

cityofnovi.org

## CITY of NOVI CITY COUNCIL

Agenda Item E  
October 20, 2008

**SUBJECT:** Approval to award a contract for engineering services for the Storm Water Modeling and Analysis of Regional Detention Basins upstream of Meadowbrook Lake project to URS Corporation for a not-to-exceed design fee of \$65,000.

**SUBMITTING DEPARTMENT:** Engineering *RH*

**CITY MANAGER APPROVAL:** *PA for cost*

EXPENDITURE REQUIRED	\$ 65,000
AMOUNT BUDGETED	\$ 50,000
APPROPRIATION REQUIRED	\$ 15,000
LINE ITEM NUMBER	210-211.00-870.500

### BACKGROUND INFORMATION:

This project is comprised of two components: 1) GIS integration of regional detention basin data; and, 2) modeling of the storm water system upstream of Meadowbrook Lake. The project was initiated in the FY2008-09 budget as *GIS Mapping of Regional Basins & Storm Sewer Facilities* in the amount of \$50,000, and was a recommended project from the 2004 Storm Water Master Plan update. As the scope of the project was refined during the preparation of the request for proposals, the Engineering Department identified an opportunity to increase the scope of the project with a slight increase in cost to accomplish a more significant task: hydraulic modeling.

The 2006 Storm Water Master Plan Phase II recommended that "due to flooding in the Meadowbrook Lake District, all new development sites upstream of this location should be required to fully detain runoff to the City's current ordinances." The hydraulic model will provide data to assist in making informed decisions to change policy in this regard. (Please see discussion in Rob Hayes' memorandum dated October 1, 2008 for additional background as it relates to the Middle One Rouge River subwatershed in general, and hydraulic modeling in particular).

The enlarged scope would accomplish the following tasks/goals:

- Integration of regional detention basins into appropriate GIS layers (original scope)
- Identification of stream bank erosion areas that would be candidates for stream bank stabilization (including identification of locations for possible grant opportunities)
- Modeling of the storm water system upstream of Meadowbrook Lake to determine if the City's practice of utilizing regional basins in the study area should continue (recommendation from 2006 Storm Water Master Plan phase II).

The regional basin data that is generated from the modeling task will be incorporated into the overall city GIS system. The completed model will then be used by Engineering staff to evaluate the system as sites are developed to better understand the impact of increased impervious area on the regional basins. The computer model proposed is very similar to the model that is currently being used for the water system and the sanitary sewer system. The consultant has provided a proposal to integrate the model into the GIS for an additional fee of \$15,000, however staff would like to first gain a better understanding of the data and the integration process before a recommendation on this additional scope can be made.

The attached Request for Proposals (RFP) was sent to the six engineering consulting firms that have been pre-qualified for utility-related engineering work. The RFP was structured with two alternates to allow more flexibility with the scope and budget: Alternate A is a smaller "pilot" area containing the Cedarsprings Regional Detention Basin; and, Alternate B, which includes the entire area upstream of Meadowbrook Lake. Alternate A would only accomplish a very small portion of the ultimate goal of modeling the watershed upstream of Meadowbrook Lake, but would provide an estimate of cost to complete the pilot area that could be extrapolated to include the larger study area. Based on the lower than expected fees provided, Engineering recommends Alternate B (modeling and collecting GIS data for the entire area upstream of Meadowbrook Lake).

Four proposals were received and each was evaluated using Qualifications Based Selection (QBS) procedures, with a greater weight assigned to the project approach criterion. The results of staff review of the proposals are as follows:

<b>Firm</b>	<b>Engineering Fee (Selected Alternate B)</b>	<b>Staff Review Score</b>	<b>Proposal Rank</b>
URS Corporation	\$ 65,000	1610	1
Orchard Hiltz & McCliment	\$232,200	1565	2
Stantec	\$251,000	930	3
Anderson Eckstein & Westrick	\$98,250	895	4

Of the four firms that submitted proposals, URS had the highest staff review score and met all requirements listed in the RFP (see attached URS's proposal dated July 29, 2008 and Engineering staff's proposal scoring summary for reference). Additionally, URS had the lowest engineering fee.

**RECOMMENDED ACTION:** Approval to award a contract for engineering services for the Storm Water Modeling and Analysis of Regional Detention Basins upstream of Meadowbrook Lake project to URS Corporation for a not-to-exceed design fee of \$65,000.

	<b>1</b>	<b>2</b>	<b>Y</b>	<b>N</b>
<b>Mayor Landry</b>				
<b>Mayor Pro Tem Capello</b>				
<b>Council Member Crawford</b>				
<b>Council Member Gatt</b>				

	<b>1</b>	<b>2</b>	<b>Y</b>	<b>N</b>
<b>Council Member Margolis</b>				
<b>Council Member Mutch</b>				
<b>Council Member Staudt</b>				

# MEMORANDUM



City of Novi

**TO:** CLAY PEARSON, CITY MANAGER  
**FROM:** ROB HAYES, CITY ENGINEER  
**SUBJECT:** STREAMBANK EROSION & LOCALIZED FLOODING IN THE MIDDLE ONE ROUGE RIVER SUBWATERSHED  
**DATE:** OCTOBER 1, 2008

10/2/08  
To: Mayor and City Council Members

Background on forthcoming ordinance and mapping work.  
[Signature]

A project from the FY07/08 Capital Improvements Program, *GIS Mapping of Regional Basins and Stormwater Facilities*, will allow the city to accurately map and catalog the various components of Novi's regional storm water detention system and incorporate this data into the city's Geographic Information System. The mapping project was deferred until improvements at two key regional detention basins (Bishop and Taft) could be made. Now that Bishop and Taft basin reconstruction is underway and will be completed this fall, we are prepared to award an engineering contract for the GIS Mapping project. <

Having the mapping information is critical because it will allow city Engineering staff to evaluate the performance of regional basins, plan future basin improvements, and recommend potential ordinance changes to address more stringent detention requirements in areas that are prone to flooding and erosion – especially in the Middle One Rouge River subwatershed.

This memorandum provides relevant background information and discusses ways in which to address flooding and erosion in the Middle One Rouge subwatershed, including a necessary component that is proposed to be added to the GIS Mapping project scope: hydraulic modeling.

## Background

As discussed in the February 2007 Stormwater Master Plan Phase II report, streambank erosion and localized flooding upstream of Meadowbrook Lake in the Middle One Rouge River subwatershed is an ongoing problem that needs to be addressed. Bank erosion and the resultant sedimentation of the stream destroys habitat, fills wetlands, and diminishes storage volume; while flooding inundates wildlife habitat and poses potential risks to health, safety and property.

The Middle One Rouge subwatershed encompasses nearly half of the land area in the City of Novi and covers approximately 14 square miles. (Map 1 depicts the subwatershed boundaries within the City of Novi.) Drainage in the subwatershed upstream of Meadowbrook Lake is conveyed to the Middle Rouge via several tributaries, including Bishop Creek, Ingersol Creek, Chapman Creek, Munro Creek, and Leavenworth Creek. The Middle Rouge and its tributary creeks exhibit varying degrees of streambank erosion, and historically have been prone to flooding - especially in the Meadowbrook Lake Drainage District located immediately northeast of Meadowbrook Lake and along Ingersol Creek and Bishop Creek.

According to the Phase II report, these problems can be attributed to a lack of flow attenuation provided by the regional detention basins. It is important to note that, while the regional basins reduce the impact of low frequency storms (e.g., 10-year and 100-year events), they may not effectively mitigate storms that occur at a much higher frequency. As indicated in the report, high frequency/high intensity storms often cause the Middle Rouge River and its tributaries to have

bank-full conditions, which is the primary cause of streambank erosion and localized flooding. The increased frequency of bank-full flows negatively affects the stream channel by increasing streambank erosion, undercutting banks, and straightening stream channels; resulting in loss of meanders, pools, riffles, and other key habitat elements. Bank-full flows are typically associated with the 1.5-year frequency storm.

### Solutions

A two-pronged approach was recommended in the Phase II report to address high frequency storms and resulting streambank erosion and localized flooding. One solution would be to retrofit existing regional stormwater detention basins to restrict flows from high frequency storm events. As mentioned above, improvements for the Taft and Bishop regional basins are under construction, and these improvements will help ensure that high frequency storm events (specifically, 1.5-year storms) are detained. Other regional basins to be retrofitted over the next three years are programmed in the city's Capital Improvements Program.

The second solution recommended in the report would require on-site stormwater detention basins for all new developments that are tributary to Meadowbrook Lake, regardless if they are already served by one of the City's regional detention basins. Because the Code of Ordinances currently spells-out on-site detention requirements for districts *without* regional detention basins, the remainder of this memorandum will discuss how we propose to implement this solution as it pertains to drainage districts with regional basins. (Map 2 shows the regional detention basin districts that are upstream of Meadowbrook Lake that would be affected by this recommendation.)

### Implementation Plan

The proposed implementation plan for effecting this change consists of three tasks, as follows:

#### 1. *First Ordinance Text Amendment:*

As a starting point, we propose an Ordinance amendment that will add a requirement for new developments in regional basin districts tributary to Meadowbrook Lake to detain up to the bank-full/1.5-year storm, because doing so would provide the optimal level of protection against streambank erosion and localized flooding. Exceptions to this requirement would be made if:

- The site is upstream of a regional detention basin that adequately controls all design storm events (i.e., both high and low frequency events). No on-site detention would be needed in situations where hydraulic modeling, as described in Task 2 below, has verified that the regional basin is functioning properly.
- Stormwater from the site to the regional basin is to be conveyed in a pipe or a stabilized/armored stream channel, therefore streambank erosion would not occur.
- The site is upstream of a regional detention basin that is not properly restricting flows for design storm events and cannot be retrofitted to detain larger volumes. In this case, an on-site detention basin would be required so that larger volumes (most likely the 100-year storm volume) could be detained. Again, determining regional basin performance characteristics would be based on the results of hydraulic modeling.

We plan on bringing the first reading of this text amendment to Council at a future meeting.

**2. Hydraulic Modeling:**

The degree of on-site detention should be inversely related to the detention value provided by the downstream regional basin. In other words, if a regional basin can detain the 1.5-year storm, then the on-site facility would not need to meet the 1.5-year/bank-full detention requirement. Conversely, if the regional basin cannot meet the City's 100-year storm detention requirement, then an on-site basin must be sized accordingly.

Because each regional basin's detention value is unknown, it is recommended that the upcoming GIS Mapping project be augmented to include hydraulic modeling to determine this factor. Once we know how well a district's regional basin is performing, we will be able to specify requirements for on-site basins in that district. This is the primary reason for augmenting the Regional Basin Mapping project with a hydraulic modeling task.

Data collection and mapping would provide the information required for model development. The model would be used to evaluate the performance of each regional detention basin to determine whether on-site detention would be required within a particular drainage district. Specifically, hydraulic modeling would help answer the following questions for each regional basin:

- Does the regional detention basin mitigate the 1.5-year through 100-year peak flows?
- Does the lack of on-site detention result in high in-stream velocities upstream of the regional detention basin and increased potential for streambank erosion?
- Does the regional detention basin system reduce in-stream velocities and the potential for streambank erosion?
- When should on-site detention be required to protect for flooding and streambank erosion concerns?

The approximate cost of adding hydraulic modeling to the GIS Mapping project is an additional \$15,000 over the \$50,000 already budgeted for the project. ))

**3. Second Ordinance Text Amendment: <**

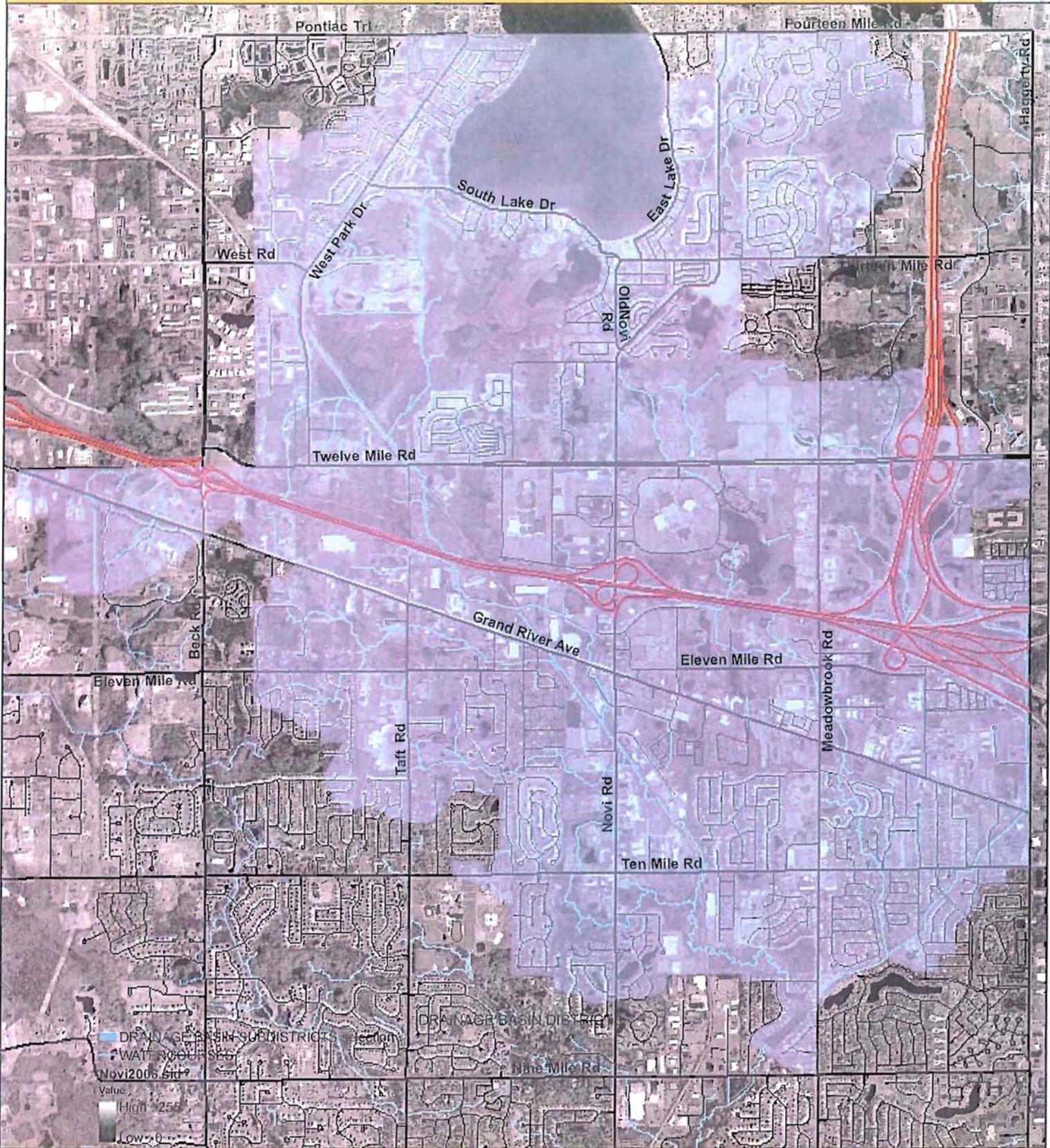
Based on the results of the GIS Mapping/Hydraulic Modeling project, we will tailor the Ordinance to reflect specific detention requirements for each of the regional detention districts upstream of Meadowbrook Lake.

The two text amendments will be presented to Council for adoption by the end of this fiscal year. The GIS Mapping/Hydraulic Modeling project will be placed on the October 20<sup>th</sup> meeting agenda ✕ for City Council's consideration.

Please let me know if you have any questions, comments or concerns in regard to the proposed plan for addressing on-site stormwater detention needs upstream of Meadowbrook Lake.

cc: Pam Antil, Assistant City Manager  
Steve Rumble, Community Development Director  
Brian Coburn, Civil Engineer  
Ben Croy, Civil Engineer

# MAP 1 MIDDLE ONE ROUGE RIVER SUBWATERSHED UPSTREAM OF MEADOWBROOK LAKE DAM

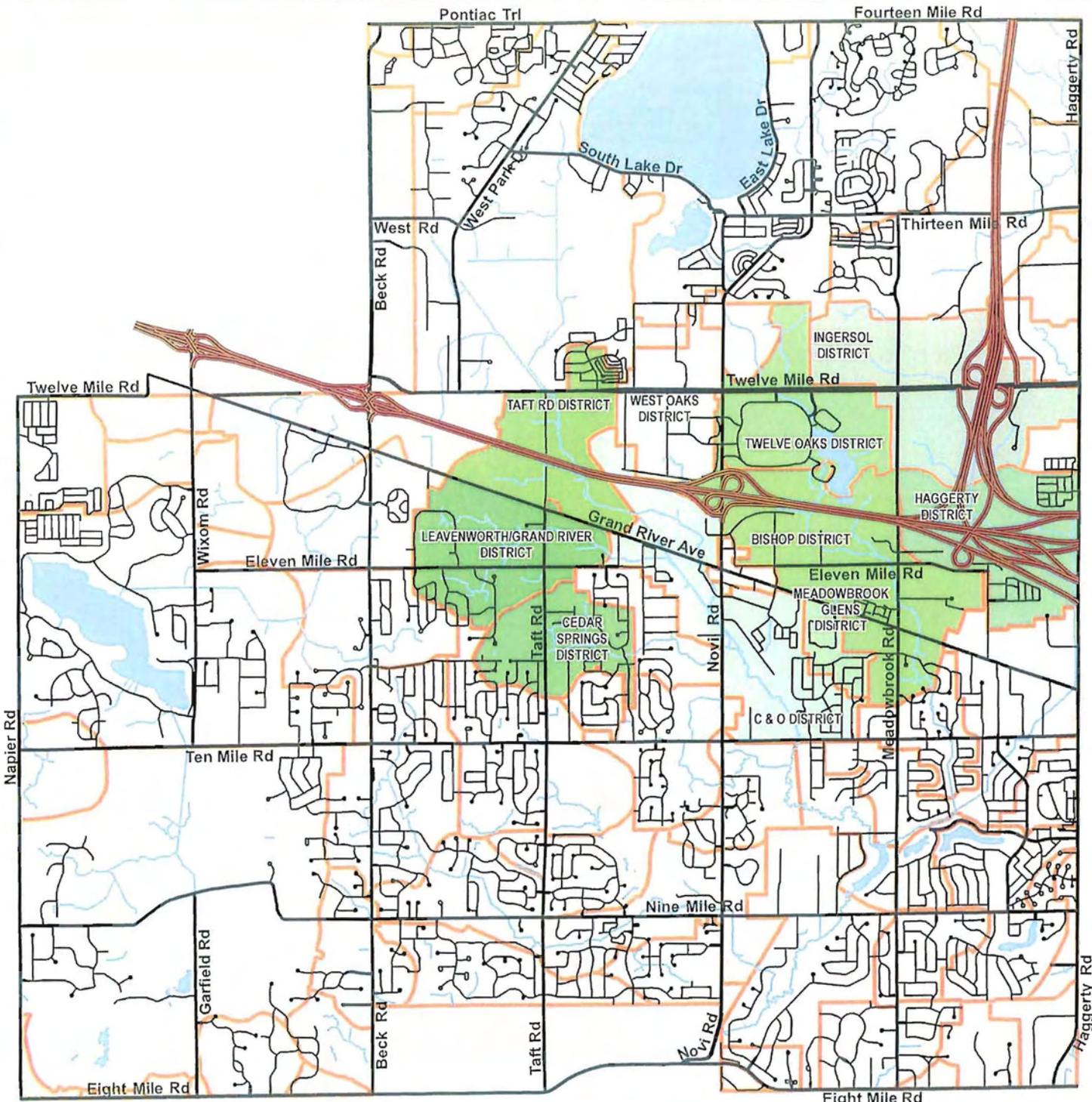


**CITY OF NOVI**  
ENGINEERING DIVISION  
46175 W. TEN MILE ROAD  
NOVI, MI 48325-3024  
(248) 547-0454  
MAP AUTHOR: CHRISTOPHER BLOUSH, GIS MANAGER



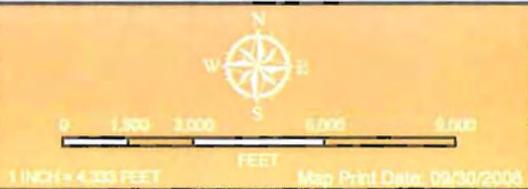
**INTERPRETATION NOTICE**  
Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent, accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as survey measurements performed by a Licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1975 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.

**MAP 2: REGIONAL STORMWATER DETENTION BASIN DISTRICTS THAT ARE TRIBUTARY TO MEADOWBROOK LAKE**  
**CITY OF NOVI. ENGINEERING DIVISION**



DRAINAGE BASIN DISTRICTS		
DRAINAGE BASIN SUBDISTRICTS	LEAVENWORTH/GRAND RIVER DISTRICT	TAFT RD DISTRICT
BISHOP DISTRICT	HAGGERTY DISTRICT	TWELVE OAKS DISTRICT
C & O DISTRICT	INGERSOL DISTRICT	WEST OAKS DISTRICT
CEDAR SPRINGS DISTRICT	MEADOWBROOK GLENS DISTRICT	WATERCOURSES

**CITY OF NOVI**  
 ENGINEERING DIVISION  
 45175 W. TEN MILE ROAD  
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**MAP INTERPRETATION NOTICE**  
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**SCORING SUMMARY FOR RFP REVIEW**

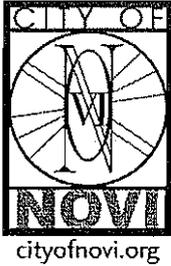
**Project Description:** Stormwater Modeling

**RANK 1= LOW, x= BEST (x = number of firms repending)**

<b>SCORES</b>	<b>TOTAL OF STAFF REVIEW SCORES</b>					<b>Totals</b>	<b>Rank</b>
	<i>Item weight:</i> 15	10	30	20	25		
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		
Anderson Eckstein & Westrick	15	16	7	5	8	<b>895</b>	4
Fishbeck Thompson Carr & Huber	0	0	0	0	0	<b>0</b>	5
Orchard Hiltz & McCliment	10	13	18	16	17	<b>1565</b>	2
Stantec	5	10	10	14	7	<b>930</b>	3
Spalding DeDecker	0	0	0	0	0	<b>0</b>	5
URS Corporation	20	11	15	15	18	<b>1610</b>	1
<b>TOTALS</b>	50	50	50	50	50		

**SCORING CRITERIA**

1. Engineering Fee
2. Evaluation of Schedule
3. Evaluation of Approach, Statement of Understanding of Project, and proposed staff
4. Analysis of subjective statements applicable to the project as required on the RFP (Value added items)
5. Evaluation of past performance on City projects



**REQUEST FOR PROPOSALS  
CITY OF NOVI**

**ENGINEERING SERVICES FOR  
STORM WATER MODELING AND ANALYSIS OF  
REGIONAL DETENTION BASINS  
UPSTREAM OF MEADOWBROOK LAKE**

**July 8, 2008**

This Request for Proposals (RFP) for **ENGINEERING SERVICES FOR STORM WATER MODELING AND ANALYSIS OF REGIONAL DETENTION BASINS UPSTREAM OF MEADOWBROOK LAKE** is being sent to the firms selected in the Utility Qualification Process completed on March 19, 2007.

**PROJECT DESCRIPTION**

The City of Novi maintains a regional detention basin system which is intended to limit the impacts of development on flooding and streambank erosion. Detention basins perform these functions by storing inflowing water during storm events and releasing it at a slower controlled rate. Currently, proposed developments within the City that are located within a drainage district with a regional detention basin (see maps in Exhibit B) have the option to utilize stormwater detention within the regional basins or provide onsite detention. The storm water from these development sites is conveyed to the regional basin through storm sewers and existing open channel drainage. Additionally, previous studies have identified some basins as being ineffective for treating lower frequency storms. Streambank erosion has been documented at several locations, especially on the Walled Lake Branch of the Rouge River upstream of Meadowbrook Lake. The City would like to develop a system for assessing when the regional detention basins are at capacity and what effects the regional detention basins have on streambank erosion in their vicinity. The City would also like to determine if new policies relating to the regional basin system are required to address stream bank erosion issues. See Exhibit B for additional background information and previous studies.

**SCOPE OF SERVICES**

The purpose of this project is to evaluate whether the regional detention basins are mitigating peak flows that may lead to flooding or streambank erosion. Specifically, a drainage district and regional detention basin will be evaluated to determine the following:

1. Does the regional detention basin mitigate the 2-year and 100-year peak flows?
2. Does the lack of onsite detention result in high in-stream velocities upstream of the Regional detention basins and increased potential for streambank erosion?
3. Does the regional detention basin system reduce in-stream velocities and the potential for streambank erosion?
4. When should onsite detention be required to protect for flooding and streambank erosion concerns?

## **APPROACH**

The selected consultant shall describe an approach for determining the effectiveness of the regional detention basin system at mitigating flows to limit flooding and streambank erosion. At a minimum, the four questions posed above should be answered. In addition, the approach proposed by the consultant should include the following:

- Simulation of peak flows at locations upstream, at the outlet, and downstream of the Regional detention basins.
- Simulation of velocities at locations upstream, at the outlet, and downstream of the Regional detention basins.
- Ability to simulate land use changes so that the City can investigate the impact of increased development on peak flows and in-stream velocities.
- Ability to simulate onsite detention so that the City can investigate the impact of new developments use of the regional detention basin or onsite detention on peak flows and in-stream velocities.
- Ability to identify areas susceptible to stream bank erosion and potential causes through computer modeling and a field investigation.

The computer modeling tool developed should be compatible with the City's existing GIS data and system. The City does not have a preferred vendor for modeling software and is looking for a recommendation from the consultant for software that 1) is capable of meeting the criteria of this RFP, 2) is competitively priced with other modeling software and 3) can be used by engineering staff with a minimum amount of training.

## **DELIVERABLES**

The consultant shall provide a report detailing the approach, methodology and conclusions related to the effectiveness of the regional detention basins within the project area at controlling erosion. In addition, an approach for determining when a regional detention basin is at capacity must be identified.

Other deliverables requested by the City include:

- All computer modeling input files needed to perform the hydrologic modeling.
- Assistance in selective a modeling software that the City will purchase.
- Training for City staff on the use and modification of the computer modeling system developed.
- Documentation of existing streambank erosion sites within the project area.
- Development of a complete GIS data model for the regional basin sites that are located within the project area which and collection of data for each basin in the project area. The data model will be developed through meeting with city staff and will be based on the OCDC data model example which is included in Exhibit B.

This proposed project will provide the City staff with a demonstration of a tool or methodology that will allow them to determine whether the regional detention basin system is effective at controlling flood flows and streambank erosion, and to provide a method for determining the optimal required onsite detention and/or increases in regional detention basin system volume.

**PROJECT AREA:**

The City is requesting two separate fees for the proposal based on two alternates: Alternate A is a relatively small pilot area (Cedarsprings Basin and the tributary downstream of the basin), and Alternate B is the watershed area upstream and tributary to Meadowbrook Lake. These areas are shown in Exhibit B. The City will determine which alternate to award based on the fees provided as they relate to the available budget.

**CONSULTANT QUALIFICATIONS**

The Consultant has been pre-qualified to provide engineering consulting services for 2007-2008 Utility Projects.

**CONSULTANT SELECTION**

As a pre-qualified consultant, the selection for this utility project will be based on an evaluation of the fee proposal, which is labeled as Exhibit A, in addition to the Consultant's project approach, schedule, and value-added concepts that would improve the overall project (i.e., cost savings, time savings, innovation, etc.). **The following scoring will be used to evaluate the proposals:**

<u>Criteria</u>	<u>Weight</u>
Engineering Fee	10%
Evaluation of Schedule	10%
Evaluation of Approach, Statement of Understanding of Project, and Proposed Staff	30%
Analysis of subjective statements applicable to the project as required on the RFP (Value-added items)	20%
Evaluation of past performance on City projects	25%

The selected consultant will enter into an agreement with the City of Novi to perform the services listed in this Request for Proposals. The City's standard Consulting Engineering Agreement is included as Exhibit C.

**PROPOSAL SUBMITTALS**

To be considered, sealed proposals (an UNBOUND original and five copies) must arrive at the City of Novi, Office of the City Clerk, 45175 W. Ten Mile Road, Novi, Michigan 48375 on or **before 3:00 PM** Local Prevailing Time, **Wednesday, July 23, 2008**, and clearly labeled **ENGINEERING SERVICES FOR STORM WATER MODELING AND ANALYSIS OF REGIONAL DETENTION BASINS UPSTREAM OF MEADOWBROOK LAKE**. There will be no exceptions to this requirement and the City of Novi shall not be held responsible for late, lost, or misdirected proposals. Submitted proposals shall include:

- The completed fee proposal (Exhibit A)
- A proposed schedule for the project.
- A rate sheet or fee schedule depicting the Consultant's hourly rates that could be applied to additional work as may be necessary, for each category of staff that would work on the project.

- A detailed discussion of the proposed approach to the project, in detail (including any value-added concepts and related costs/savings that would improve the overall project (i.e., cost savings, time savings, innovation, etc.)).

**USE OF CITY LOGO IN YOUR PROPOSAL IS PROHIBITED.**

In the hiring of employees for the performance of work under this contract, neither the contractor, subcontractor, nor any person acting in their behalf shall by reason of race, creed, color, age, height, weight, sex, sexual preference or handicap discriminate against any person qualified to perform the work required in the execution of the contract.

All proposals must remain valid for one hundred twenty (120) days from due date and cannot be withdrawn during this period.

Questions regarding this Request for Proposals may be directed to:

City Engineer, Rob Hayes, P.E. (248) 735-5606

-or-

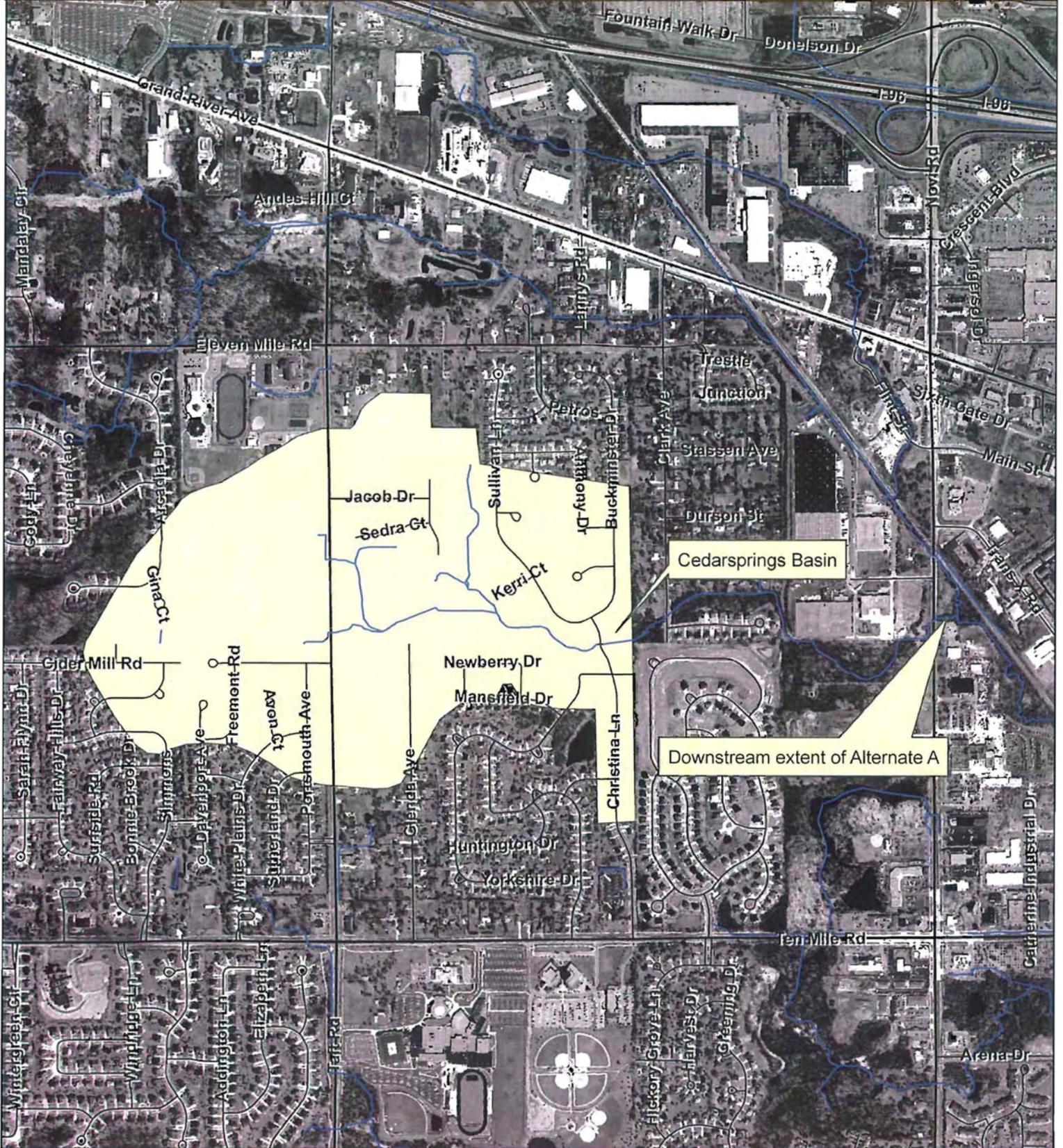
Civil Engineer, Brian Coburn, P.E. (248) 735-5632

The City of Novi reserves the right to accept any or all alternative proposals and to award the project to other than the firm with the lowest fee proposal, waive any irregularities or informalities, or both, to reject any or all proposals, and in general, to make award in any manner deemed by the City, in its sole discretion, to be in the best interests of the City of Novi.

**Exhibits**

- A - Fee Proposal
- B- Location Maps, OCDC Data Model excerpt, links to more information
- C - Engineering Consultant Agreement

# ALTERNATE A CEDARSPRING DRAINAGE DISTRICT



**CITY OF NOVI**  
ENGINEERING DIVISION

45175 W TEN MILE ROAD  
NOVI, MI 48375-3024  
(248) 347-0454  
MAP AUTHOR: Brian Coburn



1 INCH EQUALS 1,172 FEET

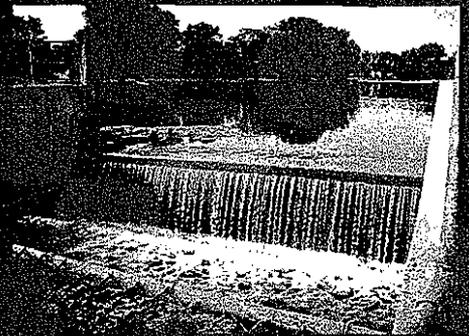
MAP PRINT DATE: 6/25/08

**MAP INTERPRETATION NOTICE**

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PROPOSAL

CITY OF NOVI ENGINEERING SERVICES FOR STORM  
WATER MODELING AND ANALYSIS OF REGIONAL  
DETENTION BASINS UPSTREAM OF MEADOWBROOK LAKE



Submitted by:

**URS**

JULY 29, 2008



July 29, 2008

City of Novi  
Office of the Clerk  
Sue Morianti, Purchasing Manager  
45175 W. Ten Mile Road  
Novi, MI 48375-3024

**Reference: Request for Proposal Engineering Services for Storm Water Modeling and Analysis of Regional Detention Basins Upstream of Meadowbrook Lake**

Dear Ms. Morianti:

Please find enclosed an original and five copies of our proposal for the above referenced project. Also enclosed is a sealed envelope with the fee proposal information requested in the RFP.

Our proposal and the prices quoted shall remain valid for 120 days.

URS has a deserved reputation for designing and inspecting large scale, complex municipal projects. However, we have also provided quality services for hundreds of projects of all types and scales to Cities, Villages and Counties throughout the State of Michigan. For this project we have teamed with Allied Information Solutions, a leader in GIS and Information Technology applications.

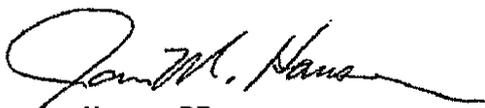
We are currently providing design, construction engineering, layout, and inspection services for the City of Novi on the Meadowbrook Lake Dam renovations and the 2008 Road Reconstruction project. We believe these projects to be a success and look forward to providing quality services to you on this project.

Allied Information Solutions, Inc. provided County and Municipal Governments and Utility companies with turnkey GIS and Information Technology solutions. They specialize in connecting individual data components with key departments of local governments. Counties and Cities are always looking for ways to improve services, cut expenses and increase revenue. Our goal is to help achieve these results through better use of data.

If you have any questions, please feel free to contact me at (248) 204-4140. We appreciate your consideration of our proposal and look forward to working with you again.

Sincerely,

**URS Corporation**

  
Jan Hauser, PE  
Vice President, Water Resources Department

Attachments:

URS Corporation  
27777 Franklin Road, Suite 2000  
Southfield, Michigan 48034  
Tel: 248.204.5900  
Fax: 248.204.5901  
www.urscorp.com

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## INTRODUCTION

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### **Interest in Project**

URS Corporation welcomes the invitation to submit our proposal to the City of Novi for the Storm Water Modeling and Analysis of Regional Detention Basins Upstream of Meadowbrook Lake or Cedar Springs Basin. This proposal describes our understanding of the project, approach and fee. We have included several "value added" concepts that will ultimately help implement stormwater management options throughout the City for your consideration.

In addition, URS has teamed with Allied Information Solutions, a firm that specializes in providing municipal governments with turnkey solutions to GIS and information technology needs. They will be providing assistance during computer model development, development of the GIS models for the detention basins and streambank erosion sites. Their experience with the GIS platforms utilized by the City of Novi and Oakland County will allow for efficient and seamless integration of the new data layers.

### **Section 1 – Understanding and Approach**

This section describes our approach to assessing the regional detention basin system, stream bank erosion sites, and analysis of capacity and onsite drainage issues within the City. Based on our experience with similar projects we understand the desire to reduce peak flows and limit velocities in downstream reaches must be investigated with a keen understanding of how this impacts existing developments and redevelopment sites. In addition, we will provide the City with retention basin data, erosion data, and a storm water assessment tool that is compatible with the data housed within the Oakland County Collaborative Asset Management System.

### **Section 2 - Staffing**

This section indicates which staff will be used for this project and describes the organizational structure of our team.

### **Section 3 – Fee Proposal**

This section includes our estimated costs for this project, as described in the RFP. Optional tasks that may add value to the project are priced separately providing the City of Novi the ability to consider all aspects of our proposal. Our estimated cost to provide engineering services is \$32,000 for Cedar Springs Basin and \$65,000 for all basins upstream of Meadowbrook Lake. Additional tasks recommended to aid in the application, implementation and acceptance of innovative stormwater management methods are included in this section.

## INTRODUCTION

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### **Section 4 – Schedule**

URS' schedule spans 8 weeks for the basins upstream of Meadowbrook Lake and 6 months for the Cedar Springs basin. This schedule has been developed to allow sufficient time to complete the field work, computer modeling, GIS integration and training. This is the amount of time we would like to accomplish the tasks set forth in the RFP; however, we are willing to work with the City to modify the schedule as needed.

## UNDERSTANDING AND APPROACH

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This proposal describes URS' approach to regional storm water modeling with the expressed purpose of evaluating the City's regional detention system with respect to flooding and streambank erosion mitigation; developing a GIS database of regional detention sites; and providing training to City staff on the storm water assessment tool. Our analysis of the regional detention basin system will result in a system for assessing when the detention basins are at capacity and what impact they have on flooding and stream bank erosion. In addition, URS will develop an approach based on sound science for controlling storm water when regional storage reaches capacity and develop alternative stormwater management options that will continue to meet the City's needs into the future. The final report will discuss and recommend policies related to the regional detention basin system required to address stream bank erosion and flooding issues under existing and future development conditions.

### **Purpose and Understanding**

The purpose of this project is to evaluate whether the regional detention basins are mitigating peak flows that may lead to flooding or streambank erosion. It also includes developing a GIS data model for the regional detention basins and integrating the storm water assessment tool with the City's existing GIS.

The City's drainage district and regional detention basin will be evaluated to determine the following:

1. Does the regional detention basin mitigate the 2-year and 100-year peak flows?
2. Does the lack of onsite detention result in high instream velocities upstream of the regional detention basins and increased potential for streambank erosion?
3. Does the regional detention basin system reduce instream velocities and the potential for streambank erosion?
4. When should onsite detention be required to protect for flooding and streambank erosion concerns?

Characteristics, photos and locations of the regional detention basins will be collected and added to a GIS data model compatible with the City's existing GIS. Our partners, Allied-Information Solutions, will lead the integration of this data.

The storm water assessment tool will be a stand alone computer model capable of meeting the technical requirements of the project. URS along with Allied Information Solution will enable the software to utilize the City's existing GIS data to it fullest potential and, if desired, provide output as GIS layers that can be viewed through CivXplorer.

## UNDERSTANDING AND APPROACH

### Assessing Basin Capacity

The City of Novi maintains a regional detention basin system which is intended to limit the impacts of development on flooding and streambank erosion. Detention basins perform these functions by storing inflowing water during storm events and releasing it at a slower controlled rate. For flood control, the 100-year storm event is typically of concern. Though, smaller or larger storms may have regulatory significance. For stream bank erosion these large flows have little impact on channel formation because they are rare. More frequent flows, such as those recurring approximately every 2 years have been found to have the greatest impact on the stream channel (Schueler, 1987 and Rosgen, 1996). Thus, when assessing streambank erosion these smaller, more frequent storm events are of most interest. Our analysis will use the 100-year flow event to assess the regional detention basins ability to provide flood control and the 2-year flow event to assess the regional detention basins effect on mitigating streambank erosion.

Basin capacity is a function of the outlet characteristics and active storage of the basin. URS' analysis will focus on both aspects. Outlet characteristics will be evaluated to insure that they mitigate small storms as well as large storms and the active storage will be assessed to determine if sufficient volume exists to reduce flooding and flashiness during large storms. The results of our analysis will determine whether the basins are mitigating or contributing to storm water flooding and erosion issues in the City.

### Discussion of Streambank Erosion Processes

One of the stated reasons of this project is to relate streambank and storm water management via the regional detention basins. Streambank erosion may have multiple causative factors, of which regional detention basins influence only a few (flow rate, instream velocities, sediment load); therefore, a brief overview of the process related to streambank erosion is provided below.

Some streambank erosion is natural, but accelerated streambank erosion may lead to channel instability, high sediment loads, and habitat loss. Streambank erosion is the result of two primary components: Streambank stability and hydraulic forces. Streambank

### Silver Creek Storm Water Plan

URS is developing a Watershed Master Plan for the City of Toledo to provide flood relief along the Silver Creek corridor, an 8 mile tributary serving a 6000 acre urban watershed.

Two alternative schemes are being developed: a traditional "grey" conveyance scheme of enlarging the channel and roadway culverts; and a "green" storage scheme of restoring floodplain storage capacity. Each scheme will be developed to assess flooding benefits, permitting strategies, land acquisition requirements, and cost estimates.

The Green scheme identifies over 20 potential floodplain restoration sites capable of providing more than 150 acre/feet of storm water storage capacity in restored floodplains adjacent to the stream channel.

## UNDERSTANDING AND APPROACH

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stability characteristics are primarily related to the type and amount of vegetation growing on the banks or level of armoring present (either engineered or natural). The hydraulic forces are typically related to greater and more frequent flows resulting from increased impervious areas.

Four major causes for increased streambank erosion potentially present in the City of Novi are:

- **Land Use Change:** When we build houses, sidewalks, and roads over soil, we reduce the amount of water that can enter the ground. Consequently, water runs off faster, and with more erosive energy into streams. Streams become "flashy," erosive, and flood-prone.
- **Straightening Streams:** When we straighten a winding stream, we remove the meanders that reduce the erosive power of water. In the past, streams were channeled to move water quickly through flood-prone or erosive areas. But instead of solving a problem, it only moved the problem downstream with even greater force.
- **Dams typically trap sediment within their impoundment and therefore change the amount of sediment and energy present in a stream. Streambank erosion and/or channel incision sometimes occurs as a result of excess energy being dissipated below dams as the stream re-establishes dynamic equilibrium.**
- **Limited deep rooted vegetation along streambanks may also contribute to erosion. When we remove trees and vegetation next to a stream this exposes the soil. As a result, streambanks may erode more rapidly and slump into the water.**

The regional detention basin system within the City of Novi may reduce the effect of land use change and straightening of streams by reducing flows and velocities. This project will determine how effective the regional detention basin system is at mitigating these hydrologic changes.

### **Storm Water Modeling Approach**

The approach to determining the effectiveness of the regional detention basin at mitigating peak flows to limit flooding and streambank erosion includes hydrologic computer modeling and a field cataloguing of streambank erosion sites. To demonstrate the effectiveness of this approach at meeting the City's project goals the analysis will be tested on a single drainage district (either the Cedar Springs or Meadowbrook Lake drainages), refined and applied to the entire City at a later date.

A Geographic Information System based hydrologic model will be developed to the sub drainage district level in order to provide adequate spatial resolution to investigate flows

## UNDERSTANDING AND APPROACH

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upstream and downstream of the regional detention basins. The hydrologic computer model will be developed with the following characteristics:

- Simulate peak flows at locations upstream, at the outlet, and downstream of the regional detention basins. This will allow the City to evaluate how each regional detention basin reduces peak flow. Refinement to the reach level will allow the model to be used to evaluate the storage capacity of natural channel design within the existing floodplain.
- Simulate velocities at locations upstream, at the outlet, and downstream of the regional detention basins. This will allow the City to evaluate how each regional detention basin may influence streambank erosion.
- Allow land use changes, basin changes, and channel changes to be simulated so that the City can investigate their impact on peak flows and in stream velocities.
- Allow onsite detention to be simulated so that the City can investigate their impact on peak flows and in stream velocities.

The computer modeling application will allow a quantitative comparison of peak flows, peak velocities at different locations for storm water management scenarios (onsite detention, increased basin volume, and natural channel design). This flexibility in the computer modeling application will allow the City to compare numerous scenarios.

URS suggests that scenarios simulated for this project be developed in cooperation with representatives of the City's engineering and planning departments. This will insure that the selected scenarios are realistic and implementable. To aid in the development of scenarios URS suggests the following four classifications:

1. Existing Conditions. This is the baseline scenario that the others will be compared to. It will represent the City in recent years as represented by existing data.
2. Future conditions with no change to storm water management policies. This scenario represents conditions that will occur if no changes are made to the City's stormwater management plan. Typical  $\gamma$ , this represents the worst possible storm water situation. This scenario will be based on existing land use or population projections.

### **Green Infrastructure**

Many communities throughout Michigan and nationally have been implementing green infrastructure as a way to mitigate the negative effects of storm water. URS has been at the forefront of this emerging concept and technology. Several ideas are discussed in this proposal that reflect green technology. These may represent methods for increasing the detention volume of City infrastructure by dispersing it in unobtrusive ways throughout the storm water basins, through enhancement of existing basins, and through natural channel design.

## UNDERSTANDING AND APPROACH

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3. Expansion of City controlled detention volumes. This scenario will include feasible expansion of existing basins and/ or increased volumes through natural channel design.
4. Onsite storm water management. This scenario will investigate the required onsite controls needed to mitigate flooding and streambank erosion. Conceptually, we will simulate best management practices that include detention and infiltration.

The computer modeling will use simulated instream velocities and shear stress to assess potential areas where streambank erosion is likely. To verify where streambank erosion is occurring and why, a field investigation is proposed to catalogue stream characteristics near active stream bank erosion sites. The field investigation will document the condition of the streambank where active erosion has been reported. Photographs will be taken, the location noted and the density of deep rooted vegetation and armoring present, and other characteristics will be estimated. This analysis in conjunction with the computer modeling will be used to evaluate the cause of streambank erosion on a site specific and stream reach basis.

### **Computer Model Selection**

A goal of this project is to develop a stormwater assessment tool that City staff can use, modify, and apply after URS' tasks are complete. Therefore, the selection of an appropriate computer modeling system is critical. Due to the importance of this task URS has elevated it to a project task. URS will meet with City staff that might use the software (engineering, planning, GIS) and will work with the City to select a computer model that meets the City's technical needs for a reasonable cost.

URS' approach to selecting a model with the City will focus on functionality, cost, open source vs. proprietary computer code, ease of use and integration with GIS. Our selection process will include a meeting with City staff; prioritization of the characteristics the City would like in a computer model and conclude with a recommendation of an appropriate model that meets the City's needs.

URS is confident that this approach will result in the selection of an appropriate model for this task that meets your immediate needs at a reasonable cost. Selecting a computer model as part of the project will not impact schedule. Ultimately, the tool developed will be the City's and could be in use for years; therefore, it is of the utmost importance that the proper computer model is selected.

A list of potential computer models suitable for this project is below (Table 1). Each meets the functional/ technical requirements of the RFP. They vary in their cost, ease of use, flexibility and integration with GIS.

# UNDERSTANDING AND APPROACH

**Table 1 – Computer Models Suitable for Storm Water Modeling**

Name	Cost	GIS Integration	Ease of Use
EPA SWMM	Free	Uses GIS data	Difficult
InfoSWMM	\$3,000	Fully integrated with ArcGis	Moderate
Infoworks SD	\$18,500	Utilizes existing GIS data and exports to GIS compatible formats	Easy
HEC-HMS/RAS	Free	Utilizes existing GIS data and exports to GIS compatible formats	Difficult
PCSWMM	\$1,500	Utilizes existing GIS data and exports to GIS compatible formats	Moderate
WMS	\$3,700	Utilizes existing data within ArcGis interface. Includes several modeling platforms (SWMM, HEC, others)	Moderate

## Streambank Erosion Assessment Approach

One goal of the project is to determine if the regional detention system is contributing to streambank erosion. This could occur in two ways: increased flashiness and runoff volumes upstream of regional detention basins from increased impervious areas or due to concentrated outflow from the detention basins. To make the above determination URS will survey the natural drainage system to locate and assess the contributing factors for identified erosion sites.

To accomplish this task URS will conduct a basic geomorphological survey of the major drainage channels and other tributaries with known erosion sites. Our field investigation will identify and assess the mechanism of bank failure which will help us identify the root cause of the erosion. While many causes of streambank erosion are independent of stream velocity (e.g. poor vegetation, obstructions in the stream, bridges, and dams) entrainment of soil from the banks can be exacerbated when greater shear stresses occur, such as that from developing urban areas. Due to the projects focus on the regional detention basins our field investigation will focus on areas immediately upstream and downstream of these facilities.

The field investigation will document the following through site sketches, photographs and field measurements:

- Condition of bank: length of erosion, location of erosion (undercutting, toe, or upper bank);
- Location within reach (bend, pool, riffle, run)
- Slope of bank
- Vegetative cover type and percent coverage
- Average bank height

## UNDERSTANDING AND APPROACH

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- Soil type (sand, gravel, stratified, clay or loam;
- Apparent cause of erosion.

This information will be used to determine the likely cause of erosion.

The deliverable for this task will be a report that details each erosion site investigated. The report will specify locations, failure mechanisms and likely causes. Our assessment of whether increases in regional detention volume, modifying the outlet structures, or adding onsite detention requirements will mitigate streambank erosion will be provided. This will be incorporated into the computer modeling report and the data will be provided to the City as a GIS layer.

### Discussion

The hydrologic computer modeling will provide a quantitative estimate of how land use changes affect peak flow and velocities within the drainage district. Different land use and detention scenarios can be simulated using the model. The field investigation will document whether high instream velocities or other factors are causing streambank erosion. Together, these tasks will answer the City's questions related to the regional detention basin system. Specifically, the questions posed by the City and the mechanism for answering each of them are reiterated below:

1. Does the regional detention basin mitigate the 2-year and 100-year peak flows?

The hydrologic computer model will allow the inflow and outflow from each regional detention basin to be simulated. Comparing these values will determine how well each regional detention basin mitigates peak flow. The metric used to assess and compare peak flow mitigation will be percent reduction in flow attributed to the regional detention basin.

2. Does the lack of onsite detention result in high instream velocities upstream of the regional detention basins and the increased potential for streambank erosion

The hydrologic computer model will allow instream velocities to be simulated. Instream velocities simulated with onsite detention will be compared to velocities under the existing conditions to help determine whether requiring onsite detention will mitigate

#### **Floodplain Storage Example**

Excavation of a floodplain at two locations adjacent to the formerly channelized stream has resulted in creation of over 8 acre/feet of storm water storage capacity.

HEC RAS modeling indicates peak discharges are reduced by 35% thereby reducing downstream flooding and erosion.

Steel weir plates on existing headwalls provide a cost effective and unobtrusive means of flow reduction. Modeling determined the size of the low flow opening and the elevation of the overflow on the weir plate installed on each head wall.

## UNDERSTANDING AND APPROACH

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streambank erosion upstream of the regional detention basins. In addition, streambank erosion evaluations from downstream of the regional detention basins will be compared to streambank erosion upstream of the regional detention basins during the field investigation. The type and amount of streambank erosion sites will be evaluated to assess whether regional detention basins mitigate erosion and/ or whether a lack of onsite detention is exacerbating streambank erosion problems.

3. Does the regional detention basin system reduce instream velocities and the potential for streambank erosion?

The hydrologic computer model will allow instream velocities to be simulated. Velocities will be compared above and below regional detention basin to assess how much they reduce velocities.

4. When should onsite detention be required to protect for flooding and streambank erosion concerns?

The hydrologic computer model can be used to assess how much additional development each drainage district can assimilate without adverse impacts on flooding or stream velocities and how different levels of onsite detention and new regional detention will impact regional flooding and instream velocities. In addition, each of the scenarios can be compared to current conditions and future conditions to determine how effective they would be at reducing the impacts from increased development.

This proposed project will provide the City with a demonstration of a computer modeling tool and field investigative method that will allow them to determine whether their system of regional detention basin are effective at controlling flood flows and streambank erosion and provide a method for determining the optimal required onsite detention and/ or quantify the need for additional regional detention volume. In addition, the computer modeling tool can be used to assess the impact of low impact developments, City wide ordinances related to onsite storm water detention, City lead construction of new detention, or identify the level of development when the basins will reach capacity and other controls will be required.

### **Compatibility/ Integration with Existing GIS Data**

URS has partnered with Allied Information Solutions, a firm that is intimately familiar with the City's and County's existing GIS data and web based viewer. URS will work with Allied Information Solutions to insure that the computer model selected is compatible with existing data. If modifications to the data are required the URS team will develop custom solutions that maintain data integrity and ease of use. In addition, the data collected as part of this project will be developed into GIS layers consistent with the structure of the existing system.

## UNDERSTANDING AND APPROACH

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The Regional Detention Basin GIS layer will include:

- Location;
- Photograph;
- Basin type (wet pond, retention/ detention pond, wetland, etc);
- Outlet type and characteristics (elevations, sizing, etc);
- Drainage area size, and;
- Other information as requested by the City.

The streambank erosion assessment will also result in a GIS data layer that includes:

- Location;
- Photograph;
- Size (length and height);
- Soil type, and;
- Other information collected during the field investigation.

The above tasks are included in our base fee estimate. Additional integration and automation with the City's existing GIS is included as a value added task. Details of this option are included in the Fee Proposal Section.

### **Training**

URS will provide a one day training class on the assessment tool and GIS layers developed as part of this project. The training will include:

- Computer modeling theory and philosophy for this project;
- Detailed review of all scenarios completed by URS;
- Review of how to run the model (i.e. the procedures required to develop and run a new scenario;
- Overview of how to use the model (i.e. the process of how to evaluate and assess what the results of a model scenario means), and;
- Overview of project reports and open discussion related to future use of the model.

URS will also provide support to users of the assessment tool over the phone for a period of 60 days after the training session.

### **Conclusions**

This section of the proposal described URS' approach to evaluating the City's system of regional detention basin's as they relate to flooding and streambank erosion; providing training; and integration with the existing GIS. URS' approach will result in a determination of which regional detention basin are no longer mitigating peak flows; which have available capacity; whether the City's policy of using regional detention basin has lead to streambank

## UNDERSTANDING AND APPROACH

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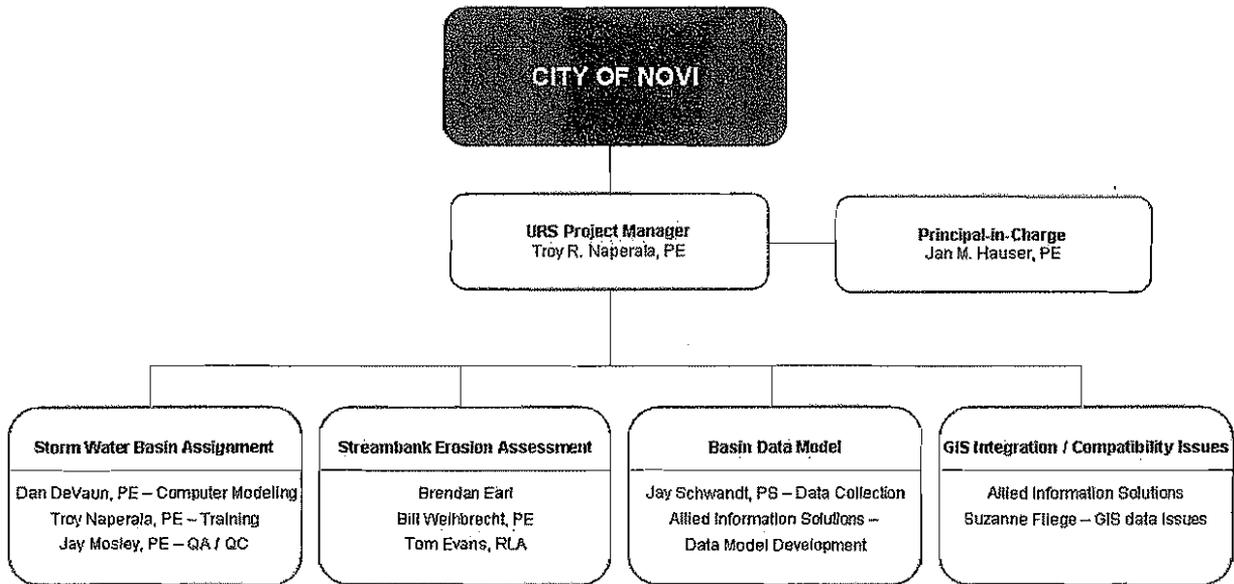
erosion *upstream* or downstream of the regional detention basins; and identify when capacity of the basins will be reached. These determinations will be developed by using a hydrologic computer model and field investigation. Project deliverables will include:

- A technical report describing our approach, methodology, results and conclusions related to the detention basins effectiveness at controlling erosion and an assessment of when the regional detention basins will reach capacity. The report will also include several recommendations for mitigating the negative effects of storm water.
- All computer modeling input files and data required to run and understand the model.
- Training and support for select City staff on the storm water assessment tool.
- Streambank erosion report describing the causes and locations of erosion sites.
- GIS data model for the regional detention basin system.

# PROJECT STAFFING

This section provides an overview of how this project will be managed. It includes an organizational chart and biographies of project staff. Resumes are available upon request.

## Organizational Chart



## Key Staff

Key staff are listed below. Paragraph descriptions are included for each staff and resumes are available upon request.

- Jan Hauser, PE. . . . . Principal-in-charge
- Troy Naperala, PE. . . . . Project Manager
- Dan DeVaun, PE. . . . . Hydrology and Hydraulics of Storm Water System
- Brendan Earl. . . . . Streambank Erosion Assessment
- Bill Wiehbrecht, RLA. . . . . Streambank Erosion Assessment
- Tom Evans, RLA. . . . . Streambank Erosion Assessment
- Jay Mosley, PE. . . . . Hydrology and Hydraulics of Storm Water System
- Jay Schwandt, PS. . . . . Surveying/ Data Collection
- Suzanne Fliege, AIS. . . . . GIS Integration and Compatibility Issues

## PROJECT STAFFING

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### **Jan Hauser, PE**

Mr. Hauser leads the URS Water/Wastewater Business line in Michigan responsible for overall business development, strategic planning, staff development, project performance and client management.

Jan is experienced managing, planning, operating, and engineering water and wastewater utilities from both the public and private sectors through his work as Director of Utilities for Adrian, Michigan and managing offices of private consulting engineering firms. Mr. Hauser is a specialist in business development, project development, client management, project management and operations.

### **Troy Naperala, PE**

Mr. Naperala has over nine years experience working on and managing projects related to civil and environmental engineering problems. He has participated in and managed numerous projects dealing with hydrology and hydraulics. Projects have included dam related studies, storm water management, watershed management, regulatory compliance, contaminated sites, wetlands and water quality issues for a variety of clients. In addition he has designed and prepared permit applications for retention basins, engineered wetlands and Great Lakes Conveyances. His experience includes the management of projects for municipalities, states, industries, regional planning organizations and regulatory agencies.

### **Dan DeVaun, PE**

Mr. DeVaun has over 5 years of professional experience in water resources, storm water and civil site design projects. His principal area of expertise is in developing and analyzing hydrologic and hydraulic computer modeling results and data for storm water assessment projects. His work experience covers a wide variety of projects, clients and assessment tools. He has completed projects for municipalities, commercial site designs, residential land development, and road design projects. These projects have included developing conceptual and final designs for storm water improvements including stream restoration, stream design, storm water basins and other structural best management practices. Mr. DeVaun has hands-on experience with the latest HEC, FHWA and EPA modeling software.

### **Brendan Earl**

Mr. Earl has a background in biological sciences with consulting experience involving wetland delineation, endangered species assessments, plant and animal identification, soil characterization, sediment and erosion control and permitting compliance. His consulting responsibilities have included coordinating and performing field activities, managing and interpreting field and laboratory data, preparing work plans, final reports, and other project related compliance documents for clients and regulatory agencies. His research experience includes the study of mottled sculpin (*Cottus bairdi*), benthic invertebrates, and coldwater trout stream systems providing him with an excellent understanding of the water quality impacts of storm water. Mr. Earl will perform the streambank assessment task.

## PROJECT STAFFING

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### **Bill Weihbrecht**

Mr. Weihbrecht is a senior biologist with URS. He has more than twenty five years of professional experience related to watershed studies and stream restoration. He is responsible for managing watersheds assessment covering over 420 square miles and developing restoration plans for those watersheds. Mr. Weihbrecht served as President of Aquatic Resource Restoration Company, a design/build firm specializing in water resource projects. Mr. Weihbrecht has experience in every aspect of stream restoration including design data collection, streambank erosion assessments, biologic assessment, preparation of permit applications, regulatory liason and construction estimating and management. He has also completed several fish passage projects including low head dams and culverted crossings. Mr. Weihbrecht will oversee and provide QA/QC of the streambank erosion assessment.

### **Tom Evans, RLA**

Mr. Evans has directed a wide variety of multidiscipline watershed restoration projects. He has developed a unique set of skills to integrate Landscape Architectural, Engineering, and Ecological measures in the design of constructed wetlands, stream restoration, and Green Infrastructure projects. He has extensive experience in the design of stormwater wetland projects which successfully balance stormwater management, stormwater treatment, habitat restoration, and wetland permitting issues. His track record of grant assistance to communities is now over \$3 million. He has been responsible for the design of a number of innovative, "first of a kind" and Award Winning projects.

### **Jay Mosley, PE**

Mr. Mosley specializes in water resources, storm water, and civil engineering project management. He has managed and participated in a wide spectrum of projects such as large federal base closure projects, statewide storm water sampling and reporting projects, countywide NPDES Phase II projects, and hydrology and hydraulics analyses and reports for a variety of restoration, mitigation, and development projects. He is familiar with hydrologic and hydraulic modeling software such as SWMM, HEC-RAS, HEC-HMS, PondPack, WinTR55, DAMBRK, Flowmaster, CulvertMaster, HEC-1, HEC-2, TR-20, and TR-55. Mr. Mosley will provide QA/QC of the storm water modeling component of this project.

### **Jay Schwandt, PLS, JD**

Mr. Schwandt is experienced in surveying and mapping for residential, commercial and retail development projects. He has provided survey and design services for new retail and residential sites throughout the Midwest, utilizing the latest technology in the surveying field. He has also worked extensively on design survey projects for the Michigan Department of Transportation, including topographic mapping, GPS network design and data processing and project administration. Mr. Schwandt also serves as an adjunct professor in the Surveying

## PROJECT STAFFING

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Engineering department at Ferris State University teaching advanced surveying and legal aspects of surveying courses.

### **Allied Information Solutions**

Allied Information Solutions, Inc. provides County and Municipal Governments and Utility companies with a turnkey solution to GIS and Information Technology needs.

We recognize the primary responsibility of Local Government is providing for the safety and security of its citizens. Revenues often fail to keep up with the mandates. Counties and Cities are looking for ways to improve services, cut expenses and increase revenues. Our goal is to help achieve these objectives.

Local Government is increasingly required to streamline business practices while adhering to complex regulatory requirements and must process immense amounts of information in order to perform duties accurately. Response time is critical.

High quality digital orthophotography allows Allied to build the accurate maps required to support each of the following:

- Parcel Mapping, Tax Assessment, GIS and CAMA Integration
- Enhanced and Wireless 911 Systems,
  - Enhanced and Wireless 911 Mapping
  - Computer Aided Dispatching,
  - Records Management
- Utility Mapping and Management Systems
- Road and Bridge Management Systems

We specialize in connecting these individual components, and other key departments of Local Government using a **Land Records Portal (LRP)** we have designed. Our LRP facilitates sharing accurate data, and allows for sharing the cost of creating and maintenance of the GIS and IT infrastructure.

**Our Land Records Portal increases services, reduces costs and can be used to increase revenues.** Allied has the expertise and experience to help you achieve these goals.

### **The key staff person assigned to this project for Allied Information Solutions is Suzanne Fliege, Chief Technical Officer:**

Suzanne majored in Cartography, Meteorology and GIS at the University of Wisconsin. Suzanne has served as a consultant and project manager for the last 12+ years on such projects as route restructuring for the StarTribune, and marketing/demographic analyses for communities (Roseville, Stillwater, Apple Valley) and companies (St Paul Chamber Orchestra, StarTribune Newspaper, Big 10 Pub).

Suzanne has extensive application development and scripting experience in ArcView/Avenue, AtlasGIS, and Visual Basic, as well as web design experience. Suzanne has guest lectured on Cartographic Principles in GIS at Hamline College and has trained/supported users in ArcIMS, Arcview/Avenue, AtlasGIS and custom application use. Over the past several years, Suzanne

## PROJECT STAFFING

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has been working almost exclusively on ArcIMS and Internet Mapping projects for a large number of local government clients.

### **Highlights of Qualifications:**

- Highly proficient with all aspects of ArcIMS and MapDotNet and supporting technologies.
- Expert user of ArcView GIS and Atlas GIS, for data development, analysis and mapping. Also adept at customizing user interfaces in ArcView for “non-GIS” users.
- Experienced programmer, especially in object oriented languages such as Avenue and Visual Basic/MapObjects.
- 12+ years of Project Management experience for diverse projects and clients.
- Adept and experienced map designer, with high proficiency at map automation. At the StarTribune, she created scripts to automate the creation/printing of carrier route maps, so several hundred a day could be created and processed overnight. Suzanne also won the Map Display competition at the 1995 Business Geographics Conference, in Chicago, IL.
- Strong understanding of cartographic principles, data maintenance & standardization practices, demographic & market analysis methods, and GIS platform capabilities.
- Extensive experience working with customer/household/incident databases and in standardizing, geocoding, mapping and analyzing them.

### **Skills and Experience:**

- Diverse experience working with public and private entities, on many sorts of projects, integrating routing technologies, marketing & demographic analyses, customer/user analyses, planning applications and user technical support.
- Extensive experience in using and supporting various GIS software, such as ArcView GIS, AtlasGIS, RouteSmart, GISPlus, and custom applications
- Proficiency in programming/scripting Avenue, Visual Basic/MapObjects, and AtlasScript
- Familiar with the ArcInfo family of modules, both in workstation and PC environments.
- Extensive experience in reporting and mapping analysis results.
- Strong experience in using and programming Microsoft products, such as Access, Excel and Word.

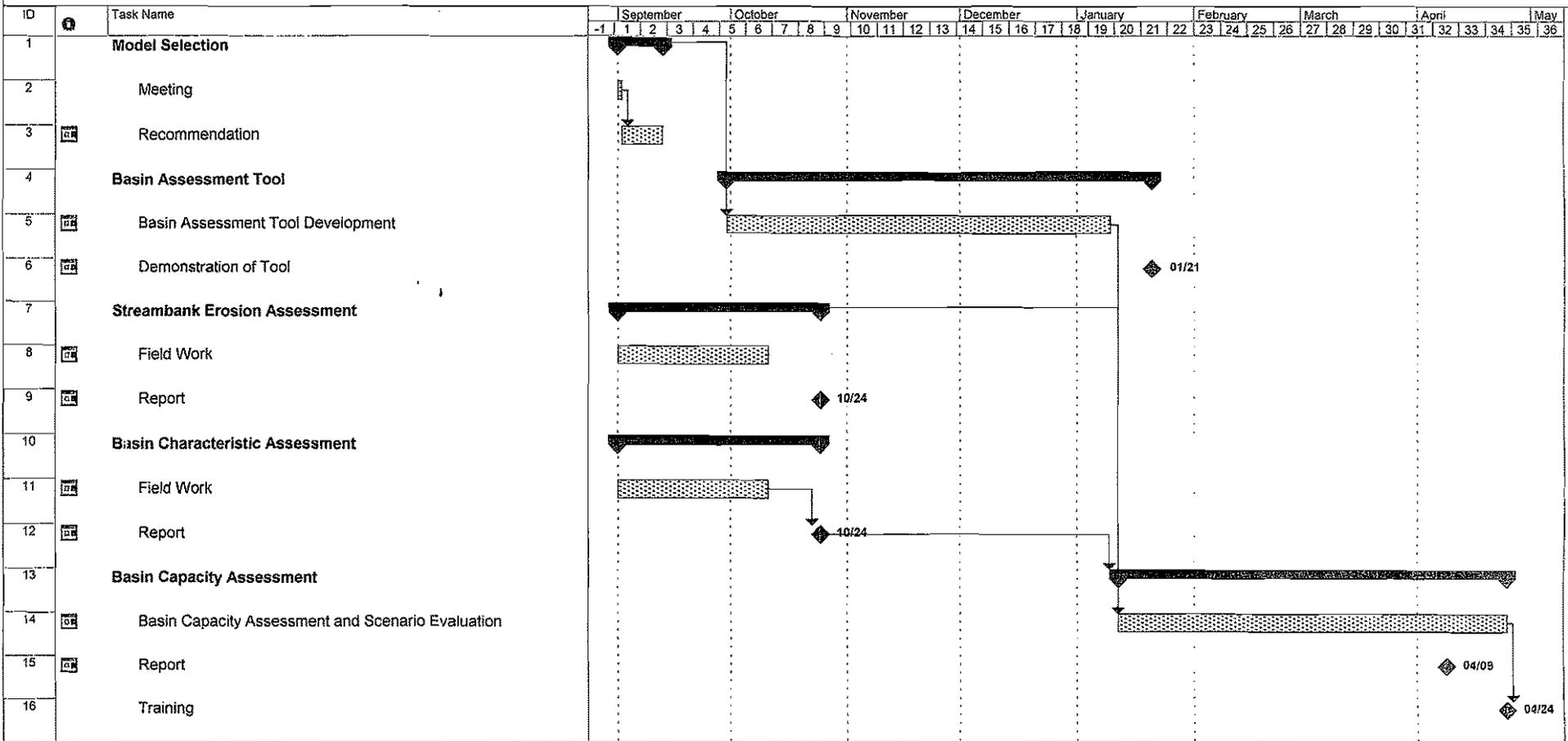
## IMPLEMENTATION SCHEDULE

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A detailed schedule is attached for the Storm Water Modeling and Analysis of Regional Detention Basins Project. The schedule shows key dates, tasks, and submittals for the each alternate study area.

The schedule shows completion of the study within 8 months for the basins upstream of Meadowbrook Lake and 6 months for the Cedar Springs basin.

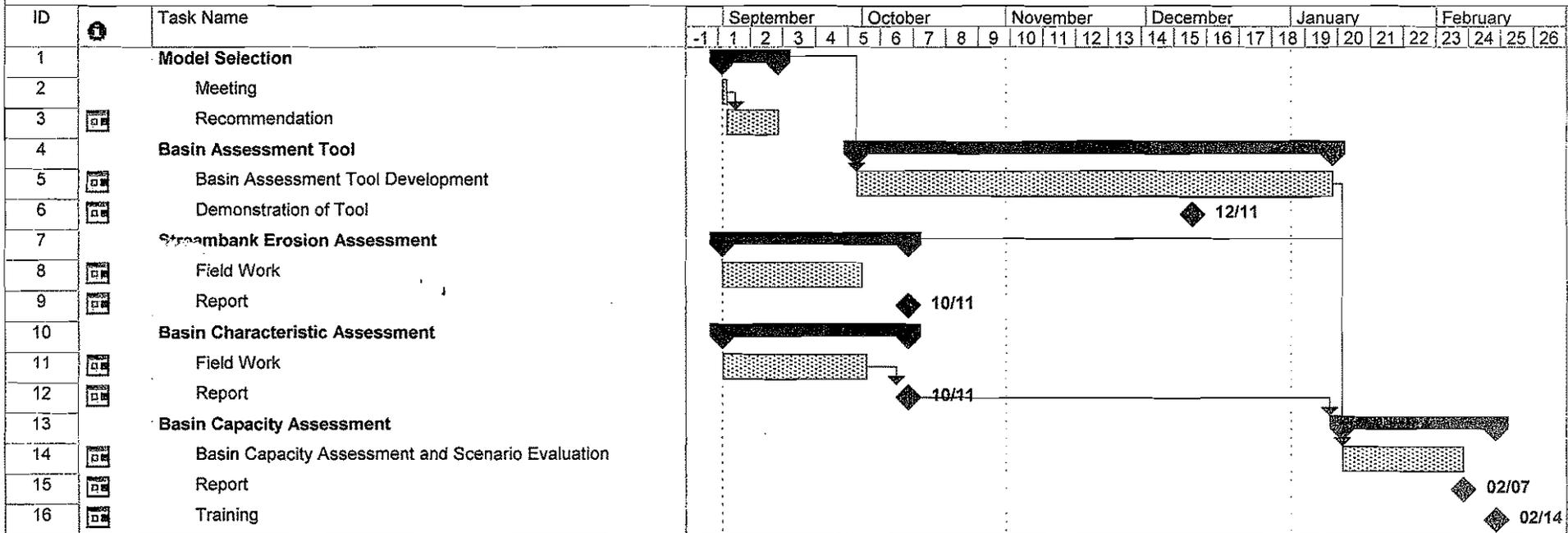
**CITY OF NOVI  
ENGINEERING SERVICES FOR STORM WATER MODELING AND ANALYSIS OF  
REGIONAL DETENTION BASINS UPSTREAM OF MEADOWBROOK LAKE**



Project: Meadowbrook Basin Schedule  
Date: 07/29/08

Task		Progress		Summary		External Tasks		Deadline	
Split		Milestone		Project Summary		External Milestone			

**CITY OF NOVI  
ENGINEERING SERVICES FOR STORM WATER MODELING AND ANALYSIS OF  
REGIONAL DETENTION BASINS UPSTREAM OF MEADOWBROOK LAKE**



Project: Cedar Springs Basin Date: 07/29/08	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

# FEE PROPOSAL

This section includes our estimated costs for this project, as described in the RFP. Optional tasks that may add value to the project are priced separately providing the City of Novi the ability to consider all aspects of our proposal . Our estimated cost for Cedar Springs is \$32,000 and upstream of Meadowbrook Lake is \$65,000.

A rate table, Fee proposal sheet and cost estimates for value added tasks are included below. The costs included in the Fee Proposal Sheet reflect our estimate for meeting the requested components of the RFP. Several other tasks that go beyond the RFP are listed separately. The City may choose to add these to the project at the cost listed. URS feels that the additional tasks will benefit the City and aid in the usefulness of the project.

**Table 2 – Rate Table for As-Needed Services Outside of the Requested Scope of Work**

Job Description	Hourly Billing Rate Range
<b>URS Corporation</b>	
Project Director/Principal	\$165
Senior Project Manager	\$135
Project Manager	\$110
Senior Engineer	\$125
Engineer	\$95
Junior Engineer	\$75
Technician	\$70
CADD	\$70
Clerical	\$55
<b>Allied Information Solutions, Inc</b>	
ArcIMS Internet Mapping Development	\$275
MapDotNet Internet Mapping Development	\$225
Data Conversion Services	\$55
Field GPS Data Collection	\$75

**Table 3 – Fee Estimate for Requested Work and Additional Value Added Tasks**

Component of Project	Cedar Springs Basin	Upstream of Meadowbrook Lake
Services Requested in RFP	\$32,000	\$65,000
Green Infrastructure workshop	\$3,000 - \$14,000	
Seamless Web Integration of Basin Assessment Tool	\$15,000	

# FEE PROPOSAL

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## **Description of Value Added Tasks**

The optional value added tasks priced separately above and not included in the proposed fee are described below. URS feels that these additional tasks will enhance the implementation of the project.

## **Green Infrastructure Workshop**

Building on our nationwide BMP design and construction experience, in the last year URS has been asked to conduct Green Infrastructure Workshops in Kentucky, Ohio, New York, North Carolina, Indiana, Missouri, Kansas, Minnesota, and Oregon. Classes include indoor and outdoor training for professional designers, municipal staff, homeowners, and students.

URS proposes to hold a similar workshop for the City of Novi that provides details to the City, developers, homeowners, and other engineering firms on how green infrastructure can be a part of a responsible storm water management plan. The course will describe the benefits of Green Infrastructure, which include:

- Reduced and delayed storm water runoff;
- Enhanced groundwater recharge;
- Storm water pollution reduction;
- Reduced urban heat island effect, and;
- Improved human health.

Past courses have described the benefits of green infrastructure to municipalities and culminated in the construction of a rain garden on public property to demonstrate the aesthetics and functionality of Green Infrastructure.

Examples of URS' successful workshops include Kansas City, Missouri's "10,000 Rain Gardens" initiative. This project is aimed at helping change how stormwater is managed in the region. Goals of the initiative are:

- To educate property owners, businesses, developers, and the general public about stormwater, sewer overflows, and water quality problems.
- To help establish "green" stormwater management approaches in the KC metropolitan region.
- To engage citizens in practical "backyard" stormwater solutions.

URS has supported the 10,000 Rain Gardens initiative by conducting training classes and seminars, providing technical content for the program website, and providing design assistance to municipalities, professional designers, homeowners, and volunteer groups. Rain gardens and similar BMPs are effective techniques to help integrate stormwater management features into the landscape, and take something that is typically viewed as a problem (stormwater runoff) and turn it into an asset (beautiful landscaping).

## FEE PROPOSAL

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Rain gardens are not just for residential yards. They have been successfully designed to catch runoff from buildings, parking lots, driveways, and roads. Rain gardens are used to capture stormwater runoff near the point of generation and help mitigate the adverse hydrologic impacts of urban development. They slow runoff, reduce runoff volume by infiltrating stormwater into the ground, and filter pollutants in the process.

Although rain gardens and similar Low Impact Development (LID) techniques are generally considered for their water quality benefits, studies around the country are documenting hydrologic benefits from these techniques as well. Thus, they can also be important tools to help prevent the stream degradation and flooding that is all too common in our urbanizing areas.

URS has designed rain gardens, bioretention facilities, bioswales, and wetlands as stormwater management solutions for municipal, transportation, and commercial applications nationwide.

### **Web Based Modeling Interface**

We propose to develop a web service modeling application. The web-service application will be developed in such a manner that it can sit on a central server supplied by the City of Novi or on the existing AIS server.

Based upon input by URS and the City the web services application can be used individually or "chained" together to perform a complex model solutions. The web service application will reference spatial and/or tabular data provided by URS during the course of the storm water assessment project.

The application will be developed to allow for use of default or modified parameters set by a user (in a web-based form page). Results of the models will be spatial or tabular data as appropriate which can be used in maps and/or reports. An archive mechanism can be included which would store reference and resulting data used by the models.



EXHIBIT A  
FEE PROPOSAL  
CITY OF NOVI

ENGINEERING SERVICES FOR  
STORM WATER MODELING AND ANALYSIS OF  
REGIONAL DETENTION BASINS  
UPSTREAM OF MEADOWBROOK LAKE

We the undersigned propose to furnish to the City of Novi services consistent with the Request for Qualifications dated January 11, 2007 and Request for Proposals dated July 8, 2008, respectively. Design fees will be paid on an hourly basis for actual work performed to a maximum as proposed. A separate fee schedule is being provided should the City request additional work on an hourly basis.

Alternate (see Exhibit B for maps):	Engineering Fee:
<b>Alternate A:</b> Cedarsprings District and the tributary downstream of the basin:	\$ 32,000
<b>Alternate B:</b> Watershed area upstream and tributary to Meadowbrook Lake	\$ 65,000

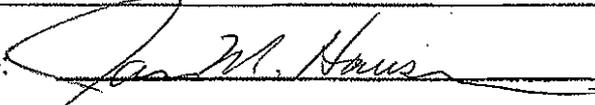
PLEASE TYPE:

Company Name: URS Corporation – Great Lakes

Address: 27777 Franklin Road, Ste. 2000, Southfield, MI 48034

Agent's Name: Jan M. Hauser, PE

Agent's Title: Vice President / Manager - Water Resources

Agent's Signature: 

Telephone Number: 248-204-5900 Fax Number: 248-204-5901

E-mail Address: jan\_hauser@urscorp.com Date: July 29, 2008