



**CITY OF ANN ARBOR, MICHIGAN**

**Public Services Area/Project Management Services Unit**  
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**Springwater Subdivision Improvements Project**  
**Request for Proposal #857**

**Pre-Proposal Meeting Minutes**

Prepared by Anne Warrow, Project Management

**PROJECT DESCRIPTION**

The City of Ann Arbor is planning to undertake the complete reconstruction of multiple streets in three phases beginning in 2014 within the Springwater Subdivision. The project includes a new roadway section, storm sewer upgrades, storm water quality improvements, some water main(s) replacement, replacement of curb and gutter, and the construction of new sidewalk and/or the filling in of sidewalk gaps within the project limits.

The City intends to utilize Michigan Department of Environmental Quality (MDEQ) S2 (SRF/SWQIF) Grant funding for the design of the storm sewer improvements with the cooperation of the Washtenaw County Water Resources Commission (WCWRC).

The City, with the support of WCWRC, has developed a SRF Project Plan to help reduce non-point source storm water pollutants, flooding, and flow to the Huron River by detention or retention and infiltration of storm water runoff. With the reconstruction of existing streets, each project must provide storm water improvements as outlined by the SRF Project Plan, WCWRC and City storm water rules and design standards. By capturing and treating the first 0.5-inch of runoff from the contributing watershed (First Flush), pollutants that are washed off of the surface can be removed from storm water runoff before flowing offsite. Attenuation of flow from larger storm events, typically represented by the 1.5-year storm event (Bankfull), downstream impacts from intense flows can be reduced.

The following specific items regarding this project were discussed:

1. All attendees were asked to sign the Meeting Sign-In Sheet, which is attached to these minutes. Minutes of this meeting and list of attendees will be posted on BidNet.
2. Proposed schedule was discussed.

3.

<b>Activity/Event</b>	<b>Anticipated Date</b>
Pre-Proposal Meeting	May 9, 2013
Written Question Deadline	May 15 , 2013 by 3:00pm
Proposal Due Date	May 22, 2013 by 10:00am
Interview Consultants	June 4, 5, and/or 6, 2013
Consultant Selection/Negotiate Final Professional Services Agreement (PSA)	June 7, 2013
Expected City Council Authorization of PSA	July 15, 2013
PSA Execution, Award and Notice to Proceed	August 1, 2013
Final submittal of Construction Plans and Specifications suitable for advertisement for bids for the construction of Phase I	January 2014
Begin Construction of Phase I	April 2014

4. Scope - The Consultant shall perform the necessary design work and prepare the plans and specifications for all the elements of the storm water improvements for the entire subdivision. The Consultant will also be required to prepare all the necessary construction plans and specifications suitable for bidding purposes for the Phase I portion of the project, which includes water main replacement, storm sewer improvements, road construction, and installation of new sidewalks.
5. Public Engagement - Develop and implement a “Public Engagement Strategy” in order to facilitate interaction and input with all interested and relevant stakeholders throughout the duration of the project.
6. Information Available - Record drawings of the existing storm and sanitary sewers within all three phases of the Springwater Subdivision Improvements Project and the surrounding area are available for review. Quarter section drawings detailing the locations of the existing water mains in and around the area are available for review. A preliminary calibrated citywide storm water model (EPA SWMM 5.0) is available. In addition, soil boring logs and water main break histories are also available for the entire subdivision.
7. A project website will be maintained by the City and the Consultants would be expected to provide updated content as the project progresses. The City will be responsible for mailing any public engagement invitations to the neighborhood.
8. The sanitary sewer will be lined as part of a separate project.
9. In accordance with the City of Ann Arbor’s complete streets philosophy, it is anticipated that the project will include the construction of new sidewalks on both sides of the street.

10. By City Code, first-time construction costs for new sidewalks are generally assessed to the property owners abutting the sidewalk.
11. Obtaining feedback from the neighborhood on design elements (i.e. storm water and sidewalks) is an essential part of the public engagement strategy for this project.
12. Natural feature impacts will also need to be evaluated and presented to the neighborhood and other stakeholders.
13. The northern portion of the neighborhood drains to the Mallets Creek and the southern portion drains to Swift Run Creek.
14. Soil borings have been completed within the project area and are attached to these meeting minutes.
15. The storm water portion of this project is included in the 2011 State Revolving Fund Project Plan prepared by OHM and submitted by the WCWRC. The relevant portions of the 2011 SRF are attached to this document.
16. A preliminary calibrated citywide storm water model (EPA SWMM 5.0) is available.
17. This project includes the preparation of a Storm Water Plan and Impact Analysis for the entire Springwater Subdivision for submittal to the MDEQ Nonpoint Source Program, as required. This will be prepared under the assumption that all streets in this subdivision will eventually be reconstructed. Storm water recommendations should take the entire neighborhood into account.
18. The Plan should include design of storm water improvements such as bioretention areas with native plantings and grasses (rain gardens), hydrodynamic separators (pre-cast, swirl chamber type systems), oversized conveyance/detention pipes, and storm structures with internal overflow weirs or other applicable best management practices.
19. The estimated project cost can be found in the City's *FY2014-2019 Capital Improvements Plan*. The relevant pages are attached to these meeting minutes.
20. The City has not performed any wetland delineation and the consultants should address this in their proposals if it is deemed necessary.
21. City anticipates that a full topographical survey will be completed for the first three phases by the selected consultant.
22. In order to adequately demonstrate past involvement with similar projects, consultants are asked to submit engineering construction cost estimates versus final construction cost estimates and original design estimates versus actual design fees.
23. In the event that the City elects to expand the scope of work, Consultants are asked to include a cost estimate for providing full design and construction engineering services for phases I-III. The City would manage the construction, but may look to the consultant to provide as-needed construction engineering, construction survey and cut sheet preparation, and full-time inspection.
24. The City would also arrange for the performance of any construction and material testing during the construction phase.

#### Attachments

Meeting Sign-In Sheet

Soil boring logs

Portions of the *2011 SRF Project Plan* related to the Springwater Subdivision

Pages of the City's *FY2014-2019 Capital Improvements Plan*

## MEETING SIGN-IN SHEET

**PROJECT: Springwater Subdivision Improvements Project  
PRE-PROPOSAL MEETING**

**File No. 2013-018  
Date: May 9, 2013**

**PLEASE PRINT (All information needs to be filled in to receive meeting minutes)**

NAME	REPRESENTING	MAILING ADDRESS	TELEPHONE	EMAIL
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## MEETING SIGN-IN SHEET

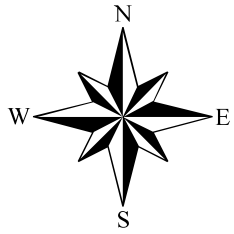
**PROJECT: Springwater Subdivision Improvements Project  
PRE-PROPOSAL MEETING**

**File No. 2013-018  
Date: May 9, 2013**

**MEETING SIGN-IN SHEET PLEASE PRINT (All information needs to be filled in to receive meeting minutes)**

NAME	REPRESENTING	MAILING ADDRESS	TELEPHONE	EMAIL
Amber Brewster	Fleis And VandenBrink	Address: <u>27725 Stansbury Blvd Suite 150</u> City, State: <u>Framington Hills, MI</u> Zip: <u>48334</u>	Office: (     ) _____ Mobile: (248) <u>227-9264</u> Fax No. (     ) _____	<a href="mailto:abrewster@fveng.com">abrewster@fveng.com</a>
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# Butternut St.

1 inch = 60 feet



Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **BU-1**



SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5-1/2 inches)	0.5						
		Fill: Very Stiff Dark Brown Silty Clay with trace sand and gravel	2.5	S-1	3 3 4	7	14.6		5500*
5		Hard Brown and Gray Silty Clay with trace sand and gravel	5.0	S-2	3 5 7	12	17.2		9000*
		Hard Brown Silty Clay with trace sand and gravel	10.0	S-3	4 8 10	18	18.5		9000*
10		Hard Brown Silty Clay with trace sand and gravel	10.0	S-4	5 8 11	19	18.1		9000*
		End of Boring @ 10ft							
15			15						

Total Depth: 10ft  
 Drilling Date: October 2, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 4-1/2 feet south of North Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 7

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12



Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **BU-2**

Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)	0.5						
		Fill: Very Stiff Dark Brown Silty Clay with trace sand and gravel	1.5						
		Very Stiff to Hard Brown and Gray Silty Clay with trace sand and gravel	5	S-1	2 4 7	11	18.2		7000*
	S-2			6 9 12	21	17.1		9000*	
	S-3			7 11 13	24	9.5		9000*	
		Hard Brown Silty Clay with trace sand and gravel	8.0						
		End of Boring @ 10ft	10	S-4	3 10 12	22	17.7		9000*
				15	15				

Total Depth: 10ft  
 Drilling Date: October 2, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 4-1/2 feet south of North Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Figure No. 8

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **BU-3**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5-1/2 inches)	0.5						
		Fill: Dark Brown Silty Clay with trace sand, gravel, and organic matter	0.9						
				S-1	3 5 6	11	17.3		9000*
5		Hard Brown and Gray Silty Clay with trace sand and gravel							
			5	S-2	4 8 10	18	17.6		9000*
			7.0	S-3	6 11 10	21	12.8		7000*
		Very Stiff Gray Silty Clay with trace sand and gravel							
10			10.0	S-4	4 6 9	15	14.2		5000*
		End of Boring @ 10ft							
15			15						

Total Depth: 10ft  
 Drilling Date: October 2, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 9 feet during and upon completion of drilling operations


Notes:  
 Boring performed 8 feet north of South Curbline  
 \* Calibrated Hand Penetrometer

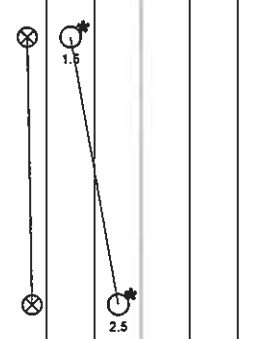
Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

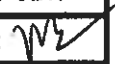
SOIL / PAVEMENT BORING\_120547A.GPJ\_G2\_CONS.GDT\_10/19/12


Figure No. 9


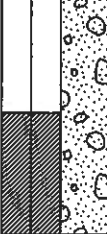
Client: <b>City of Ann Arbor</b>	PSI Project #: <b>381-85088</b> Sheet: <b>1</b> of <b>1</b>	Boring Log Number: <b>B-1</b>	 Professional Service Industries, Inc.
Project: <b>2009 Construction Projects Nordman Road, Packard to Sharon</b>	Location: <b>City of Ann Arbor, Michigan</b>		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Dry Unit Wt (lb/cu.ft.)	<input checked="" type="checkbox"/> "N" Blows Per Foot 0    20    40    60  <input type="checkbox"/> Unconfined Compressive Strength (tsf) <input type="checkbox"/> Calibrated Hand Penetrometer (tsf) 0    2    4    6
				Surface Elevation:							
				5.5" ASPHALT PAVEMENT							
1SS				12" SAND and GRAVEL BASE, some silt, dark brown (Recycled Base)							
				SANDY CLAY (CL) - few seams of clayey sand, mottled brown, moist, stiff to very stiff	6	17	2,3,3,3				
2SS					7	17	2,3,4				
				END OF BORING							
<u>Boring Location</u> North Bound Nordman Road 7.5' West of Curb, 65' South of St. Aubin Avenue Centerline											


Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.


<input checked="" type="checkbox"/> Water Level While Drilling <u>None</u> <input checked="" type="checkbox"/> Water Level At Completion <u>None</u> _____ After Completion	Boring Started: <b>9/26/2008</b> Completed: <b>9/26/2008</b>	Engineer: <b>JDH</b>
	Drilling Method: <b>3.25" HSA</b>	Office: <b>Plymouth</b>
	Driller: <b>M. Dubnicki</b> Drill Rig: <b>CME-75</b>	Hole Depth (ft): <b>5.5</b>
	Approved: 	
Note: Boring backfilled with soil unless otherwise noted.		

Client: <b>City of Ann Arbor</b>	PSI Project #: <b>381-85088</b>	Boring Log Number: <b>B-2</b>	 Professional Service Industries, Inc.
	Sheet: <b>1</b> of <b>1</b>		
Project: <b>2009 Construction Projects Nordman Road, Packard to Sharon</b>	Location: <b>City of Ann Arbor, Michigan</b>		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Dry Unit Wt (lb/cu.ft.)	<input checked="" type="checkbox"/> "N" Blows Per Foot 0      20      40      60	
											<input type="checkbox"/> Unconfined Compressive Strength (tsf) <input type="checkbox"/> Calibrated Hand Penetrometer (tsf)	
				Surface Elevation:								
				6.75" ASPHALT PAVEMENT								
1SS				12" SAND and GRAVEL BASE, some silt, dark brown (Recycled Base)	23	5						<input checked="" type="checkbox"/>
				SAND (SP-SM) - fine coarse, some gravel and silt, brown to light yellowish brown, moist, medium dense to loose	5	6						<input checked="" type="checkbox"/>
2SS				END OF BORING								
				<u>Boring Location</u> South Bound Nordman Road 6' East of Curb, 23' South of Driveway Centerline to #3050 Nordman Road								


Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.


<input checked="" type="checkbox"/> Water Level While Drilling <u>None</u> <input checked="" type="checkbox"/> Water Level At Completion <u>None</u> _____ After Completion	Boring Started: <b>9/26/2008</b>	Completed: <b>9/26/2008</b>	Engineer: <b>JDH</b>
	Drilling Method: <b>3.25" HSA</b>	Office: <b>Plymouth</b>	
Driller: <b>M. Dubnicki</b>	Drill Rig: <b>CME-75</b>	Hole Depth (ft): <b>5.5</b>	Approved: 
Note: Boring backfilled with soil unless otherwise noted.			

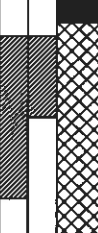
Client: <b>City of Ann Arbor</b>	PSI Project #: <b>381-85088</b> Sheet: <b>1</b> of <b>1</b>	Boring Log Number: <b>B-3</b>	 Professional Service Industries, Inc.
Project: <b>2009 Construction Projects Nordman Road, Packard to Sharon</b>	Location: <b>City of Ann Arbor, Michigan</b>		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Dry Unit Wt (lb/cu.ft.)	<input checked="" type="checkbox"/> "N" Blows Per Foot 0    20    40    60  <input checked="" type="checkbox"/> Unconfined Compressive Strength (tsf) <input type="checkbox"/> Calibrated Hand Penetrometer (tsf) 0    2    4    6
				Surface Elevation:							
				7" ASPHALT PAVEMENT							
1SS				FILL - SANDY CLAY, few gravel, some organics, dark gray	12	19					⊗
				FILL - SANDY CLAY, some organics, grayish brown, dark gray and olive, moist L.O.I. = 6.0%	5,6,6,7						
2SS				SILTY CLAY (CL) - some sand, mottled light gray, olive and yellowish brown, moist, stiff	11	19					⊗
				END OF BORING	5						⊗
				<u>Boring Location</u>  North Bound Nordman Road 7' West of Curb, 10' North of Driveway Centerline to #3129 Nordman Road	3,4,7						⊗


Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.


<input checked="" type="checkbox"/> Water Level While Drilling <u>None</u> <input checked="" type="checkbox"/> Water Level At Completion <u>None</u> _____ After Completion	Boring Started: <b>9/26/2008</b> Completed: <b>9/26/2008</b> Drilling Method: <b>3.25" HSA</b> Office: <b>Plymouth</b> Driller: <b>M. Dubnicki</b> Drill Rig: <b>CME-75</b> Hole Depth (ft): <b>5.5</b>	Engineer: <b>JDH</b> Drawn By: <b>JDH</b> Approved: 
Note: Boring backfilled with soil unless otherwise noted.		

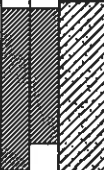
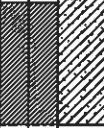
Client: <b>City of Ann Arbor</b>	PSI Project #: <b>381-85088</b>	Boring Log Number: <b>B-4</b>	 Professional Service Industries, Inc.
	Sheet: <b>1</b> of <b>1</b>		
Project: <b>2009 Construction Projects Nordman Road, Packard to Sharon</b>	Location: <b>City of Ann Arbor, Michigan</b>		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Dry Unit Wt (lb/cu.ft.)	⊗ "N" Blows Per Foot	
											0	60
Surface Elevation:											● Unconfined Compressive Strength (tsf)	
											○ Calibrated Hand Penetrometer (tsf)	
											0	6
1SS				4" ASPHALT PAVEMENT								
				FILL - SANDY CLAY, few gravel, some organics, brown, dark brown and dark gray, moist L.O.I. = 5.0%	11	19						
				Obstruction encountered @ 3' END OF BORING								
				<u>Boring Location</u> North Bound Nordman Road 8.5' West of Curb, 23' North of Driveway Centerline to #3181 Nordman Road								


Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.


<input checked="" type="checkbox"/> Water Level While Drilling <u>None</u> <input checked="" type="checkbox"/> Water Level At Completion <u>None</u> _____ After Completion	Boring Started: <b>9/26/2008</b>	Completed: <b>9/26/2008</b>	Engineer: <b>JDH</b>
	Drilling Method: <b>3.25" HSA</b>	Office: <b>Plymouth</b>	Drawn By: <b>JDH</b>
	Driller: <b>M. Dubnicki</b>	Drill Rig: <b>CME-75</b>	Hole Depth (ft): <b>3</b>
Approved: 			
Note: Boring backfilled with soil unless otherwise noted.			

Client: <b>City of Ann Arbor</b>	PSI Project #: <b>381-85088</b>	Boring Log Number: <b>B-5</b>	 Professional Service Industries, Inc.
	Sheet: <b>1</b> of <b>1</b>		
Project: <b>2009 Construction Projects Nordman Road, Packard to Sharon</b>	Location: <b>City of Ann Arbor, Michigan</b>		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Dry Unit Wt (lb/cu.ft.)	⊗ "N" Blows Per Foot		● Unconfined Compressive Strength (tsf)		○ Calibrated Hand Penetrometer (tsf)	
											0	20	40	60	0	2
				Surface Elevation:												
				5" ASPHALT PAVEMENT												
1SS				SANDY CLAY (CL) - few gravel and white silt partings, mottled brown, moist, hard	17	15						⊗				○*
						7,8,9,9										
2SS					24	15						⊗				○*
					5											4.5+
						8,10,14										4.5+
				END OF BORING												
				<u>Boring Location</u> South Bound Nordman Road 8' East of Curb, 17' South of Driveway Centerline to #3224 Nordman Road												


Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.

<input checked="" type="checkbox"/> Water Level While Drilling <u>None</u> <input checked="" type="checkbox"/> Water Level At Completion <u>None</u> _____ After Completion	Boring Started: <b>9/26/2008</b> Completed: <b>9/26/2008</b>		Engineer: <b>JDH</b>	
	Drilling Method: <b>3.25" HSA</b>		Office: <b>Plymouth</b>	
	Driller: <b>M. Dubnicki</b>	Drill Rig: <b>CME-75</b>	Hole Depth (ft): <b>5.5</b>	Approved: 
	Note: Boring backfilled with soil unless otherwise noted.			

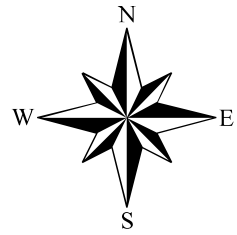
Client: <b>City of Ann Arbor</b>	PSI Project #: <b>381-85088</b> Sheet: <b>1</b> of <b>1</b>	Boring Log Number: <b>B-6</b>	 Professional Service Industries, Inc.
Project: <b>2009 Construction Projects Nordman Road, Packard to Sharon</b>	Location: <b>City of Ann Arbor, Michigan</b>		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Dry Unit Wt (lb/cu.ft.)	⊗ "N" Blows Per Foot 0 20 40 60  ● Unconfined Compressive Strength (tsf) ○ Calibrated Hand Penetrometer (tsf) 0 2 4 6
				Surface Elevation:							
				6.5" ASPHALT PAVEMENT							
1SS				SANDY CLAY (CL) - few gravel, some organics, dark gray, moist	10	17					⊗
				SANDY CLAY (CL) - few organics, mottled olive and gray, moist, very stiff	4.5, 5.6						○
2SS				SANDY CLAY (CL) - few gravel and white silt partings, mottled brown, yellowish brown and gray, moist, hard	15	17					⊗
				END OF BORING	5						○
				<u>Boring Location</u>  North Bound Nordman Road 10.5' West of Curb, 39' North of Driveway Centerline to #3299 Nordman Road	5.6, 9						○

Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.

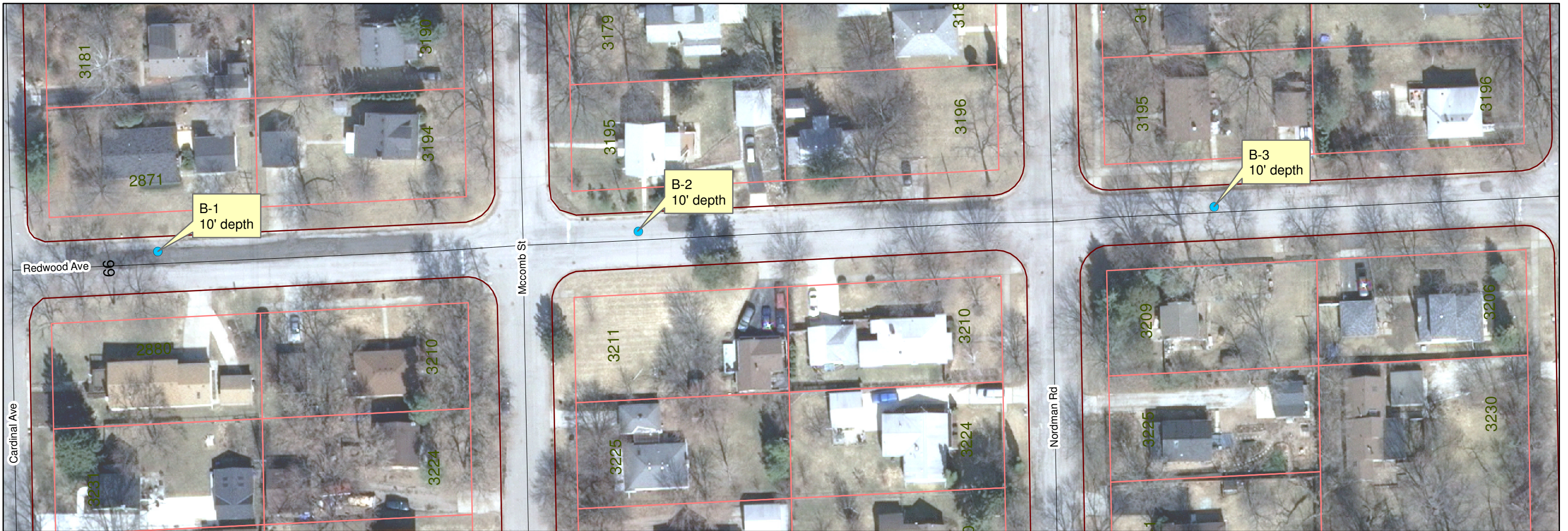
<input checked="" type="checkbox"/> Water Level While Drilling <u>None</u> <input checked="" type="checkbox"/> Water Level At Completion <u>None</u> _____ After Completion	Boring Started: <b>9/26/2008</b> Completed: <b>9/26/2008</b> Drilling Method: <b>3.25" HSA</b> Office: <b>Plymouth</b> Driller: <b>M. Dubnicki</b> Drill Rig: <b>CME-75</b> Hole Depth (ft): <b>5.5</b>	Engineer: <b>JDH</b> Drawn By: <b>JDH</b> Approved: 
Note: Boring backfilled with soil unless otherwise noted.		

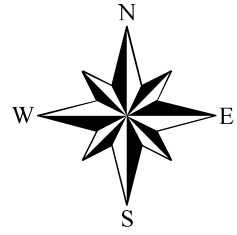




# Redwood Ave.

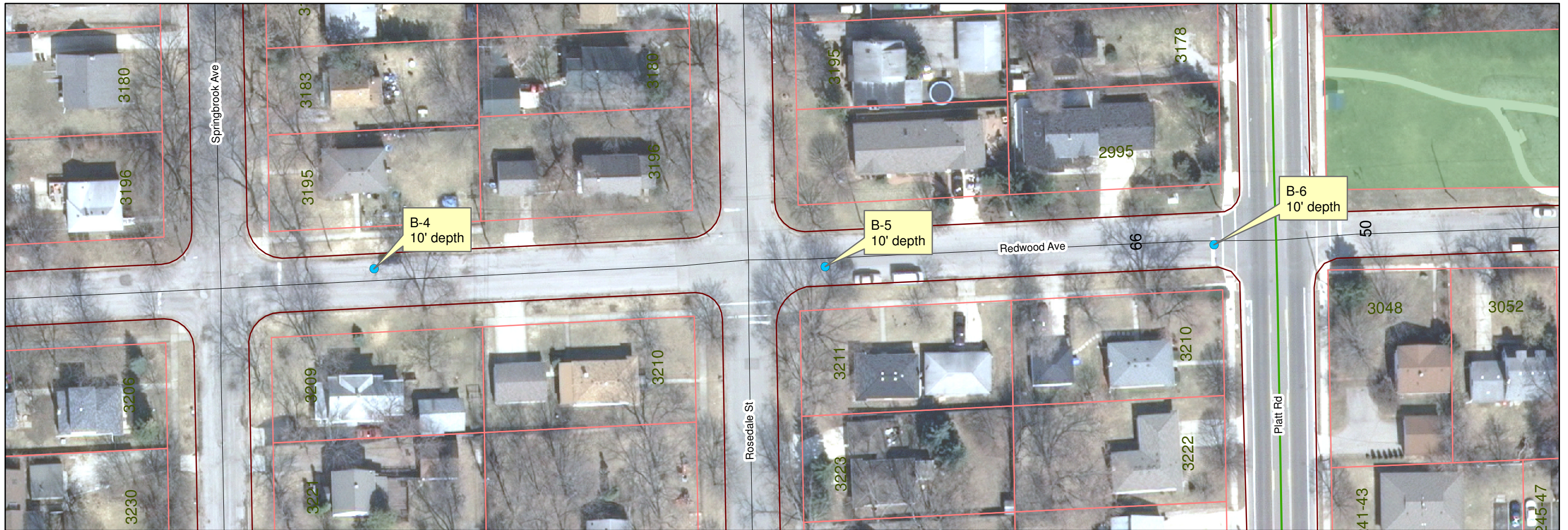
1 inch = 60 feet





# Redwood Ave.

1 inch = 60 feet



Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. RA-1



SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (9 inches)	0.8						
		Hard Brown and Gray Silty Clay with trace sand and gravel	3.5	S-1	3 4 6	10	18.2		8000*
5				S-2	4 9 11	20	17.3		9000*
		Hard Brown Silty Clay with trace sand and gravel	10.0	S-3	5 6 9	15	19.4		9000*
10				S-4	5 8 10	18	19.4		9000*
		End of Boring @ 10ft							
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 9 feet south of North Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Figure No. 58

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. RA-2

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)	
		Bituminous Concrete (6 inches)	0.5							
		Very Stiff to Hard Brown and Gray Silty Clay with trace sand and gravel		S-1	3 3 5	8	18.3		7000*	
5			5	S-2	4 7 12	19	17.6		9000*	
			Hard Brown Silty Clay with trace sand and gravel		S-3	5 9 13	22	19.2		9000*
10				10	S-4	7 10 13	23	18.8		9000*
		End of Boring @ 10ft	10.0							
15			15							

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 7 feet south of North Curbline  
 \* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Figure No. 59

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. RA-3

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)	0.5						
		Fill: Very Stiff Dark Brown Silty Clay with trace sand, gravel, and organic matter		S-1	3 4 5	9	18.7		6000*
5			4.5	S-2	3 4 8	12	22.3		3500*
			Hard Brown Silty Clay with trace sand and gravel		S-3	6 11 13	24	17.4	
10		6.0		S-4	6 9 15	24	18.3		9000*
		End of Boring @ 10ft	10.0						
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 7 feet south of North Curbline  
 \* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 60

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. RA-4

Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5-1/2 inches)	0.5						
		Fill: Dark Brown Silty Clay with trace sand, gravel, and organic matter	1.5						
		Very Stiff Brown and Gray Silty Clay with trace sand and gravel	4.0	S-1	3 3 4	7	25.5		5000*
5				S-2	4 5 7	12	18.9		7000*
		Very Stiff to Hard Brown Silty Clay with trace sand and gravel	10.0	S-3	5 10 15	25	17.5		9000*
10				S-4	7 11 13	24	17.0		9000*
		End of Boring @ 10ft							
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 10 feet south of North Curbline  
 \* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 61

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. RA-5

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)	0.5						
		Fill: Dark Brown Silty Clay with trace sand, gravel, and organic matter	2.0						
		Very Stiff to Hard Brown and Gray Silty Clay with trace sand and gravel	5	S-1	3 6 8	14	22.7		4500*
				S-2	7 12 15	27	16.7		9000*
		Hard Brown Silty Clay with trace sand and gravel	5.5	S-3	6 12 16	28	18.0		9000*
				S-4	7 13 15	28	18.1		9000*
		End of Boring @ 10ft	10.0						
			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 10 feet north of South Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Figure No. 62

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. RA-6

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (8 inches)	0.7						
		Very Stiff to Hard Brown and Gray Silty Clay with trace sand and gravel		S-1	2 5 8	13	22.0		6000*
5			5	S-2	5 9 13	22	17.2		9000*
		Hard Brown Silty Clay with trace sand and gravel		S-3	6 10 14	24	16.6		9000*
10			10	S-4	6 9 14	23	15.5		9000*
		End of Boring @ 10ft	10.0						
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:  
 Dry during and upon completion of drilling operations

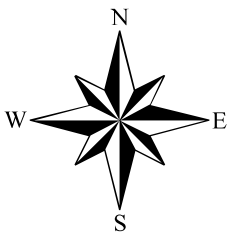
Notes:  
 Boring performed 3-1/2 feet north of South Curbline  
 \* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 63

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

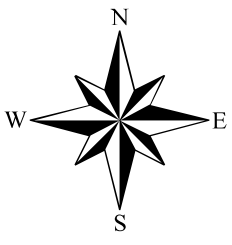




# Springbrook Ave.

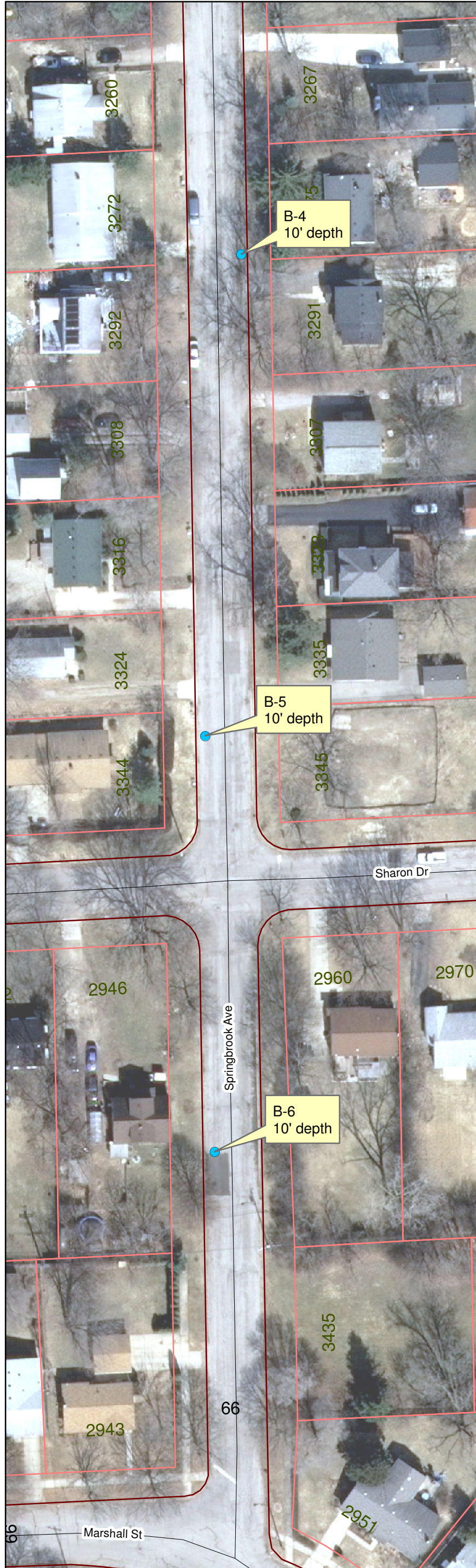
1 inch = 60 feet





# Springbrook Ave.

1 inch = 60 feet



Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **SP-1**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)	0.5						
		Fill: Bituminous Concrete Millings (4 inches)	0.8						
		Loose Brown Sand with trace silt and gravel	3.5	S-1	2 4 4	8			
5		Hard Brown and Gray Silty Clay with trace sand and gravel	5	S-2	3 5 7	12	18.5		8500*
		Hard Brown and Gray Silty Clay with trace sand and gravel	10	S-3	4 8 12	20	17.1		9000*
10		End of Boring @ 10ft	10.0	S-4	6 9 12	21	16.9		9000*
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 3-1/2 feet west of East Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 100

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **SP-2**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)	
		Bituminous Concrete (6-1/2 inches)	0.5							
		Hard Brown and Gray Silty Clay with trace sand and gravel		S-1	4 7 7	14	13.5		9000*	
5			5	S-2	5 9 14	23	9.7		9000*	
					S-3	7 11 16	27	16.7		9000*
10				10	S-4	6 10 13	23	16.6		9000*
		End of Boring @ 10ft								
15			15							

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 4-1/2 feet west of East Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 101

SOIL / PAVEMENT BORING\_120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **SP-3**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)	
		Bituminous Concrete (7 inches)	0.6							
		Hard Brown and Gray Silty Clay with trace sand and gravel		S-1	3 4 5	9	16.4		8500*	
5			5	S-2	4 8 10	18	17.6		9000*	
					S-3	5 8 11	19	19.3		9000*
10				10	S-4	4 9 11	20	19.5		9000*
		End of Boring @ 10ft								
15			15							

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 3 feet west of East Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **SP-4**



SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5 inches)	0.4						
		Very Stiff to Hard Brown and Gray Silty Clay with trace sand and gravel		S-1	3 4 5	9	15.0		6000*
5				S-2	6 8 13	21	17.4		9000*
				S-3	7 10 14	24	18.1		9000*
10				S-4	6 9 14	23	18.5		9000*
		End of Boring @ 10ft	10.0						
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 3 feet west of East Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A

Longitude: N/A



Soil Boring No. **SP-5**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)	0.5						
		Fill: Stiff Dark Brown Silty Clay with trace sand, gravel, and organic matter	2.0		2 2 4	6	27.3		2500*
		Stiff Brown and Gray Silty Clay with trace sand and gravel	4.5		3 5 8	13	27.4		7000*
5			5	S-2					
		Hard Brown and Gray Silty Clay with trace sand and gravel			5 7 11	18	17.1		9000*
10			10	S-4	6 8 12	20	19.1		9000*
		End of Boring @ 10ft							
15			15						

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 7 feet east of West Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 104

SOIL / PAVEMENT BORING 120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **SP-6**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)	
		Bituminous Concrete (7 inches)	0.6							
		Very Stiff to Hard Brown and Gray Silty Clay with trace sand and gravel		S-1	2 4 5	9	24.4		7000*	
5			5	S-2	4 9 12	21	16.6		9000*	
					S-3	5 10 14	24	17.4		9000*
10				10	S-4	7 11 14	25	17.6		9000*
		End of Boring @ 10ft								
15			15							

Total Depth: 10ft  
 Drilling Date: October 3, 2012  
 Inspector:  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

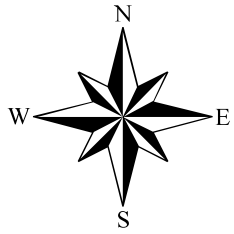
Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 7 feet east of West Curbline  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch





# St. Aubin Ave.

1 inch = 40 feet



Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **ST-1**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (4 inches)	0.3					
		Fill: Brown Sand and Gravel with trace silt (Natural Aggregate Base, 4 inches)	0.7	AS-1	4	10.2		1000*
				AS-2				
		Fill: Medium Dark Gray Sandy Clay with trace gravel			4			
			3.0					
		Very Stiff Brown and Gray Silty Clay with trace sand and gravel			11			
5			5.0	AS-3	9	18.0		5000*
		End of Boring @ 5ft						
10			10					
15			15					

Total Depth: 5ft  
 Drilling Date: September 21, 2012  
 Inspector:  
 Contractor: G2 Consulting Group, LLC  
 Driller: J. Hayball, P.E.

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 17 feet north of South Sidewalk  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

PAVEMENT CORE DCP 120547A.GPJ G2\_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A



Soil Boring No. **ST-2**

**G2** Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (4 inches)	0.3	AS-1				
		Fill: Brown Sand and Gravel with trace silt (Natural Aggregate Base, 7 inches)	0.9	AS-2	5	21.4		1500*
		Fill: Medium Dark Gray Sandy Clay with trace gravel			4			
					4			
				3.5		8		
5		Very Stiff Brown and Gray Silty Clay with trace sand and gravel	5.0	AS-3	10	18.7		4500*
		End of Boring @ 5ft						
10			10					
15			15					

Total Depth: 5ft  
 Drilling Date: September 21, 2012  
 Inspector:  
 Contractor: G2 Consulting Group, LLC  
 Driller: J. Hayball, P.E.

Water Level Observation:  
 Dry during and upon completion of drilling operations

Notes:  
 Boring performed 7 feet north of South Sidewalk  
 \* Calibrated Hand Penetrometer

Drilling Method:  
 4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Excavation Backfilling Procedure:  
 Borehole backfilled with auger cuttings and capped with cold patch

PAVEMENT CORE DCP 120547A.GPJ G2\_CONS.GDT 10/19/12

6. 7<sup>th</sup> St, between Pauline Blvd and Madison St – Leaching catch basins with infiltration and a pollutant separation structure
7. South Forest Ave, between Hill St and S. University Ave – Porous surface with infiltration and pollutant separation structures
8. Springwater Subdivision – First flush storm sewers with detention, and pollutant separation structures
9. Stormwater Basin Retrofit – Basin regrading, sediment removal, naturalization, and outlet control structure redesign.
10. Compost Center – Basin regrading, sediment removal, naturalization, and water reuse irrigation system
11. Dexter – Ann Arbor Rd, between N. Maple Rd and S. Revena Blvd – Leaching basins and pollutant separation structures
12. Madison Ave, between 7<sup>th</sup> St and Main St – Porous road surface with infiltration, first flush storm sewers with detention, and pollutant separation structures
13. Stadium Blvd, between Hutchins Ave. and Kipke Dr – First flush storm sewers with detention and trees with structural soil
14. Leslie Park Golf Course – Streambank stabilization, stream corridor naturalization, inline flow mitigation wetland, and basin retrofits
15. Leslie Science and Nature Center – Porous Pavement with bioinfiltration

This Project Plan Amendment is intended as a supplement to the 2010 Huron River SRF Project Plan. The projects identified in this Amendment are additional projects.

is to remove suspended pollutants from the storm flow before moving downstream. The units will be size to treat the first flush runoff. This is not a Principal Alternative.

Two factors eliminated this concept as a principle alternative, they are the follow:

- 1) Potential rate of failure is higher then the porous roadway. If the leaching basin fills with sediment, infiltration will be limited and potential flooding may occur.
- 2) The porous roadway has the potential to mitigate more then the first flush rain event. The large exposed surface area and Type B soils may allow for greater infiltration capacity then the leaching basins.

- ▼ The Springwater Subdivision is located at the southwest corner of Packard St. and Platt Rd (see **Figure 14**). This subdivision is a residential development originally constructed in the 1950s. The pavement widths within the subdivision are extra wide to accommodate on-street parking on each side of the road. There is also an existing storm sewer system within the subdivision, however, it has reached the end of its useful life. Currently, there are no water quality treatment measures in the system. The NRCS Soil Survey identifies the soils in this area to be Type C and D. These soils are typically poor drained and high in clays.

A “first flush storm sewer” network would be sized to capture and detain the stormwater runoff from the first 0.5-in of rainfall. All catch basins and manholes along the first flush storm sewer would be sumped to capture accumulated sediment. Detention of the first flush will help improve watershed hydrology and downstream conditions by reducing peak flows, particularly those that result in streambank erosion. The proposed improvements would mitigate stormwater runoff from approximately 67-ac of contributing area. The existing road width could also be narrower; resulting in less runoff needing treatment.

Three pollutant separation units would be placed on the storm sewer at three locations as the drainage leaves the subdivision. The intent of these underground structures is to remove suspended pollutants from the storm flow before moving downstream. Sewers at Cardinal, Nordman, and Sharon would be retrofitted with pollutant separation units on the three existing 24-in (20-cfs, 12-cfs, & 9-cfs), pipes respectively. The units will be size to treat the first flush runoff from the entire area (67-ac). This is a Principal Alternative.

Other alternatives, such as a porous roadway or bioinfiltration could have been considered. However, due to poor soil conditions and private property issues, they are not viable alternatives for NPS pollution management at this site.

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Site 4A – 4 <sup>th</sup> Ave between Huron and Liberty	
Alternative 1 (Figure 8)	
Total Preliminary Costs .....	\$560,000
Present Worth of the Alternative.....	\$529,266
Total Preliminary Costs .....	\$660,000
Present Worth of the Alternative.....	\$508,651
Site 5 – Stone School Rd Reconstruction between Packard and I-94	
Alternative 1 (Figure 10)	
Total Preliminary Costs .....	\$1,300,000
Present Worth of the Alternative.....	\$1,097,045
Site 6 – 7 <sup>th</sup> St between Pauline and Madison	
Alternative 1 (Figure 11)	
Total Preliminary Costs .....	\$930,000
Present Worth of the Alternative.....	\$709,849
Site 7A – South Forest Ave between Hill St and S. University Ave	
Alternative 1 (Figure 12)	
Total Preliminary Costs .....	\$1,550,000
Present Worth of the Alternative.....	\$1,435,175
Alternative 2 (Figure 13)	
Total Preliminary Costs .....	\$330,000
Present Worth of the Alternative.....	\$262,741
Site 8 – Springwater Subdivision	
Alternative 1 (Figure 14)	
Total Preliminary Costs .....	\$4,480,000
Present Worth of the Alternative.....	\$3,372,070
Site 9 – Stormwater Basin Retrofit (Figure 15)	
Total Preliminary Costs .....	\$1,030,000
Present Worth of the Alternative.....	\$976,176
Site 10A – Compost Center (Figure 16)	
Total Preliminary Costs .....	\$730,000
Present Worth of the Alternative.....	\$743,738

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Site 11 – Dexter-Ann Arbor Rd, between N. Maple Rd and S. Revena Blvd Alternative 1 (Figure 17)	
Total Preliminary Costs .....	\$1,480,000
Present Worth of the Alternative.....	\$1,119,698
Site 12 – Madison Avenue, between 7 <sup>th</sup> Ave and Main St Alternative 1 (Figure 18)	
Total Preliminary Costs .....	\$3,940,000
Present Worth of the Alternative.....	\$2,952,841
Site 13 – Stadium Blvd, between Hutchins Ave. and Kipke Dr Alternative 1 (Figure 19)	
Total Preliminary Costs .....	\$1,650,000
Present Worth of the Alternative.....	\$1,246,379
Site 14 - Leslie Park Golf Course Alternative 1 (Figure 20)	
Total Preliminary Costs .....	\$1,050,000
Present Worth of the Alternative.....	\$977,645
Site 15 - Leslie Science and Nature Center Alternative 1 (Figure 21)	
Total Preliminary Costs .....	\$260,000
Present Worth of the Alternative.....	\$218,995

**c. Salvage Value**

There is a salvage value associated with all underground concrete infrastructure and detention basins. The expected life expectancy is beyond 20 years for Willard St, Stadium Bridges, 4<sup>th</sup> Ave, Stone School Rd, 7<sup>th</sup> St, South Forest, Springwater Subdivision, Dexter-Ann Arbor Rd, Madison Ave, and Stadium Blvd.

**d. Escalation**

Energy costs and land value may be escalated, if appropriate. This is most applicable if different alternatives use different fuel supplies or an alternative land application and others do not. For this Project Plan Amendment, any increase will apply equally at all alternatives. Therefore, costs were not escalated.

**e. Interest During Construction**

If interest during construction is significant and may influence the choice of alternatives, it may be included in the monetary evaluation. The construction period for the project alternatives will be on the order of months. Therefore,

Table 4 (continued): Calculated Urban TSS Pollutant Load, Removal Efficiency, and Quantity Removed

7A	South Forest Ave (Hill St to S. University Ave)	Porous Road (Full Width)	4.05	0.95	30.22	100	2,766	65%	172%	1,798
		Pollutant Separation	1.59	0.95	30.22	100	1,086	60%	100%	652
7B	South Forest Ave (Hill St to S. University Ave)	Leaching Basins	4.05	0.95	30.22	100	2,766	75%	35%	716
		Pollutant Separation	1.59	0.95	30.22	100	1,086	60%	100%	652
8	Springwater Subdivision	First Flush Storm Sewer	66.90	0.40	12.73	100	19,241	30%	87%	4,994
		Pollutant Separation	66.90	0.40	12.73	100	19,241	60%	100%	11,504
9	Basin Retrofits	Basin Improvements	350	0.43	13.62	100	107,709	75%	100%	80,782
10	Compost Center	Basin Improvements	505	0.45	14.32	100	163,455	70%	100%	114,419
		Water Reuse								
11	Dexter - Ann Arbor Rd (N. Maple Rd to S. Revena Blvd)	Leaching Basins	21.10	0.60	19.09	100	9,103	75%	30%	2,060
		Pollutant Separation	76.20	0.63	19.96	100	34,369	60%	100%	20,621
12	Madison Ave (7th St to Main St)	Pollutant Separation	36.20	0.57	18.10	100	14,812	60%	100%	8,887
		First Flush Storm Sewer	42.85	0.60	19.09	100	18,486	30%	30%	1,652
		Porous Road (Full Width)	7.70	0.73	23.22	100	4,042	65%	240%	2,627
13	Stadium Blvd (Hutchins Ave to Kipke Dr)	First Flush Storm Sewer	1.93	0.95	30.22	100	1,316	75%	289%	987
		Tree Planting								
14	Leslie Park Golf Course	Constructed Wetland	5.00	0.25	7.95	100	899	75%	100	674
15	Leslie Science and Nature Center	Porous Pavement	3.00	0.35	11.14	100	755	65%	39%	193
		Bioinfiltration	3.00	0.35	11.14	100	755	70%	63%	333

<sup>1</sup>Assuming 35.35-in annual rainfall for P and 0.9 for P<sub>2</sub> where R=P\*P<sub>2</sub>\*R<sub>v</sub>

<sup>2</sup>Schueler, *Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban Best Management Practices* (Washington D.C.: MWCOC, 1987), L=0.226\*R\*C\*A

<sup>3</sup>USEPA, *Results of the Nationwide Urban Runoff Program* (Washington D.C.: USEPA 1983)

<sup>4</sup>Low Impact Development Manual for Michigan



Table 5 (continued): Calculated Urban TP Pollutant Load, Removal Efficiency, and Quantity Removed

7A	South Forest Ave (Hill St to S. University Ave)	Porous Road (Full Width)	4.05	0.95	30.22	0.5	2	50%	172%	1
		Pollutant Separation	1.59	0.95	30.22	0.5	1	30%	100%	0.24
7B	South Forest Ave (Hill St to S. University Ave)	Leaching Basins	4.05	0.95	30.22	0.5	2	60%	35%	0.42
		Pollutant Separation	1.59	0.95	30.22	0.5	1	30%	100%	0.24
8	Springwater Subdivision	First Flush Storm Sewer	66.90	0.40	12.73	0.5	33	30%	87%	9
		Pollutant Separation	66.90	0.40	12.73	0.5	33	30%	100%	10
9	Basin Retrofits	Basin Improvements	350	0.43	13.62	0.5	175	50%	100%	88
10	Compost Center	Basin Improvements	505	0.45	14.32	0.5	253	56%	100%	141
		Water Reuse								
11	Dexter - Ann Arbor Rd (N. Maple Rd to S. Revena Blvd)	Leaching Basins	21.10	0.60	19.09	0.5	11	60%	30%	2
		Pollutant Separation	76.20	0.63	19.96	0.5	38	30%	100%	11
12	Madison Ave (7th St to Main St)	Pollutant Separation	36.20	0.57	18.10	0.5	18	30%	100%	5
		First Flush Storm Sewer	42.85	0.60	19.09	0.5	21	30%	30%	2
		Porous Road (Full Width)	7.70	0.73	23.22	0.5	4	50%	240%	2
13	Stadium Blvd (Hutchins Ave to Kipke Dr)	First Flush Storm Sewer	1.93	0.95	30.22	0.5	1	30%	289%	0.29
		Tree Planting								
14	Leslie Park Golf Course	Constructed Wetland	5.00	0.25	7.95	0.5	3	50%	100	1
15	Leslie Science and Nature Center	Porous Pavement	3.00	0.35	11.14	0.5	2	50%	39%	0.30
		Bioinfiltration	3.00	0.35	11.14	0.5	2	60%	63%	1

<sup>1</sup>Assuming 35.35-in annual rainfall for P and 0.9 for P<sub>i</sub> where R=P\*P<sub>i</sub>\*R<sub>v</sub>.

<sup>2</sup>Millers Creek Watershed Improvement Plan

<sup>3</sup>Low Impact Development Manual for Michigan

<sup>4</sup>Analysis was performed as part of a TMDL basin assessment with a pollutant concentration in mg/L.

Table 6 (continued): Calculated Urban *E. coli* Pollutant Load

7A	South Forest Ave (Hill St to S. University Ave)	Porous Road (Full Width)	4.05	0.95	30.22	20,000	2,522
		Pollutant Separation	1.59	0.95	30.22	20,000	990
7B	South Forest Ave (Hill St to S. University Ave)	Leaching Basins	4.05	0.95	30.22	20,000	2,522
		Pollutant Separation	1.59	0.95	30.22	20,000	990
8	Springwater Subdivision	First Flush Storm Sewer	66.90	0.40	12.73	20,000	17,538
		Pollutant Separation	66.90	0.40	12.73	20,000	17,538
9	Basin Retrofits	Basin Improvements	350	0.43	13.62	20,000	98,177
10	Compost Center	Basin Improvements	505	0.45	14.32	20,000	148,990
		Water Reuse					
11	Dexter - Ann Arbor Rd (N. Maple Rd to S. Revena Blvd)	Leaching Basins	21.10	0.60	19.09	20,000	8,297
		Pollutant Separation	76.20	0.63	19.96	20,000	31,328
12	Madison Ave (7th St to Main St)	Pollutant Separation	36.20	0.57	18.10	20,000	13,501
		First Flush Storm Sewer	42.85	0.60	19.09	20,000	16,850
		Porous Road (Full Width)	7.70	0.73	23.22	20,000	3,684
13	Stadium Blvd (Hutchins Ave to Kipke Dr)	First Flush Storm Sewer with Infiltration CBs	1.93	0.95	30.22	20,000	1,199
		Tree Planting					
14	Leslie Park Golf Course	Constructed Wetland	5.00	0.25	7.95	20,000	819
15	Leslie Science and Nature Center	Porous Pavement	3.00	0.35	11.14	20,000	688
		Bioinfiltration	3.00	0.35	11.14	20,000	688

<sup>1</sup>Assuming 35.35-in annual rainfall for P and 0.9 for P<sub>i</sub> where R=P\*P<sub>i</sub>\*R<sub>v</sub>.

<sup>2</sup>USEPA, *Results of the Nationwide Urban Runoff Program* (Washington D.C.: USEPA 1983)

<sup>3</sup>Schueler, *Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban Best Management Practices* (Washington D.C.: MWCOG, 1987), L=1.03\*10<sup>-3</sup>\*R\*C\*A

<sup>4</sup>MPN/100 mL, which represents the most probable number (MPN) of bacteria that would be found in 100 mL of water, analysis was performed as part of a TMDL basin assessment

Table 7 (continued): First Flush Volume Summary

7A	South Forest Ave (Hill St to S. University Ave)	Porous Road (Full Width)	6,983	12,000	NA	NA	172%
		Pollutant Separation	2,742	NA	2	2	100%
7B	South Forest Ave (Hill St to S. University Ave)	Leaching Basins	6,983	2,412	NA	NA	35%
		Pollutant Separation	2,742	NA	2	2	100%
8	Springwater Subdivision	First Flush Storm Sewer	48,569	42,017	NA	NA	87%
		Pollutant Separation	48,569	NA	40	40	100%
9	Basin Retrofits	Basin Improvements	271,887		NA	NA	100%
10	Compost Center	Basin Improvements	412,606	412,606	NA	NA	100%
		Water Reuse					
11	Dexter - Ann Arbor Rd (N. Maple Rd to S. Revena Blvd)	Leaching Basins	22,978	6,933	NA	NA	30%
		Pollutant Separation	86,757	NA	72	72	100%
12	Madison Ave (7th St to Main St)	Pollutant Separation	37,389	NA	31	31	100%
		First Flush Storm Sewer	46,664	13,900	NA	NA	30%
		Porous Road (Full Width)	10,202	24,480	NA	NA	240%
13	Stadium Blvd (Hutchins Ave to Kipke Dr)	First Flush Storm Sewer	3,321	9,600	NA	NA	289%
		Tree Planting		10	NA	NA	NA
14	Leslie Park Golf Course	Constructed Wetland	2,269	10,000	NA	NA	100
15	Leslie Science and Nature Center	Porous Pavement	1,906	750	NA	NA	39%
		Bioinfiltration		1,200	NA	NA	63%

<sup>1</sup>The first flush is 0.5-in of rainfall over the contributing area, determined by with the Rational Method

Table 9: Alternative Cost and Cost per Unit of Storage or Removal

Site	Alternative Type	Site	BMP	Cost	\$/cf Storage	\$/lb TSS Removed	\$/lb P Removed
1	Water Quality BMP	Miller Rd "Green" Corridor (Maple Rd to Newport Rd)	On-street Bioinfiltration	\$1,960,000	\$84	\$5.84	\$8,113
			Bioswale				
			Pollutant Separation				
2A	Water Quality BMP	Willard St (E University Ave to S Forest Ave)	Porous Road (Full Width)	\$630,000	\$46	\$13.07	\$30,612
			Pollutant Separation				
2B	Water Quality BMP	Willard St (E University Ave to S Forest Ave)	Leaching Basins	\$380,000	\$1,267	\$10.84	\$28,736
			Pollutant Separation				
3	Water Quality BMP	Stadium Blvd Bridges Replacement	Underground Detention with Infiltration	\$3,630,000	\$87	\$1,322	\$2,257,463
4A	Water Quality BMP	4th Ave (Huron St to Liberty St)	Porous Road (Parking Areas)	\$560,000	\$54	\$4.23	\$10,718
			Pollutant Separation				
4B	Water Quality BMP	4th Ave (Huron St to Liberty St)	Leaching Basins	\$630,000	\$1,050	\$5.42	\$14,537
			Pollutant Separation				
5	Water Quality BMP	Stone School Rd Reconstruction (Packard Rd to I-94)	Bioinfiltration	\$1,300,000	\$153	\$4.67	\$7,015
			First Flush Storm Sewer				
			Pollutant Separation				
			Tree Planting				
6	Water Quality BMP	7th St (Pauline Blvd to Madison St)	Leaching Basins	\$930,000	\$97	\$15.26	\$16,865
			Pollutant Separation				
7A	Water Quality BMP	South Forest Ave (Hill St to S. University Ave)	Porous Road (Full Width)	\$1,550,000	\$129	\$31.63	\$61,950
			Pollutant Separation				
7B	Water Quality BMP	South Forest Ave (Hill St to S. University Ave)	Leaching Basins	\$330,000	\$137	\$12.06	\$25,073
			Pollutant Separation				
8	Water Quality BMP	Springwater Subdivision	First Flush Storm Sewer	\$4,480,000	\$107	\$13.58	\$11,991
			Pollutant Separation				
9	Optimization of Existing Facilities	Basin Retrofits	Basin Improvements	\$1,030,000		\$0.64	\$589
10	Optimization of Existing Facilities	Compost Center	Basin Improvements	\$730,000	\$2	\$6.38	\$5,161
			Water Reuse				
11	Water Quality BMP	Dexter - Ann Arbor Rd (N. Maple Rd to S. Revena Blvd)	Leaching Basins	\$1,480,000	\$213	\$3.26	\$5,547
			Pollutant Separation				
12	Water Quality BMP	Madison Ave (7th St to Main St)	Pollutant Separation	\$3,940,000	\$103	\$14.96	\$21,252
			First Flush Storm Sewer				
			Porous Road (Full Width)				
13	Water Quality BMP	Stadium Blvd (Hutchins to Kipke)	First Flush Storm Sewer	\$1,650,000	\$172	\$83.61	\$285,554
			Tree Planting				
14	Streambank Stabilization/ Water Quality BMP	Leslie Park Golf Course	Streambank Stabilization	\$1,050,000	\$105	\$1.35	\$3,003
			Constructed Wetland				
15	Water Quality BMP	Leslie Science and Nature Center	Porous Pavement	\$260,000	\$133	\$24.72	\$15,084
			Bioinfiltration				

Table 10: Project Sites, Selected Alternative Type, and Associated BMPs

Site	Alternative Type	Site
1	Water Quality BMP	Miller Rd "Green" Corridor - On-street bioinfiltration, bioswale, and pollutant separation
2A	Water Quality BMP	Willard St - Porous road with pollutant separation
3	Water Quality BMP	Stadium Bridges Reconstruction - Underground detention with infiltration
4A	Water Quality BMP	4th Ave (Huron St to Liberty St) - Porous road with pollutant separation
5	Water Quality BMP	Stone School Rd Reconstruction (Packard Rd to I-94) - Bioinfiltration with first flush storm sewer, pollutant separation, and tree planting
6	Water Quality BMP	7th St (Pauline Blvd to Madison St) - Leaching basins with pollutant separation
7A	Water Quality BMP	South Forest Ave (Hills St to University Ave) - Porous road with pollutant separation
8	Water Quality BMP	Springwater Subdivision - First flush storm sewer with pollutant separation
9	Optimization of Existing Facilities	Basin Retrofits - Forebay installation and improvements
10	Optimization of Existing Facilities	Compost Center - Detention basin retrofits with vegetative filter strips, bioinfiltration, and water reuse
11	Water Quality BMP	Dexter - Ann Arbor Rd (N. Maple to S. Revena Blvd) - Leaching basins with pollutant separation
12	Water Quality BMP	Madison Ave (7th St to Main St) - Porous road with pollutant separation and first flush storm sewer
13	Water Quality BMP	Stadium Blvd (Hutchins Ave to Kipke Dr) - First flush storm sewer with tree planting
14	Streambank Stabilization/ Water Quality BMP	Leslie Park Golf Course - Streambank stabilization, stream corridor naturalization, inline flow mitigation wetland, and basin retrofits
15	Water Quality BMP	Leslie Science and Nature Center – Porous pavement and bioinfiltration

## 1. Relevant Design Parameters

- a. The major process features are outlined in **Table 10**. Each sites pollutant loads and BMP reductions are outlined in **Tables 4, 5, 6, 7, and 9**.
- b. The unit processes and sizes as related to service area needs.  
The BMP sizing was performed at conceptual level for each site. Greater emphasis will be placed on the calculations during the design phase of the projects. The graphical elements are the proposed improvement locations shown on **Figures 4-21**. These locations have been reviewed by the WCWRC.

testing at the time of site design. An overflow system will be considered for all proposed BMPs as a means for emergency conveyance during large storm events.

Streambank stabilization (Sites 14) will be designed on a site by site basis. However, a combination of regrading, toe protection, flow dissipation, and naturalization with native species will be incorporated. The improvements will be subject to high velocities and will need to reflect that in the final design.

The tree installation and enhancement program (Site 13) will be focused on placing new hardwood vegetation along the Stadium Blvd road corridor. The specific species and locations will be guided by the City's forester to enhance water quality through interception, infiltration, and transpiration.

**e. Residuals management**

It is anticipated that frequent vactoring and/or dredging of sediment and debris from the hydrodynamic separators and first flush storm sewers will be necessary for proper BMP function. It is recommended the City initially perform maintenance twice annually on the pollutant separators and first flush storm sewer. All sediment and debris that is removed from the BMPs will be transported and disposed of at a licensed disposal facility.

**f. Sewer lengths and sizes**

The sewers that are proposed for this Project Plan Amendment area all associated with the first flush storm sewer upgrades. All improvements will be performed as an enhancement and upsize to the existing infrastructure to mitigate the flow and volume associated with the first flush. A combination of 12-in, 15-in, 24-in, 36-in, 42-in, 48-in, and 60-in pipe is proposed at the Stone School, Springwater Subdivision, Madison Ave, and Stadium Blvd sites. Final sizing and length of the storm sewer will be determined as part of the project design.

For the bioinfiltration basins, infiltration swale, and porous road surfaces, it may be necessary for an underdrain below the BMPs if the in-situ soils are poorly drained. This will be determined by a geotechnical investigation completed during the design phase of the projects. If the geotechnical report recommends an underdrain for proper BMP function, its length and size will be determined as part of the design phase.

**g. Pump stations types and sizes, including provisions for standby power and odor control.**

There are no pump stations to be constructed as part of this Project Plan Amendment.

Table 11: SRF Improvement Project Start Dates

Site	Site	Year	Quarter
1	Miller Rd "Green" Corridor - On-street bioinfiltration, bioswale, and pollutant separation	2013	NA
2A	Willard St - Porous road with pollutant separation	2012	2nd
3	Stadium Bridges Reconstruction - Underground detention with infiltration	2012	1st
4A	4th Ave (Huron St to Liberty St) - Porous road with pollutant separation	2012	2nd
5	Stone School Rd Reconstruction (Packard Rd to I-94) - Bioinfiltration with first flush storm sewer, pollutant separation, and tree planting	2015	NA
6	7th St (Pauline Blvd to Madison St) - Leaching basins with pollutant separation	2012	2nd
7A	South Forest Ave (Hills St to University Ave) - Porous road with pollutant separation	2013	NA
8	Springwater Subdivision - First flush storm sewer with pollutant separation	2014	NA
9	Basin Retrofits - Forebay installation and improvements	2012	4th
10	Compost Center - Detention basin retrofits with vegetative filter strips, bioinfiltration, and water reuse	2012	2nd
11	Dexter - Ann Arbor Rd (N. Maple to S. Revena Blvd) - Leaching basins with pollutant separation	2012	2nd
12	Madison Ave (7th St to Main St) - Porous road with pollutant separation and first flush storm sewer	2012	2nd
13	Stadium Blvd (Hutchins Ave to Kipke Dr) - First flush storm sewer with tree planting	2014	NA
14	Leslie Park Golf Course - Streambank stabilization, stream corridor naturalization, inline flow mitigation wetland, and basin retrofits	2012	4th
15	Leslie Science and Nature Center – Porous pavement and bioinfiltration	2012	3rd

## 7. Cost Summary

The cost summary provided in **Table 12** is the total cost for all of the selected alternatives, including engineering, construction, and contingency fees. As the summary indicates, the total cost for all of the selected alternatives is \$25,190,000. See **Appendix B** for a detailed cost breakdown of each site.

Table 12: Cost Summary of Selected Alternatives

Site	Site	Cost
1	Miller Rd "Green" Corridor - On-street bioinfiltration, bioswale, and pollutant separation	\$1,960,000
2A	Willard St - Porous road with pollutant separation	\$630,000
3	Stadium Bridges Reconstruction - Underground detention with infiltration	\$3,630,000
4A	4th Ave (Huron St to Liberty St) - Porous road with pollutant separation	\$560,000
5	Stone School Rd Reconstruction (Packard Rd to I-94) - Bioinfiltration with first flush storm sewer, pollutant separation, and tree planting	\$1,300,000
6	7th St (Pauline Blvd to Madison St) - Leaching basins with pollutant separation	\$930,000
7A	South Forest Ave (Hills St to University Ave) - Porous road with pollutant separation	\$1,550,000
8	Springwater Subdivision - First flush storm sewer with pollutant separation	\$4,480,000
9	Basin Retrofits - Forebay installation and improvements	\$1,030,000
10	Compost Center - Detention basin retrofits with vegetative filter strips, bioinfiltration, and water reuse	\$730,000
11	Dexter - Ann Arbor Rd (N. Maple to S. Revena Blvd) - Leaching basins with pollutant separation	\$1,480,000
12	Madison Ave (7th St to Main St) - Porous road with pollutant separation and first flush storm sewer	\$3,940,000
13	Stadium Blvd (Hutchins Ave to Kipke Dr) - First flush storm sewer with tree planting	\$1,650,000
14	Leslie Park Golf Course - Streambank stabilization, stream corridor naturalization, inline flow mitigation wetland, and basin retrofits	\$1,050,000
15	Leslie Science and Nature Center – Porous pavement and bioinfiltration	\$260,000



Table 13: Project Cost, Annual Debt to Retirement and Annual Cost to Typical User

Site	Proposed Alternative	Cost	Annual Debt Retirement	Annual Cost to Typical User
1	Miller Rd "Green" Corridor - On-street bioinfiltration, bioswale, and pollutant separation	\$1,960,000	\$125,728	\$4.99
2A	Willard St - Porous road with pollutant separation	\$630,000	\$40,413	\$1.61
3	Stadium Bridges Reconstruction - Underground detention with infiltration	\$3,630,000	\$232,854	\$9.25
4A	4th Ave (Huron St to Liberty St) - Porous road with pollutant separation	\$560,000	\$35,922	\$1.43
5	Stone School Rd Reconstruction (Packard Rd to I-94) - Bioinfiltration with first flush storm sewer, pollutant separation, and tree planting	\$1,300,000	\$83,391	\$3.31
6	7th St (Pauline Blvd to Madison St) - Leaching basins with pollutant separation	\$930,000	\$59,657	\$2.37
7A	South Forest Ave (Hills St to University Ave) - Porous road with pollutant separation	\$1,550,000	\$99,428	\$3.95
8	Springwater Subdivision - First flush storm sewer with pollutant separation	\$4,480,000	\$287,379	\$11.42
9	Basin Retrofits - Forebay installation and improvements <b>(Estimate need to confirm with Harry)</b>	\$1,030,000	\$66,072	\$2.62
10	Compost Center - Detention basin retrofits with vegetative filter strips, bioinfiltration, and water reuse	\$730,000	\$46,827	\$1.86
11	Dexter - Ann Arbor Rd (N. Maple to S. Revena Blvd) - Leaching basins with pollutant separation	\$1,480,000	\$94,938	\$3.77
12	Madison Ave (7th St to Main St) - Porous road with pollutant separation and first flush storm sewer	\$3,940,000	\$252,740	\$10.04
13	Stadium Blvd (Hutchins Ave to Kipke Dr) - First flush storm sewer with tree planting	\$1,650,000	\$109,692	\$4.36
14	Leslie Park Golf Course - Streambank stabilization, stream corridor naturalization, inline flow mitigation wetland, and basin retrofits	\$1,000,000	\$64,147	\$2.55
15	Leslie Science and Nature Center – Porous pavement and bioinfiltration	\$260,000	\$16,678	\$0.66
Total Improvement Costs:		\$25,190,000	\$1,615,866	\$64.20

**f. 7<sup>th</sup> St, between Pauline Blvd and Madison St (Site 6)**

The proposed retrofits along 7<sup>th</sup> St are to incorporate BMPs (leaching basins and pollutant separation) into the road corridor. Adverse environmental impacts are expected to be minimal. All construction activities will take place within the 7<sup>th</sup> St right-of-way. The extent of the site in this Project Plan Amendment is not located in or near known floodways, floodplains, wetlands, or any other sensitive features.

There is no anticipated tree removal or adverse effects on endangered species or historical cultural resources. There may be minor disruptions to road traffic or limits on parking usage during construction. These disruptions will be temporary and will be communicated through appropriate signage.

**g. South Forest Ave, between Hill St and S. University Ave. (Site 7)**

The proposed retrofits along South Forest Ave are to incorporate BMPs (porous roadway and pollutant separation) into a road reconstruction project. Adverse environmental impacts are expected to be minimal. All construction activities will take place within the South Forest Ave right-of-way, and the project site is not located in or near a floodway, floodplain, wetland, or any other sensitive features.

There will be no tree removal, and adverse effects on endangered species or historical resources are not anticipated. There may be minor disruptions to road traffic or limits on park usage during construction. These disruptions will be temporary and will be communicated through appropriate signage.

**h. Springwater Subdivision (Site 8)**

The proposed project involves construction of a pollutant separators and first flush storm sewer within the existing road right-of-ways. The project site is not located in or near a floodway, floodplain, wetland, or any other sensitive features.

There will be no tree removal, and adverse effects on endangered species or historical resources are not anticipated. There may be minor disruptions to road traffic or limits on park usage during construction. These disruptions will be temporary and will be communicated through appropriate signage.

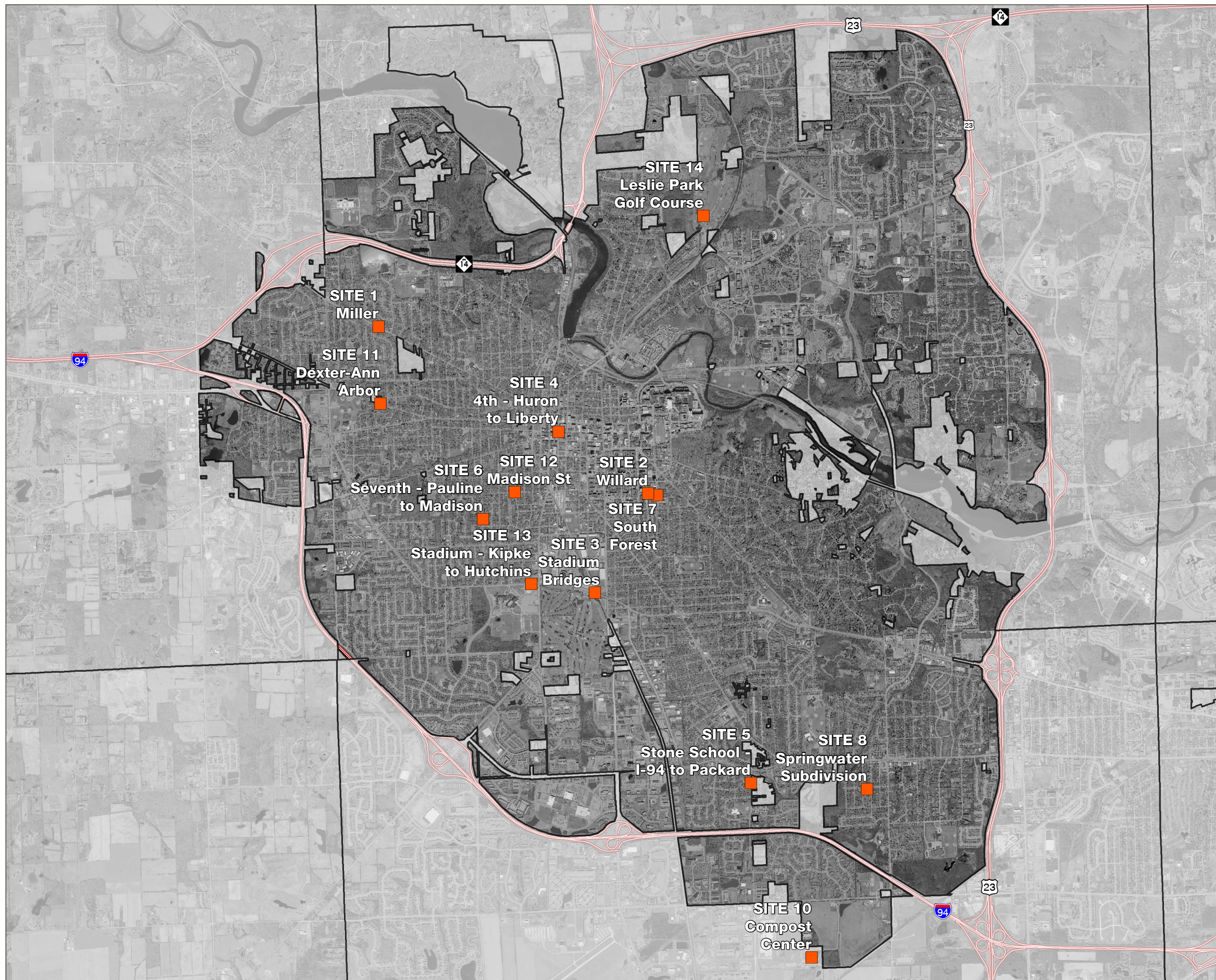
**i. Basin Improvements (Sites 9 & 10)**

The proposed project located at the City of Ann Arbor Compost Center includes retrofitting five existing basins and utilizing collected stormwater for irrigation reuse. The basin retrofits and improvements include creating sediment forebays, dredging the existing detention basin, installing outlet control structures, and naturalization of the basin with wetland vegetation.

# FIGURE 2

## Project Plan Amendment Locations

HURON RIVER 2011 SRF PROJECT PLAN AMENDMENT



■ 2011 Project Location

0 4,000 8,000 Feet



**Source:** Data provided by Washtenaw County and the City of Ann Arbor. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

**Coordinate System:** Michigan South NAD 1983 State Plane International Feet

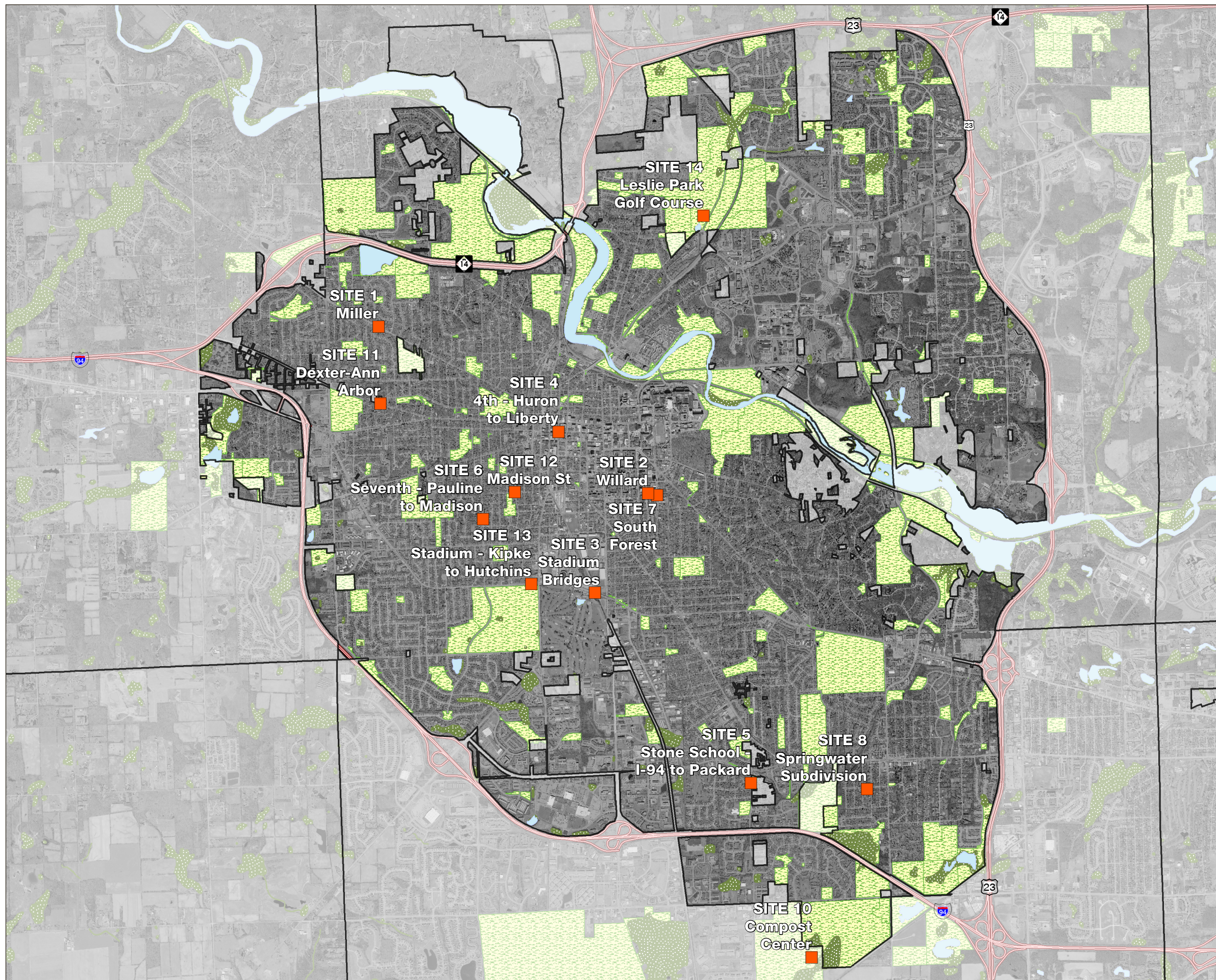
**Map Published:** April 6, 2011



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# FIGURE 3 Natural Features & Open Space

HURON RIVER 2011 SRF PROJECT PLAN AMENDMENT



- 2011 Project Location
- Water Body
- NWI Wetland
- Open Space/Park

0 4,000 8,000 Feet



**Source:** Data provided by Washtenaw County and the City of Ann Arbor. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

**Coordinate System:** Michigan South NAD 1983 State Plane International Feet

**Map Published:** April 6, 2011



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# PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

## Huron River 2010 SRF Project Plan

Springwater Subdivision Alternative 1

Apr-11

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Mobilization (5%)	LS	1	\$60,000	\$60,000
2	Traffic Control	LS	1	\$20,000	\$20,000
3	Erosion Control	LS	1	\$25,000	\$25,000
4	First Flush Sewer, 24" RCP	FT	900	\$75	\$67,500
5	First Flush Sewer, 30" RCP	FT	320	\$85	\$27,200
6	First Flush Sewer, 36" RCP	FT	680	\$90	\$61,200
7	First Flush Sewer, 42" RCP	FT	1,670	\$100	\$167,000
8	First Flush Sewer, 48" RCP	FT	5,130	\$150	\$769,500
9	First Flush Sewer, 60" RCP	FT	1,000	\$200	\$200,000
10	First Flush Manhole, 60" DIA	EACH	6	\$5,000	\$30,000
11	First Flush Manhole, 72" DIA	EACH	7	\$8,000	\$56,000
12	First Flush Manhole, 96" DIA	EACH	17	\$9,000	\$153,000
13	9 cfs Pollutant Separator (First Flush: 9 cfs)	EACH	1	\$55,000	\$55,000
14	14 cfs Pollutant Separator (First Flush: 12 cfs)	EACH	1	\$70,000	\$70,000
15	25 cfs Pollutant Separator (First Flush: 20 cfs)	EACH	1	\$125,000	\$125,000
16	Pavement Remove and Replace	SYD	15,000	\$40	\$600,000
17	Restoration	LS	1	\$150,000	\$150,000
<b>SUBTOTAL</b>					<b>\$2,636,400</b>
Construction Contingency (20%)					\$527,300
<b>TOTAL CONSTRUCTION COST</b>					<b>\$3,163,700</b>
Engineering and Construction Services (25%)					\$790,900
Geotechnical Investigation					\$20,000
Geotechnical Services During Construction					\$80,000
Financial and Legal (5%)					\$158,200
<b>ALLOWANCES</b>					
Easement acquisition costs, if required					\$150,000
Major utility relocation					\$90,000
Permit fees, bonds and inspection fees from permitting agencies.					\$20,000
<b>TOTAL COST</b>					<b>\$4,480,000</b>

# Springwater Subdivision Alternative 1

## Alternative 1 Present Worth Analysis

Apr-11



Design and Construction Costs	\$4,480,000
EPA Discount Rate (i)	4.375%
Life Expectancy (lexp)	50
Cost Recovery Period - Years (n):	20

<b>SALVAGE VALUE (Straight Line Depreciation)</b>	
Constant Yearly Depreciation (Dx) (Design & Const Costs/lexp):	\$89,600.00
Value Remaining After 20 years (Vn = Dx*(lexp-n) )	\$2,688,000.00
Present Worth Factor of Remaining Value: $PWf = (1+i)^{-n}$	0.4247
<i>Present Worth of Salvage Value (PWsalv = PWf * Vn):</i>	<i>\$1,141,593.60</i>

<b>OPERATION, MAINTENANCE and REPLACEMENT (OM&amp;R)</b>	
Present Worth Factor for uniform series of payments $PWf = ((1+i)^n - 1) / (i * (1+i)^n)$	13.15
<b>Annual O, M &amp; R Costs</b>	
Annual Inspection of BMP (2 man crew, 2 day, once per year)	\$2,560.00
Projected Annual OM&R Costs (Aomr)	<b>\$2,560.00</b>
<i>Present Worth for OM&amp;R: Pwomr = Aomr * PWf</i>	<i>\$33,663.96</i>

<b>TOTAL PRESENT WORTH</b>	
<i>Total Present Worth (Pwtot) = Design &amp; Construction Cost + Pwomr - Pwsalv</i>	<i>\$3,372,070</i>

**Assumptions:**

With proper O & M, the BMPs are anticipated to last upto 50 years



Springwater Subdivision



Springwater Subdivision



Springwater Subdivision



Springwater Subdivision





Springwater Subdivision



Dexter – Ann Arbor Road

# CIP PROJECT DATASHEET

**PROJECT NAME:** Springwater Subdivision Water Main Replacement

**Project ID:** UT-WS-14-18

**Project Type:** Replacement

**Prioritization Model Rank:** 13

**Prioritization Model Score:** 49.53

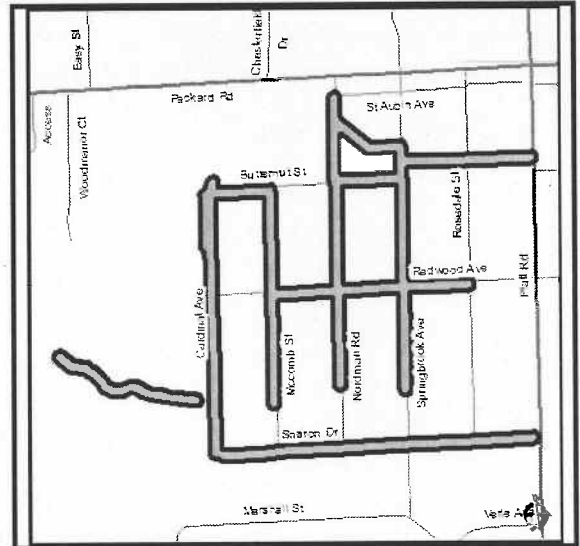
**Location:** Springwater Subdivision

**Identified Need:**

History of main breaks in the subdivision

**Scope Items:**

Coordinate with street reconstruction, stormwater improvements, and sanitary sewer improvements; anticipated as multi-year project based on funding. Targeted streets include Butternut, Nordman, Springbrook, and Redwood.



- Public Engagement Anticipated?     Public Plan Review/CPC Approval

**Source of Need:**

Outside Request?

Staff?                      Condition Analysis

Master Plan?

Master Plan 1:

Master Plan 2:

Master Plan 3:

Master Plan 4:

**Schedule**

Planning Start:	0	Planning End:	0	\$0.00
Design Start:	July - September 2013	Design End:	January - March 2014	\$0.00
Construction:	April - June 2014	To:	October - December 2017	\$1,210,000.00

Rev	Revenue Source Name	Prior Years	Funding (in thousands) *							Beyond FY19	Total
			FY14	FY15	FY16	FY17	FY18	FY19			
2742	OPERATING TRANSFER FROM 0042	\$0	\$490	\$220	\$500	\$0	\$0	\$0	\$0	\$1,210	
		\$0	\$490	\$220	\$500	\$0	\$0	\$0	\$0	\$1,210	

# CIP PROJECT DATASHEET

**PROJECT NAME:** Springwater Subdivision Street Reconstruction

**Project ID:** TR-SC-14-22

**Prioritization Model Rank:** 26

**Project Type:** Replacement & Capital Maintenance

**Prioritization Model Score:** 0

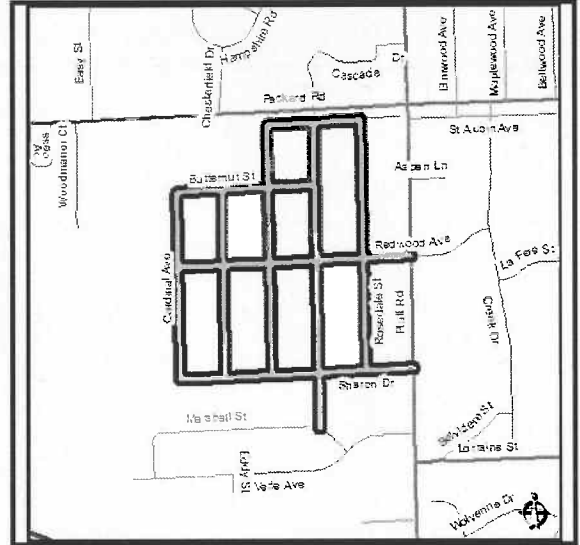
**Location:** Springwater Subdivision

**Identified Need:**

Condition issues with local streets in the subdivision

**Scope Items:**

Reconstruct roads in coordination with water, sanitary, and stormwater projects in the subdivision. Streets include all or portions of Butternut, Nordman, Redwood, and Springbrook.



Public Engagement Anticipated?     Public Plan Review/CPC Approval

**Source of Need:**

Outside Request?

Staff?                      Condition Analysis

Master Plan?

Master Plan 1:

Master Plan 2:

Master Plan 3:

Master Plan 4:

**Schedule**

Planning Start:	0	Planning End:	0	<b>\$0.00</b>
Design Start:	July - September 2013	Design End:	January - March 2014	<b>\$155,000.00</b>
Construction:	April - June 2014	To:	October - December 2017	<b>\$2,025,000.00</b>

Rev	Revenue Source Name	Prior Years	Funding (in thousands) *							Total
			FY14	FY15	FY16	FY17	FY18	FY19	Beyond FY19	
2762	OPERATING TRANSFER FROM 0062	\$0	\$785	\$710	\$685	\$0	\$0	\$0	\$0	\$2,180
		\$0	\$785	\$710	\$685	\$0	\$0	\$0	\$0	\$2,180

# CIP PROJECT DATASHEET

**PROJECT NAME:** Springwater Subdivision Storm Sewer Replacement

**Project ID:** UT-ST-10-04

**Prioritization Model Rank:** 16

**Project Type:** Replacement

**Prioritization Model Score:** 46.57

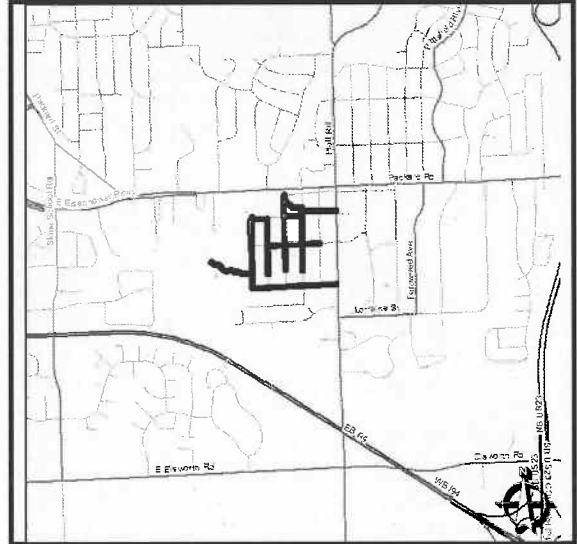
**Location:** Neighborhood south of Packard, west of Platt.

**Identified Need:**

Replace existing storm sewer system in streets slated for reconstruction (Butternut, Nordman, Springbrook, Redwood).

**Scope Items:**

Evaluate all storm sewer in neighborhood, replace & upsized existing storm sewer where necessary, deal with existing storm sewer taps, evaluate downstream impacts if upsized, follow with road construction. Coordinate with lining of sanitary sewer. SRF



**Public Engagement Anticipated?**     **Public Plan Review/CPC Approval**

**Source of Need:**

Outside Request?

Staff?                      Condition Analysis

Master Plan?

Master Plan 1:

Master Plan 2:

Master Plan 3:

Master Plan 4:

**Schedule**

Planning Start:		Planning End:	\$0.00
Design Start:	July - September 2013	Design End:	January - March 2014
			\$105,000.00
Construction:	April - June 2014	To:	October - December 2017
			\$1,345,000.00

Rev	Revenue Source Name	Prior Years	Funding (in thousands) *							Beyond FY19	Total
			FY14	FY15	FY16	FY17	FY18	FY19			
2769	OPERATING TRANSFER FROM 0069	\$0	\$650	\$500	\$300	\$0	\$0	\$0	\$0	\$1,450	
		\$0	\$650	\$500	\$300	\$0	\$0	\$0	\$0	\$1,450	

# CIP PROJECT DATASHEET

**PROJECT NAME:** Sanitary Sewer Lining Projects

**Project ID:** UT-SN-14-06

**Prioritization Model Rank:** 6

**Project Type:** Capital Maintenance

**Prioritization Model Score:** 59.79

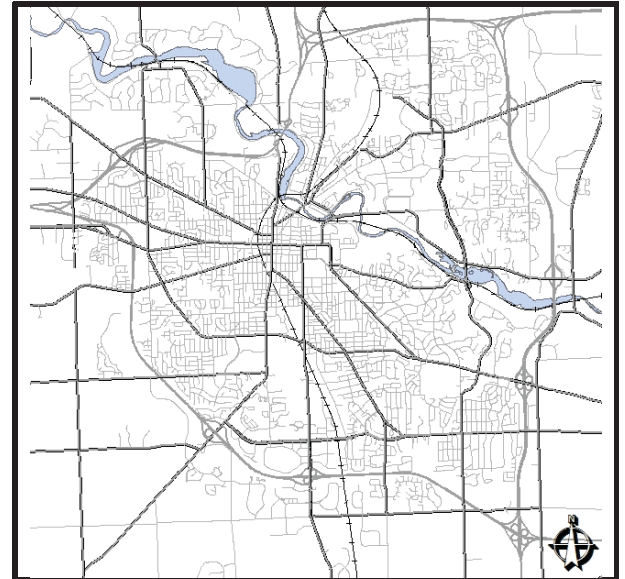
**Location:** Various Locations Throughout the City

**Identified Need:**

Future sewer lining projects.

**Scope Items:**

Programming of funds; locations to be identified as determined.  
Tent. for 2014 and 2015: Fox Hunt Sanitary (formerly UT-SN-12-09); Packard Street Sanitary (formerly UT-SN-12-08); and Redbud Park Sanitary (formerly UT-SN-12-11): Springwater Sub..



Public Engagement Anticipated?  Public Plan Review/CPC Approval

**Source of Need:**

- Outside Request?
- Staff?      Condition Analysis
- Master Plan?

Master Plan 1: \_\_\_\_\_ Master Plan 2: \_\_\_\_\_  
Master Plan 3: \_\_\_\_\_ Master Plan 4: \_\_\_\_\_

**Schedule**

Planning Start:	0	Planning End:	0	<b>\$0.00</b>
Design Start:	0	Design End:	0	<b>\$0.00</b>
Construction:	0 2014	To:	0 2018	<b>\$3,750,000.00</b>

Rev	Revenue Source Name	Prior Years	Funding (in thousands) *							Beyond FY19	Total
			FY14	FY15	FY16	FY17	FY18	FY19			
2743	OPERATING TRANSFER FROM 0043	\$0	\$750	\$1,500	\$0	\$0	\$1,500	\$0	\$0	\$3,750	
		\$0	\$750	\$1,500	\$0	\$0	\$1,500	\$0	\$0	\$3,750	