APPENDIX A

Water Distribution Modeling Analysis

Scenario: Hydrant Flows
Fire Flow Analysis
Fire Flow Report

Label	Description	Zone	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Fire Flow Upper Limit (gpm)	Calculated Residual Pressure @ Total Flow Needed (psi)	Calculated Minimum Zone Pressure @ Total Flow Needed (psi)	Minimum Zone Junction	Satisfies Fire Flow Constraints?	Calculated Minimum Zone Pressure (psi)
J-2	Sunset Cr. and No. 15th St	Low Zone	1,000.00	1,338.31	2,000.00	37.96	25.53	J-1	true	20.00
J-15	1900 Block Greene St (6" Main)	Low Zone	750.00	1,660.32	3,000.00	32.80	24.37	J-21	true	20.00
J-18	Brickyard Rd and Visions Prkway	Low Zone	750.00	1,295.84	4,500.00	40.84	23.60	J-21	true	20.00
J-27	No. 12th and Court St	Low Zone	1,000.00	1,415.45	2,000.00	33.69	25.53	J-21	true	25.30
J-28	No. 6th and Rapids St	Low Zone	490.00	2,784.98	3,500.00	67.33	25.74	J-114	true	20.00
J-48	North 10th Street & Kinnick Feller Prk	Low Zone	970.00	1,000.00	1,000.00	49.91	25.54	J-21	true	25.52
J-53	19th and Rapids St	Low Zone	1,000.00	503.91	2,000.00	-55.58	-51.83	J-56	false	20.00
J-74	Horse n Buggy Dr at 19th St	High Zone	1,000.00	439.31	2,000.00	-177.26	-30.56	J-75	false	52.27
J-84	Bryan St and South 8th St	Low Zone	1,000.00	1,526.77	2,000.00	41.37	25.52	J-21	true	25.21
J-104	800 Block of Nile Kinnick Dr. South	High Zone	970.00	745.97	3,000.00	10.65	-8.53	J-182	false	20.00
J-111	FH North of 14th and Bike Trail	Low Zone	930.00	2,323.82	4,500.00	39.42	25.56	J-114	true	20.00
J-118	West End of Beverly Cr	High Zone	1,000.00	1,028.03	2,000.00	21.91	31.28	J-119	true	29.86
J-120	So. 14th and Ann Ave	High Zone	870.00	1,000.00	1,000.00	49.08	49.07	J-118	true	46.30
J-132	So. 14th and Greene St	Low Zone	520.00	586.39	2,500.00	33.02	22.34	J-73	true	20.00
J-135	West Crt. at 17th St	Low Zone	1,000.00	500.19	2,000.00	-58.11	-49.38	J-134	false	22.45
J-140	North 12th Street Circle	Low Zone	1,000.00	397.97	2,000.00	-154.17	-95.95	J-21	false	25.78
J-141	No. 11th and Court St	Low Zone	1,050.00	2,500.00	2,500.00	52.06	25.50	J-21	true	24.47
J-158	School 6th and Aspen	Low Zone	950.00	2,094.54	4,500.00	59.40	25.54	J-114	true	20.00
J-159	1800 Block Greene Street	Low Zone	750.00	1,659.72	3,000.00	37.11	24.37	J-21	true	20.00
J-178	1100 Blk of So 12th St & Evansview Rd.	High Zone	1,000.00	1,651.97	2,500.00	47.77	47.97	J-177	true	23.97
J-182	So. 10th at Greenwood Hills Dr	High Zone	1,000.00	745.93	2,000.00	-12.80	-9.71	J-102	false	21.82
J-186	100 Blk of Nile Kinnick Dr South	Low Zone	970.00	914.88	2,000.00	14.98	25.54	J-21	false	25.57

Scenario: Needed Fire Flow Existing Distributin System
Fire Flow Analysis
Fire Flow Report

Label	Description	Zone	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Fire Flow Upper Limit (gpm)	Calculated Residual Pressure @ Total Flow Needed (psi)	Calculated Minimum Zone Pressure @ Total Flow Needed (psi)	Minimum Zone Junction	Satisfies Fire Flow Constraints?	Calculated Minimum Zone Pressure (psi)
J-2	Sunset Cr. and No. 15th St	Low Zone	1,000.00	1,338.31	3,000.00	37.96	25.53	J-1	true	20.00
J-15	1900 Block Greene St (6" Main)	Low Zone	3,000.00	1,660.31	7,500.00	14.69	9.10	J-21	false	20.00
J-18	Brickyard Rd and Visions Prkway	Low Zone	4,500.00	1,295.84	7,500.00	-13.80	-28.98	J-21	false	20.00
J-27	No. 12th and Court St	Low Zone	1,000.00	1,415.45	3,000.00	33.69	25.53	J-21	true	25.30
J-28	No. 6th and Rapids St	Low Zone	3,500.00	2,784.98	4,000.00	28.99	13.29	J-114	false	20.00
J-48	North 10th Street & Kinnick Feller Prk	Low Zone	1,000.00	1,812.87	3,000.00	49.11	25.52	J-47	true	20.19
J-53	19th and Rapids St	Low Zone	1,000.00	503.91	3,000.00	-55.58	-51.83	J-56	false	20.00
J-74	Horse n Buggy Dr at 19th St	High Zone	1,000.00	439.31	3,000.00	-177.26	-30.56	J-75	false	52.27
J-84	Bryan St and South 8th St	Low Zone	1,000.00	1,526.77	3,000.00	41.37	25.52	J-21	true	25.21
J-104	800 Block of Nile Kinnick Dr. South	High Zone	3,000.00	745.97	5,000.00	-546.74	-555.54	J-182	false	20.00
J-111	FH North of 14th and Bike Trail	Low Zone	930.00	2,323.82	4,500.00	39.42	25.56	J-114	true	20.00
J-118	West End of Beverly Cr	High Zone	1,000.00	1,028.03	3,000.00	21.91	31.28	J-119	true	29.86
J-120	So. 14th and Ann Ave	High Zone	1,000.00	1,895.57	5,000.00	46.30	46.30	J-118	true	20.00
J-132	So. 14th and Greene St	Low Zone	2,500.00	586.39	3,000.00	-127.71	-135.19	J-73	false	20.00
J-135	West Crt. at 17th St	Low Zone	1,000.00	500.19	3,000.00	-58.11	-49.38	J-134	false	22.45
J-140	North 12th Street Circle	Low Zone	1,000.00	397.97	3,000.00	-154.17	-95.95	J-21	false	25.78
J-141	No. 11th and Court St	Low Zone	2,500.00	3,819.68	4,000.00	38.92	24.47	J-114	true	20.81
J-158	School 6th and Aspen	Low Zone	3,000.00	2,094.54	5,000.00	28.07	7.80	J-114	false	20.00
J-159	1800 Block Greene Street	Low Zone	3,000.00	1,659.72	7,500.00	18.80	9.08	J-21	false	20.00
J-178	1100 Blk of So 12th St & Evansview Rd.	High Zone	1,000.00	1,651.97	5,000.00	47.77	47.97	J-177	true	23.97
J-182	So. 10th at Greenwood Hills Dr	High Zone	1,000.00	745.93	5,000.00	-12.80	-9.71	J-102	false	21.82
J-186	100 Blk of Nile Kinnick Dr South	Low Zone	2,000.00	914.85	3,000.00	-122.13	-1.27	J-21	false	25.57

Scenario: With Water Main Improvements
Fire Flow Analysis
Fire Flow Report

Label	Description	Zone	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Fire Flow Upper Limit (gpm)	Calculated Residual Pressure @ Total Flow Needed (psi)	Calculated Minimum Zone Pressure @ Total Flow Needed (psi)	Minimum Zone Junction	Satisfies Fire Flow Constraints?	Calculated Minimum Zone Pressure (psi)
J-2	Sunset Cr. and No. 15th St	Low Zone	1,000.00	1,369.45	3,000.00	38.50	25.53	J-1	true	20.00
J-15	1900 Block Greene St (6" Main)	Low Zone	3,000.00	1,660.56	7,500.00	14.70	9.10	J-21	false	20.00
J-18	Brickyard Rd and Visions Prkway	Low Zone	4,500.00	1,296.02	7,500.00	-13.80	-28.97	J-21	false	20.00
J-27	No. 12th and Court St	Low Zone	1,000.00	1,508.65	3,000.00	35.44	25.53	J-21	true	25.24
J-28	No. 6th and Rapids St	Low Zone	3,500.00	3,472.85	4,000.00	45.36	19.81	J-114	false	20.00
J-48	North 10th Street & Kinnick Feller Prk	Low Zone	1,000.00	2,969.57	3,000.00	58.03	25.53	J-47	true	21.93
J-53	19th and Rapids St	Low Zone	1,000.00	1,698.83	3,000.00	39.60	25.54	J-56	true	20.00
J-74	Horse n Buggy Dr at 19th St	High Zone	1,000.00	1,691.36	3,000.00	53.76	49.46	J-97	true	30.76
J-84	Bryan St and South 8th St	Low Zone	1,000.00	1,553.96	3,000.00	42.02	25.52	J-21	true	25.20
J-104	800 Block of Nile Kinnick Dr. South	High Zone	3,000.00	1,494.90	5,000.00	-89.09	-95.50	J-182	false	20.01
J-111	FH North of 14th and Bike Trail	Low Zone	930.00	2,501.16	4,500.00	39.75	25.56	J-114	true	20.00
J-118	West End of Beverly Cr	High Zone	1,000.00	1,028.66	3,000.00	21.95	31.32	J-119	true	29.87
J-120	So. 14th and Ann Ave	High Zone	1,000.00	1,898.33	5,000.00	46.34	46.34	J-118	true	20.00
J-132	So. 14th and Greene St	Low Zone	2,500.00	587.03	3,000.00	-127.61	-135.08	J-73	false	20.00
J-135	West Crt. at 17th St	Low Zone	1,000.00	1,048.96	3,000.00	22.63	25.54	J-21	true	25.52
J-140	North 12th Street Circle	Low Zone	1,000.00	1,559.46	3,000.00	42.22	25.53	J-21	true	25.21
J-141	No. 11th and Court St	Low Zone	2,500.00	4,000.00	4,000.00	41.32	24.48	J-114	true	20.07
J-158	School 6th and Aspen	Low Zone	3,000.00	2,259.47	5,000.00	32.02	10.98	J-114	false	20.00
J-159	1800 Block Greene Street	Low Zone	3,000.00	1,659.98	7,500.00	18.80	9.09	J-21	false	20.00
J-178	1100 Blk of So 12th St & Evansview Rd.	High Zone	1,000.00	1,654.09	5,000.00	47.83	48.02	J-177	true	23.97
J-182	So. 10th at Greenwood Hills Dr	High Zone	1,000.00	1,475.19	5,000.00	43.54	43.78	J-102	true	20.51
J-186	100 Blk of Nile Kinnick Dr South	Low Zone	2,000.00	3,000.00	3,000.00	52.59	24.89	J-114	true	23.98

Scenario: Phase II Water Main Improvements
Fire Flow Analysis
Fire Flow Report

Label	Description	Zone	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Fire Flow Upper Limit (gpm)	Calculated Residual Pressure @ Total Flow Needed (psi)	Calculated Minimum Zone Pressure @ Total Flow Needed (psi)	Minimum Zone Junction	Satisfies Fire Flow Constraints?	Calculated Minimum Zone Pressure (psi)
J-2	Sunset Cr. and No. 15th St	Low Zone	1,000.00	1,382.15	3,000.00	38.71	25.53	J-1	true	20.00
J-15	1900 Block Greene St (6" Main)	Low Zone	3,000.00	1,660.58	7,500.00	14.70	9.10	J-21	false	20.00
J-18	Brickyard Rd and Visions Prkway	Low Zone	4,500.00	1,296.04	7,500.00	-13.80	-28.97	J-21	false	20.00
J-27	No. 12th and Court St	Low Zone	1,000.00	1,511.20	3,000.00	35.49	25.53	J-21	true	25.24
J-28	No. 6th and Rapids St	Low Zone	3,500.00	3,501.55	4,000.00	45.76	20.01	J-114	true	20.00
J-48	North 10th Street & Kinnick Feller Prk	Low Zone	1,000.00	3,000.00	3,000.00	58.17	25.53	J-47	true	22.08
J-53	19th and Rapids St	Low Zone	1,000.00	2,065.63	3,000.00	43.05	25.54	J-56	true	20.00
J-74	Horse n Buggy Dr at 19th St	High Zone	1,000.00	1,832.94	3,000.00	57.60	53.62	J-97	true	34.56
J-84	Bryan St and South 8th St	Low Zone	1,000.00	1,554.87	3,000.00	42.05	25.52	J-21	true	25.20
J-104	800 Block of Nile Kinnick Dr. South	High Zone	3,000.00	2,898.76	5,000.00	23.99	16.88	J-182	false	20.00
J-111	FH North of 14th and Bike Trail	Low Zone	930.00	2,507.68	4,500.00	39.77	25.56	J-114	true	20.00
J-118	West End of Beverly Cr	High Zone	1,000.00	1,435.25	3,000.00	39.53	48.90	J-119	true	38.26
J-120	So. 14th and Ann Ave	High Zone	1,000.00	3,620.74	5,000.00	56.19	56.20	J-168	true	33.68
J-132	So. 14th and Greene St	Low Zone	2,500.00	587.08	3,000.00	-127.60	-135.07	J-73	false	20.00
J-135	West Crt. at 17th St	Low Zone	1,000.00	1,623.55	3,000.00	38.37	25.54	J-21	true	25.19
J-140	North 12th Street Circle	Low Zone	1,000.00	1,779.31	3,000.00	46.02	25.53	J-21	true	25.06
J-141	No. 11th and Court St	Low Zone	2,500.00	4,000.00	4,000.00	41.36	24.48	J-114	true	20.19
J-158	School 6th and Aspen	Low Zone	3,000.00	2,265.25	5,000.00	32.14	11.08	J-114	false	20.00
J-159	1800 Block Greene Street	Low Zone	3,000.00	1,659.99	7,500.00	18.80	9.09	J-21	false	20.00
J-178	1100 Blk of So 12th St & Evansview Rd.	High Zone	1,000.00	2,615.08	5,000.00	60.06	55.48	J-177	true	25.23
J-182	So. 10th at Greenwood Hills Dr	High Zone	1,000.00	2,760.13	5,000.00	60.89	55.83	J-102	true	20.79
J-186	100 Blk of Nile Kinnick Dr South	Low Zone	2,000.00	3,000.00	3,000.00	52.68	24.89	J-21	true	23.99
J-191	South 10th at Meadow Road	High Zone	1,500.00	4,500.00	4,500.00	61.04	56.39	J-202	true	44.04
J-202	South 10th at Ann Ave	High Zone	1,500.00	2,973.72	4,500.00	51.63	54.88	J-182	true	36.45

Scenario: Phase III Including Storage Improvements
Fire Flow Analysis
Fire Flow Report

Label	Description	Zone	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Fire Flow Upper Limit (gpm)	Calculated Residual Pressure @ Total Flow Needed (psi)	Calculated Minimum Zone Pressure @ Total Flow Needed (psi)	Minimum Zone Junction	Satisfies Fire Flow Constraints?	Calculated Minimum Zone Pressure (psi)
J-2	Sunset Cr. and No. 15th St	Low Zone	1,000.00	1,388.47	3,000.00	38.84	25.91	J-1	true	20.00
J-15	1900 Block Greene St (6" Main)	Low Zone	3,000.00	4,214.81	7,500.00	26.75	24.64	J-21	true	23.55
J-18	Brickyard Rd and Visions Prkway	Low Zone	4,500.00	7,086.70	7,500.00	34.73	23.34	J-21	true	20.00
J-27	No. 12th and Court St	Low Zone	1,000.00	1,517.21	3,000.00	35.61	25.91	J-21	true	25.88
J-28	No. 6th and Rapids St	Low Zone	3,500.00	3,614.04	4,000.00	46.49	20.75	J-114	true	20.00
J-48	North 10th Street & Kinnick Feller Prk	Low Zone	1,000.00	3,000.00	3,000.00	58.30	25.91	J-47	true	22.65
J-53	19th and Rapids St	Low Zone	1,000.00	2,077.62	3,000.00	43.17	25.91	J-56	true	20.00
J-74	Horse n Buggy Dr at 19th St	High Zone	1,000.00	2,231.97	3,000.00	64.08	56.46	J-75	true	44.93
J-84	Bryan St and South 8th St	Low Zone	1,000.00	1,559.77	3,000.00	42.18	25.91	J-21	true	25.88
J-104	800 Block of Nile Kinnick Dr. South	High Zone	3,000.00	3,848.87	5,000.00	51.21	37.83	J-182	true	20.00
J-111	FH North of 14th and Bike Trail	Low Zone	930.00	2,554.70	4,500.00	39.89	25.91	J-114	true	20.00
J-118	West End of Beverly Cr	High Zone	1,000.00	1,431.74	3,000.00	39.48	48.85	J-119	true	38.18
J-120	So. 14th and Ann Ave	High Zone	1,000.00	3,727.52	5,000.00	56.61	57.22	J-118	true	33.44
J-132	So. 14th and Greene St	Low Zone	2,500.00	590.21	3,000.00	-126.77	-134.25	J-73	false	20.00
J-135	West Crt. at 17th St	Low Zone	1,000.00	1,629.93	3,000.00	38.50	25.91	J-21	true	25.88
J-140	North 12th Street Circle	Low Zone	1,000.00	1,785.74	3,000.00	46.15	25.91	J-21	true	25.87
J-141	No. 11th and Court St	Low Zone	2,500.00	4,000.00	4,000.00	41.79	25.81	J-114	true	21.10
J-158	School 6th and Aspen	Low Zone	3,000.00	2,301.69	5,000.00	32.73	11.67	J-114	false	20.00
J-159	1800 Block Greene Street	Low Zone	3,000.00	4,232.02	7,500.00	30.85	24.62	J-15	true	20.00
J-178	1100 Blk of So 12th St & Evansview Rd.	High Zone	1,000.00	2,875.64	5,000.00	61.77	57.10	J-177	true	25.49
J-182	So. 10th at Greenwood Hills Dr	High Zone	1,000.00	3,469.13	5,000.00	63.82	57.23	J-102	true	20.90
J-186	100 Blk of Nile Kinnick Dr South	Low Zone	2,000.00	3,000.00	3,000.00	52.99	25.85	J-114	true	24.69
J-191	South 10th at Meadow Road	High Zone	1,500.00	4,500.00	4,500.00	58.88	56.76	J-202	true	26.88
J-197	Meadow Road at Van Fossen Ln	High Zone	1,500.00	4,184.08	4,500.00	54.13	55.75	J-198	true	31.02
J-198	Van Fossen at Ann Ave	High Zone	1,500.00	4,267.95	4,500.00	54.30	55.78	J-197	true	29.91
J-200	South 19th at Ann Ave	High Zone	1,500.00	4,500.00	4,500.00	56.08	55.79	J-201	true	40.62
J-201	South 19th at Penoach St	High Zone	1,000.00	4,077.63	4,500.00	57.03	55.97	J-179	true	33.98
J-202	South 10th at Ann Ave	High Zone	1,500.00	3,091.30	4,500.00	52.74	56.58	J-182	true	45.09

APPENDIX B

IDNR Sanitary Survey Report for Potable Water System (October 23, 2006)

Fields of Opportunities

STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

October 23, 2006

City of Adel
102 South 10th Street
Adel, IA 50003

ATTN: Honorable Mayor & Council

SUBJECT: ADEL MUNICIPAL WATER WORKS Sanitary Survey
Public Water Supply ID # 2503003

Dear Mayor and Council Members:

Enclosed is the report of the recent survey of the above facility conducted by Cory Carr of my staff.

We believe you will find the report self-explanatory and strongly encourage you to take action on the requirements and recommendations listed near the end.

If you have any questions about the inspection or report, please contact Cory Carr at (515-725-0372) (email: cory.carr@dnr.state.ia.us) or this office.

The cooperation and assistance of Chuck Bandy in completing this survey was appreciated.

Sincerely,

Jim Stricker
Supervisor, Field Office # 5

c: IDNR Water Supply Operations Section (w/encl.)
Chuck Bandy 102 South 10th Street (w/encl.)
Paul Van Dorpe, IGS, via e-mail (w/encl.)

GENERAL DESCRIPTION:
Water is derived from 4 wells. Well #2 was drilled in 1969 to a depth of 44.5'; Well 3 was drilled in 1977 to a depth of 54'; and Well 4 was drilled in 1977 to a depth of 66'. These wells are located considerably north of the plant on the east side of the North Raccoon River. Well #5 was drilled in 1983 to a depth of 42.5' and located approximately 100' northeast of the water plant.

Water treatment consists of induced draft aeration, detention (65,000 gallons) for settling, filtration for iron removal, zeolite softening, fluoridation, caustic soda injection, and gas chlorination for disinfection.

Finished water storage includes a 300,000-gallon ground storage reservoir at the plant and a 250,000-gallon and a 200,000-gallon elevated storage tank.

The distribution system is constructed primarily of PVC plastic and ductile iron; there are about 10 blocks of asbestos cement pipe within the system.

1. **SOURCE:**
   Water is derived from 4 wells. Three of which are located north of the water plant and on the east side of the North Raccoon River. These wells are each house in separate well houses that are fenced in. Each of the wells is inspected on an annual basis and any improvements are made at that time.

   The Department recommends that a contingency plan, such as an emergency connection to a neighboring water supply, for the provision of potable water during emergencies be developed and updated on an annual basis. It is also recommended that the supply have some means to provide auxiliary power in the event of loss of normal power.

2. **TREATMENT:**
   The treatment plant was neat and clean in appearance. The flooring, softeners, filters, and its associated piping were in need of a fresh coat of paint which at the time of this survey had begun. One of the filter valves at the time of this survey was leaking. It was understood that the leaking valve is going to be fully replaced, which is a good effort to reduce water loss throughout the system. Each filter is backwashed based on head loss or every seven days, whichever comes first. The filter beds should be regularly inspected for cementing, mud balls, and uniform depth of media.

   The caustic soda and hydrofluorosilic acid are dispensed side-by-side bulk tanks which gravity feed to day tanks for each of these chemicals. It is also recommended that the fluoride chemicals be isolated from other chemicals to prevent contamination and to prevent the potential mixing of acids and bases (caustic soda), which could cause toxic fumes and explosive fire.

   Two 150-pound cylinders of gas chlorine are kept on line with an automatic switchover. There is a SCBA at the water treatment plant and at least one operator is fit tested. An ammonia bottle is kept on hand for chlorine leak detection. The chlorine gas room does not have sufficient ventilation. Chlorine gas rooms should have a ventilation fan with a capacity that provides one complete air change per minute when the room is occupied. (Recommended Standards for Water Works 5.4.1.c1) The chlorine leak detector should be located at a site that is readily available to the operator, but not in the chlorine gas storage

running the water plant there are many other duties an operator must do, the city is encouraged at possibly hiring another full time employee to assist Mr. Bandy.

SUMMARY OF MINOR DEFICIENCIES

- Install proper ventilation system in the chlorine gas room.

SUMMARY OF RECOMMENDATIONS

- The city is encouraged to develop a contingency plan, for the provision of potable water during emergencies.
- Separate the caustic soda and hydrofluorosilic acid, to avoid mixing if a spill would occur.
- Install a chlorine gas detector.
- The facility should look at modifying the feed location of the gas chlorine so that pressurized gas chlorine piping does not leave the chlorine room.
- It is recommended that the city continue general improvements of the all of the water facilities, such as painting, up keep, and increased security.
- Replace the leaking filter valve to reduce water loss with in the plant.
- All fire hydrants that are used for fire flow should be on six inch mains.
- It is recommended that the city look into hiring another full time employee for the distribution and water treatment facilities.

APPENDIX C

IDNR Water Supply Operation Permit

Fields of Opportunities

STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

November 13, 2006

ADEL MUNICIPAL WATER WORKS
ATTN WATER SUPERINTENDENT
PO BOX 248
ADEL, IA 50003

SUBJECT: **Public Water Supply Operation Permit Renewal – PWSID# 2503003**

Enclosed is the operation permit for ADEL MUNICIPAL WATER WORKS, classified as a community public water supply (PWS) by the Iowa Department of Natural Resources (IDNR).

Please be advised that this permit does not address additional sampling requirements that may be assigned as a result of monitoring or maximum contaminant level violations. This includes, but is not limited to, "confirmation," "replacement" and "repeat" monitoring requirements.

After reviewing the permit, feel free to contact me at 515-725-0372.

Sincerely,

Cory Carr
Environmental Specialist, Field Office 5

cc:

		Attachments OP
[ ]	Water Supply Operations Section	[X]
[ ]	File: PWSID # 2503003	[X]
[ ]	ADEL, CITY OF ATTN CITY CLERK CITY HALL PO BOX 248, ADEL, IA 50003	[X]

IOWA DEPARTMENT OF NATURAL RESOURCES

WATER SUPPLY OPERATION PERMIT

ADEL MUNICIPAL WATER WORKS

Public Water Supply ID: 2503003

ADEL MUNICIPAL WATER WORKS
ATTN WATER SUPERINTENDENT
PO BOX 248
ADEL, IA 50003

Effective Date: November 13, 2006
Expiration Date: February 28, 2010

The permittee is authorized to operate the public water system identified as ADEL MUNICIPAL WATER WORKS, subject to the applicable sections of Iowa Code including Chapter 455B and part 567 of the Iowa Administrative Code (IAC). This system is further subject to the monitoring requirements and general conditions of this permit and appendices when attached.

Appeal: Conditions of this permit may be appealed as provided in the 561 IAC Chapter 7. Appeals must be made in writing and received at the Iowa Department of Natural Resources, Attn: Legal Services, Henry A. Wallace Building, 502 E. 9th Street, Des Moines, IA 50319-0034 by December 13, 2006.

Renewal: The permittee must file for renewal of this permit by December 30, 2009. The Iowa Department of Natural Resources (IDNR) will issue an application for renewal prior to this date. It is the permittee's responsibility to ensure that the application is completed and returned to the IDNR. Failure to make proper application or maintain compliance with the requirements of this operation permit may result in legal action pursuant to Iowa Code sections 455B.175 and 455B.191, and 567 IAC Chapter 10 (455B), including the possible assessment of monetary penalties.

FOR THE DIRECTOR,

By: _____ Date: November 13, 2006

c: Field Office 5

File: PWSID: 2503003, ADEL MUNICIPAL WATER WORKS

ADEL, CITY OF
ATTN CITY CLERK CITY HALL
PO BOX 248
ADEL, IA 50003

IOWA DEPARTMENT OF NATURAL RESOURCES

WATER SUPPLY OPERATION PERMIT

ADEL MUNICIPAL WATER WORKS

Date: November 15, 2006 Public Water Supply ID: 2503003

Adel Municipal Water Works is classified as a community public water supply with a groundwater source. You must have a certified operator in direct responsible charge of the treatment to have a Water Treatment Grade2 Certification and of the distribution system to have a Water Distribution Grade2 Certification. The current operating period is defined as January 1 to December 31. In case your operating period is different than these dates, you must notify the IDNR immediately.

The water supply must sample at the locations and frequencies specified in this permit during periods of normal operation and representative of all water sources and treatment.

Distribution System Monitoring Requirements

The following samples must be taken throughout the distribution system, according to written sampling plans, and analyzed by a laboratory certified by the IDNR.

Facility ID: **950** Distribution System Name : **DISTRIBUTION SYSTEM**

ANALYTE	MONITORING FREQUENCY	SAMPLE PERIOD
Coliform Bacteria	4 samples every month	
Total Trihalomethanes (TTHM)	1 sample every year per plant	July 01 to August 31 every year
	Your approved sampling plan has 1 designated plant. One sample or at least 25 percent of all samples must be collected at a maximum residence time location (Sample Point ID = MRT).	
Haloacetic Acids (HAA5)	1 sample every year per plant	July 01 to August 31 every year
	Your approved sampling plan has 1 designated plant. One sample or at least 25 percent of all samples must be collected at a maximum residence time location (Sample Point ID = MRT).	
Lead and Copper	20 samples every 3 years	June 01 to September 30, 2008

Source Entry Point Monitoring Requirements

The following samples must be taken at the source entry point and analyzed by a laboratory certified by the IDNR

Facility ID: **02** Source Entry Point Name: **WELL 2, 3, 4 & 5 AFTER TREATMENT**

ANALYTE	MONITORING FREQUENCY	SAMPLE PERIOD
Arsenic	1 sample every 3 years	July 1 to September 30, 2009
Combined Radium	1 sample every 9 years	April 1 to June 30, 2012
Gross Alpha	1 sample every 9 years	April 1 to June 30, 2010
Inorganic (IOC) Chemicals	1 sample every 9 years	July 1 to September 30, 2015
Nitrate	1 sample every year	July 1 to September 30
Sodium	1 sample every year	July 1 to September 30
Synthetic (SOC) Chemicals	1 sample every 6 years	April 1 to June 30, 2012
Volatile (VOC) Chemicals	1 sample every 6 years	April 1 to June 30, 2012

Note: Samples may be collected before the sample period specified, for monitoring frequencies of a year or greater. However, the interval between samples must not exceed the frequency. If a yearly 3rd quarter sample is collected early, for example in the 2nd quarter, the next yearly sample must be collected before the end of the 2nd quarter of the next year.

Monthly Operation Report (MOR) Self-Monitoring Requirements

Monthly records of operation must be signed by the certified operator in direct responsible charge or their designee, maintained at the system for a period of five years, and available for IDNR review. Analysis of analytical parameters by a laboratory certified by IDNR is not required; however, a reliable field test kit or laboratory method must be used. Monthly Operation Report Forms may be obtained by contacting Field Office 5 at 515-725-0268. When IDNR notification is required, use this same field office number. During evenings, weekends, and holidays, notify the IDNR through the 24-Hr Emergency Response Unit at 515-281-8694.

When indicated in the section(s) below, the permittee must report the signed results of the self-monitoring in an approved format to Field Office 5 in Des Moines within 10 days after the end of each month.

Routine Monitoring

Any parameter with an "X" in the report column below, must be submitted to the IDNR field office monthly as prescribed above. All parameters, whether reported to the field office or not, must be maintained at the system.

PARAMETER	FREQUENCY	LOCATION	REPORT	COMMENTS/RANGES
Calculated MRDL Value	1/Month	Distribution System	X	Calculated from the TOTAL chlorine residual measured at the time of reoutine and repeat bacterial collection.
Chemical Additive, Quantity Used	1/Week	Day Tank / Scale		Caustic Soda
Disinfectant Residual	At Sampling	Distribution System	X	The system must measure and record both Free and Total chlorine residuals on the sample data sheet when sampling for routine and repeat coliform bacteria
Disinfectant Residual	1/Day	Distribution System	X	
Disinfectant Residual	1/Day	Source Entry Point	X	
Disinfectant, Quantity Used	1/Day	Day Tank / Scale	X	
Fluoride	1/Month	Raw Water	X	
Fluoride	1/Day	Source Entry Point	X	
Fluoride, Quantity Used	1/Day	Day Tank / Scale	X	
Hardness, as CaCO3	1/Month	Raw Water		
Hardness, as CaCO3	2/Week	Source Entry Point		
Iron	1/Month	Raw Water		
Iron	2/Week	Source Entry Point		
Manganese	1/Month	Raw Water		
Manganese	2/Week	Source Entry Point		
Pumpage or Flow	1/Day	Source Entry Point	X	
Pumpage or Flow	1/Day	Raw Water	X	
Pumpage or Flow	1/Day	Bypass	X	
Static Water and Pumping Levels	1/Month	Each Active Well		
pH	2/Week	Source Entry Point		

IOWA DEPARTMENT OF NATURAL RESOURCES

WATER SUPPLY OPERATION PERMIT

ADEL MUNICIPAL WATER WORKS

Date: November 15, 2006 Public Water Supply ID: 2503003

GENERAL PERMIT CONDITIONS

1. ADMINISTRATIVE RULES
   Rules of the IDNR which govern your facility operation, in connection with this permit, are published in 567 Iowa Administrative Code (IAC) Chapters 40, 41, 42, 43, and 81.
2. NOTICE OF CHANGED CONDITIONS
   You are required to report any changes in existing conditions or information on which this permit is based. If any modification of, addition to, or construction of this water system is made, you must first obtain a written construction permit from the IDNR, in accordance with 567 Chapters 40, 41, and 43.
3. PERMIT MODIFICATION, SUSPENSION, OR REVOCATION
   a. This permit may be modified at any time as a result of changes to the Iowa Administrative Code.
   b. This permit may be modified due to changes in the conditions or information on which this permit is issued.
   c. This permit may be modified to include a compliance schedule.
   d. This permit may be modified, suspended, or revoked for causes specified in 567 IAC 43.2(8).
4. INSPECTION OF PREMISES, RECORDS, EQUIPMENT, AND METHODS
   You are required to permit authorized IDNR personnel to survey and inspect any construction, operation, and records of your water supply system in accordance with Iowa Code, section 455B. 174, and 567 IAC 42.4(3)"a" and 42.5(1)"g" and 567 Chapter 44.
5. OPERATION AND MAINTENANCE
   All facilities and control systems must be operated as efficiently as possible and maintained in good working order in accordance with 567 IAC Chapter 43. A sufficient number of staff, adequately trained and knowledgeable in the operation of your facility, must be retained to achieve compliance with the terms of this permit.
6. REPORTING, PUBLIC NOTIFICATION, AND RECORDKEEPING REQUIREMENTS
   a. You are required to report all test, measurement, or analysis results to the IDNR in accordance with 567 IAC 42.4(1)"a". This must include the reporting of all positive detects within the same analytical series.
   b. You are required to report to the IDNR within 48 hours any violation of the drinking water regulations or monitoring requirements in accordance with 567 IAC 42.4(1)"b".
   c. You are required to notify the public of any violation of the drinking water regulations or monitoring requirements in accordance with 567 IAC 42.1(455B).
   d. Within 10 days of notifying the public, you are required to provide proof of such action to the IDNR in accordance with 567 IAC 42.4(1)"c".
   e. You are required to maintain records of analyses, of actions to correct violations of any of the drinking water regulations, of correspondence, and of permits for periods of 5 to 12 years depending on the nature of the records, in accordance with 567 IAC 42.5(1).
7. TRANSFER OF TITLE, CHANGE IN OPERATION
   If title to your facility or any part of it is transferred, the new owner shall be subject to this permit. You are required to notify the new owner of the requirements of this permit in writing within 30 days to such transfer of title. The Director of the IDNR must be notified in writing within 30 days of such transfer or of any other change in conditions identified in the permit application (567 IAC 43.2(455B)).
8. SEVERABILITY
   If any provision or application of any provision to any circumstances is found to be invalid by the IDNR or by a court of law, all other provisions and conditions shall remain effective.
9. APPLICATION OF OTHER AUTHORITY
   This permit does not relieve you of the responsibilities to comply with all local, state, and federal laws, ordinances, regulations, or other legal requirements applying to the operation of your facility.

FACILITY ID SUMMARY

ADEL MUNICIPAL WATER WORKS PWSID 2503003

Facility Type :	**Distribution System**		Facility Type Code :	**DS**	
Facility ID	**950**	Facility Name	**DISTRIBUTION SYSTEM**		Status **Active**
Facility Type :	**Source/Entry Point**		Facility Type Code :	**SS**	
Facility ID	**01**	Facility Name	**WELLS 1, 2, 3, & 4 AFTER TREATMENT**		Status **Inactive**
Facility ID	**02**	Facility Name	**WELL 2, 3, 4 & 5 AFTER TREATMENT**		Status **Active**
Facility Type :	**Well**		Facility Type Code :	**WL**	
Facility ID	**WL01**	Facility Name	**WELL # 1 (1969) PLUGGED**	**Well Tag ID:**	Status **Inactive**
Facility ID	**WL02**	Facility Name	**WELL # 2 (1969)**	**Well Tag ID: 1050001**	Status **Active**
Facility ID	**WL03**	Facility Name	**WELL # 3 (1977)**	**Well Tag ID: 1050002**	Status **Active**
Facility ID	**WL04**	Facility Name	**WELL # 4 (1977)**	**Well Tag ID: 1050003**	Status **Active**
Facility ID	**WL05**	Facility Name	**WELL # 5 (1983)**	**Well Tag ID: 1050004**	Status **Active**
Facility Type :	**Treatment Plant**		Facility Type Code :	**TP**	
Facility ID	**TP01**	Facility Name	**PLANT #1**		Status **Active**
Facility Type :	**Storage**		Facility Type Code :	**ST**	
Facility ID	**ST01**	Facility Name	**TOTAL GROUND STORAGE**		Status **Active**
cility ID	**ST02**	Facility Name	**TOTAL ELEVATED STORAGE**		Status **Active**

APPENDIX D

Well Information and Maintenance Data Reports

MORRELL
HEATING & COOLING
GEOTHERMAL SYSTEMS

WATER SERVICES
MUNICIPAL & COMMERCIAL

MAINTENANCE DATA REPORT

April 28, 2006

Chuck Bandy
City of Adel
P.O. Box 230
Adel, IA 5003-0230

Dear Chuck:

Morrell Company appreciates the opportunity to complete this year's maintenance testing. From the data collected the following can be summarized:

Well #1
Specific capacity is down slightly testing at 16.28 GPM per foot of drawdown. The pump showed severe signs of plugging indicated by the rapid drop in pressure at higher flow rates. This well and pump was authorized for repair following the maintenance tests and is currently being repaired.

Well #2
Well Performance is in excellent shape while the pump is slightly plugged up. Specific capacity tested at 44.74 GPM per foot. I would recommend pulling the pump and simply cleaning on site and reinstalling since the pump was recently overhauled.

Well #3
No problems indicated by this year's testing. The pump is showing only minor plugging problems. Specific capacity is at 39.39.

Well #4
Specific capacity continues to drop since this well was treated March of 2004. Following the treatment the S.C. was 50.3 compared to 19.09 currently. Pump performance is good. It would be a good idea to budget a treatment for this one in the near future.

In summary Well #1 is currently being worked on. Well #2 could benefit from the pump being cleaned and Well #4 could use a treatment to restore S.C. Morrell Company is pleased that you have selected to use us for your water supply needs.

Sincerely,
Morrell Water Services

Anthony Sherman
Project Engineer

MORRELL
HEATING & COOLING
GEOTHERMAL SYSTEMS

WATER SERVICES
MUNICIPAL & COMMERCIAL

MAINTENANCE DATA REPORT

JOB NAME: City of Adel
ADDRESS: PO Box 230
CITY, STATE: Adel, IA 50003-0230

CUSTOMER CONTACT: Chuck
CUSTOMER PHONE: (515)993-3831/(515)202-4913-ce
DATE: 04/2006

WELL INFORMATION

WELL No.: 1 DIAMETER: 16" DEPTH: _____ STATIC: 18'

WELL LOCATION: Well field

PUMP INFORMATION

BRAND: _____ MODEL: _____ STAGES: _____ DEPTH OF SET: _____

MOTOR & GEAR DRIVE INFORMATION

BRAND: US H.P.: 30 RPM: 1750 FULL LOAD AMPS: 78

PUMPING INTO SYSTEM DATA (NORMAL OPERATION)

METER (GPM): 400 PWL: 35' MAIN PRESSURE: 93 Hz _____

SHUTOFF HEAD: 128 PSI 23 FT STATIC MAIN PRESSURE: _____

VARIABLE RATE PUMPING TEST

Flow Rate GPM						Sp. Cap.	AMPS			VOLTS		
ORIFICE	METER	PWL	DD	PSI	TDH	GPM/ FT	L1	L2	L3	L1-2	L1-3	L2-3
178		28	10	112	286.72	17.8	62.1	56.6	57	120.9	121.3	208.5
261		33	15	90	150.6	17.4	69.8	64	62.6	120.7	121.2	208.5
300		40	22	75	110.33	13.6	72.5	67.7	66.4	121.2	121.8	209.5

ELECTRIC METER READING: _____ GPM _____ KWH _____ REV/ _____ SEC

SUMMARY:

Calculated input H.P.	26.49	
Calculated output H.P.	8.36	
Wire-to-water Eff.	0.32	
Avg. specific capacity	16.28	GPM/FT
05 specific capacity	17.78	GPM/FT

Materials:

Oil		Qts.
Electric Motor Grease		Tube
Rings of Packing		Ea.
Tube of Packing Grease		Tube
Gauges	1	Ea.
Airline		Ft.

COMMENTS: _____

DATA CERTIFIED BY: _____
JOHN MOHR

MORRELL
HEATING & COOLING
GEOTHERMAL SYSTEMS

WATER SERVICES
MUNICIPAL & COMMERCIAL

MAINTENANCE DATA REPORT

JOB NAME: City of Adel
ADDRESS: PO Box 230
CITY, STATE: Adel, IA 50003-0230

CUSTOMER CONTACT: Chuck
CUSTOMER PHONE: (515) 993-3831/ 202-4913-cell
DATE: 04/2006

WELL INFORMATION

WELL No.: 2 DIAMETER: _____ DEPTH: _____ STATIC: 20'

WELL LOCATION: Well field

PUMP INFORMATION

BRAND: _____ MODEL: _____ STAGES: _____ DEPTH OF SET: _____

MOTOR & GEAR DRIVE INFORMATION

BRAND: US H.P.: 30 RPM: 1760 FULL LOAD AMPS: 78

PUMPING INTO SYSTEM DATA (NORMAL OPERATION)

METER (GPM): 470 PWL: _____ MAIN PRESSURE: 42 Hz _____

SHUTOFF HEAD: 135 PSI 20.2 FT STATIC MAIN PRESSURE: _____

VARIABLE RATE PUMPING TEST

Flow Rate GPM						Sp. Cap.	AMPS			VOLTS		
ORIFICE	METER	PWL	DD	PSI	TDH	GPM/ FT	L1	L2	L3	L1-2	L1-3	L2-3
153		23	3	118	295.58	51.0	42.9	48.9	53.7	242.4	242	239.4
226		25.1	5.1	105	150.6	44.3	57	56.8	59.7	242.2	239	241
319		28.2	8.2	75	110.33	38.9	72.2	63.6	65.1	242	238	241
404		30.6	10.6	37	116.07	38.1	78.1	68.6	70.2	241	237	240

ELECTRIC METER READING: _____ GPM _____ KWH _____ REV/ _____ SEC

SUMMARY:

Calculated input H.P.	25.75	
Calculated output H.P.	8.89	
Wire-to-water Eff.	0.35	
Avg. specific capacity	44.74	GPM/FT
05 specific capacity	22.44	GPM/FT

Materials:

Oil		Qts.
Electric Motor Grease		Tube
Rings of Packing		Ea.
Tube of Packing Grease		Tube
Gauges		Ea.
Airline		Ft.

COMMENTS: _____

DATA CERTIFIED BY: _____
JOHN MOHR

MORRELL
HEATING & COOLING
GEOTHERMAL SYSTEMS

WATER SERVICES
MUNICIPAL & COMMERCIAL

MAINTENANCE DATA REPORT

JOB NAME: City of Adel
ADDRESS: P.O. Box 230
CITY, STATE: Adel, IA 50003-0230

CUSTOMER CONTACT: Chuck
CUSTOMER PHONE: (515) 993-3831/ 202-4913-cell
DATE: "4/06

WELL INFORMATION

WELL No.: 3 DIAMETER: 16 DEPTH: _____ STATIC: 20

WELL LOCATION: Well Field

PUMP INFORMATION

BRAND: Layne MODEL: _____ STAGES: 6 DEPTH OF SET: 40

MOTOR & GEAR DRIVE INFORMATION

BRAND: US H.P.: 30 RPM: 1770 FULL LOAD AMPS: 78

PUMPING INTO SYSTEM DATA (NORMAL OPERATION)

METER (GPM): N/A PWL: 17.5 MAIN PRESSURE: _____ Hz _____

SHUTOFF HEAD: 137 PSI 335 FT STATIC MAIN PRESSURE: _____

VARIABLE RATE PUMPING TEST

Flow Rate GPM						Sp. Cap.	AMPS			VOLTS		
ORIFICE	METER	PWL	DD	PSI	TDH	GPM/ FT	L1	L2	L3	L1-2	L1-3	L2-3
195		25	5	107	272.17	39.0	58.8	62.4	57.3	236	239	238
316		28	8	60	166.6	39.5	61.9	65.1	60.7	235	233	236
357		29	9	43	128.33	39.7	60.5	64.2	60	235	233	235

ELECTRIC METER READING: _____ GPM _____ KWH _____ REV/ _____ SEC

SUMMARY:		
Calculated input H.P.	31.57	
Calculated output H.P.	11.57	
Wire-to-water Eff.	0.37	
Avg. specific capacity	39.39	GPM/FT
2005 specific capacity	48.8	GPM/FT

Materials:		
Oil		Qts.
Electric Motor Grease		Tube
Rings of Packing		Ea.
Tube of Packing Grease		Tube
Gauges		Ea.
Airline		Ft.

COMMENTS: _____

DATA CERTIFIED BY: _____
JOHN MOHR

MORRELL
HEATING & COOLING
GEOTHERMAL SYSTEMS

WATER SERVICES
MUNICIPAL & COMMERCIAL

MAINTENANCE DATA REPORT

JOB NAME: City of Adel
ADDRESS: P.O. Box 230
CITY, STATE: Adel, IA 50003-0230

CUSTOMER CONTACT: Chuck
CUSTOMER PHONE: (515) 993-3831/ 202-4913-cell
DATE: "4/06

WELL INFORMATION

WELL No.: 4 DIAMETER: 12" DEPTH: 62 STATIC: 13

WELL LOCATION: Water Plant

PUMP INFORMATION

BRAND: Layne MODEL: 10L STAGES: 2 DEPTH OF SET: 45

MOTOR & GEAR DRIVE INFORMATION

BRAND: US H.P.: 15 RPM: 1750 FULL LOAD AMPS: 37

PUMPING INTO SYSTEM DATA (NORMAL OPERATION)

METER (GPM): N/A PWL: _____ MAIN PRESSURE: _____ Hz _____

SHUTOFF HEAD: 45 PSI 113.3 FT STATIC MAIN PRESSURE: _____

VARIABLE RATE PUMPING TEST

Flow Rate GPM						Sp. Cap.	AMPS			VOLTS		
ORIFICE	METER	PWL	DD	PSI	TDH	GPM/ FT	L1	L2	L3	L1-2	L1-3	L2-3
146		22	9	42	119.02	16.2	25.5	23.7	28.6	244	242	243
195		23	10	40	115.4	19.5	29	31	28.5	244	241	244
280		26	13	33	102.23	21.5	31.6	34.2	31.8	244	241	243

ELECTRIC METER READING: _____ GPM _____ KWH _____ REV/ _____ SEC

SUMMARY:		
Calculated input H.P.	13.19	
Calculated output H.P.	7.23	
Wire-to-water Eff.	0.55	
Avg. specific capacity	19.09	GPM/FT
2005 specific capacity	36.27	GPM/FT

Materials:		
Oil		Qts.
Electric Motor Grease		Tube
Rings of Packing		Ea.
Tube of Packing Grease		Tube
Gauges		Ea.
Airline		Ft.

COMMENTS: _____

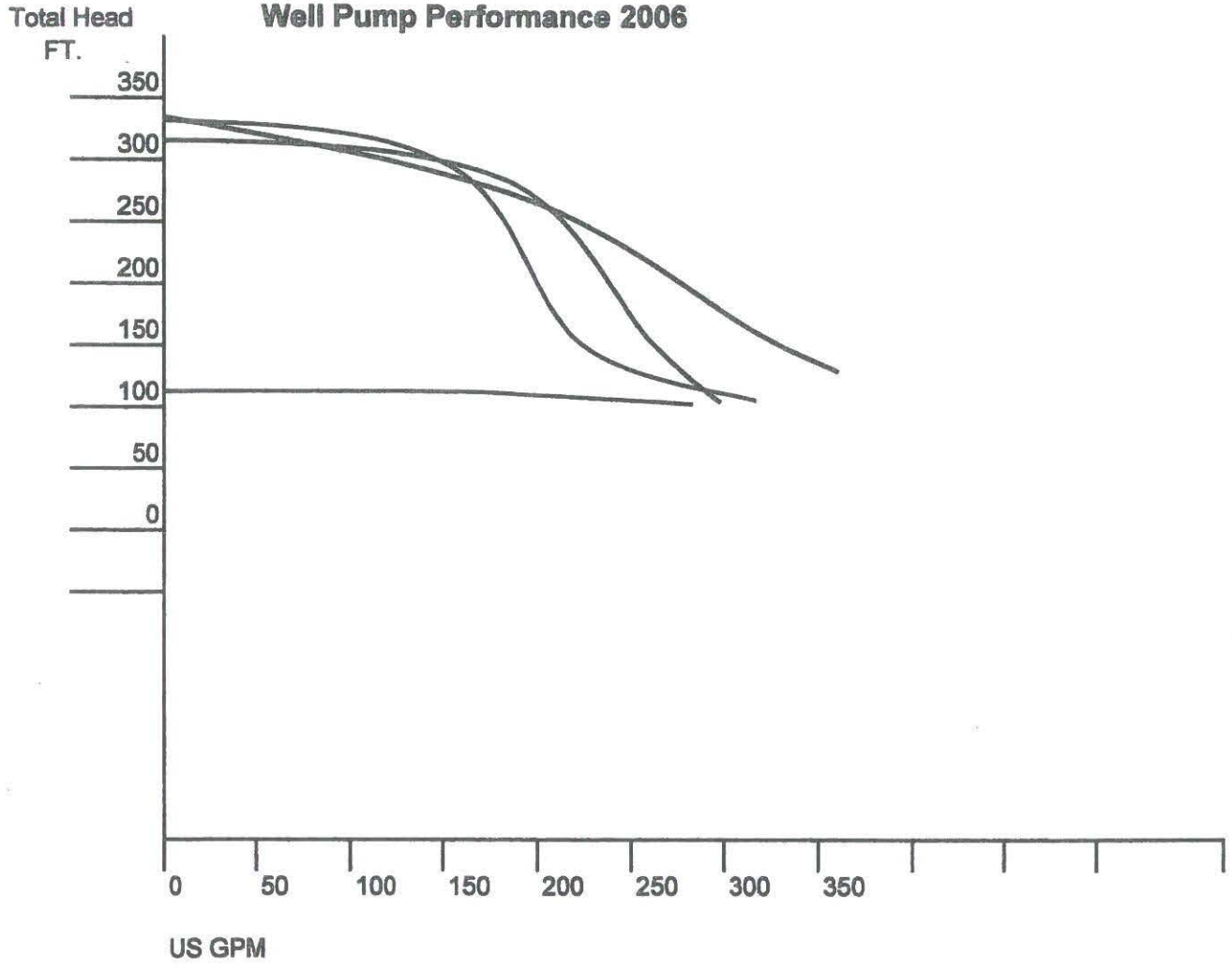
DATA CERTIFIED BY: _____
JOHN MOHR

MORRELL
HEATING & COOLING
GEOTHERMAL SYSTEMS

WATER SERVICES
MUNICIPAL & COMMERCIAL

MAINTENANCE DATA REPORT

City of Adel
Well Pump Performance 2006

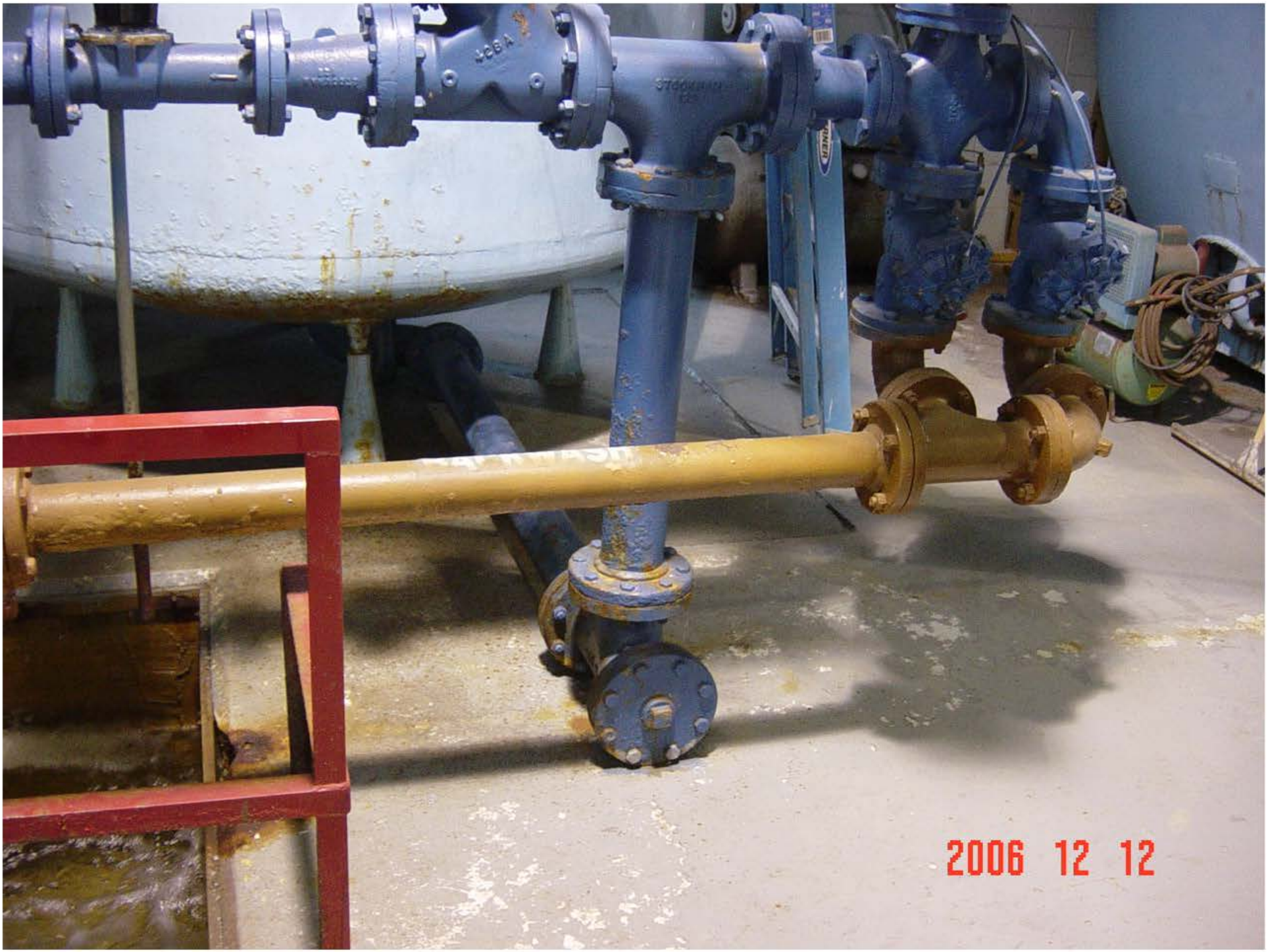


Well # 1		Well #2		Well #3		Well #4	
GPM	TDH	GPM	TDH	GPM	TDH	GPM	TDH
0	319	0	331	0	335	0	113
178	287	153	296	195	272	146	119
261	151	226	151	316	167	195	115
300	110	319	110	357	128	280	102

1-800-550-LOOP(5667) • 15301 Hickman Road • P.O. Box 908 • Waukee, IA 50263

APPENDIX E

Water Treatment Plant Photos (Corrosion Issues)


2006 12 12


2006 12 12


2006 12 12


Hydrofluosilicic Acid
2006 12 12


2006 12 12


2006 12 12


2006 12 12


2/24/03
2006 12 12

APPENDIX F

ISO Public Protection Classification Survey (August 2005)

111 NORTH CANAL STREET SUITE 950 CHICAGO, IL 60606-7270
TEL: (312) 930-0070 (800) 444-4554 FAX: (312) 930-0017

August 22, 2005

James Peters, Mayor
City of Adel
301 S. 10th St.
Adel, IA 50003

RE: Public Protection Classification Results
Adel, Dallas County, IA

Dear Mayor Peters:

We wish to thank you and the other community officials for your cooperation during our recent Public Protection Classification (PPC) survey. ISO is the leading supplier of statistical, underwriting, and actuarial information for the property/casualty insurance industry. Most insurers use the PPC classifications for underwriting and calculating premiums for residential, commercial and industrial properties.

ISO has completed its analysis of the structure fire suppression delivery system provided in your community. We would like to report that the resulting classification is a Class 6. Congratulations on your commitment to serve the needs of your community's property owners and residents.

ISO will advise its subscribing insurers of this classification change within the next 30-days and assign an effective date of October 1, 2005. This date allows insurers the necessary lead time to incorporate the Public Protection Classification change into their policy rating systems.

Enclosed is a summary of the ISO analysis of your fire suppression services. If you would like to know how your community's classification could improve, or if you would like to learn about the potential effect of proposed changes to your fire suppression delivery system, please call us at the phone number listed below.

The PPC program is not intended to analyze all aspects of a comprehensive structure fire suppression delivery system program. It is not for purposes of determining compliance with any state or local law, nor is it for making recommendations about loss prevention or life safety.

If you have any questions about your classification, please let us know.

Very truly yours,

Public Protection Classification Dept.

Public Protection Classification Dept.
(800) 930-1677 Ext. 6209

cc: Tim Morlan, Fire Chief
Swede Belgarde, Water Supt.

CLASSIFICATION DETAILS

Graded Area: Adel
County: Dallas State: IA
Date Surveyed: January, 2005 Total Credit: 43.47 Class: 6 Pop.: 3435

FIRE DEPARTMENT

This section of the Fire Suppression Rating Schedule reviews the engine and ladder-service companies, equipment carried, response to fires, training and available fire fighters.

	Credit	
	Actual	Maximum
1. Credit for Engine Companies (Item 513)		
This item reviews the number of engine companies and the hose equipment carried.	5.66	10.00
2. Credit for Reserve Pumpers (Item 523)		
This item reviews the number of reserve pumpers, their pump capacity and the hose equipment carried on each.	0.35	1.00
3. Credit for Pump Capacity (Item 532)		
This item reviews the total available pump capacity.	4.95	5.00
4. Credit for Ladder-Service Companies (Item 549)		
This item reviews the number of ladder and service companies and the equipment carried.	1.62	5.00
5. Credit for Reserve Ladder-Service Companies (Item 553)		
This item reviews the number of reserve ladder and service trucks, and the equipment carried.	0.25	1.00

Graded Area: Adel
County: Dallas State: IA
Date Surveyed: January, 2005 Total Credit: 43.47 Class: 6 Pop.: 3435

FIRE DEPARTMENT
(continued

	Credit	
	Actual	Maximum
6. Credit for Distribution (Item 561)		
This item reviews the percent of the built-upon area of the city which has an adequately-equipped, responding first-due engine company within 1.5 miles and an adequately-equipped, responding ladder-service company within 2.5 miles.	1.84	4.00
7. Credit for Company Personnel (Item 571)		
This item reviews the average number of equivalent fire fighters and company officers on duty with existing companies.	2.13	15.00+
8. Credit for Training (Item 581)		
This item reviews the training facilities and their use.	0.72	9.00
9. Total Credit for Fire Department:	17.52	50.00+
Relative Classification for Fire Department:	7	

+ This indicates that credit for company personnel is open-ended, with no maximum credit for this item.

INSURANCE SERVICES OFFICE, INC.

CLASSIFICATION DETAILS

Graded Area: Adel
County: Dallas State: IA
Date Surveyed: January, 2005 Total Credit: 43.47 Class: 6 Pop.: 3435

RECEIVING AND HANDLING FIRE ALARMS

This section of the Fire Suppression Rating Schedule reviews the facilities provided for the general public to report fires, and for the operator on duty at the communication center to dispatch fire department companies to the fires.

	Credit	
	Actual	Maximum
1. Credit for Telephone Service (Item 414)		
This item reviews the facilities provided for the public to report fires, including the listing of fire and business numbers in the telephone directory.	1.32	2.00
2. Credit for Operators (Item 422)		
This item reviews the number of operators on-duty at the communication center to handle fire calls.	3.00	3.00
3. Credit for Dispatch Circuits (Item 432)		
This item reviews the dispatch circuit facilities used to transmit alarms to fire department members.	2.50	5.00
4. Total Credit for Receiving and Handling Fire Alarms:	6.82	10.00
Relative Classification for Receiving and Handling Fire Alarms:	4	

Graded Area: Adel
County: Dallas State: IA
Date Surveyed: January, 2005 Total Credit: 43.47 Class: 6 Pop.: 3435

WATER SUPPLY

This section of the Fire Suppression Rating Schedule reviews the water supply system that is available for fire suppression in the city.

	Credit	
	Actual	Maximum
1. Credit for the Water System (Item 616)		
This item reviews the supply works, the main capacity and hydrant distribution.	22.19	35.00
2. Credit for Hydrants (Item 621)		
This item reviews the type of hydrants, and method of installation.	1.58	2.00
3. Credit for Inspection and Condition of Hydrants (Item 631)		
This item reviews the frequency of inspections of hydrants and their condition	0.47	3.00
4. Total Credit for Water Supply:	24.24	40.00
Relative Classification for Water Supply:	4	

Grading Sheet For: Adel, IA
Dallas County

Public Protection Class: 6 Surveyed: January, 2005

Feature	Credit Assigned	Maximum Credit
Receiving and Handling Fire Alarms	6.82%	10.00%
Fire Department	17.52%	50.00%
Water Supply	24.24%	40.00%
*Divergence	-5.11%	
Total Credit	43.47%	100.00%

The Public Protection Class is based on the total percentage credit as follows:

Class	%
1	90.00 or more
2	80.00 to 89.99
3	70.00 to 79.99
4	60.00 to 69.99
5	50.00 to 59.99
6	40.00 to 49.99
7	30.00 to 39.99
8	20.00 to 29.99
9	10.00 to 19.99
10	0 to 9.99

*Divergence is a reduction in credit to reflect a difference in the relative credits for Fire Department and Water Supply.

The above classification has been developed for use in property insurance premium calculations.

PUBLIC PROTECTION CLASSIFICATION

IMPROVEMENT STATEMENTS
FOR
Adel
Dallas County, IA

Prepared by
INSURANCE SERVICES OFFICE, INC.
111 North Canal St., Ste 950, Chicago, IL 60606
312-930-0070 FAX 800-711-6431

The following statements are based upon the criteria contained in our Fire Suppression Rating Schedule and upon conditions in Adel, IA during January, 2005. They indicate the performance needed to receive full credit for the specific item in the Schedule, and the quantity you have provided. Partial improvement will result in receiving a partial increase in the credit. These statements relate only to the fire insurance classification of your city. They are not for property loss prevention or life safety purposes and no life safety or property loss prevention recommendations are made.

RECEIVING AND HANDLING FIRE ALARMS

Credit For Telephone Service (Item 414).

Actual = 1.32%; Maximum = 2.00%

For maximum credit in the Schedule, there should be 2 incoming telephone lines reserved for receiving notification of fires (and other emergency calls). You have 1 line reserved.

For maximum credit in the Schedule, there should be 2 incoming lines reserved for notification of fires (and other emergency calls) plus 1 additional lines for conducting other fire department business. Since the designated business line is to a location that is not attended during normal business hours, 1(one) line has been deducted from the number of creditable reserved fire lines.

For maximum credit in the Schedule, emergency calls should progress to the business number.

For maximum credit in the Schedule, both the number to report a fire and the fire department business number should be listed under "Fire Department" in the white pages directory (or government section of the white pages). Your fire number is not listed and your business number is not listed under "Fire Department".

Credit For Dispatch Circuits (Item 432).

Actual = 2.50%; Maximum = 5.00%

For maximum credit in the Schedule, the primary alarm dispatch circuit should be monitored for integrity in accordance with National Fire Protection Association Standard, 1221.

Total credit for Receiving and Handling Fire Alarms (Item 440)

Actual = 6.82%; Maximum = 10.00%

FIRE DEPARTMENT

Credit For Engine Companies (Item 513).

Actual = 5.66%; Maximum = 10.00%

For maximum credit in the Schedule, 3 engine companies are needed in your city.
These are calculated as follows:

3 for the Basic Fire Flow of 3000 gpm.

You have 3 engine companies in service.
These are calculated as follows:

63 percent for Engine 304 because of insufficient equipment.
Additionally Engine 304 is lacking: an adequate hose testing program, an adequate pump testing program.

46 percent for Engine 302 because of insufficient equipment.
Additionally Engine 302 is lacking: an adequate hose testing program, an adequate pump testing program.

58 percent for Engine 301 because of insufficient equipment.
Additionally Engine 301 is lacking: an adequate hose testing program, an adequate pump testing program.

Credit For Reserve Pumpers (Item 523).

Actual = 0.35%; Maximum = 1.00%

For maximum credit in the Schedule, 1 fully-equipped reserve pumper is needed. You have 0 reserve pumpers.

Credit For Pump Capacity (Item 532).

Actual = 4.95%; Maximum = 5.00%

For maximum credit in the Schedule, at least 3000 gpm in fire department pump capacity is needed.
You have 2970 gpm in creditable pump capacity.
This is calculated as follows:

2850 gpm in service and reserve	= 2850 gpm
240 gpm X 50% for other apparatus	= 120 gpm
Total	= 2970 gpm

Credit For Ladder And Service Companies (Item 549).

Actual = 1.62%; Maximum = 5.00%

For maximum credit in the Schedule, 1 ladder company is needed in your city.

This is calculated as follows:

1 ladder company due to method of operation.

You have 1 ladder company
This is calculated as follows:

32 percent for Ladder Combined equipment from Units 300, 303, 304 and 302 because of insufficient equipment, insufficient aerial device testing and insufficient aerial device length.

Credit For Reserve Ladder And Service Companies (Item 553).

Actual = 0.25%; Maximum = 1.00%

For maximum credit in the Schedule, 1 fully-equipped reserve ladder truck is needed.
You have 1 reserve ladder truck.
This is calculated as follows:

25 percent for Ladder Combined Units 303, 302 and 301 because of insufficient equipment, insufficient aerial device testing and insufficient aerial device length.

Credit For Distribution (Item 561).

Actual = 1.84%; Maximum = 4.00%

For maximum credit in the Schedule, all sections of the city with hydrant protection should be within 1½ miles of a fully-equipped engine company and 2½ miles of a fully-equipped ladder, service, engine-ladder or engine-service company. The distance to be measured along all-weather roads.

Credit For Company Personnel (Item 571).

Actual = 2.13%; Maximum = 15.00%

An increase in the average response of fire department members by one person will increase the fire department credit by 0.21.

Credit For Training (Item 581).

Actual = 0.72%; Maximum = 9.00%

For maximum credit in the Schedule, the training program should be improved. You received 8 percent credit for the current training program and the use of facilities.

For maximum credit in the Schedule, pre-fire planning inspections of each commercial, industrial, institutional and other similar-type building should be made twice a year by company members. Records of the inspections should include complete and up-to-date notes and sketches.

Total credit for Fire Department (Item 590)

Actual = 17.52%; Maximum = 50.00%

WATER SUPPLY

Credit For Supply System (Item 616).

Actual = 22.19%; Maximum = 35.00%

For maximum credit in the Schedule, the needed fire flows should be available at each location in the city. Needed fire flows of 2500 gpm and less should be available for 2 hours, 3000 and 3500 gpm for 3 hours and all others for 4 hours. See the attached table for an evaluation of fire flow tests made at representative locations in your city.

All AWWA standard hydrants within 1000 feet of a building, measured as hose can be laid by apparatus, are credited; 1000 gpm for hydrants within 300 feet; 670 gpm for 301 to 600 feet; and 250 gpm for 601 to 1000 feet. Credit is reduced when hydrants lack a pumper outlet, and is further reduced when they have only a single 2½-inch outlet.

Credit For Hydrants (Item 621).

Actual = 1.58%; Maximum = 2.00%

For maximum credit in the Schedule, all hydrants should: have a pumper outlet, have a 6-inch or larger branch connection.

Credit For Inspection and Condition of Hydrants (Item 631).

Actual = 0.47%; Maximum = 3.00%

For maximum credit in the Schedule, all hydrants should be inspected twice a year, the inspection should include operation and a test at domestic pressure. Records should be kept of the inspections. Hydrants should be conspicuous, well located for use by a pumper, and in good condition.

Total credit for Water Supply (Item 640)

Actual = 24.24%; Maximum = 40.00%

FIRE FLOW TESTS

Adel, IA

Tests witnessed on May 4, 2005

Test No.	Needed Fire Flow† gpm	Limited By Supply Works, gpm	Limited by Distribution Mains (flow tests), gpm	Limited By Hydrant Spacing, gpm
1	3500	1815	2400	
2	2000		1400	
3	3000	1815	2100	
4	2500	2132	2100	
4a	1000			
5	2500	2132	1200	
6	3000	1815	1400	1920
7	1000			
8†	4500	1503	1900	2200

†Needed fire flows exceeding 3500 gpm are not considered in Item 616 (CSS) Credit for System Supply

INSURANCE SERVICES OFFICE, INC.

HYDRANT FLOW DATA SUMMARY

City Adel
County Dallas State IA Witnessed by Insurance Services Office, Inc. Date May 4, 2005

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS			TOTAL	PRESSURE PSI STATIC	PRESSURE PSI RESID.	FLOW - AT 20 PSI $Q_R=Q_T(h_R^{0.54}/h_T^{0.54})$ NEEDED **	FLOW - AT 20 PSI AVAIL.	REMARKS***
1	Comm	N 6th & Rapids Sts.	Main	490	490		980	69	60	3500	2400	(C)-(1815 gpm)
2	Comm	Nile Kinnick Dr. & Main St.	Main	970			970	67	44	2000	1400	
3	Comm	S. Nile Kinnick Dr. & Greenwood Hills Dr.	Main	970			970	62	52	3000	2100	(C)-(1815 gpm)
4	Comm	N 11th & Court Sts.	Main	1240			1240	66	48	2500	2100	(B)-(2132 gpm)
4a	Res	N 11th & Court Sts.	Main	1240			1240	66	48	1000	2100	
5	Comm	S 14th & Green Sts.	Main	520			520	50	44	2500	1200	(B)-(2132 gpm)
6	Comm	1900 Block of Greene St.	Main	750			750	46	38	3000	1400	(A)-(1920 gpm) (C)-(1815 gpm)
7	Res	S. 14th & Ann Ave.	High	870			870	62	55	1000	2300	
8	Comm	Brickyard Rd. & Visions Pkwy	Main	750	750		1500	50	30	4500	1900	(A)-(2200 gpm) (D)-(1503 gpm)

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE *NOT* INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

***Comm = Commercial; Res = Residential.**

****Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.**

*****(A)-Limited by available hydrants to gpm shown. Available facilities limit flow to gpm shown plus consumption for the needed duration of (B)-2 hours, (C)-3 hours or (D)-4 hours.**

4 13 on 12" dead end
159 13 on 6" in Highway

INSURANCE SERVICES OFFICE, INC.

HYDRANT FLOW DATA SUMMARY

City Adel
County Dallas State IA Witnessed by Insurance Services Office, Inc. Date May 4, 2005

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS			TOTAL	PRESSURE PSI STATIC	PRESSURE PSI RESID.	FLOW - AT 20 PSI $Q_R=Q_T(h_R^{0.54}/h_T^{0.54})$ NEEDED **	FLOW - AT 20 PSI AVAIL.	REMARKS***
1	Comm	N 6th & Rapids Sts.	Main	490	490		980	69	60	3500	2400	(C)-(1815 gpm)
2	Comm	Nile Kinnick Dr. & Main St.	Main	970			970	67	44	2000	1400	
3	Comm	Highway ? S. Nile Kinnick Dr. & Greenwood Hills Dr.	Main	970			970	62	52	3000	2100	(C)-(1815 gpm)
4	Comm	N 11th & Court Sts.	Main	1240			1240	66	48	2500	2100	(B)-(2132 gpm)
4a	Res	N 11th & Court Sts.	Main	1240			1240	66	48	1000	2100	
5	Comm	S 14th & Green Sts.	Main	520			520	50	44	2500	1200	(B)-(2132 gpm)
6 *	Comm	1900 Block of Greene St.	Main	750			750	46	38	3000	1400	(A)-(1920 gpm) (C)-(1815 gpm)
7	Res	S. 14th & Ann Ave.	High	870			870	62	55	1000	2300	
8	Comm	Brickyard Rd. & Visions Pkwy	Main	750	750		1500	50	30	4500	1900	(A)-(2200 gpm) (D)-(1503 gpm)

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE *NOT* INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

*Comm = Commercial; Res = Residential.

**Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.

***(A)-Limited by available hydrants to gpm shown. Available facilities limit flow to gpm shown plus consumption for the needed duration of (B)-2 hours, (C)-3 hours or (D)-4 hours.

APPENDIX G

Water Treatment Plant Equipment Information

INSTRUCTIONS

This instruction folder has been prepared for your convenience, to assist you in the installation of your General Filter Company equipment.

Carefully study these instructions, and any instructions or information attached to the equipment or supplied with it, before beginning erection of the equipment. Refer to accompanying prints and bill of material for parts identification and location.

If any details are not clearly understood, consult General Filter Company for additional information before commencing erection. Be sure to refer to General Filter Company order number as shown below in any correspondence.

Retain this folder and any other information pertinent to the equipment for future reference.

INSTRUCTIONS FOR:

EQUIPMENT: INDUCED DRAFT AERATOR

LOCATION: ADEL, IOWA

GFC NO. N70-54 **PURCHASER NO.** Contract 701003

IMPORTANT !

General Filter Company assumes no responsibility for work done, apparatus furnished, or repairs made by others. Purchaser shall notify General Filter Company of seemingly extraordinary difficulties in the erection of the equipment prior to any remedial action by purchaser or others. Allowance will not be made for repairs, alterations, or additional work of any kind made or ordered by purchaser or others without prior written authorization from General Filter Company.

Equipment furnished but not manufactured by General Filter Company is offered subject to the manufacturer's warranty only, but not to exceed one year.

In case of loss or damage of equipment enroute, consignee must notify the carrier's agent at destination, in writing, in order to substantiate formal claim when presented. An unqualified receipt given the carrier will constitute a waiver of claim for damage in transit unless the equipment is unpacked and carefully examined promptly on delivery and any damage or shortages reported to and noted by carrier and any shortages reported to General Filter Company.

GENERAL FILTER Company
WATER PROCESS EQUIPMENT

FORM 5931-1 P. O. BOX 350, AMES, IOWA PHONE 515-232-4121

GENERAL FILTER COMPANY

PERTINENT DATA ON WATER TREATMENT PLANT

I. Customer's Name: Boone Construction Company

Installation Location: Adel, Iowa

Customer's Order No.: 701003 Date: 1-5-70

General Filter Co. Production No.: N70-54

II. Equipment Furnished:

One - 630 GPM Aluminum Induced Draft Aerator size 6'-0" sq. x 10'-0" high, with one removable side

INSTRUCTIONS

FOR

INSTALLING AND OPERATING

INDUCED DRAFT AERATORS

GENERAL

The instructions and drawings mentioned herein should be studied carefully before beginning erection of the equipment. If any questions arise or there are any apparent discrepancies in this information, the matter should be called to the attention of the General Filter Company.

Before commencing erection the material should be checked with packing lists and Bills of Material for the project to make sure that everything that will be required is on hand. Any shortages or damages in transit should be brought to the immediate attention of General Filter Company.

It is assumed that all necessary foundations have been provided by others to suit the equipment design, local soil bearing values and layout of the plant. Also, all cast in anchor bolts have been set.

GENERAL FILTER COMPANY
AMES, IOWA

GENERAL FILTER COMPANY AR-1

PERTINENT DATA ON AERATION EQUIPMENT

Aerator - Drawing No. B-16863-F1

1. Type: Aluminum, Induced Draft
2. Capacity: 630 GPM
3. Size: 6'-0" square x 10'-0" high of 3/16" aluminum
4. Inlet Pipe Size: 8" flanged
5. Outlet Pipe Size: 10" flanged
6. Remarks: Aluminum internals

Blower: A-13789-F

1. Make and Model: GFC 10-204
2. Capacity: 2200 CFM @ 3/8" SP
3. Motor: 1/2 hp, 220 volts, 3 ph, 60 cy.
4. Type Motor: Electro TENV frame #66, 1750 GPM
5. Electrical Control: Motor Starter NOT by GFC

Atomerator Assembly - Drawing No. _____

1. Size Atomerator: _____
2. Capacity: _____
3. Size Condensate Trap: _____
4. Remarks: _____

Air Compressor and Air Volume Control Assembly - Dwg. No. _____

1. Air Compressor: Make: _____ Model: _____
2. Motor: _____ hp, _____ volts, _____ ph, _____ cy.
3. Compressor Electrical Control: _____
4. Pressure Tank: _____
5. Air Volume Control: _____
6. Remarks: _____

GENERAL FILTER COMPANY

PERTINENT DATA ON WATER SOFTENING PLANT

Softener Tank Specifications: Drawing D-18270-F

1. Number of Tanks Two
2. Nominal Diameter 84 inches. Shell Height 96 inches.
3. Type of Underdrain GFC "Multiplate"
4. Working Pressure 100 psi. Test Pressure 150 psi.
5. Size of Connections 3" screwed brine connection
4" flanged top and bottom head
6. Type of Supports Adjustable jack legs Number 4 per tank
7. Remarks Non-code, 5/8" heads, 7/16" shell

Performance:

1. Softening Rate per Unit	263	GPM
2. Number of Softening Units	Two	
3. Capacity Softened Water per Unit	162,000	Gal.
4. Salt Required per Regeneration	972	Lbs.
5. Gallons of Brine required per Regeneration per Unit	390	
6. Backwash Rate	194	GPM
7. Rinse Rate	47	GPM
8. Softening Mineral: 162 cu. ft. of	#HCR	per unit
9. Exchange Capacity per Unit	3240	KG

Air Release Assembly: Drawing #A-3029-F

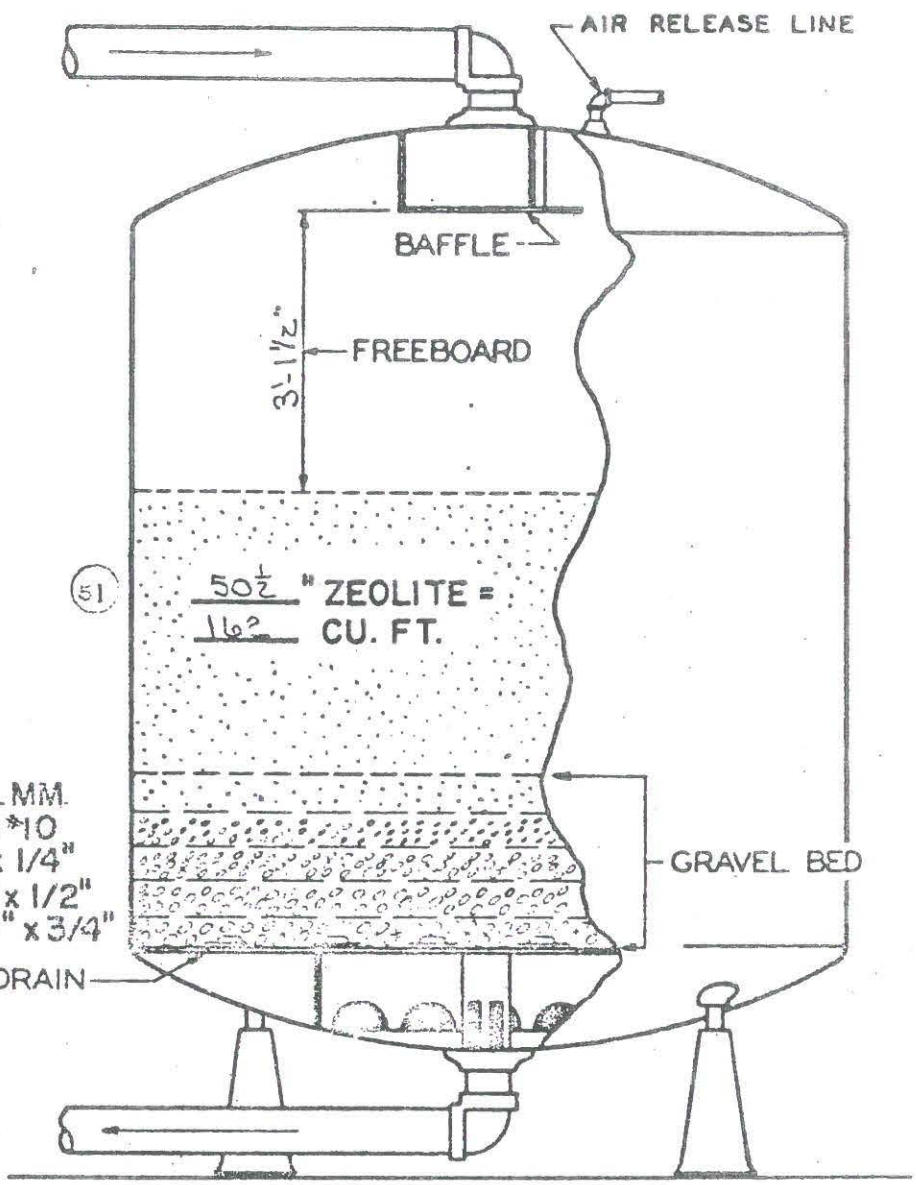
1. Type of Air Release Valve: VAPCO #65 with Ball Check
2. Size Piping: 3/4" screwed
3. Connecting Points: Top head and side shell
4. Remarks: PV & F not by GFC.

VERTICAL SOFTENER TANK

84 " DIAMETER

96 " SIDE SHELL HEIGHT

100 P.S.I. W.P.



3 " FILTER SAND, SIZE 0.8 TO 1.2 MM.
3 " GRADED GRAVEL, SIZE 1/4" x #10
3 " GRADED GRAVEL, SIZE 1/2" x 1/4"
3 " GRADED GRAVEL, SIZE 3/4" x 1/2"
5 " GRADED GRAVEL, SIZE 1 1/2" x 3/4"

ZEOLITE TO BE SHIPPED IN 5 CU. FT. DRUMS, SUPPORTING GRAVEL TO BE SHIPPED BAGGED

STANDARD SOFTENER

UNDERDRAIN:-
RIGIDLY SUPPORTED PLATE OVER 100 % FILTER AREA WITH STAINLESS STEEL BAFFLE ASSEMBLIES.

ZEOLITE:- 16² CUBIC FEET.

SUPPORTING GRAVEL:- 15 "GRADED.

ZEOLITE & SUPPORTING GRAVEL FOR TWO SOFTENERS REQ'D

STAINLESS STEEL BAFFLE ASSEMBLY

ADEL, IOWA
N73-493
8-15-73 RM

GENERAL FILTER COMPANY
AMES, IOWA

NO. A 996-2F

SALT SPECIFICATIONS

For the regeneration of Zeolite Water Softeners, the salt should conform to the following specifications:

(1) Kind: Rock Salt

(2) Color: White or grayish white

(3) Composition:

(a) Not less than 98% sodium chloride with a minimum of calcium and magnesium salts.

(b) Phenolphthalein alkalinity zero.

(c) No grease fat or oil content.

(4) Size: Approximately 1/8"

(5) Solubility: The salt should dissolve rapidly without packing, forming a clear solution.

Notes: Evaporated or granulated salts will not provide best operation because of compacting and resultant restriction of brine draw or channeling through the salt bed and allowing unsaturated brine to enter softener.

GENERAL FILTER COMPANY

OPERATION INSTRUCTIONS (Continued)

TO DETERMINE BYPASS RATE

$$\frac{\text{Hardness of finished water}}{\text{Total hardness of water supply}} \times \frac{\text{Plant Flow Rate}}{1}$$

Typical Problem

GIVEN: Hardness of finished water = 5
Hardness of raw water = 20
Flow rate of plant = 125 gpm

$$\frac{5}{20} \times \frac{125}{1} = \frac{625}{20}$$

Total Bypass Rate

$$20\overline{)625}\quad 31$$

TO DETERMINE TOTAL BYPASS WATER PER REGENERATION

$$\frac{\text{Softener G.P.M.}}{\text{Bypass G.P.M.}} = A$$

$$\frac{\text{Softener Cap. Zero Water}}{A} = \text{Total Bypass Water}$$

Typical Problem

GIVEN: Softening Rate = 94 GPM
Bypass Rate = 31 GPM
Softener Cap. = 62,000 gallons

$$\frac{94}{31} = 3.02$$

$$\frac{62,000}{3.02} = 20,500$$

Total Bypass Water

Total 5 grain water from plant per regeneration of both softeners

= 20,500 + 62,000
= 82,500 gallons

GENERAL FILTER COMPANY

OPERATION INSTRUCTIONS (Continued)

Maintenance:

1. Automatic control system will perform satisfactorily with proper care. Keeping all parts of the system clean and free from brine, dirt and all other foreign materials will aid the life of the equipment.

2. All parts within the control cabinet do not require frequent oiling or other routine servicing. If special service of this equipment is required, contact General Filter Company.

3. Blow down air filter in control line by opening the valve under the filter weekly. Blow down air receiver daily as required.

4. Service all other equipment in accordance with the manufacturer's instructions.

NOTE: To figure capacity of softener, divide 3,240,000 by 20 the hardness in grains per gallon of raw water. Set the meter at this capacity (162,000).

SOFTENER SPECIFICATION

RAW WATER		TREATED WATER
20	- Total Hardness (Grains per gallon)	5
Total gallons of zero soft water between regenerations, plant		324,000
Total gallons of bypass water between regenerations		107,178
Total gallons of 5 grain water per regeneration		431,178
Pounds of salt per regeneration, (per unit)		972
Gal. of brine per regeneration, (per unit)		390

REPORT AND CALCULATIONS

OF SALT AND BRINE USE

FOR PROPOSED 700 GPM

ZEOLITE WATER TREATMENT

PLANT AT ADEL, IOWA

November 3, 1971

SUBJECT: From well water analysis through estimated salt cost.

Well Water Analysis = 94.4 ppm Ca++ 30 ppm Mg++

Element or Compound	ppm present	Atomic Wt.	Eq. Wt.	Molecular Wt.	meq/l present	grains/gal. present
Ca++	94.4	40.1	20.05		4.60	
Mg++	30	24.3	12.15		2.47	
Equivalent $CaCO_3$	353		50	100	7.07	20.6
Na^+		23.0	23.0			
Cl^-		35.5	35.5			
NaCl			58.5	58.5		

1 million gallons weighs 8.34×10^6 lbs.

and contains 94.4 ppm x 8.34 lbs. = 786 lbs. Ca = 38.3 lb. eq.

and 30 ppm x 8.34 lbs. = 250 lbs. Mg = 20.6 lb. eq.

TOTAL = 58.9 lb. eq.

At this level of hardness regenerate 4 times daily (twice each filter) for 1 MGD.

Use 972 lbs/regeneration x 4 = 3900 lbs. salt/day with 1/4 bypass when treating 1 MGD.

Theoretically = need 1 eq. NaCl/eq. removed
or 58.9 lb. eq. x 58.5 NaCl/lb.eq. x 3/4 = 3440

Actual efficiency of regeneration = $\frac{3900 \times 1/58.5}{58.9 \times 4/5} = \frac{1.41 \text{ eq.salt}}{\text{eq.hardness removed}}$

Crystal salt volume/day = $\frac{3900}{1.5 \text{ S.G.} \times 62.4} = 41.7 \text{ ft}^3$
for 1 MGD

Brine volume/day = $\frac{3900}{2.987 \frac{\text{lbs.salt}}{\text{gal.}} \times \frac{7.48 \text{ gal.}}{\text{ft}^3}} = 175 \text{ ft}^3$
for 1 MGD

Salt cost = 3900 lbs. x \$20/2000 lb. = \$39.00
for 1 MG

Prepared by: Sheldon Kelman
Dr. Sheldon Kelman
P.E. No. 6016

Legend

Ca^{++} = Calcium ions
Mg^{++} = Magnesium ions
Na^{+} = Sodium ions
Cl^{-} = Chloride ions
NaCl = Salt
Equivalent $CaCO_3$ = the sum of the Ca^{++} and Mg^{++} ions (which is the hardness) expressed in terms of Calcium Carbonate ($CaCO_3$)

REPORT ON BRINE WASTE

FROM 700 GPM ZEOLITE

WATER TREATMENT PLANT

AT ADEL, IOWA

SUBJECT: Calculations

I. Determine wt. of solids in brine waste

$$\text{NaCl in} = \frac{(972)}{(58.5)} \quad \frac{(454)\ \text{gm eq.}}{}$$

$$= 7550 \text{ gm eq. NaCl}$$

Ca & Mg out

$$\text{capacity} = 20000 \text{ grains/ft}^3 \text{ as } CaCO_3$$

$$= \frac{(20000)}{} \quad \frac{(162)}{} \quad \frac{1 \text{ gm}}{15.43} \quad \frac{1 \text{ gm eq.}}{50 \text{ gms}}$$

$$= 4200 \text{ gm eq. of Mg \& Ca}$$

$$\% \text{ Mg} = \frac{124}{340} \times 100 = 36.5\%$$ from LS Co. anal 9-4-69

In brine waste

Ca^{++} = (1-.365) (4200) (20)	=	53,300 gms
Mg^{++} = (.365) (4200) (12.15)		15,300 gms
Na^{+} = (7550-4200) (23)		77,200 gms
Cl^{-} = (7550) (35.5)	=	269,000 gms
Est. TDS_D	=	414,800 gms

II. Estimate volume of Brine and Rinse water carrying these solids. If brine is saturated, volume required is:

$$\text{gal.} = \frac{972}{363.8} \quad \frac{\text{gal.}}{3.785} \quad \frac{454}{}$$

$$= 321 \text{ gal.}$$

The initial rinse water will also carry a substantial portion of the solids. Estimate effective rinse water = 80 gallons.

III. Solids Concentration of brine waste.

$$TDS_{Br} = \frac{414{,}800 \text{ gms}}{400 \text{ gal.}} \quad \frac{\text{gal.}}{3.785 \text{ l}}$$

$$= 273 \text{ gms/l}$$

IV. Flow rate - use 35 gpm
Brine

$$= \frac{35 \text{ gpm}}{448.8} \quad \text{cfs}$$

$$= .07799 \text{ cfs}$$

V. Stream Low Flows

Location	D.A.-mi^2	Q_{10} 7 da 10 yr	Q/DA	Stream	Record length
VanMeter	3441	31	.0090	Racoon	51 yrs.
Redfield	988	25	.0253	S. Racoon	26 yrs.
Jefferson	1619	12	.0074	N. Racoon	26 yrs.
Sac City	713			N. Racoon	8 yrs.
Adel	2280			N. Racoon	
Perry	2169	16	.0074	N. Racoon	Calculated

Est. Q_{10} @ Adel = (2280) (.0074) = 17.1 cfs

VII. Solids Concentration with brine waste mixed with stream at 7 day - 10 year low flow.

$$TDS_{St} = \frac{273{,}000 \text{ mg}}{1} \quad \frac{(.07799 \text{ cfs})}{(17.1 \text{ cfs})}$$

$$= 1245 \text{ mg/l}$$

Prepared by: David W. Hubly
David W. Hubly

Legend

Ca++ = Calcium ions
Mg++ = Magnesium ions
Na+ = Sodium ions
Cl- = Chloride ions
NaCl = Salt
Equivalent $CaCO_3$ = the sum of the Ca++ and Mg++ ions (which is the hardness) expressed in terms of Calcium Carbonate ($CaCO_3$)

GENERAL FILTER COMPANY

PERTINENT DATA ON FILTRATION EQUIPMENT

Performance:

1. Number of Filter Units: One - 6 cell
2. Type of Filters: Horizontal Pressure "Multicell"
3. Filtering Area: 272 sq. ft.
4. Filtering Rate: 2.59 gals/min./sq. ft. = 700 gpm
5. Backwash Rate: 15 gals/min./sq. ft. = 680 gpm
6. Backwash Water Source: 5 in-service cells

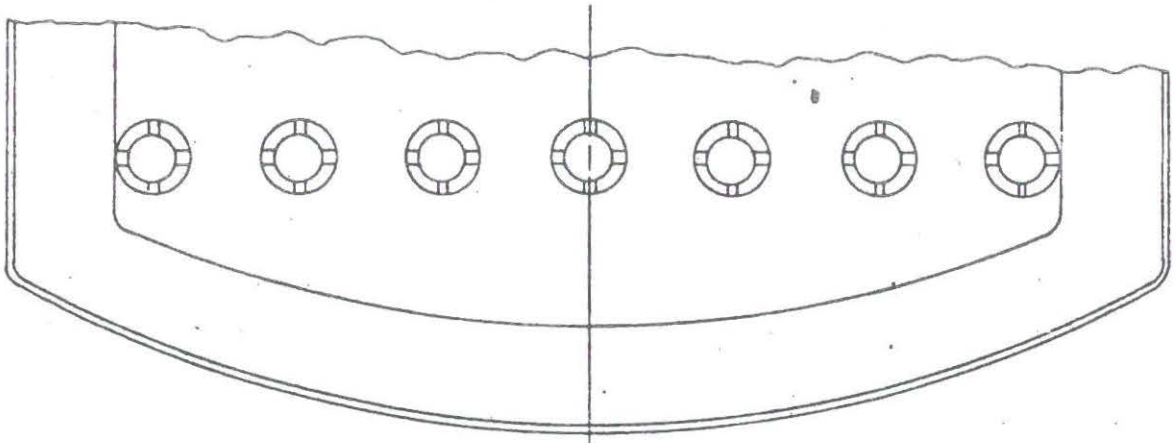
Filter Specifications: Drawing No. D-18270-F

1. Number of Tanks: One
2. Size: 8'-0" dia. x 36'-0" O.E., Non-code, 5/8" heads, 7/16" shell
3. Filter Media: Filter sand, size 0.5 to 0.6 mm unif. coeff. 1.60
4. Type of Underdrain: GFC "Multiplate"
5. Working Pressure: 100 psi Test Pressure: 150
6. Filter Media Bed Depth: 24 inches
7. Gravel Supporting Bed Depth: 16 inches
8. Size of Connections: 6 - 6" flanged inlets, one - 8" flanged effluent, one - 4" flanged drai
9. Type of Supports: Skids Number: Two
10. Remarks: Threaded and plugged thickness check holes provided

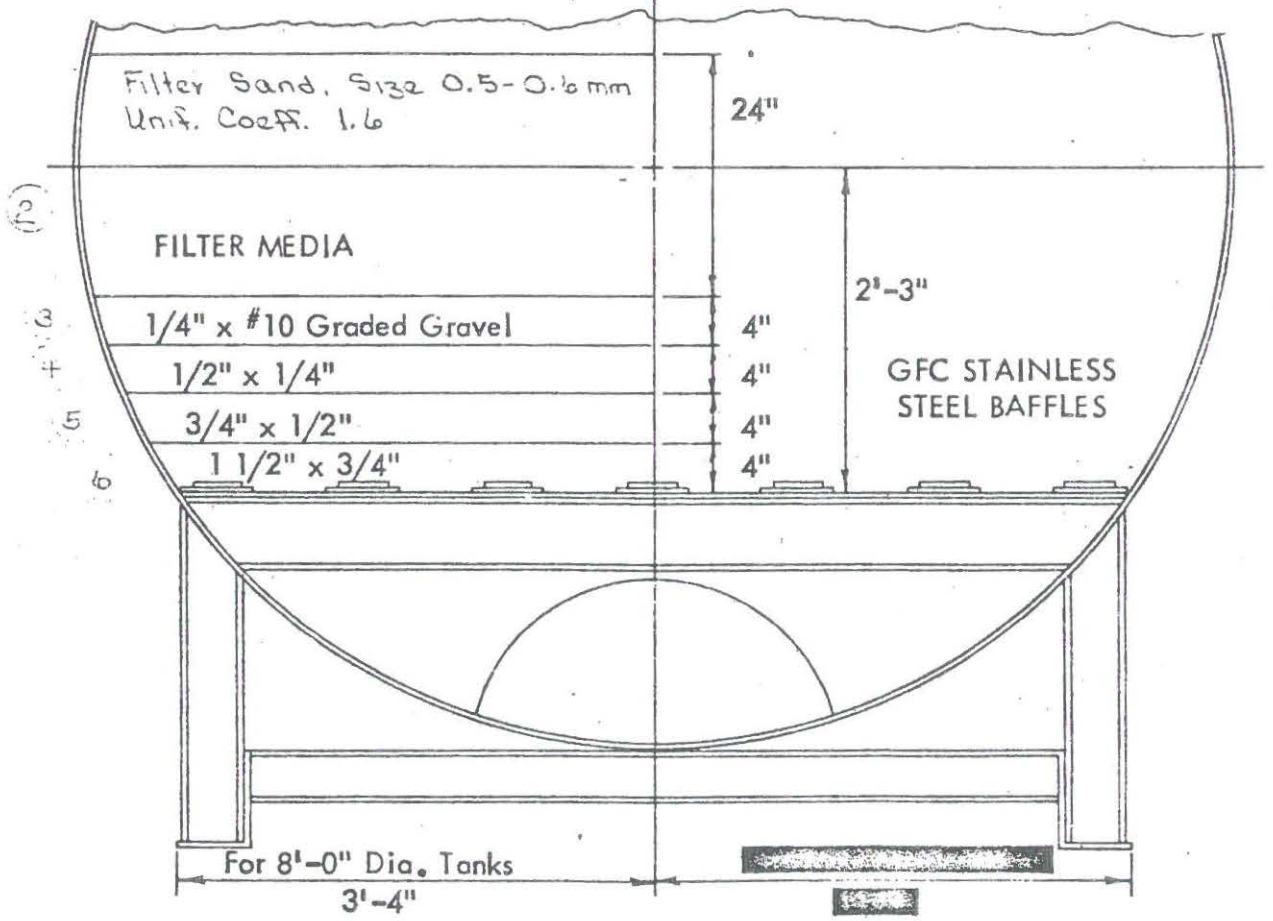
Air Release Assembly: Drawing No. A-17129-F

1. Type Air Release Valve: VAPCO #65 exhaust port drilled 1/4"
2. Size Piping: 1/2" not by GFC
3. Connection Points: Top of each cell and in end head
4. Remarks: Valve only by GFC

MULTIPLATE UNDERDRAIN
FOR
HORIZONTAL FILTER



Filter Media & Supporting Gravel To Be Shipped Bagged For Field Installation Media For One Filter Req'd.



Adel, Iowa
N73-443
8-14-73 Rm

GENERAL FILTER Company
AMES IOWA

A-17341F

GENERAL FILTER COMPANY

Filter Operation (Continued)

IV. What is the proper procedure for backwashing filter?

1. The source of backwash water is fromthe in-service cells.

2. Each cell is to be backwashed individually.

3. For description of control operation see dwg. D-18280-F.

4. On the initial backwashing of the filter the backwash rate set valve must be closed and manually opened slowly after first cell backwash waste valve is opened. Adjust the rate set valve until the backwash rate of flow indicator reaches the red hand set at 16 ft. for a rate of 680 gpm.

APPENDIX H

Xenia Water Proposal (February 10, 2007)

BARTLETT WEST
ENGINEERS
SERVICE. THE BARTLETT & WEST WAY.

FEB 10 2007

February 7, 2007

Shawn Foutch, P.E.
Kirkham Michael Consulting Engineers
11021 Aurora Ave.
Des Moines, IA 50322

Re: Xenia RWD potential supply to Adel
Project No.: 4011.280

Dear Shawn:

As a follow-up to our phone conference in January, we have been working with Xenia Rural Water District to analyze the various possibilities for a water supply agreement between the District and the City of Adel. You had asked the District to look at supplying wholesale water at various demand levels, and also at the potential of an emergency standby connection only. The District also took the initiative to provide an estimate for service to the City's patrons through a franchise agreement.

Using the growth projections that you provided, we looked at four scenarios ranging from 10% to 100% of the projected 2060 peak day demands. This equates to 23% to 234% of projected 2007 peak day demands. The corresponding peak day volumes and cost are illustrated in the attachments to this letter. As an illustration of the cost, a supply of 900,000 gallons per day would meet 117% of the projected 2007 peak day demands and 50% of the projected 2060 peak day demands. Xenia would charge a monthly flat fee of $14,220, which represents an allocated portion of debt service to cover the capacity in the treatment and transmission line facilities. The delivery of this water would be on a constant-rate basis. In addition to the monthly minimum cost, water would be sold to the City at $1.06 per 1,000 gallons. The monthly debt service allocation varies proportionally to the requested peak day volume, while the water rate would remain constant for all scenarios.

For a standby connection, no volume would be guaranteed. Excess water would be sold at $1.78 per 1,000 gallons. Adel could either pay for 100% of the connection and meter cost or could pay a modest monthly flat fee of $141, which represents the amortized cost of the connection and meter.

An alternative to wholesale purchase is a franchise agreement in which Xenia RWD would assume ownership of Adel's entire water supply system. All citizens of Adel would then become customers of Xenia. The particulars of this proposed arrangement are discussed in further detail on the attached summary sheet. Based on preliminary calculations, the rate charged to the average residential customer would decrease approximately 30%. Obviously this potential arrangement is complex and would merit further discussion between the entities.

1200 SW EXECUTIVE DRIVE ■ TOPEKA KS 66615-3850
785.272.2252 ■ FAX 785.272.7349 ■ 888.200.6464
WWW.BARTWEST.COM

Xenia RWD appreciates the opportunity to address these possible arrangements with Adel. We look forward to continued discussions. Please call Dan Miller or me if you have any questions.

Sincerely,

Louis P. Funk

Louis P. Funk, P.E.

cc: Dan Miller, Xenia RWD
Brian Hoellein, Bartlett & West

Enclosure

XENIA RURAL WATER DISTRICT
PROPOSED COST FOR WHOLESALE SERVICE TO CITY OF ADEL
FROM NEW WTP NORTH OF VAN METER
JANUARY 22, 2007

SUMMARY OF COST BASED ON VARYING DEMANDS

Scenario #	1	2	3	4	Standby Only
Maximum Contract Volume, gal.	180,000	450,000	899,000	1,799,000	0
% of 2007 Peak Day	23%	59%	117%	234%	0%
% of 2030 Peak Day	16%	41%	81%	162%	0%
% of 2060 Peak Day	10%	25%	50%	100%	0%
Debt Service Cost/Month	$ 2,960	$ 7,187	$ 14,220	$ 28,312	$ 141
Water Rate/1,000 gal.	$ 1.06	$ 1.06	$ 1.06	$ 1.06	$ 1.78

Xenia Rural Water District
Water Proposal
To The City of Adel

1. Xenia Rural Water District (Xenia) is a governmental entity organized pursuant to Iowa Code Chapter 357A to provide water and sewer services. Xenia has the statutory authority to operate a city water franchise pursuant to Iowa Code section 357A.23.

2. Xenia proposes that the City of Adel (the City) would hold a franchise election to approve the granting of a 40-year water franchise to Xenia pursuant to Iowa Code sections 357A.23 and 364.2(4).
    A. Upon the approval of the franchise, property owners, within the City of Adel, receiving water service, would become Participating Members of Xenia Rural Water District with full voting rights.
3. Xenia would then operate the City's water distribution system and would supply water to the City from Xenia's system.
    A. Xenia would be responsible for taking the existing City water plant out of service, however the building would remain the responsibility of the city.

4. Xenia's water rates for the citizens of Adel would be based on the cost of services with any future rate change to be preceded by a notice to the Adel City Council showing the breakdown of the cost of services.

5. The Adel City Council would have the opportunity to review and comment on improvements to the water distribution system.

6. The Adel City Council would receive quarterly reports from Xenia showing the status of the water distribution system, including the number of new meters, the average residential, commercial and government usage, the status of projects, as well as other material information important to the City Council.

7. Adel would have the opportunity to purchase the water distribution system at the price of the outstanding debt if Xenia's franchise was not renewed after 40 years.

XENIA RURAL WATER DISCTRICT
PROPOSED WATER RATES
FOR THE CITY OF ADEL

	Existing Adel rates	Rates proposed by Xenia
User Fee/Minimum	$ 12.14	$ 10.00
Base Rate ($/1000-gal)	$ -	$ -
1st Break (gal)	2,000	2,000
1st Rate ($/1000-gal)	$ 6.07	$ 3.25
2nd Break (gal)	5,000	25,000
2nd Rate ($/1000-gal)	$ 4.10	$ 3.00
3rd Break (gal)	20,000	50,000
3rd Rate ($/1000-gal)	$ 3.32	$ 2.75
Consumption *(gal)*		
1,000	$ 12.14	$ 10.00
2,000	$ 12.14	$ 10.00
3,000	$ 18.21	$ 13.25
4,000	$ 24.28	$ 16.50
5,000	$ 30.35	$ 19.75
6,000	$ 34.45	$ 23.00
7,000	$ 38.55	$ 26.25
8,000	$ 42.65	$ 29.50
9,000	$ 46.75	$ 32.75
10,000	$ 50.85	$ 36.00
11,000	$ 54.95	$ 39.25
12,000	$ 59.05	$ 42.50
13,000	$ 63.15	$ 45.75
14,000	$ 67.25	$ 49.00
15,000	$ 71.35	$ 52.25
16,000	$ 75.45	$ 55.50
17,000	$ 79.55	$ 58.75
18,000	$ 83.65	$ 62.00
19,000	$ 87.75	$ 65.25
20,000	$ 91.85	$ 68.50
25,000	$ 108.45	$ 84.75
30,000	$ 125.05	$ 99.75
35,000	$ 141.65	$ 114.75
40,000	$ 158.25	$ 129.75
45,000	$ 174.85	$ 144.75
50,000	$ 191.45	$ 159.75
55,000	$ 208.05	$ 173.50
60,000	$ 224.65	$ 187.25
65,000	$ 241.25	$ 201.00
70,000	$ 257.85	$ 214.75
75,000	$ 274.45	$ 228.50
80,000	$ 291.05	$ 242.25
85,000	$ 307.65	$ 256.00
90,000	$ 324.25	$ 269.75
95,000	$ 340.85	$ 283.50
100,000	$ 357.45	$ 297.25

APPENDIX I

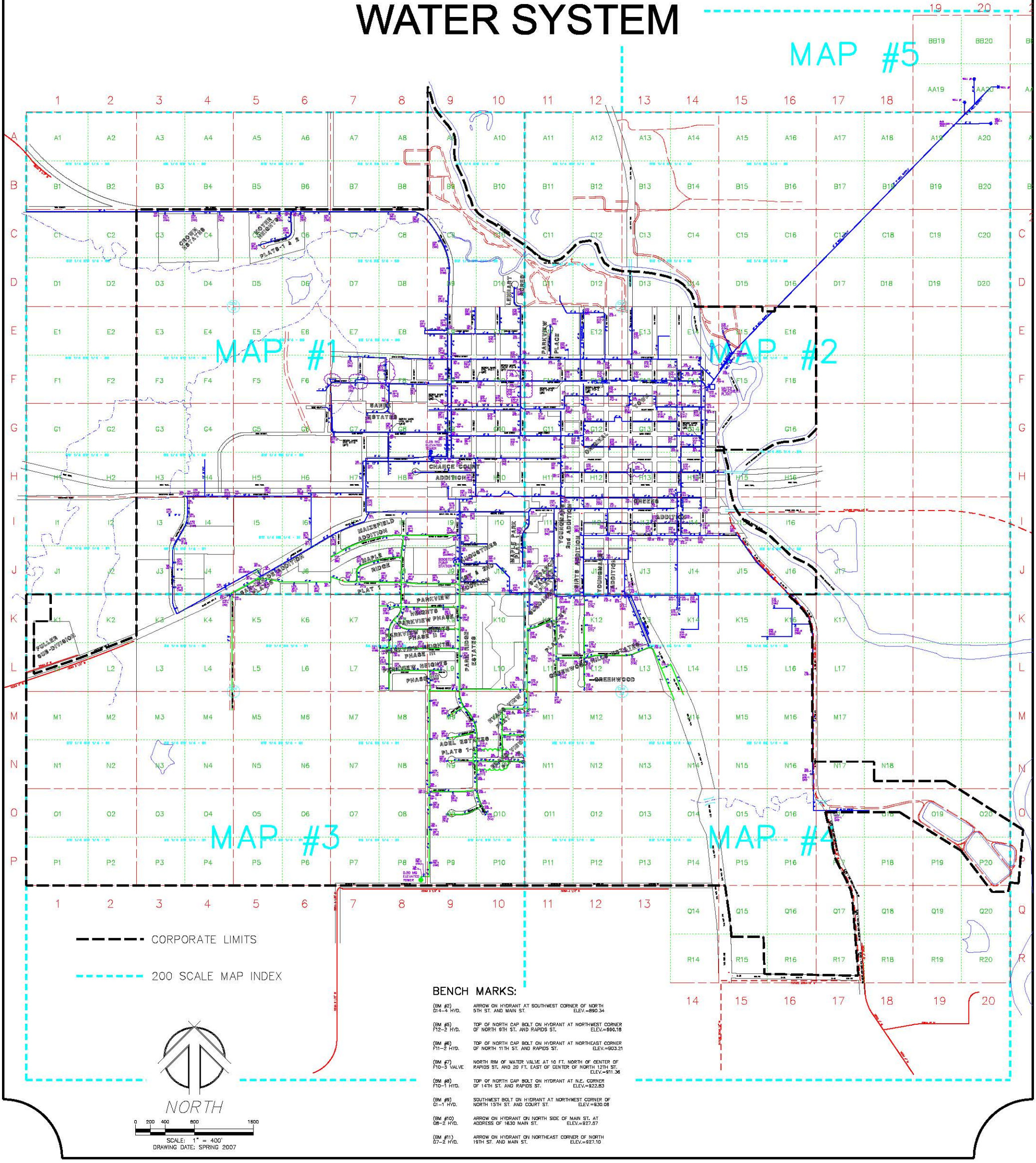
Infrastructure Map Updates

KIRKHAM MICHAEL
11021 AURORA AVENUE, DES MOINES, IOWA 50322
VOICE (515) 270-0848 FAX (515) 270-1067

CITY OF ADEL, IOWA
WATER SYSTEM

CAUTION:

UTILITY LOCATIONS SHOWN HAVE BEEN PLOTTED FROM EXISTING MAPS AND RECORD DRAWINGS AND ARE APPROXIMATE IN NATURE. ACTUAL LOCATIONS SHOULD BE FIELD LOCATED PRIOR TO CONSTRUCTION.



BENCH MARKS:

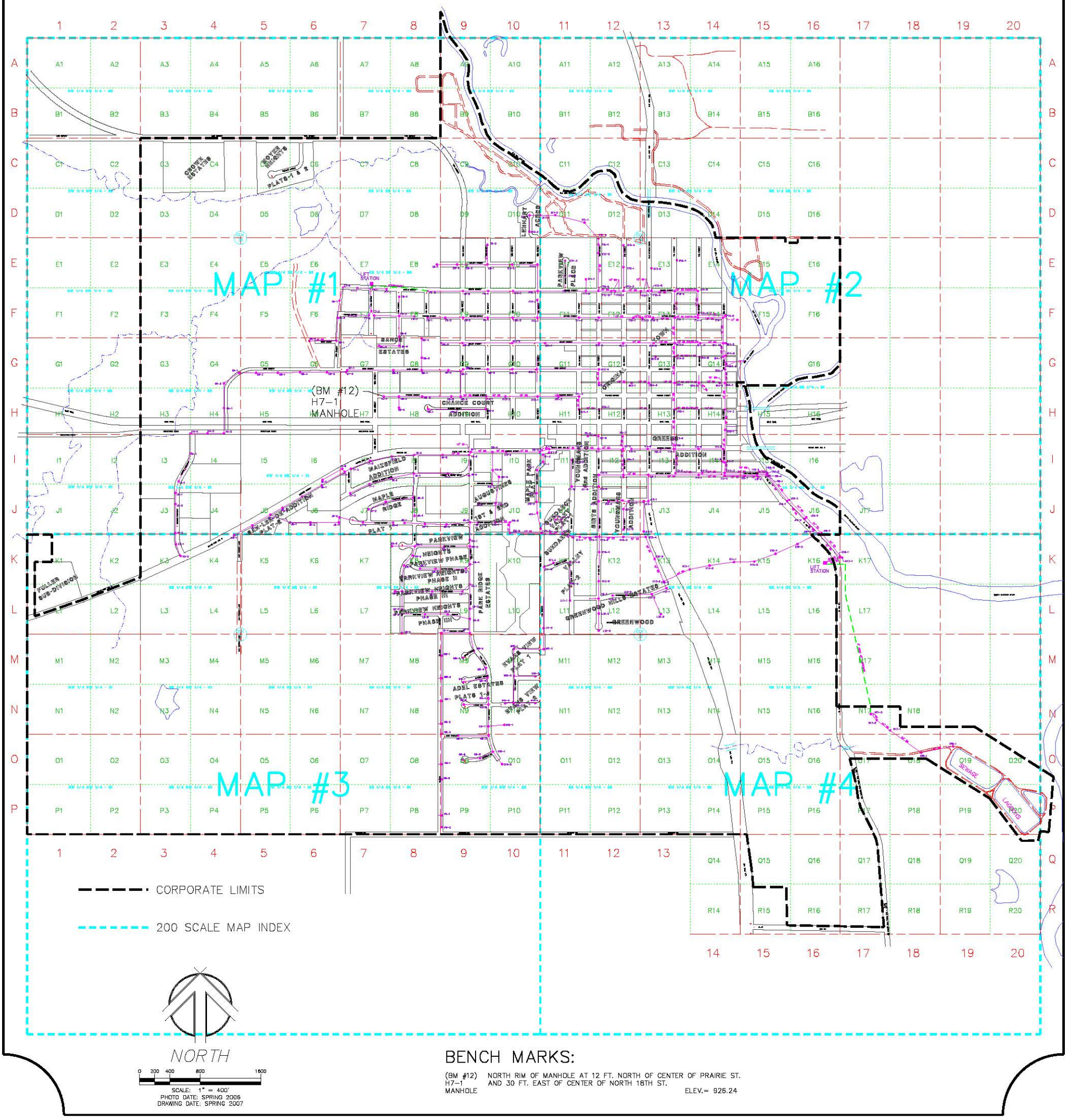
(BM #2) G14-4 HYD.	ARROW ON HYDRANT AT SOUTHWEST CORNER OF NORTH 5TH ST. AND MAIN ST.	ELEV.=890.34
(BM #5) F12-2 HYD.	TOP OF NORTH CAP BOLT ON HYDRANT AT NORTHWEST CORNER OF NORTH 9TH ST. AND RAPIDS ST.	ELEV.=890.18
(BM #6) F11-2 HYD.	TOP OF NORTH CAP BOLT ON HYDRANT AT NORTHEAST CORNER OF NORTH 11TH ST. AND RAPIDS ST.	ELEV.=903.21
(BM #7) F10-3 VALVE	NORTH RIM OF WATER VALVE AT 10 FT. NORTH OF CENTER OF RAPIDS ST. AND 20 FT. EAST OF CENTER OF NORTH 12TH ST.	ELEV.=911.36
(BM #8) F10-1 HYD.	TOP OF NORTH CAP BOLT ON HYDRANT AT N.E. CORNER OF 14TH ST. AND RAPIDS ST.	ELEV.=922.83
(BM #9) G1-1 HYD.	SOUTHWEST BOLT ON HYDRANT AT NORTHWEST CORNER OF NORTH 15TH ST. AND COURT ST.	ELEV.=930.08
(BM #10) G8-2 HYD.	ARROW ON HYDRANT ON NORTH SIDE OF MAIN ST. AT ADDRESS OF 1630 MAIN ST.	ELEV.=927.57
(BM #11) G7-2 HYD.	ARROW ON HYDRANT ON NORTHEAST CORNER OF NORTH 19TH ST. AND MAIN ST.	ELEV.=927.10

KIRKHAM MICHAEL
11021 AURORA AVENUE, DES MOINES, IOWA 50322
VOICE (515) 270-0848 FAX (515) 270-1067

CAUTION:

UTILITY LOCATIONS SHOWN HAVE BEEN PLOTTED FROM EXISTING MAPS AND RECORD DRAWINGS AND ARE APPROXIMATE IN NATURE. ACTUAL LOCATIONS SHOULD BE FIELD LOCATED PRIOR TO CONSTRUCTION.

CITY OF ADEL, IOWA
SANITARY SEWER SYSTEM



BENCH MARKS:

(BM #12) H7-1 MANHOLE — NORTH RIM OF MANHOLE AT 12 FT. NORTH OF CENTER OF PRAIRIE ST. AND 30 FT. EAST OF CENTER OF NORTH 18TH ST. ELEV.= 926.24

KIRKHAM MICHAEL
11021 AURORA AVENUE, DES MOINES, IOWA 50322
VOICE (515) 270-0848 FAX (515) 270-1067

CAUTION:

UTILITY LOCATIONS SHOWN HAVE BEEN PLOTTED FROM EXISTING MAPS AND RECORD DRAWINGS AND ARE APPROXIMATE IN NATURE. ACTUAL LOCATIONS SHOULD BE FIELD LOCATED PRIOR TO CONSTRUCTION.

CITY OF ADEL, IOWA
STORM SEWER SYSTEM