



City of Madison Master

City of Madison
Madison, WI 53703
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Item 16-1

File Number: 07288

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File Type: Resolution

Status: Draft

Version: 1

Reference:

Controlling Body: Water Utility

Requester: BOARD OF WATER
COMMISSIONERS

Cost:

Introduced: 08/14/2007

File Name: Authorizing the Mayor and City Clerk to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Assoc Resource Solutions LLC for completion of an extended period pumping test of Well 29 in conjunction with the study of manganese.

Final Action:

Title: Authorizing the Mayor and the City Clerk to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC for the completion of an extended period pumping test of Well 29 in conjunction with the study of Manganese in Water Supply Wells and Identification of Alternatives (2nd, 6th and 15th AD).

Notes:

Code Sections:

Agenda Date: 08/21/2007

Indexes:

Agenda Number:

Sponsors: Lauren Cnare

Enactment Date:

Attachments:

Enactment Number:

History of Legislative File

Ver- sion:	Acting Body:	Date:	Action:	Sent To:	Due Date:	Return Date:	Result:
1	Water Utility	08/15/2007	Fiscal Note Required / Approval	Comptroller's Office/Approval Group		08/16/2007	
1	Comptroller's Office/Approval Group	08/16/2007	Approved Fiscal Note By The Comptroller's Office	Water Utility		08/16/2007	

Notes: *Knepp*

Text of Legislative File 07288

..Fiscal Note

The proposed amendment to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC for the completion of an extended period pumping test of Well 29 in conjunction with the study of Manganese in Water Supply Wells and identification of alternatives is estimated at \$23,200. Funds are included in the 2007 Water Utility Capital Budget under Design and Construction in the Unit Well 29 Filter project.

Account No. EW01-810564.

..Title

Authorizing the Mayor and the City Clerk to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC for the completion of an extended period pumping test of Well 29 in conjunction with the study of Manganese in Water Supply Wells and Identification of Alternatives (2nd, 6th and 15th AD).

..Body

WHEREAS, Madison Water Utility recognizes the need to study, identify and more fully understand manganese water quality issues and groundwater hydraulics at city wells; and

WHEREAS, Montgomery Associates Resource Solutions LLC has completed a study on manganese in wells at the Utility's Well 29, received public comment and has recommended additional pump testing at Well 29 to evaluate groundwater movement and contaminant capture around Well 29; and

WHEREAS, Madison Water Utility feels that it is in the Utility's best interest to proceed with this recommendation to further develop data and knowledge on the area aquifer and groundwater resource and to protect the long term water quality at Well 29; and

WHEREAS, it is in the best interests of the Water Utility for efficiency and continuity of knowledge to continue this project with Montgomery Associates Resource Solutions LLC, therefore it is prudent to seek Council approval of this amendment and extension of work as a "sole source" per MGO 4.26(4)(a)2 and 4.26(4)(B);

WHEREAS, Madison Water Utility has budgeted funds in the 2007 Capital Budget for the design and construction of a filter at Well 29.

NOW THEREFORE BE IT RESOLVED that the Mayor and the City Clerk are authorized to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC for the completion of an extended period pumping test of Well 29 in conjunction with the study of Manganese in Water Supply Wells and Identification of Alternatives.



Madison Water Utility

David Denig-Chakroff, General Manager
Alan L. Larson – Principal Engineer

119 E. Olin Avenue
Madison, Wisconsin 53713
Telephone: 608 266-4653
FAX: 608 266-4426
email: allarson@cityofmadison.com

MEMORANDUM

Date: Tuesday, August 14, 2007

To: Board of Water Commissioners

From: Al Larson
Principal Engineer

(Resolution # 07288)

Subject: Montgomery Mn Assessment Study
Extended Period Well 29 Pump Testing Proposal

Description: Extended Period Test Pumping of Well 29. Conduct a 21-day high capacity pump test of the deep well at Well 29. Measure the groundwater levels at and around the Sycamore Landfill to evaluate the integrity of the Eau Claire shale in the area and the overall potential of the possibility of changing groundwater flow patterns due to high capacity pumping and then drawing contamination from the landfill toward the well. See attached proposal for a detailed description of the proposed scope of services.

Estimated Cost: \$23,400

Benefit: Studying the groundwater hydrology around Well 29 and the Sycamore landfill will allow the Utility to identify any potential well contaminant sources and will build on the knowledge of the Eau Claire shale layer in the Well 29 area. During the study conducted in January 2008, there was no indication that water would be drawn toward the well at a pumping rate of approximately 1800 gpm. This study would look at the potential impact of higher sustained pumping rates. The data gained through this study will allow the Utility to manage and potentially monitor the movement of contaminants, if they exist, from the Sycamore landfill toward the well. This knowledge gained would be used to optimize well and filter operation and would be a long-term benefit to the Utility.

Recommendation: Approval of the study.

Let me know if you have questions or concerns about this.



May 16, 2007

Mr. Alan Larson
City of Madison Water Utility
119 E. Olin Avenue
Madison, Wisconsin 53713

Re: Proposal for Professional Services
UW 29 Pumping Test

VIA: EMAIL

Dear Al,

Montgomery Associates: Resource Solutions, LLC (MARS) in collaboration with RMT, Inc. is pleased to present this proposal for conducting a pumping test at Unit Well 29 (UW 29) as you requested in our meeting on Friday, May 4, 2007. This letter describes the project objectives, proposed scope of work, fees, and schedule for the project. The services described in this proposal will be performed according to the terms and conditions of the attached Services Agreement.

INTRODUCTION

The results of our investigation into the probable cause of elevated concentrations of manganese in the groundwater at UW 29 as presented in our March 2007 Summary Report indicated that the deep aquifer is relatively isolated from the surface based on our sampling and testing program. Based on the results of water quality sampling at UW 29, there was no indication of shallow groundwater being present in water being produced from UW 29. However, the fact remains that Sycamore Landfill, located to the west of the water supply well, is a potential source of surficial contaminants in the vicinity of the well. The results of the groundwater modeling indicated that groundwater recharged at Sycamore Landfill would not be captured by UW 29 pumping at a rate of 2,100 gpm if the model assumptions are accurate and if the contaminated groundwater beneath the landfill is at an elevation of approximately 810 ft msl (a depth of about 60 ft below the bottom of the waste).

We took advantage of the pumping between mid January and early February at UW 29 conducted for the manganese treatment pilot study to complete an additional scope of work in which water levels at two monitoring wells at the Sycamore Landfill were monitored to evaluate the drawdown that occurred as a result of pumping UW 29. The results of the water level monitoring were presented in our March 2007 Summary Report and indicated that water levels in the two monitoring wells declined approximately 0.6 to 1.1 feet after a few weeks of pumping. The groundwater model simulated drawdowns of approximately 3 feet at the eastern edge of the landfill. These drawdowns are reasonable considering that the model was run for steady state or long term conditions. As stated earlier, the drawdowns were not sufficient to divert groundwater beneath the landfill to UW 29 at pumping rates of 2,100 gpm or less based on the modeling results. In groundwater jargon that means there was influence from the well, but not capture. However, given that there were declines in the water levels in both wells at the landfill, there are



still uncertainties regarding the connectivity of the upper and lower aquifers and whether or not the Eau Claire shale is absent or is more leaky than is assumed in the model.

Other results of the modeling indicated that if groundwater beneath the landfill has moved deeper in the aquifer, or if the aquitard (Eau Claire shale) is missing, then it is likely that the groundwater could be captured by UW 29 pumping at 2,100 gpm in about twenty years. If manganese treatment is installed at UW 29, the future production of the well is forecasted to be increased to approximately 2,300 gpm. Based on the results of the computer modeling, the unknown condition of the Eau Claire shale underlying the landfill area and the potential need for pumping UW 29 at higher production rates, further evaluation of pumping impacts on the water levels at the landfill is warranted by conducting a more extensive pumping test at UW 29 and monitoring several wells at Sycamore Landfill.

PROPOSED APPROACH

It is proposed that a pumping test be conducted at UW 29, pumping UW 29 for 21 days and monitoring water levels for one week prior to and up to one week after pumping. UW 29 would be pumped at the maximum sustainable rate, approximately 2,300 gpm using the flow meter in the well house (i.e., discharging the water through the on site reservoir) so that the pumping rate and drawdown are accurately monitored. The monitoring network would include several wells at the Sycamore Landfill. The data would be analyzed and compared to groundwater modeling results. If drawdowns exceed those simulated in the model, then the model may need to be adjusted to match observed drawdowns more closely and rerun to assess the potential range in hydraulic properties of the Eau Claire Shale. Additionally it could be concluded from the analysis that pumping from the deep aquifer increases downward gradients to the extent that shallow water can move across the aquitard and toward UW 29. If this is the case, it would provide the Utility with additional information for management of UW 29.

OBJECTIVES

The project objectives include:

- Assessing the potential of UW 29 to capture groundwater beneath the landfill, and
- Providing the Water Utility with recommendations on management strategies for UW 29.

PROPOSED SCOPE OF WORK

MARS and RMT are proposing to provide the following services:

A: Design and Conduct Pumping Test

Task 1. Determine Monitoring Network: Review Sycamore Landfill monitoring well data, water quality data, well construction reports, geology, and cross-sections of the contaminant plume. Determine the number and location of wells to be monitored during the pumping



test. Determine the frequency and type of monitoring for each well selected. Produce a map of the monitoring network. Wells to be monitored will be selected based on several variables including the well depth, open interval, geology, hydraulic conductivity information and water quality. It is expected that several pairs of nested wells will be monitored. Other wells located in the vicinity of UW 29 may be identified and monitored.

Task 2. Coordinate with the City: Coordinate with the City Engineering Department and Health Department to instrument and monitor wells. Some wells will be instrumented with pressure transducers and data loggers while other wells may be monitored manually. Coordinate with the City Water Utility on the test schedule, UW 29 monitoring, and other logistics.

Task 3. Install Monitors and Collect Data: Recording pressure transducers will be installed in six wells 1 week prior to starting UW 29 and will remain in the wells for up to 1 week after turning off UW 29 for a total of 5 weeks (3 weeks of pumping). One data logger will be dedicated to atmospheric pressure monitoring to allow for simple correction of the pressure transducer data. Manual water level measurements will be made and data will be downloaded from data loggers twice during the pumping test. In addition, manual measurements will be taken at up to 10 wells in the monitoring network prior to the test, twice during the test and when removing the data loggers.

B: Data Plotting

Task 4. Prepare Graphs: Pre-pumping water levels, drawdown and post-pumping water levels will be plotted for each well and analyzed using time drawdown, distance drawdown and/or other methods to assess changes in water levels and vertical gradients at nested wells. Since there are no wells within the pumped aquifer, no estimates of the aquifer transmissivity or confining layer (i.e., Eau Claire Shale) vertical conductance can be made using analytical methods.

C: Groundwater Modeling

Task 5. Groundwater Flow Model: The existing TMR groundwater flow model developed from the Dane County Model for the manganese study will be used to evaluate drawdowns and the UW 29 capture zone.

- a. The model will be run to simulate drawdowns in the vicinity of the landfill as a result of pumping UW 29 at a known rate for 3 weeks and compared to observed monitoring data.
- b. Based on the actual versus modeled drawdown comparisons, model parameters may be adjusted to reflect more accurately the observed data then rerun for several pumping scenarios to evaluate resulting changes in the capture zone of UW 29.



D. Reporting and Presentation of Findings

The letter report will consist of tables, graphics, analytical data, and text describing the methods and results of the assessment with recommendations and confidence for proceeding with pumping strategies for UW 29.

Task 6 Analysis and Report

- a. Draw conclusions regarding the potential of UW 29 to capture groundwater beneath the Sycamore Landfill;
- b. Make recommendations regarding UW 29 long term pumping strategies; and
- c. Present the results in a letter report and that contains a summary of the analysis, conclusions and recommendations;

E. PROJECT MANAGEMENT

A total of 3 meetings are planned for this project. Two meetings are planned to brief the Water Utility on the monitoring plan for the pumping test and to present the results and recommendations. One meeting is planned to present the results to the Water Board. Routine project management activities will be conducted to include contract completion, communication, and review of schedule and budget.

Task 7 Meetings and Presentations;

- a. Present the pumping test plan to the City;
- b. Present the test findings and conclusions to the City; and
- c. Present the conclusions and recommendations to the Water Board in the form of a powerpoint or acceptable form of presentation.

ASSUMPTIONS AND CONDITIONS

We have assumed the following regarding the scope of our work:

- Up to 6 monitoring wells will be instrumented with recording pressure transducers for a period of approximately 5 weeks.
- Coordination with the City Health Department will result in their assistance in making the wells available for monitoring, pulling pumps if necessary and manually monitoring water levels during the pumping test.
- Two briefing meetings will be attended to discuss monitoring plan, and results and conclusions.
- One meeting with the Water Board to present conclusions and recommendations.



CONTRACT, FEES AND SCHEDULE

MARS and RMT proposes to perform the Scope of Services on a time-and-expenses basis. The estimated total fees will be approximately \$ 23,400. Included in this fee is an allowance of \$3,400 for the data loggers. Should the City request MARS or RMT to make changes in the services or to perform additional services, MARS will prepare a Change Order for the City's acceptance.

COSTS INCLUDE:

▪ Task 1 – Prepare Monitoring Plan	\$ 1,300
▪ Task 2 – Coordination With the City	\$ 500
▪ Task 3 – Instrument Installation and Pumping Test Monitoring	\$ 2,300
▪ Task 4 – Data Preparation	\$ 2,100
▪ Task 5 - Groundwater Modeling	\$ 2,100
▪ Task 6 – Analysis and Report	\$ 6,400
▪ Task 7 – Project Management & Meetings	\$ 4,500

SCHEDULE

The study can begin upon authorization of this proposal and receipt of data from the City. The proposed schedule is based on the Water Utility's expectation that the pumping test will be completed in the next several weeks. Changes to the schedule may be necessary depending on the starting date of the project.

<u>Work Element</u>	<u>Date</u>
▪ Task 1 – Prepare Monitoring Plan	June 1
▪ Task 2 – Coordination With the City	June 1
▪ Task 3 – Instrument Installation and Pumping Test (June 11 – July 2) Monitoring	June 4 (week prior to test) June 11 – July 6
▪ Task 4 – Data Preparation	June 4 – July 13
▪ Task 5 - Groundwater Modeling	July 16 – July 20
▪ Task 6 – Analysis and Report	July 16 – July 25
▪ Task 7 – Meetings to brief the Water Utility and Water Board	May 25, July 19, August 21

Thanks very much for the opportunity to provide this proposal. Please contact me at 608-223-9585 with any questions.

Montgomery Associates: *Resource Solutions, LLC*

Nancy R. Zolidis, PhD, PG, PH
Senior Hydrogeologist