



Water System Improvement Project

Submitted March 2011





Chapter Award Nomination Information Form

Please Print or Type
Award Information

Award Category: Environment - \$25 million to \$75 million

Nominee: City of Rockford, Illinois
(as printed on plaque)

Title of Project: Water System Improvement Project
(If Applicable)

Project Participants (If Applicable)

Managing Agency: City of Rockford, Illinois

Engineer: McMahon Associates, Inc./MWH/Strand Associates, Inc.

Contractor: Various

150 Word Summary of Award

Application Highlights: _____
(attach additional sheets as needed)

The City of Rockford has successfully implemented a \$75 million Water System Improvement Plan to improve the quality and reliability of water services to its more than 150,000 residents. The key goals of the project, improved water quality, higher and more consistent service pressures, fewer unplanned outages, and overall improvement in the appearance of facilities, have been achieved through the efforts of City staff, a lead team of consulting engineers, and a number of supporting engineers, contractors, and equipment vendors. Highlights of the project include the construction of ten new water treatment facilities, replacement or rehabilitation of nineteen pumping facilities, construction of nine miles of water distribution main, creation of two new pressure zones, and a systemwide SCADA system upgrade. A strong project management structure, together with low interest loan funding from the Illinois EPA, has enabled the City to meet interim milestones and drive the project toward successful completion.

Contact Information (nominating individual)

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Project Description

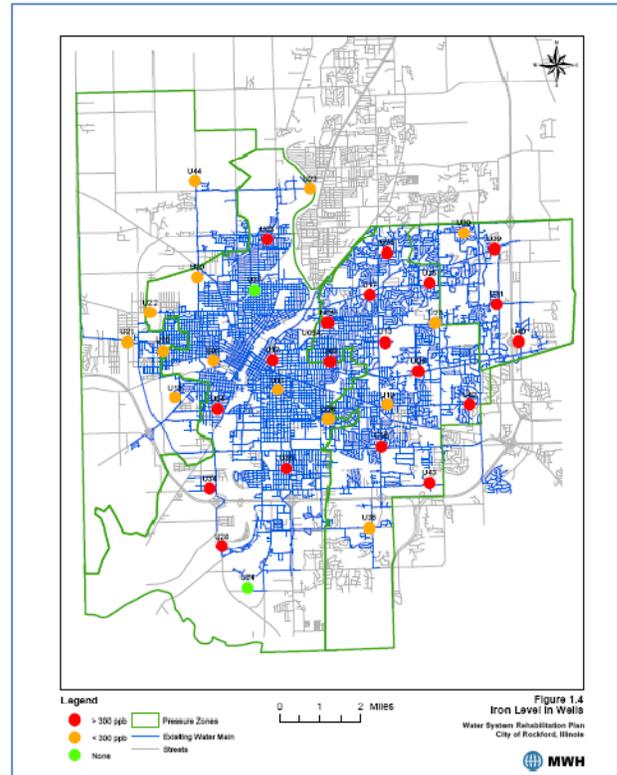
The Rockford Water System Improvement Project is a \$75 million program of capital improvements undertaken by the City of Rockford to rehabilitate key elements of the City’s water system infrastructure and dramatically increase the level of service provided to its customers. As of the end of 2010, the City has completed more than 87% of the overall improvement plan and met key objectives in the areas of improved water quality, service pressures, reliability, and appearance.

Need for the Project

In 2005, the City of Rockford was approaching a critical point in the management of its water supply infrastructure. Indicators related to water quality, water delivery, and the overall physical condition of the utility’s infrastructure suggested that the Rockford water system was in need of an immediate and comprehensive program of capital improvements in order to be able to provide its customers with a modern level of service. Recognizing this need, the City embarked upon a \$75 million Water System Improvement Project structured to address past issues and re-establish the Rockford water system as a strong, effective, and reliable water provider to the City’s more than 150,000 residents.

Project Concept, Goals, and Objectives

The concept adopted for the Water System Improvement Project was based on the City’s commitment to a comprehensive system rehabilitation effort. At the same time, project planners recognized that the project had to be financially feasible to obtain the support of City decision-makers and the utility’s customers. A balance between desired improvements and a



Deteriorated Ground Storage Reservoir



Original Stanley Street Pumping Station



reasonable level of funding was achieved through a focused effort to “right size” the project. Because the City projected water demands to remain relatively stable for the near term, the project focused on the rehabilitation and improvement of the limited facilities and infrastructure needed to reliably deliver high quality water at consistent service pressures to the water system service area, rather than rehabilitating every facility that was part of the system. In fact, specific decisions were made early on in the project to not invest any of the limited available capital in certain facilities that were judged to be of limited value to the utility.

Furthermore, system planners analyzed historic pumpage data to determine the risk that certain levels of demand might be exceeded. These data were used in decisions regarding the number of full treatment facilities to be constructed, the number of facilities where project goals required rehabilitation, but not the addition of treatment, and the number of additional facilities that needed to be kept in reserve to sustain reliable capacity but which did not merit significant investment.

Through this analysis, an overall project plan was formulated to significantly improve the level of service provided to all of the City’s water customers while maintaining rates within a reasonable and acceptable range. Specific project objectives included:

- Improving the quality of water supplied to customers through the construction of new water treatment facilities to reduce levels of iron, manganese, and radium in the City’s finished water;
- Improving the level and consistency of service pressures for customers throughout the water system service area, especially in higher elevation area historically subject to low pressure;
- Increasing the reliability of the overall water system through rehabilitation of facilities and the addition of emergency generating capacity at key sites; and
- Improving the overall appearance of Rockford water system facilities located throughout neighborhoods within the City of Rockford.

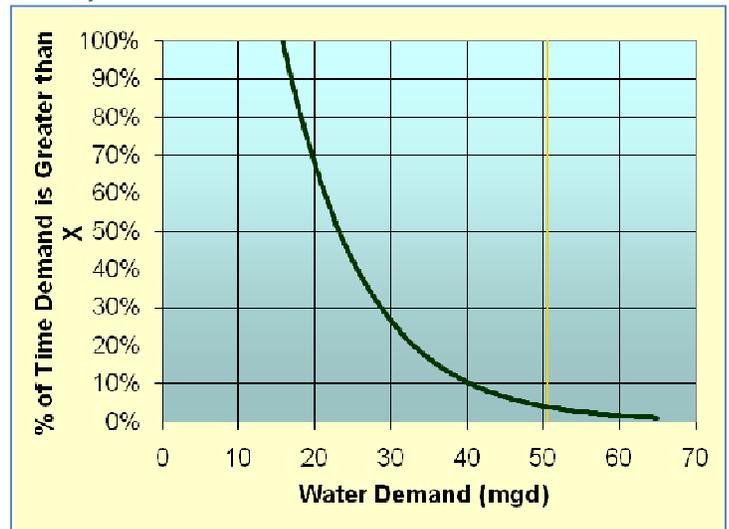
Project Elements

The success of the City of Rockford’s Water System Improvement Project has been the result of the City’s effective implementation of key elements within a comprehensive project framework.

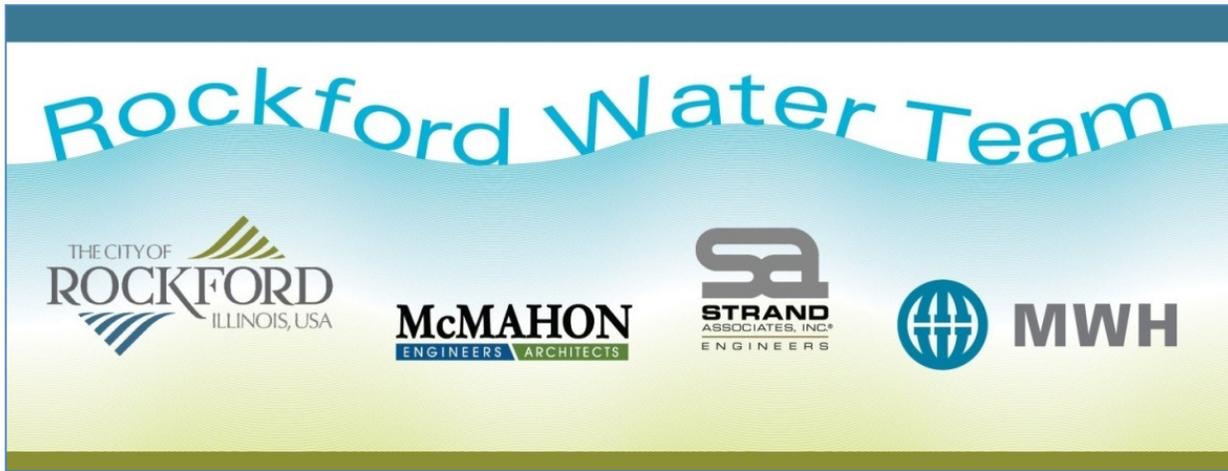
Project Team

Early on, the City adopted an innovative structure for the team that would be responsible for the success of the project. Three engineering firms, McMahon Associates, MWH, and Strand Associates were selected based on their specific expertise to work collaboratively with City staff to develop, design, and implement the overall

Analysis of Rockford Water Demands

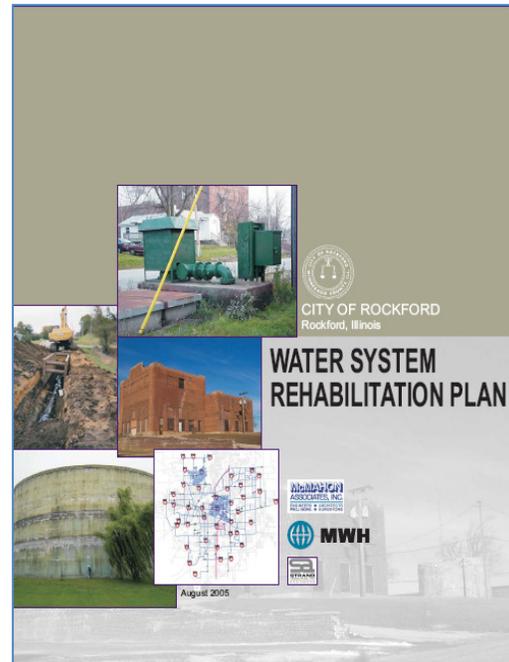


improvement strategy. Each firm entered into a master agreement with the City and was assigned primary responsibility for key aspects of the project. However, staff from the three firms met regularly in a collaborative workshop setting to coordinate efforts and provide input to key decisions impacting the overall project. As specific projects moved from conceptual planning into design, this core project team received support from a large number of Rockford area engineering firms, major contractors and equipment suppliers, and numerous vendors, suppliers, and construction subcontractors.



Project Planning and Design

The City of Rockford’s innovative use of a collaborative consultant team allowed for an intensive, yet efficient approach to initial project planning and design. City staff worked closely with selected experts from each of the lead consulting firms in a three-day focused workshop to analyze the challenges facing the Water Division and quickly define the structure of the Water System Improvement Project. Outputs from the workshop were then used to quickly formulate an overall implementation plan, schedule, budget, and funding plan for consideration and approval by the Rockford City Council.



Capital Improvement Projects

The Rockford Water System Improvement Project is at its core a comprehensive capital improvement program for the City of Rockford Water Division. To date, more than 40 individual capital improvement projects have been completed as part of the effort. Six additional projects are in various stages of construction, with two substantially complete and moving into final testing and shake-down. Expenditures through the end of 2010 total \$65.9 million, or approximately 88% of the total project budget of \$75 million. Capital projects completed as part of the project are described below.

1. **Well Rehabilitation and Construction.** Rockford relies entirely on local groundwater as the source for its public water supply. To maintain a reliable source of supply for the City, 11 existing wells were evaluated and rehabilitated, and one new deep well was constructed as part of the Water System Improvement Program. Rehabilitation measures focused on restoring well capacity and addressing historic issues related to pumping of sand and/or accumulation of iron bacteria.
2. **Treatment Plant Construction.** Construction of new water treatment facilities to remove iron, manganese, and radium is a centerpiece of the Rockford Water System Improvement Project. Six new treatment facilities (including 2 radium removal plants) are now in operation, providing residents of Rockford with their first filtered water. Four additional plants are currently in construction, with two substantially complete and moving toward full operation. The treatment equipment installed in each of these facilities was specified and procured on the basis of pilot testing conducted by three potential suppliers under contract to the City.

New Pressure Filtration System



Well 29 Water Treatment Plant



3. **Pumping Station Construction/Rehabilitation.** Improvements to pumping equipment have been completed at 18 of the City's primary water supply facilities, with work at one additional site to be completed later in 2011. Improvements made to the City's pumping stations range from pump, motor, and electrical equipment rehabilitation to full replacement of entire facilities. Replacement of the City's oldest operating facility, the Stanley Street Pumping Station, with a new pump station was one of the first major activities completed under the Water System Improvement Project. By modifying pumps, installing variable frequency drives, rehabilitating electrical systems, and providing a total of four emergency generators major pumping stations, the City has dramatically increased the reliability of the facilities that are critical to the distribution of water throughout Rockford. At the same time, results from detailed hydraulic analyses and operational studies have been used to significantly improve the consistency and level of service pressures provided throughout the complex distribution network.

New Stanley Street Pumping Station



Group 1-NT Facility Rehabilitation



4. **Water Distribution and Pressure Zone Improvements.** Early planning for the Water System Improvement Project used the results of detailed water distribution system analyses performed with an all-pipes model of the Rockford water system. Based on the model results, the City constructed approximately 9 miles of new water main and ten zone control valve stations to support the creation of two new pressure zones and improve service to residents in higher elevation parts of the community. Water main improvements ranged from 8-inches to 20-inches in diameter, and were designed and constructed by a number of local engineering and construction firms under the overall Improvement Project. The zone control valve stations were designed and constructed to be packaged, underground facilities through which the movement of water between pressure zones and the City's multiple sources of supply can be monitored and managed by system operators. Completion of these improvements has provided operators with the control and capacity needed to address historic low pressure issues in the far western and northeastern parts of the water system service area.

5. **SCADA System Upgrade.** The Water System Improvement Project included implementation of a new radio and SCADA system to enhance tracking of conditions and control of operations throughout the Rockford water system. As part of the SCADA system improvements, the City updated its operational control center, installing new master SCADA computers and communications systems. Parallel improvements using programmable logic controllers and remote radios were completed in conjunction with construction and rehabilitation activities at remote facilities.

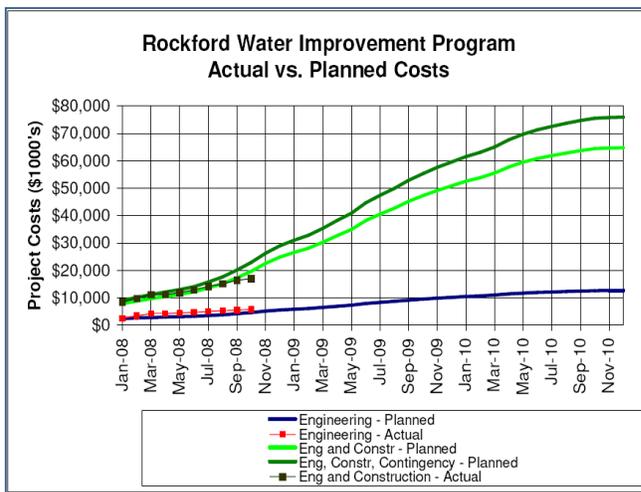
6. **Facility Decommissioning.** A key final element in the Water System Improvement Project involves the decommissioning of seven of the City’s older well sites. These sites were designated to be abandoned based primarily on their poor water quality and deteriorated physical condition. Analyses conducted during the planning phase of the project determined that investment of additional capital dollars in the rehabilitation or replacement of these facilities was not a wise choice for the City, and that the remaining facilities in the system could reliably meet projected system demands.



Program Management

City staff and the lead consultant team recognized early on in this project the need for overall coordination and project management. Initial efforts centered around monthly team workshops gradually were developed into a more structured framework involving monthly workshops, weekly conference calls, contract and budget tracking systems, public communications, operational planning tools, and a collaborative Sharepoint site. To date, the overall project team has held more than 50 workshop sessions and numerous issue-specific meetings while utilizing custom tools to track project progress, action items, planned and actual water supply capacity, and project results and accomplishments.

Effective coordination of project activities has enabled the City to meet the deadlines specified in its Compliance Commitment Agreement with the Illinois EPA while staying within the \$75 million program budget and maintaining a reliable level of service to customers throughout Rockford.



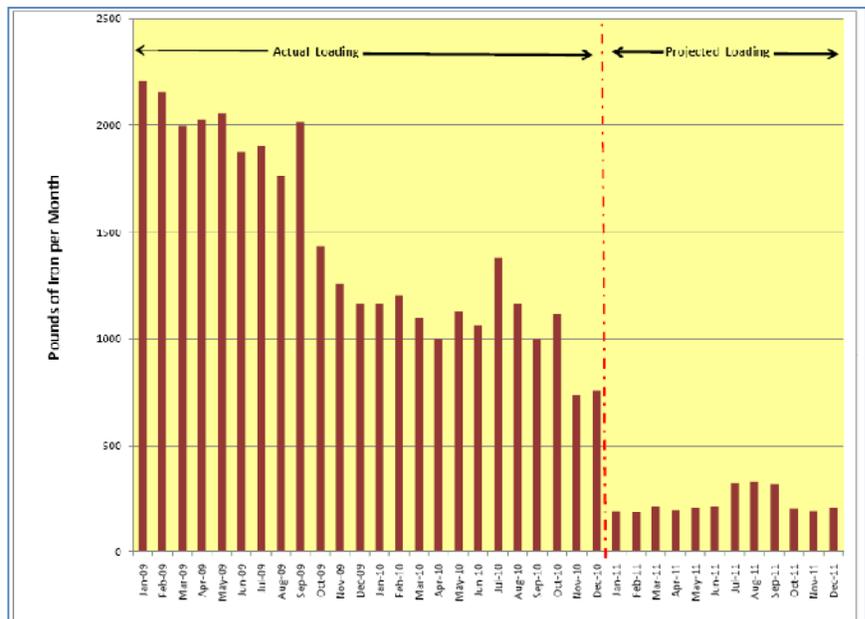
Public communication and outreach have been important elements in the maintenance of public support for this important project. Rockford has used a combination of quarterly progress reports, posted to the City’s website, as well as dedication events for key facilities to present evidence of project progress and accomplishments to key decision-makers and the general public. A copy of the most recent quarterly report document is included at the end of this submittal.

Project Accomplishments

Through the combined efforts of Rockford staff, the project lead consultant team, and numerous additional engineering, construction, and equipment supply firms, the Rockford Water System Improvement Project is resulting in real, visible improvements in the level of water service provided to the City of Rockford. Key accomplishments to date include:

- Dramatic reductions in the levels of iron, manganese and radium contained in the treated water distributed throughout the City;
- Significant improvements in the level and consistency of service pressures throughout the City’s water distribution system;
- Increases in system reliability achieved through rehabilitation of key facilities, upgrades to the SCADA system, and installation of emergency generators at critical locations;
- Improvements in the physical appearance of water system facilities through rehabilitation, replacement, and or decommissioning and demolition of deteriorated facilities; and
- Successful completion of the project within the established \$75 million budget while achieving additional cost savings through the use of \$44.5 million in low interest loan funds from the IEPA State Revolving Loan Fund.

The Rockford Water System Improvement Project has changed the real and perceived role of the Rockford Water Division in the life of the community. The improvements completed have re-established the Water Division as a modern, effective water utility, and set the stage for its continued service to the community in the future.



4th Quarter 2010 Highlights (cont.)

Pressure Zone Start-up

In September, the West Pressure Zone was expanded to deliver water at a more consistent and higher service pressure within the region. This zone was historically confined to the North-West part of the city, roughly bounded by Rockton Avenue and Halsted Road. With the completion of rehabilitation work at U18, U21, and U44, as well as the installation of Zone Control Valves 8, 9, and 10, the zone was expanded to the southern end of the system roughly west of Pierpont Avenue to the north and Central Avenue to the south. Part of the effort to create the new pressure zone included water main reconfiguration and the installation of small-diameter bypass lines across the new zone boundary to maintain water quality in the area. In the late spring of 2011, the new East High Pressure Zone will be established roughly east of Mulford Road and north of State Street, increasing service pressure in that area.



Zone Control Valves and Inside Components

Well Decommissioning

Six wells in the City of Rockford system are no longer needed due to the condition of the well itself, or the quality of the water supply at that well. These wells will now be abandoned and plugged, and the entire well house will be demolished and cleared. Work for the well abandonment has been awarded to Layne-Western, and work for the site demolition has been awarded to Northern Illinois Service Co. of Rockford. The work will include well sites U04, U11, U12, U16, U20, and U27. Work is expected to start at these six sites in February, 2011, and should take approximately 6 months to complete.

Unit Well 10 Radium Removal Treatment Plant Addition

Construction of the radium removal plant addition at the U10 well site on Newburg Road began in September, 2010. Iron and manganese will also be removed in the new treatment plant. This work has been awarded to Scandrol Construction of Rockford. The project will consist of the addition of a radium removal filter, chemical feed facilities, and a backwash storage tank. This project is being funded by a combination loan and grant from the Illinois Environmental Protection Agency. Work is expected to be finished at this site in the fall of 2011.



Filter Vessel Delivery at Well 10



Water System Improvement Project

Project Expenditures and Progress

During 2010 the City of Rockford achieved major interim milestones related to the implementation of its comprehensive Water System Improvement Program. Six of the ten planned water treatment facilities, including three radium removal facilities, are now complete and in operation. Construction is well under way at the four remaining treatment facility sites. Rehabilitation work has been completed at all nine of the base system non-treatment facilities included in the project, and these facilities are also fully operational.

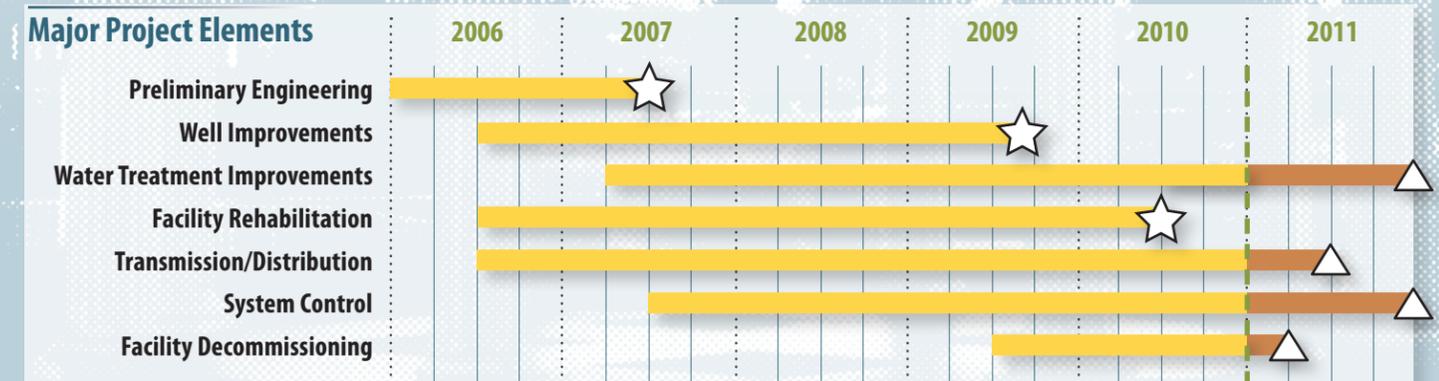
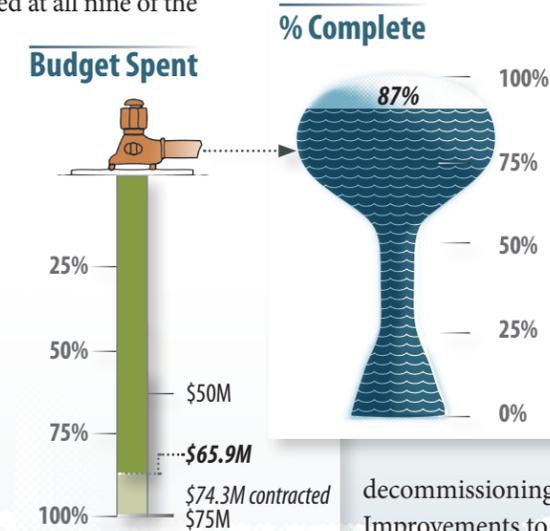
Work completed in 2010 also included demolition of three deteriorated water reservoirs, construction of the last of more than 8 miles of new water main, and installation of ten new zone control valves. Following completion of the zone control valve project, the City implemented an expanded west pressure zone to increase service pressures to customers in the far western part of the community. A new East High Pressure Zone is scheduled to be brought on line in the Spring of 2011. The East High Zone Project will increase normal service pressures to customers in the northeastern part of Rockford by more than 20 psi. Additional funding awards from the IEPA during the 2nd half of 2010 brought the state low interest loan support for this project to more than \$44.5 million, including more than \$5.1 million in principal forgiveness.

As of the end of 2010, the City had signed contracts for approximately \$74.3 million worth of studies, designs, and construction related to the water system improvement project. This total represents approximately 99.1% of the overall project budget of \$75 million. Actual expenditures recorded through December 2010 total \$65.9 million, or about 87.9% of the budget. Progress reports developed for the individual projects

indicate that work related to the overall improvement project is about 87% complete.

Project Milestone Schedule

Rockford, together with its construction contractors and consultant team, continues to make strong progress toward completion of major elements of the water system improvement program. Efforts remain on track to complete the majority of the remaining water treatment, control, and facility decommissioning projects during 2011. Improvements to the water transmission and distribution network are complete with the exception of implementation of the East High Pressure Zone and final programming of the remaining zone control valves. As the remaining projects are completed, residents of Rockford will continue to see incremental improvements in the quality and pressure of the water they receive.



For more information on specific projects, please contact:
Tim Holdeman • Rockford Water Division Superintendent (815) 987-5738 • Tim.Holdeman@rockfordil.gov

Prepared by: MWH

4th Quarter 2010 Project Status

Individual Project Status

A detailed listing of the location, schedule and status of improvements planned for individual facilities, water mains, or the overall water system, is provided in these tables.

Color-coded cells in the last column of the table indicate overall project status using a green (Good), yellow (OK, but some issues), or red (Problems) format.

Project Status – June 2010			Rehabilitation				Progress				Status
Project	Ward	Planned Construction	Wells	Treatment	Facility Rehab	Abandon	Planning	Design	Construction	Complete	
Facility Rehabilitation / Improvements											
Treatment Equipment	--	2008-2011		X				✓	✓	✓	✓
S01 : 525 Stanley Street	13	2007-2008	X		X		✓	✓	✓	✓	✓
U03 : 1404 River Bluff Blvd.	12	2008-2009	X		X		✓	✓	✓	✓	✓
U04 : 801 Marchesano Dr.	5	2011				X	✓				✓
U05 : 2526 Pelham Rd.	3	2009-2011		X	X		✓	✓	✓		✓
U06 : 2604 19th Ave.	8	2008-2009	X		X		✓	✓	✓	✓	✓
U09 : 2708 Crosby St.	10	--					✓				✓
U10 : 4316 Newburg Rd.	14	2008-2011		X	X		✓	✓	✓		✓
U11 : 1218 7th Ave.	11	2011				X	✓				✓
U12 : 1022 Benton St.	3	2011				X	✓				✓
U13 : 4625 Skyline Dr.	10	2009-2011	X	X	X		✓	✓	✓		✓
U15 : 3030 Chestnut St.	13	2010				X	✓	✓	✓	✓	✓
U16 : 4550 Harrison St	14	2011				X	✓				✓
U17 : 3700 Brookview Rd.	3	--					✓				✓
U18 : 1409 S. Johnson Ave.	5	2008-2009			X		✓	✓	✓	✓	✓
U20 : 2434 N. Central Ave.	9	2011				X	✓				✓
U21 : 703 Daisyfield Rd.	13	2008-2009	X		X		✓	✓	✓	✓	✓
U22 : 5110 Auburn St.	13	2008-2009			X		✓	✓	✓	✓	✓
U23 : 1206 Elmwood Rd.	12	--					✓				✓
U24 : 6475 Cessna Dr.	6	2008-2009	X		X		✓	✓	✓	✓	✓
U25 : 5602 Spring Creek Rd.	4	2009					✓	✓	✓	✓	✓
U26 : 5500 E. State St.	10	2009					✓	✓	✓	✓	✓
U27 : 5834 Guilford Rd.	1	2011				X	✓				✓
U28 : 5400 Belt Line Rd.	6	--					✓				✓
U29 : 4750 Pepper Dr.	4	2008-2009	X	X	X		✓	✓	✓	✓	✓
U30 : 3725 Trainer Rd.	4	2008-2009	X	X	X		✓	✓	✓	✓	✓
U31 : 1780 Bell School Rd.	1	2008-2009	X	X	X		✓	✓	✓	✓	✓
U33 : 930 Arthur Ave.	1	--				X	✓				✓
U34 : 3945 Dawes Rd.	5	2009-2010	X		X		✓	✓	✓	✓	✓
U35 : 2944 Bildahl St.	6	2010					✓				✓
U36 : 4141 Samuelson Rd.	6	2009-2011		X	X		✓	✓	✓		✓
U37 : 2100 Huffman Blvd.	9	2008-2009			X		✓	✓	✓	✓	✓
U39 : 7423 Spring Brook Rd.	4	--					✓				✓
U40 : 738 Lyford Rd.	1	2008-2009		X	X		✓	✓	✓	✓	✓
U42 : 6733 Newburg Rd.	1	2008-2009	X	X	X		✓	✓	✓	✓	✓
U43 : 3447 Publishers Dr.	14	2008-2009		X	X		✓	✓	✓	✓	✓
U44 : 5250 Owen Center Rd.	9	2008-2009			X		✓	✓	✓	✓	✓
SCADA	--	2008-2010					✓	✓	✓	✓	✓



4th Quarter 2010 Highlights

Group 3 Treatment Facilities Construction

The Group 3 Treatment Facilities began construction in October of 2009. The Group 3 water treatment facilities consist of iron and manganese removal at U5/5A and U13. U13 is currently moving into the start up phase of the project and U5 will be following close behind with start up scheduled for early spring. This project utilizes ARRA funding through the Illinois Environmental Protection Agency's State Revolving Loan Fund. Significant project cost savings are being realized through zero-interest loans and principal forgiveness being offered through this program.

U36 Treatment Facility Construction

Construction began on the U36 treatment facility, located near Jefferson High School, on the city's far south side in September. The work at this site includes construction of a radium removal facility, replacement of chemical feed equipment, and a sewer extension to service the facility. This facility will also remove naturally occurring iron and manganese from the water.

Scandrol Construction of Rockford is the general contractor for this facility. They have completed the necessary work to receive the new filter vessel which is anticipated to be delivered in February. Work at the site over the next few months will be limited by winter conditions, but will pick up as the weather warms and spring approaches. The project is scheduled for completion before the end of 2011.

Group 2 Treatment Facilities Construction

The Group 2 Treatment Facilities Construction project is entirely complete. The project included work at U29, U30, and U43. The contractor, Williams Brothers Construction, of Peoria, Illinois, completed the work at all three sites. The total value of construction for the three sites totaled \$8,961,328.



Well 5/5a: 2526 Pelham Rd.



Well 13: 4625 Skyline Dr.



Well 43: 3447 Publishers Dr.

Dedication ceremonies were held on June 3, August 25, and December 2, 2010 at the U29, U30 and U43 sites, respectively. These facilities are the first treatment plants in Rockford to utilize hydrated manganese oxides (HMO) to remove naturally occurring radium, in addition to the iron and manganese, from the ground water. The previous treatment plants were designed to remove iron and manganese from the water, with the capability to modify the process in the future should radium removal become necessary. Local residents had the opportunity to tour the facility and see the radium removal facilities during the dedications. Water quality testing data collected to date has shown that the treatment process is removing over 90 percent of the radium in the raw well water.



U43 Dedication Ceremony

Project	Ward	Planned Construction	Progress				Status				
			Planning	Design	Construction	Complete					
Preliminary Engineering			2005-2007	✓	✓	✓	✓	✓			
Well Rehabilitation			2006-2007	✓	✓	✓	✓	✓			
Pilot Test Program			2006-2007	✓	✓	✓	✓	✓			
Zone Boundary Improvements			2007-2011	✓	✓	✓		✓			
Water Main Improvements											
W-1 : Harrison Street East	8	2007	✓	✓	✓	✓	✓	✓			
W-2 : Airport Loop	6	2007-2008	✓	✓	✓	✓	✓	✓			
W-3 : Auburn Street	7/9	2008-2009	✓	✓	✓	✓	✓	✓			
W-4 : Aldeen	10	2008-2009	✓	✓	✓	✓	✓	✓			
W-5 : Alpine Meadows	4	2009-2010	✓	✓	✓	✓	✓	✓			
W-6 : American Road	14	2008-2009	✓	✓	✓	✓	✓	✓			
W-7 : Dawson Avenue	2/3	2008-2010	✓	✓	✓	✓	✓	✓			
W-8 : 20th Street	8/11	2008-2009	✓	✓	✓	✓	✓	✓			
W-9 : Green Street	13	2008-2009	✓	✓	✓	✓	✓	✓			
W-10 : 22nd Street	8	2008-2009	✓	✓	✓	✓	✓	✓			
W-11 : Ekberg Pine Manor Park	6/14	2008-2009	✓	✓	✓	✓	✓	✓			
W-12 : 35th Street	14	2008-2009	✓	✓	✓	✓	✓	✓			
EXW : Porter Road	9	2008-2009	✓	✓	✓	✓	✓	✓			

Prepared by:  MWH.

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