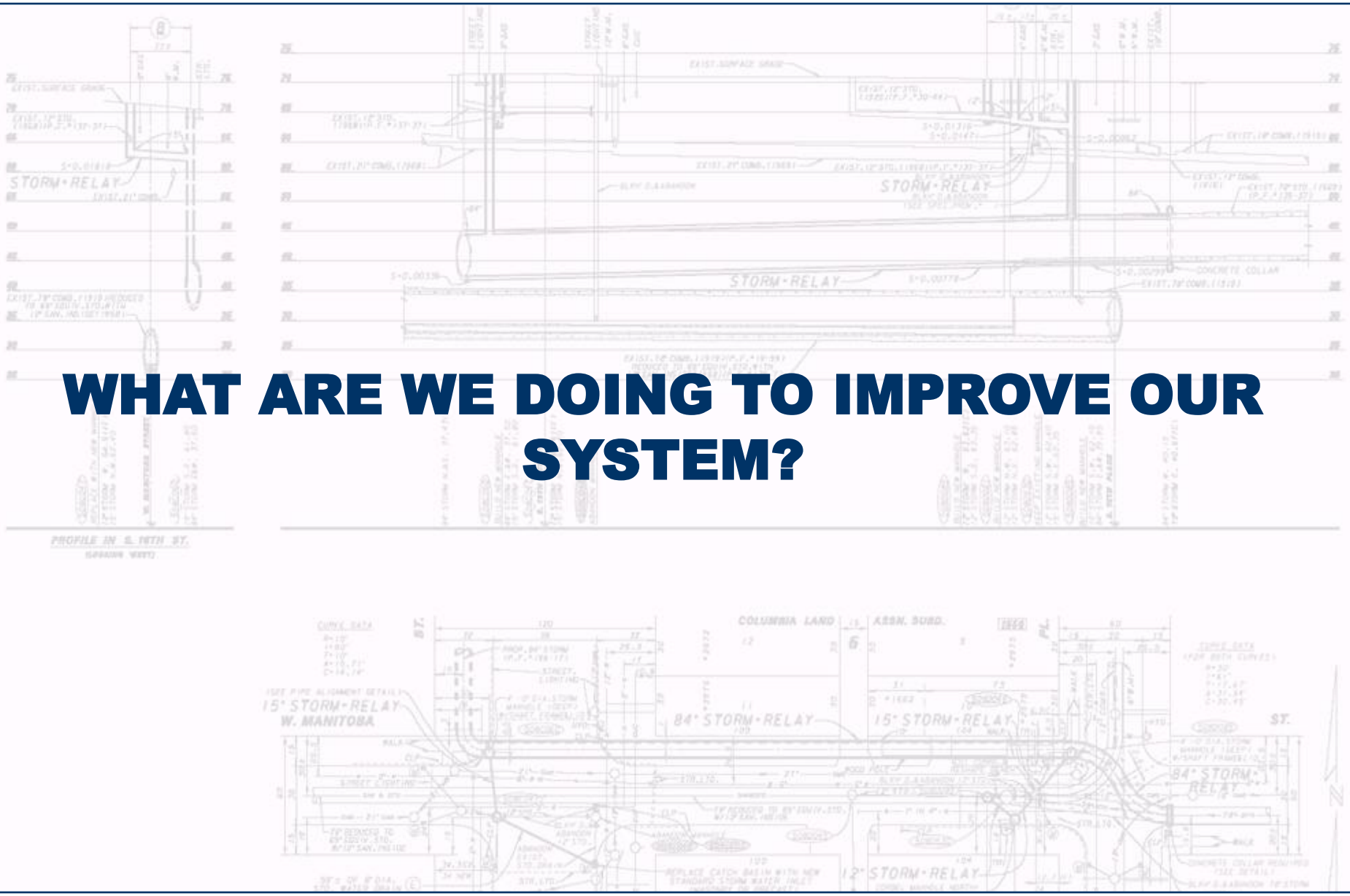
- Improper catch basin connections to sanitary sewer
- Cracks and open joints in sanitary sewer mains
- Leaky sanitary manholes

SOURCES OF I/I



EXAMPLE OF I/I

WHAT ARE WE DOING TO IMPROVE OUR SYSTEM?



CURRENT INVESTIGATIONS

City has contracted with a private firm to perform a check of all pumps on a monthly basis.

Provides City with a written report.

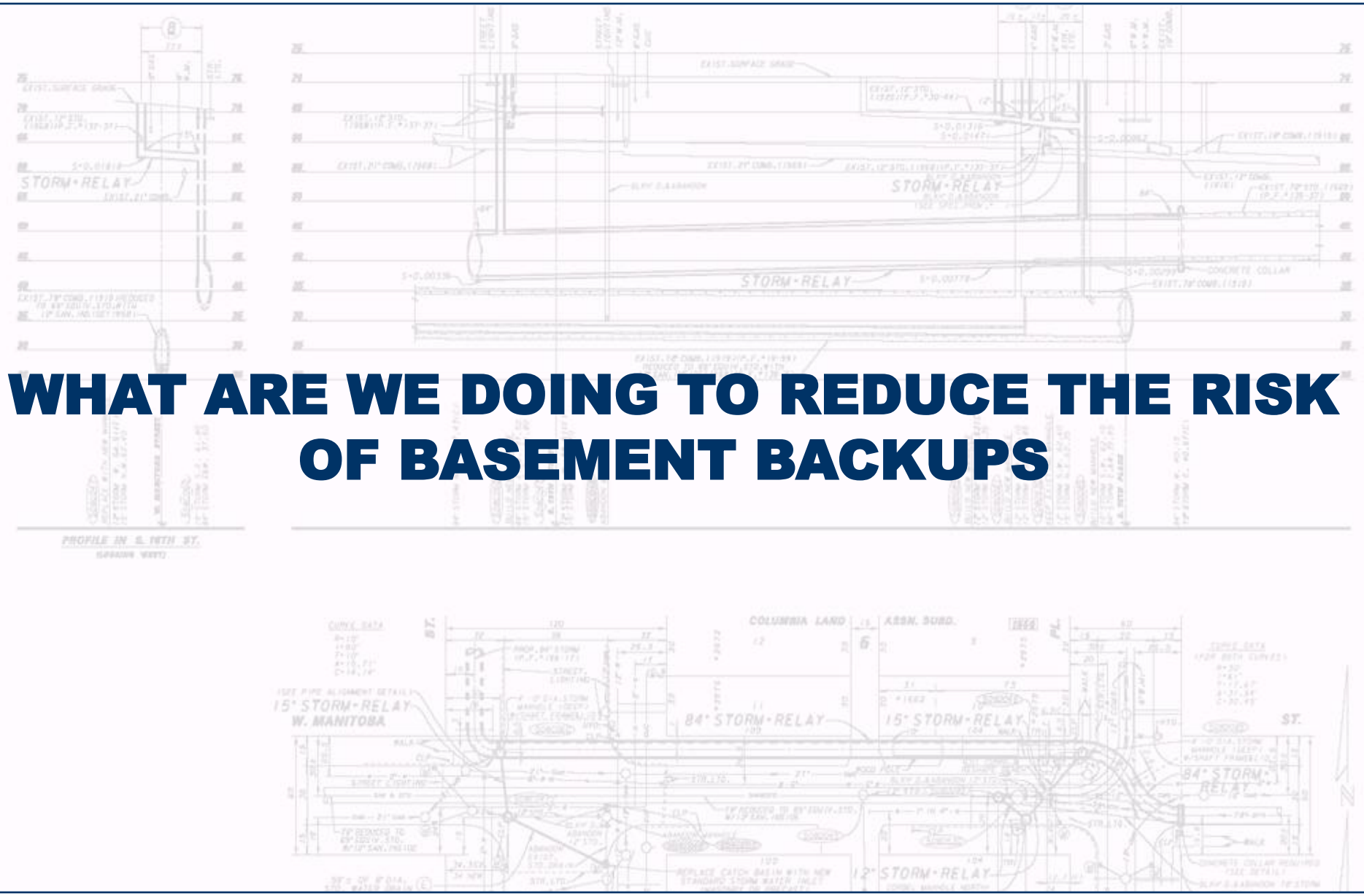
Field managers can use this information for establishing priorities for troubleshooting work.

Engineers use this information for future pump rehab projects.

City of Milwaukee
By-Pass Sewer Pump Station Inspection Report
June 2009

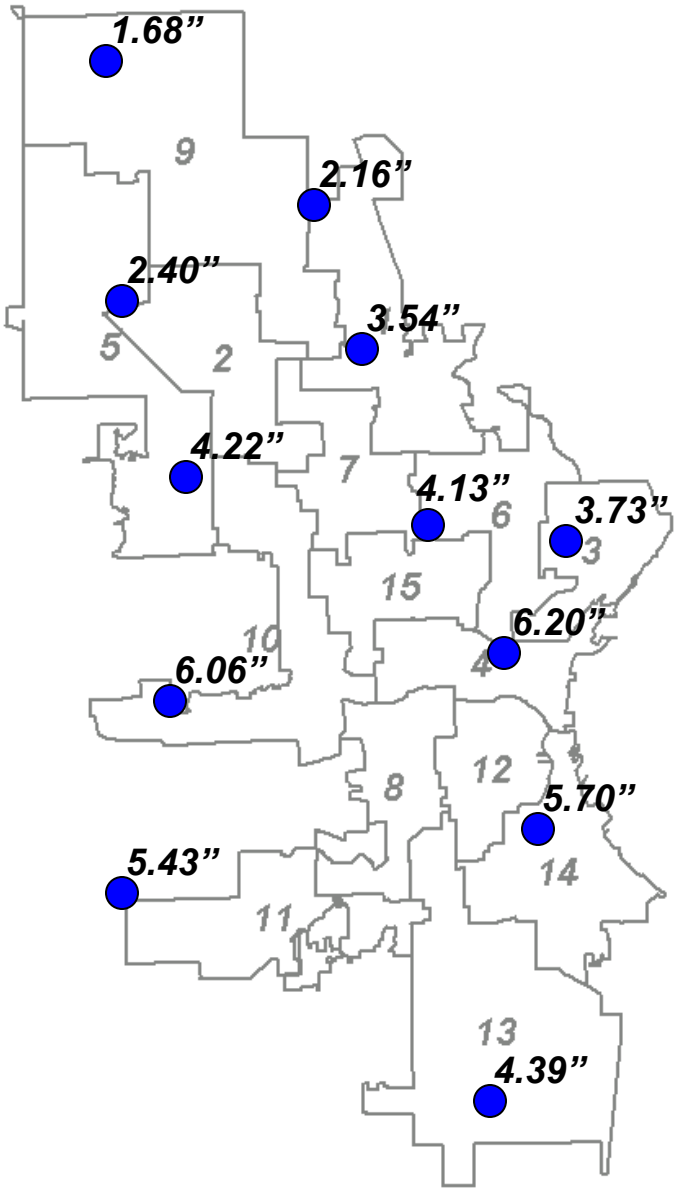
Permit No.	Site Location	Ald. Circ.	Entered By	Inspection Personnel	Review Date	San Manhole Condition	Discharge Pipe	Pump	Power Cable	Wiring	Float	Level Transmitter	Shear Gates	Pump Control Cabinet	Voltage	Phase Voltage	Amperage	Thermal Protection	Meg Readings	Pump Operation	Work Requirements	Comments
214	N 072nd St & W Hope Ave	01		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	241/243/241	3-Phase	12.3/13.2/13.6	.1/.1/.1	550/550/550	good	none	None
215	N 072nd St & W Capitol Dr	01		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	needs paint	245/245/243	3-Phase	14.5/13.8/14.1	.1/.1/.1	550/550/550	good	none	multi ranger
216	W Potomac Ave & W Chapman Pl	01		Tom & Kyle	12-Jun-09	some loose brick	good	good	good	good	none		good	good	243/243/242	3-Phase	12.5/13.5/12.3	.1/.1/.1	39.8/40.0/40.3	good	none	bricks loose in manway
220	N 049th St & W Luscher Ave	01		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	no panel
223	N 066th St & W Ruby Ave	01		Tom & Kyle	15-Jun-09	Good	good	good	good	good	none		None	good	241/239/239	3 Phase	7/6.2/6.5	.1/.1/.1	237/246/255	good	none	pump noise on shut down
041	N 037th St & W Kiley Ave	02		Tom & Kyle	15-Jun-09	Good	good	good	good	good	none		good	good	243/242/242	3 Phase	11.9/13/13.5	.1/.1/.1	44.2/44.2/44.0	good	none	mini ranger reads short
042	N 053rd St & W Silver Spring Dr	02		Tom & Kyle	15-Jun-09	Good	good	good	good	good	none		good	good	238/236/236	3 Phase	20.6/19.7/19.5	.2/.2/.2	354/360/326	good	none	None
069	N 061st St & W Sheridan Ave	02		Tom & Kyle	16-Jun-09	good	good	good	good	good	none		gpod	good	242/242/242		14/16.5/13.6	.1/.1/.1	10.8/10.4/11.0	good	none	gates multi ranger
072	N 059th St & W Custer Ave	02		Tom & Kyle	16-Jun-09	does not operate	do no operate	does not operate	does not operate	does not operate	does not operate		none	does not operate	does not operate	does not operate	does not operate	does not operate	does not operate	do not operate	none	line loss, panel smells burnt
200	N 039th St & W Oriole Dr (40' n/o)	02		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
040	S Burrell St & W Van Norman Ave	03		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
048	W Green Ave & W Ramsey Ave	03		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	241/241/240	3-Phase	13.2/13.6/12.7	.1/.1/.1	.57/.57/.57	good	none	mini ranger/cabinets leaning
050	S Pine Ave & E Cudahy Ave	03		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	245/245/245	1-Phase	10.7/11.1	.1/.1/.1	1.64/1.61	good	none	no gates
077	S Whitnall Ave (400' w/o) & E Waterford Ave	03		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
205	S Quincy Ave & E Ohio St	03		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	485/485/486	3-Phase	21.6/22.3/22.3	.1/.1/.1	.9/.9/.9	good	none	no gates/mini ranger/test@1000v
211	S 001st Pl & W Bolivar Ave (S/S)	03		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	244/246/246	3-Phase	13.6/13.3/15	.1/.1/.1	550/550/550	good	none	mini ranger/no gates
032	S 046th St & W Cleveland Ave	04		Tom & Kyle	12-Jun-09	excellent	good	good	good	good	none		None	good	244/244/244	3-Phase	7.5/7.2/7.2	.1/.1/.1	550/550/550	good	none	mini ranger
033	S 036th St (170' w/o) & W Lincoln Ave	04		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	240/240/240	3-Phase	6.4/6.8/7.0	.1/.1/.1	282/296/302	good	none	called in to r. c. talley
037	S 077th St & W Oklahoma Ave	04		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	242/243/242	3-Phase	18.2/16.8/17.8	.1/.1/.1	550/550/550	good	none	mini ranger/no gates
038	S 054th St & W Midland Dr	04		Tom & Kyle	12-Jun-09	very good	good	good	good	good	none		None	good	240/239/239	3-Phase	20.6/19.7/19.2	.1/.1/.1	4.38/4.48/4.44	good	none	no gates
039	S 092nd St & W Howard Ave	04		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	241/242/242	3-Phase	26.3/23.7/25.8	.1/.1/.1	6.37/6.42/6.46	good	none	mini ranger/no gates
045	S 086th St & W Ohio Ave	04		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	246/248/247	3-Phase	13.3/12.9/13.3	.1/.1/.1	no reading	good	Possible bad ground	Possible bad ground
074	S 099th St & W Oklahoma Ave	04		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	247/247/248	3-Phase	27.7/29.4/27.6	.1/.1/.1	no reading	good	Possible bad ground	Possible bad ground
209	S 057th St & W Euclid Ave	04		Tom & Kyle	12-Jun-09	some loose brick	good	good	good	good	none		None	good	236/237/237	3-Phase	20.7/20.3/20.6	.1/.1/.1	184/183/186	good	none	some loose and cracked bricks
225	S 072nd St & W Honey Creek Dr (N/E)	04		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	very good	246/245/246	3-Phase	12/13.2/12.4	.1/.1/.1	68.2/66.5/65.6	good	none	None
230	S Honey Creek Dr & W Riverbend Dr (S/W)	04		Tom & Kyle	12-Jun-09	some loose brick	good	good	good	good	none		None	very good	246/245/245	3-Phase	12.3/13.8/12.5	.1/.1/.1	55.8/56.1/56.4	good	none	loose bricks
240	S 094th St & W Howard Ave	04		Tom & Kyle	12-Jun-09	very good	good	good	good	good	none		None	very good	242/242/242	3-Phase	9.5/9.4/9.4	.1/.1/.1	.94/.95/.97	good	none	no gates
241	W KK River Pkwy & W Cleveland Ave	04		Tom & Kyle	12-Jun-09	cover tarred shut	good	good	good	good	none		None	good	243/243/243	3-Phase	23.4/25.5/24.0	.1/.1/.1	296/316/320	good	none	manhole shut could not open
025	N 060th St (W/S) & W Custer Ave	05		Tom & Kyle	16-Jun-09	good	good	good	good	good	none		None	good	241/241/241		9.6/9.4/9.6	.1/.1/.1	16.3/17.3/18.4	good	none	noise on shut down
026	N 060th St (E/S) & W Custer Ave	05		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		None	good	242/242/242		10.4/7.5/10.1	.1/.1/.1	11.8/11.7/12.0	good	none	None
027	N 061st St & W Lawn Ave	05		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	good	246/245/245	3-Phase	28.3/28.4/27	.1/.1/.1	no reading	good	Possible bad ground	Possible bad ground
028	N 060th St (W/S) & W Custer Ave (150' s/o)	05		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		good	good	241/241/242		5.9/6.1/5.6	.1/.1/.1	550/550/550	good	none	none
029	N 060th St (Center) & W Custer Ave (320' s/o)	05		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		good	good	242/242/242		15.2/16.5/18.2	.1/.1/.1	550/550/550	good	none	none
030	N 063rd St & W Fairmount Ave (95' w/o)	05		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
073	N 056th St & W Villard Ave	05		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	241/239/239	3 Phase	15/15.6/16.0	.1/.1/.1	118/121/126	good	none	echo multi ranger / no gates
232	N 062nd St & W Fairmount Ave	05		Tom & Kyle	12-Jun-09	skip	skip	pump locked-up	skip	smells burned	none	unknown	None	skip	242/239/240	skip	8.5/7.7/7.8	.1/.1/.1	24.3/24.3/23.7	None	electrical	burned smell in control cabinet
238	N 049th St & W Rohr Ave	05		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	240/240/240	3-Phase	21.6/19.3/19.3	.3/.3/.2	550/550/550	good	none	echo multi ranger/hang elect.box
046	N 107th St & W Lawn Ave	06		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		None	good	243/243/243		16.4/16.9/16.6	.1/.1/.2	530/530/530	good	none	None
047	N 107th St & W Silver Spring Dr (100' s/o)	06		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		good	very good	239/239/239	3-Phase	10.7/16.3/12.9	.1/.1/.1	550/550/550	good	none	None
075	N 110th St & W Harvest Ln	06		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		good	good	241/241/241	3-Phase	32.6/28.6/28	.1/.1/.1	.48/.53/.55	good	None	no gates
226	W Crossfield Ave & W Monrovia Ave	06		Tom & Kyle	16-Jun-09	seal rough	good	good	good	good	none		good	good	236/236	1-Phase	2.9/2.8	.2/2	4.57/4.55	good	None	manhole seal rough
008	N 089th St & W Townsend St	07		Tom & Kyle	12-Jun-09	excellent	excellent	good	good	good	none		None	excellent	245/243/245	3- Phase	16.3/17.4/17.8	.1/.1/.1	550/550/550	excellent	none	None
009	N 090th St & W Townsend St	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	excellent	244/244/245	3-Phase	13.3/12.8/12.5	.1/.1/.1	550/550/500	good	none	none
016	N 095th St & W Metcalf Pl	07		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
031	N 096th St & W Auer Ave	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	238/238/238	3 -Phase	9.1/8.6/9.4	.1/.1/.1	442/426/436	good	none	None
060	N 088th St & W Concordia Ave	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	leaning	244/245/244	3-Phase	12.2/11.8/12.1	.1/.1/.1	550/550/550	good	none	cabinet still leaning
061	N 080th St & W Townsend Ave	07		Tom & Kyle	12-Jun-09	excellent	excellent	good	excellent	good	none		None	excellent	243/242/243	3-Phase	11.1/11.4/10.7	.1/.3/.1	550/550/550	excellent	none	None
062	N 079th St & W Hadley St	07		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
199	N 086th St & W Center St	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	239/240/240	3-Phase	19.2/19.4/19.2	.1/.1/.1	550/550/550	good	none	None
201	N 088th St & W Center St	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	237/238/238	3-Phase	17.4/16.4/16.7	.1/.1/.1	502/535/544	good	none	None
203	N 089th St & W Center St (N/S)	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	238/237/237	3-Phase	15.6/15.9/16.2	.1/.1/.1	550/550/550	good	none	None
204	N 087th St & W Center St	07		Tom &Kyle	12-Jun-09	Good	good	good	good	good	none		None	Fair	242/243/243	3-Phase	11.2/13.8/14.1	.1/.1/.1	550/550/550	good	none	None
210	N 089th St & W Center St (S/S)	07		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	leaning	239/239/239	3-Phase	10.9/11.1/10.7	.1/.1/.1	.60/.60/.60	good	none	No display on mini-ranger
237	N 067th St & W Center St	07		Tom & Kyle	12-Jun-09	loose brick	good	good	good	good	none		good	good	242/242/241	3-Phase	28.9/28.9/27.9	.1/.1/.1	508/528/550	good	none	pump noise on shut down
002	N 020th St & W Fairmount Ave	09		Tom & Kyle	12-Jun-09	good	good	good	good	good	none		good	good	240/239/239	3-Phase	5.2/5.8/5.6	.5/.5/.5	550/550/550	good	none	mini ranger gates
034	N Milwaukee River Pkwy & W Lawn Ave	09		Tom & Kyle	12-Jun-09	excellent	good	good	good	good	none		None	good	240/240/241	3-Phase	13.2/13.1/12.9	.1/.1/.1	124/125/128	good	none	mini ranger no gates
035	N Milwaukee River Pkwy & W Lawn Ave (340' no	09		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	good	248/249/248	3-Phase	9.4/8.8/9.0	.1/.1/.1	72.4/73.5/74	good	none	mini ranger gates
055	N 023rd St & W Villard Ave	09		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	236/238/239	no-power	14.5/16.1/15.6	.1/.1/.1	550/550/550	None	unknown	mini ranger gates
056	N 024th St & W Villard Ave	09		Tom & Kyle	15-Jun-09	Good	good	good	good	good	none		None	good	no reading	no reading	no reading	no reading	no reading	none	good	tripped breaker/elec. Problem
057	N 024th Pl & W Villard Ave	09		Tom & Kyle	12-Jun-09	good	excellent	good	good	good	none		None	good	240/237/237	3-Phase	20.0/19.9/23.0	.7/.7/.7	550/550/550	good	none	mini ranger
063	N 027th St & W Villard Ave	09		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	Station turned off
064	N 028th St & W Villard Ave	09		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	245/245/245	3-Phase	21.2/18.4/20.5	.1/.1/.1	3.90/3.93/3.95	good	unknown	pump control was in off position, Ran pump made test and returned pump control to off position
065	N 029th St & W Villard Ave	09		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	246/247/247	3-phase	21.8/20.5/20.9	.3/.3/.4	2.73/2.88/2.88	good	none	none
066	N 027th St & W Villard Ave (300' n/o)	09		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	Station turned off
198	N 031st St & W Villard Ave	09		Tom & Kyle	12-Jun-09	some decay	good	good	good	good	none		None	good	245/245/245	3-Phase	30.6/33.8/39.1	1.1/1.1/1.3	70.0/71.1/72.0	good	none	cord broke on top of pump
207	N Green Bay Rd & W Fairmount Ave	09		Tom & Kyle	16-Jun-09	cannot hear pump run	cant hear pump	cant hear pump	can't hear pump	cant hear pump	none	cant hear pump	None	cannot hear pump	cannot hear pump	cannot hear pump	cannot hear pump	cannot hear pump	cannot hear pump	cant hear pump	cannot hear pump	cannot hear pump run
208	N 019th Pl & W Fairmount Ave	09		Tom & Kyle	12-Jun-09	good	good	good	good	good	none		good	good	244/245/244	3-Phase	16.7/17.5/18.6	.6/.6/.6	108/123/129	good	none	mini ranger gates
023	N 020th St & W Hampton Ave (N/S)	10		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	good	238/238/237	3-Phase	7.6/7.0/7.9	.5/.5/.5	61.0/61.0/60.0	good	none	mini ranger gates
024	N 020th St & W Hampton Ave (S/S)	10		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	good	241/239/239	3-Phase	7.5/7.8/7.0	.1/.1/.1	550/550/550	good	none	mini ranger gates/reading ok
058	N 020th St & W Hampton Ave (680' s/o)	10		Tom & Kyle	12-Jun-09	good	good	good	good	good	none		good	good	481/479/483	3-Phase	8.0/8.8/8.8	.1/.1/.1	2.3/2.3/2.8	good	none	float switch sonar
059	N 021st St & W Hampton Ave	10		Tom & Kyle	12-Jun-09	very good	good	good	good	good	none		good	good	238/238/237	3-Phase	10.6/10.9/10.5	.1/.1/.1	550/550/550	good	none	None
233	W Olive St & W Roosevelt Dr (440 ' se/o)	10		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		good	good	241/243/243	3-Phase	8.6/8.7/9.1	.1/.1/.1	226/237/245	good	none	selec switch in off/runs in auto
001	N 041st St & W Congress St (S/S)	11		skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
003	N 031st St & W Capitol Dr (N/S)	11		Tom & Kyle	12-Jun-09	very good	very good	good	good	good	none		None	good	243/243/243	3-Phase	5.0/4.9/4.6	.1/.1/.1	22.4/22.6/22.8	good	none	None
004	N 031st St & W Capitol Dr (S/S)	11		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	242/243/243	3-Phase	7.7/7.5/7.2	.1/.1/.1	550/550/550	good	none	None
014	N 041st St & W Congress St (N/S)	11		Tom & Kyle	12-Jun-09	very good	good	good	good	good	none		None	very good	248/250/248	3-Phase	9.2/8.2/9.4	.1/.1/.1	2.15/2.19/2.25	good	none	no gates
219	N 027th St & W Hope Ave (404' s/o)	11		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	243/243/243	3-Phase	17.1/16.3/16	.1/.1/.1	8.6/8.68/8.8	none	none	None
242	N 036th St & W Toronto St	11		Tom & Kyle	12-Jun-09	very good	good	good	good	good	none		None	good	240/239/240	3-Phase	14.9/15/13.5	.1/.1/.1	21.7/22.1/23.1	good	none	shear gates
243	N 030th St & W Hope Ave	11		Tom & Kyle	12-Jun-09	very good	good	good	good	good	none		None	good	242/242	3-Phase	15.8/15.0	.1/.1	247/267	good	none	mini ranger / no gates
052	W Medford Ave & W Grantosa Dr	12		Skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip	skip
234	N 076th St (W/S) & W Glendale St	12		Tom & Kyle	16-Jun-09	Good	good	good	good	good	none		None	good	239/239/239		15.6/16.4/16.3	overload set @ 28A	550/550/550	good	none	gates overload set/multi-ranger
236	N 083rd St & W Hope Ave	12		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	246/244/245	3-Phase	23.7/23.1/24.2	.1/.1/.1	11.0/12.4/14.7	good	none	None
239	W Potomac Ave & W Glendale (350' nw/o)	12		Tom & Kyle	12-Jun-09	Good	good	good	good	good	none		None	good	249/247/247	3 Phase	17.9/18/17	.1/.1/.1	196/195/192	good	none	None
901	N 035th St & W Hopkins St (Pumps To Mis)			Tom & Kyle	12-Jun-09	very good	very good	good	good	good	none		None	good	485/484/486	3-Phase	16.9/17.4/15.9	overload set @ 40A	2.6/3.0/3.1	good	none	none
A	N Lincoln Memorial Dr. & W Belleview			Tom & Kyle	24-Jun-09	excellent	good	good	good	good	not used	ok	none	good	N: 229/229/229 S: 238/238/238	3 Phase	N: 67.1/68.7/68.7 S: 68.7/68.7/68.7	N/A	N: 550/550/550 S: 550/550/550		none	H2 Baldor Inverter Drive Mini-Ranger
B	N Lincoln Memorial Dr. & W Lafayette St.			Tom & Kyle	24-Jun-09	excellent	good	good	good	see comments	not used	ok	None	good	N: 247/247/247 S: 247/247/247	1 Phase	N: 31.9/30.6/31.5 S: 30.9/32.4/31.3	N: .1/.1/.1 S: .1/.1/.1	N: 550/550/550 S: 550/550/550	good	none	Wires hang out of panel, can't close pump door, MR
C	N Lake Dr. & W Newport Ct.			Tom & Kyle	24-Jun-09	excellent	good	good	good	good	no longer needed	ok	None	good	N: 241/249/244 S: 244/247/243	1 Phase	N: 6.1/4.8/5.6 S: 5.7/5.7/5.1	N: .1/.1/.1 S: .1/.1/.1	N: 41.7/42.3/41.7 S: 56.5/56.0/55.6	good	none	Handle on pit door broken Mini Ranger
D	N 91st St. & W County line Rd.			Tom & Kyle	24-Jun-09	Good	good	good	good	good	not used	ok	None	good	N: 490/491/491	3 Phase	N: 10.2/10.5/11.0	N: .1/.1/.1	N: 11.0/11.0/11.0	good	none	South pump turned off due to plug valve failure
E	N 124th St. & W Brown Deer Rd.			Tom & Kyle	24-Jun-09	Good	good	good	good	good	not used	ok	None	good	N: 243/243/243 S: 243/243/243	3 Phase	N: 10.2/9.9/10.0 S: 8.6/8.9/8.8	N: .1/.1/.1 S: .1/.1/.1	N: 243/251/253 S: 550/550/550		none	South pump guide rail vibrates when running, MR

WHAT ARE WE DOING TO REDUCE THE RISK OF BASEMENT BACKUPS



JUNE 19, 2009 RAINFALL TOTALS

Based on Southeaster Wisconsin Regional Planning Commission (SEWRPC), this amount of rain corresponds to a greater than 100-year storm event.

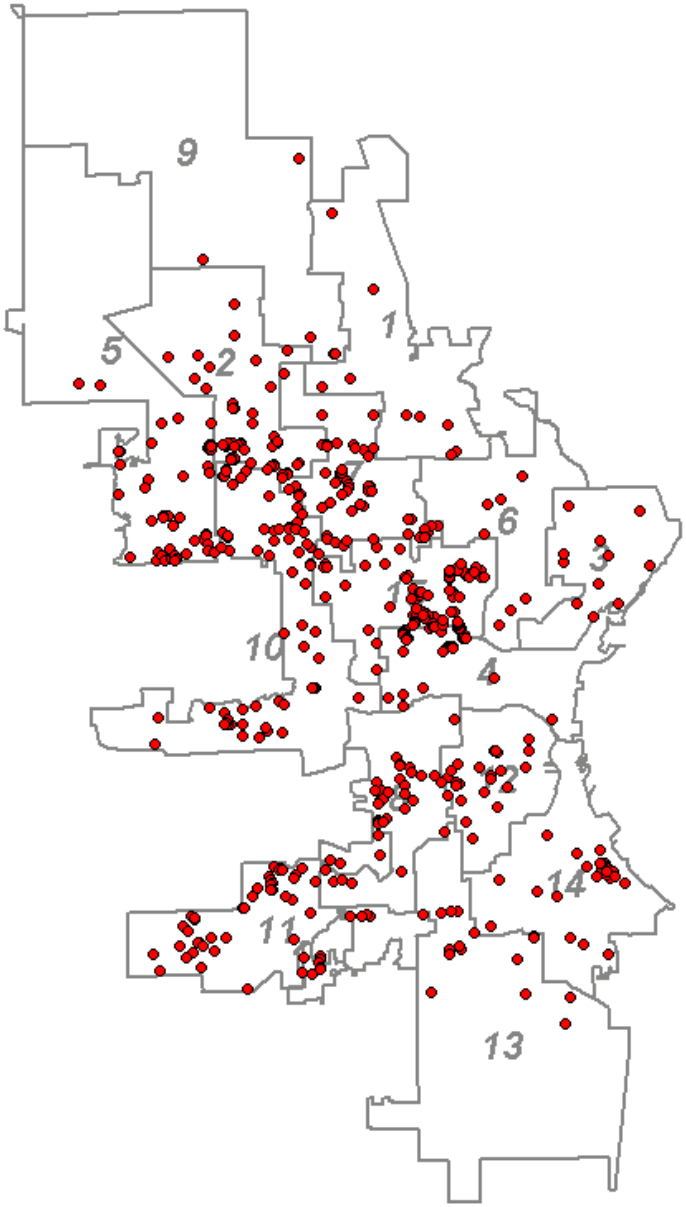


JUNE 19, 2009 BACKWATERS

658 calls placed to DPW Call Center

By Aldermanic District:

1st	Hamilton	9
2nd	Davis	70
3rd	Kovac	12
4th	Bauman	49
5th	Bohl	63
6th	Coggs	8
7th	Wade	56
8th	Donovan	38
9th	Puente	6
10th	Murphy	85
11th	Dudzik	81
12th	Witkowiak	28
13th	Witkowski	20
14th	Zielinski	34
15th	Hines	99



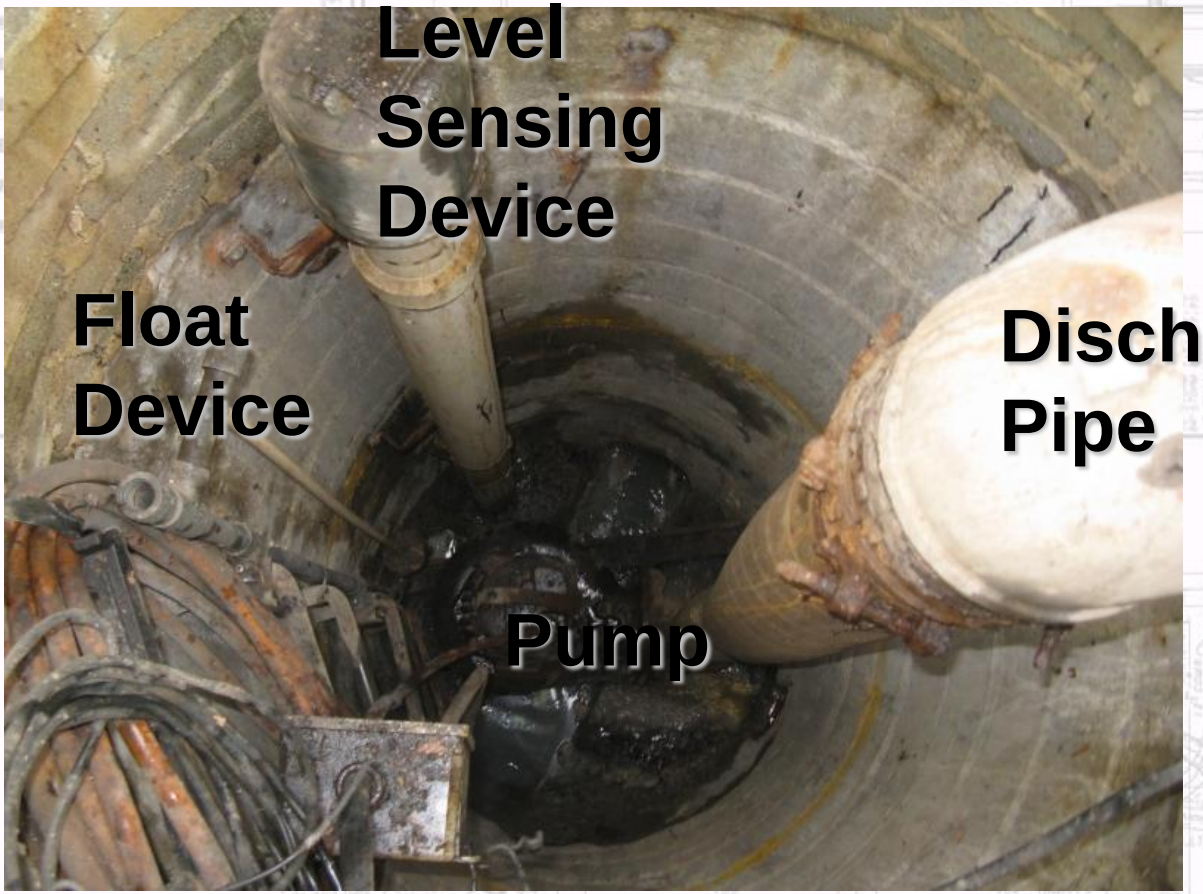
I/I REDUCTION EFFORTS SINCE 2001

Year	Sewer System Evaluation Survey (SSES)	Sanitary Manhole Rehab	Sanitary Sewer Lining	Sanitary Sewer Relay	Total
2001	$ 1,066,430	$ 2,392,994	$ 5,081,000	$ 733,550	$ 9,273,974
2002	$ 974,400	$ 2,194,206	$ 2,037,000	$ 1,776,986	$ 6,982,592
2003	$ 307,875	$ 1,830,000	$ 1,981,590	$ 3,232,470	$ 7,351,935
2004	$ 297,487	$ 928,448	$ 3,568,000	$ 942,312	$ 5,736,247
2005	$ 505,570	$ 564,949	$ 2,568,000	$ 3,180,000	$ 6,818,519
2006	$ 415,000	$ 1,579,000	$ 3,280,200	$ 2,456,400	$ 7,730,600
2007	$ 420,969	$ 874,705	$ 6,909,000	$ 4,739,000	$ 12,943,674
2008	$ 1,324,199	$ 2,431,982	$ 4,842,000	$ 5,441,000	$ 14,039,181
2009	$ 141,000	$ 2,201,000	$ 9,192,300	$ 4,790,700	$ 16,325,000
2010 (est)	$ 200,000	$ 2,800,000	$ 2,061,000	$ 10,250,000	$ 15,311,000
Total	$ 5,652,930	$ 17,797,284	$ 41,520,090	$ 37,542,418	$ 102,512,722

Department of Public Works
Environmental Engineering Section

Questions?

TYPICAL BYPASS PUMP LAYOUT (PRE-REHAB)



CURRENT INVESTIGATIONS WET TESTING

Wet testing simulates high water conditions by plugging sewer lines and filling pump manhole with hydrant water.

Pro: Tests all components of a pump station while working together.

Often corrections can be made at time of the test.

Con: More costly in terms of manpower, and time pulled away from other activities such as sewer cleaning and televising.

Plugging sewers increases risk of basement back-ups.

Up until recently, this type of testing was prohibited by the DNR due to sanitary pollution concerns.