AGENDA
MAPLE PLAIN PLANNING COMMISSION
MAPLE PLAIN CITY HALL
June 5, 2014
7 p.m.

1. **CALL TO ORDER**

2. **PLEDGE OF ALLEGIANCE**

3. **ADOPT AGENDA**

4. **CONSENT AGENDA**

5. **PUBLIC HEARING**

6. **ADMINISTRATIVE REPORTS**
    a. **City update**
    b. **City website update**

7. **OLD BUSINESS**

8. **NEW BUSINESS**

9. **COMMISSION REPORTS AND OTHER BUSINESS**
    a. **Planning Commission Strategic Planning**

10. **VISITORS TO BE HEARD**
    Note: This is a courtesy extended to persons wishing to address the Commission who are not on the agenda. A completed public comment form should be presented to the City Administrator prior to the meeting. The presentation will be limited to 3 minutes. The session will be limited to 15 minutes.

11. **ADJOURN**

City of Maple Plain Planning Commission
Meeting Minutes
April 17, 2014
7 p.m.

1. **CALL TO ORDER**

Chair Bliss called the meeting to order at 7 p.m.
Present: Commission Chair Michele Bliss, and Commissioners John Fay, Stephen Shurson and Mardelle DeCamp. Also in attendance were Councilmember Liaison, Dave Eisinger, City Planner, Mark Kaltsas, and City Administrator, Tessia Melvin.

Absent: Commissioner Barb Rose

2. **PLEDGE OF ALLEGIANCE**

3. **ADOPT AGENDA**

Commissioner DeKamp moved to adopt the Agenda; Commissioner Shurson seconded. Motion passed 4-0.

4. **CONSENT AGENDA**

Commissioner Fay moved to adopt the Consent Agenda with minor changes to the January 9, 2014, minutes; Commissioner Shurson seconded. Motion passed 4-0.

5. **PUBLIC HEARING**

The Public Hearing opened at 7:14 p.m. City Planner, Mark Kaltsas, presented the site plan review to allow an expansion of the existing parking lot for the property located at 5540 Pioneer Creek Drive (Proto Labs). Kaltsas reported that the applicant is seeking site plan approval to expand the existing parking lot as part of an internal building renovation.

Kaltsas identified the following aspects of the project:

- The proposed parking lot expansion consists of the addition of 25 parking spaces. There are currently 121 parking spaces in the west parking lot and the applicant is removing 26 and putting back 51 parking spaces.
- The applicant is proposing to meet all applicable parking space design criteria that has been established by the City. Currently City Code requires a minimum parking space width of 9 feet, a minimum parking

space length of 20 feet, a minimum parking aisle width of 25 feet and a minimum parking aisle with one-sided parking of 22 feet.

- In addition, to meeting the parking space design, the applicant is proposing to meet the parking lot lighting requirements.
- The City Engineer reviewed the proposed parking lot expansion related to storm water, grading and drainage. The City is requesting additional information pertaining to storm water calculations.
- The City Building Inspector, Roger Peitso did not have any additional requirements for the applicant.
- The City Fire Chief, Dave Eisinger, did not have any additional requirements for the applicant.
- Pioneer-Sarah Creek representative, Jim Kujawa, did not have any additional requirements for the applicant, but raised the issue with the cumulative amount of impervious areas.
- The City Engineer, Dan Boyum, provided the following comments for the applicant:
    - The developer's engineer should submit storm water calculations that show sizing and infiltration volumes for the new pervious area.
    - There were some dimension discrepancies on the typical stall length provided on the applicant's drawing.
    - Generally every 25 stalls triggers the need for one handicap stall to meet ADA requirements.
    - The developer's engineer should verify that the water main lead to Hydrant B has sufficient cover.

There was much discussion by the Commission regarding lighting, handicapped accessibility, parking lot size requirements, the amount of impervious area and the size of the parking lots.

Commissioner Shurson asked that staff guarantee that the storm water requirements and have been met with Pioneer-Sarah Creek Watershed.

Commissioner DeKamp added that the Commission should consider looking at ways of assisting with the pervious areas that may include rain gardens.

The Public Hearing closed at 7:42.

6. ADMINISTRATIVE REPORTS

City Administrator, Tessia Melvin, reported on the following items:

- RoseCreek Builders continue to move ahead on the Townhome project. They have retained Anderson Engineering to do the wetland delineation on the K-Bid parcel. The long winter has delayed this process a bit, but they are looking to complete their testing by April 24. This will come before the Planning Commission in late May or at the June meeting. Melvin

reported that they currently have a development sign up and 5 home plans are pre-priced from $299,000-$400,000.

- In a conversation with the RoseCreek Builder, he is currently looking at another location in Maple Plain for a similar project, but with a starting price of $230,000-$250,000.
- Staff has met with the Met Council, Commercial Brokers and Developers for the Downtown Project.
- The City continues to do its Water Meter Project.
- Work will begin in May on the Rainbow Avenue and Main Street West Road Construction Project.

There was much discussion by the Commission to maintain the regular meeting times. Staff stated that they appreciate their time and will work to maintain regular meeting times.

7. OLD BUSINESS

There was no old Business

8. NEW BUSINESS

A. Approval of Preliminary and Final Plat Approval Request for 5540 Pioneer Creek Drive Parking Lot Expansion

Commissioner Fay moved to approve the Preliminary and Final Plat approval request for Proto Lab; seconded by Commissioner Shurson. Motion passed 4-0.

9. COMMISSION REPORTS AND OTHER BUSINESS

Melvin reported that he next meeting would be May 8, but was corrected by Kaltsas that the earliest would be May 15, due to the public notice process and the developer's schedule. The Commission asked staff to try and hold Planning Commission meetings on the set dates of the first Thursday of the month. While they understand deadlines, they also want staff and others to know that they are volunteers. Melvin agreed to maintain their monthly meeting times.

10. VISITORS TO BE HEARD

There were no visitors.

11. ADJOURN

Commissioner Fay commented on the ability of the Chair to host the meeting under 60 minutes. Commissioner Faye moved to adjourn the meeting at 7:55 p.m.; seconded by Commissioner DeKamp. Motion passed 4-0.

City of Maple Plain
1620 Maple Avenue
P.O. Box 97
Maple Plain, MN 55359
Office: (763) 479-0515
Fax: (763) 479-0519

ZONING & LAND USE APPLICATION

APPLICANT INFORMATION

Applicant Name ANDREW BERENBERG	**Company, if applicable** ANDERSON ENGINEERING
Address 13605 1ST AVE N	**Phone Number** 763-412-4019
City, State, Zip PLYMOUTH, MN 55441	**Email** ABERENBERG@AE-MN.COM
Are you the owner of the property? ☐ **Yes.** ☒ **No.** *(If not, property owner information is required.)*	

Owner Name MICHAEL HALLEY	**Company, if applicable** ROSE CREEK BUILDERS
Address 12955 HWY 55	**Phone Number** 763-717-8000
City, State, Zip PLYMOUTH, MN 55441	**Email** mike@rosecreekbuilders.com

Applicant Signature	**Owner Signature**
Date	**Date**

PROJECT INFORMATION

Site Address or Property Identification Number **2511824110029**

Type of Request *(Check all that apply.)*

	Fee	Escrow		Fee	Escrow
General Application			**Conditional Use Permit**		
☐ Site Plan Review	$500	$1,000	☐ Home Occupation	$200	$1,000
☐ Rezoning	$500	$750	☐ Commercial / Industrial	$500	$1,000
☐ Preliminary Plat	$500	$1,000	☐ Cell Towers	$500	$1,000
☐ Final Plat	$500	$1,000	☐ Amendment	$200	$1,000
☐ Comprehensive Plan Amendment	$500	$1,000	☐ Others	$200	$1,000
Simple / Minor Subdivision			**Planned Unit Development**		
☐ Lot Split	$500	$1,000	☐ Concept Plan	$500	
☐ Lot Combination	$500	$1,000	☐ General Plan	$1,000	$5,000
☐ Lot Line Rearrangement	$500	$1,000	☒ Final Plan	$500	
Subdivision			**Variance**		
☐ 1-5 Lots	$350	$1,000	☐ Residential	$100	$500
☒ More than 5 Lots	$500	$1,000	☐ Commercial / Industrial	$250	$500
Vacate Public Rights of Way			**Special Uses**		Letter of Credit
☐ Vacation of Property	$400		☐ Interim Use Permit	$350	

Brief Project Narrative / Overview *(Use additional paper if necessary. Please be thorough.)*

Rose Creek Builders LLC, proposes to develop 3.3 ac of mixed used land into a Planned Unit Development. The PUD will include 18 residential lots for sale, a private road, an outlot for storm water management, along with a "tot lot". Lots areas range from 4,596 SF to 8,244 SF and average about 6.000 SF. The land is currently serviced by City sewer and water.

NOTICE TO APPLICANT

The Maple Plain City Code guides and enables development activities within the City by ensuring proper and well-coordinated projects. The land use application is the mechanism that allows the City to examine proposed land uses to ensure compatibility with the City Codes, design and development standards, and the surrounding land uses and natural environments. The review is intended to ensure positive growth for the community.

All applications are reviewed individually and are evaluated based on their own merit. Each land use request has an associated checklist of required items. Applicants are encouraged to participate in the City's pre-application workshop prior to submitting a formal land use application. The workshop is an opportunity to informally discuss the conceptual idea of the proposed project in an effort to reduce delays. Participation in the pre-application process does not provide approval, or guarantee of approval, of the project. The City shall not accept plans, drawings or other information related to the project except upon submittal of a formal application. The City reserves the right to reject an incomplete application.

APPLICATION FEE STATEMENT

All expenses pertaining to project reviews are the responsibility of the applicant. Planning review deposits and other applicable fees must be paid when submitting land use applications and accompanying materials. All fees, which are set annually by City ordinance, help cover costs incurred by the City to review the application. The City of Maple Plain often uses consulting firms to assist in the review of projects. City staff and consultant review costs are billed hourly; all other costs are billed at cost. Applicants shall be billed directly for incurred expenses upon receipt by the City. The City reserves the right to request an applicant to submit a development escrow in advance of the formal project review.

Please refer to the City's Fee Schedule for information on planning review fees and deposits, and other applicable costs.

By signing this form, the applicant recognizes his/her responsibility for any and all fees associated with the land use application from project review through to construction and release of financial guarantees for an approved project. All fees associated with a project that is denied or withdrawn remain the sole responsibility of the applicant and shall be paid upon receipt of invoice.

I hereby understand the fee statement and responsibilities associated with this land use application:

Applicant Signature	**Owner Signature**
Date	**Date**

REVIEW REQUIREMENTS

Minnesota State Statute 15.99 requires local governments to review an application within 15 business days of its submission to determine if an application is complete and/or if additional information is required to complete the review. Once complete, a formal 60-day review period begins. The City has the ability to extend the review period an additional 60 days, if necessary, due to insufficient information or scheduling difficulties.

Please review the corresponding checklist that goes with the request as all materials are required unless waived by the City. All applications must be received by the deadline(s) attached hereto. Failure to submit by the date shown may result in a delay of the review by the Planning Commission and City Council.

DEADLINES

Application Due Date	Planning Commission Review	City Council Review
January 7, 2011	February 3, 2011	February 28, 2011
February 4, 2011	March 3, 2011	March 28, 2011
March 4, 2011	April 7, 2011	April 25, 2011
April 1, 2011	May 5, 2011	May 23, 2011
May 6, 2011	June 2, 2011	June 27, 2011
June 3, 2011	July 7, 2011	July 25, 2011
July 8, 2011	August 4, 2011	August 22, 2011
August 5, 2011	September 8, 2011	September 26, 2011
September 2, 2011	October 6, 2011	October 24, 2011
October 7, 2011	November 3, 2011	November 28, 2011
November 4, 2011	December 1, 2011	December 27, 2011
December 2, 2011	January 5, 2012	January 23, 2012
January 6, 2012	February 2, 2012	February 27, 2012

OFFICE USE ONLY

Application Type	Review Deadline
	☐ 15 Business Days: _____ ☐ 60 Day Review: _____ ☐ 120 Day Review: _____
Fees Collected	**Received By**
☐ Application Fee Collected: $_____ ☐ Escrow: $_____ ☐ Total Receipt: $_____	☐ Name: _____ ☐ Signature: _____ ☐ Date: _____
Receipt	**Application Complete**
☐ Receipt Number(s) _____	Are there any missing materials? ☐ Yes. ☐ No. If yes, was the application accepted? ☐ Yes. ☐ No. Please list what was missing according to the

City of Maple Plain
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SUBDIVISION CHECKLIST & PROCEDURE

APPLICATION REQUIREMENTS

The following materials are required in order for each application to receive consideration. The City reserves to waive certain requirements. An application that is missing materials may not be accepted.

- ☐ Completed Land Use Application and pay all applicable fees.
- ☐ All materials as required by City Zoning Code regarding Subdivisions.
- ☐ Address labels of property owners within 350 feet (available through Hennepin County).
- ☐ Certified survey of property (8 full size, 10 reduced) plus CAD and PDF electronic files.
- ☐ Written narrative of outlining project and purpose of request.
- ☐ Wetland report by Certified Wetland Specialist.

- ☐ Scaled site plan showing dimensions & distances
- ☐ Existing & proposed property conditions *(page 2)*
- ☐ Architectural plans and elevations
- ☐ Grading, erosion control & drainage plans *(page 2)*
- ☐ Location of fire suppression, if applicable
- ☐ Soil borings, if applicable
- ☐ Parking plan
- ☐ Lighting plan
- ☐ Landscape plan
- ☐ Utility plan
- ☐ Tree Preservation plan
- ☐ Signage plan
- ☐ Storage & waste enclosure

** Applicants must also submit a site plan application.*

APPROVALS & PERMITS

Project applications may require review and comment from the following agencies. Applicants should allow for enough time for agency review. The City encourages applicants to contact each state and county agency and the appropriate watershed district prior to submitting formal application to understand agency requirements.

- ☐ City of Maple Plain
- ☐ Hennepin County
- ☐ MN Department of Transportation
- ☐ MN Pollution Control Agency (NPDES)
- ☐ Minnehaha Creek Watershed District
- ☐ Pioneer-Sarah Creek Watershed Commission

Upon completion of the formal review period, the following permits may be required for an approved project. The City, county, state and other jurisdictional agencies each have a review period for all permit requests.

- ☐ Building Permit
- ☐ Demolition Permit
- ☐ Excavation & Grading Permit
- ☐ Right of Way Permit
- ☐ Sewer Availability Charges (SAC)
- ☐ Water Availability Charge (WAC)
- ☐ Sign Permit
- ☐ Hennepin County Right of Way Permit
- ☐ MnDOT Right of Way Permit
- ☐ Minnehaha Creek Watershed District Permit
- ☐ Pioneer-Sarah Creek Watershed Commission
- ☐ MnPCA Storm Water (NPDES) Construction Permit
- ☐ Wetland Conservation Act requirements

NOTICE TO APPLICANT

In order to receive consideration the applicant must complete a number of steps.

1. Meet with City staff to discuss the proposed use, whether permitted or conditional, obtain a land use application packet, and schedule a pre-application meeting.
2. Assemble information outlining the request.
3. Submit a completed application packet, including all materials as required by City Zoning Code related to the type of request, to City Hall by the dates noted on the Land Use Application.
4. Participate in the review process by attending City staff and public meetings.
5. Attend all Public Hearings, and Planning Commission and City Council meetings.

By law, the City of Maple Plain must notify adjacent property owners of proposed projects that may impact their properties. This notification is mailed to property owners within 350 feet of the project area at least 10 days prior to the public hearing. A Certified List of Property Owners is available from Hennepin County (612) 348-5910.

ADDITIONAL INFORMATIOIN

Drawings of Existing & Proposed Conditions should include:

- name of proposed plat and layout of lot lines and preliminary dimensions
- proposed guiding and zoning classification
- future platting for re-subdivision
- gross and net acreages of the proposed development
- location, width and name of all existing streets and highway, public property, railroad, utility rights of way, & easements within the proposed development
- location and size of existing buildings & infrastructure (water, sewer and storm sewer lines)
- tree inventory, including trees to be removed & saved
- wetlands, wooded areas & other natural features
- layout of proposed streets, rights of way, sidewalks, trails & pedestrian ways
- location and dimension of all easements
- minimum building setback lines

Grading & Erosion Control & Drainage Plans must show the following:

- existing & proposed topography
- existing natural features, such as trees, wetlands, ponds, swales, drainage channels, etc.
- existing and proposed storm sewer facilities
- proposed storm water improvements
- flood elevations based on a 100-year flood plain
- spot elevations & directional arrows representing drainage patterns
- wetland delineation & mitigation plan at 2:1 ratio

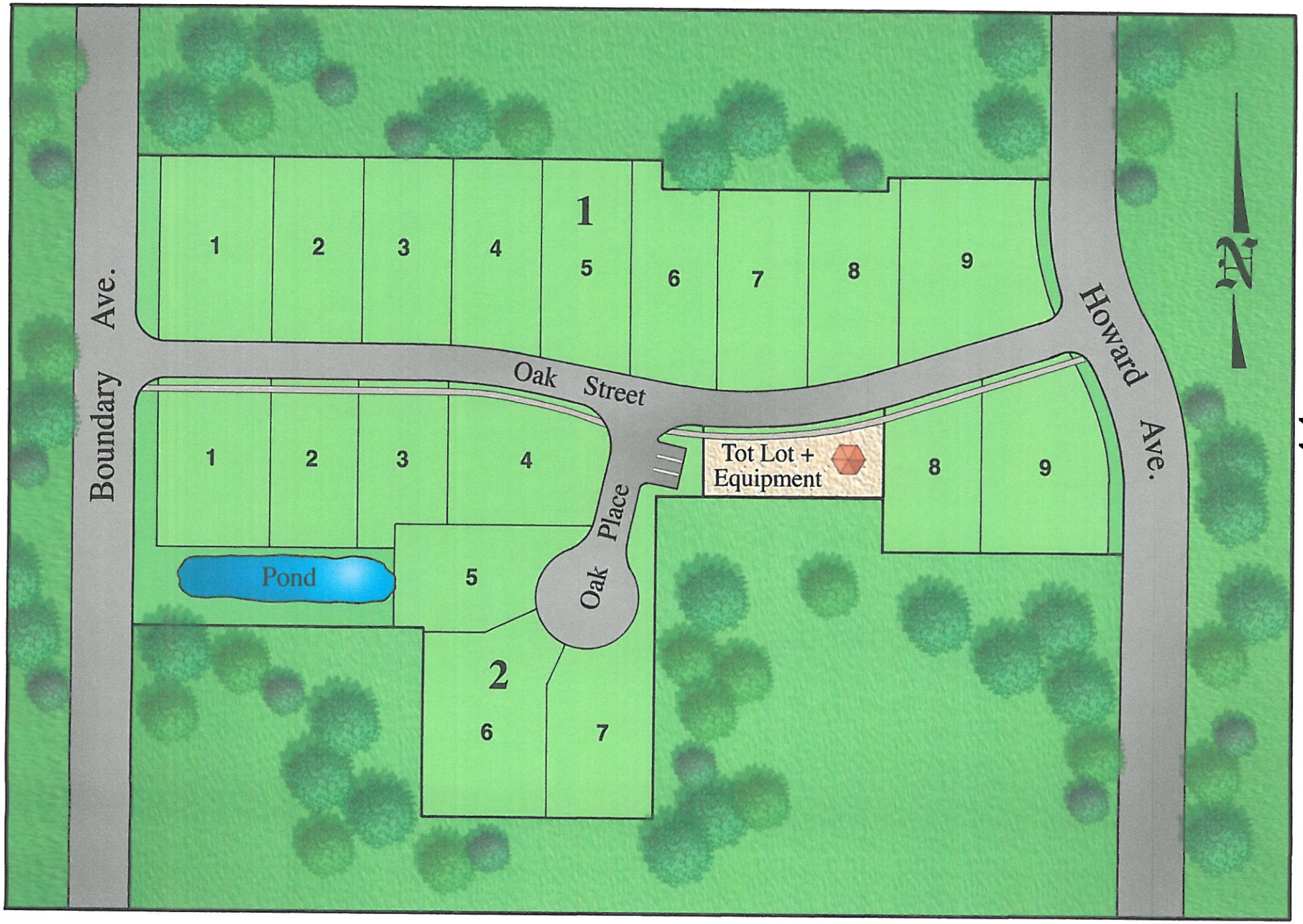
ACKNOWLEDGEMENT

By signing this form, the applicant hereby acknowledges the receipt of the checklist and procedure for the project to be submitted for consideration. It is the responsibility of the applicant to submit all required materials. All permit requests should be submitted in a timely manner so as not to cause project delays.

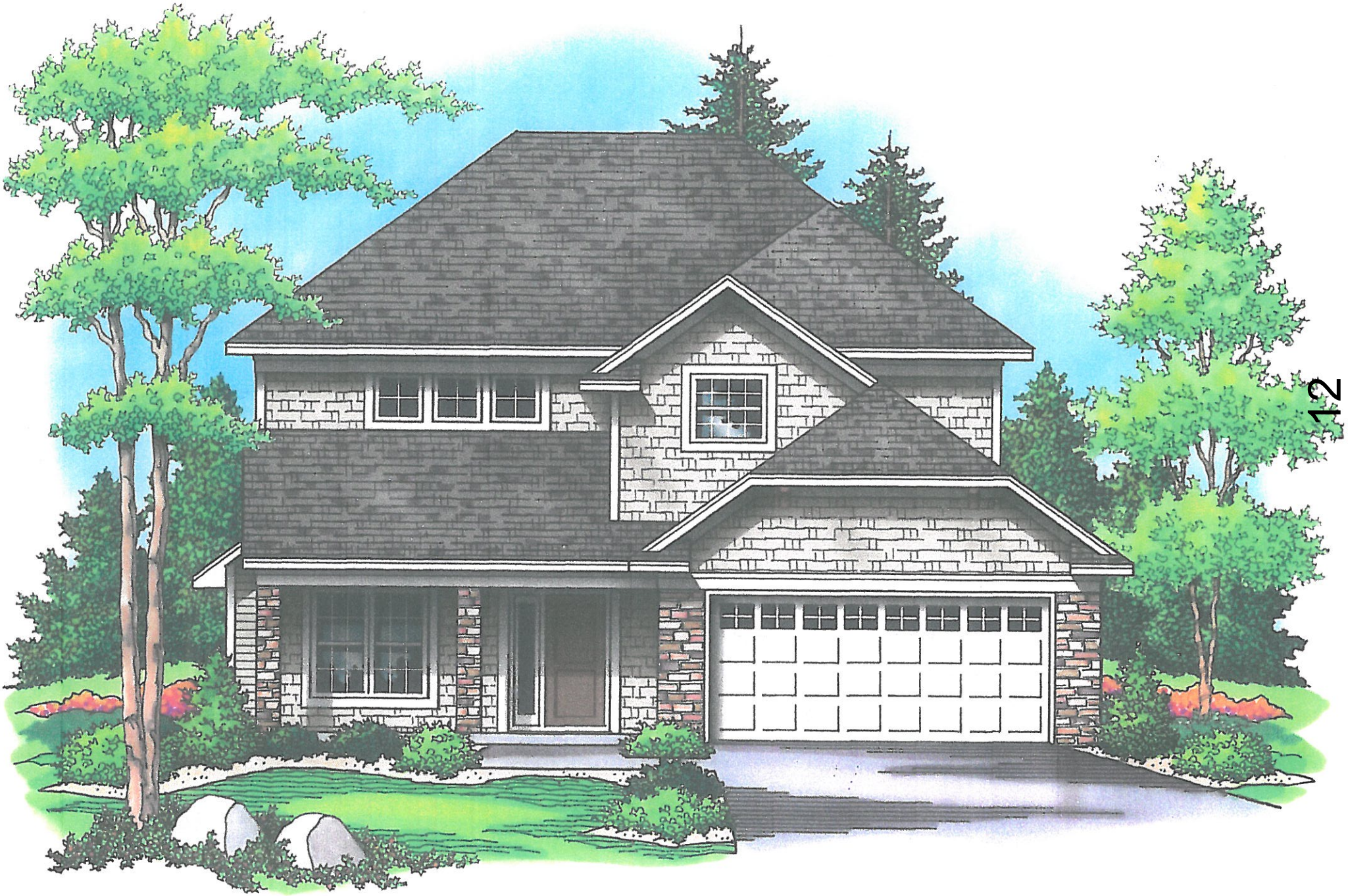
Applicant Signature	**Owner Signature**
Date	**Date**

the
MEADOWS
of
MAPLE PLAIN

Meadows of Maple Plain



Wyndham



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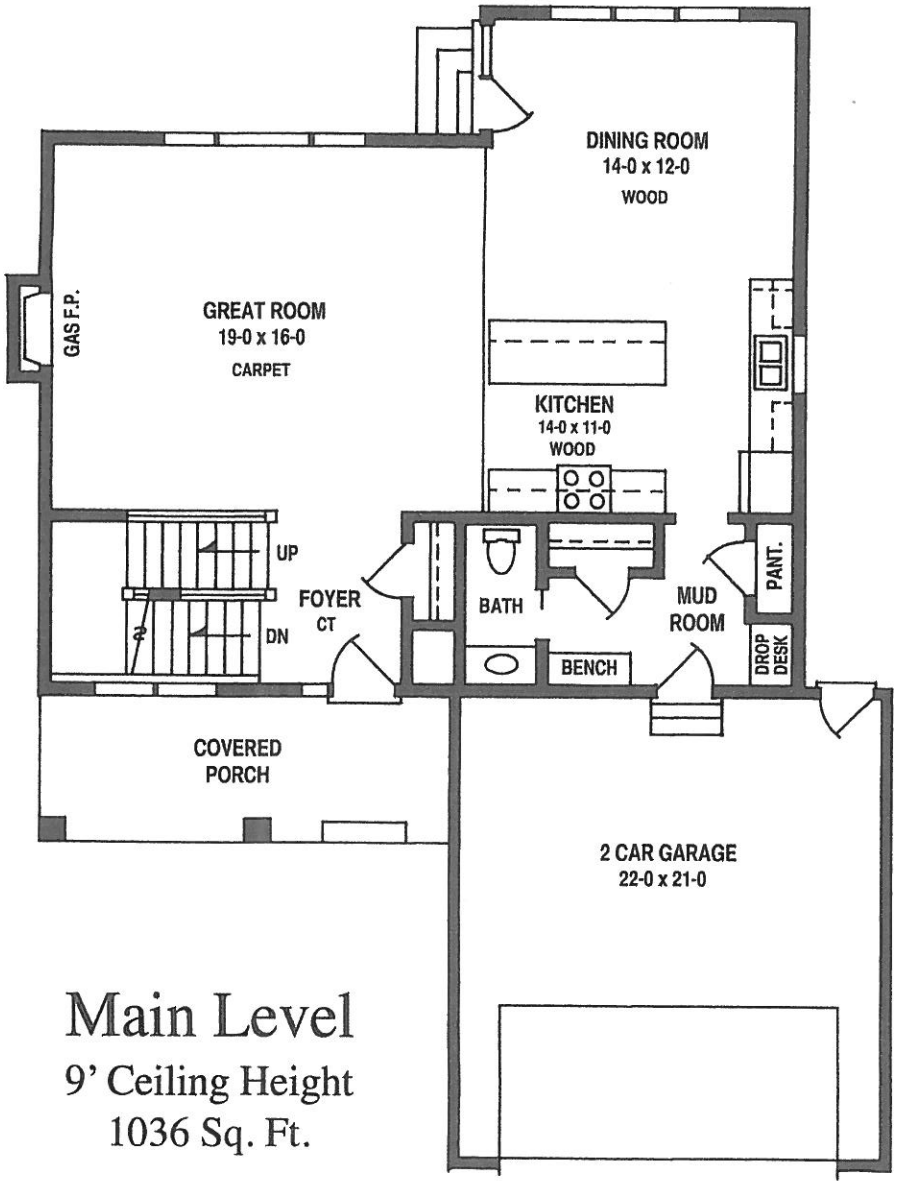
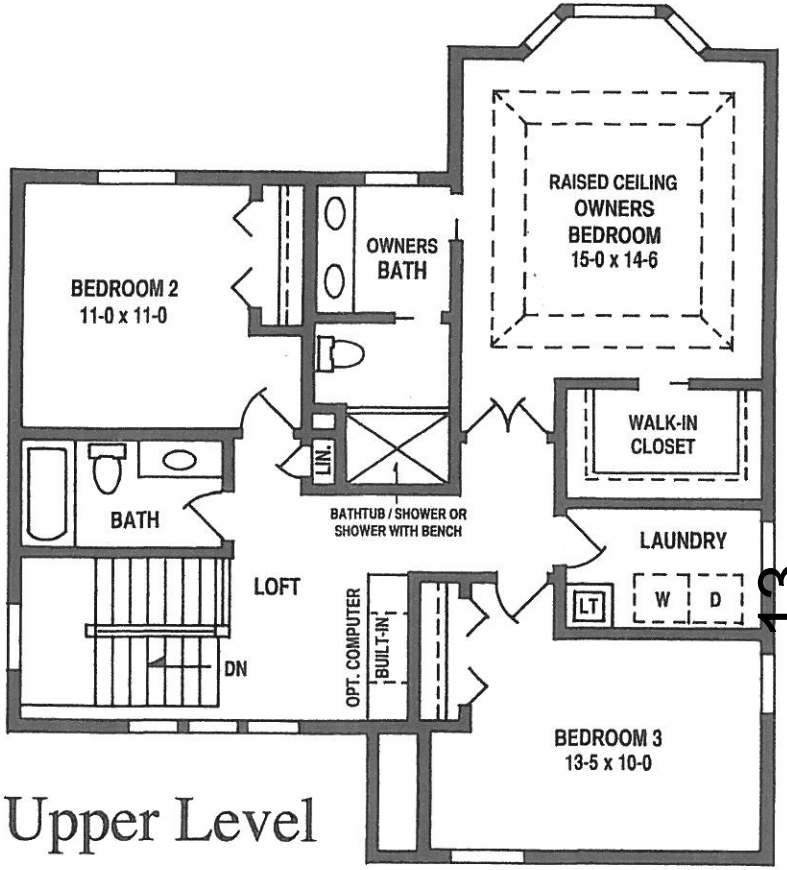


Main Level

9' Ceiling Height
1036 Sq. Ft.



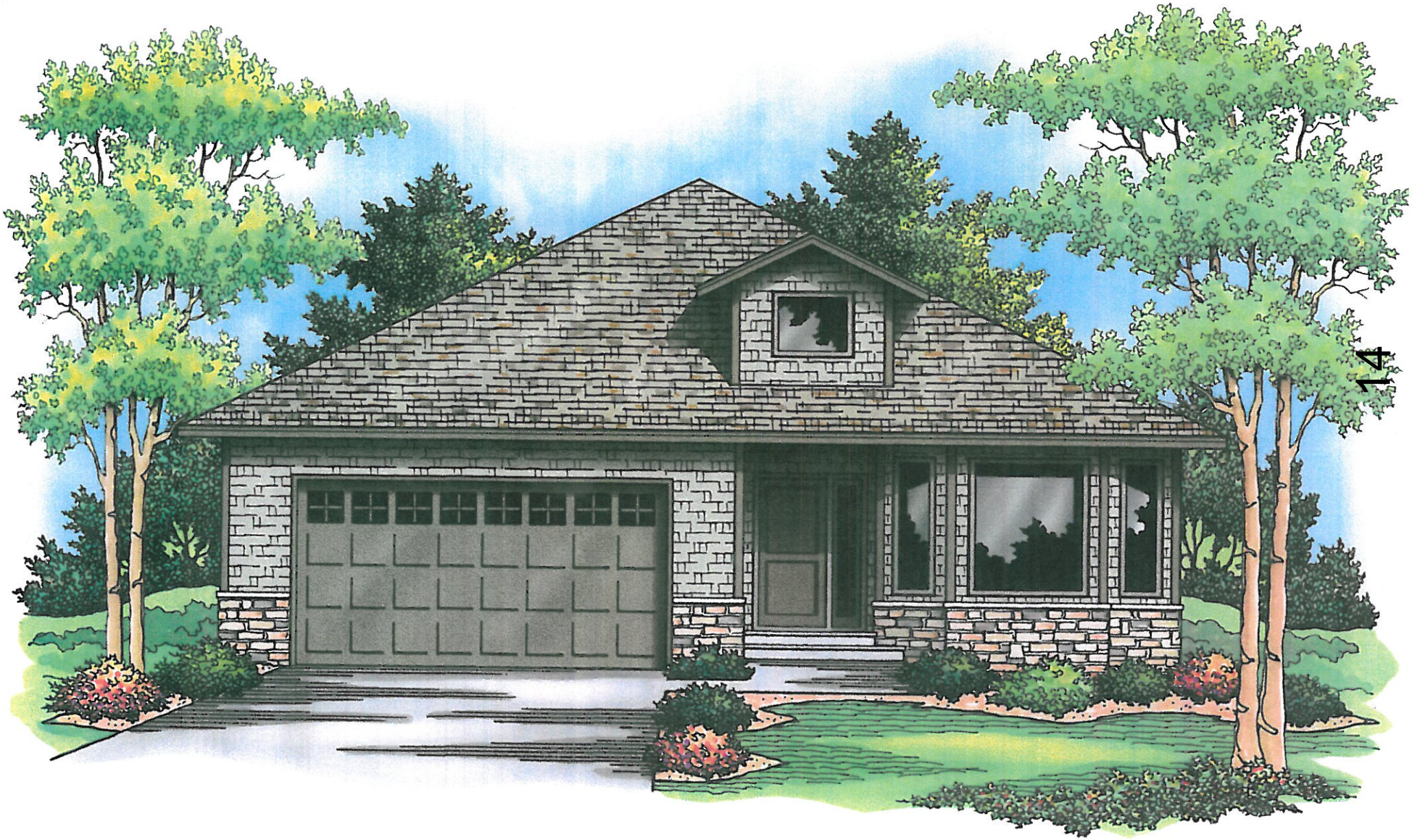
Upper Level

8' Ceiling Height
1070 Sq. Ft.

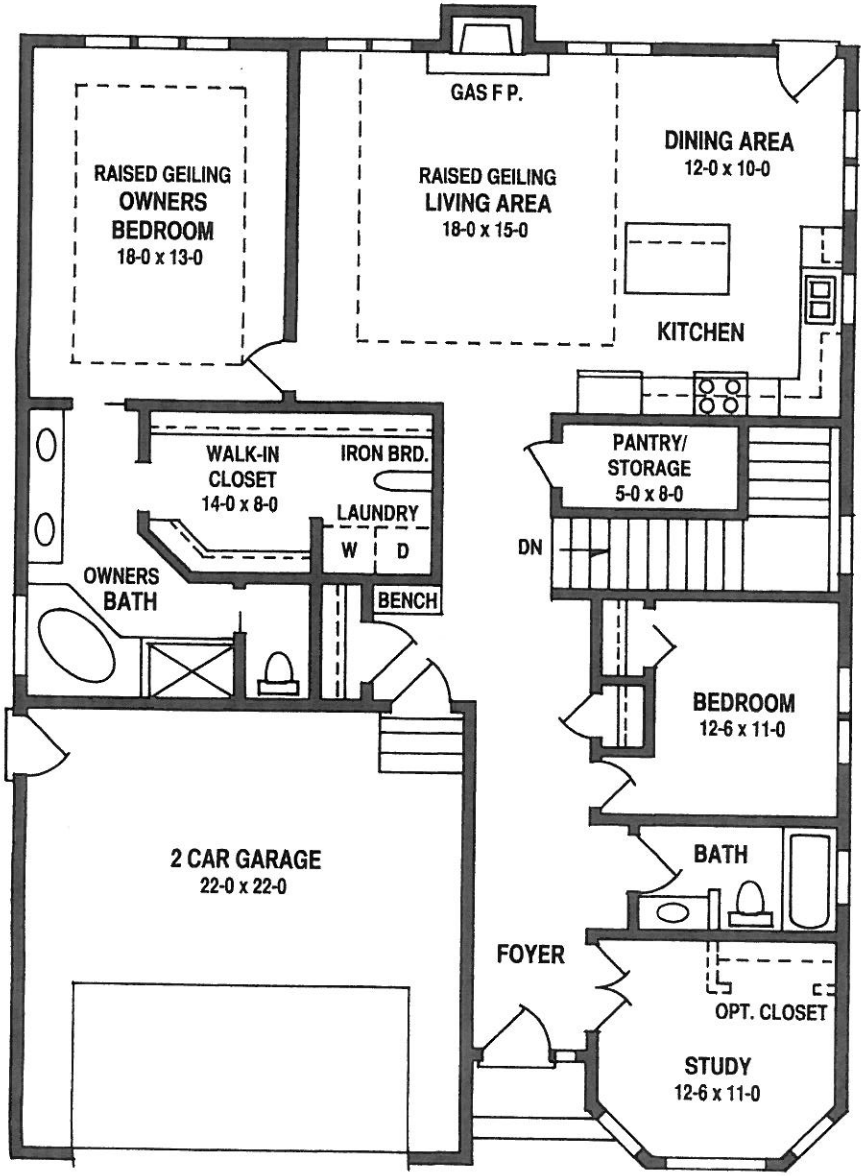
(Full, unfinished basement with roughed-in bath included but not shown)

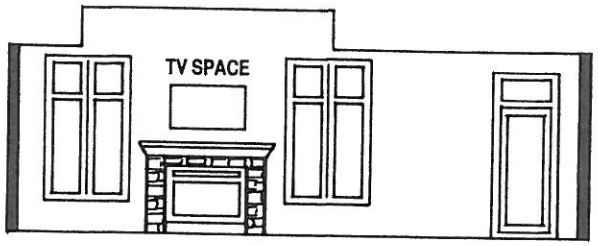
Finished: 2106 Sq. Ft.
Total: 3142 Sq. Ft. (with unfinished basement)

Deacon

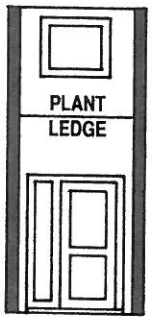


Deacon





Interior fireplace wall



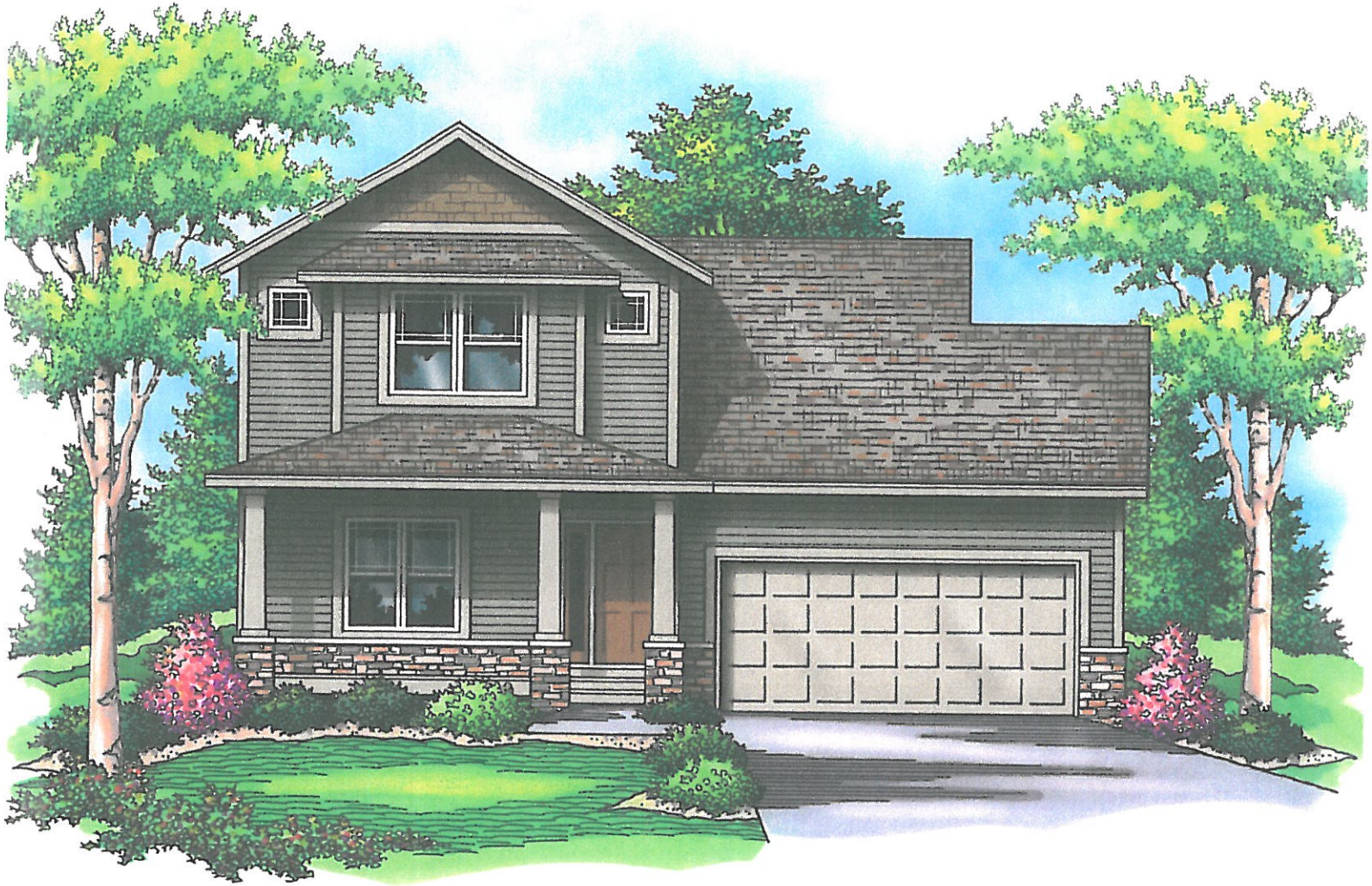
Foyer view of front
door & side window
and window above front door

Main Level

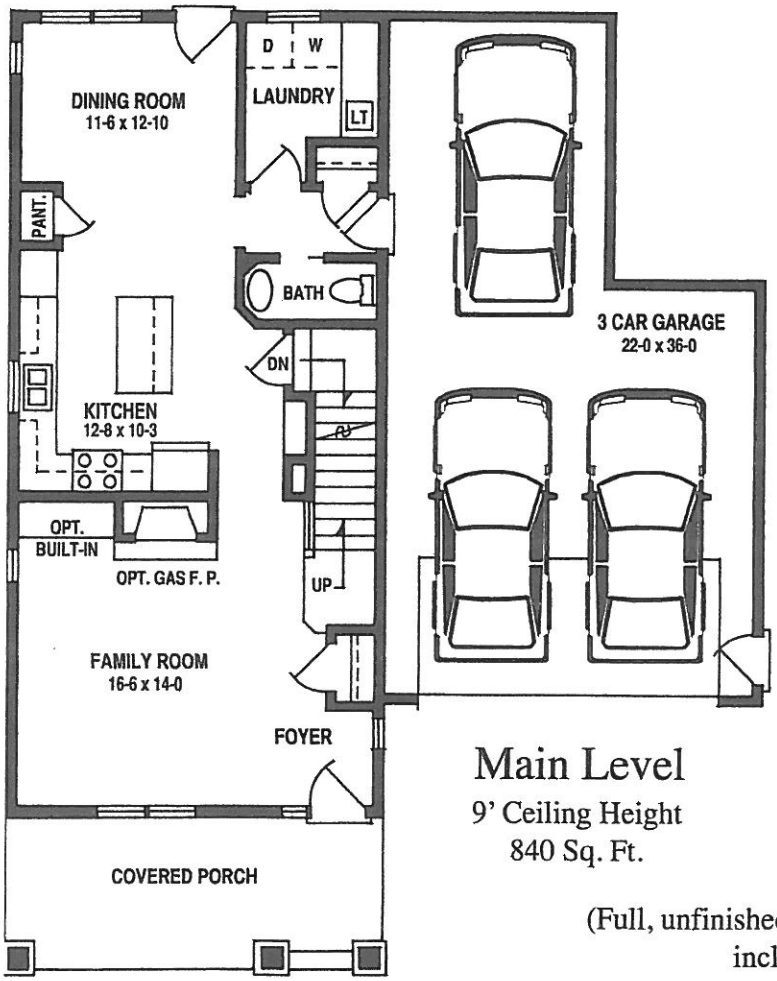
9' Ceiling Height
1680 Sq. Ft.

(Full, unfinished basement with roughed-in bath included with Deacon but not shown)

Bridgeport II

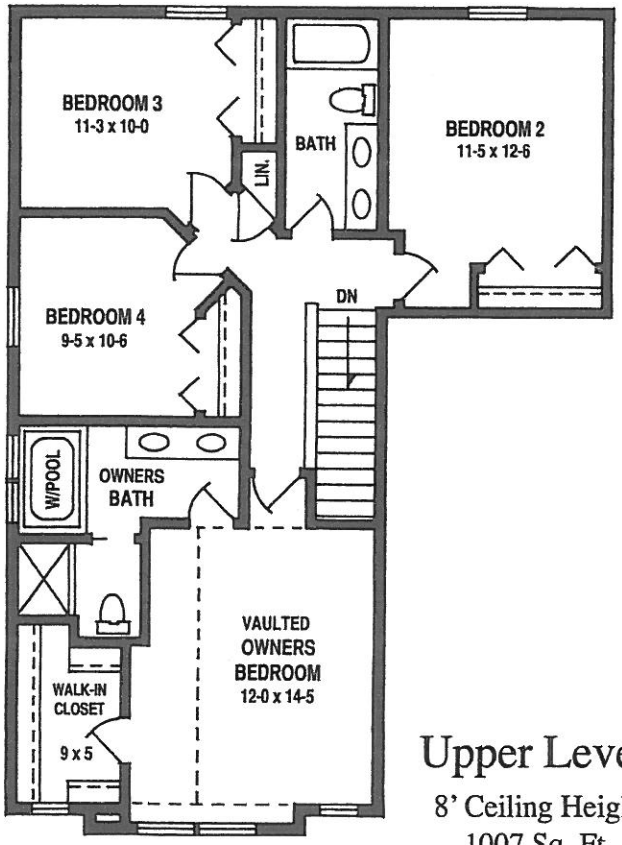


Bridgeport II



Main Level

9' Ceiling Height
840 Sq. Ft.



Upper Level

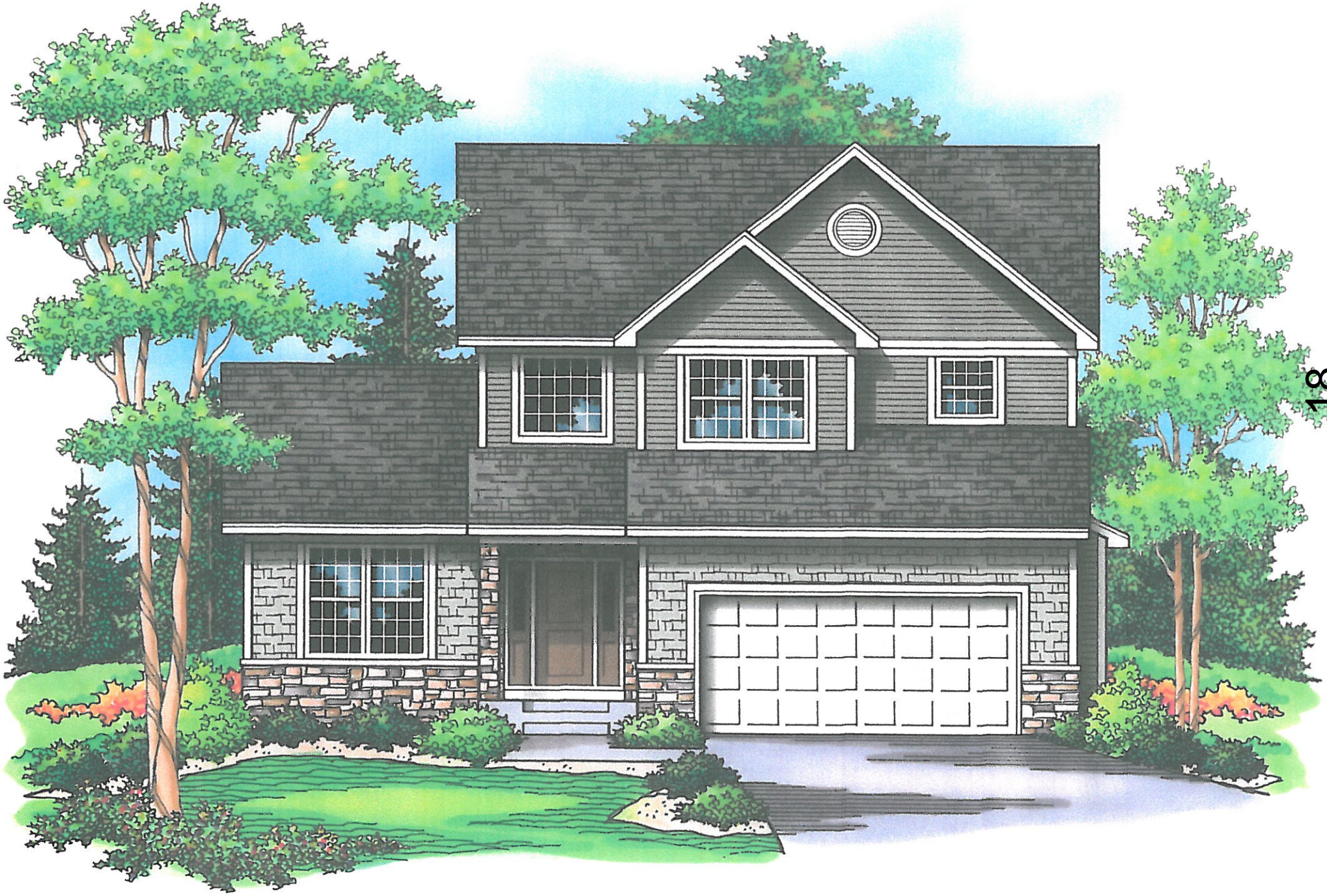
8' Ceiling Height
1007 Sq. Ft.

(Full, unfinished basement with roughed-in bath included but not shown)

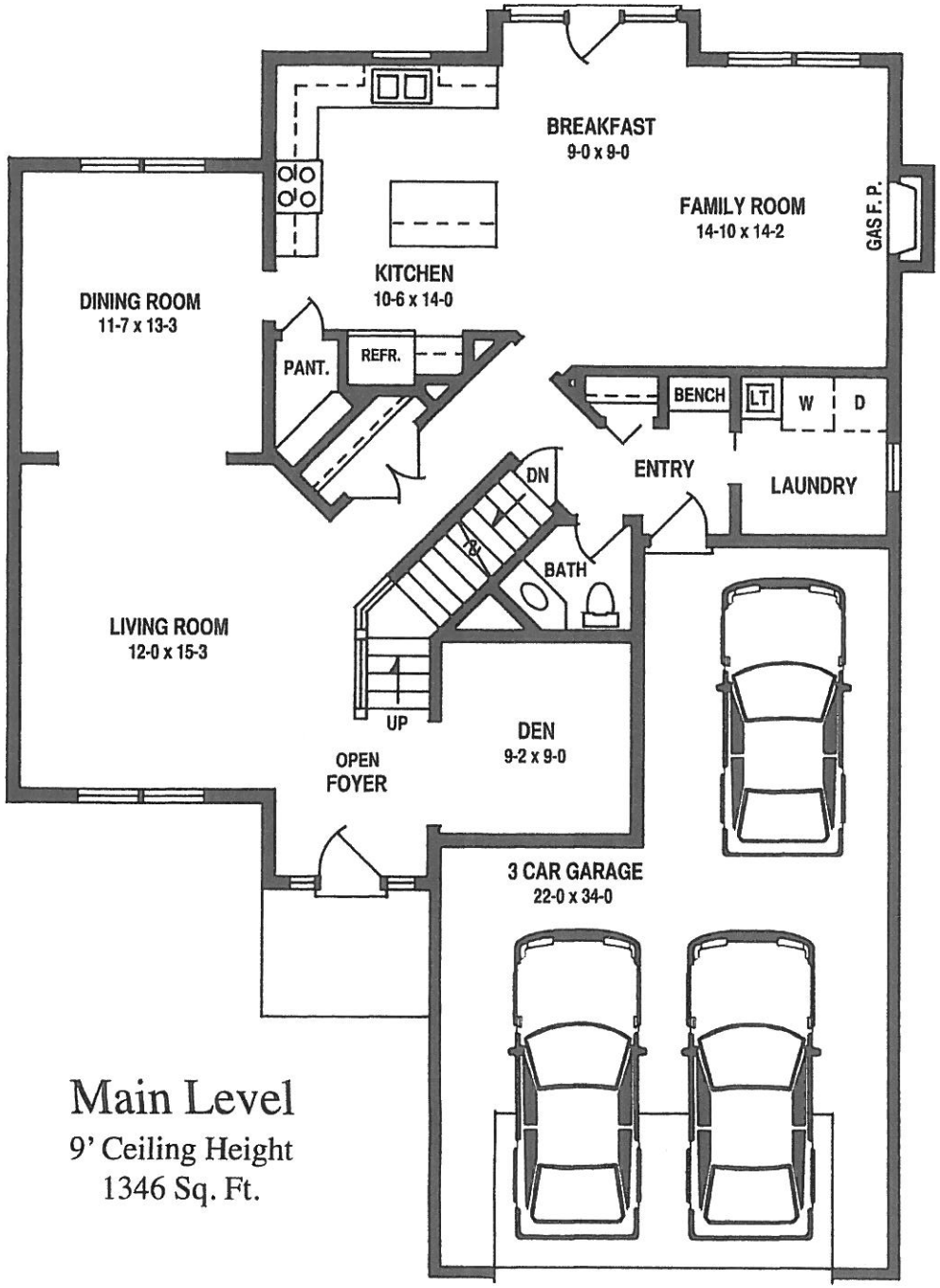
Finished: 1847 Sq. Ft.

Total: 2687 Sq. Ft. (with unfinished basement)

Manchester

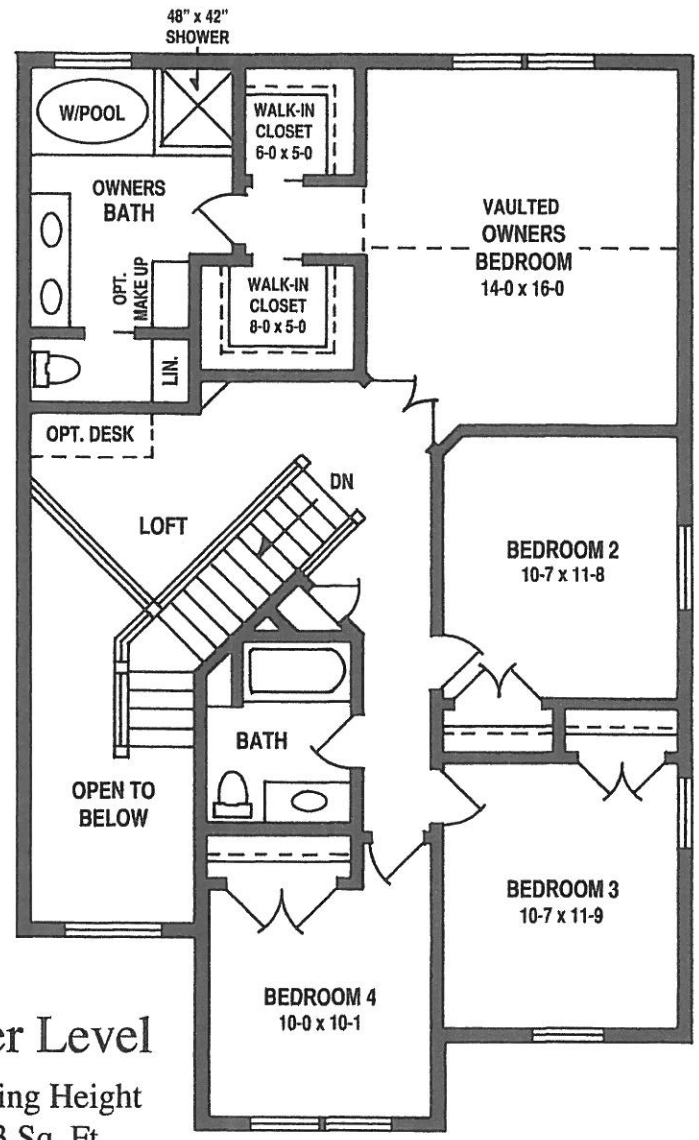


Manchester



Main Level

9' Ceiling Height
1346 Sq. Ft.



Upper Level

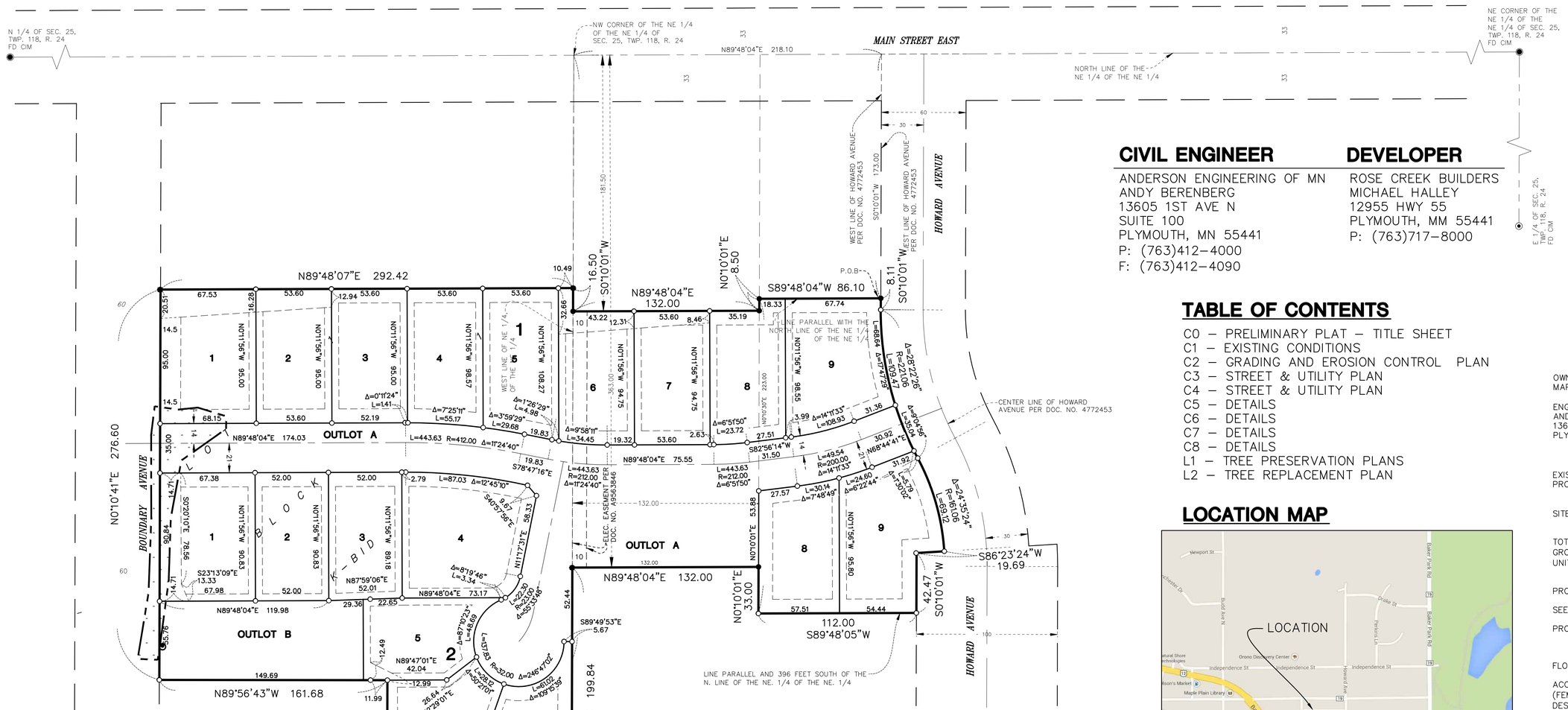
8' Ceiling Height
1313 Sq. Ft.

(Full, unfinished basement with roughed-in bath included but not shown)

Finished: 2659 Sq. Ft.
Total: 4005 Sq. Ft. (with unfinished basement)

FIELD
3

PROPOSED MEADOWS OF MAPLE PLAIN FIRST ADDITION



CIVIL ENGINEER

ANDERSON ENGINEERING OF MN
ANDY BERENBERG
13605 1ST AVE N
SUITE 100
PLYMOUTH, MN 55441
P: (763)412-4000
F: (763)412-4090

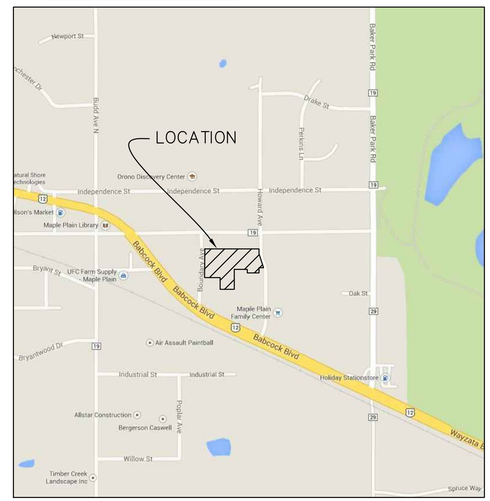
DEVELOPER

ROSE CREEK BUILDERS
MICHAEL HALLEY
12955 HWY 55
PLYMOUTH, MM 55441
P: (763)717-8000

TABLE OF CONTENTS

C0 – PRELIMINARY PLAT – TITLE SHEET
C1 – EXISTING CONDITIONS
C2 – GRADING AND EROSION CONTROL PLAN
C3 – STREET & UTILITY PLAN
C4 – STREET & UTILITY PLAN
C5 – DETAILS
C6 – DETAILS
C7 – DETAILS
C8 – DETAILS
L1 – TREE PRESERVATION PLANS
L2 – TREE REPLACEMENT PLAN

LOCATION MAP



LEGEND

- FOUND MONUMENT
- SET 1/2 INCH IRON PIPE MONUMENT (FUTURE)

OWNER: ROSE CREEK BUILDERS, LLC
MAPLE PLAIN, MN 55446

ENGINEER/SURVEYOR
ANDERSON ENGINEERING OF MINNESOTA
13605 1ST AVENUE NORTH, SUITE 100
PLYMOUTH, MN 55441

EXISTING ZONING: MU: MIXED USE DISTRICT
PROPOSED ZONING: PLANNED UNIT DEVELOPMENT

SITE AREA = 144,215 SQ. FT. (3.3107 ACRES)

TOTAL UNITS = 18
GROSS DENSITY = 5.4 UN./AC.
UNIT DENSITY = 5.4 UN./AC.

PROPOSED LOTS:

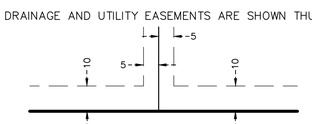
SEE DRAWING

PROPOSED RIGHT OF WAY – N.A.

FLOOD ZONE

ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) MAPS OF HENNEPIN COUNTY, THE PROPERTY DESCRIBED HEREON LIES IN FLOOD ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) PER COMMUNITY PANEL MAP NO. 27053C0144E, DATED SEPTEMBER 2, 2004.

DRAINAGE AND UTILITY EASEMENTS ARE SHOWN THUS:



BEING 5 FEET IN WIDTH ON INTERIOR LOT LINES, UNLESS OTHERWISE INDICATED AND BEING 10 FEET IN WIDTH ON EXTERIOR LOT LINES, UNLESS OTHERWISE INDICATED.

0 40 80 120
SCALE IN FEET

Parcel Area Table			
Lot No.	Blk No.	Acres	Square Foot
1	1	0.148 AC	6445 SF
2	1	0.117 AC	5092 SF
3	1	0.117 AC	5092 SF
4	1	0.118 AC	5157 SF
5	1	0.127 AC	5527 SF
6	1	0.120 AC	5217 SF
7	1	0.117 AC	5079 SF
8	1	0.118 AC	5140 SF
9	1	0.147 AC	6394 SF
1	2	0.141 AC	6148 SF
2	2	0.108 AC	4723 SF
3	2	0.107 AC	4680 SF
4	2	0.174 AC	7586 SF
5	2	0.106 AC	4596 SF
6	2	0.174 AC	7594 SF
7	2	0.189 AC	8244 SF
8	2	0.119 AC	5188 SF
9	2	0.152 AC	6613 SF
OUTLOT A		0.725 AC	31595 SF
OUTLOT B		0.186 AC	8113 SF

PROPOSED PROPERTY DESCRIPTION:

Parcel 1
Lot 1, Block 1, K–BID ADDITION, Hennepin County, Minnesota (NOTE: The use of this legal description is contingent upon the successful recording of the plat of K–BID ADDITION. (Abstract and Torrens property.)

Parcel 2
That part of the Northeast Quarter of the Northeast Quarter, Section 25, Township 118 North, Range 24 West of the 5th Principal Meridian, which lies south of the North 181.5 feet of said Northeast Quarter of the Northeast Quarter, described as follows:

Commencing at the Northwest corner of said Northeast Quarter of the Northeast Quarter; thence South along the west line of said northeast Quarter of the Northeast Quarter, a distance of 363 feet; thence East, parallel with the north line of said Northeast Quarter of the Northeast Quarter a distance of 132 feet; thence North, parallel with said west line a distance of 363 feet to said north line; thence West along said north line a distance of 132 feet to the point of beginning.

Parcel 3
That part of the Northeast Quarter of the Northeast Quarter of Section 25, Township 118 North, Range 24 West of the 5th Principal Meridian described as follows:

Commencing at the Northwest corner of said Northeast Quarter of the Northeast Quarter; thence North 89 degrees 48 minutes 04 seconds East, assumed bearing, along the north line of said Northeast Quarter of the Northeast Quarter a distant of 218.10 feet to the west line of Howard Avenue as described as an easement in Document No. 4772453; thence South 0 degrees 10 minutes 01 seconds West, along said west line a distance of 173.00 feet to the point of beginning of the land to be described; thence South 0 degrees 10 minutes 1 second West, continuing along said west line a distance of 8.11 feet; thence southeasterly continuing along said west line a distance of 109.47 feet along a tangential curve, concave to the east, having a radius of 221.06 feet, and a central angle of 28 degrees 22 minutes 26 seconds; thence southerly continuing along said west line a distance of 69.12 feet along a reverse curve concave to the west having a radius of 161.06 feet, and a central angle of 24 degrees 35 minutes 24 seconds; thence South 86 degrees 23 minutes 24 seconds West a distance of 19.69 feet to a line parallel and 50 feet west of the center line of said Howard Avenue; thence South 0 degrees 10 minutes 1 second West, along said parallel line a distance of 42.47 feet to a line parallel and 396 feet south of said north line of the Northeast Quarter of the Northeast Quarter; thence South 89 degrees 48 minutes 04 seconds West, along the last described parallel line a distance of 112.00 feet to the east line of the west 132 feet of said Northeast Quarter of the Northeast Quarter; thence North 0 degrees 10 minutes 1 second East, along the said east line a distance of 223.00 feet to a line drawn parallel with said north line of the Northeast Quarter of the Northeast Quarter through said point of beginning; thence North 89 degrees 48 minutes 04 seconds East along the last described parallel line a distance of 86.10 feet to said point of beginning.

Hennepin County, Minnesota

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: ANDREW M. BERENBERG
SIGNATURE:
DATE 03/23/2014 LICENSE # 25126

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ENVIRONMENTAL SERVICES • LANDSCAPE ARCHITECTURE

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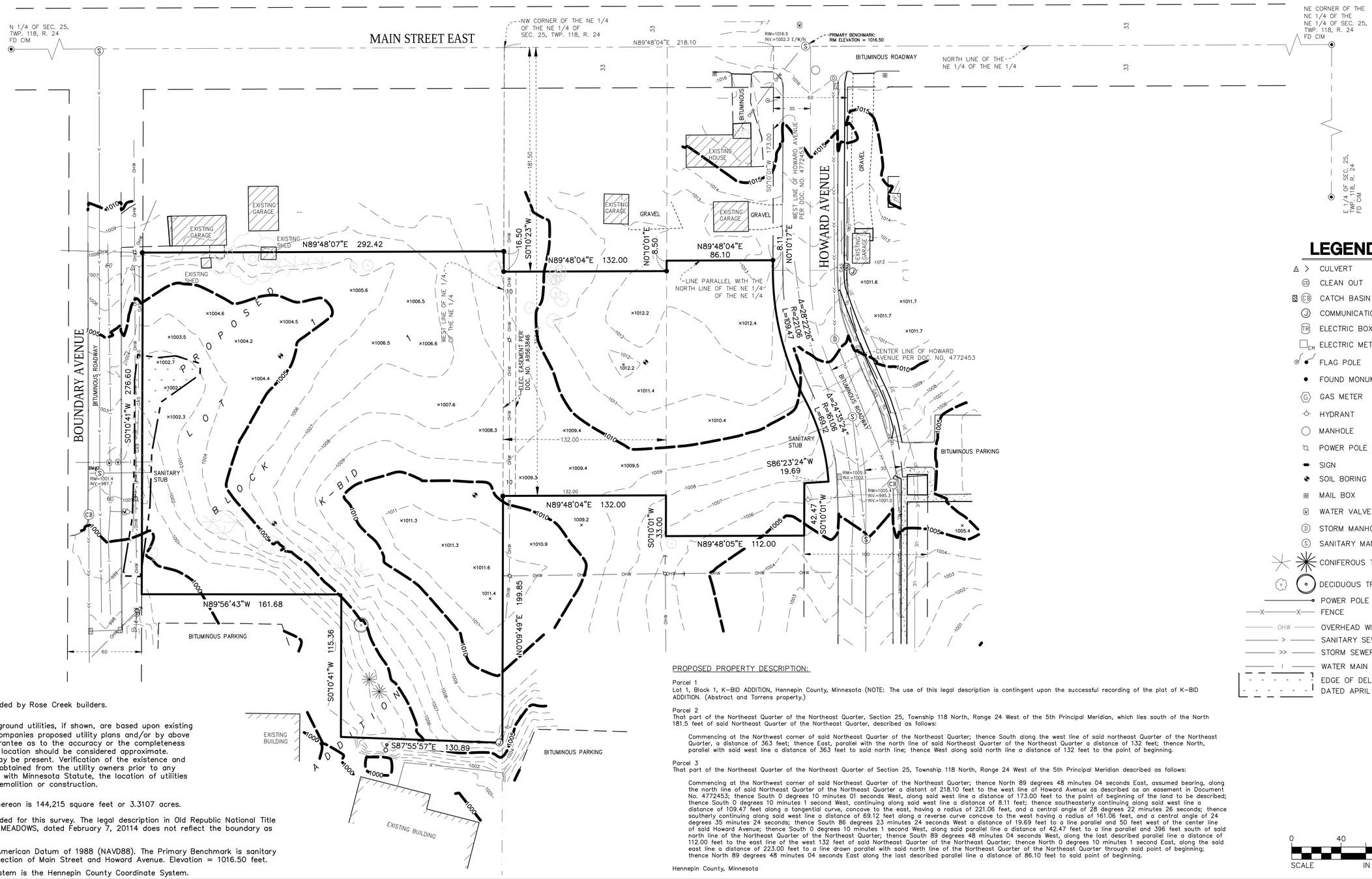
www.ae-mn.com

ROSE CREEK BUILDERS
(763) 717-8000
12955 Highway 55
Plymouth, MN 55441

PRELIMINARY PLAT
TITLE SHEET

COMM. NO. 13672
PLOTTED: 5/5/2014
DRAWING NO. C0



LEGEND

- CULVERT
- CLEAN OUT
- CATCH BASIN
- COMMUNICATION JUNCTION BOX
- ELECTRIC BOX
- ELECTRIC METER
- FLAG POLE
- FOUND MONUMENT
- GAS METER
- HYDRANT
- MANHOLE
- POWER POLE
- SIGN
- SOIL BORING
- MAIL BOX
- WATER VALVE
- STORM MANHOLE
- SANITARY MANHOLE
- CONIFEROUS TREE
- DECIDUOUS TREE
- POWER POLE ANCHOR
- FENCE
- OVERHEAD WIRES
- SANITARY SEWER
- STORM SEWER
- WATER MAIN
- EDGE OF DELINEATED WET LAND DATED APRIL 25, 2014

NOTES:

1. Topographic information was provided by Rose Creek builders.
2. The location and extent of underground utilities, if shown, are based upon existing drawings provided by the utility companies proposed utility plans and/or by above ground evidence. There is no guarantee as to the accuracy or the completeness of this information. The size and location should be considered approximate. Additional underground utilities may be present. Verification of the existence and location of all utilities should be obtained from the utility owners prior to any planning or design. In accordance with Minnesota Statute, the location of utilities shall be confirmed prior to any demolition or construction.
3. The area of the property shown hereon is 144,215 square feet or 3.3107 acres.
4. Complete title work was not provided for this survey. The legal description in Old Republic National Title Insurance Commitment No. 6436-MEADOWS, dated February 7, 20114 does not reflect the boundary as shown and contains other lands.
5. The vertical datum is the North American Datum of 1988 (NAVD88). The Primary Benchmark is sanitary manhole rim located at the intersection of Main Street and Howard Avenue. Elevation = 1016.50 feet.
6. The orientation of this bearing system is the Hennepin County Coordinate System.

PROPOSED PROPERTY DESCRIPTION:

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Hennepin County, Minnesota

0 40 80 120
SCALE IN FEET

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

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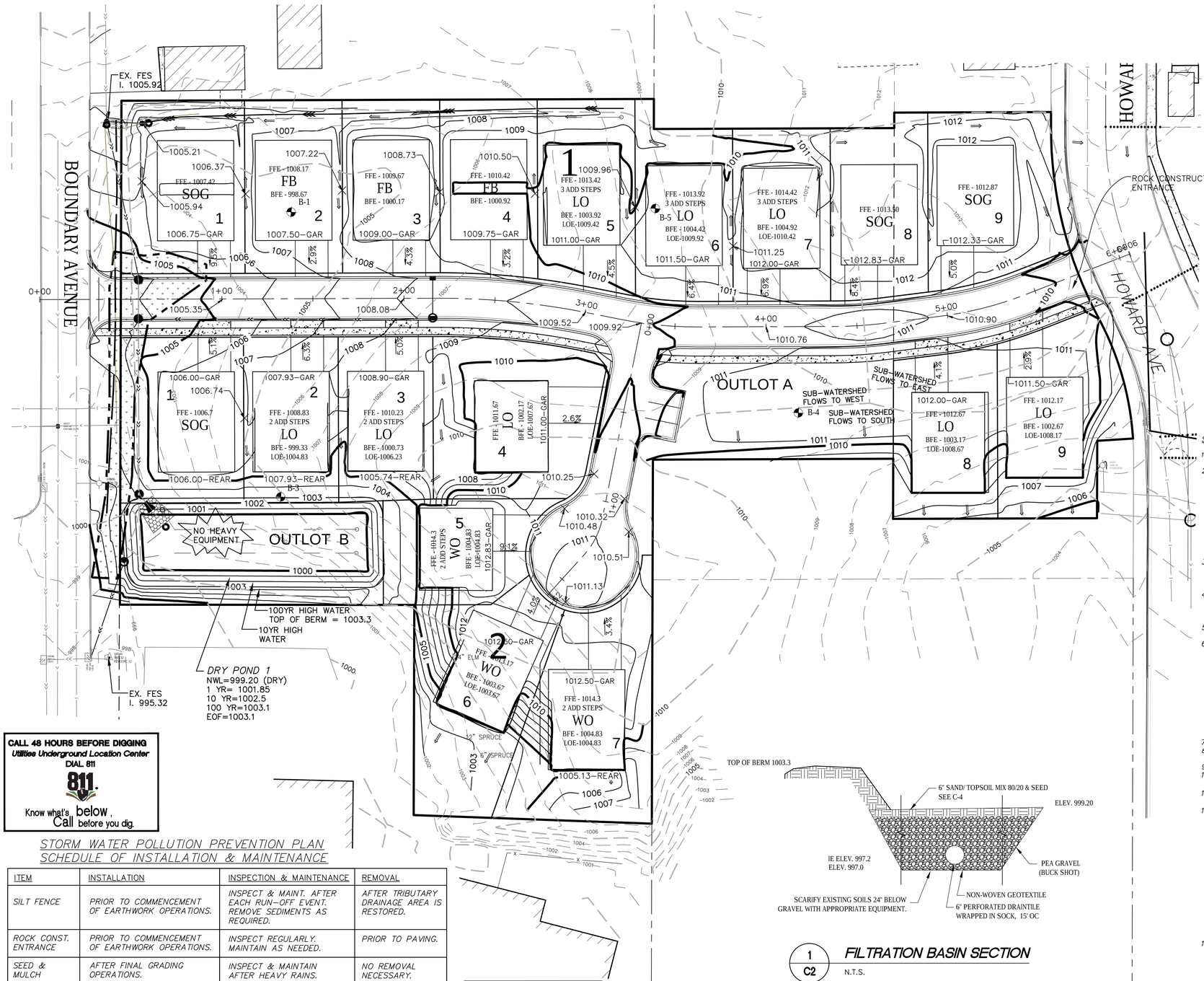
Plymouth, MN 55441

EXISTING CONDITIONS

COMM. NO. 13672
PLOTTED: 5/5/2014
DRAWING NO. C1



LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- PROPOSED CONTOUR
- PROPOSED 10' CONTOUR
- EXISTING DELINEATED WETLAND
- EXISTING CONTOUR
- EXISTING 10' CONTOUR
- SILT FENCE
- CURB & GUTTER
- DRAINAGE ARROW
- PROPOSED SPOT ELEVATION
- PROPOSED DRAINAGE SLOPE
- SOIL BORING

N

0 15 30 60
SCALE IN FEET

CALL 48 HOURS BEFORE DIGGING
Utilities Underground Location Center
DIAL 811
811
Know what's below. Call before you dig.

STORM WATER POLLUTION PREVENTION PLAN SCHEDULE OF INSTALLATION & MAINTENANCE

ITEM	INSTALLATION	INSPECTION & MAINTENANCE	REMOVAL
SILT FENCE	PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS.	INSPECT & MAINT. AFTER EACH RUN-OFF EVENT. REMOVE SEDIMENTS AS REQUIRED.	AFTER TRIBUTARY DRAINAGE AREA IS RESTORED.
ROCK CONST. ENTRANCE	PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS.	INSPECT REGULARLY. MAINTAIN AS NEEDED.	PRIOR TO PAVING.
SEED & MULCH	AFTER FINAL GRADING OPERATIONS.	INSPECT & MAINTAIN AFTER HEAVY RAINS. REPLACE WASH-OUT AREAS IMMEDIATELY.	NO REMOVAL NECESSARY.
INLET PROTECTION	UPON INLET CONSTRUCTION.	WHEN 1/3 CAPACITY OF BMP IS REACHED	AFTER TRIBUTARY AREAS ARE FULLY RESTORED

NOTE: CONTRACTOR IS RESPONSIBLE FOR INSTALLATION, MAINTENANCE AND REMOVAL OF ALL APPLICABLE EROSION & SEDIMENT CONTROL ITEMS.

1 / C2 **FILTRATION BASIN SECTION**
N.T.S.

UNIVERSITY OF MINNESOTA
Andrew M Berenberg
Plymouth MN
Design of SWPPP (May 31 2014)
If your certification expires on May 31, 2013, you must take a class in Winter 2012-2013 to maintain certification.

GRADING NOTES

1. ALL CONSTRUCTION SHALL COMPLY WITH RECOMMENDATIONS OF THE SOIL ENGINEER UNLESS DIRECTED OTHERWISE.
2. ALL CONSTRUCTION SHALL COMPLY WITH CITY OF ST. CLOUD ENGINEERING STANDARDS AND THE 2005 EDITION OF MNDOT STANDARD CONSTRUCTION SPECIFICATIONS (INCLUDING SUPPLEMENTS) UNLESS DIRECTED OTHERWISE.
3. ALL CONSTRUCTION SHALL COMPLY WITH APPLICABLE MUNICIPAL, WATERSHED DISTRICT, COUNTY, MPCA, DEPT. OF HEALTH, AND MNDOT PERMITS.
4. ALL HANDICAPPED STALLS AND ACCESS RAMPS SHALL COMPLY WITH CURRENT ADA STANDARDS. SEE ARCHITECTURAL PLANS FOR EXACT LOCATION OF BUILDING ENTRANCES.
5. THE LOCATION AND TYPE OF EXISTING UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE INFORMATION IS NOT WARRANTED TO BE ACCURATE OR COMPLETE. THE CONTRACTOR, IN COOPERATION WITH THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY, IS RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES.
6. SPOT ELEVATIONS IN STREETS ARE GUTTER GRADES UNLESS OTHERWISE NOTED.
7. THE VERTICAL DATUM IS THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE PRIMARY BENCHMARK IS SANITARY MANHOLE RIM LOCATED AT THE INTERSECTION OF MAIN STREET AND HOWARD AVENUE. ELEVATION = 1016.50 FEET.

STORM WATER POLLUTION PREVENTION PLAN NOTES:

1. GRADING CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL UNDERGROUND UTILITIES WITH THE RESPECTIVE UTILITY COMPANIES PRIOR TO CONSTRUCTION.
2. ALL EROSION CONTROL MEASURES CALLED FOR ON THESE PLANS AND SPECIFICATIONS, WHICH MAY INCLUDE SILT FENCE, SEDIMENTATION BASINS OR TEMPORARY SEDIMENT TRAPS, SHALL BE CONSTRUCTED AND SERVICEABLE IN THE FOLLOWING ORDER:
   - A. ROCK CONSTRUCTION ENTRANCES A MINIMUM OF 50 FEET.
   - B. SILT FENCE.
   - C. TEMPORARY CULVERTS.
   - D. TEMPORARY SEDIMENTATION BASINS AND OUTFALL FACILITIES.
   - E. COMMON EXCAVATION AND EMBANKMENT (GRADING)
   - F. SEED AND MULCH OR SOD.
   - G. BIO-ROLL BARRIERS IN FINISHED GRADED AREAS.
3. INLET AND OUTLET FACILITIES SUBSEQUENT TO STORM SEWER WORK. GRADING CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL EROSION CONTROL MEASURES IN ACCORDANCE WITH CITY AND NPDES PHASE II PERMITTING REQUIREMENTS AS WELL AS EROSION CONTROL MEASURES AS SHOWN ON THESE PLANS OR SPECIFICATIONS. GRADING CONTRACTOR SHALL IMPLEMENT ANY ADDITIONAL EROSION CONTROL MEASURES AS MAY BE REQUIRED TO PROTECT ADJACENT PROPERTY.
4. ALL EROSION CONTROL FACILITIES SHALL BE MAINTAINED BY THE CONTRACTOR DURING GRADING OPERATIONS. ANY TEMPORARY FACILITIES WHICH ARE TO BE REMOVED AS CALLED FOR ON THESE PLANS AND SPECIFICATIONS SHALL BE REMOVED BY THE GRADING CONTRACTOR WHEN DIRECTED BY THE ENGINEER. THE GRADING CONTRACTOR SHALL THEN RESTORE THE SUBSEQUENTLY DISTURBED AREA IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.
5. THE GRADING CONTRACTOR SHALL SCHEDULE THE SOILS ENGINEER AT THE CONTRACTORS EXPENSE SO THAT CERTIFICATION OF ALL CONTROLLED FILLS WILL BE FURNISHED TO THE OWNER DURING AND UPON COMPLETION OF THE PROJECT.
6. EROSION CONTROL.
   PRIOR TO CONSTRUCTION, AREAS NOT TO BE DISTURBED SHOULD BE CLEARLY FLAGGED, STAKED OR IDENTIFIED WITH SIGNS AND NOTED ON THE PLANS.
   - ALL EXPOSED AREAS MUST BE STABILIZED NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA IS TEMPORARILY OR PERMANENTLY COMPLETED.
   - THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH MUST BE STABILIZED WITHIN 200 FEET FROM THE PROPERTY EDGE.
   - DRAINAGE DITCHES AND CONVEYANCE SYSTEMS MUST BE INSPECTED FOR EVIDENCE OF EROSION AND SEDIMENT DEPOSITION. ALL DELTAS AND SEDIMENT DEPOSITED MUST BE REMOVED AND THE AREAS MUST BE RESTABLIZED WHERE SEDIMENT REMOVAL RESULTS IN EXPOSED SOIL.
   - IN ORDER TO MAINTAIN SHEET FLOW AND MINIMIZE RILLS AND GULLIES, THERE SHALL BE NO UNBROKEN SLOPE LENGTHS OF GREATER THAN 75 FEET FOR SLOPES WITH A GRADE OF 3:1 OR STEEPER.
7. CONTRACTORS GRADING AND EROSION CONTROL OPERATIONS SHALL TAKE PLACE WITHIN THE CONSTRUCTION LIMITS.
8. IT IS REQUIRED THAT SOILS TRACKED FROM THE SITE BY MOTOR VEHICLES BE CLEANED DAILY FROM PAVED ROADWAY SURFACES THROUGHOUT THE DURATION OF CONSTRUCTION.
9. ALL REQUIREMENTS OF THE LOCAL WATERSHED DISTRICT SHALL BE SATISFIED PER THE APPROVED PERMIT.
10. ALL EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THIS PLAN AND IMPLEMENTED IN THE FIELD AS DIRECTED BY THE ENGINEER SHALL CONFORM TO THE MPCA'S "PROTECTING WATER QUALITY IN URBAN AREAS: BEST MANAGEMENT PRACTICES FOR MINNESOTA".
11. DEWATERING AND/OR BASIN DRAINING DISCHARGE SHALL BE DIRECTED TO SEDIMENTATION BASINS WHEREVER POSSIBLE. ALL DISCHARGE POINTS SHALL BE ADEQUATELY PROTECTED FORM EROSION & SCOUR THROUGH USE OF APPROVED ENERGY DISSIPATION DEVICES.
12. ALL SOLID WASTE/ CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN ACCORDANCE WITH MPCA REQUIREMENTS. HAZARDOUS MATERIALS SHALL BE STORED/ DISPOSED OF IN COMPLIANCE WITH MPCA REGULATIONS CONTRACTOR SHALL USE RAPID STABILIZATON METHODS PER MNDOT 2573 AS NEEDED DURING THE COURSE OF THE WORK TO MAINTAIN CONFORMANCE WITH THE CITY AND NPDES II PERMIT REQUIREMENTS. THIS WORK SHALL CONSIST OF OPERATIONS NECESSARY TO RAPIDLY STABILIZE SMALL CRITICAL AREAS, TO PREVENT OFF SITE SEDIMENTATION AND/OR TO COMPLY WITH PERMIT REQUIREMENTS. THE WORK MAY BE PREFORMED AT ANY TIME DURING THE CONTRACT AND DURING NORMAL WORKING HOURS. THIS WORK WILL BE CONDUCTED ON SMALL AREAS THAT MAY OR MAY NOT BE ACCESSIBLE WITH NORMAL EQUIPMENT. THIS WORK SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE MNDOT STANDARD SPECIFICATIONS, THE DETAILS SHOWN IN THE PLANS, AND THE FOLLOWING:
   - THERE ARE FIVE STABILIZATION METHODS APPROVED FOR THESE OPERATIONS. THESE METHODS MAY BE CONDUCTED INDEPENDENTLY OR IN COMBINATION.
   - METHOD #1: APPLY TYPE 1 MULCH AND DISC ANCHOR APPLY
   - METHOD #2: TYPE 1 MULCH AND TACK WITH TYPE 5 HYDRAULIC SOIL STABILIZER
   - METHOD #3: HYDROSPREAD SEED, FERTILIZER AND TYPE 6 HYDRAULIC SOIL STABILIZER
   - METHOD #4: HAND INSTALL SEED, FERTILIZER AND EROSION CONTROL BLANKET CATEGORY 3
   - METHOD #5: PLACE GEOTEXTILE AND RIP RAP CLASS II IN VARIOUS CONFIGURATIONS

   THESE EFFORTS WILL BE INCIDENTAL TO THE EROSION CONTROL BID ITEM.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL NECESSARY ADDITIONAL EROSION CONTROL MEASURES AS MAY BE REQUIRED. REQUIRED EROSION CONTROL METHODS SHALL CONSIST OF BUT NOT BE LIMITED TO THE FOLLOWING:
    - A. STAKED FIBER LOG ROLLS AT BACK OF ALL CURB EXCEPT AT CONSTRUCTION/DRIVEWAY ENTRANCE.
    - B. SILT FENCE ON ALL DOWN GRADIENT SLOPES FROM CONSTRUCTION AREA. SILT FENCE SHALL HAVE THE BOTTOM DUG IN WITH SOIL FIRMLY COMPACTED.
    - C. ROCK CONSTRUCTION ENTRANCE HAVING 1" TO 2" CLEAR ROCK OVER GEOTEXTILE FABRIC.
    - D. STREET CLEANING AS MAY BE REQUIRED SHOULD VEHICLE TRACKING OCCUR.
14. CONTRACTOR SHALL PROVIDE A TEMPORARY SEDIMENTATION BASIN ON SITE FOR CONSTRUCTION WASH OUT USE. TEMPORARY BASIN SHALL BE LOCATED AS TO PROVIDE EASY ACCESS FOR CONSTRUCTION VEHICLES AND CONCRETE TRUCKS AS NECESSARY.
15. INLET SEDIMENTATION CONTROL IS TO BE PROVIDED TO ALL STORM SEWER CATCH BASINS THROUGHOUT CONSTRUCTION. MEASURES APPLIED SHALL COMPLY WITH BEST MANAGEMENT PRACTICES FOR MINNESOTA AND APPLICATIONS OF NPDES PHASE II AS APPROPRIATE FOR PHASE OF CONSTRUCTION.

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

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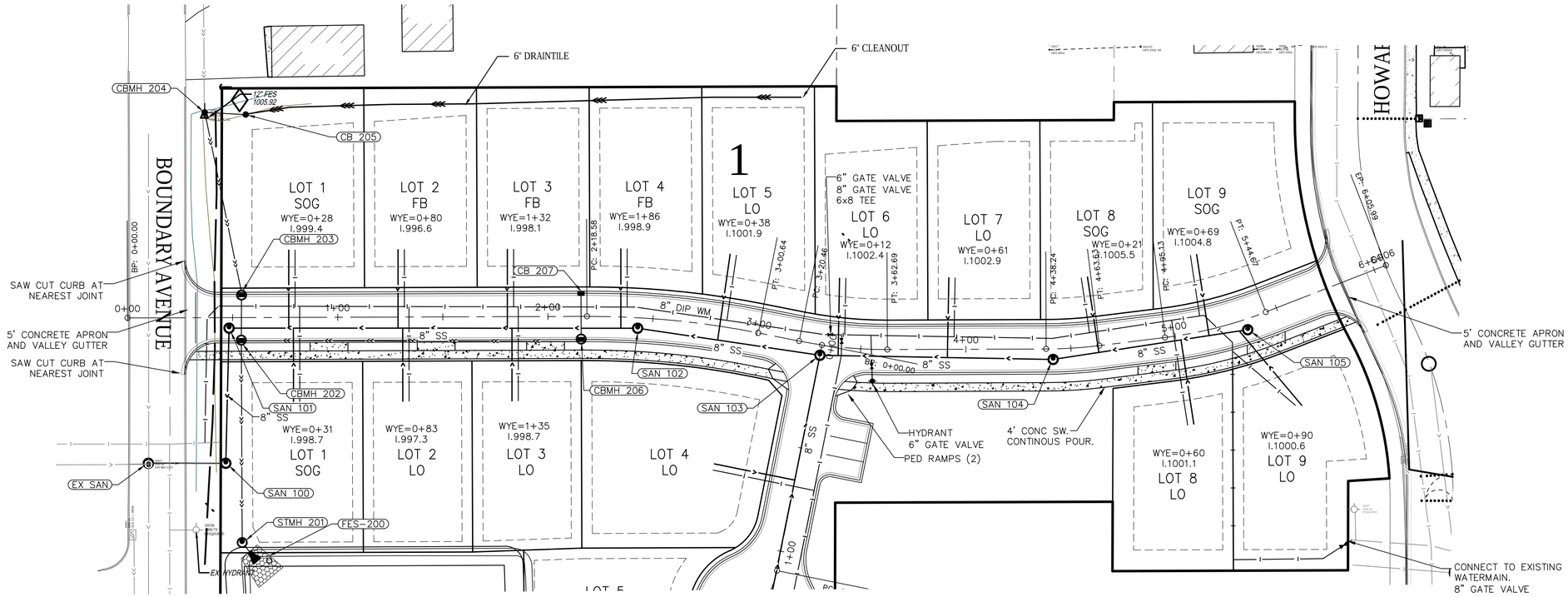
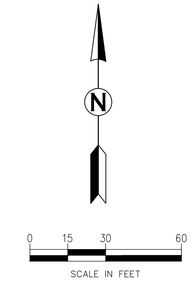
GRADING AND EROSION CONTROL PLAN

COMM. NO. 13672
PLOTTED:
DRAWING NO. C2





LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- EXISTING DELINEATED WETLAND
- CURB & GUTTER

1 TOPOGRAPHY & SITE SURVEY BY OTHERS

2 ALL CONSTRUCTION SHALL COMPLY WITH RECOMMENDATIONS OF THE SOIL ENGINEER UNLESS DIRECTED OTHERWISE.

3 ALL CONSTRUCTION SHALL COMPLY WITH CITY ENGINEERING STANDARDS AND THE 2005 EDITION OF MNDOT STANDARD CONSTRUCTION SPECIFICATIONS (INCLUDING SUPPLEMENTS) UNLESS DIRECTED OTHERWISE. WATER SERVICES TO HAVE 8.0' MIN. COVER.

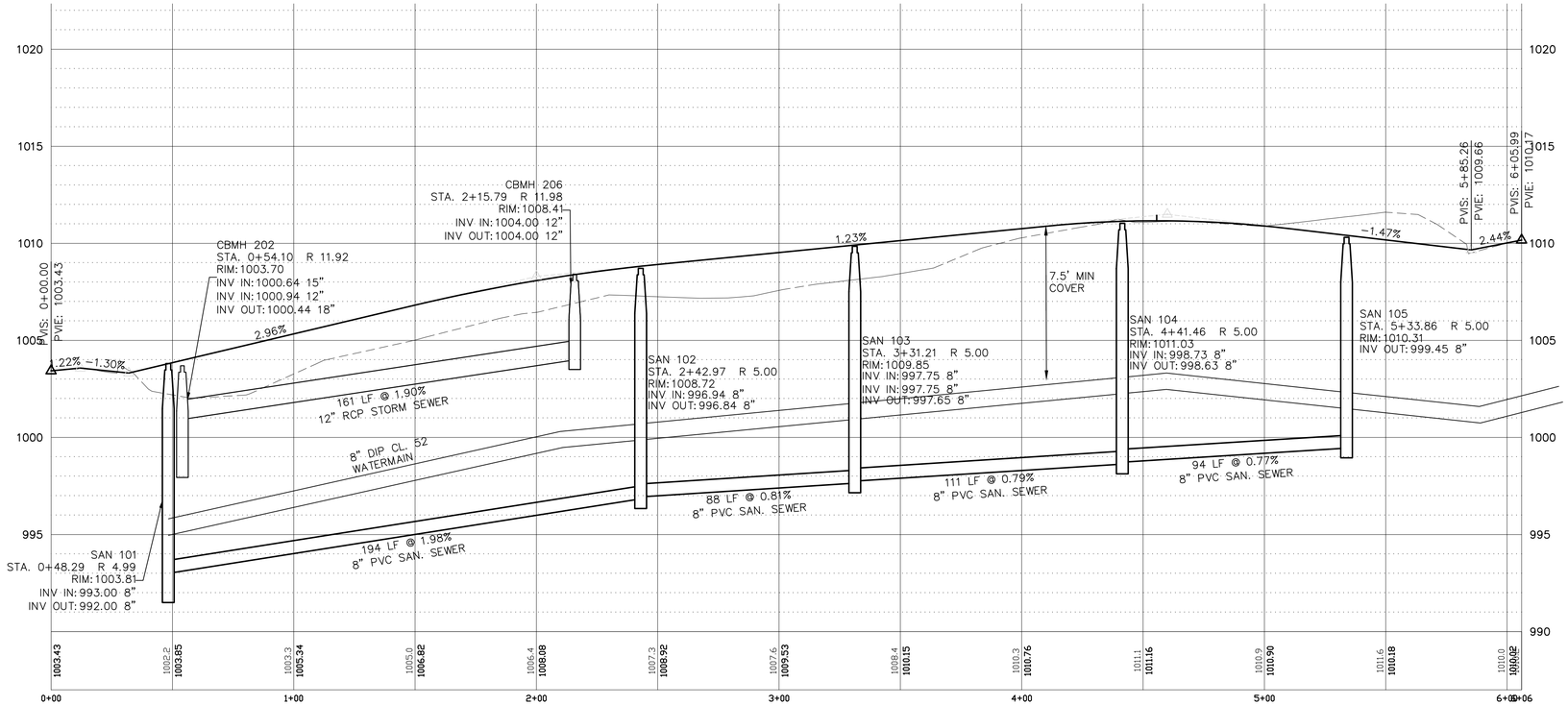
4 ALL CONSTRUCTION SHALL COMPLY WITH APPLICABLE MUNICIPAL, WATERSHED DISTRICT, COUNTY, MPCA, DEPT. OF HEALTH, AND MNDOT PERMITS..

6 THE LOCATION AND TYPE OF EXISTING UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE INFORMATION IS NOT WARRANTED TO BE ACCURATE OR COMPLETE. THE CONTRACTOR, IN COOPERATION WITH THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY, IS RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES.

7 PROVIDE MINIMUM 10' HORIZONTAL & 18" VERTICAL SEPARATION OF ALL WATER MAIN CROSSINGS FROM STORM OR SANITARY SEWER.

8 WATER MAIN MUST BE TESTED TO THE EXISTING VALVE. IF PRESSURE TEST FAILS DUE TO EXISTING DIP WM STUB OR EXISTING GATE VALVE THE DEVELOPER OR DEVELOPER'S CONTRACTOR SHALL REPLACE EXISTING GATE VALVE WITH A NEW GATE VALVE ALONG WITH NEW WATER MAIN LEADING FROM THE VALVE AT THE DEVELOPERS EXPENSE.

THE VERTICAL DATUM IS THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE PRIMARY BENCHMARK IS SANITARY MANHOLE RIM LOCATED AT THE INTERSECTION OF MAIN STREET AND HOWARD AVENUE. ELEVATION = 1016.50 FEET.



CALL 48 HOURS BEFORE DIGGING
Utilities Underground Location Center
DIAL 811
811
Know what's below, Call before you dig.

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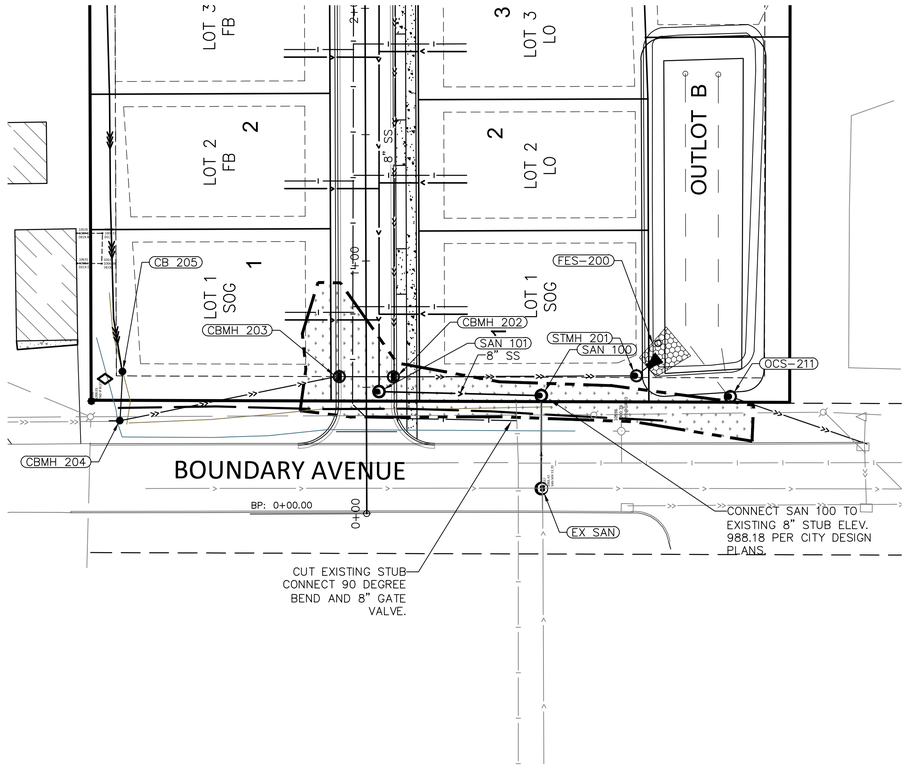
Plymouth, MN 55441

STREET & UTILITY PLAN

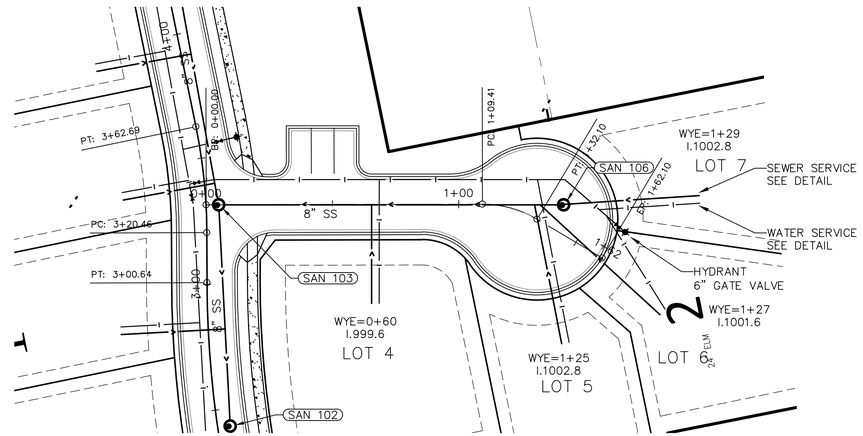
COMM. NO. 13672
PLOTTED:
DRAWING NO. C3



STRUCTURE #	SIZE	CASTING	DETAIL REF.
FES-200	18" FES	NO TRASH GAURD	5005 / C6
STMH-201	48" DIA	R-1642	5003 / C6
CBMH-202	48" DIA	R-3290VB	5002 / C6
CBMH-203	48" DIA	R-3290VB	5002 / C6
CBMH-204	48" DIA	R-3290VB	5002 / C6
CB-205	48" DIA	R-3290VB	5004 / C6
CBMH-206	27" DIA	R4342	5002 / C6
CB-207	2X3 RECT.	R-3290VB	5001 / C6
OCS-211	48" DIA	R-3501-TB	

N

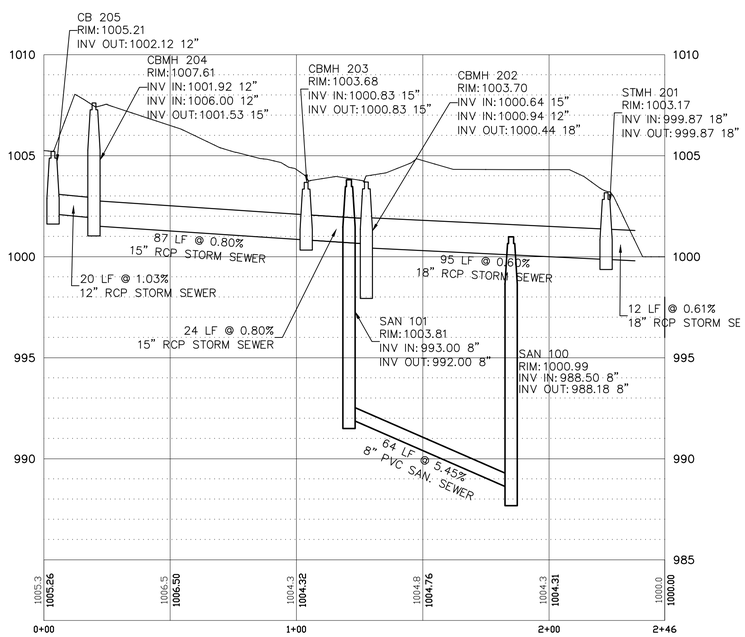
0 15 30 60
SCALE IN FEET

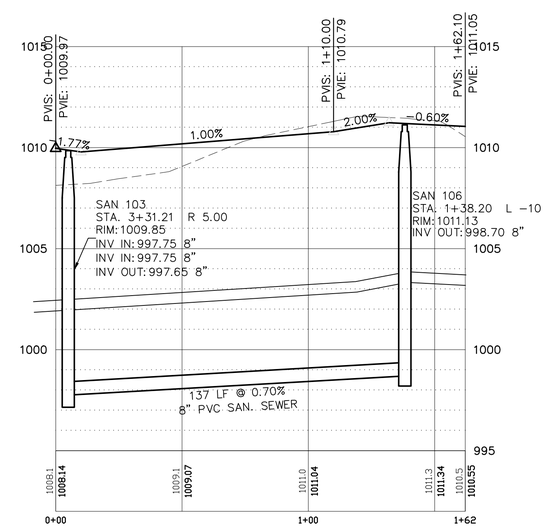


LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- EXISTING DELINEATED WETLAND
- CURB & GUTTER

1. TOPOGRAPHY & SITE SURVEY BY OTHERS
2. ALL CONSTRUCTION SHALL COMPLY WITH RECOMMENDATIONS OF THE SOIL ENGINEER UNLESS DIRECTED OTHERWISE.
3. ALL CONSTRUCTION SHALL COMPLY WITH CITY ENGINEERING STANDARDS AND THE 2005 EDITION OF MNDOT STANDARD CONSTRUCTION SPECIFICATIONS (INCLUDING SUPPLEMENTS) UNLESS DIRECTED OTHERWISE. WATER SERVICES TO HAVE 8.0' MIN. COVER.
4. ALL CONSTRUCTION SHALL COMPLY WITH APPLICABLE MUNICIPAL, WATERSHED DISTRICT, COUNTY, MPCA, DEPT. OF HEALTH, AND MNDOT PERMITS..
6. THE LOCATION AND TYPE OF EXISTING UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE INFORMATION IS NOT WARRANTED TO BE ACCURATE OR COMPLETE. THE CONTRACTOR, IN COOPERATION WITH THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY, IS RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES.
7. PROVIDE MINIMUM 10' HORIZONTAL & 18" VERTICAL SEPARATION OF ALL WATER MAIN CROSSINGS FROM STORM OR SANITARY SEWER.
8. WATER MAIN MUST BE TESTED TO THE EXISTING VALVE. IF PRESSURE TEST FAILS DUE TO EXISTING DIP WM STUB OR EXISTING GATE VALVE THE DEVELOPER OR DEVELOPER'S CONTRACTOR SHALL REPLACE EXISTING GATE VALVE WITH A NEW GATE VALVE ALONG WITH NEW WATER MAIN LEADING FROM THE VALVE AT THE DEVELOPERS EXPENSE.





CALL 48 HOURS BEFORE DIGGING
Utilities Underground Location Center
DIAL 811
811
Know what's below. Call before you dig.

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME:
SIGNATURE:
DATE 03/23/2014 LICENSE # 25126

ANDERSON ENGINEERING
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ENVIRONMENTAL SERVICES • LANDSCAPE ARCHITECTURE

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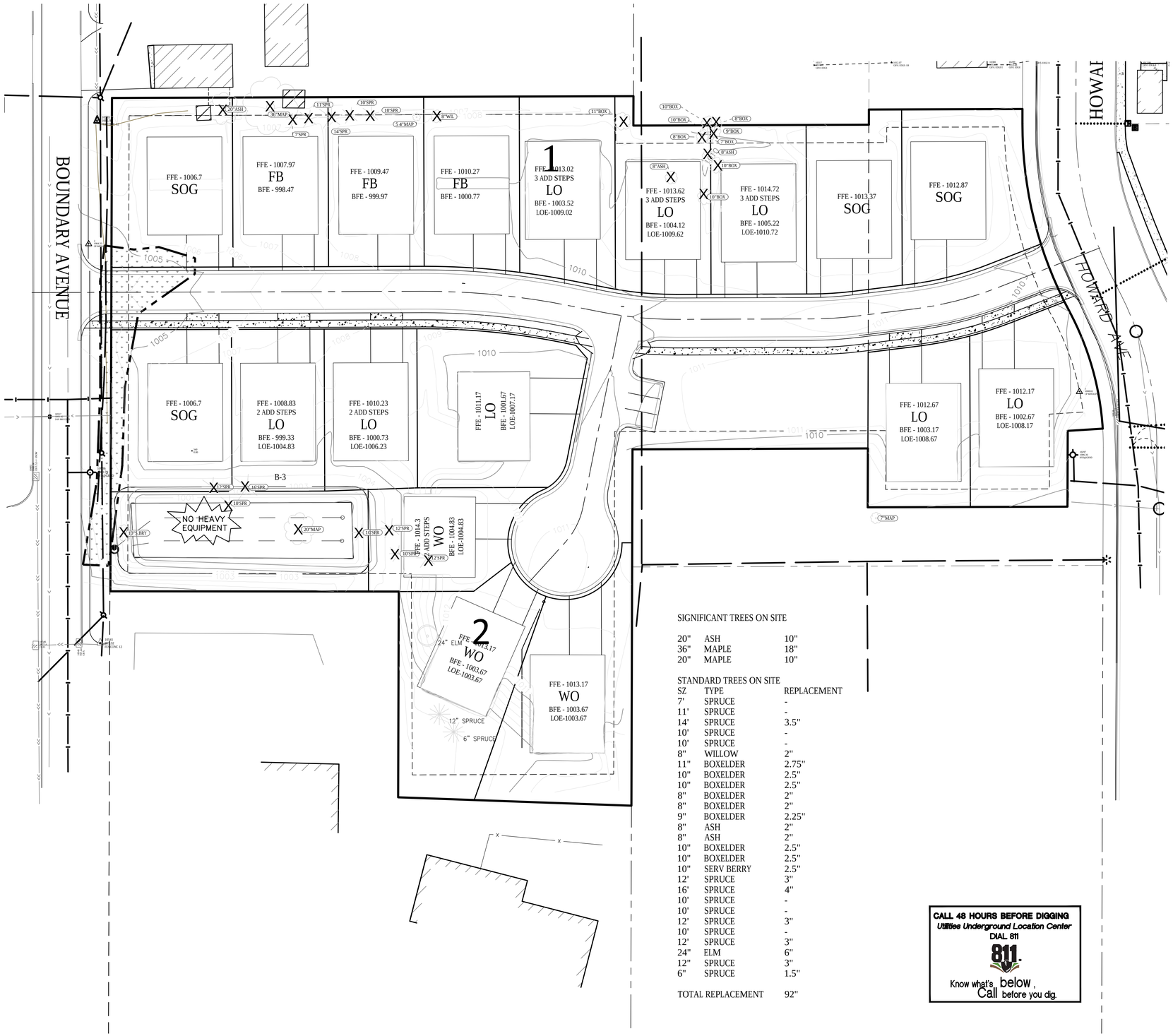
763-412-4000 (o) 763-412-4090 (f)
www.ae-mn.com

ROSE CREEK BUILDERS
(763) 717-8000
12955 Highway 55
Plymouth, MN 55441

STREET & UTILITY PLAN

COMM. NO. 13672
PLOTTED:
DRAWING NO. C4



SIGNIFICANT TREES ON SITE

20"	ASH	10"
36"	MAPLE	18"
20"	MAPLE	10"

STANDARD TREES ON SITE

SZ	TYPE	REPLACEMENT
7"	SPRUCE	-
11'	SPRUCE	-
14'	SPRUCE	3.5"
10'	SPRUCE	-
10'	SPRUCE	-
8"	WILLOW	2"
11"	BOXELDER	2.75"
10"	BOXELDER	2.5"
10"	BOXELDER	2.5"
8"	BOXELDER	2"
8"	BOXELDER	2"
9"	BOXELDER	2.25"
8"	ASH	2"
8"	ASH	2"
10"	BOXELDER	2.5"
10"	BOXELDER	2.5"
10"	SERV BERRY	2.5"
12'	SPRUCE	3"
16'	SPRUCE	4"
10'	SPRUCE	-
10'	SPRUCE	-
12'	SPRUCE	3"
10'	SPRUCE	-
12'	SPRUCE	3"
24"	ELM	6"
12"	SPRUCE	3"
6"	SPRUCE	1.5"

TOTAL REPLACEMENT 92"

CALL 48 HOURS BEFORE DIGGING
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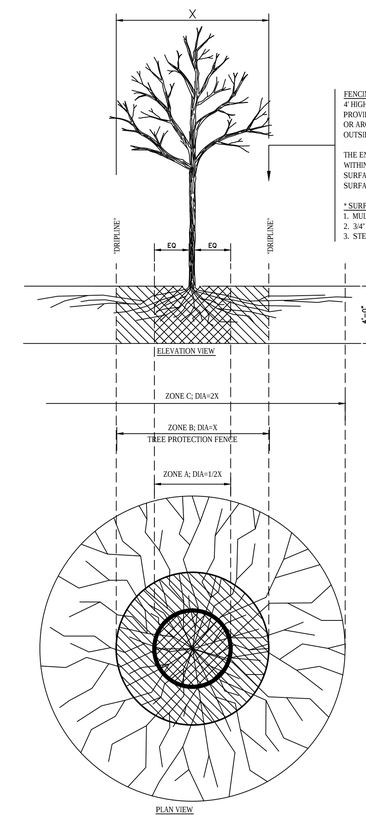
DIAL 811
811
Know what's below, Call before you dig.

LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- 1063 — PROPOSED CONTOUR
- 1065 — PROPOSED 10' CONTOUR
- EXISTING DELINEATED WETLAND
- 902 — EXISTING CONTOUR
- 1070 — EXISTING 10' CONTOUR
- SILT FENCE
- CURB & GUTTER
- DRAINAGE ARROW
- 1065.50 — PROPOSED SPOT ELEVATION
- 1.50% — PROPOSED DRAINAGE SLOPE
- B-4 — SOIL BORING
- X — TREES REMOVED (SEE TREE REPLACEMENT PLAN FOR NEW TREES)

N

0 15 30 60
SCALE IN FEET



FENCING/ROOT PROTECTION
4' HIGH ORANGE POLY CONSTRUCTION FENCING SHALL BE PROVIDED AND MAINTAINED AT THE DRIPLINE OF EACH TREE OR ABOUND A GROUP OF TREES AT THE DRIPLINE OF OUTSIDE TREES.

THE ENGINEER'S APPROVAL IS REQUIRED FOR USE/ACCESS WITHIN ZONE B. PERMISSION FOR USE/ACCESS REQUIRES SURFACE PROTECTION FOR ALL UNFENCED, UNPAVED SURFACES WITHIN ZONE B AT ALL TIMES.

* SURFACE PROTECTION MEASURES
1. MULCH LAYER, @ 6"-8"DEPTH
2. 3/4" PLYWOOD
3. STEEL PLATES

TRENCHING / EXCAVATIONN

NOTE:
THE NUMBER OF INCHES OF TRUNK DIAMETER DIRECTLY TRANSLATES TO NUMBER OF FEET OF ZONE (X) DIAMETER.

ZONE A (CRITICAL ROOT ZONE)
[DEFINED AS TRUNK DIAMETER MULTIPLIED BY 0.5]

1. NO DISTURBANCE ALLOWED WITHOUT SITE-SPECIFIC INSPECTION AND APPROVAL OF METHODS TO MINIMIZE ROOT DAMAGE
2. SEVERANCE OF ROOTS LARGER THAN 2 INCHES IN DIAMETER REQUIRES AN ENGINEER'S APPROVAL
3. TUNNELING REQUIRED TO INSTALL LINES 3 FEET BELOW GRADE OR DEEPER

ZONE B (DRIPLINE)
[MAXIMUM WIDTH OF BRANCH EXTENSION ON TREE]

1. OPERATION OF HEAVY EQUIPMENT AND/OR STOCKPILING OF MATERIALS SUBJECT TO LANDSCAPE ARCHITECTS APPROVAL
2. SURFACE PROTECTION MEASURES REQUIRED TRENCHING ALLOWED AS FOLLOWS:
   - EXCAVATION BY HAND OR WITH HAND- DRIVEN TRENCHER MAY BE REQUIRED
   - LIMIT TRENCH WIDTH. DO NOT DISTURB ZONE A (CRITICAL ROOT ZONE) MAINTAIN 2/3 OR MORE OF ZONE B (DRIPLINE) IN UNDISTURBED CONDITION
3. TUNNELING MAY BE REQUIRED FOR TRENCHES DEEPER THAN 3 FOOT

3.1. USE OF PNEUMATIC AIR WAND AND EXCAVATION MAY BE CONSIDERED WHERE THE TRENCH DEPTH DOES NOT EXCEED 4 FEET

ZONE C (ABSORBING ROOT ZONE)
[DEFINED AS TRUNK DIAMETER MULTIPLIED BY 2]

1. OPERATION OF HEAVY EQUIPMENT AND OR STOCKPILING OF MATERIALS SUBJECT TO LANDSCAPE ARCHITECT APPROVAL
2. SURFACE PROTECTION MEASURES MAY BE REQUIRED AND IS TO BE DETERMINED BY LANDSCAPE ARCHITECT
3. TRENCHING WITH HEAVY EQUIPMENT ALLOWED AS FOLLOWS:
   - MINIMIZE TRENCH WIDTH
   - MAINTAIN 2/3 OR MORE OF ZONE C IN UNDISTURBED CONDITION
   - OR AS SPECIFIED BY LANDSCAPE ARCHITECT

1 / L1 EXISTING TREE PROTECTION – (WHERE REQUIRED)
SCALE: NO SCALE

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: ANDREW M. BERENBERG
SIGNATURE:
DATE 03/23/2014 LICENSE # 25126

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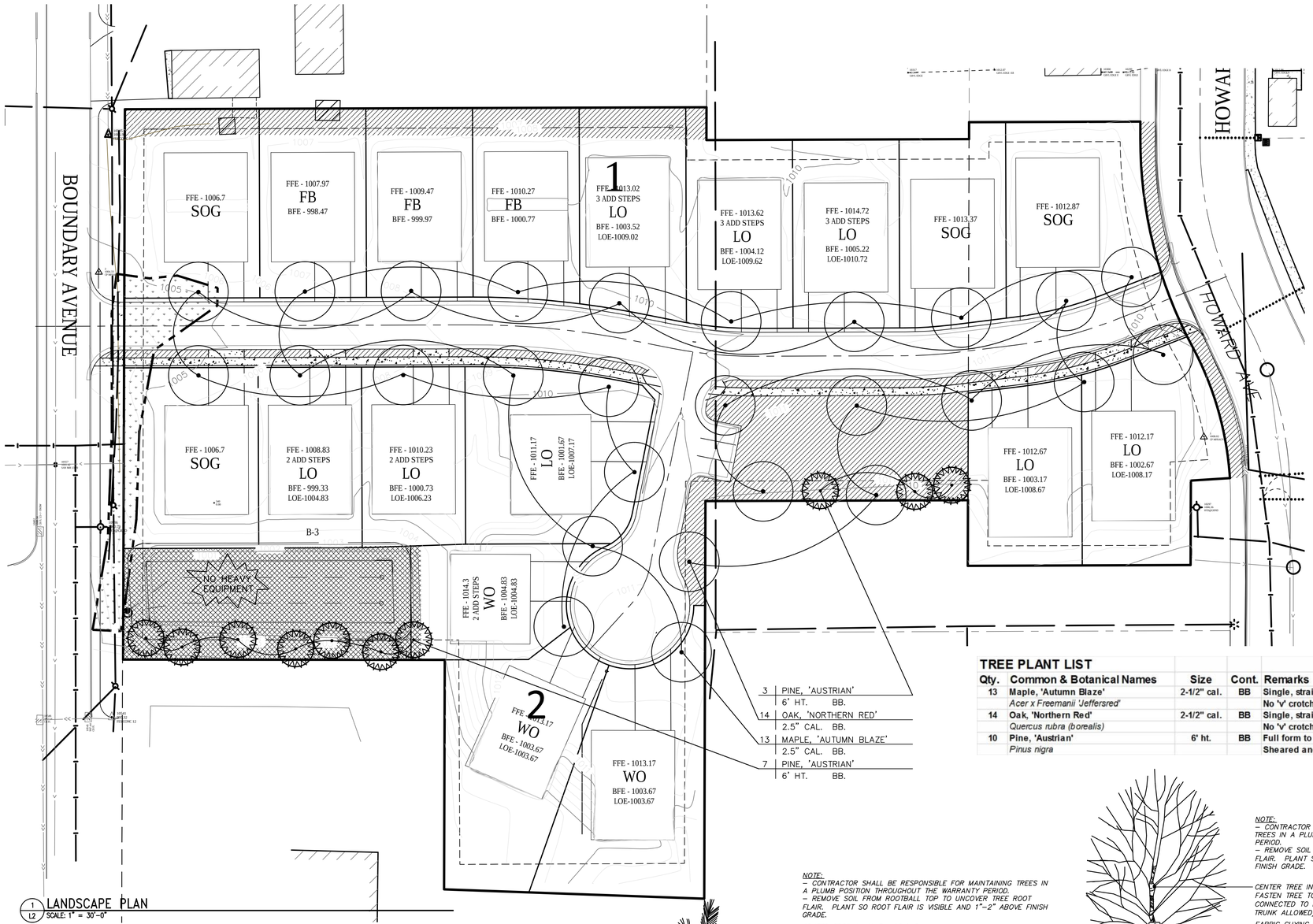
TREE PRESERVATION PLANS

COMM. NO. 13672
PLOTTED:
DRAWING NO. L1



3	PINE, 'AUSTRIAN'	
	6' HT.	BB.
14	OAK, 'NORTHERN RED'	
	2.5" CAL.	BB.
13	MAPLE, 'AUTUMN BLAZE'	
	2.5" CAL.	BB.
7	PINE, 'AUSTRIAN'	
	6' HT.	BB.

1 L2 LANDSCAPE PLAN
SCALE: 1" = 30'-0"

LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- 1063 — PROPOSED CONTOUR
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- SILT FENCE
- CURB & GUTTER
- DRAINAGE ARROW
- 1065.50 — PROPOSED SPOT ELEVATION
- 1.50% — PROPOSED DRAINAGE SLOPE
- B-4 — SOIL BORING
- PROPOSED SOD W/ IRRIGATION (SEE LANDSCAPE NOTES)
- PROPOSED SEED MIX – MNDOT 310 AS SPECIFIED. (SEE LANDSCAPE NOTES)
- PROPOSED TREES

N

0 15 30 60
SCALE IN FEET

TREE PLANT LIST

Qty.	Common & Botanical Names	Size	Cont.	Remarks
13	Maple, 'Autumn Blaze'	2-1/2" cal.	BB	Single, straight leader
	Acer x Freemanii 'Jeffersred'			No 'V' crotches
14	Oak, 'Northern Red'	2-1/2" cal.	BB	Single, straight leader
	Quercus rubra (borealis)			No 'V' crotches
10	Pine, 'Austrian'	6' ht.	BB	Full form to grade - 12" max. leader length
	Pinus nigra			Sheared and clipped trees will not be accepted

GENERAL LANDSCAPE NOTES:

– LANDSCAPE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID TO BECOME COMPLETELY FAMILIAR WITH SITE CONDITIONS.

– ALL ROUGH AN FINISH GRADING TO BE DONE BY OTHERS.

– NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN IMMEDIATE AREA.

– IT IS THE RESPONSIBILITY OF THE OWNER & CONTRACTOR TO IDENTIFY ALL UNDERGROUND CABLES, CONDUITS, WIRES, ETC., ON THE PROPERTY.

– IF THERE IS A DISCREPANCY BETWEEN THE NUMBER OF PLANTS SHOWN ON THE PLAN AND THE NUMBER OF PLANTS SHOWN IN THE PLANT LIST, THE NUMBER OF PLANTS SHOWN ON THE PLAN WILL TAKE PRECEDENCE.

– ALL CONTAINER MATERIAL TO BE GROWN IN CONTAINER A MINIMUM OF 6 MONTHS.

– ALL MATERIAL SHALL COMPLY WITH THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, AMERICAN ASSOCIATION OF NURSERYMEN.

– REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO THE OWNER.

– GUARANTEE NEW PLANT MATERIAL THROUGH ONE CALENDAR YEAR FOR DECIDUOUS TREES UP TO 3–1/2" CAL. & CONIFERS UP TO 11' HT. (LARGER SIZES WILL BE GUARANTEED FOR TWO CALENDAR YEARS FROM TIME OF PROVISIONAL ACCEPTANCE.

– ALL PROPOSED PLANTS SHALL BE LOCATED CAREFULLY AS SHOWN ON THE PLANS AND SHALL BE APPROVED BY LANDSCAPE ARCHITECT BEFORE THEY ARE INSTALLED.

– CONTRACTOR CAN SUBSTITUTE MACHINE MOVED MATERIAL USING APPROPRIATE SIZE TREE SPADE FOR B & B WITH LANDSCAPE ARCHITECTS APPROVAL.

– LANDSCAPE CONTRACTOR SHALL ENSURE THAT NEW TREES MOVED ONTO THE SITE ARE DUG FROM SIMILAR SITES WITH SIMILAR SOILS TO THE SOILS OF THIS PROJECT (HEAVY TO HEAVY, LIGHT TO LIGHT. HEAVY TO LIGHT SOILS).

– LANDSCAPE CONTRACTOR IS REQUIRED TO PROVIDE OWNER WITH MAINTENANCE INFORMATION DURING GUARANTEE PERIOD RELATING TO WATERING, FEEDING, PRUNING, PEST CONTROL, AND RELATED ITEMS. THIS WILL BE PREPARED AND DELIVERED TO OWNER AFTER PROVISIONAL INSPECTION APPROVAL HAS BEEN GIVEN BY LANDSCAPE ARCHITECTS.

– WRAPPING MATERIAL SHALL BE CORRUGATED TREE PROTECTION WITH THE SIZE OF TUBE 1" DIA. (MIN.) LARGER THAN THE CALIPER INCH SIZE OF TREE TO BE PROTECTED. WRAP ALL TREES, EXCEPT HACKBERRY TREE SHALL BE PROTECTED PRIOR TO 12/1 AND TUBES REMOVED BY 5/1.

– 3" DEEP WOOD MULCH WILL BE INSTALLED UNDER ALL TREES AND SHRUBS THAT ARE ISOLATED FROM GROUNDCOVER AREAS AND GENERAL SHRUB MASSES.

– ALL PLANTING SHALL RECEIVE FERTILIZER AS FOLLOWS:
SUMMER AND FALL PLANTING – BEFORE WINTER FREEZE–UP APPLY 0–20–20 GRANULAR IN SAUCER AROUND PLANT AT THE RATE OF 1–12 OZ. CAN PER 2–3" CAL. TREE. FOLLOW UP WITH THE SAME AMOUNT OF 10–10–10 THE FOLLOWING SPRING.

– SOD SHALL BE HIGHLAND SOD, 30" x 100' ROLLS PREFERRED WHERE APPLICABLE, TO BE LAID PARALLEL TO THE CONTOURS AND HAVE STAGGERED JOINTS. ON SLOPES STEEPER THAN 3:1 OR DRAINAGE SWALES, THE SOD SHALL BE STAKED INTO THE GROUND. SCARIFY THE EXISTING GRADES WITH FIELD CULTIVATOR TO A MIN. DEPTH OF 12" PRIOR TO PLACING OF TOPSOIL AND FINISH GRADING FOR SOD. IMMEDIATELY PRIOR TO PLACING SOD, CONTRACTOR SHALL APPLY 10–6–4 FERTILIZER AT THE RATE OF 10 POUNDS PER 1000 SQ. FT.

– CALIPER OF ALL TREE TRUNKS UP TO AND INCLUDING 4" SHALL BE MEASURED 6" ABOVE GROUND LEVEL, AND 12" ABOVE GROUND LEVEL FOR LARGER SIZES.

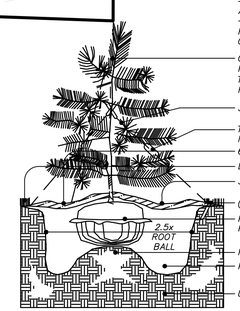
– IF THE CONTRACTOR FEELS AN ERROR HAS BEEN MADE REGARDING SPACING OR HARDINESS OF A SPECIES OF PLANT MATERIAL INDICATED ON THE PLAN, NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO THE INSTALLATION OF PLANT MATERIAL.

– ALL NEWLY INSTALLED PLANT MATERIAL SHALL BE PLANTED IN WELL–DRAINED AREAS. CONTRACTOR SHALL AVOID INSTALLING ANY PLANT MATERIAL IN DRAINAGE SWALES OR WET & POORLY DRAINED AREAS.

– ALL AREAS SPECIFIED AS 'ROUGH SEED' TO BE SEEDED WITH MNDOT MIX 310. BROAD CAST, DRILL AND/OR HYDROSEED AT A RATE OF 150 LBS./AC. WITH 2 TONS SHREDDED AND PUNCHED IN PLACE STRAW PER ACRE. SEED MIX SHALL BE ABLE TO WITHSTAND PERIODIC FLOODING.

– IRRIGATION BY OWNER

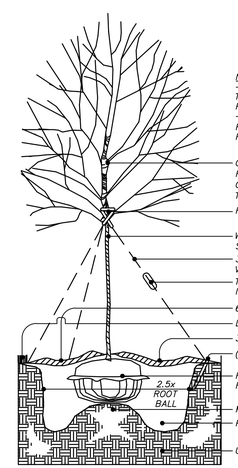
CALL 48 HOURS BEFORE DIGGING
Utilities Underground Location Center
DIAL 811
811
Know what's below, Call before you dig.



NOTE:
– CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TREES IN A PLUMB POSITION THROUGHOUT THE WARRANTY PERIOD.
– REMOVE SOIL FROM ROOTBALL TOP TO UNCOVER TREE ROOT FLAIR. PLANT SO ROOT FLAIR IS VISIBLE AND 1"–2" ABOVE FINISH GRADE.

CENTER TREE IN HOLE, UPRIGHT
FASTEN TREE TO 3/16" GALVANIZED STEEL BRAIDED CABLE CONNECTED TO BLACK RUBBER BANDS(NO WIRE AROUND TRUNK ALLOWED) SECURE FIRMLY AND NEATLY ALL ENDS.
3/16" GALVANIZED STEEL BRAIDED CABLE FLAGGED FOR VISIBILITY
TURNBUCKLE AT EACH GUY LINE TO ADJUST TENSION INDEPENDENTLY
6' MIN. DIA. EARTH SAUCER
LAWN OR PLANTING BED
3" LAYER MULCH TO 6" OUTSIDE OF STAKE CIRCUMFERENCE
(3) 2"X4"X24" LONG ANCHORS DRIVEN BELOW FINISH GRADE
REMOVE BURLAP, TWINE, ROPE AND WIRE FROM TOP HALF OF ROOT BALL
MOUND MIN. 6"
PLANTING MIXTURE
UNDISTURBED OR COMPACTED SOIL

2 L2 CONIFEROUS TREE PLANTING (TYP)
SCALE: NO SCALE



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CENTER TREE IN HOLE, UPRIGHT
FASTEN TREE TO 3/16" GALVANIZED STEEL BRAIDED CABLE CONNECTED TO BLACK RUBBER BANDS(NO WIRE AROUND TRUNK ALLOWED) SECURE FIRMLY AND NEATLY ALL ENDS.
FABRIC GUYING STRAP WITH HOSE CHAFING GUARD
WRAP TREE W/4" WIDE TREE WRAPPING MATERIAL AS SPECIFIED TO 1ST BRANCHING
3/16" GALVANIZED STEEL BRAIDED CABLE FLAGGED FOR VISIBILITY
TURNBUCKLE AT EACH GUY LINE TO ADJUST TENSION INDEPENDENTLY
6' MIN. DIA. EARTH SAUCER
LAWN OR PLANTING BED
3" LAYER MULCH TO 6" OUTSIDE OF STAKE CIRCUMFERENCE
(3) 2"X4"X24" LONG ANCHORS DRIVEN BELOW FINISH GRADE.
REMOVE BURLAP, TWINE, ROPE AND WIRE FROM TOP HALF OF ROOT BALL
MOUND MIN. 6"
PLANTING MIXTURE
UNDISTURBED OR COMPACTED SOIL

3 L2 DECIDUOUS TREE PLANTING (TYP)
SCALE: NO SCALE

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: ANDREW M. BERENBERG
SIGNATURE:
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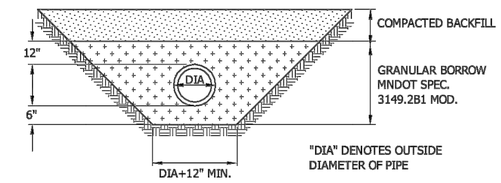
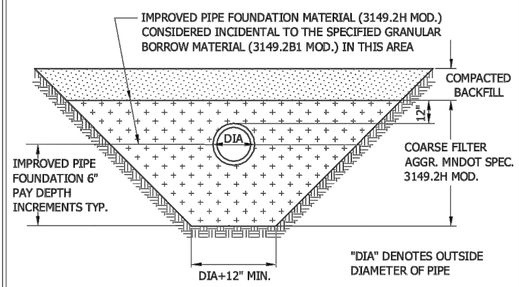
TREE REPLACEMENT PLAN

COMM. NO. 13672
PLOTTED:
DRAWING NO. L2



PIPE FOUNDATION & BEDDING
GOOD SOILS



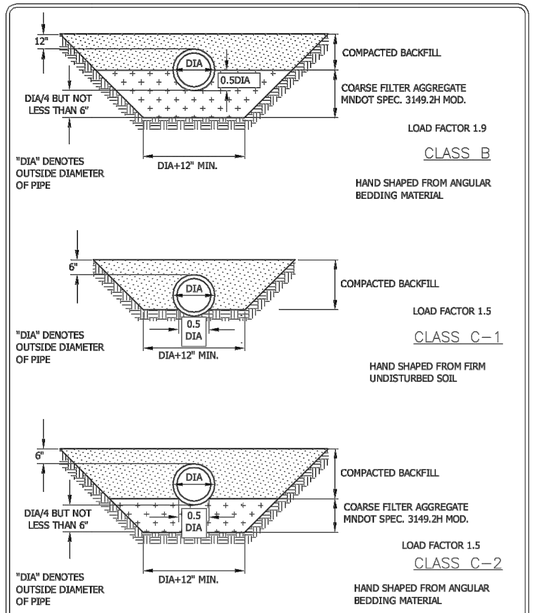
IMPROVED PIPE FOUNDATION
MATERIAL POOR SOILS

Stantec

PIPE FOUNDATION & BEDDING METHODS FOR PVC

LAST REVISION: March 2002

PLATE NO. 1001

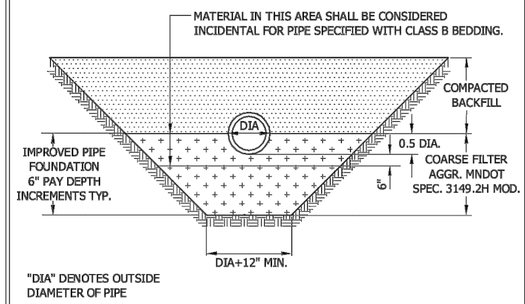


Stantec

PIPE FOUNDATION & BEDDING METHODS FOR RCP OR DIP

LAST REVISION: March 2002

PLATE NO. 1002

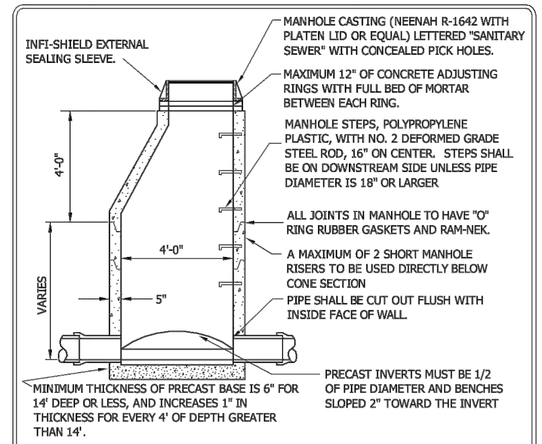


Stantec

IMPROVED PIPE FOUNDATION FOR RCP AND DIP

LAST REVISION: March 2002

PLATE NO. 1003



NOTE:
1. KOR-N-SEAL MANHOLE OR EQUAL CONSIDERED ACCEPTABLE ALTERNATE.
2. ALL DOG HOUSES SHALL BE GROUTED ON INSIDE AND OUTSIDE.
3. WHEN THE MANHOLE OR CATCH BASIN STRUCTURE IS CONSTRUCTED OUTSIDE THE TRAVELED ROADWAY A WITNESS POST AND SIGN SHALL BE INSTALLED NEXT TO THE MANHOLE.
4. IRON MANHOLE ADJUSTING RINGS (NEENAH R-1979 OR APPROVED EQUAL) MAY BE USED WHEN RAISING CASTING RIM ELEVATION ABOVE THE STREET BASE COURSE. THE ADJUSTING RING SHOULD BE SEALED TO THE CASTING FRAME WITH EBS SUPER GLUE OR APPROVED EQUAL.

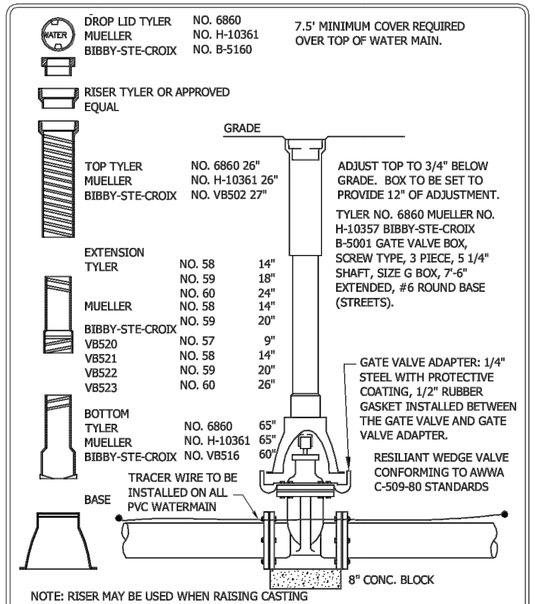
SECTION

Stantec

SANITARY MANHOLE STANDARD

LAST REVISION: OCT 1999

PLATE NO. 2001



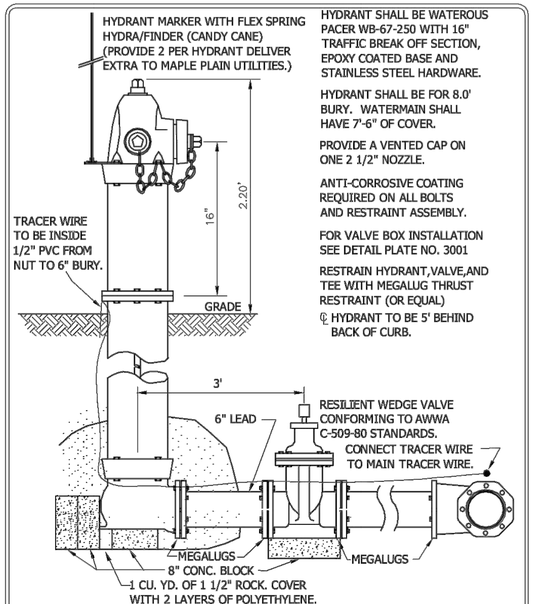
NOTE: RISER MAY BE USED WHEN RAISING CASTING RIM ELEVATION ABOVE STREET BASE COURSE.

Stantec

GATE VALVE AND BOX INSTALLATION

LAST REVISION: OCT 1999

PLATE NO. 3001



Stantec

TYPICAL HYDRANT DETAIL

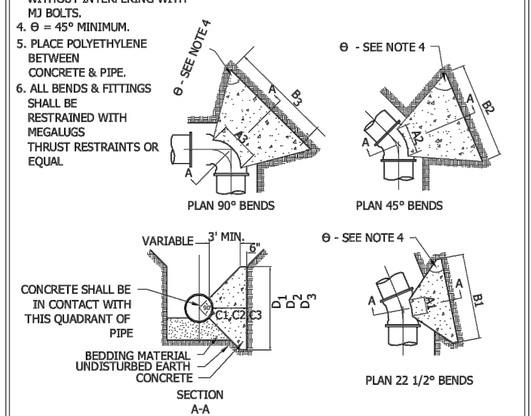
LAST REVISION: APR 2007

PLATE NO. 3002

NOTES:
1. SHAPE OF BACK OF BUTTRESS MAY VARY AS LONG AS POURED AGAINST FIRM UNDISTURBED EARTH.
2. DIMENSION C1,C2,C3 SHOULD BE LARGE ENOUGH TO MAKE ANGLE Θ EQUAL TO OR LARGER THAN 45°.
3. DIMENSION A1,A2,A3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH MJ BOLTS.
4. Θ = 45° MINIMUM.
5. PLACE POLYETHYLENE BETWEEN CONCRETE & PIPE.
6. ALL BENDS & FITTINGS SHALL BE RESTRAINED WITH MEGALUGS THRUST RESTRAINTS OR EQUAL

BUTTRESS DIMENSIONS

PIPE SIZE	22 1/2° BEND		45° BEND		90° BEND/TEE	
	B1	D1	B2	D2	B3	D3
6"	1'-5"	1'-5"	1'-5"	1'-5"	2'-1"	1'-6"
8"	1'-5"	1'-5"	2'-1"	1'-6"	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6'	3'-4"	8'-4"	4'-0"
24"	4'-4"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"
30"	-	-	9'-3"	6'-0"	17'-0"	6'-0"



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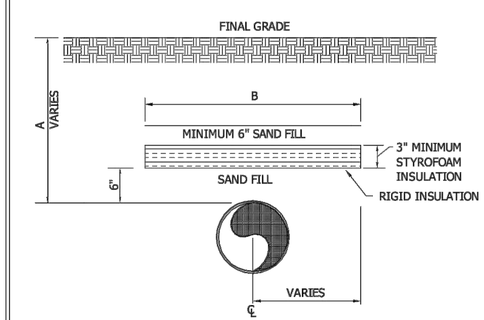
CONCRETE THRUST BLOCK

LAST REVISION: OCT 1999

PLATE NO. 3003



NOTE:
PIPE SHALL BE CENTERED UNDER INSULATION UNLESS OTHERWISE SPECIFIED.

COVER OVER PIPE - A	WIDTH OF INSULATING BOARD - B
5'	5'
6'	3'

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INSULATION DETAIL

LAST REVISION: OCT 1999

PLATE NO. 3004

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

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PRINT NAME: ANDREW M. BERENBERG
SIGNATURE:
DATE 03/23/2014 LICENSE # 25126

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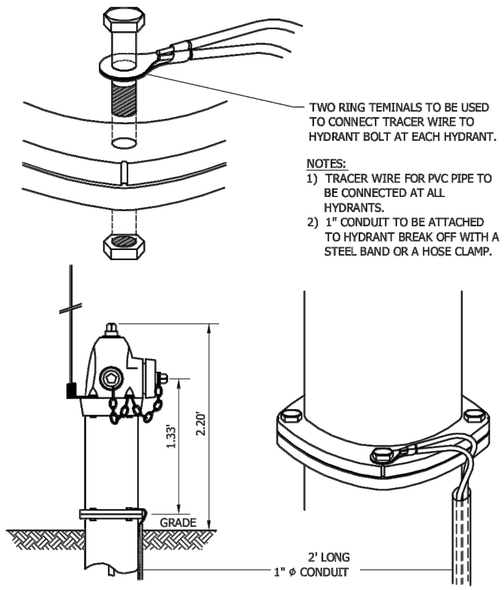
DETAILS

COMM. NO. 13672
PLOTTED:
DRAWING NO. C5



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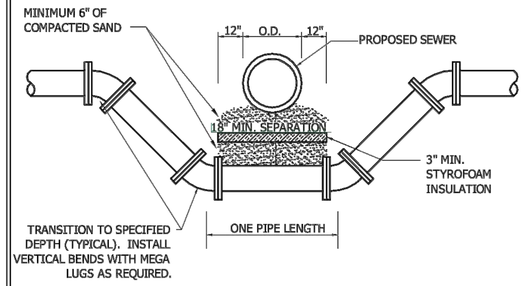
TRACER WIRE FOR PVC WATER MAIN

LAST REVISION: APRIL 2008

PLATE NO. 3005



WATERMAIN UNDER STORM SEWER

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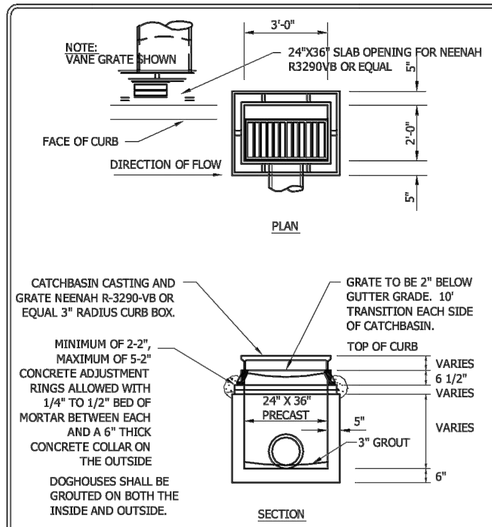
WATERMAIN OFFSET DETAIL

LAST REVISION: OCT 2007

PLATE NO. 3006



NOTES:
1. STEPS SHALL BE PROVIDED IN ALL CATCH BASIN/MANHOLES AND STORM SEWER MANHOLES.
2. CASTING TO BE TOTALLY ENCASED IN CONCRETE CURB SECTION.
3. NO BLOCK STRUCTURES ARE ALLOWED.
4. TOP OF CURB BOX SHALL HAVE "DUMP NO WASTE DRAINS TO FRESH WATER" LOGO OR APPROVED EQUAL. LOGO TO BE CAST INTO CURB BOX WITH RAISED LETTERS.

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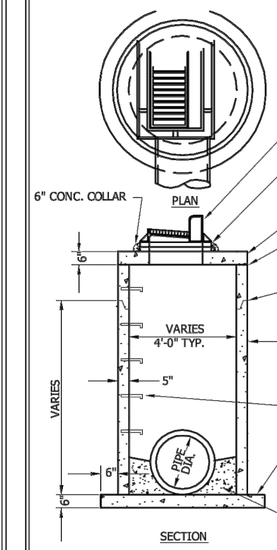
STORM SEWER CATCH BASIN

LAST REVISION: OCT 1999

PLATE NO. 5001



NEENAH R3290VB CASTING OR EQUAL WITH VANE GRATE

MINIMUM OF 2, MAXIMUM OF 5-2" CONCRETE ADJUSTMENT RINGS WITH FULL BEDS OF MORTAR.

6" PRECAST REINFORCED CONCRETE SLAB.

TOP OF BARREL SECTION UNDER TOP SLAB TO HAVE FLAT TOP EDGE SEALED WITH 2 BEADS OF RAMNEK OR EQUAL.

ALL JOINTS IN MANHOLE TO HAVE "O" RING RUBBER GASKETS.
PRECAST CONCRETE SECTION

NOTES:
1. DOGHOUSES SHALL BE GROUTED ON BOTH THE OUTSIDE AND INSIDE.
2. NO BLOCK STRUCTURES ARE ALLOWED.

MANHOLE STEPS, NEENAH R1981J OR EQUAL, 16" O.C., ALUMINUM STEPS APPROVED.

MINIMUM SLAB THICKNESS, 6" FOR 14' DEPTH. INCREASE THICKNESS 1" FOR EACH 4' OF DEPTH GREATER THAN 14', AND REINFORCE WITH 6"X6" 10/10 MESH.

GROUT BOTTOM OF MANHOLE TO 1/2 DIAMETER AT PIPE AND SLOPE GROUT 2" TOWARD INVERT.

NOTE: TOP OF CURB BOX SHALL HAVE "DUMP NO WASTE DRAINS TO FRESH WATER" LOGO OR APPROVED EQUAL. LOGO TO BE CAST INTO CURB BOX WITH RAISED LETTERS.

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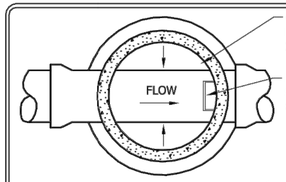
STORM SEWER CATCH BASIN MANHOLE

LAST REVISION: OCT 1999

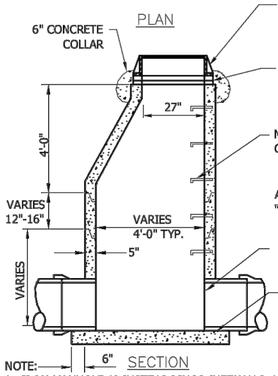
PLATE NO. 5002



GROUT BOTTOM OF MANHOLE TO 1/2 DIAMETER AT PIPE AND SLOPE GROUT 2" TOWARD INVERT.

MANHOLE STEPS SHALL BE PLACED SO THAT OFFSET VERTICAL PORTION OF CONE IS FACING DOWNSTREAM.

NO BLOCK STRUCTURES ARE ALLOWED.



MANHOLE CASTING (NEENAH R-1642 WITH PLATEN LID OR EQUAL) LETTERED "STORM SEWER" WITH 2 CONCEALED PICK HOLES.

MINIMUM OF 2, MAXIMUM OF 4 CONCRETE ADJUSTING RINGS WITH FULL BED MORTAR BETWEEN EACH.

MANHOLE STEPS, NEENAH R1981J OR EQUAL, 16" ON CENTER.

ALL JOINTS IN MANHOLE TO HAVE "O" RING RUBBER GASKETS.

PIPE SHALL BE CUT OUT FLUSH WITH INSIDE FACE OF WALL.

MINIMUM SLAB THICKNESS IS 6" FOR 14' DEPTH. INCREASE THICKNESS 1" FOR EVERY 4' OF DEPTH GREATER THAN 14' AND REINFORCE WITH 6" X 6" MESH.

DOGHOUSES MUST BE GROUTED BOTH INSIDE AND OUTSIDE.

NOTE:
1. IRON MANHOLE ADJUSTING RINGS (NEENAH R-1979 OR APPROVED EQUAL) MAY BE USED WHEN RAISING CASTING RIM ELEVATION ABOVE THE STREET BASE COURSE. THE ADJUSTING RING SHOULD BE SEALED TO THE CASTING FRAME WITH EBS SUPER GLUE OR APPROVED EQUAL.

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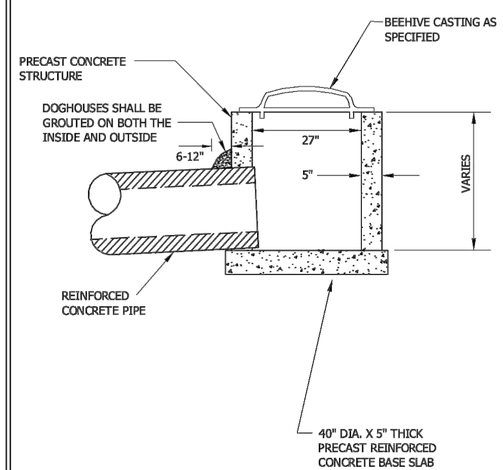
STORM SEWER MANHOLE

LAST REVISION: OCT 1999

PLATE NO. 5003



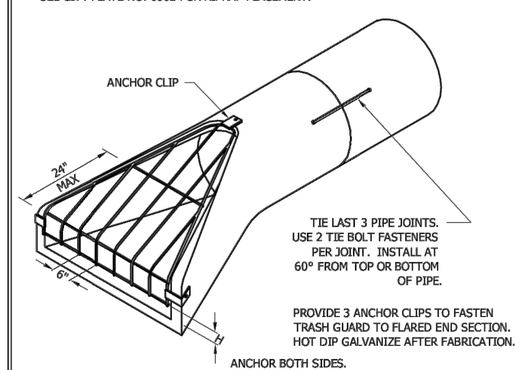
Stantec

PRECAST 27" SHALLOW DEPTH BEEHIVE

LAST REVISION: APRIL 2008

PLATE NO. 5004

SEE CITY PLATE NO. 6002 FOR RIPRAP PLACEMENT.



TRASH GUARD SIZING

PIPE SIZE	BARS	'H'	BOLTS
12"-18"	3/4"ϕ	6"	5/8"
21"-42"	1"ϕ	6"	3/4"
48"-72"	1 1/4"ϕ	12"	1"

NOTES:
1. ALL REINFORCED CONCRETE APRONS SHALL BE FURNISHED AND INSTALLED WITH TRASH GUARDS.
2. ALL NEW REINFORCED CONCRETE APRONS ON NEW PIPE SHALL BE TIED BACK 3 PIPE LENGTHS BACK FROM APRON.
3. ALL NEW REINFORCED CONCRETE APRONS ON EXISTING PIPE SHALL BE TIED TO THE FIRST PIPE ADJACENT TO THE APRON.

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FLARED END SECTION AND TRASH GUARD

LAST REVISION: OCT 1999

PLATE NO. 5005

NO.	DATE	DESCRIPTION OF REVISIONS

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DRAWN: AMB
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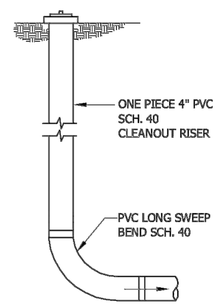
DETAILS

COMM. NO. 13672
PLOTTED:
DRAWING NO. C6

NOTE:
4" HUB WITH THREADED
PVC PLUG - DO NOT GLUE



END OF LINE CLEANOUT

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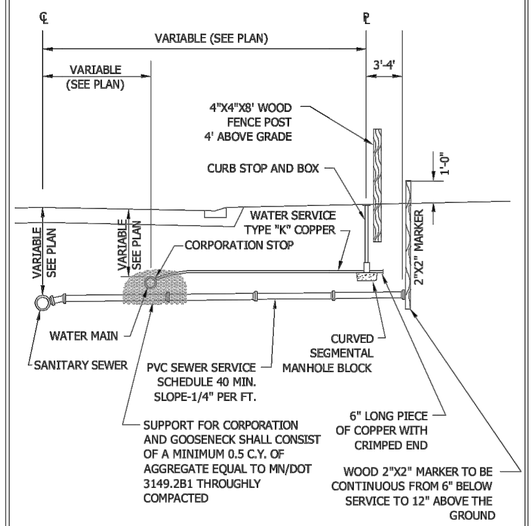
PVC SERVICE LINE CLEANOUTS

LAST REVISION: April 2000

PLATE NO. 5008



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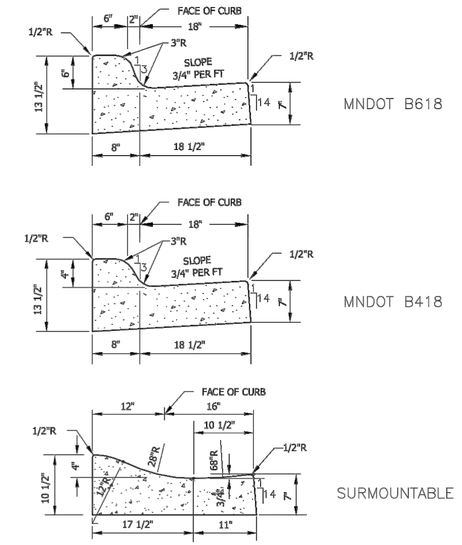
SEWER AND WATER
SERVICE CONNECTIONS

LAST REVISION: April 2000

PLATE NO. 6001



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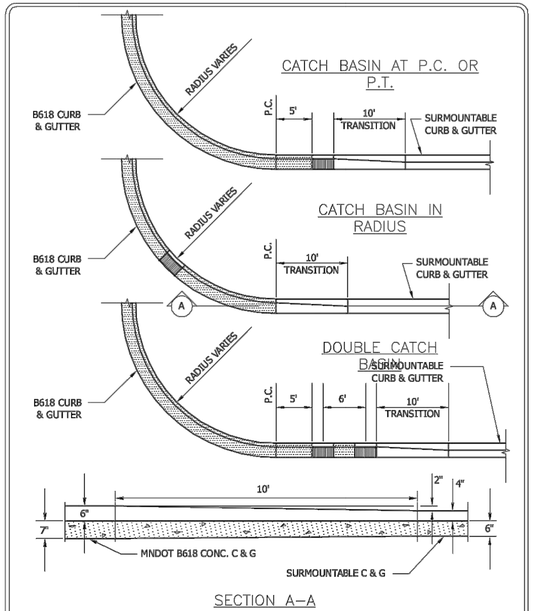
TYPICAL CURB AND GUTTER

LAST REVISION: OCT 1999

PLATE NO. 7001

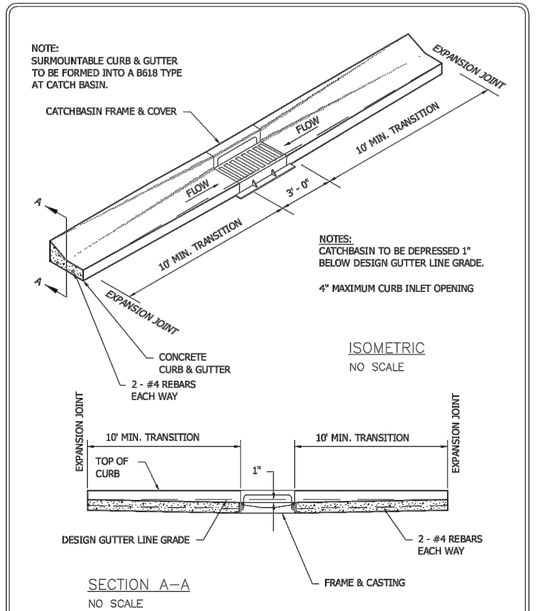


Stantec

CONCRETE CURB & GUTTER
TRANSITION

LAST REVISION: April 2010

PLATE NO. 7002

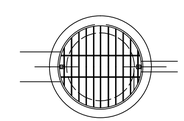


Stantec

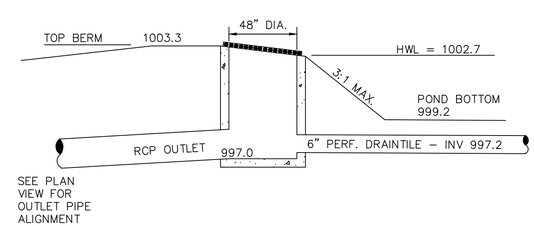
SURMOUNTABLE CURB & GUTTER
CONSTRUCTION AT CATCH BASIN

LAST REVISION: April 2010

PLATE NO. 7003



SKIMMER GRATE



POND OUTLET SKIMMER STRUCTURE

STM–37

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

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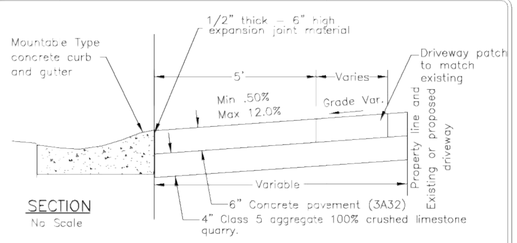
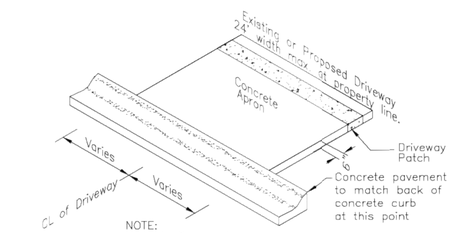
DETAILS

COMM. NO. 13672
PLOTTED:
DRAWING NO. C7



SECTION
No Scale



ISOMETRIC
No Scale

NOTE:
1. Control joints in concrete curb not to exceed 10' spacing through driveway section.
2. Driveway wings are not required with the mountable style curbing. The maximum driveway width at the curb and the property line is 24'. The minimum driveway width is 12'.

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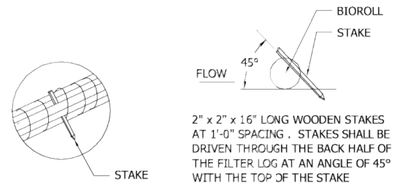
CONCRETE DRIVEWAY APRON FOR SURMOUNTABLE CURB

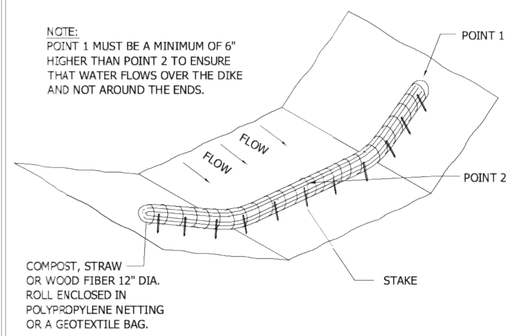
LAST REVISION: JAN 2005

PLATE NO. 7006



2" x 2" x 16" LONG WOODEN STAKES AT 1'-0" SPACING . STAKES SHALL BE DRIVEN THROUGH THE BACK HALF OF THE FILTER LOG AT AN ANGLE OF 45° WITH THE TOP OF THE STAKE POINTING UPSTREAM.

NOTE:
POINT 1 MUST BE A MINIMUM OF 6" HIGHER THAN POINT 2 TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.



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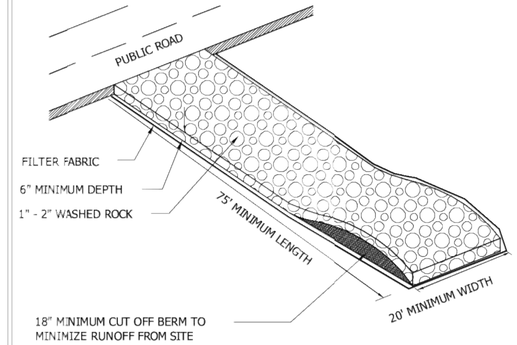
FILTER LOG DITCH CHECK

LAST REVISION: April 2008

PLATE NO. 8001



NOTE: FILTER FABRIC SHALL BE PLACED UNDER ROCK TO STOP MUD MIGRATION THROUGH ROCK.

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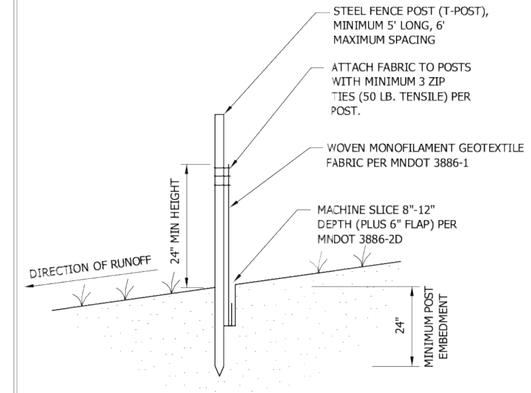
ROCK CONSTRUCTION ENTRANCE

LAST REVISION: OCT 1999

PLATE NO. 8002

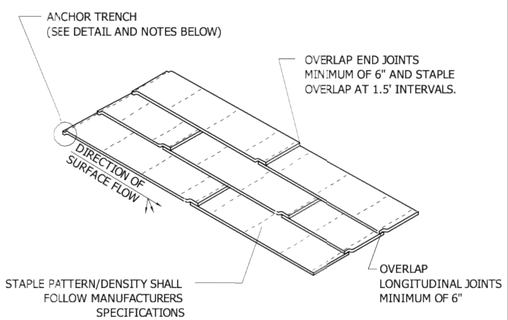


Stantec

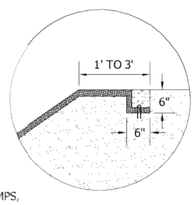
SILT FENCE MACHINE SLICED

LAST REVISION: FEB 2003

PLATE NO. 8003



ANCHOR TRENCH
1. DIG 6" X 6" TRENCH
2. LAY BLANKET IN TRENCH
3. STAPLE AT 1.5' INTERVALS
4. BACKFILL WITH NATURAL SOIL AND COMPACT
5. BLANKET LENGTH SHALL NOT EXCEED 100' WITHOUT AN ANCHOR TRENCH



NOTE:
SLOPE SURFACE SHALL BE FREE OF ROCKS, SOIL CLUMPS, STICKS, VEHICLE IMPRINTS, AND GRASS. BLANKETS SHALL HAVE GOOD SOIL CONTACT.

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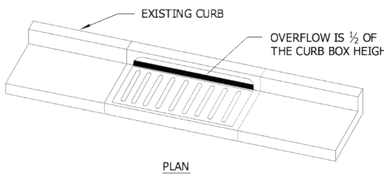
EROSION CONTROL BLANKET INSTALLATION

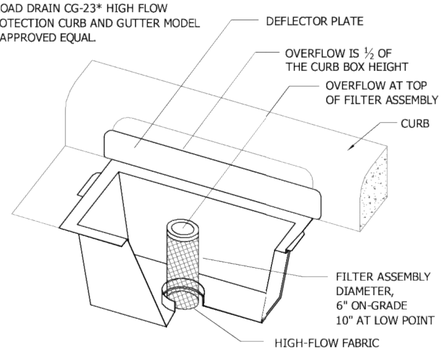
LAST REVISION: APRIL 2008

PLATE NO. 8004



PLAN

WIMCO ROAD DRAIN CG-23* HIGH FLOW INLET PROTECTION CURB AND GUTTER MODEL OR CITY APPROVED EQUAL.



* FOR THE NEW R-3290-VB STANDARD CASTING, INSTALL WIMCO ROAD DRAIN CG-3290 OR CITY APPROVED EQUAL.

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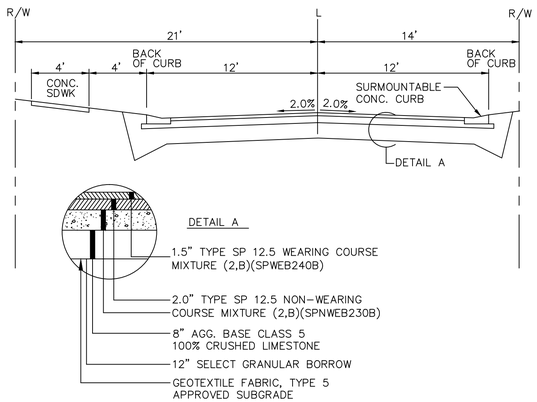
INLET PROTECTION – CATCH BASIN INSERT AFTER CURB CONSTRUCTION

LAST REVISION: APRIL 2008

PLATE NO. 8005



TYPICAL STREET SECTION

STR-3

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

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DETAILS

COMM. NO. 13672
PLOTTED:
DRAWING NO. C8

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763-412-4000 (o) 763-412-4090 (f)
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To: Maggy Mccallum 1620 Maple Ave PO Box 97 Maple Plain, MN 55359	***From:***	Andy Berenberg
	Re:	Meadows of Maple Plain
	Date:	05-05-2014
	AE Job Number:	13672

We are sending you:					
x	Attached		Prints		Documentation CD
	Shop Drawings		Change Order		DVD Video
	Reports	x	Plans		
	Specification		Other: amendments		

Quantity	***Description***
4	Full sized Development Plans
6	Reduced sized Development Plans
1	Soil Boring Report
1	Storm water management Report
1	Wetland Delineation Report
1	Zoning and Land Use Application

Transmitted as checked below:					
	As Requested		Approved as Submitted		Approved as Noted
	For Your Use		For Approval		Returned for Corrections
			Other:		

Copies	***CC.***	
	Anderson Engineering File	
		Signature:

STORM WATER
MANAGEMENT PLAN

CALCULATIONS AND SUMMARIES

MEADOWS OF MAPLE PLAIN

Comm. No. 13672

MAY 5 , 2014

Engineer:
Anderson Engineering of MN, LLC
13605 1st Ave North, Suite 100
Plymouth, MN 55441
Ph. (763) 412-4000

Owner:
ROSE CREEK BUILDERS
12955 HWY 55
Plymouth, MN 55441

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Hydrology Report
Rose Creek Builders – Maple Plain, MN

May 5, 2014

Overview

The project is located in Maple Plain, Hennepin County, Minnesota. The site is bounded by Boundary Avenue to the west and Howard Avenue to the east. A row of houses are located to the North between the site and Hennepin County 19 and a row of commercial buildings are located to the south between the site and US Highway 12. No buildings are currently located on the site. One Type 1, PEMA, seasonally flooded wetland, approximately 0.05 acres in size was field delineated within the identified project boundary.

An edge of trees separates the houses in the north and the buildings in the southwest from the grassy area that make up the majority of the 3.3 acre site.

The proposed site will have 18 single family houses and 686 ft of roadway connecting Boundary and Howard Avenues as well as a cul-de-sac to the south. Runoff from 3.1 acres is designed to be treated in a dry basin, while the remainder of site will be drained through normal infiltration or be captured by storm drains.

Methodology

The hydrologic characteristics of the site were modeled using HydroCAD® software. TR55/TR20 methods were utilized. Existing and proposed drainage areas were determined via review of as-built data, current land survey data, aerial photos, and wetland delineation.

The 1, 10, & 100 year frequency events were analyzed in existing and proposed conditions. A type II 24 hour rainfall distribution was used. Rainfalls were estimated as 2.48”, 4.2”, and 5.9” respectively. Analysis results are summarized in this narrative, with a full HydroCAD summary attached as Appendix A.

Existing Site Conditons

The property is located in Minnehaha Watershed District within the Mississippi River, Twin Cities Watershed. Site topography places the highest point at 1013.1 FT in the northeast corner and generally slopes south and southwest towards the lowest point of 999.0 FT in the southwest corner. The current infiltration rate is approximately 0.2 inches per hour across the site. A ditch along the east side of side of Boundary Avenue currently captures the majority of runoff from the property where it is sent southward

to infiltrate or be captured by city storm sewer. Additional water enters the ditch and property from a culvert near the northwest corner of the site. A 0.05 acre seasonally flooded wetland is located within that ditch and extends eastward approximately 30 feet into the site. A portion of the wetland lies outside of the property within the Boundary Avenue right of way.

Proposed Site Conditions

74% of the runoff from the 2.0 acres of impervious surface will be captured by a dry storage pond located in the southwest corner of the property. The dry storage pond is designed to retain a 100 year rainfall volume of 1.31 acre-ft from across the catchment area and drain after 48 hours without exceeding outflow rate requirements. This meets the 1" instant volume over new impervious surface requirement. An overflow control structure with a 6" side orifice maintains increasing flow and combined infiltration and underdrains ensures that water will be completely drained from the pond. Phosphorus loading also will be reduced to meet watershed requirements as runoff infiltrates from the pond. The site will release water from the site at a slower rate than predevelopment conditions across the site with storage sufficient for greater than 100 year rainfall events. Water storage during a 100 year rainfall event will place the high water elevation more than two feet beneath all nearby foundations. Additional water from property to the north will enters through a culvert and be captured and detained by the storage pond to be released at the reduced rate. The total flow rate is calculated for all water captured from the subject site.

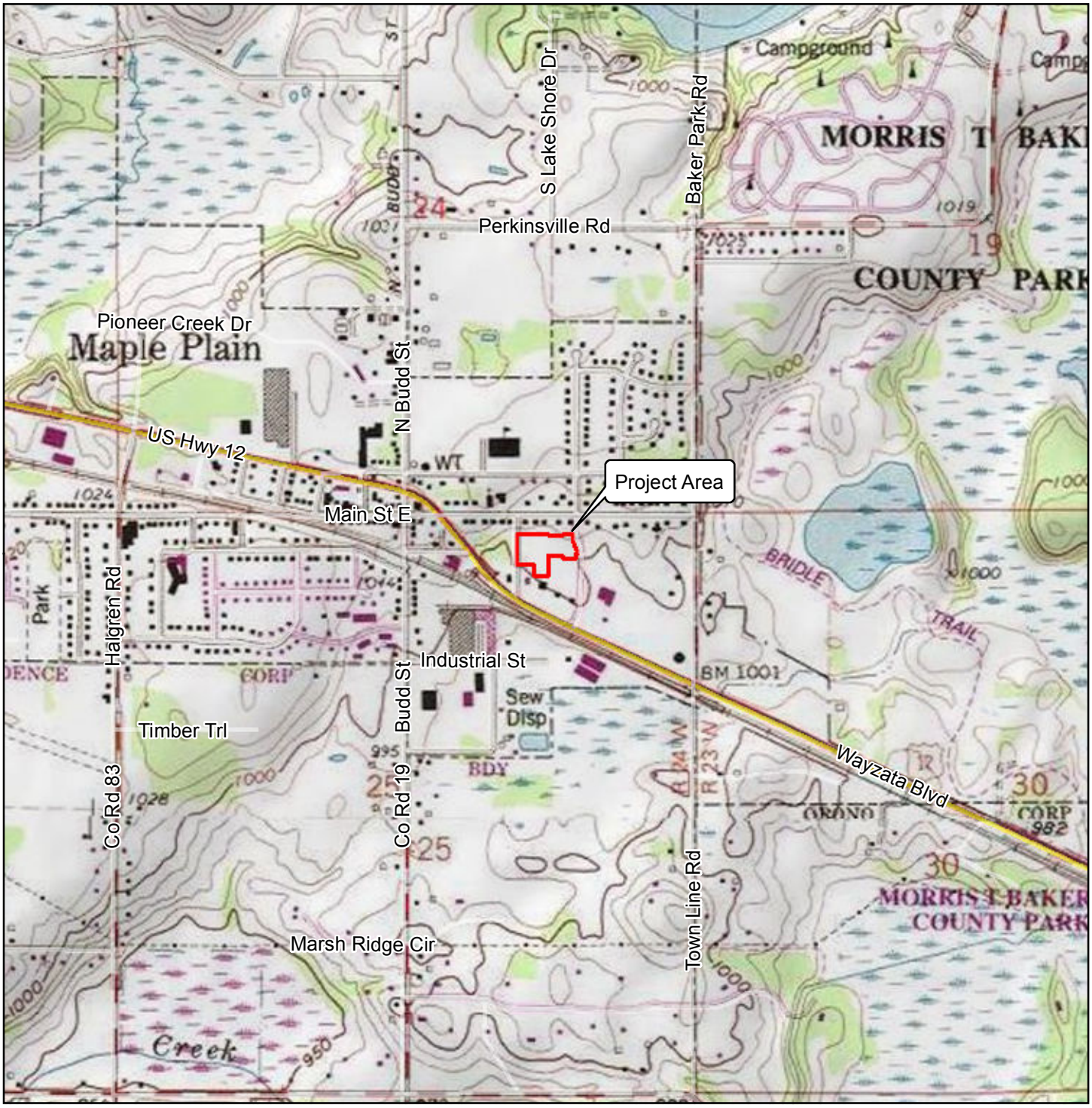
Existing & Proposed Conditions Rate & Volume Summary

STORM EVENT	*EXISTING* [cfs]	RUNOFF TREATED [cfs]	RUNOFF TO EAST [cfs]	RUNOFF FROM OFFSITE [cfs]	**PROPOSED [cfs]**
1yr	*1.55*	0.09	0.88	(0.87)	**0.10**
2yr	*3.02*	0.56	1.36	(1.37)	**0.55**
10yr	*7.21*	2.20	2.59	(2.62)	**2.17**
100yr	*13.02*	9.35	4.15	(4.20)	**9.30**

Anderson Engineering of Minnesota, LLC
Andy Berenberg, PE

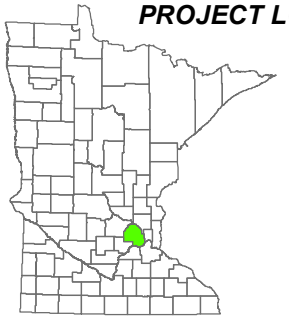
Appendix

- **Figure 1 – Site Location**
- **Figure 2 – Wetland Delineation**
- **Figure 3 – Drainage Areas**
- **HydroCAD Report**

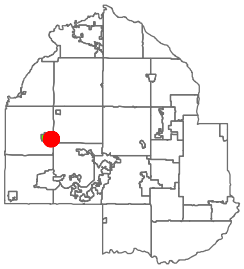


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 0.25 miles

0 0.125 0.25 0.5

Miles

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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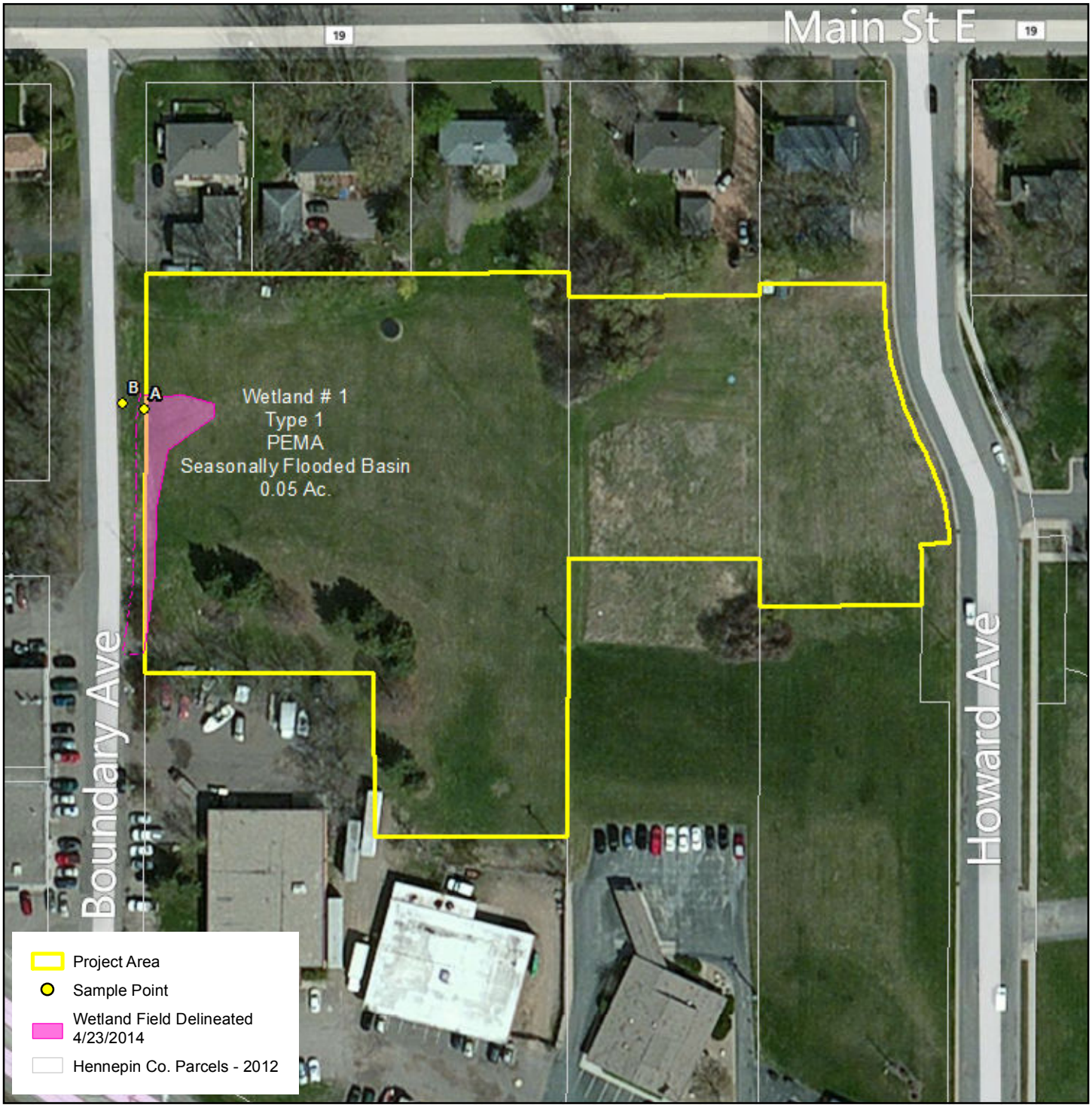
Plymouth, MN 55441
763-412-4000 (o) 763-412-4090 (f)
www.ae-mn.com

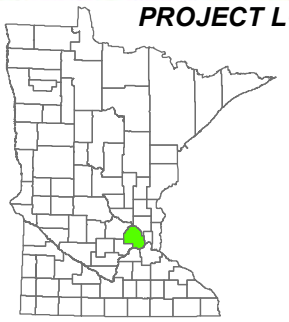
LOCATION - FIGURE 1
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/24/2014 By: JLA

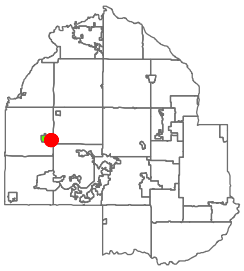


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 100 feet

0 50 100 200

Feet

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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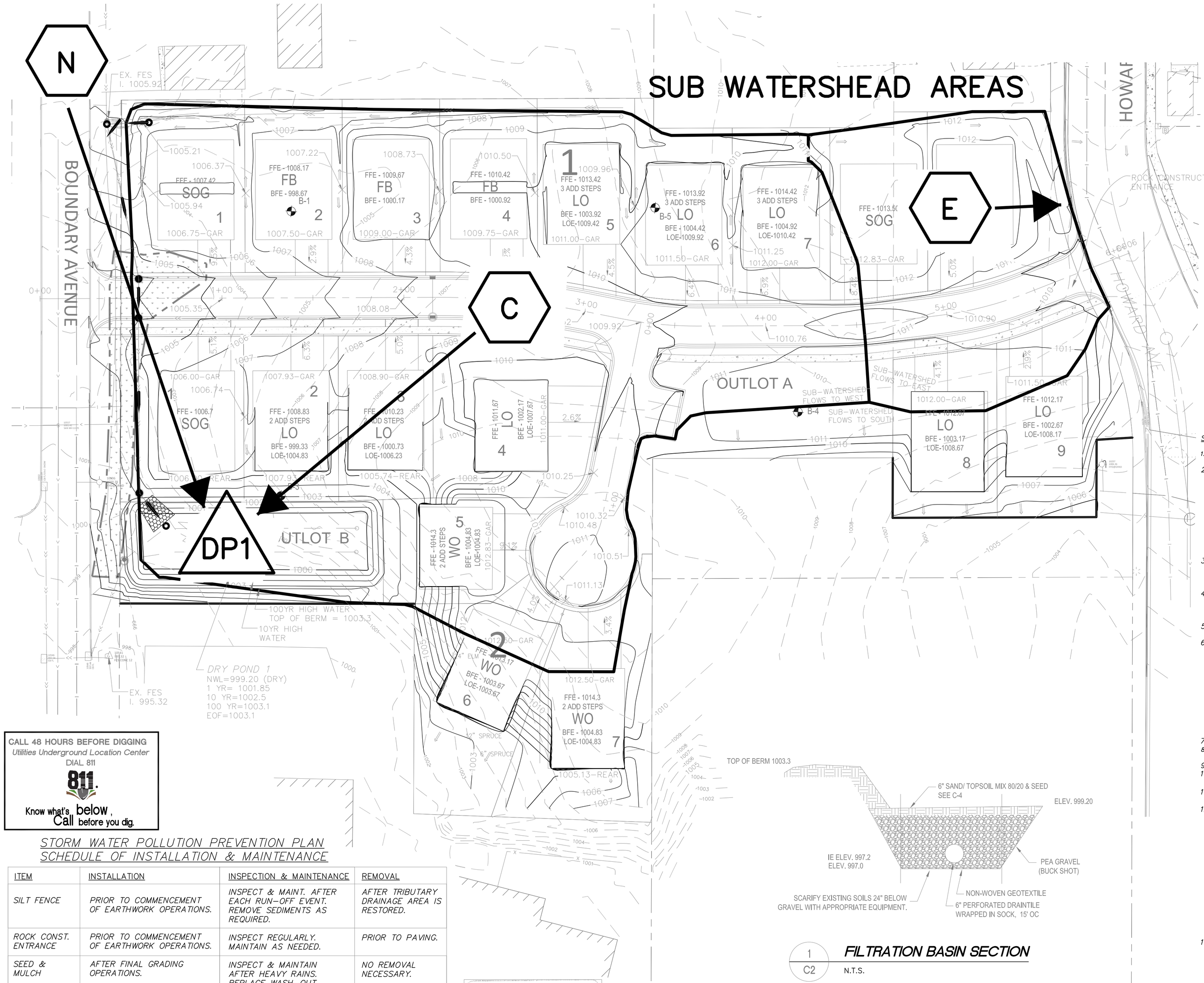
DELINEATION - FIGURE 5
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/24/2014 By: JLA



LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- PROPOSED CONTOUR
- PROPOSED 10' CONTOUR
- EXISTING DELINEATED WETLAND
- EXISTING CONTOUR
- EXISTING 10' CONTOUR
- SILT FENCE
- CURB & GUTTER
- DRAINAGE ARROW
- PROPOSED SPOT ELEVATION
- PROPOSED DRAINAGE SLOPE
- SOIL BORING

N

0 15 30 60
SCALE IN FEET

CALL 48 HOURS BEFORE DIGGING
Utilities Underground Location Center
DIAL 811
811. Know what's below. Call before you dig.

STORM WATER POLLUTION PREVENTION PLAN SCHEDULE OF INSTALLATION & MAINTENANCE

ITEM	INSTALLATION	INSPECTION & MAINTENANCE	REMOVAL
SILT FENCE	PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS.	INSPECT & MAINT. AFTER EACH RUN-OFF EVENT. REMOVE SEDIMENTS AS REQUIRED.	AFTER TRIBUTARY DRAINAGE AREA IS RESTORED.
ROCK CONST. ENTRANCE	PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS.	INSPECT REGULARLY. MAINTAIN AS NEEDED.	PRIOR TO PAVING.
SEED & MULCH	AFTER FINAL GRADING OPERATIONS.	INSPECT & MAINTAIN AFTER HEAVY RAINS. REPLACE WASH-OUT AREAS IMMEDIATELY.	NO REMOVAL NECESSARY.
INLET PROTECTION	UPON INLET CONSTRUCTION.	WHEN 1/3 CAPACITY OF BMP IS REACHED	AFTER TRIBUTARY AREAS ARE FULLY RESTORED

NOTE: CONTRACTOR IS RESPONSIBLE FOR INSTALLATION, MAINTENANCE AND REMOVAL OF ALL APPLICABLE EROSION & SEDIMENT CONTROL ITEMS.

UNIVERSITY OF MINNESOTA
Andrew M Berenberg
Plymouth MN
Design of SWPPP (May 31 2014)
If your certification expires on May 31, 2013, you must take a class in Winter 2012-2013 to maintain certification.

1 / C2 **FILTRATION BASIN SECTION**
N.T.S.

GRADING NOTES

1. ALL CONSTRUCTION SHALL COMPLY WITH RECOMMENDATIONS OF THE SOIL ENGINEER UNLESS DIRECTED OTHERWISE.
2. ALL CONSTRUCTION SHALL COMPLY WITH CITY OF ST. CLOUD ENGINEERING STANDARDS AND THE 2005 EDITION OF MNDOT STANDARD CONSTRUCTION SPECIFICATIONS (INCLUDING SUPPLEMENTS) UNLESS DIRECTED OTHERWISE.
3. ALL CONSTRUCTION SHALL COMPLY WITH APPLICABLE MUNICIPAL, WATERSHED DISTRICT, COUNTY, MPCA, DEPT. OF HEALTH, AND MNDOT PERMITS.
4. ALL HANDICAPPED STALLS AND ACCESS RAMPS SHALL COMPLY WITH CURRENT ADA STANDARDS. SEE ARCHITECTURAL PLANS FOR EXACT LOCATION OF BUILDING ENTRANCES.
5. THE LOCATION AND TYPE OF EXISTING UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE INFORMATION IS NOT WARRANTED TO BE ACCURATE OR COMPLETE. THE CONTRACTOR, IN COOPERATION WITH THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY, IS RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES.
6. SPOT ELEVATIONS IN STREETS ARE GUTTER GRADES UNLESS OTHERWISE NOTED.
7. THE VERTICAL DATUM IS THE NORTH AMERICAN DATUM OF 1988 (NAVD88). THE PRIMARY BENCHMARK IS SANITARY MANHOLE RIM LOCATED AT THE INTERSECTION OF MAIN STREET AND HOWARD AVENUE. ELEVATION = 1016.50 FEET.

STORM WATER POLLUTION PREVENTION PLAN NOTES:

1. GRADING CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL UNDERGROUND UTILITIES WITH THE RESPECTIVE UTILITY COMPANIES PRIOR TO CONSTRUCTION.
2. ALL EROSION CONTROL MEASURES CALLED FOR ON THESE PLANS AND SPECIFICATIONS, WHICH MAY INCLUDE SILT FENCE, SEDIMENTATION BASINS OR TEMPORARY SEDIMENT TRAPS, SHALL BE CONSTRUCTED AND SERVICEABLE IN THE FOLLOWING ORDER:
   A. ROCK CONSTRUCTION ENTRANCES A MINIMUM OF 50 FEET.
   B. SILT FENCE.
   C. TEMPORARY CULVERTS.
   D. TEMPORARY SEDIMENTATION BASINS AND OUTFALL FACILITIES.
   E. COMMON EXCAVATION AND EMBANKMENT (GRADING)
   F. SEED AND MULCH OR SOD.
   G. BIO-ROLL BARRIERS IN FINISHED GRADED AREAS.
3. INLET AND OUTLET FACILITIES SUBSEQUENT TO STORM SEWER WORK. GRADING CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL EROSION CONTROL MEASURES IN ACCORDANCE WITH CITY AND NPDES PHASE II PERMITTING REQUIREMENTS AS WELL AS EROSION CONTROL MEASURES AS SHOWN ON THESE PLANS OR SPECIFICATIONS. GRADING CONTRACTOR SHALL IMPLEMENT ANY ADDITIONAL EROSION CONTROL MEASURES AS MAY BE REQUIRED TO PROTECT ADJACENT PROPERTY.
4. ALL EROSION CONTROL FACILITIES SHALL BE MAINTAINED BY THE CONTRACTOR DURING GRADING OPERATIONS. ANY TEMPORARY FACILITIES WHICH ARE TO BE REMOVED AS CALLED FOR ON THESE PLANS AND SPECIFICATIONS SHALL BE REMOVED BY THE GRADING CONTRACTOR WHEN DIRECTED BY THE ENGINEER. THE GRADING CONTRACTOR SHALL THEN RESTORE THE SUBSEQUENTLY DISTURBED AREA IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.
5. THE GRADING CONTRACTOR SHALL SCHEDULE THE SOILS ENGINEER AT THE CONTRACTORS EXPENSE SO THAT CERTIFICATION OF ALL CONTROLLED FILLS WILL BE FURNISHED TO THE OWNER DURING AND UPON COMPLETION OF THE PROJECT.
6. EROSION CONTROL.
   PRIOR TO CONSTRUCTION, AREAS NOT TO BE DISTURBED SHOULD BE CLEARLY FLAGGED, STAKED OR IDENTIFIED WITH SIGNS AND NOTED ON THE PLANS.
   - ALL EXPOSED AREAS MUST BE STABILIZED NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA IS TEMPORARILY OR PERMANENTLY COMPLETED.
   - THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH MUST BE STABILIZED WITHIN 200 FEET FROM THE PROPERTY EDGE.
   - DRAINAGE DITCHES AND CONVEYANCE SYSTEMS MUST BE INSPECTED FOR EVIDENCE OF EROSION AND SEDIMENT DEPOSITION. ALL DELTAS AND SEDIMENT DEPOSITED MUST BE REMOVED AND THE AREAS MUST BE RESTABLIZED WHERE SEDIMENT REMOVAL RESULTS IN EXPOSED SOIL.
   - IN ORDER TO MAINTAIN SHEET FLOW AND MINIMIZE RILLS AND GULLIES, THERE SHALL BE NO UNBROKEN SLOPE LENGTHS OF GREATER THAN 75 FEET FOR SLOPES WITH A GRADE OF 3:1 OR STEEPER.
7. CONTRACTORS GRADING AND EROSION CONTROL OPERATIONS SHALL TAKE PLACE WITHIN THE CONSTRUCTION LIMITS.
8. IT IS REQUIRED THAT SOILS TRACKED FROM THE SITE BY MOTOR VEHICLES BE CLEANED DAILY FROM PAVED ROADWAY SURFACES THROUGHOUT THE DURATION OF CONSTRUCTION.
9. ALL REQUIREMENTS OF THE LOCAL WATERSHED DISTRICT SHALL BE SATISFIED PER THE APPROVED PERMIT.
10. ALL EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THIS PLAN AND IMPLEMENTED IN THE FIELD AS DIRECTED BY THE ENGINEER SHALL CONFORM TO THE MPCA'S "PROTECTING WATER QUALITY IN URBAN AREAS: BEST MANAGEMENT PRACTICES FOR MINNESOTA".
11. DEWATERING AND/OR BASIN DRAINING DISCHARGE SHALL BE DIRECTED TO SEDIMENTATION BASINS WHEREVER POSSIBLE. ALL DISCHARGE POINTS SHALL BE ADEQUATELY PROTECTED FORM EROSION & SCOUR THROUGH USE OF APPROVED ENERGY DISSIPATION DEVICES.
12. ALL SOLID WASTE/ CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN ACCORDANCE WITH MPCA REQUIREMENTS. HAZARDOUS MATERIALS SHALL BE STORED/ DISPOSED OF IN COMPLIANCE WITH MPCA REGULATIONS CONTRACTOR SHALL USE RAPID STABILIZATON METHODS PER MNDOT 2573 AS NEEDED DURING THE COURSE OF THE WORK TO MAINTAIN CONFORMANCE WITH THE CITY AND NPDES II PERMIT REQUIREMENTS. THIS WORK SHALL CONSIST OF OPERATIONS NECESSARY TO RAPIDLY STABILIZE SMALL CRITICAL AREAS, TO PREVENT OFF SITE SEDIMENTATION AND/OR TO COMPLY WITH PERMIT REQUIREMENTS. THE WORK MAY BE PREFORMED AT ANY TIME DURING THE CONTRACT AND DURING NORMAL WORKING HOURS. THIS WORK WILL BE CONDUCTED ON SMALL AREAS THAT MAY OR MAY NOT BE ACCESSIBLE WITH NORMAL EQUIPMENT. THIS WORK SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE MNDOT STANDARD SPECIFICATIONS, THE DETAILS SHOWN IN THE PLANS, AND THE FOLLOWING:
   - THERE ARE FIVE STABILIZATION METHODS APPROVED FOR THESE OPERATIONS. THESE METHODS MAY BE CONDUCTED INDEPENDENTLY OR IN COMBINATION.
   - METHOD #1: APPLY TYPE 1 MULCH AND DISC ANCHOR APPLY
   - METHOD #2: TYPE 1 MULCH AND TACK WITH TYPE 5 HYDRAULIC SOIL STABILIZER
   - METHOD #3: HYDROSPREAD SEED, FERTILIZER AND TYPE 6 HYDRAULIC SOIL STABILIZER
   - METHOD #4: HAND INSTALL SEED, FERTILIZER AND EROSION CONTROL BLANKET CATEGORY 3
   - METHOD #5: PLACE GEOTEXTILE AND RIP RAP CLASS II IN VARIOUS CONFIGURATIONS

   THESE EFFORTS WILL BE INCIDENTAL TO THE EROSION CONTROL BID ITEM.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL NECESSARY ADDITIONAL EROSION CONTROL MEASURES AS MAY BE REQUIRED. REQUIRED EROSION CONTROL METHODS SHALL CONSIST OF BUT NOT BE LIMITED TO THE FOLLOWING:
    A. STAKED FIBER LOG ROLLS AT BACK OF ALL CURB EXCEPT AT CONSTRUCTION/DRIVEWAY ENTRANCE.
    B. SILT FENCE ON ALL DOWN GRADIENT SLOPES FROM CONSTRUCTION AREA. SILT FENCE SHALL HAVE THE BOTTOM DUG IN WITH SOIL FIRMLY COMPACTED.
    C. ROCK CONSTRUCTION ENTRANCE HAVING 1" TO 2" CLEAR ROCK OVER GEOTEXTILE FABRIC.
    D. STREET CLEANING AS MAY BE REQUIRED SHOULD VEHICLE TRACKING OCCUR.
14. CONTRACTOR SHALL PROVIDE A TEMPORARY SEDIMENTATION BASIN ON SITE FOR CONSTRUCTION WASH OUT USE. TEMPORARY BASIN SHALL BE LOCATED AS TO PROVIDE EASY ACCESS FOR CONSTRUCTION VEHICLES AND CONCRETE TRUCKS AS NECESSARY.
15. INLET SEDIMENTATION CONTROL IS TO BE PROVIDED TO ALL STORM SEWER CATCH BASINS THROUGHOUT CONSTRUCTION. MEASURES APPLIED SHALL COMPLY WITH BEST MANAGEMENT PRACTICES FOR MINNESOTA AND APPLICATIONS OF NPDES PHASE II AS APPROPRIATE FOR PHASE OF CONSTRUCTION.

NO.	DATE	DESCRIPTION OF REVISIONS

DESIGNED: AMB
DRAWN: AMB
CHECKED BY: TJG

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME:
SIGNATURE:
DATE 03/23/2014 LICENSE # 25126

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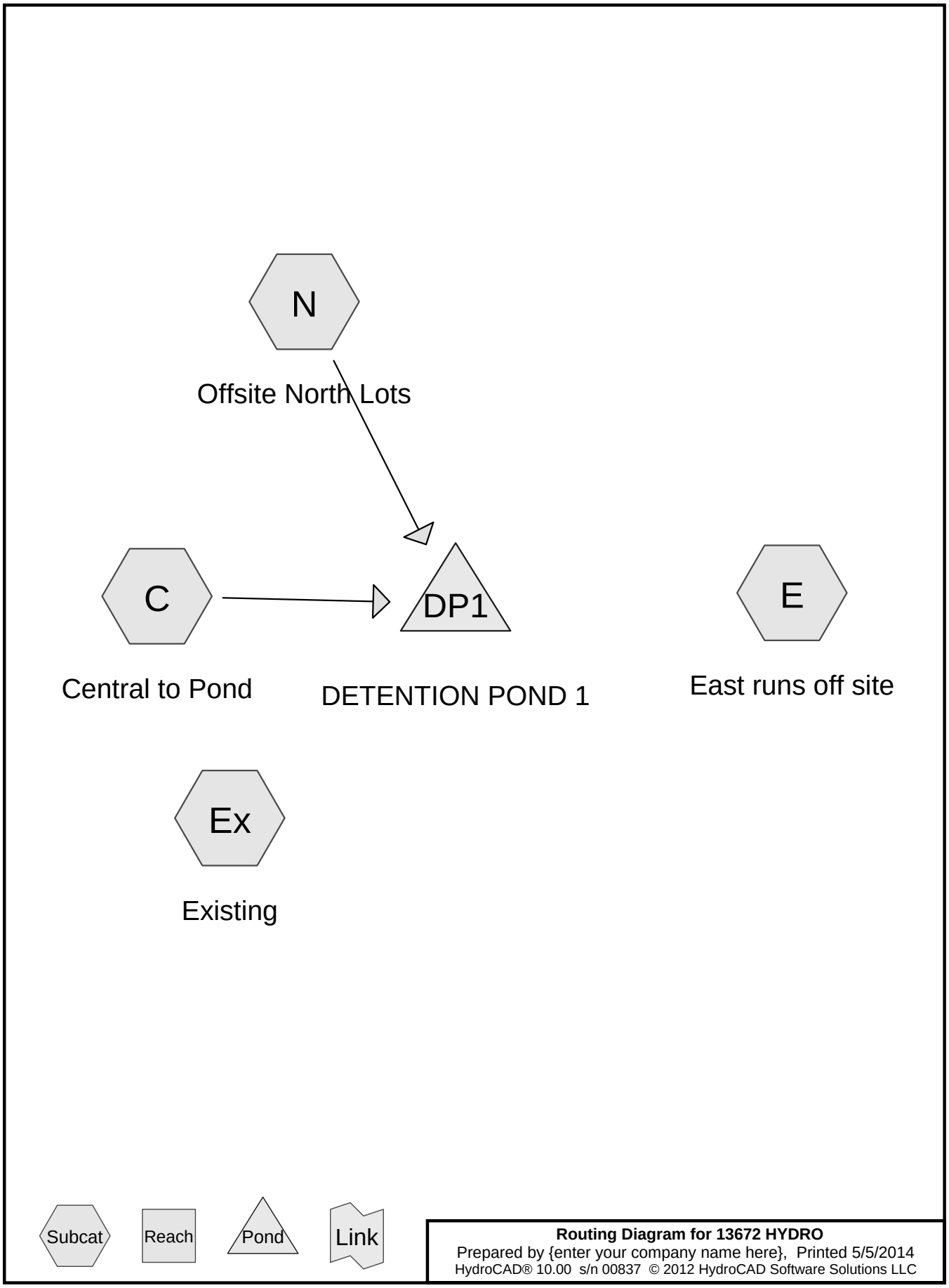
ROSE CREEK BUILDERS
(763) 717-8000
12955 Highway 55
Plymouth, MN 55441

GRADING AND EROSION CONTROL PLAN

COMM. NO. 13672
PLOTTED:
DRAWING NO. C2

Y:\13600\13672 ROSE CREEK BUILDERS - MAPLE PLAIN PUD\Dwg-C3d\Civil\13672 Hydrology.dwg, 5/5/2014 1:58:10 PM, Adobe PDF, ANSI D, 1:1


N
Offsite North Lots
C
Central to Pond
DP1
DETENTION POND 1
E
East runs off site
Ex
Existing
Subcat
Reach
Pond
Link
Routing Diagram for 13672 HYDRO
Prepared by {enter your company name here}, Printed 5/5/2014
HydroCAD® 10.00 s/n 00837 © 2012 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.630	83	1/4 acre lots, 38% imp, HSG C (C, E, N)
3.800	74	Pasture/grassland/range, Good, HSG C (Ex)
8.430	**79**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
8.430	HSG C	C, E, Ex, N
0.000	HSG D	
0.000	Other	
8.430		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	4.630	0.000	0.000	4.630	1/4 acre lots, 38% imp	C, E, N
0.000	0.000	3.800	0.000	0.000	3.800	Pasture/grassland/range, Good	Ex
0.000	**0.000**	**8.430**	**0.000**	**0.000**	**8.430**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	DP1	998.30	998.20	25.0	0.0040	0.013	12.0	0.0	0.0

Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment C: Central to Pond Runoff Area=3.100 ac 38.00% Impervious Runoff Depth=0.84"
Tc=15.0 min CN=83 Runoff=3.26 cfs 0.216 af

Subcatchment E: East runs off site Runoff Area=0.700 ac 38.00% Impervious Runoff Depth=0.84"
Tc=10.0 min CN=83 Runoff=0.88 cfs 0.049 af

Subcatchment Ex: Existing Runoff Area=3.800 ac 0.00% Impervious Runoff Depth=0.45"
Tc=20.0 min CN=74 Runoff=1.55 cfs 0.142 af

Subcatchment N: Offsite North Lots Runoff Area=0.830 ac 38.00% Impervious Runoff Depth=0.84"
Tc=15.0 min CN=83 Runoff=0.87 cfs 0.058 af

Pond DP1: DETENTION POND 1 Peak Elev=1,000.63' Storage=8,782 cf Inflow=4.13 cfs 0.273 af
Discarded=0.02 cfs 0.036 af Primary=0.09 cfs 0.055 af Outflow=0.12 cfs 0.090 af

Total Runoff Area = 8.430 ac Runoff Volume = 0.464 af Average Runoff Depth = 0.66"
79.13% Pervious = 6.671 ac 20.87% Impervious = 1.759 ac

Summary for Subcatchment C: Central to Pond

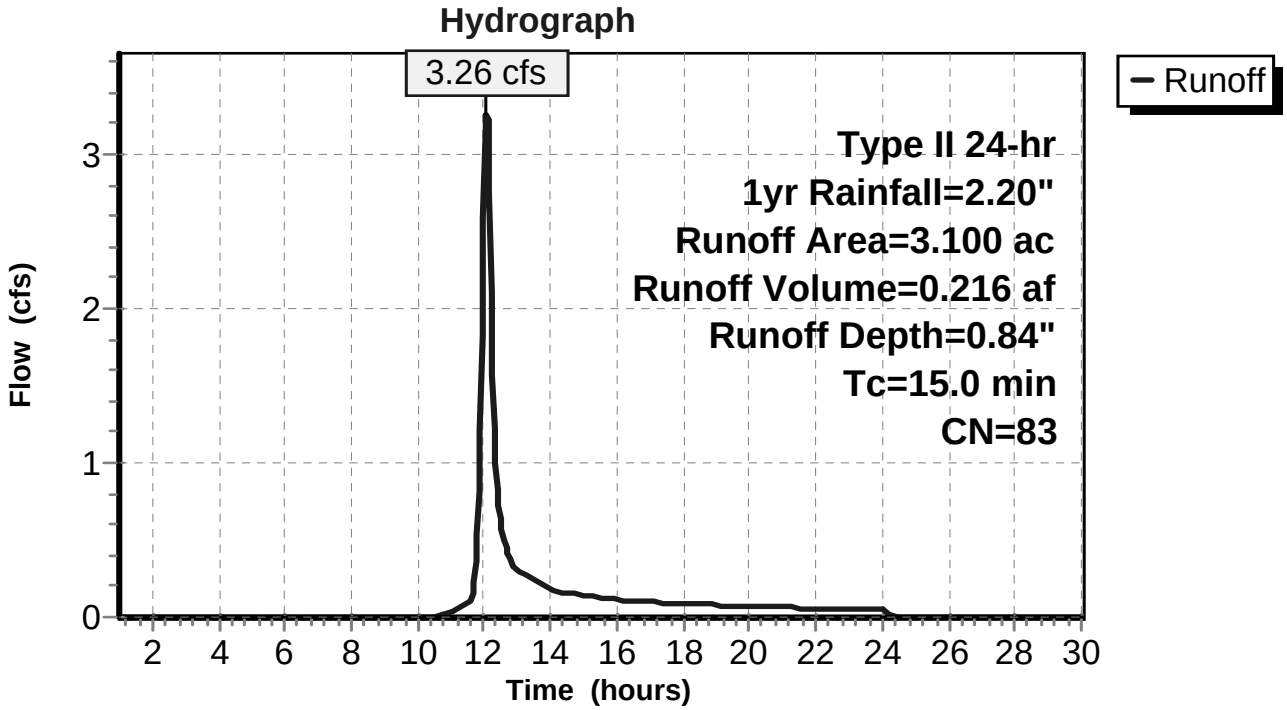
Runoff = 3.26 cfs @ 12.08 hrs, Volume= 0.216 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.20"

Area (ac)	CN	Description
3.100	83	1/4 acre lots, 38% imp, HSG C
1.922		62.00% Pervious Area
1.178		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment C: Central to Pond



Summary for Subcatchment E: East runs off site

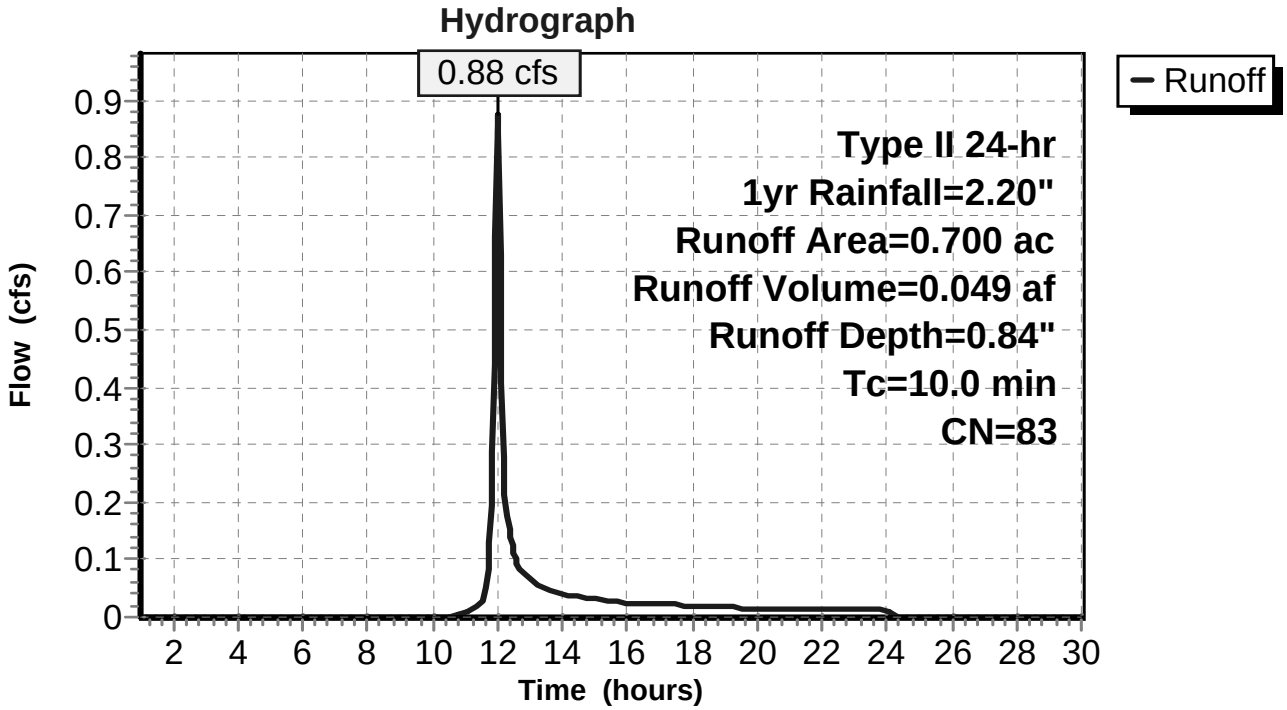
Runoff = 0.88 cfs @ 12.02 hrs, Volume= 0.049 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.20"

Area (ac)	CN	Description
0.700	83	1/4 acre lots, 38% imp, HSG C
0.434		62.00% Pervious Area
0.266		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment E: East runs off site



Summary for Subcatchment Ex: Existing

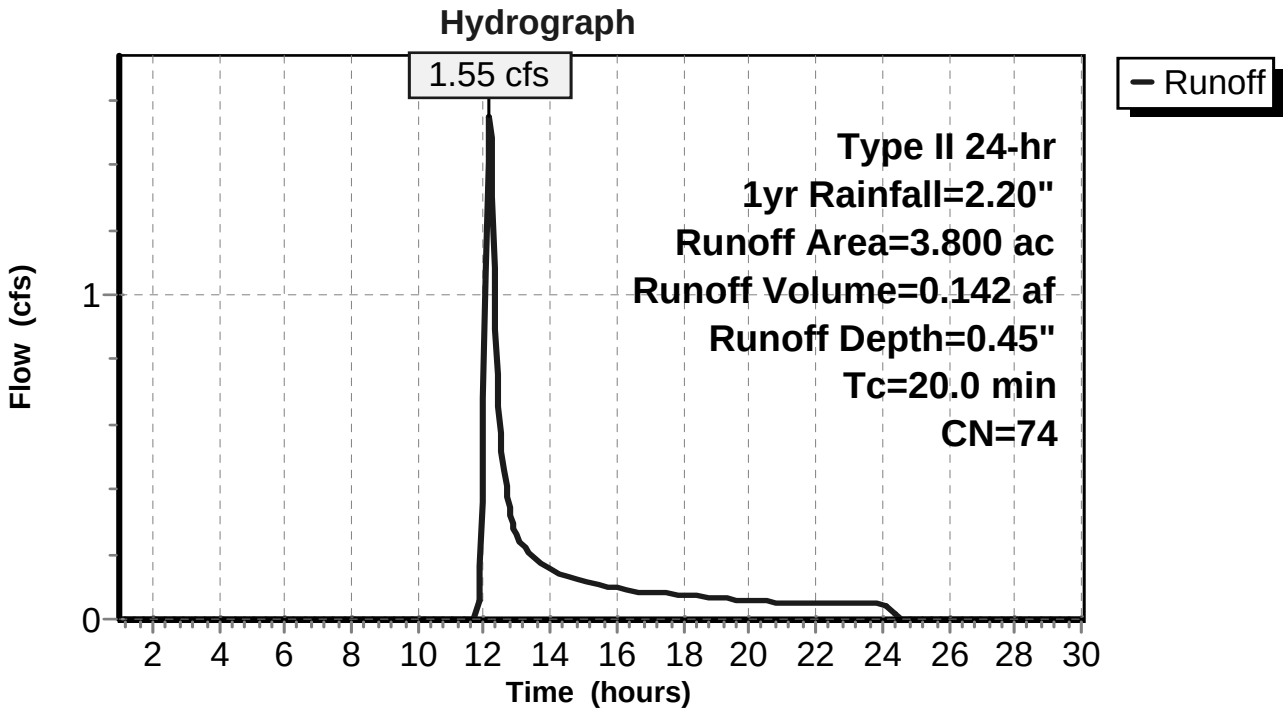
Runoff = 1.55 cfs @ 12.16 hrs, Volume= 0.142 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.20"

Area (ac)	CN	Description
3.800	74	Pasture/grassland/range, Good, HSG C
3.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Subcatchment Ex: Existing



Summary for Subcatchment N: Offsite North Lots

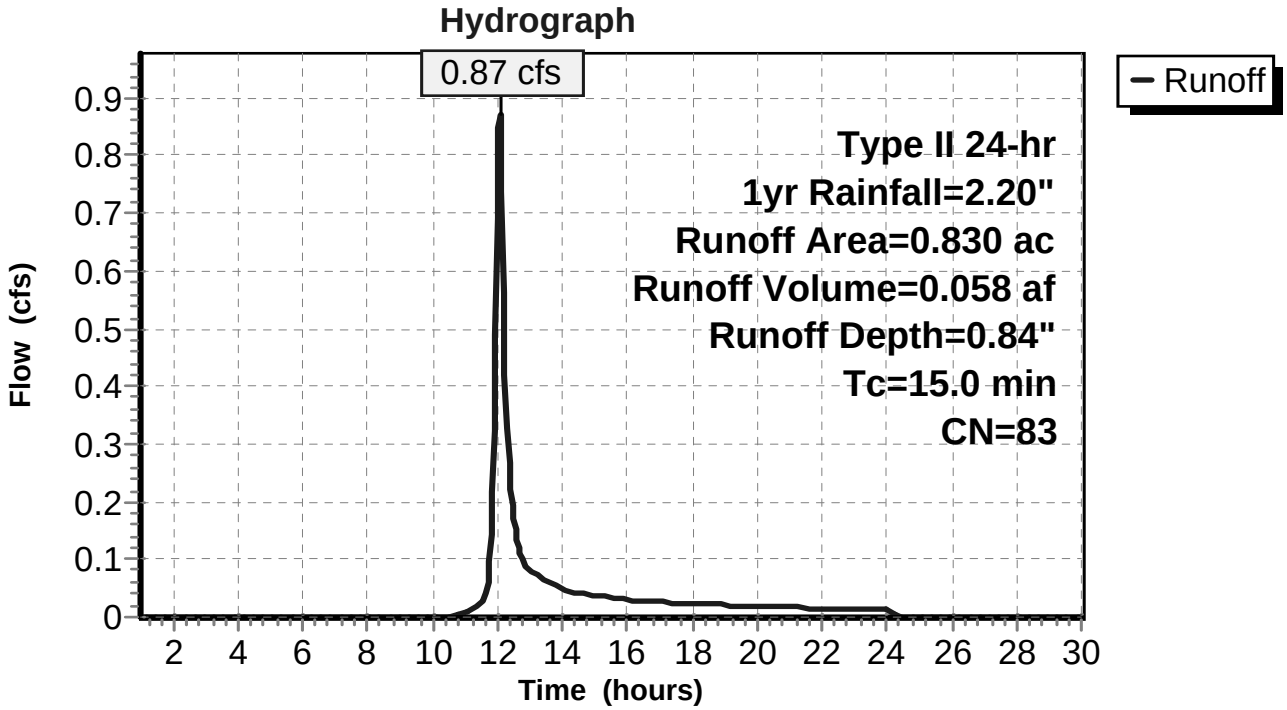
Runoff = 0.87 cfs @ 12.08 hrs, Volume= 0.058 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.20"

Area (ac)	CN	Description
0.830	83	1/4 acre lots, 38% imp, HSG C
0.515		62.00% Pervious Area
0.315		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment N: Offsite North Lots



Summary for Pond DP1: DETENTION POND 1

[86] Warning: Oscillations may require smaller dt (severity=3)

Inflow Area =	3.930 ac, 38.00% Impervious, Inflow Depth = 0.84" for 1yr event				
Inflow =	4.13 cfs @	12.08 hrs,	Volume=	0.273 af	
Outflow =	0.12 cfs @	17.59 hrs,	Volume=	0.090 af,	Atten= 97%, Lag= 330.8 min
Discarded =	0.02 cfs @	17.59 hrs,	Volume=	0.036 af	
Primary =	0.09 cfs @	17.59 hrs,	Volume=	0.055 af	

Routing by Sim-Route method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 1,000.63' @ 17.59 hrs Surf.Area= 4,953 sf Storage= 8,782 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 346.6 min (1,203.8 - 857.2)

Volume	Invert	Avail.Storage	Storage Description
#1	997.00'	22,423 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 30,783 cf Overall - 8,360 cf Embedded = 22,423 cf
#2	997.00'	2,508 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) Inside #1 8,360 cf Overall x 30.0% Voids
		24,931 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
997.00	3,800	0	0
999.20	3,818	8,380	8,380
1,003.00	6,841	20,252	28,632
1,003.30	7,500	2,151	30,783

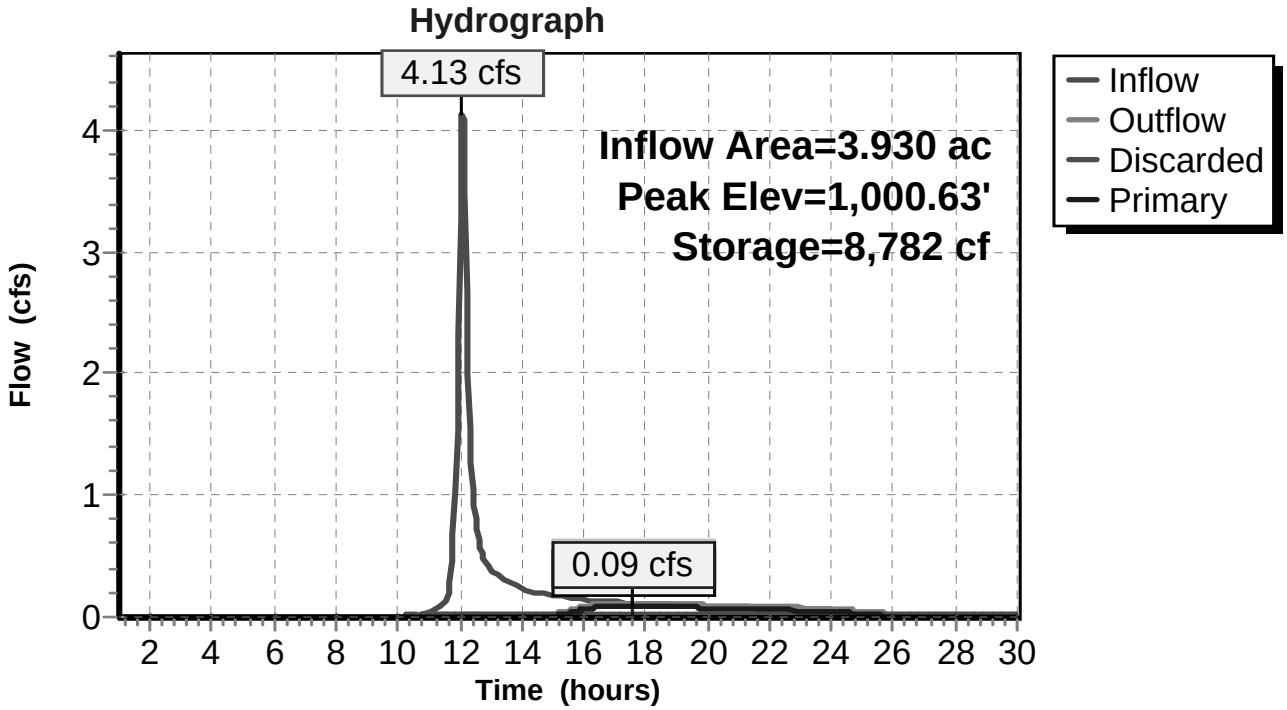
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
997.00	3,800	0	0
999.20	3,800	8,360	8,360

Device	Routing	Invert	Outlet Devices
#1	Discarded	997.00'	**0.200 in/hr Exfiltration over Surface area**
#2	Primary	998.30'	**12.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 998.30' / 998.20' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	1,002.70'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	1,000.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Primary	1,003.20'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 17.59 hrs HW=1,000.63' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.09 cfs @ 17.59 hrs HW=1,000.63' (Free Discharge)
├─**2=Culvert** (Passes 0.09 cfs of 5.48 cfs potential flow)
│ ├─**3=Orifice/Grate** (Controls 0.00 cfs)
│ └─**4=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.21 fps)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP1: DETENTION POND 1



Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment C: Central to Pond Runoff Area=3.100 ac 38.00% Impervious Runoff Depth=2.46"
Tc=15.0 min CN=83 Runoff=9.77 cfs 0.636 af

Subcatchment E: East runs off site Runoff Area=0.700 ac 38.00% Impervious Runoff Depth=2.46"
Tc=10.0 min CN=83 Runoff=2.59 cfs 0.144 af

Subcatchment Ex: Existing Runoff Area=3.800 ac 0.00% Impervious Runoff Depth=1.74"
Tc=20.0 min CN=74 Runoff=7.21 cfs 0.552 af

Subcatchment N: Offsite North Lots Runoff Area=0.830 ac 38.00% Impervious Runoff Depth=2.46"
Tc=15.0 min CN=83 Runoff=2.62 cfs 0.170 af

Pond DP1: DETENTION POND 1 Peak Elev=1,002.10' Storage=16,960 cf Inflow=12.39 cfs 0.806 af
Discarded=0.03 cfs 0.042 af Primary=2.20 cfs 0.579 af Outflow=2.23 cfs 0.621 af

Total Runoff Area = 8.430 ac Runoff Volume = 1.502 af Average Runoff Depth = 2.14"
79.13% Pervious = 6.671 ac 20.87% Impervious = 1.759 ac

Summary for Subcatchment C: Central to Pond

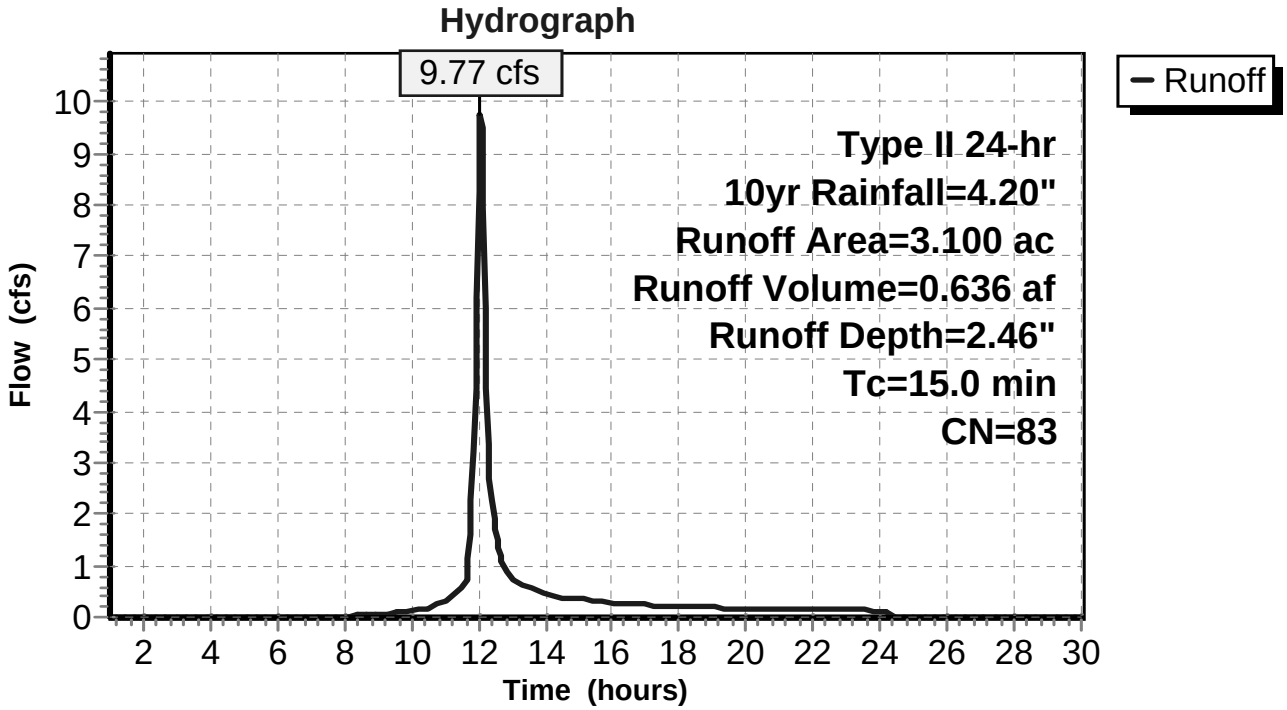
Runoff = 9.77 cfs @ 12.07 hrs, Volume= 0.636 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.20"

Area (ac)	CN	Description
3.100	83	1/4 acre lots, 38% imp, HSG C
1.922		62.00% Pervious Area
1.178		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment C: Central to Pond



Summary for Subcatchment E: East runs off site

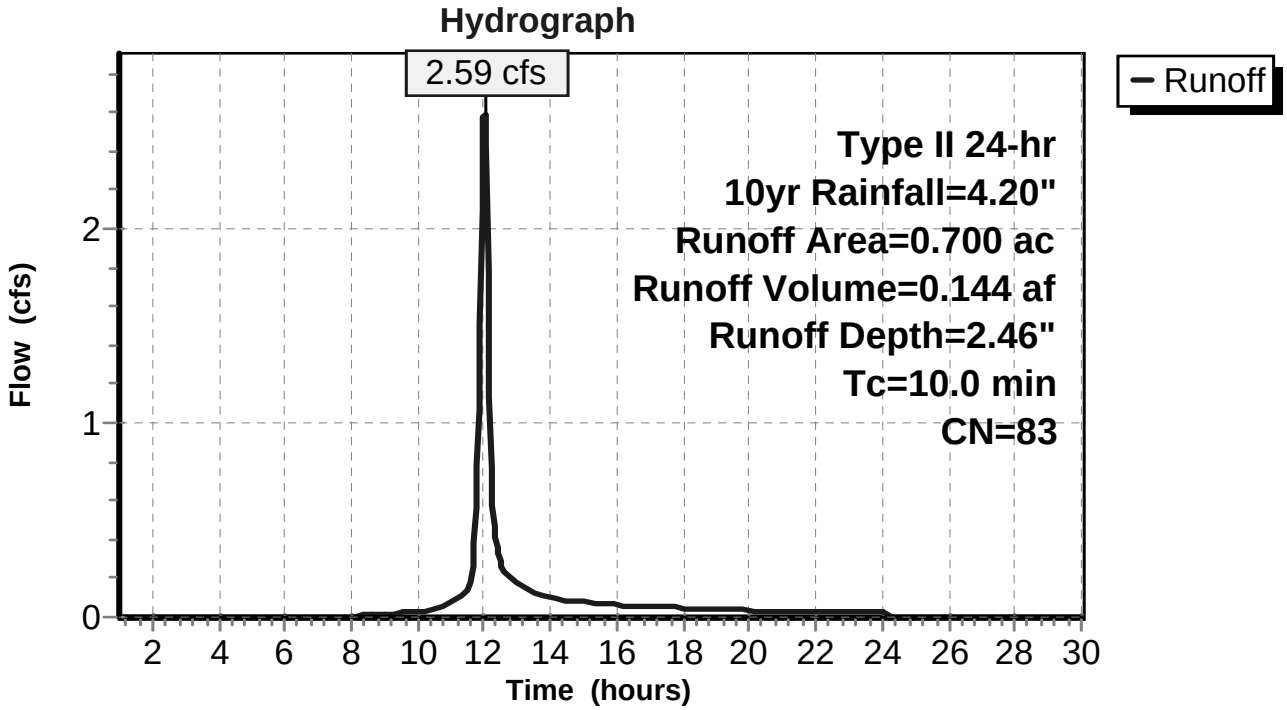
Runoff = 2.59 cfs @ 12.01 hrs, Volume= 0.144 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.20"

Area (ac)	CN	Description
0.700	83	1/4 acre lots, 38% imp, HSG C
0.434		62.00% Pervious Area
0.266		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment E: East runs off site



Summary for Subcatchment Ex: Existing

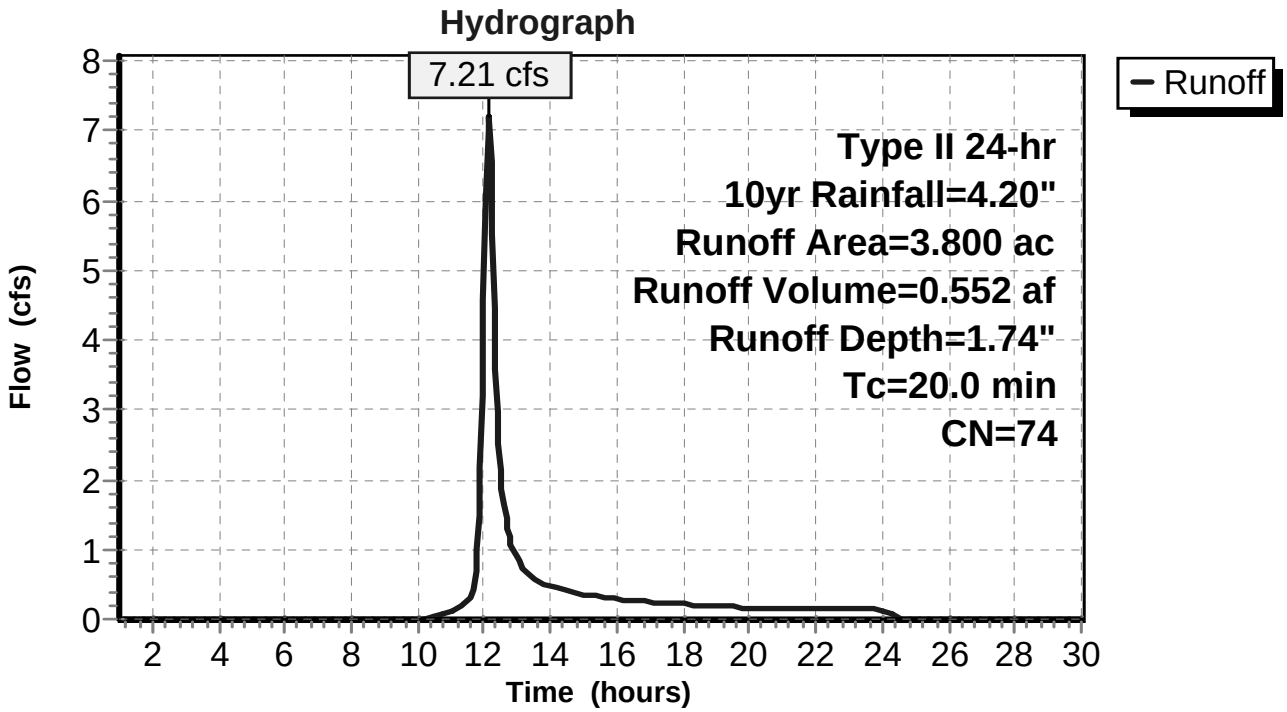
Runoff = 7.21 cfs @ 12.14 hrs, Volume= 0.552 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.20"

Area (ac)	CN	Description
3.800	74	Pasture/grassland/range, Good, HSG C
3.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Subcatchment Ex: Existing



Summary for Subcatchment N: Offsite North Lots

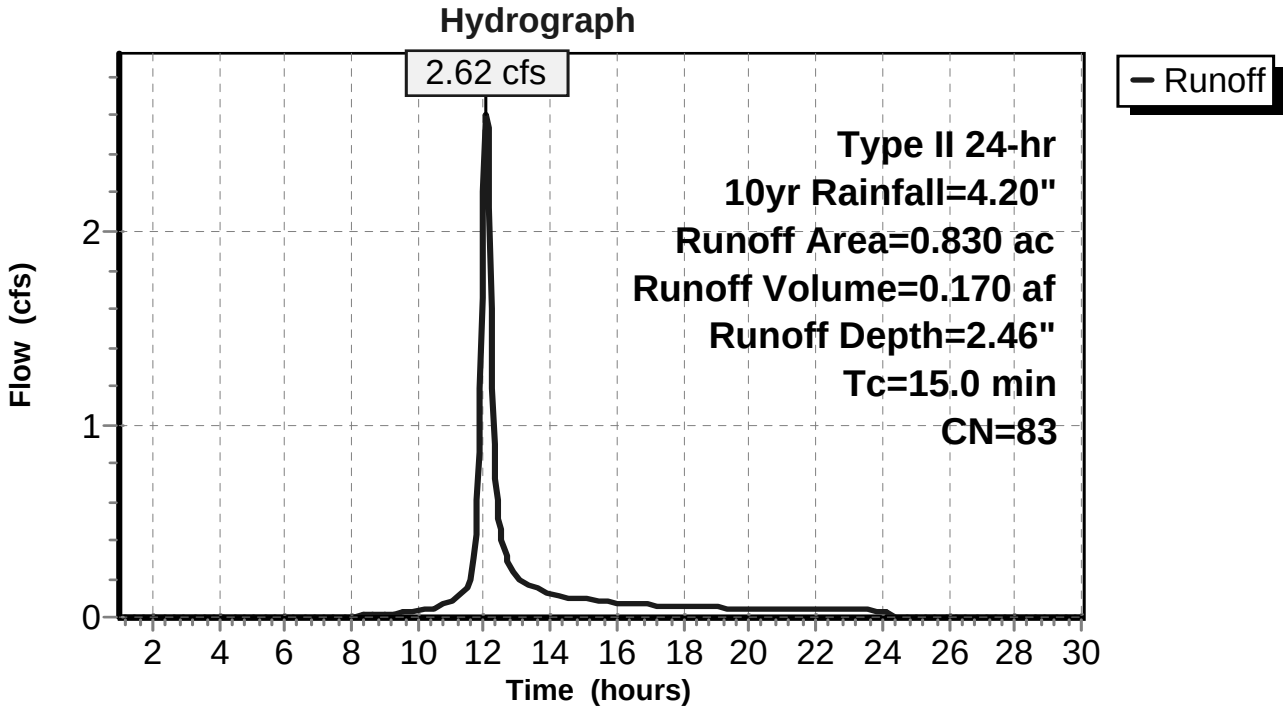
Runoff = 2.62 cfs @ 12.07 hrs, Volume= 0.170 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.20"

Area (ac)	CN	Description
0.830	83	1/4 acre lots, 38% imp, HSG C
0.515		62.00% Pervious Area
0.315		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment N: Offsite North Lots



Summary for Pond DP1: DETENTION POND 1

[86] Warning: Oscillations may require smaller dt (severity=4)

Inflow Area =	3.930 ac, 38.00% Impervious, Inflow Depth = 2.46" for 10yr event				
Inflow =	12.39 cfs @	12.07 hrs,	Volume=	0.806 af	
Outflow =	2.23 cfs @	12.51 hrs,	Volume=	0.621 af,	Atten= 82%, Lag= 26.4 min
Discarded =	0.03 cfs @	12.51 hrs,	Volume=	0.042 af	
Primary =	2.20 cfs @	12.51 hrs,	Volume=	0.579 af	

Routing by Sim-Route method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 1,002.10' @ 12.51 hrs Surf.Area= 6,127 sf Storage= 16,960 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 102.1 min (928.1 - 826.0)

Volume	Invert	Avail.Storage	Storage Description
#1	997.00'	22,423 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 30,783 cf Overall - 8,360 cf Embedded = 22,423 cf
#2	997.00'	2,508 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1 8,360 cf Overall x 30.0% Voids
		24,931 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
997.00	3,800	0	0
999.20	3,818	8,380	8,380
1,003.00	6,841	20,252	28,632
1,003.30	7,500	2,151	30,783

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
997.00	3,800	0	0
999.20	3,800	8,360	8,360

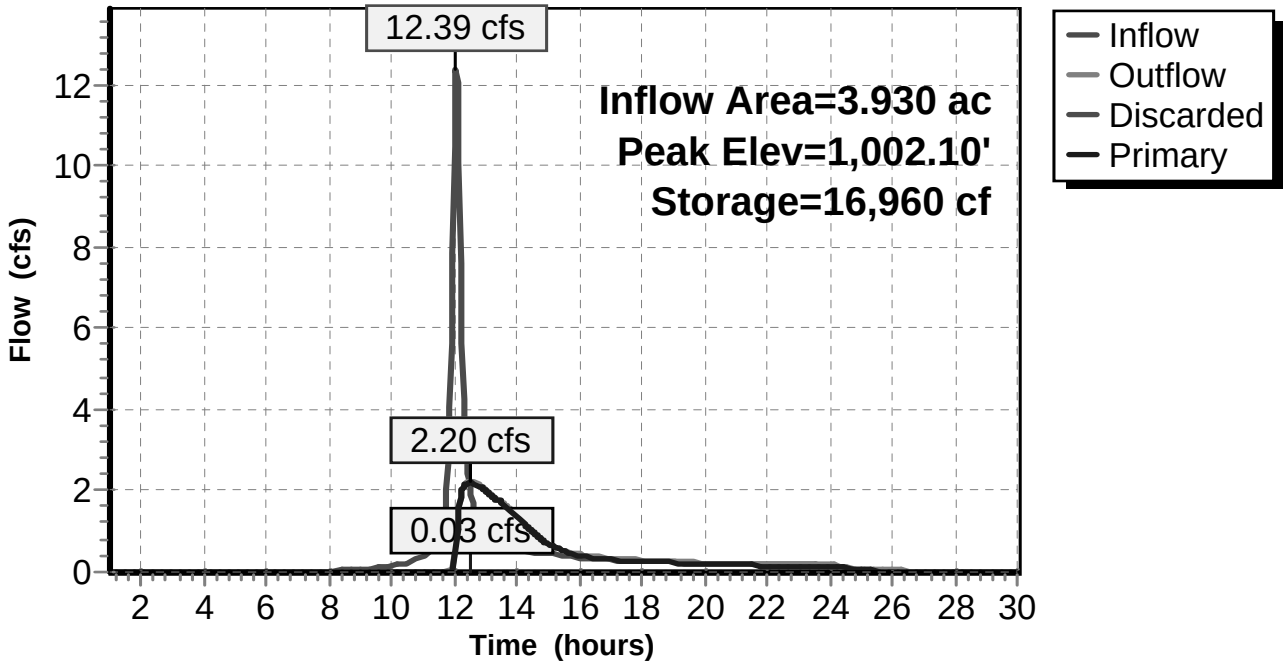
Device	Routing	Invert	Outlet Devices
#1	Discarded	997.00'	**0.200 in/hr Exfiltration over Surface area**
#2	Primary	998.30'	**12.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 998.30' / 998.20' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	1,002.70'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	1,000.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Primary	1,003.20'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.03 cfs @ 12.51 hrs HW=1,002.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.20 cfs @ 12.51 hrs HW=1,002.10' (Free Discharge)
├─**2=Culvert** (Passes 2.20 cfs of 7.82 cfs potential flow)
│ ├─**3=Orifice/Grate** (Controls 0.00 cfs)
│ └─**4=Orifice/Grate** (Orifice Controls 2.20 cfs @ 5.60 fps)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP1: DETENTION POND 1

Hydrograph



Time span=1.00-30.00 hrs, dt=0.05 hrs, 581 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment C: Central to Pond Runoff Area=3.100 ac 38.00% Impervious Runoff Depth=4.00"
Tc=15.0 min CN=83 Runoff=15.69 cfs 1.033 af

Subcatchment E: East runs off site Runoff Area=0.700 ac 38.00% Impervious Runoff Depth=4.00"
Tc=10.0 min CN=83 Runoff=4.15 cfs 0.233 af

Subcatchment Ex: Existing Runoff Area=3.800 ac 0.00% Impervious Runoff Depth=3.10"
Tc=20.0 min CN=74 Runoff=13.02 cfs 0.982 af

Subcatchment N: Offsite North Lots Runoff Area=0.830 ac 38.00% Impervious Runoff Depth=4.00"
Tc=15.0 min CN=83 Runoff=4.20 cfs 0.277 af

Pond DP1: DETENTION POND 1 Peak Elev=1,003.23' Storage=24,391 cf Inflow=19.89 cfs 1.310 af
Discarded=0.03 cfs 0.045 af Primary=9.35 cfs 1.079 af Outflow=9.39 cfs 1.125 af

Total Runoff Area = 8.430 ac Runoff Volume = 2.525 af Average Runoff Depth = 3.59"
79.13% Pervious = 6.671 ac 20.87% Impervious = 1.759 ac

Summary for Subcatchment C: Central to Pond

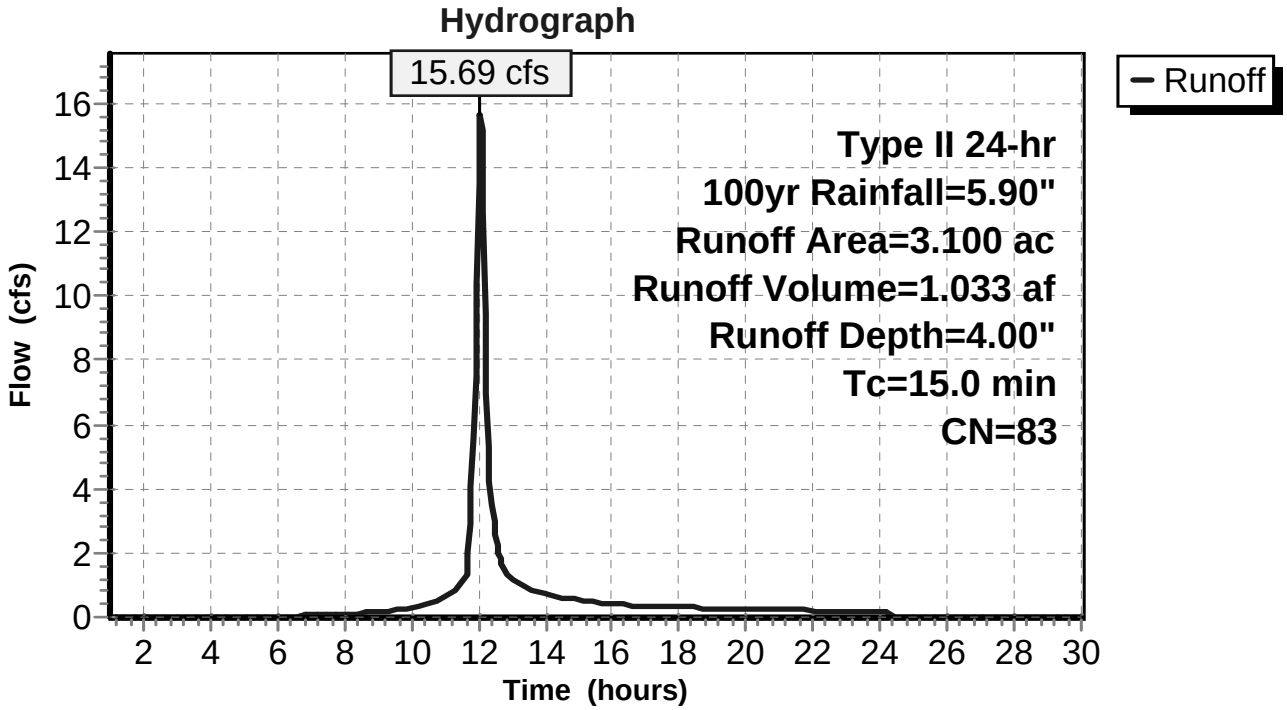
Runoff = 15.69 cfs @ 12.07 hrs, Volume= 1.033 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.90"

Area (ac)	CN	Description
3.100	83	1/4 acre lots, 38% imp, HSG C
1.922		62.00% Pervious Area
1.178		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment C: Central to Pond



Summary for Subcatchment E: East runs off site

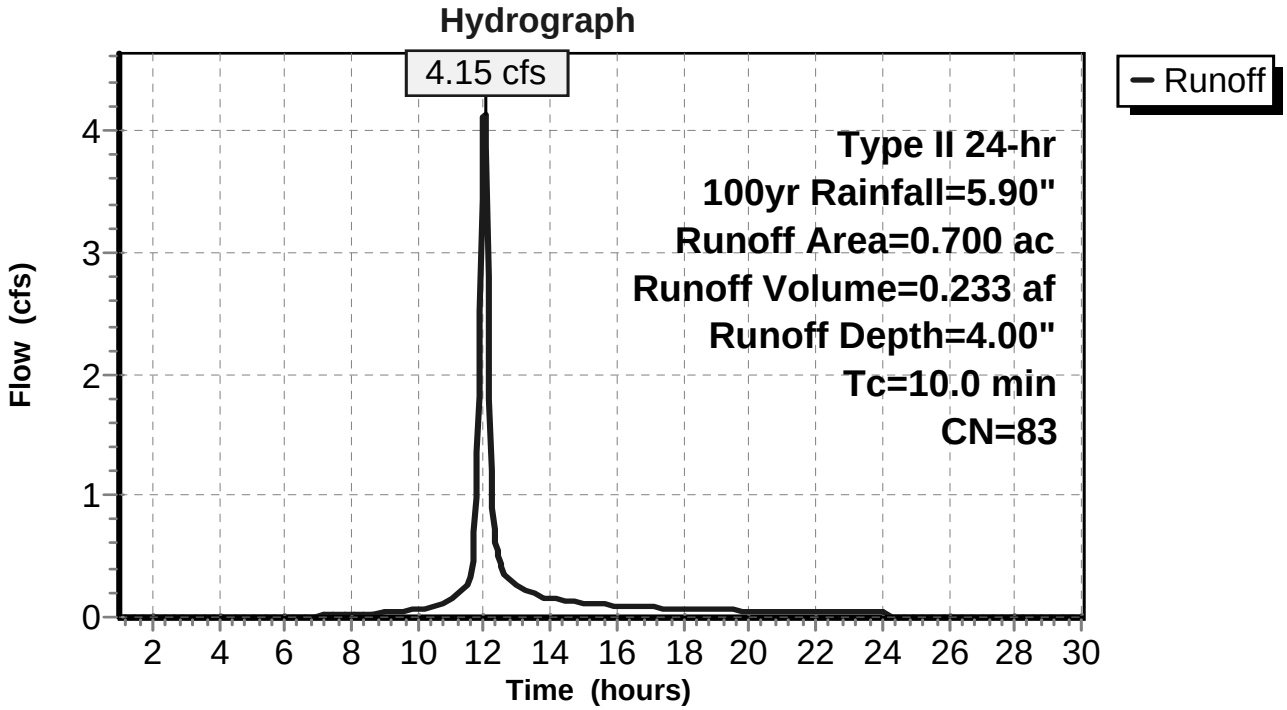
Runoff = 4.15 cfs @ 12.01 hrs, Volume= 0.233 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.90"

Area (ac)	CN	Description
0.700	83	1/4 acre lots, 38% imp, HSG C
0.434		62.00% Pervious Area
0.266		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment E: East runs off site



Summary for Subcatchment Ex: Existing

Runoff = 13.02 cfs @ 12.13 hrs, Volume= 0.982 af, Depth= 3.10"

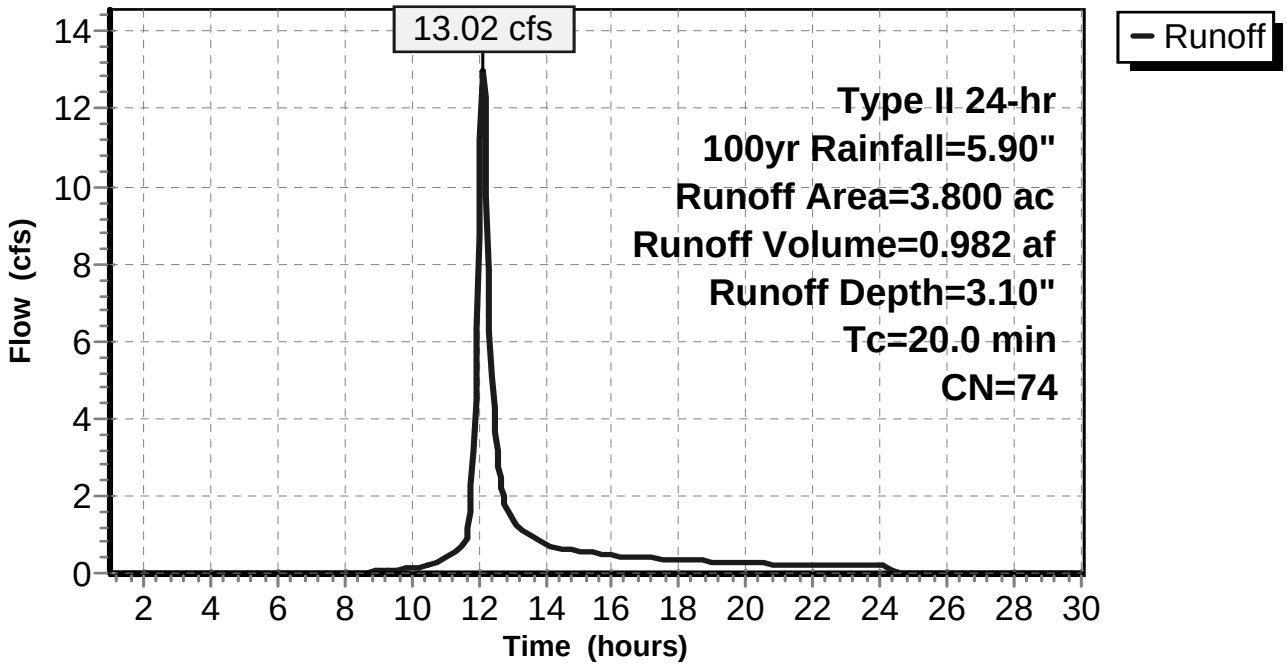
Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.90"

Area (ac)	CN	Description
3.800	74	Pasture/grassland/range, Good, HSG C
3.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Subcatchment Ex: Existing

Hydrograph



Summary for Subcatchment N: Offsite North Lots

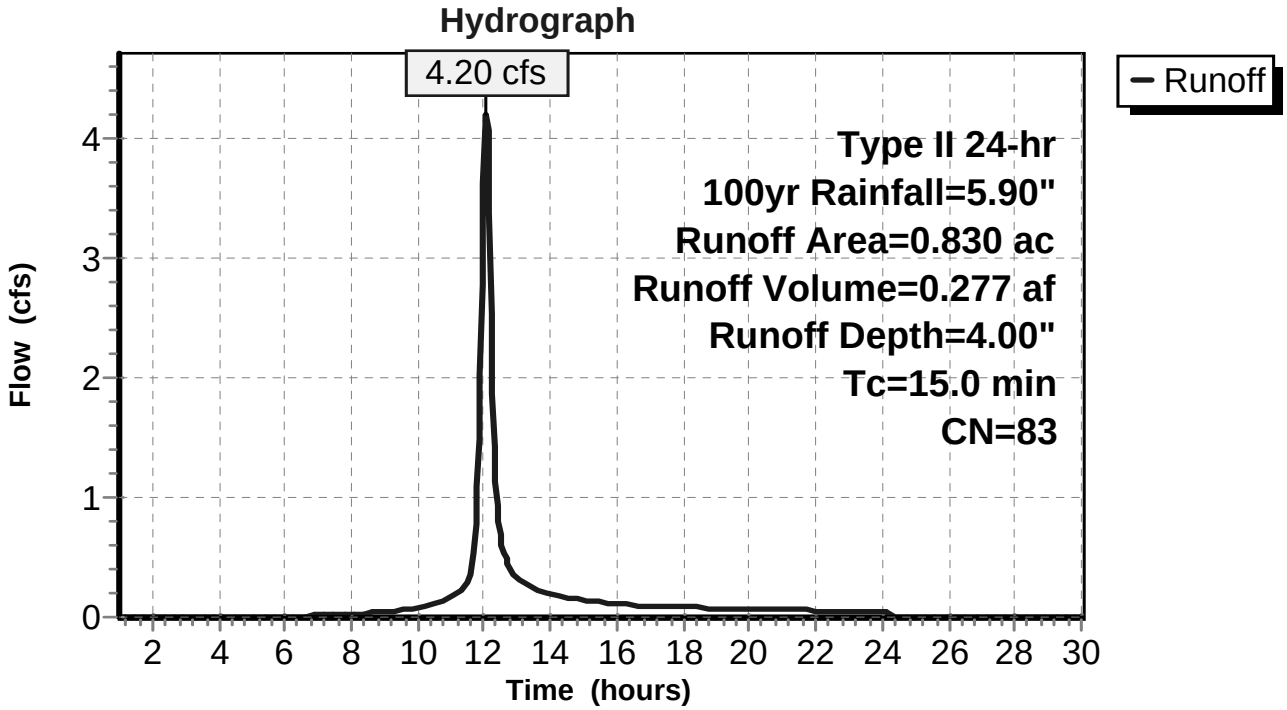
Runoff = 4.20 cfs @ 12.07 hrs, Volume= 0.277 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.90"

Area (ac)	CN	Description
0.830	83	1/4 acre lots, 38% imp, HSG C
0.515		62.00% Pervious Area
0.315		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Subcatchment N: Offsite North Lots



Summary for Pond DP1: DETENTION POND 1

Inflow Area =	3.930 ac, 38.00% Impervious, Inflow Depth = 4.00" for 100yr event				
Inflow =	19.89 cfs @	12.07 hrs,	Volume=	1.310 af	
Outflow =	9.39 cfs @	12.26 hrs,	Volume=	1.125 af,	Atten= 53%, Lag= 11.4 min
Discarded =	0.03 cfs @	12.27 hrs,	Volume=	0.045 af	
Primary =	9.35 cfs @	12.26 hrs,	Volume=	1.079 af	

Routing by Sim-Route method, Time Span= 1.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 1,003.23' @ 12.27 hrs Surf.Area= 7,340 sf Storage= 24,391 cf

Plug-Flow detention time= 148.0 min calculated for 1.125 af (86% of inflow)
Center-of-Mass det. time= 82.4 min (894.5 - 812.2)

Volume	Invert	Avail.Storage	Storage Description
#1	997.00'	22,423 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 30,783 cf Overall - 8,360 cf Embedded = 22,423 cf
#2	997.00'	2,508 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1 8,360 cf Overall x 30.0% Voids
		24,931 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
997.00	3,800	0	0
999.20	3,818	8,380	8,380
1,003.00	6,841	20,252	28,632
1,003.30	7,500	2,151	30,783

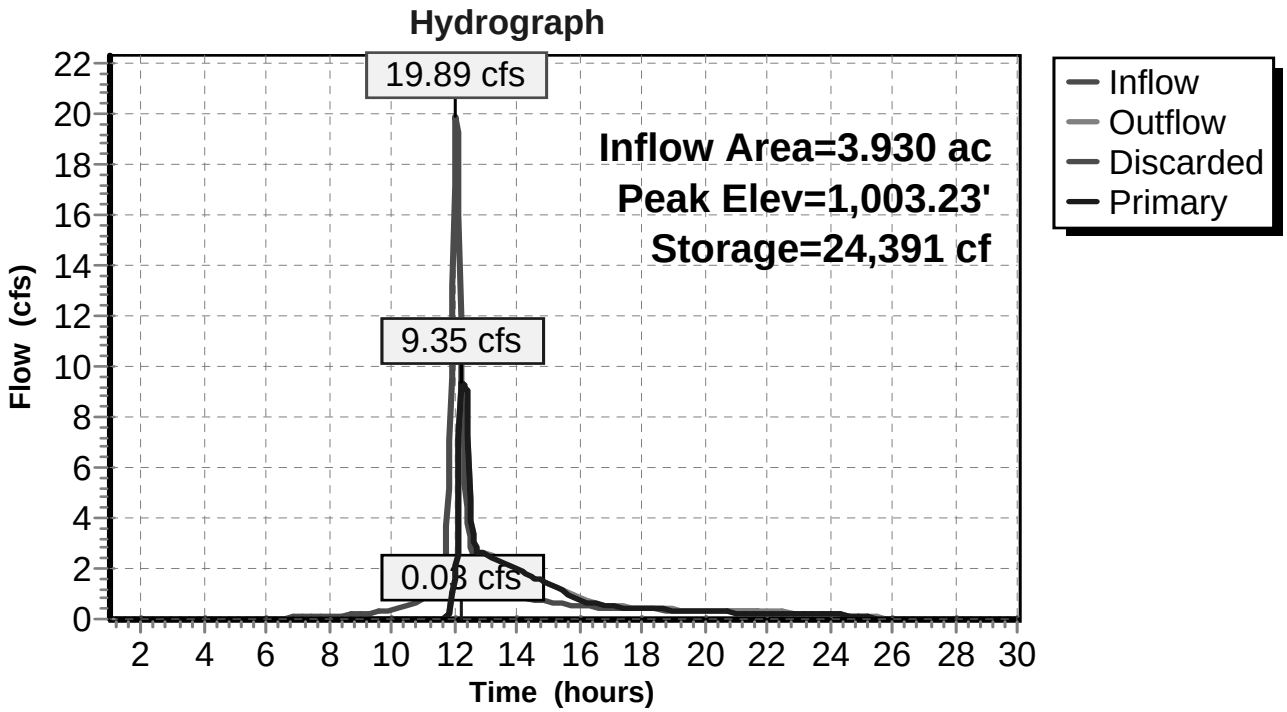
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
997.00	3,800	0	0
999.20	3,800	8,360	8,360

Device	Routing	Invert	Outlet Devices
#1	Discarded	997.00'	**0.200 in/hr Exfiltration over Surface area**
#2	Primary	998.30'	**12.0" Round Culvert** L= 25.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 998.30' / 998.20' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	1,002.70'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	1,000.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Primary	1,003.20'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.03 cfs @ 12.27 hrs HW=1,003.22' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=9.33 cfs @ 12.26 hrs HW=1,003.22' (Free Discharge)
├─**2=Culvert** (Barrel Controls 9.21 cfs @ 11.72 fps)
│ ├─**3=Orifice/Grate** (Passes < 15.44 cfs potential flow)
│ └─**4=Orifice/Grate** (Passes < 2.97 cfs potential flow)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 0.12 cfs @ 0.40 fps)

Pond DP1: DETENTION POND 1



MAPLE PLAIN
#13672

Hard Surface
Draining to BMP 79,500 SF

1) FOR FILTRATATION, PROVIDE 1" TREATMENT VOLUME
79,500 SF X 1 IN / (12 IN / FT) = 6,625 CF

INFILTRATION BASIN #1			
CONTOUR	AREA	VOLUME	
		STAGE	CUM'TIVE
	SF	CF	CF
999.2	2,900		
1,001.0	4,800	6,930.00	6,930

EXCEEDS REQUIREMENT

MAPLE PLAIN

STORM SEWER CALCS
Storm Frequency = 10 Years

Area 1
5/2/2014
By: AMB

Location		Tributary Area			Runoff Coefficient			Time of Concentration			Design												Hydraulic Grade Line		Profile					
Upstream Structure	Downstream Structure	Incremental Acreage	Total Acreage	% Impervious	Incremental C	Incremental CA	SUM CA'S	Inlet Time of Concentration (min.)	Time in Pipe (minutes)	Outlet Time of Concentration (min.)	Intensity (inches/hour)	Calculated Q (cfs)	Length of Pipe (feet)	Calculated Diameter of Pipe (inches)	Design Diameter of Pipe (inches)	Calculated Grade of Pipe (%)	Design Grade of Pipe (%)	Hydraulic Grade Line (%)	Temporary Q (cfs)	Temporary V (ft/sec)	Q Without Head (cfs)	Full Velocity in Pipe (ft/sec)	Hydraulic Grade Line Upstream (ft.)	Hydraulic Grade Line Downstream (ft.)	Design Upstream Invert (ft.)	Calculated Downstream Invert (ft.)	Design Downstream Invert (ft.)	Upstream Rim Elevation (ft.)	Head Space at Upstream Manhole (ft.)	Build Above Top of Pipe (Upstream) (ft.)
207	206	0.6	0.6	50%	0.58	0.35	0.35	15	0.1	15.1	3.3	1.13	24	12	12	0.19%	2.09%	0.10%	1.57	2.0	5.15	6.6	1005.41	1004.91	1004.41	1003.91	1003.91	1008.0	2.59	2.59
206	202	0.6	1.2	50%	0.58	0.35	0.69	15	0.4	15.5	3.2	2.23	162	12	12	0.39%	1.90%	0.39%	2.23	2.8	4.91	6.3	1004.91	1001.94	1003.91	1000.84	1000.84	1008.0	3.09	3.09
EX	205	1	1	50%	0.58	0.58	0.58	15	0.0	15.0	3.3	1.89	10	12	12	0.28%	0.80%	0.28%	1.89	2.4	3.19	4.1	1003.00	1002.95	1002.00	1001.92	1001.92	1005.2	2.20	2.20
205	204	0.8	1.8	50%	0.58	0.46	1.04	15	0.1	15.1	3.3	3.39	19	15	12	0.90%	1.00%	0.90%	3.39	4.3	3.56	4.5	1002.95	1002.78	1001.92	1001.73	1001.73	1005.2	2.25	2.28
204	203	0.6	2.4	50%	0.58	0.35	1.38	15	0.3	15.4	3.2	4.47	87	18	15	0.48%	0.80%	0.48%	4.47	3.6	5.78	4.7	1002.78	1002.08	1001.53	1000.83	1000.83	1007.0	4.22	4.22
203	202	0.23	2.63	50%	0.58	0.13	1.51	15	0.1	15.5	3.2	4.89	24	18	15	0.57%	0.80%	0.57%	4.89	4.0	5.78	4.7	1002.08	1001.94	1000.83	1000.64	1000.64	1003.7	1.62	1.62
202	201	0.23	4.059	50%	0.58	0.13	2.33	15	0.3	15.8	3.2	7.46	95	21	18	0.51%	0.60%	0.51%	7.46	4.2	8.14	4.6	1001.94	1001.37	1000.44	999.87	999.87	1003.7	1.76	1.76
201	200	0	4.059	50%	0.58	0.00	2.33	15	0.0	15.9	3.2	7.46	12	21	18	0.50%	0.60%	0.50%	7.46	4.2	8.14	4.6	1001.37	999.80	999.87	0.00	999.80	1003.2	1.83	1.83

Wetland Investigation Report

Rose Creek Builders, LLC

Proposed Meadows of Maple Plain
1561 Howard Ave
Maple Plain, MN

AE Comm. #13672

April 25th, 2014

Anderson Engineering of Minnesota, LLC

13605 1st Avenue North
Plymouth, MN 55441
763-412-4000 Main
763-412-4090 Fax

A Service-Disabled Veteran-Owned Small Business

Table of Contents

Contact Information 2
Executive Summary 3
Background 4
Methodology 4
Resource Review 5
Field Review 6
Conclusion 7

List of Appendices

Appendix A Figures
Appendix B Routine On-site Determination Method Datasheets
Appendix C Site Photographs
Appendix D Historic Aerials
Appendix E Antecedent Precipitation Record
Appendix F Minnesota Routine Assessment Methodology (MnRAM)
Appendix G Credentials

Contact Information

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Environmental Associate

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Certified MN Wetland Delineator #1207

Anderson Engineering of Minnesota, LLC
13605 1st Avenue North
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Plymouth, MN 55441

Phone: (763) 412-4000
Fax: (763) 412-4090

Website: www.ae-mn.com

Executive Summary

Anderson Engineering of Minnesota, LLC was retained to provide professional wetland services to identify those areas meeting wetland criteria utilizing the 1987 United States Army Corps of Engineers (USACE) Wetland Delineation Manual (*Technical Report Y-87-1; January 1987*) and all supplemental guidance documents within the specified investigation boundary of approximately 3.3 acres located on 1561 Howard Avenue, Maple Plain, Minnesota. Geographically, the parcel is located in Section 25, Township 118 North, Range 24 West.

One Type 1, PEMAD, seasonally flooded wetland, approximately 0.05 acres in size was field delineated within the identified project boundary *(Appendix A. Figure 5)*.

Background

As requested by Rose Creek Builders, Anderson Engineering of MN, LLC completed a wetland investigation on the property located on 1561 Howard Avenue, Maple Plain, Minnesota.

Geographically, the site is located in Section 25, Township 118 North, Range 24 West. The wetland delineation was completed in accordance with the 1987 United States Army Corps of Engineers Wetland Delineation Manual and the published regional supplement to the Army Corps Wetland Delineation Manual, Midwest Region.

The purpose of this study was to investigate the project area, identify areas meeting the technical criteria for wetlands, delineate the jurisdictional extent of the wetland basins, and classify the wetland habitat.

Fieldwork for this site investigation was completed by Environmental Scientist Marc Cottingham and Environmental Associates Mohamed Elabbady and Courtney Luensman on April 22, 2014.

Methodology

United States Geologic Service 7.5" Topographic Quadrangle maps, United States Fish and Wildlife Service National Wetland Inventory maps, United States Department of Agriculture Natural Resources Conservation Service Soil Survey and available aerial photographs were consulted to initially locate potential wetland habitats.

Routine On-site Determination Method was used during this investigation. In this method, the following procedures were used:

1) The vegetative community was sampled in all present strata to determine whether it met hydrophytic vegetation criteria based on the indicators identified in the Midwest Regional Supplement.

2) Soil pits were dug using a Dutch auger to depths of 16"-36". Soil profile was noted, in addition to any hydric soil characteristics.

3) Signs of wetland hydrology were noted and compared to field criteria such as depth to shallow water table and depth of soil saturation found in the soil pits.

At least one sample point transect crosses the delineated wetland edge. This transect consist of an upland sample point and a wetland sample point. Other sample points may be located in areas which have one or more of the wetland vegetation, soils, or hydrologic characteristics present, where questionable conditions exist, or to verify the absence of wetland criteria.

Sample points were marked in the field with orange pin flags. The identified wetland boundaries were marked with sequentially numbered pink flags. All sample points and the delineated wetland boundary were located utilizing a Trimble Geo XH sub-meter GPS unit.

Resource Review

The following resources were reviewed to supplement the wetland field delineation:

National Wetlands Inventory:

The National Wetlands Inventory (*Appendix A. Figure 2*) identifies one wetland within the project area. The NWI identifies the wetland as:

- 2013 NWI identifies one Type 1, PEM1A Temporarily Flooded
- 2003 NWI identifies one Type 3, PEMC Seasonally Flooded

Natural Resources Conservation Service Soil Survey:

The Soil Survey of Hennepin County, MN (*Appendix A. Figure 3*) does not identify hydric soils within the project area.

Minnesota Department of Natural Resources Public Water Inventory:

According to the MN DNR PWI for Hennepin County, MN (*Appendix A. Figure 4*), an unnamed water body is located south of the project area.

Historic Aerials:

Reviews of historic aerials show wetland signatures. Reviewed historic aerials are included in Appendix D.

Antecedent Precipitation Data:

A review of the antecedent precipitation data collected from the University of Minnesota Climatology Working Group (*Appendix E)* indicate that precipitation totals for the previous weeks were slightly below average in Hennepin County and hydrologic conditions were suitable for completing an accurate wetland determination and boundary delineation.

Field Review

One wetland basin was field delineated within and adjacent to the project area:

Wetland 1: Wetland 1 is a Type 1, PEMAD, seasonally flooded basin, approximately 0.05 acres in size. The wetland is primarily vegetated with reed canary grass *(Phalaris arundinacea*), curly dock (*Rumex crispus*), Kentucky bluegrass (*Poa pratensis*), common dandelion (*Taraxacum officinale*), and narrow-leaf cat-tail (*Typha angustifolia*). The underlying soils are mapped as Urban land. The investigated soil profile contained the redox dark surface (F6) hydric soil indicator. Hydrology indicators observed include saturation (A3), geomorphic position (D2), FAC-Neutral Test and drainage patterns (B10).

Wetland 1 receives hydrology from a roadside stormwater outlet located in the northwest corner of the property. A portion of Wetland 1 is channelized as a roadside ditch that conveys runoff into an off-site stormwater inlet. Wetland 1 is likely hydrologically connected to a navigable waterway through underground stormwater utiliiies, and is therefore likely a jurisdictional waters of the U.S.

Wetland 1 is a modified basin. The vegetation has been mowed and a portion of the wetland is currently channelized. The soils show mixing from channel being installed. The hydrology has been modified due to culvert draining into the basin from the north.

Historically, the southern portion of Wetland 1 was mapped on the 2003 NWI as a Type 3, PEMC wetland. The revised NWI of 2013, it is now mapped as a Type 1, PEM1A wetland. The historic aerials (*Appendix D*) from 1962 (*Figure 6*) and 1971 (*Figure 7*), show wetland signatures present.

Although this wetland is modified, the fact that the area is mapped as a historic wetland on the 2003 and 2013 NWI maps and contains wetland signatures on the 1962 and 1972 historic aerials, results that it will be regulated under the Minnesota Wetland Conservation Act (WCA) and potentially the Federal Clean Water Act (CWA).

The upland buffer surrounding the basin consists of Kentucky blugrass (*Poa pratensis*), white clover (*Trifolium repens*), curly dock (*Rumex crispus*) and common plantain (*Plantago major*). Shallow slopes form the transition into the basin.

Conclusion

One Type 1, PEMAD, seasonally flooded wetland was identified and delineated in accordance with the 1987 United States Army Corps of Engineers Wetland Delineation Manual within the proposed project area located in 1561 Howard Ave, Maple Plain, MN. This wetland is likely jurisdictional, however the final jurisdictional status must be determined by the St. Paul District U.S. Army Corps of Engineers (USACE).

Wetlands in the project area may be regulated by several agencies at the local, State, and/or federal level. Activities which may potentially impact those wetlands identified within this report should be discussed in advance with the appropriate regulating agency in regards to potential permit requirements. The Local Government Unit (LGU) responsible for implementing the Minnesota Wetland Conservation Act at this project location is the Minnehaha Creek Watershed District.

The Minnehaha Creek Watershed District requires vegetated buffers around all preserved wetland areas. Wetland buffers must meet the standards specified by the district for any project that is regulated under WCA.

The Base Buffer Width shall be determined by the management class of the wetland as evaluated by the District's Functional Assessment of Wetlands or by the current version of the Minnesota Routine Assessment Method (MnRAM).

Management Class	Base Buffer Width	Minimum Applied Buffer Width
Manage 3	20 feet	16 feet
Manage 2	30 feet	24 feet
Manage 1	40 feet	34 feet
Preserve	75 feet	67 feet

Based on the MnRAM assessment, Wetland 1 would be classified as Manage 3, and would require a 16 foot buffer (See Appendix F)

This wetland investigation meets the standards and criteria described in the 1987 United States Army Corps of Engineers Wetland Delineation Manual all applicable subsequent guidance for an on-site determination and the results reflect the conditions present at the time of the delineation.

I certify that I performed the field analysis and wrote the report for this wetland determination.

4-23-2014

_____ _____

Mohamed Elabbady Date
Environmental Associate
Anderson Engineering of Minnesota, LLC

4-23-2014

_____ _____

Marc Cottingham Date
MN Certified Wetland Delineator #1207
Anderson Engineering of Minnesota, LLC

4-23-2014

_____ _____

Courtney Luensman Date
Environmental Associate
Anderson Engineering of Minnesota, LLC

I certify that I performed the field analysis and/or reviewed work completed by above staff.

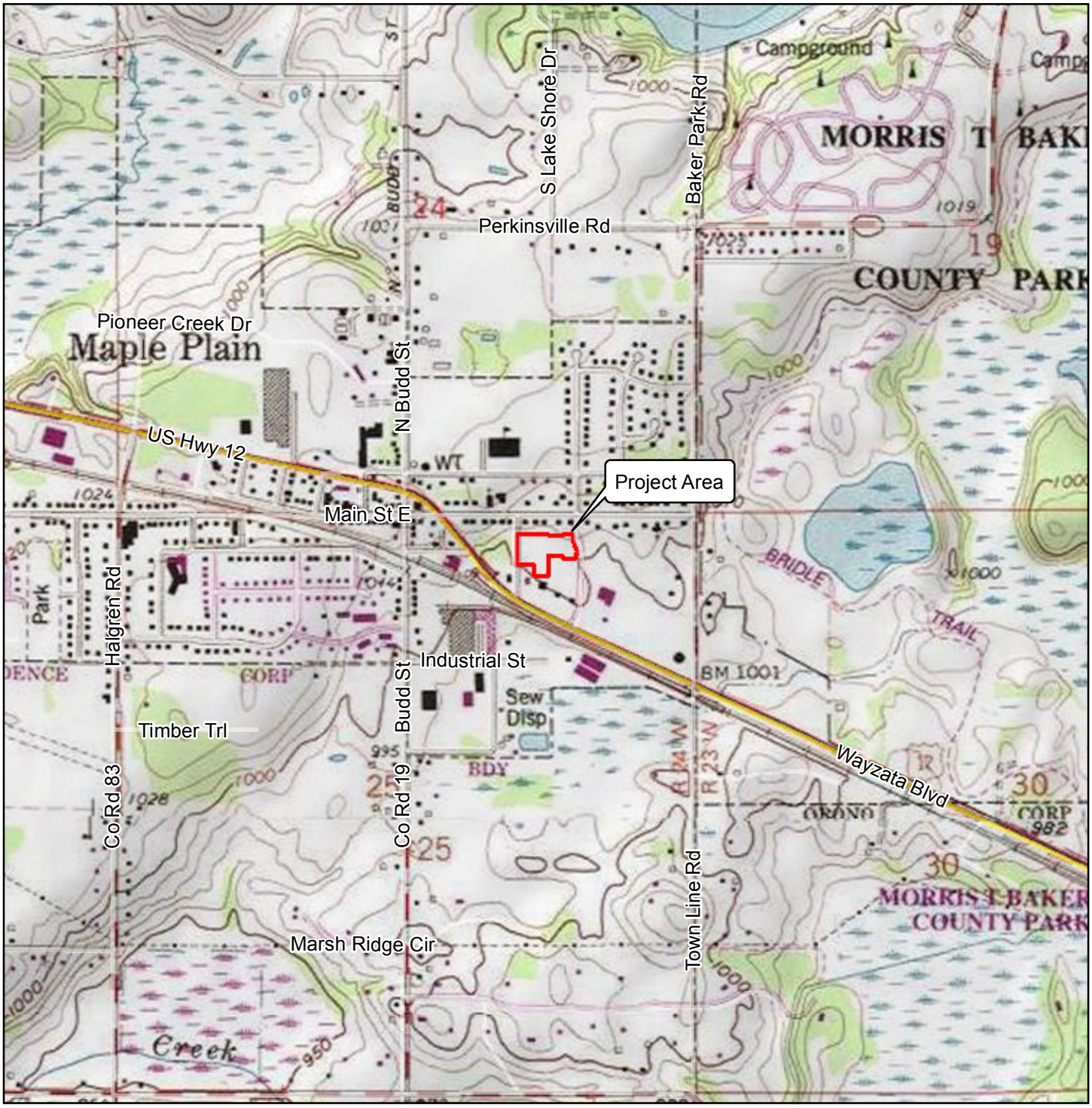
4-23-2014

_____ _____

Benjamin J Hodapp, PWS Date
Environmental Services Manager
MN Certified Wetland Delineator #1016
Anderson Engineering of Minnesota, LLC

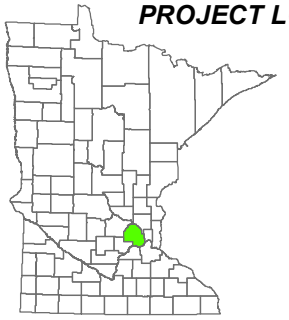
APPENDIX A

Figures

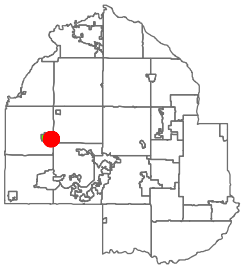


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 0.25 miles

0 0.125 0.25 0.5

Miles

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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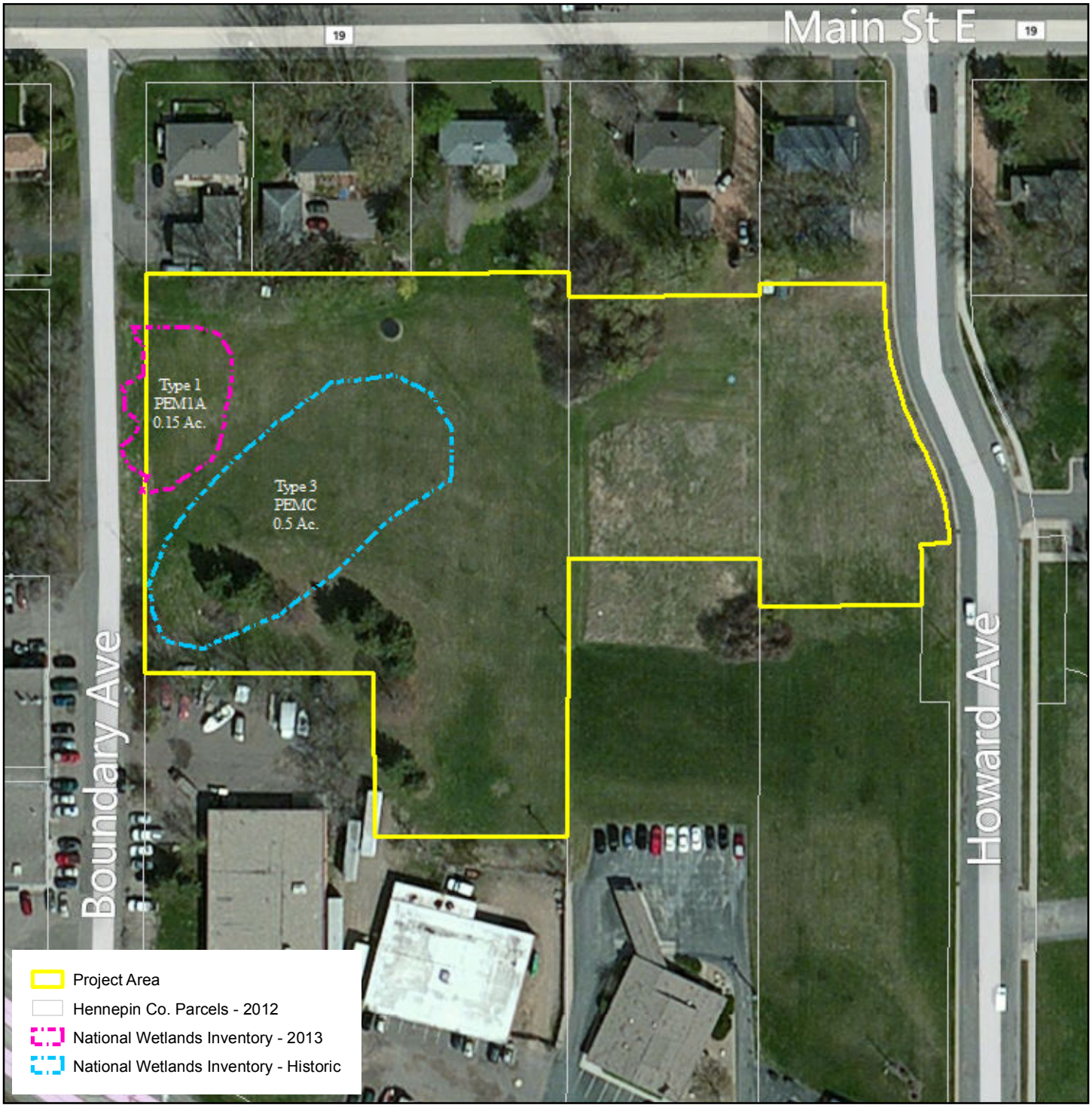
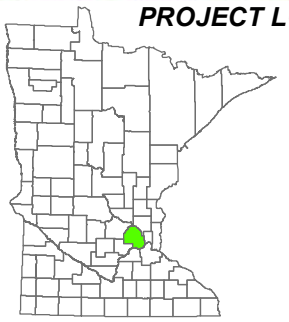
LOCATION - FIGURE 1
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/24/2014 By: JLA

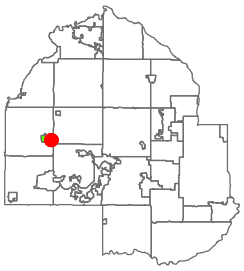


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 100 feet

0 50 100 200

Feet

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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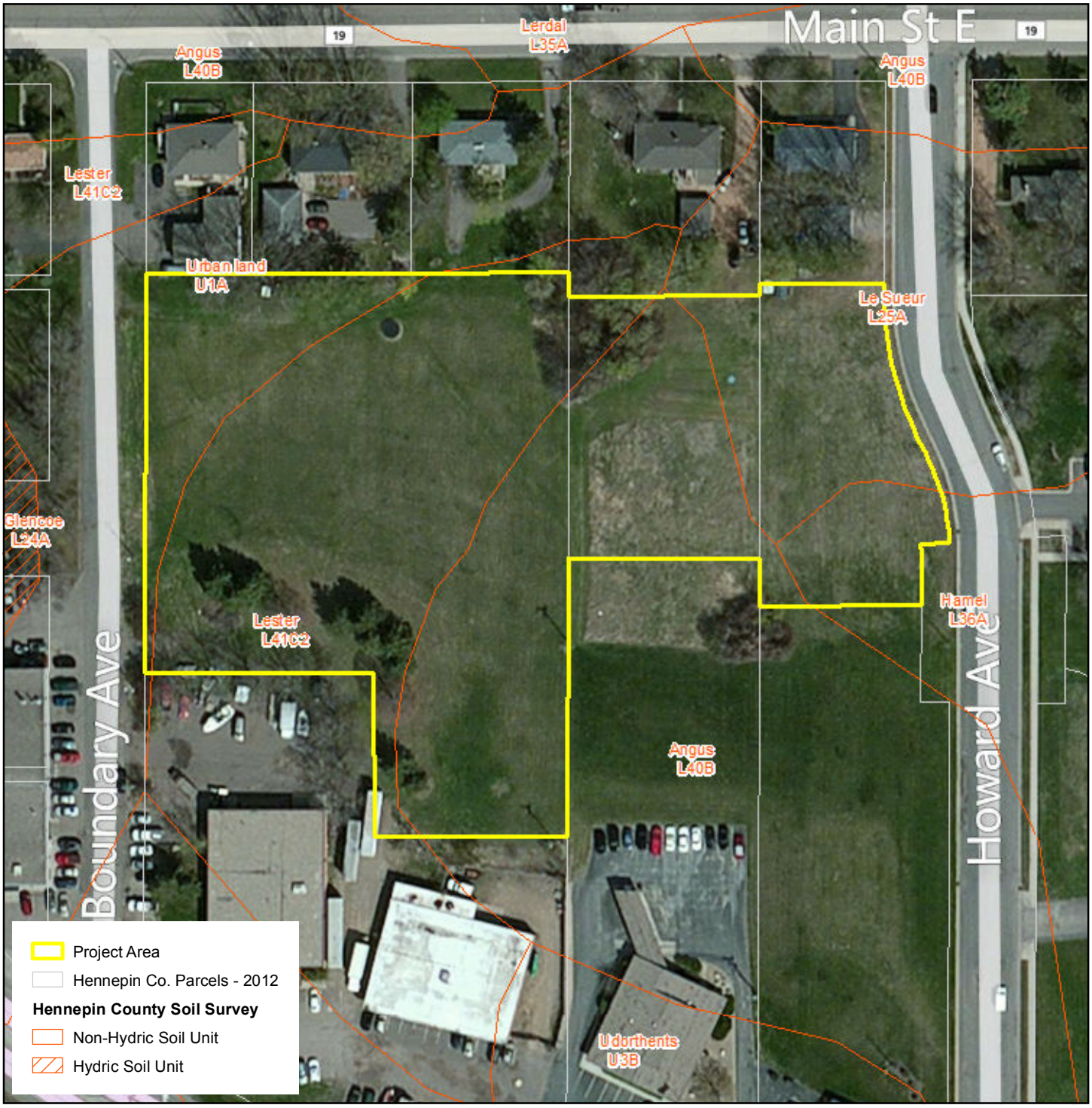
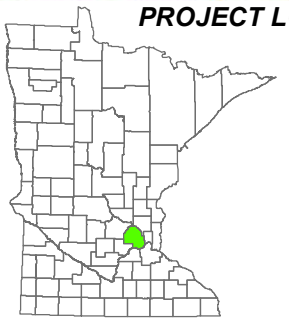
NWI - FIGURE 2
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/24/2014 By: JLA

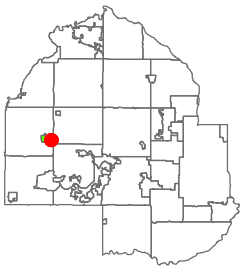


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 100 feet

0 50 100 200

Feet

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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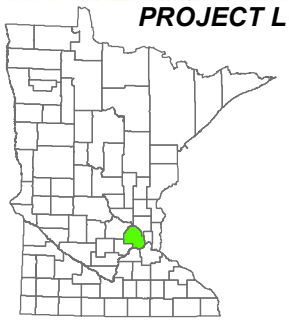
SOILS - FIGURE 3
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

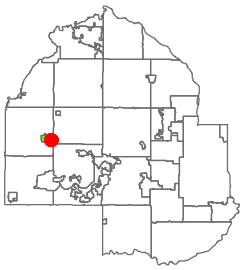
AE Comm.# 13672 Date: 4/24/2014 By: JLA

PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 500 feet

0 250 500 1,000

Feet

Howard Avenue
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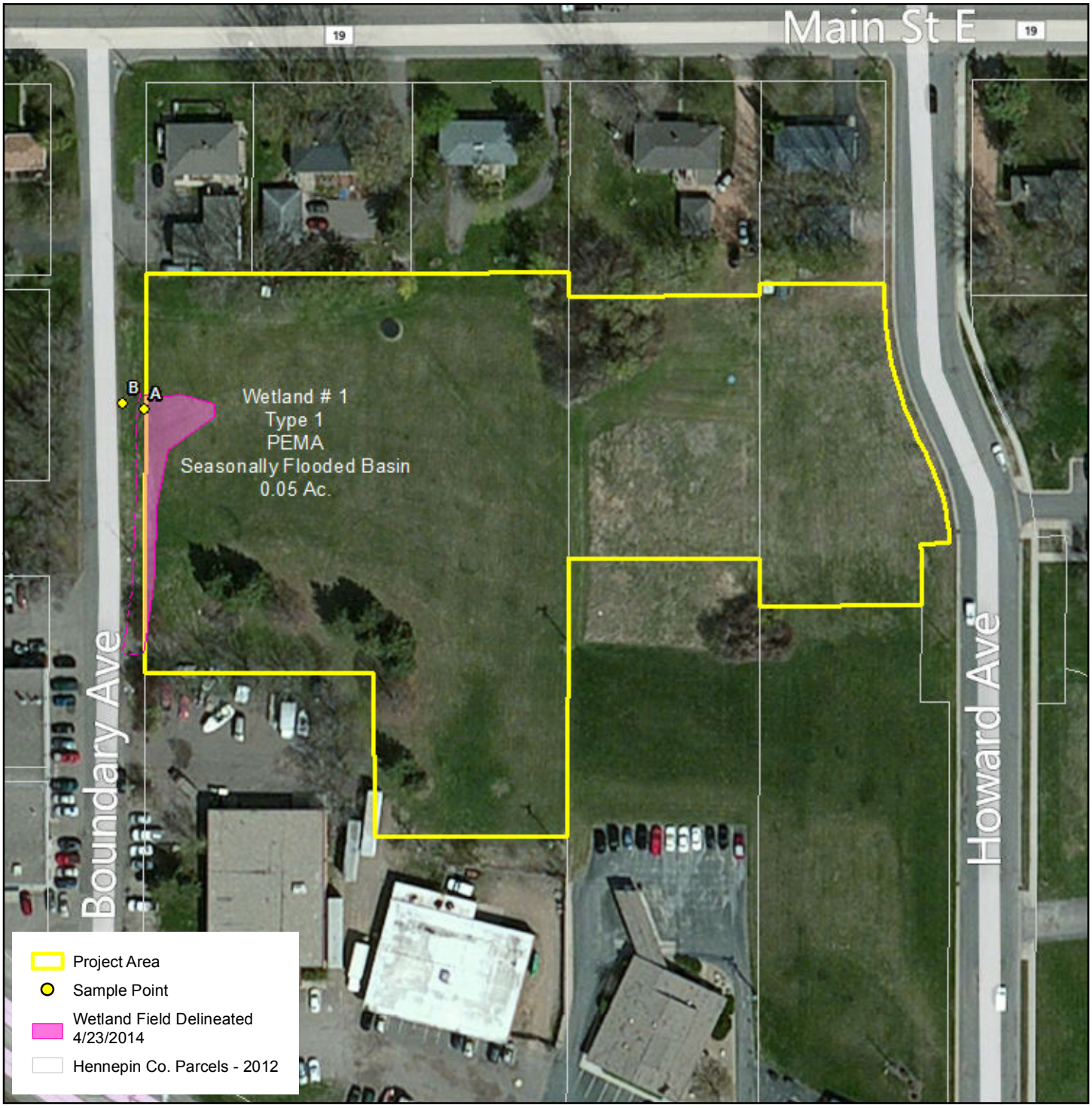
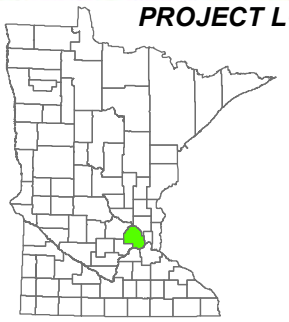
PWI - FIGURE 4
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/24/2014 By: JLA

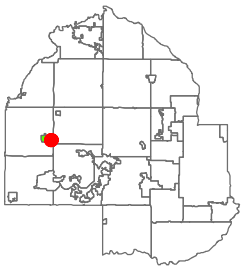


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 100 feet

0 50 100 200

Feet

Howard Avenue
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DELINEATION - FIGURE 5
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/24/2014 By: JLA

APPENDIX B

Routine On-site Determination Method Datasheets

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Rose Creek Builders - Maple Plain 13672 City/County: Hennepin Sampling Date: 4-22-2014

Applicant/Owner: Rose Creek Builders State: MN Sampling Point: A

Investigator(s): Marc Cottingham, Mo Elabbady, Courtney Luensman Section, Township, Range: Sec 25 Town 118 Range 24

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave

Slope (%): 0-6 Lat: Long: Datum:

Soil Map Unit Name: Urban Land - Udorthents NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil X, or hydrology ___ significantly disturbed? Are "normal circumstances" present? No

Are vegetation ___, soil ___, or hydrology ___ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	Y
Hydric soil present?	Y		
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

All three criteria were met. Area is a wetland. Normal circumstances not met because area is mowed and soil profile is disturbed urban land.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: ___)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: ___)			
1 *Phalaris arundinacea*	30	Y	FACW
2 *Rumex crispus*	5	N	FAC
3 *Poa pratensis*	5	N	FAC
4 *Taraxacum officinale*	3	N	FACU
5 *Typha angustifolia*	3	N	OBL
6			
7			
8			
9			
10			
	46	= Total Cover	

Woody vine stratum (Plot size: ___)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	3	x 1 =	3	
FACW species	30	x 2 =	60	
FAC species	10	x 3 =	30	
FACU species	3	x 4 =	12	
UPL species	0	x 5 =	0	
Column totals	46	(A)	105	(B)

Prevalence Index = B/A = 2.28

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Vegetation is mowed

SOIL

Sampling Point: A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type*	Loc**	Texture	Remarks
0-20	10YR 2/1	80					SCL	
	10YR 5/6	18	10YR 4/6	2	C	M	SCL	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:
Soil is mixed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	___	Depth (inches): ___
Water table present?	Yes	___	No	___	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 0

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Rose Creek Builders - Maple Plain 13672 City/County: Hennepin Sampling Date: 4-22-2014

Applicant/Owner: Rose Creek Builders State: MN Sampling Point: B

Investigator(s): Marc Cottingham, Mo Elabbady, Courtney Luensman Section, Township, Range: Sec 25 Town 118 Range 24

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none

Slope (%): 0-6 Lat: Long: Datum:

Soil Map Unit Name: Urban Land - Udorthents NWI Classification:

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil X, or hydrology ___ significantly disturbed? Are "normal circumstances" present? No

Are vegetation ___, soil ___, or hydrology ___ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	N
Hydric soil present?	N		
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Wetland soil and hydrology indicators were not met. Area is not a wetland. Normal circumstances not met because vegetation is mowed and soils profile is disturbed urban land.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: ___)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: ___)			
1 *Poa pratensis*	50	Y	FAC
2 *Trifolium repens*	5	N	FACU
3 *Rumex crispus*	3	N	FAC
4 *Plantago major*	3	N	FAC
5			
6			
7			
8			
9			
10			
	61	= Total Cover	

Woody vine stratum (Plot size: ___)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	56	x 3 =	168	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column totals	61	(A)	188	(B)

Prevalence Index = B/A = 3.08

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Vegetation is mowed

SOIL

Sampling Point: B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type*	Loc**	Texture	Remarks
0-10	10YR 2/1	100					SCL	
10-16	10YR 2/1	70					SCL	
	7.5YR 5/6	30					SCL	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? N

Remarks:
Soil is mixed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
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- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C

Site Photographs

Wetland 1, viewing south

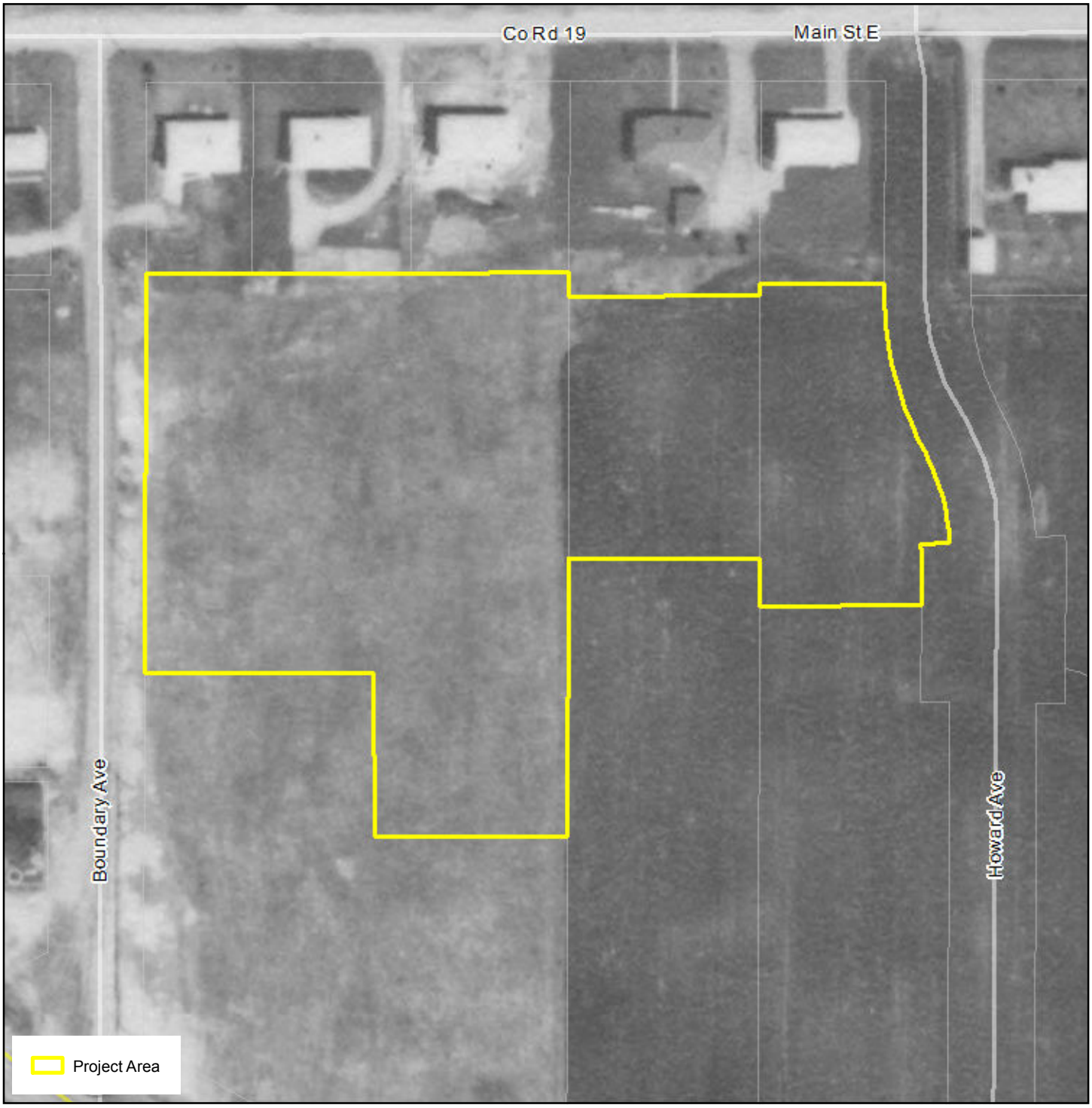
Wetland 1, viewing east

Wetland 1, with culvert, viewing north

Transition to upland, viewing east

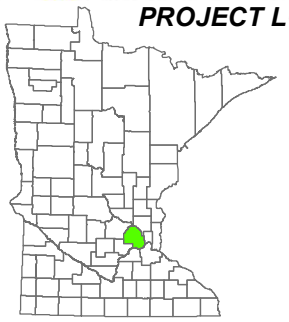
APPENDIX D

Historic Aerials

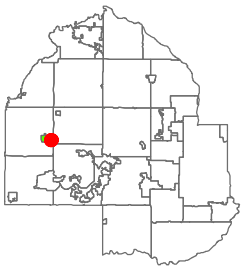


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 100 feet

0 50 100 200

Feet

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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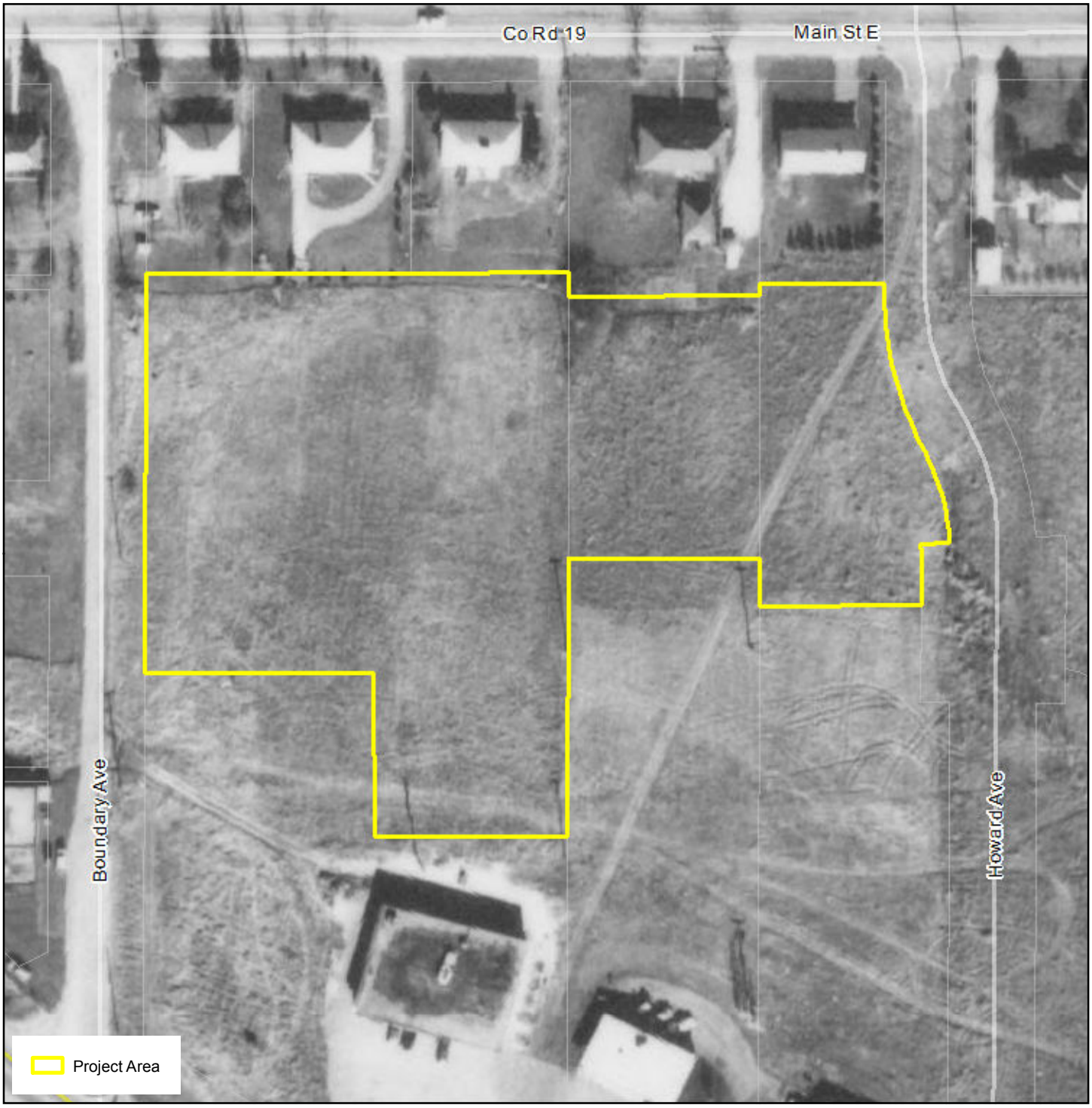
763-412-4000 (o) 763-412-4090 (f)
www.ae-mn.com

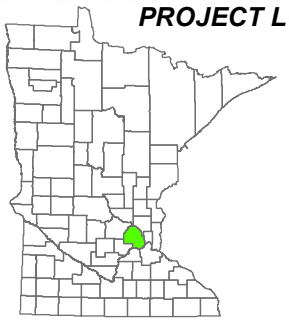
1962 AERIAL - FIGURE 6
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

AE Comm.# 13672 Date: 4/25/2014 By: JLA

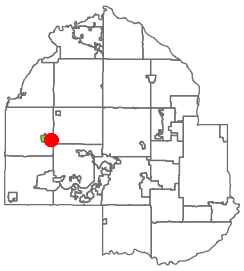


PROJECT LOCATION

SOURCE: USDA, MN DNR, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Maple Plain
Hennepin County, MN

1 inch = 100 feet

0 50 100 200

Feet

Howard Avenue
Maple Plain, Hennepin County, MN

S.25 Twp.118 N R.24 W

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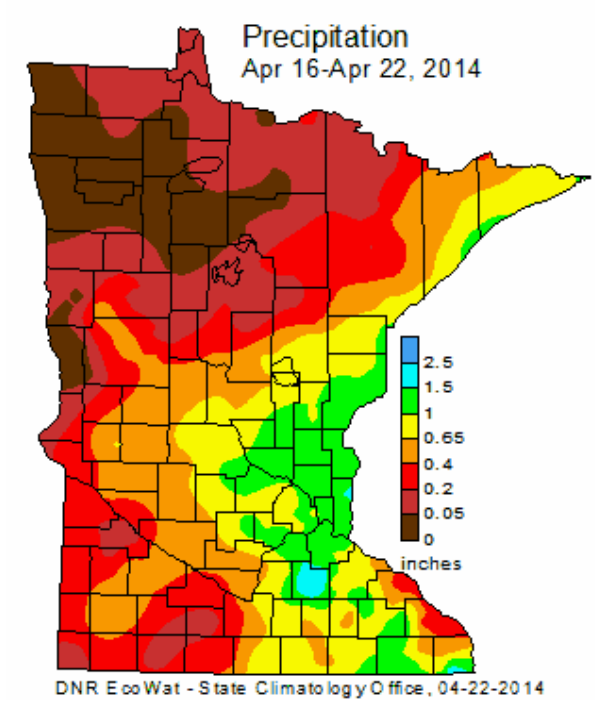
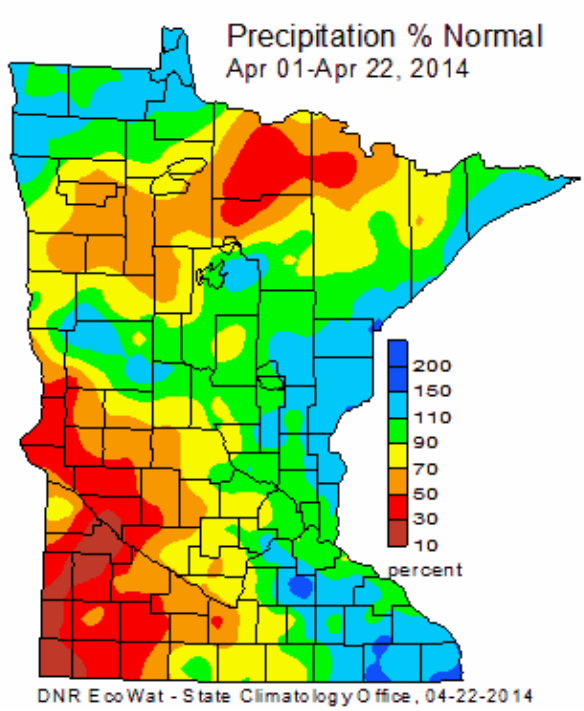
1971 AERIAL - FIGURE 7
MEADOWS OF MAPLE PLAIN
ROSE CREEK BUILDERS

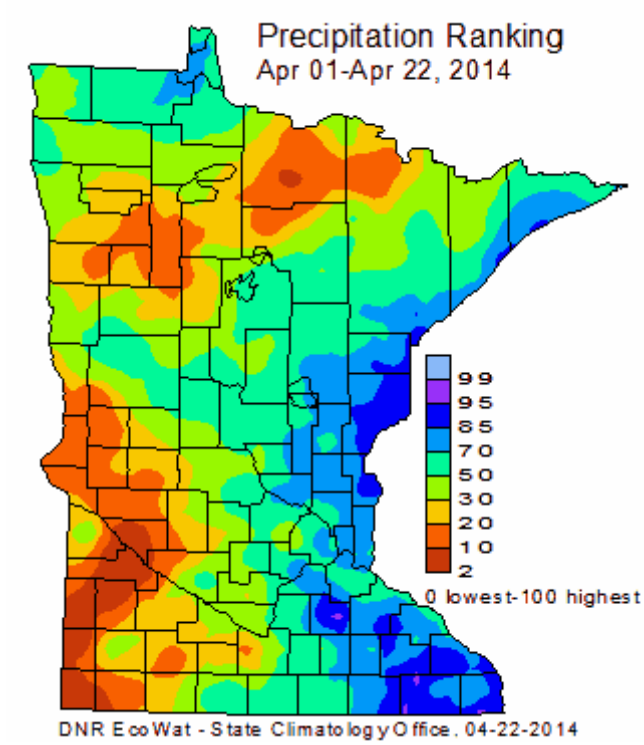
AE Comm.# 13672 Date: 4/25/2014 By: JLA

APPENDIX E

Antecedent Precipitation Record







Source: http://climate.umn.edu/doc/weekmap/weekmap_140422.htm

APPENDIX F

Minnesota Routine Assessment Methodology (MnRAM)

MnRAM: Site Response Record

For Wetland: 1561 Howard Ave

Location:

#13672 1561 Howard Ave

Plant Community: Seasonally Flooded Ba

Cowardin Classification: PEMA

Circular 39: Type 1

4	*Listed, rare, special species?*	No
5	*Rare community or habitat?*	No
6	*Pre-European-settlement condition?*	No

Hydrogeomorphology / topography:

7 Depressional/FlowThru

8-1	*Maximum water depth*	0.5 inche
8-2	*% inundated*	20%
9	*Immediate drainage--local WS*	0.5 acres
10	*Esimated size/existing site:*	*(see #66)*

11-Upland Soil	Urban land
11-Wetland Soil	Urban land

12	*Outlet for flood control*	C
13	*Outlet for hydro regime*	A
14	*Dominant upland land use*	B
15	*Wetland soil condition*	A
16	*Vegetation (% cover)*	0%
17	*Emerg. veg flood resistance*	C
18	*Sediment delivery*	B
19	*Upland soils (soil group)*	A
20	*Stormwater runoff*	B
21	*Subwatershed wetland density*	B
22	*Channels/sheet flow*	C
23	*Adjacent buffer width*	0 feet

Adjacent area management

24-A	*Full*	0%
24-B	*Manicured*	80%
24-C	*Bare*	20%

Adjacent area diversity/structure

25-A	*Native*	0%
25-B	*Mixed*	100%
25-C	*Sparse*	0%

Adjacent area slope

26-A	*Gentle*	100%
26-B	*Moderate*	0%
26-C	*Steep*	0%

27	*Downstream sens./WQ protect.*	C
28	*Nutrient loading*	A
29	*Shoreline wetland?*	No

Shoreline Wetland

30	*Rooted veg., % cover*	0%
31	*Wetland in-water width*	0 feet
32	*Emerg. veg. erosion resistance*	
33	*Erosion potential of site*	
34	*Upslope veg./bank protection*	
35	*Rare wildlife?*	No
36	*Scare/Rare/S1/S2 community*	No
37	*Vegetative cover*	C
38	*Veg. community interspersion*	NA
39	*Wetland detritus*	C
40	*Interspersion on landscape*	C
41	*Wildlife barriers*	B

Amphibian-breeding potential

42	*Hydroperiod adequacy*	Inadequate
43	*Fish presence*	A
44	*Overwintering habitat*	
45	*Wildlife species (list)*	
46	*Fish habitat quality*	NA
47	*Fish species (list)*	
48	*Unique/rare opportunity*	No
49	*Wetland visibility*	A
50	*Proximity to population*	No
51	*Public ownership*	C
52	*Public access*	C
53	*Human influence on wetland*	B
54	*Human influence on viewshed*	B
55	*Spatial buffer*	A
56	*Recreational activity potential*	C
57	*Commercial crop--hydro impact*	NA

Groundwater-specific questions

58	*Wetland soils*	Recharge
59	*Subwatershed land use*	Recharge
60	*Wetland size/soil group*	Recharge
61	*Wetland hydroperiod*	Recharge
62	*Inlet/Outlet configuration*	Discharge
63	*Upland topo relief*	Recharge

Additional information

64	*Restoration potential*	No
65	*LO affected by restoration*	
66	*Existing size*	0.05
	Restorable size	0
	Potential new wetland	0
67	*Average width of pot. buffer*	6 feet
68	*Ease of potential restoration*	
69	*Hydrologic alterations*	0
70	*Potential wetland type*	0
71	*Stormwater sensitivity*	B
72	*Additional treatment needs*	A

Watershed

WS# Service Area:

For functional ratings, please run the Summary tab report.

This report printed on: 4/25/2014

Wetland Functional Assessment Summary

Wetland Name	Hydrogeomorphology	Maintenance of Hydrologic Regime	Flood/ Stormwater/ Attenuation	Downstream Water Quality	Maintenance of Wetland Water Quality	Shoreline Protection
1561 Howard Ave	Depressional/Flow-through (apparent inlet and outlet), Depressional/Flow-through (apparent inlet and outlet)	0.75	0.35	0.33	0.43	0.00
		High	Moderate	Low	Moderate	Not Applicable

							Additional Information		
Wetland Name	Maintenance of Characteristic Wildlife Habitat Structure	Maintenance of Characteristic Fish Habitat	Maintenance of Characteristic Amphibian Habitat	Aesthetics/ Recreation/ Education/ Cultural	Commercial Uses	Ground-Water Interaction	Wetland Restoration Potential	Wetland Sensitivity to Stormwater and Urban Development	Additional Stormwater Treatment Needs
1561 Howard Ave	0.29	0.00	0.00	0.43	0.00	Recharge	0.00	0.10	0.43
	Low	Not Applicable	Not Applicable	Moderate	Not Applicable		Not Applicable	Exceptional	Moderate

Wetland Community Summary

		Vegetative Diversity/Integrity								
		Community								
Wetland Name	Location	Cowardin Classification	Circular 39	Plant Community	Wetland Proportion	Individual Community Rating	Highest Wetland Rating	Average Wetland Rating	Weighted Average Wetland Rating	
1561 Howard Ave		PEMA	Type 1	Seasonally Flooded Basin	0	0.1	0.10	0.10	0.00	
							Low	Low	Not Applicable	
							0.10	0.10	0.00	☐

☑ *Denotes incomplete calculation data.*

Management Classification Report for 1561 Howard Ave **#13672 1561 Howard Ave**

ID: 4

County
Watershed, #
Corps Bank Service Area

Based on the MnRAM data input from field and office review and using the classification settings as shown below, this wetland is classified as Manage 3

Functional rank of this wetland based on MnRAM data	Functional Category	Self-defined classification value settings for this management level
Not Applicable	Vegetative Diversity/Integrity	Low
Low	Habitat Structure (wildlife)	Low
Not Applicable	Amphibian Habitat	NA
Not Applicable	Fish Habitat	Low
Not Applicable	Shoreline Protection	NA
Moderate	Aesthetic/Cultural/Rec/Ed and Habitat	Low / Low
Exceptional	Stormwater/Urban Sensitivity and Vegetative Diversity	- / -
Moderate	Wetland Water Quality and Vegetative Diversity	Low / Low
High	Characteristic Hydrology and Vegetative Diversity	Low / Low
Moderate	Flood/Stormwater Attenuation*	High
Not Applicable	Commericial use*	-
Low	Downstream Water Quality*	High

The critical function that caused this wetland to rank as **Manage 3** was **Vegetative Diversity**

Details of the formula for this action are shown below:

Aesthetics/Recreation/Education/Cultural **(Q49+Q50+Q51+Q52+Q53+Q54+Q55+Q56)/8**

Question	*Value*	*Description*
49	1	Wetland visibility
50	0.1	Proximity to population
51	0.1	Public ownership
52	0.1	Public access
53	0.5	Human influence on wetland
54	0.5	Human influence on viewshed
55	1	Spatial buffer
56	0.1	Recreational activity potential

* The classification value settings for these functions are not adjustable

Management Classification Report for 1561 Howard Ave **#13672 1561 Howard Ave**

ID: 4

County
Watershed, #
Corps Bank Service Area

Maintenance of Characteristic Wildlife Habitat Str **(Q3e*2+Q39+Q37+Q40+Q41+(Q23+Q24+Q25)/3+Q13+Q20)/9**

Question	*Value*	*Description*
13	1	Outlet: hydrologic regime
20	0.5	Stormwater runoff
23	0.5	Buffer width
24	0.42	Adjacent area Management
25	0.5	Adjacent area diversity
37	0.1	Vegetation cover interspersion
39	0.1	Detritus
3e	0	<No Description Found>
40	0.1	Wetland interspersion/landscape
41	0.5	Wildlife barriers

This report was printed on: Friday, April 25, 2014

* The classification value settings for these functions are not adjustable

MnRAM Site Assessment Report

Friday, April 25, 2014

Wetland: 1561 Howard Ave **Project: #13672 1561 Howard Ave**

Wetland ID: 4, Township 0, Section 0, Range 0

Site conditions were Normal. This wetland is estimated to cover 0.05 acres.

This report reflects conditions on the ground at the date of the assessment and, unless noted or implicit in the standard questions, does not reflect speculation on the future or past conditions.

This wetland is located in or near the city of Maple Plain

General Features

Hydrogeomorphology

The maximum water depth at this site is 0.5 inches, with 20 percent inundated. Although there was no standing water at the time of the site visit, the existence of water in the soil below indicates wetland hydrology is present. With an immedidate drainage area of 0.5 acres, it is doubtful that this wetland is sustainable given its small catchment area.

As a Depressional/Flow-through wetland, this site has an apparent inlet and outlet. As such,
Placeholder for Depressional/Flow-through discussion

This wetland has been drained or altered 0% from its original size of 0.05 acres.

Soils

The soils in the immediate wetland area are primarily Urban land. The adjacent upland, to about 500 feet, is Urban land.

Vegetation and Upland Buffer

The extent of vegetation in this wetland is about 0 percent and the naturalized buffer width averages 0 feet. Vegetated buffers around wetlands provide multiple benefits including wildlife habitat, erosion protection, and a reduction in surface water runoff.

This buffer provides very little, if any, protection of water quality or habitat for wildlife.

Special Features

There were no special features observed at the site at the time of this assessment

Vegetative Communities

The following plant communities were observed:

(See Appendix A for details on the Dominant Species per plant community)

Seasonally Fl Basin Type 1, PEMA. This community had a vegetative index of low and comprised 0 percent of the entire area.

Functional Ratings

Function	*Rating*	*Comment*
Vegetative Diversity	Low	If vegetation is present, the primary communities are compromised by extensive invasive and/or non-native species. Ongoing maintenance will be necessary to restore native ecologic communities, although the presence of invasives upstream will limit the success of restoration efforts.
Additional stormwater treatment needs	Moderate	Sediment removal would improve the ability of this site to maintain water quality.
Maintenance of Hydrologic Regime	High	Due either to careful human management or lack of alteration of the outlet or watershed conditions, the wetland maintains a hydrologic regime similar to the original wetland type. This stability supports characteristic vegetative communities and is closely associated with flood attenuation, water quality, and groundwater interaction.
Flood/Stormwater/Attenuation	Moderate	The wetland provides some flood storage and/or flood wave attenuation. It may have either an altered or unrestricted outlet, disturbed wetland soils, thin or little emergent vegetation (with channels) or it may be situated high in a watershed with a low proportion of impervious surfaces, moderate runoff volumes, loamy upland soils, and one or more other wetlands present within the subwatershed.
Downstream Water Quality	Low	In addition to a lack of valuable downstream resources, this site may be unable to remove sediment and nutrients from stormwater. Channel flow reduces retention time; longer retention time increases sediment fallout and nutrient removal from the water column. Vegetation slows water and may uptake nutrients, as well.
Maintenance of Wetland Water Quality	Moderate	Wetland water quality is average. Sediment removal from incoming water would benefit the site. Also consider reducing the amount of stormwater directed at the site. Sustaining a diverse wetland may require additional control over upland land use and the buffer.
Shoreline Protection	Not Applicable	The site does not fringe a deepwater habitat, lake, or is not within any type of watercourse.
Maintenance of Characteristic Wildlife Habitat Structure	Low	Isolated by development, the vegetation impacted and reduced, this site does not support an integral community of species.
Maintenance of Characteristic Fish Habitat	Not Applicable	The site is too isolated or does not remain wet enough to support a population of fish or to allow for even temporary use as a refuge.
Maintenance of Characteristic Amphibian Habitat	Not Applicable	Wetland never or rarely contains standing water and is not inundated longenough most years to allow amphibians to successfully breed.

Aesthetics/Recreation /Education/Cultural	Moderate	Many wetlands are visible from nearby buildings or roads and are accessible for some recreational activities. Excess negative human influence (such as trash or alteration) will reduce the ranking of well-used and highly-accessible sites.
Wetland restoration potential	Not Applicable	Because restoration would affect permanent structures or infrastructure (houses, roads, septic systems), this site is not suitable for restoration.
Wetland Sensitivity to Stormwater and Urban Development	Exceptional	This site is exceptionally sensitive to stormwater; sedge meadows, open and coniferous bogs, calcareous fens, low prairies, wet to wet-mesic prairies, coniferous swamps, lowland hardwood swamps, or seasonally flooded basins.

Appendix A: Dominant Species By Plant Community

	Wetland Type	Plant Community	Dominant Species	Percent Cover
PEMA	**Type 1**	**Seasonally Fl Basin**		
			Reed canary grass	>25-50%
			Kentucky bluegrass	>25-50%

APPENDIX G

Credentials

Anderson Engineering of Minnesota, LLC • 13605 1st Avenue North, Suite 100 • Plymouth, Minnesota 55441 • (763) 412-4000 Main • (763) 412-4090 Fax • www.ae-mn.com

MOHAMMED ELABBADY

Environmental Associate

Education:

BS Environmental Science
Minnesota State University-Mankato (2011)

Specialized Training

Wastewater Chemical Treatment
Environmental Consultant

Professional Associations:

MN Wetland Professionals Association
Society of Wetland Scientists

Total Years Experience:

3 years

Years with Current Firm:

2012 to Present

Experience Summary:

Mohamed Elabbady, an Environmental Associate, brings a range of knowledge and experience in the field of biological monitoring to the Anderson Engineering team. Prior to his employment with Anderson Engineering of MN, LLC, Mohamed worked as an Environmental Consultant for DFMS Consulting Services. The skills Mohamed has developed through his educational background and experience as a consultant make him proficient in assessing and consulting with a variety of solutions to clients and various regulatory agencies.

Mohamed's project experience includes erosion and sediment control Best Management Practice's inspection and dewatering and stream diversion planning. Enabled assistance in construction permitting with SWPPP design, MN/DOT, MPCA, DNR, Watershed Districts, Wetland Impacts, Hydraulic computations and hydrologic analysis. Mohamed also has experience with Global Positioning Systems (GPS), remote sensing, and Geographic Information Systems (GIS).

Representative Projects:

- **Environmental Services for North Dakota Natural Resources Conservation Service (NRCS) (2013) -** Performed on-site investigation on farmed wetlands on over 24,000 acres of agricultural land. Implemented standard sampling protocols such as standard transect sampling, vegetation identification, quantitative vegetative data collection and completion of standardized data sheets.
- **Environmental Services for United Trailer Leasing (2012)-** Performed on site investigation and wetland delineation. Implemented standard sampling protocols such as standard transect sampling, vegetation identification, quantitative vegetative data collection and completion of standardized data sheets. Used protocol of MN RAM wetland functions assessment and classified land cover and habitat types.
- **Environmental Services for Cemstone, Trout Brook (2012)**- Performed on site investigation and wetland delineation. Implemented standard sampling protocols such as standard transect sampling, vegetation identification, quantitative vegetative data collection and completion of standardized data sheets. Classified land cover and habitat types.
- **SJVNC Water treatment System (2012)-** Environmental Management System formulation for San Joaquin Valley National Cemetery (SJVNC). Review of existing drinking water treatment system and assisted in project proposals for improvement of SJVNC's water treatment systems. Prepared Bacteriological Site Sampling Plan, Emergency Notification Plan and Operations Plan in accordance with California Department of Public Health requirements. Developed project cost estimate and statement of work for proposed improvements. Provided assistance and consultation to owner and owner's representative.
- **NCA Environmental Management System (2012)-** Project Environmental Associate for Environmental Management System (EMS) program development, baseline site audits at 160 cemetery sites and EMS Manual preparation for 65 supervisory cemetery facilities; and tracking database development for the United States Department of Veterans Affairs, National Cemetery Administration. Development of environmental program Standard Operating Procedures (SOPs) and State specific Work Lists to assist in maintaining regulatory compliance. Development of environmental program area training module analysis and improvement reports.

MARC COTTINGHAM, CPESC

Environmental Services Consultant
Certified Professional in Erosion and Sediment Control #4491
MN Certified Wetland Delineator #1207
Soil-Scientist-In-Training #145839

Education:

MS Water Resources Management
University of Wisconsin-Madison (2003)

BS Soil Science
University of Wisconsin-Madison (1998)

Specialized Training:

New Tree Inspector Certification, Minnesota Department of Natural Resources, February 26, 2014

Using the Midwest Interim Regional Supplement for Wetland Delineation, Illinois Soil Classifiers Association, February 27, 2009

Certified Professional in Erosion and Sediment Control, March 13, 2008

Railroad Right-of-Way Contractor Orientation Course Certification, April 11, 2007

Designated Erosion Control Inspector, Lake County, IL, March 22, 2007

Certified Wetland Specialist, Lake County, IL, February 7, 2007

Illinois Department of Agriculture Herbicide Applicator License, June, 2006

Wetland Plant Identification, Biotic Consultants, Inc. June 4, 2004

Federally Licensed Wetland Delineator Certification Training, Richard Chinn Environmental Training, Inc., August, 2004

Professional Associations:

Illinois Environmental Professionals Association
Soil Science Society of America
Environmental Consulting Professionals
MN Wetland Professionals Association
Society of Wetland Scientists

Total Years of Experience:

12 years

Years with Current Firm:

2009 to Present

Selected Publications:

Innovating Stormwater Management on the University of Wisconsin-Madison Campus. 2003. Water resources Management Workshop 2003 Gaylord Nelson Institute for Environmental Studies, University of Wisconsin, Madison.

Experience Summary:

Marc Cottingham, an Environmental Scientist, has over twelve years of professional experience completing wetland delineation/investigations. Prior to his employment with Anderson Engineering of MN, LLC, Marc worked as a wetland consultant in Illinois. The skills Marc has developed through his educational background and years of experience as a wetland/environmental consultant give him a firm understanding of each of the wetland indicators. Marc is able to correctly and thoroughly identify and delineate each wetland type within the Midwestern United States, including disturbed and problematic wetlands.

Marc's project experience includes wetland determinations, delineations, collection of wetland data using the data forms provided in the U.S. Army Corps of Engineers (USACE) Regional Supplement(s) to the 1987 Delineation Manual, farmed wetland assessments using the protocol established by the USDA and USACE for purposes of the Food Security Act, wetland mitigation design, wetland mitigation monitoring and maintenance, water resource regulatory permit applications, wetland functions and values assessments, natural resource inventories, watershed assessments, and aerial photo interpretation. Marc has training and experience with Global Positioning Systems (GPS) and Geographic Information Systems (GIS).

Representative Projects

- **Wetland Delineation/Assessment – Northern Natural Gas – Dakota County and Freeborn County, MN & Worth County, IA (2012):** Services included wetland determinations, boundary delineations and threatened and endangered species habitat assessments for three proposed natural gas line corridors located in Iowa and Minnesota. Project tasks included completion of wetland boundary investigations following the 1987 USACE Wetland Manual and all appropriate Regional Supplements; classification of the wetland habitat types based on soil profiles, dominant vegetative communities and hydrology indicators, completion of a habitat assessment for native tall grass prairie for potential occurrence of the federally listed prairie bush clover (*Lespedeza leptostachya)*, and preparation of a comprehensive wetland delineation report documenting the findings.

- **Farmed Wetland Determination Inventory – USDA NRCS – Various Counties, ND (2013):** Field crew chief for farmed wetland determination inventory project within three counties in North Dakota. Project tasks included collecting field data following the procedures of the USACE and USDA, supervision of supporting field staff, and preparation of deliverables to the NRCS.

- **Wetland Delineation/Assessment – Fort McCoy Alderwood Dam Removal – Fort McCoy, WI (2012):** Services included a wetland determination and delineation of wetland associated with a proposed dam removal project at the Fort McCoy U.S. Army installation. Project tasks included completion of a wetland delineation following the 1987 USACE Wetland Manual and the Midwest Regional Supplement and preparation of the wetland delineation report to document findings and help assess potential wetland impacts for Section 401/404 permitting,

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COURTNEY M. LUENSMAN

Environmental Associate

Education:

BA Environmental Studies (2012)
Illinois Wesleyan University

Professional Associations:

MN Wetland Professionals Association
Minnesota Naturalists' Association

Total Years Experience:

2 years

Years with Current Firm:

2013 to Present

Experience Summary:

Courtney Luensman, an Environmental Associate, brings a range of knowledge and experience in the field of biological monitoring to the Anderson Engineering team. Prior to her employment with Anderson Engineering of MN, LLC, Courtney worked as an Assistant Ecologist for Arrowhead Environmental Consulting and as an environmental educator in Cuyahoga Valley National Park. The skills Courtney has developed through her educational background and work experience make her proficient in clearly communicating a variety of solutions to clients and regulatory agencies.

Courtney's project experience includes natural resource inventories; watershed assessments; biologic assessments; collection of wetland data using the data forms provided in the U.S. Army Corps of Engineers (USACE) Regional Supplement(s) to the 1987 Delineation Manual; wetland determinations, delineations, and monitoring; regulatory permit applications; aquatic macro invertebrate sampling; Low Impact Development strategies; and technical document preparation. Courtney has experience with Global Positioning Systems (GPS), remote sensing, and Geographic Information Systems (GIS).

Representative Projects:

- **Farmed Wetland Determination Inventory – USDA NRCS – Various Counties, ND (2013):** Services included completion of a farmed wetland determination inventory project within three counties in North Dakota. Performed on-site investigation on farmed wetlands on over 24,000 acres of agricultural land. Implemented standard sampling protocols such as standard transect sampling, vegetation identification, quantitative vegetative data collection and completion of standardized data sheets.

- Stream biological monitoring including macro invertebrate community and habitat assessment as well as water chemistry collection for Cuyahoga Valley National Park

BENJAMIN J. HODAPP, PWS

Environmental Services Manager
Professional Wetland Scientist #1832
MN Certified Wetland Delineator #1016

Education:

MS Water Resources Management
University of Wisconsin-Madison

BS Biology; Ecology
Minnesota State University- Mankato

Specialized Training:

Wetland Delineation & Management Training
Richard Chinn Environmental Training, Inc.

Wetland Plant Identification
Biotic Consultants Inc.

Plant Identification for Wetland Delineation
University of Wisconsin-La Crosse

Watershed Academy Web Certificate
United States Environmental Protection Agency

Professional Associations:

Society of Wetland Scientists
MN Wetland Professionals Association (WPA)
MN WPA President 2010
Wisconsin Wetlands Association
Minnesota Native Plant Society
Ecological Society of America

Total Years of Experience:

14 years

Years with Current Firm:

2004 to Present

Selected Publications:

The Future of Rowan Creek Watershed: Connecting Land Use and Management with Water Quality. 2003. Water resources Management Workshop 2002 Gaylord Nelson Institute for Environmental Studies, University of Wisconsin, Madison.

The Tumultuous World of Drainage Districts: An Analysis of Existing Management Arrangements, with Recommendations. Working Paper Series 2002-1. Water Resources Institutions and Policies, Department of Urban and Regional Planning, University of Wisconsin, Madison.

Experience Summary:

Benjamin Hodapp, a Biologist and Project Manager, brings a broad background of knowledge and experience in the natural resource field to the Anderson Engineering team. Benjamin has a unique combination of biologic training and field skills in addition to working experience at various levels of government (NRCS, FSA, University of MN Extension, Watonwan County Soil and Water Conservation District and Watonwan County Environmental Services).

Benjamin's project experience includes natural resource inventory, wetland determinations, delineations, mitigation design and monitoring, regulatory permit applications, wetland functions and values assessments, flood plain analysis, ordinary high water determinations, aerial photo interpretation. Benjamin has training and experience with Global Positioning Systems (GPS) and Geographic Information Systems (GIS).

Representative Projects:

- **Farmed Wetland Determination Inventory - USDA NRCS – Various Counties, ND:** Project manager and field crew chief for farmed wetland determination inventory project within three counties in North Dakota. Project tasks included project management oversight of all supporting staff, client point of contact, scheduling field investigations with dozens of landowners, supervision of field staff during data collection, and quality control of deliverables sent to the USDA NRCS.

- **Wetland Delineation/Assessment – Northern Natural Gas – Dakota County and Freeborn County, MN & Worth County, IA:** Project manager and field crew chief for wetland determinations, boundary delineations and threatened and endangered species habitat assessments for three proposed natural gas line corridors located in Iowa and Minnesota. Project tasks and included project management oversight of all supporting staff, providing point of contact services for client, supervising field staff in completion of a wetland investigations and habitat assessments, and quality control of deliverables.

- **Wetland Delineation/Assessment – Northern Natural Gas – Redfield, IA:** Project manager and field crew chief for wetland determinations, boundary delineations and threatened and endangered species habitat assessments for 20 miles of proposed natural gas line corridors and 1,000 acres of proposed natural gas well pads. Project tasks and included project management oversight of all supporting staff, providing point of contact services for client, supervising field staff in completion of a wetland investigations and habitat assessments, and quality control of deliverables

- **Section 401/404 Wetland Permitting – Fort McCoy Commemorative Park Expansion – Fort McCoy, WI:** Provided project management services for Section 401/404 permitting associated with proposed wetland impacts resulting from the Commemorative Park Expansion Project at the Fort McCoy U.S. Army installation. Project tasks included project management of supporting staff, providing point of contact services for the U.S. Army, developing a wetland mitigation strategy in compliance with Section 401/404 and state wetland permitting requirements and oversight and quality control in preparing Section 401/404 permit application

CONSTRUCTION ENGINEERING LABORATORY, INC.
TESTING FOR QUALITY AND STRENGTH

March 7, 2014 CEL Project Number: 14-008

Mr. Michael Halley
Rose Creek Builders
12955 Highway 55
Plymouth, MN 55411

Re: Geotechnical Exploration Report
Proposed Meadows of Maple Plain Residential Development
Maple Plain, Minnesota

Dear Mr. Halley:

We have completed the geotechnical exploration report for the proposed Meadows of Maple Plain residential development generally located north of Highway 12 between Howard Avenue and Boundary Avenue in Maple Plain, Minnesota. The purpose of this geotechnical exploration was to characterize subsurface soil and ground water conditions and provide recommendations for site grading and foundation support for the proposed residential development.

In general the soil borings encountered varying depths of topsoil overlying native glacial till soils. The soils are generally suitable for construction of the proposed residential development but some soil corrections, mainly to remove the topsoil and vegetation, will be required. Specific details regarding our procedures, results and recommendations follow in the attached geotechnical exploration report. Our services were performed in accordance with Construction Engineering Laboratory proposal P-14017 dated February 14, 2014.

Thank you for the opportunity to assist you on this project. If you have any questions or need additional information please contact Paul Gionfriddo at 763-504-5266.

Sincerely,

Construction Engineering Laboratory

Paul S. Gionfriddo P.E.
Project Engineer

5661 International Parkway ◆ Minneapolis, Minnesota 55428 ◆ (763) 533-9534 ◆ FAX (763) 533-9586
E-mail: paul_g@cel-inc.com

CONSTRUCTION ENGINEERING LABORATORY, INC.
TESTING FOR QUALITY AND STRENGTH

GEOTECHNICAL EXPLORATION REPORT

PROJECT:

Proposed Meadows of Maple Plain Residential Development
North of Highway 12 between Boundary Avenue and Howard Avenue
Maple Plain, Minnesota

PREPARED FOR:

Rose Creek Builders
12955 Highway 55
Plymouth, MN 55411

PREPARED BY:

Construction Engineering Laboratory
5661 International Parkway
Minneapolis, MN 55428

Construction Engineering Laboratory Project: 14-008
March 7, 2014

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Paul Gionfriddo, P.E.
Project Engineer
License Number 23093
March 7, 2014

5661 International Parkway ◆ Minneapolis, Minnesota 55428 ◆ (763) 533-9534 ◆ FAX (763) 533-9586
E-mail: paul_g@cel-inc.com

1.0 INTRODUCTION

1.1 Project description

Rose Creek Builders in association with Anderson Engineering of Minnesota (Anderson Engineering) are preparing plans to develop an approximate 3.3 acre parcel of land generally located north of Highway 12 between Boundary Avenue and Howard Avenue in Maple Plain, MN. We understand that development plans include preparing 18 residential lots and constructing the associated streets and underground utilities. The project will also include constructing a storm water detention/infiltration pond

Rose Creek Builders retained Construction Engineering Laboratory (CEL) to perform a geotechnical exploration to evaluate subsurface soil and groundwater condition and provide recommendations for site development.

1.2 Purpose

The purpose of this geotechnical exploration was to characterize subsurface soil and groundwater conditions and provide recommendations for site development.

1.3 Site Description

The project site currently exists as a vacant parcel. The ground surface is mostly gently rolling but generally slopes downward toward the south. Ground surface elevations at the boring locations ranged from about 111 to 103 based on a local datum. The ground surface was snow covered at the time of this geotechnical exploration which prevented direct observations of the surface.

1.4 Scope of Services

Our services were performed in accordance with CEL proposal P-14017, dated February 14, 2014.

Our scope of services was limited to the following tasks:

- Completing four (4) standard penetration test borings to nominal depths of 20 feet.
- Visually/manually classifying samples recovered from the soil borings.
- Performing laboratory moisture content tests on selected samples.
- Preparing soil boring logs describing the materials encountered and the results of groundwater level measurements.
- Preparing an engineering report describing soil and groundwater conditions, and providing preliminary recommendations for site grading and foundation support.

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1.5 Documents Provided

We were provided three plan sheets showing he project site. One plan sheet was prepared by MFRA and dated December 17, 2013. The plan sheet was identified as "preliminary" and showed the proposed site layout as well as the style of home proposed for each lot and proposed floor elevations. The plan sheet also showed the proposed soil boring locations.

The second plan sheet appears to have been taken form the Hennepin County Property Information website. The plan sheet consisted of an aerial photograph of the site with the outline of the proposed development hand sketched onto it. The plan sheet also included some property information.

The third plan sheet was also an aerial photograph of the project site. The plan sheet was titled "Web Soil Survey National Cooperative Soil Survey". The plan sheet was dated February 7, 2014 and was identified as page 1 of 3. The plan sheet identified the United State Department of Agriculture (USDA) soil types associated with the property.

1.6 Locations and Elevations

The ground surface elevations at the boring location were referenced to the top nut of the fire hydrant on the east side of Boundary Avenue about 335 feet north of Highway 12. An elevation of 100.0 was assumed for the benchmark. The approximate locations of the borings are shown on the "Soil Boring Location Sketch" in the appendix. The sketch was prepared by CEL using information from the documents provided.

2.0 FIELD PROCEDURES

Four (4) standard penetration test borings were advanced on February 26th 2014 by STS Enterprises, LLC (STS) with a rotary drilling rig, using continuous flight augers to advance the boreholes. Representative samples were obtained from the borings, using split-barrel sampling procedures in general accordance with ASTM Specification D-1586. In the split-barrel sampling procedure, a 2-inch O.D. split-barrel spoon is driven into the ground with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampling spoon the last 12 inches of an 18-inch penetration is recorded as the standard penetration resistance value, or "N" value. The results of the standard penetration tests are indicated on the boring log. The samples were sealed in containers and provided to HGTS for testing and soil classification.

A field log of each boring was prepared by the STS drill crew. The logs contained visual classifications of the soil materials encountered during drilling, as well as the driller's interpretation of the subsurface conditions between samples and water observation notes. The final boring logs included with this report represent an interpretation of the field logs and include modifications based on visual/manual method observation of the samples.

The soil boring logs, general terminology for soil description and identification, and classification of soils for engineering purposes are also included in the appendix. The soil boring logs identify and describe the materials encountered, the relative density or consistency based on the Standard Penetration resistance (N-value, "blows per foot") and groundwater observations.

The strata changes were inferred from the changes in the samples and auger cuttings. The depths shown as changes between strata are only approximate. The changes are likely transitions, variations can occur beyond the location of the boring.

3.0 RESULTS

3.1 Soil Conditions

The borings encountered varying depths of topsoil overlying native glacially deposited soils. The topsoil ranged in thickness from about ½ foot to 5 feet and consisted of lean clay that was black in color and judged to be slightly organic to organic.

Beneath the topsoil, soil borings B-1, B-2 and B-3 encountered predominantly native sandy lean clay glacial till that extended to the termination depths of the borings at about 21 feet below the ground surface. Soil boring B-4 was taken near the proposed infiltration pond and encountered numerous sand seams or layers within the native glacial till.

Penetration resistance values (N-Values), shown as blows per foot (bpf) on the boring logs, within the native glacial till soils ranged from 6 to 15 bpf. These values indicate that glacial till had a medium to stiff consistency.

3.3 Groundwater

Ground water was not encountered in soil boring B-1, B-2 or B-3 while drilling or after removing the augers from the boreholes. Groundwater was encountered in soil boring B-4 at a depth of about 17 ½ feet below the ground surface while drilling and at a depth of about 11 ½ feet below the ground surface after drilling. The groundwater encountered in soil boring B-4 appears to be associated with the sand seams within the native glacial till soils.

Although groundwater was not encountered in borings B-1, B-2 and B-3 the borings were completed in clayey soils. In clayey soils it may take several hours or days for groundwater to reach its hydrostatic level in an open borehole. Therefore the groundwater levels observed in the borings may be lower than the actual hydrostatic groundwater levels.

We made water level measurements in the borings at the times and under the conditions stated on the boring logs. The period of observation was relatively short. Groundwater monitoring wells or piezometers would be required to more accurately determine water

levels. Seasonal and annual fluctuations in the groundwater levels should also be expected.

3.4 Laboratory Tests

Laboratory moisture content tests were performed on selected samples recovered from the soil borings. Results of the laboratory moisture content tests ranged from about 18 to 28 percent and are shown on the boring logs adjacent to the sample tested.

We also performed laboratory "pocket penetrometer" tests on selected samples recovered from the boring. The pocket penetrometer uses a calibrated spring to estimate the soils unconfined compressive strength. Pocket penetrometer results ranged from about ½ tons per square foot (tsf) to about 3 ½ tsf. Results are shown on the boring log adjacent to the sample tested.

3.5 OSHA Soil Classification

The soils encountered in the borings consisted predominantly of lean clay or sandy lean clay glacial till corresponding to the ASTM Classification CL. The soils identified in the borings will generally be Type B soils under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines.

Numerous sand seams or layers were encountered within the glacial till soil in soil boring B-4. Because of their layered nature these soils will generally be considered Type C soils under OSHA guidelines.

3.6 Estimated In-Situ Soil Infiltration Rates

We understand the project will also include construction of a storm water infiltration/detention pond. The pond will generally be located in the southwest quadrant of the development. Soil boring B-4 was completed at or near the location of the pond and encountered interbeded layers of sandy lean clay and poorly graded sand to a depth of about 15 feet below the ground surface.

You have requested an estimated soil infiltration rate in order to design the proposed pond. Table 12.BIO.8 - Design Infiltration Rates on page 197 of the Minnesota Storm Water Manual, Version 2, dated January 2008 recommends using an infiltration rate of <0.2 inches per hour for sandy lean clay soils.

A design infiltration rate of <0.2 inches per hour may be appropriate when estimating vertical infiltration rates. However the sand seams and layers encountered in the borings will likely yield horizontal infiltration rates greater than that value. The Minnesota Strom Water manual recommends a design infiltration rate for sand soils ranging from about 0.6 to 0.8 inches per hour.

We were not provided any information regarding the depth of the proposed pond and therefore recommend in-situ soil permeability test to further evaluate soil infiltration rates. Tests could include double ring infiltrometers.

4.0 DISCUSSION AND PRELIMINARY RECOMMENDATIONS

4.1 Proposed Construction

We understand that Rose Creek Builders in conjunction with Anderson Engineering are proposing to design and construct the Meadows of Maple Plain residential development which will include preparing house pads for 18 single family residential lots and the associated streets and underground utilities. Based on the plan sheet(s) provided it appears that the new homes could include full basement, walk-out or look-out style structures. We anticipate that the new homes will likely include one or two stories above grade and will likely consist of cast-in-place concrete or masonry block foundation walls supported on concrete spread footings. We anticipate above grade construction to consist of wood framing, a pitched roof and asphalt shingles.

We were not provided any information as to proposed or final site grades but assume the residential development will be constructed at or near existing site grades in order to minimize import or export of soil materials and to take advantage of natural site contours.

Based on the assumed construction we estimate wall loadings will range from about 1 to 2 kips (1,000 to 2,000 pounds) per lineal foot and column loads, if any will be less than 50 kips (50,000 pounds).

4.2 Discussion

The soil borings completed for this project encountered varying depths of topsoil overlying native glacially deposited soils that were generally suitable for support of the proposed residential development. However some soil corrections will be required. The topsoil was judged to be slightly organic to organic and is not suitable for supporting the proposed foundations, roadways or utilities. Soil corrections will include removing the vegetation and topsoil encountered at the surface in each boring and removing any soft soil encountered within the proposed building pads, utility trenches and roadways.

The in-place soil moisture contents ranged from about 18 to 28 percent. The soils appear to be above the soils estimated optimum moisture content. If the on-site soil will be used as fill or backfill we anticipate that some moisture conditioning (wetting or drying) of these soils will be required. The summer months are typically more favorable for drying soils.

The following sections provide recommendations for site development.

4.3 Mass Grading Recommendations

Excavation We recommend that all vegetation, topsoil, and any other soft or loose soil, if encountered, be removed from the proposed building and oversize areas.

Fill required to attain site grades and may consist of any debris-free, non-organic mineral soil. On-site soils are generally suitable for use or re-use as fill or backfill provided it is free of organic material or other deleterious material. Some moisture conditioning (drying) of these soils will likely be required to meet the recommended compaction levels. The exception being within 3 feet of the groundwater table where granular soil with less than 7 percent passing the number 200 sieve and at least 50 percent retained on the number 40 sieve should be used. The on-site soil identified as poorly graded sand (SP) may meet this requirement.

Organic soils, including soils that are black in color, peat, organic silt, organic clay, if encountered, are not suitable for re-use as fill or backfill.

Groundwater was not encountered in three of the four borings but was encountered in one of the borings (B-4) generally in excess of 10 feet below the ground surface. We do not anticipate that groundwater will be encountered and do not anticipate that dewatering will be required. However, groundwater could be perched within sand seams within the native clay soils which may not become apparent until construction commences or additional soil borings are completed.

Backfilling We recommend that backfill placed to attain site grades be compacted to a minimum of 95 percent of its standard Proctor density (ASTM D 698), except the upper 3 feet of pavement areas, where the compaction level should be increased to a minimum of 100 percent. Fill should be placed within 3 percentage points above and 1 percentage point below its optimum moisture content as determined by the standard Proctor. All fill should be placed in thin lifts and be compacted with a large self-propelled vibratory compactor operating in vibratory mode.

In areas where fill depths will exceed 10 feet, if any, we recommend that compaction levels be increased to minimum of 98 percent of the materials standard Proctor density. Even with the increased compaction levels a construction delay may be appropriate to allow for post construction settlement of the fill mass.

Fill and backfill placed on slopes must be "benched" into the underlying suitable soil to reduce the potential for slip planes to develop between the fill and underlying soil. We recommend "benching" or excavating into the slope at 5 feet vertical intervals to key the fill into the slope.

Foundations We recommend the perimeter footings bear a minimum of 42 inches below the exterior grade for frost protection. Interior footings may be placed immediately below the slab provided construction does not occur during below freezing weather conditions. Foundation elements in unheated areas should bear at least 5 feet below exterior grade for frost protection.

We anticipate the foundations and floor slabs will bear on compacted engineered fill or native glacial or alluvial deposited soils.

It is our opinion the footings can be designed for a net allowable bearing pressure up to 2,000 psf.

We anticipate total and differential settlement of the foundations will be less than 1 inch and ½ inch, respectively.

4.4 Interior Slabs

The anticipated floor subgrade is granular fill over compacted fill or native soils. It is our opinion a modulus of subgrade reaction, k, of 200 pounds per square inch of deflection (psi) may be used to design the floor.

If floor coverings or coatings less permeable than the concrete slab will be used, we recommend that a vapor retarder or vapor barrier be placed immediately beneath the slab. Some contractors prefer to bury the vapor barrier or vapor retarder beneath a layer of sand to reduce curling and shrinkage, but this practice often traps water between the slab and vapor retarder or barrier.

Regardless of where the vapor retarder or vapor barrier is placed, we recommend consulting the floor covering manufacturer regarding the appropriate type, use and installation of the vapor retarder or vapor barrier to preserve the warranty.

4.5 Below Grade Walls

Foundation walls or below grade (basement) walls will have lateral loads from the surrounding soil transmitted to them. The site soils are predominantly granular in composition. We recommend general waterproofing of the below grade walls. We recommend either placing drainage composite against the backs of the exterior walls or backfilling adjacent to the walls with sand having less than 50 percent of the particles by weight passing the #40 sieve and less than 5 percent of the particles by weight passing the #200 sieve. The sand backfill should be placed within 2 feet horizontally of the wall. We recommend the balance of the backfill for the walls consist of sand however the sand may contain up to 20 percent of the particles by weight passing the #200 sieve.

Clay may be used to make up the balance of the wall backfill. However consolidation of the clay under its own weight can be expected to continue even after construction. If not accommodated for, structures supported on the clay backfill could settle unfavorably or be damaged. If clay backfill is used, we recommend that construction of grade supported slabs not occur immediately after the below grade walls are backfilled to allow for consolidation/settlement of the clay backfill. The amount of consolidation could range from approximately 1 to 3 percent of the backfill thickness or wall height.

We recommend installing drain tile behind the below grade walls, adjacent to the wall footing and below the slab elevation. Preferably the drain tile should consist of perforated pipe embedded in gravel. A geotextile filter fabric should encase the pipe

and gravel. The drain tile should be routed to a storm sewer, sump pump or other suitable disposal site.

Active earth pressures can be used to design the below grade walls if the walls are allowed to rotate slightly. If wall rotation cannot be tolerated then below grade wall design should be based on at-rest earth pressures. We recommend soil parameters found below in Table 1, be used for below grade/retaining wall design. These design parameters are based on the assumptions that the walls are drained, there are no surcharge loads within a horizontal distance equal to the height of the wall and the backfill is level.

Table 1. Soil Parameters

Soil Type	Estimated Unit Weight (pcf)	Estimated Friction Angle (degrees)	At-Rest Pressure (pcf)	Active Soil Pressure (pcf)	Passive Soil Pressure (pcf)
Clays	135	28	70	50	375
Sands	125	32	60	40	405

Resistance to lateral earth pressures will be provided by passive resistance against the wall footings and by sliding resistance along the bottom of the wall footings. We recommend a sliding coefficient of 0.35. This value does not include a factor of safety.

4.6 Exterior Slabs

Exterior slabs will likely be underlain by predominantly clay soils which are considered highly frost susceptible. If these soils become saturated and freeze, significant heave may occur. This heave can be a nuisance in front of doors and at other critical grade areas. One way to help reduce the potential for heaving is to remove the frost-susceptible soils below the slabs down to bottom of footing grades, and replace them with non-frost-susceptible backfill consisting of sand having less than 5 percent of the particles by weight passing the number 200 sieve.

If this approach is used and the excavation bottoms terminate in non-free draining granular soil we recommend a drain tile be installed along the bottom outer edges of the excavation to collect and remove any water that may accumulate within the sand. The bottom of the excavation should be graded away from the building.

If the banks of the excavations to remove the frost-susceptible soils are not sloped, abrupt transitions between the frost-susceptible and non-frost-susceptible backfill will exist along which unfavorable amounts of differential heaving may occur. Such transitions could exist between exterior slabs and sidewalks, between exterior slabs and pavements and along the slabs themselves if the excavations are confined to only the building entrances. To address this issue we recommend sloping the excavations to remove frost-susceptible soils at a minimum 3:1 (horizontal: vertical) gradient.

An alternative method of reducing frost heave is to place a minimum of 2 inches of extruded polystyrene foam insulation beneath the slabs and extending it about 4 feet

beyond the slabs. The insulation will reduce frost penetration into the underlying soil and reduce heave. Six to 12 inches of granular soil is typically placed over the insulation to protect it during construction.

Another alternative for reducing frost heave is to support the slabs on frost depth footings. A void space of at least 4 inches should be provided between the slab and the underlying soil to allow the soil to heave without affecting the slabs.

4.7 Site Grading and Drainage

We recommend the site be graded to provide positive run-off away from the proposed buildings. We recommend landscaped areas be sloped a minimum of 6 inches within 10 feet of the building and slabs be sloped a minimum of 2 inches. In addition we recommend downspouts with long splash blocks or extensions for each house.

4.8 Utilities

We anticipate that water and sewer utilities will bear at depths ranging from about 7 to 10 feet below the ground surface. At these depths we anticipate the utilities will be supported native glacial till soils. The native glacial till soils, in our opinion are suitable for pipe support. We recommend removing all organic soils, soft or other unsuitable soil, if any, beneath utilities prior to placement.

We recommend bedding material be thoroughly compacted around the pipes. We recommend trench backfill above the pipes be compacted to a minimum of 95 percent beneath slabs and pavements, the exception being within 3 feet of the proposed pavement subgrade, where 100 percent of standard Proctor density is required. In landscaped areas we recommend a minimum compaction of 90 percent.

4.9 Pavement Considerations

The City of Maple Plain may have Standard Plates which govern street construction. We recommend designing the roadways in accordance with City Standard Plates. In the absence City Standard Plates we recommend the following.

Pavement design depends on several factors including but not limited to; subgrade soil type and associated R-value(s), traffic volume, traffic types and vehicle distribution. We assume the roadways will be used by a variety of vehicles but primarily by automobiles, light trucks, delivery trucks, garbage trucks and school busses. We assume the pavement will be subjected to less than 50,000 Equivalent Single Axle Loads (EASL's) over a design life of 20 years and further assume the roadways will be bituminous pavements.

R-Value testing was beyond the scope of this project. The soil borings encountered predominantly sandy lean clay glacial till soils corresponding to the ASTM Classification CL. These soils typically have R-Values ranging from 5 to 15. It is our opinion that an R-Value of 10 can be used for pavement design.

We recommend removing all vegetation, topsoil, or other unsuitable materials from within 3 feet of the pavement subgrade elevation. Backfill, if needed, to attain pavement subgrade elevation can consist of any mineral soil provided it is free of organic material or other deleterious materials. We recommend compacting the backfill at moisture contents within a range of 1 percentage point below and 3 percentage points above its optimum moisture content. The upper 3 feet of fill and backfill should be compacted to a minimum of 100 percent of its standard Proctor maximum dry density.

Prior to placing the aggregate base (Class 5) we recommend proof rolling the pavement subgrade to identify soft, weak, loose or unstable areas that may require additional subcuts.

We recommend aggregate base meeting MN/DOT specification 3138 for Class 5 aggregate base. We recommend the aggregate base be compacted to 100 percent of its maximum standard Proctor dry density.

We recommend a pavement section consisting of a minimum of 4 inches of bituminous, and a minimum of 8 inches of aggregate base.

We recommend that the bituminous wear and base courses meet the requirement of MN/DOT specification 2360. We recommend the bituminous pavements be compacted to at least 92% of the maximum theoretical density.

We recommend specifying concrete that has a minimum 28 day compressive strength of 4,000 psi. We recommend specifying 5 to 8 percent entrained air for exposed concrete to provide resistance to freeze-thaw deterioration. We recommend slump, air content and compressive strength test of Portland cement concrete.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Excavation

The borings indicated that at the anticipated excavation depths the soils in the sidewalls of the excavations will be primarily Type B soil under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines. However some Type C soil should be anticipated especially near boring B-4. Temporary excavations in Type B soils should be constructed at a minimum of 1 foot horizontal to every 1 foot vertical within excavations. Temporary excavations in Type C soils should be constructed at a minimum of 1½ foot horizontal to every 1 foot vertical within excavations. Slopes constructed in this manner may still exhibit surface sloughing. If site constraints do not allow the construction of slopes with these dimensions then temporary shoring may be required.

5.2 Observations

A geotechnical engineer should observe the excavation subgrade to evaluate if the subgrade soils are similar to those encountered in the borings and adequate to support the proposed construction.

5.3 Backfill and Fills

Clay soils that will be excavated and reused as backfill and fill appear to be above their assumed optimum moisture content. We anticipate it will be necessary to moisture condition (dry) these soils to achieve the recommended compaction. We recommend that fill and backfill be placed in lifts not exceeding 4 to 12 inches, depending on the size of the compactor and materials used.

5.4 Testing

We recommend density tests of backfill and fills placed for the new house pads. Samples of the proposed materials should be submitted to our laboratory prior to placement for evaluation of their suitability and to determine their optimum moisture content and maximum dry density (Standard Proctor).

5.5 Winter Construction

If site grading and construction is anticipated to proceed during cold weather, all snow and ice should be removed from cut and fill areas prior to additional grading and placement of fill. No fill should be placed on frozen soil and no frozen soil should be used as fill or backfill.

Concrete delivered to the site should meet the temperature requirements of ASTM and/or ACI. Concrete should not be placed on frozen soil. Concrete should be protected from freezing until the necessary strength is obtained. Frost should not be permitted to penetrate below the footings.

6.0 PROCEDURES

6.1 Soil Classification

The drill crew chief visually and manually classified the soils encountered in the borings in general accordance with ASTM D 2488, "Description and Identification of Soils (Visual-Manual Procedure)". Soil terminology notes are included in the Appendix. The samples were returned to our laboratory for review of the field classification by a soils engineer. Samples will be retained for a period of 30 days.

6.2 Groundwater Observations

Immediately after taking the final samples in the bottom of the borings, the holes were checked for the presence of groundwater. Immediately after removing the augers from the borehole the holes were once again checked and the depth to water and cave-in depths were noted.

7.0 GENERAL

7.1 Subsurface Variations

The analyses and recommendations presented in this report are based on data obtained from a limited number of soil borings. Variations can occur between and away from the borings, the nature of which may not become apparent until additional exploration work is completed or construction is conducted. A reevaluation of the recommendations in this report should be made after performing on-site observations during construction to note the characteristics of any variations. The variations may result in additional foundation costs and it is suggested that a contingency be provided for this purpose.

It is recommended that we be retained to perform the observation and testing program during construction. This will allow correlation of the soil conditions encountered during construction to the soil borings and will provide continuity of professional responsibility.

7.2 Review of Design

This report is based on the design of the proposed structure as related to us for preparation of this report. It is recommended that we be retained to review the geotechnical aspects of the design and specifications. With the review we will evaluate whether any changes have affected the validity of the recommendations and whether our recommendations have been correctly interpreted and implemented in the design and specifications.

7.3 Groundwater Fluctuations

We made water level measurements in the borings at the times and under the conditions stated on the boring logs. The data was interpreted in the text of this report. The period of observation was relatively short and fluctuations in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw, drainage, and other seasonal and annual factors not evident at the time the observations were made. Design drawings and specifications and construction planning should recognize the possibility of fluctuations.

7.4 Use of Report

This report is for the exclusive use of Rose Creek Builders and Anderson Engineering of Minnesota and their design team to use to design the proposed structure and prepare construction documents. In the absence of our written approval, we make no representation and assume no responsibility to other parties regarding this report. The data, analysis and recommendations may not be appropriate for other structures or purposes. We recommend that parties contemplating other structures or purposes contact us.

7.5 Level of Care

Construction Engineering Laboratory has used the degree of skill and care ordinarily exercised under similar circumstance by members of the profession currently practicing in this locality. No warranty expressed or implied is made.

APPENDIX

Soil Boring Location Sketch

Soil Boring Log B-1 thru B-4

Descriptive Terminology

= Approximate Soil Boring Location

BM = Approximate Benchmark Location

Construction Engineering Laboratory 5661 International Parkway Minneapolis, MN	**Soil Boring Location Sketch** **Meadows of Maple Plain** **Maple Plain, Minnesota**	Figure #: 1 Drawn By: PSG Date: 3/06/14 Scale: None CEL Project: L14008

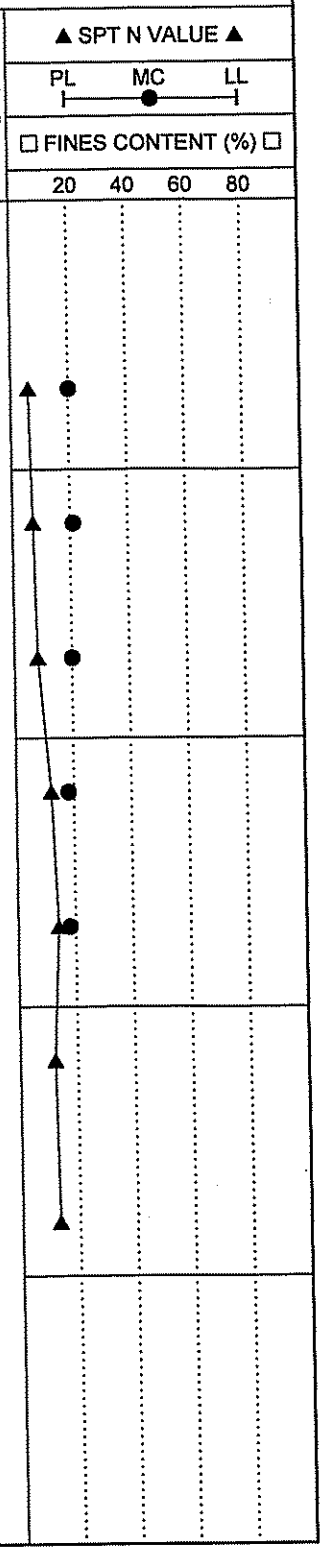
BORING NUMBER B-1

Construction Engineering Laboratory
5661 International Parkway
Minneapolis, MN 55428

CLIENT Rose Creek Builders
PROJECT NUMBER L-14008
DATE STARTED 2/26/14 COMPLETED 2/26/14
DRILLING CONTRACTOR STS Enterprises LLC
DRILLING METHOD Hollow Stem Auger & Split Spoon Sampler
LOGGED BY STS CHECKED BY PSG
NOTES

PROJECT NAME Meadows of Maple Plain
PROJECT LOCATION Maple Plain, MN
GROUND ELEVATION 103.5 ft HOLE SIZE 3 1/4
GROUND WATER LEVELS:
AT TIME OF DRILLING NE
AT END OF DRILLING NE
AFTER DRILLING NE

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
		Lean Clay, slightly organic to organic, black, frozen (TOPSOIL).	AU 1	100			
		Sandy Lean Clay, trace Gravel, light gray and brown, moist to wet, medium to rather stiff (GLACIAL TILL).	SS 2	100	3-3-3-4 (6)	1/2	
5			SS 3	100	3-3-4-5 (7)	1	
			SS 4	100	3-4-4-5 (8)	1	
10		Sandy Lean Clay, trace Gravel, gray, moist to wet, rather stiff (GLACIAL TILL).	SS 5	100	4-5-7-8 (12)	1	
			SS 6	100	4-5-9-9 (14)	1	
15			SS 7	100	4-5-7-9 (12)	1 1/2	
			SS 8	100	4-6-7-9 (13)	2 1/2	
20		Bottom of hole at 20.0 feet.					



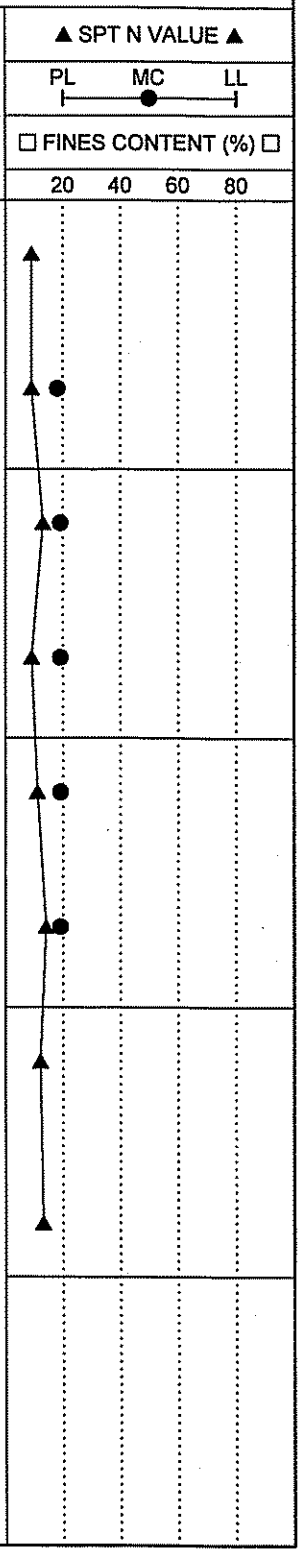
GEOTECH BH PLOTS L 14008 MEADOWS.GPJ GINT US.GDT 3/4/14

Construction Engineering Laboratory
5661 International Parkway
Minneapolis, MN 55428

BORING NUMBER B-2

CLIENT Rose Creek Builders
PROJECT NAME Meadows of Maple Plain
PROJECT NUMBER L-14008
PROJECT LOCATION Maple Plain, MN
DATE STARTED 2/26/14 COMPLETED 2/26/14
GROUND ELEVATION 110.9 ft HOLE SIZE 3 1/4
DRILLING CONTRACTOR STS Enterprises LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger & Split Spoon Sampler
AT TIME OF DRILLING NE
LOGGED BY STS CHECKED BY PSG
AT END OF DRILLING NE
NOTES
AFTER DRILLING NE

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
		Lean Clay, slightly organic to organic, black, frozen (TOPSOIL).					
		Sandy Lean Clay, trace Gravel, light gray and brown, moist to wet, rather stiff (GLACIAL TILL).	SS 1	50	4-4-5-5 (9)		
			SS 2	100	4-4-5-5 (9)	2	
5		Sandy Lean Clay, trace Gravel, grayish brown with rust stains, moist to wet, rather stiff (GLACIAL TILL).	SS 3	83	4-5-8-9 (13)	2	
			SS 4	100	4-4-5-7 (9)	2 1/2	
10			SS 5	100	4-5-6-7 (11)	2 1/2	
			SS 6	100	4-6-8-9 (14)	2 1/2	
15			SS 7	100	4-5-7-8 (12)	1 1/2	
		Sandy Lean Clay, trace Gravel, gray, moist to wet, rather stiff (GLACIAL TILL).	SS 8	100	4-5-8-11 (13)	1 1/2	
20		Bottom of hole at 20.0 feet.					



GEOTECH BH PLOTS L 14008 MEADOWS.GPJ GINT US.GDT 3/4/14

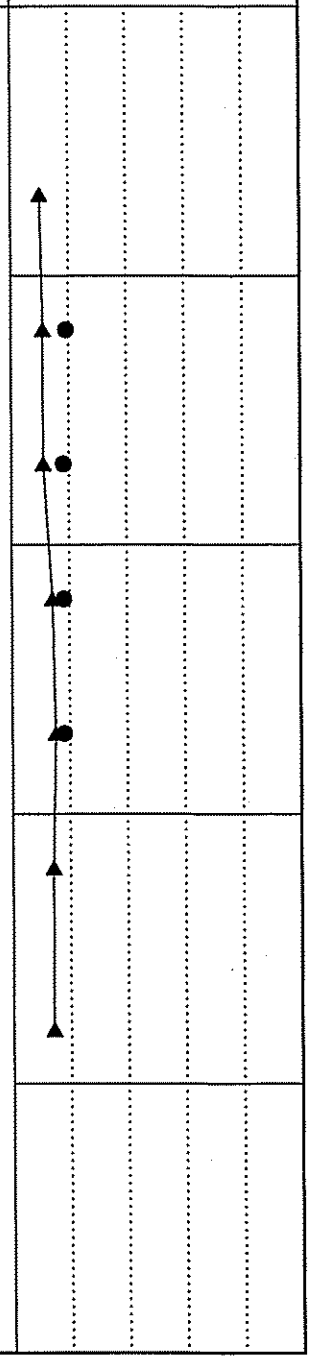
Construction Engineering Laboratory
5661 International Parkway
Minneapolis, MN 55428

BORING NUMBER B-3

CLIENT Rose Creek Builders
PROJECT NAME Meadows of Maple Plain
PROJECT NUMBER L-14008
PROJECT LOCATION Maple Plain, MN
DATE STARTED 2/26/14 COMPLETED 2/26/14
GROUND ELEVATION 109.2 ft HOLE SIZE 3 1/4
DRILLING CONTRACTOR STS Enterprises LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger & Split Spoon Sampler
AT TIME OF DRILLING NE
LOGGED BY STS CHECKED BY PSG
AT END OF DRILLING NE
NOTES
AFTER DRILLING NE

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
		Lean Clay, slightly organic to organic, black, frozen (TOPSOIL).	AU 1	100			
			SS 2	50	4-4-6-6 (10)		
5		Sandy Lean Clay, trace Gravel, light gray and brown, moist to wet, rather stiff (GLACIAL TILL).	SS 3	100	4-5-6-7 (11)	1	
		Sandy Lean Clay, trace Gravel, grayish brown with rust stains, moist to wet, rather stiff (GLACIAL TILL).	SS 4	100	4-5-6-7 (11)	3 1/2	
10			SS 5	100	4-7-7-8 (14)	1 1/2	
			SS 6	100	4-7-8-9 (15)	2 1/2	
15		Sandy Lean Clay, trace Gravel, gray, moist to wet, rather stiff (GLACIAL TILL).	SS 7	100	4-6-8-9 (14)	2	
			SS 8	100	4-6-8-9 (14)	2	
20		Bottom of hole at 20.0 feet.					

▲ SPT N VALUE ▲
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



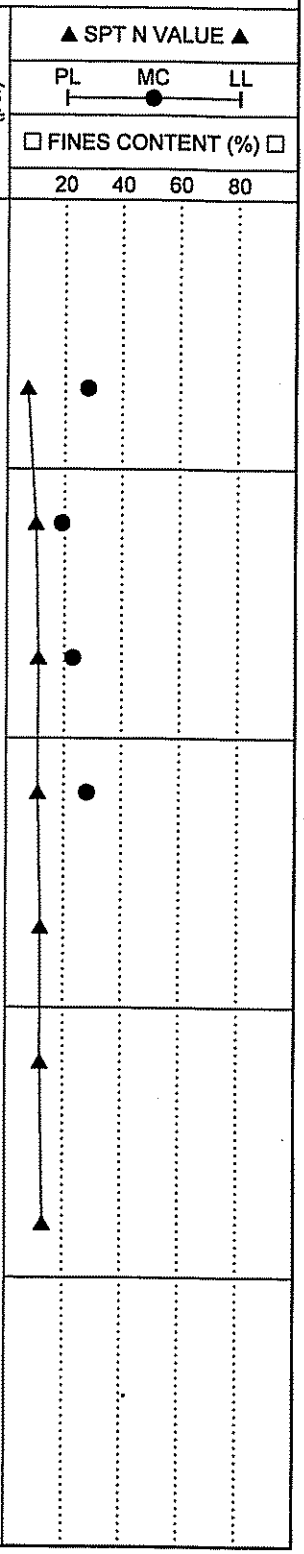
GEOTECH BH PLOTS L 14008 MEADOWS.GPJ GINT US.GDT 3/4/14

Construction Engineering Laboratory
5661 International Parkway
Minneapolis, MN 55428

BORING NUMBER B-4

CLIENT Rose Creek Builders
PROJECT NAME Meadows of Maple Plain
PROJECT NUMBER L-14008
PROJECT LOCATION Maple Plain, MN
DATE STARTED 2/26/14 COMPLETED 2/26/14
GROUND ELEVATION 104.9 ft HOLE SIZE 3 1/4
DRILLING CONTRACTOR STS Enterprises LLC
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger & Split Spoon Sampler
AT TIME OF DRILLING 17.5 ft / Elev 87.4 ft
LOGGED BY STS CHECKED BY PSG
AT END OF DRILLING 11.7 ft / Elev 93.2 ft
NOTES
AFTER DRILLING —

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
		Lean Clay, slightly organic to organic, black, frozen (TOPSOIL).					
		Sandy Lean Clay with numerous interbedded sand seams, brown, moist to wet, medium to rather stiff (GLACIAL TILL).	AU 1	100			
			SS 2	92	3-4-3-4 (7)		
5							
			SS 3	92	4-5-5-6 (10)		
			SS 4	92	4-5-6-7 (11)		
10							
			SS 5	100	4-5-6-7 (11)		
			SS 6	100	4-5-7-7 (12)		
15							
		Lean Clay, brown, moist to wet, rather stiff (GLACIAL TILL).	SS 7	100	4-5-7-7 (12)	1 1/2	
		Sandy Lean Clay with sand seams, brown, moist to wet, medium to rather stiff (GLACIAL TILL).	SS 8	92	4-5-8-10 (13)	2	
20							
		Bottom of hole at 20.0 feet.					



GEOTECH BH PLOTS L 14008 MEADOWS.GPJ GINT US.GDT 3/4/14

CONSTRUCTION ENGINEERING LABORATORY, INC.
TESTING FOR QUALITY AND STRENGTH

GENERAL TERMINOLOGY NOTES

DRILLING & SAMPLING SYMBOLS:

SL:	SS with Liner	FA:	Flight Auger
SS:	Split Spoon – 1 3/8" I.D., 2" O.D., unless otherwise noted	HA:	Hand Auger
ST:	Shelby Tube – 2" O.D., unless otherwise noted	OS:	Osterberg Sampler – 3" Shelby Tube
PA:	Power Auger	HS:	Hollow Stem Auger
DB:	Diamond Bit – NX:BX:AX	WS:	Wash Sample
AS:	Auger Sample	RB:	Rock Bit
JS:	Jar Sample	PM:	Pressuremeter test-in situ
VS:	Vane Sheer		

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2" O.D. split spoon, except where noted.

GRADATION DESCRIPTION & TERMINOLOGY:

Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a #200 Sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays or clayey silts if they are cohesive, and silts if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency, and their plasticity.

Major Component of Sample	Size Range
Boulders	Over 8" (200mm)
Cobbles	8" to 3" (200mm to 75mm)
Gravel	3" to #4 Sieve (75mm to 2mm)
Sand	#4 to #200 Sieve (2mm to .074mm)
Silt	Passing #200 Sieve (.074mm to .005mm)
Clay	Smaller than .005mm

Relative Proportions of other component in Sample	Percent of Dry Weight
Trace	1 - 9
Little	10 - 19
Some	20 - 34
And	35 - 50

STRATIFICATION

Term	Thickness
Layer	> ½'
Seam	½" to ½'
Lense/Lamination	< ½"

CONSISTENCY OF COHESIVE SOILS:

Unconfined Comp. Strength, Qu,tsf	Consistency
< .25	Very soft
.25 - .49	Soft
.50 - .99	Medium (Firm)
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
> 8.00	Very Hard

RELATIVE DENSITY OF GRANULAR SOILS:

N – Blows/ft.	Relative Density
0 - 3	Very loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
80+	Extremely Dense

WATER LEVEL INFORMATION:

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated and under conditions noted. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence of ground water elevations must be sought.

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E-mail: cel.engineer@palanisami.com

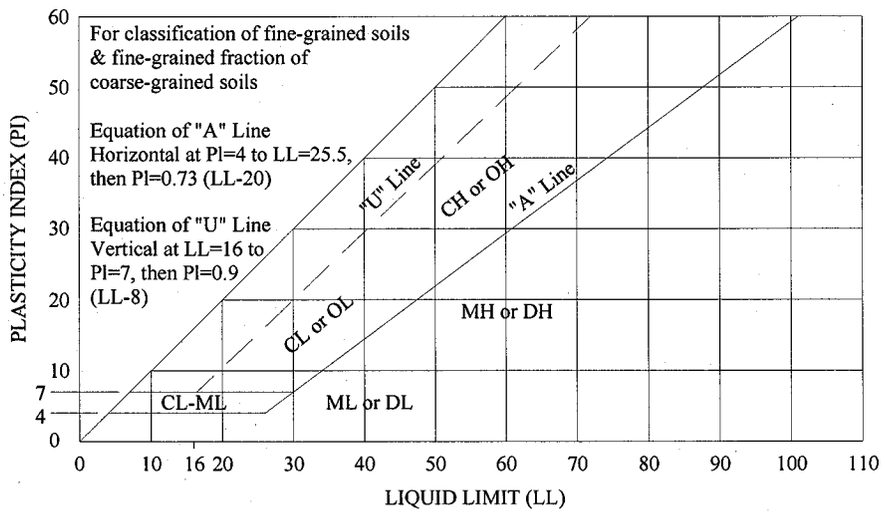
CONSTRUCTION ENGINEERING LABORATORY, INC.
TESTING FOR QUALITY AND STRENGTH

SOIL CLASSIFICATION CHART

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D2487-85
(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols & Group Names Using Laboratory Tests[A]				Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines[C]	Cu≥4 and 1≥Cc≥3[E]	GW	Well graded Gravel[F]
			Cu<4 and/or 1>Cc>3[E]	GP	Poorly graded Gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty Gravel [F,G,H]
			Fines classify as CL or CH	GC	Clayey Gravel [F,G,H]
	Sands 50% of more of coarse Fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	Cu≥6 and 1≤Cc≤3[E]	SW	Well graded Sand[I]
			Cu<6 and/or 1>Cc>3	SP	Poorly graded Sand[J]
		Sands with Fines More than 12% fines[C]	Fines classify as ML or MH	SM	Silty Sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey Sand [G,M,J]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI>7 and plots on or above "A" line	CL	Lean Clay [K,L,M]
			PI<4 and plots below "A" line	ML	Silt [K,L,M]
		Organic	Liquid limit – oven dried / Liquid limit – not dried <.75	OL	Organic Clay [K,L,M,N] / Organic Silt [K,L,M,O]
Highly organic soils	Primarily matter, dark in color and organic odor			PT	Peat
Fibric Peat > 67% Fibers	Hemic Peat 33%-67% Fibers	Sapric Peat < 33% Fibers			

A Based on the material passing the 3" (75mm) Sieve
B If field sample contained cobbles or boulders or both, Add "with cobbles or boulders or both" to group name
C Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded Gravel with Silt
GW-GC well-graded Gravel with Clay
GP-GM poorly-graded Gravel with Silt
D Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded Sand with Silt
SW-SC well-graded Sand with Clay
SP-SM poorly-graded Sand with Silt
SP-SC poorly-graded Sand with Clay
E $Cu = D_{60} / D_{10}$ $Cc = (D_{30})^2 / (D_{10} \times D_{60})$
F If soil contains 15% sand, add "with sand" to group name.
G If fines classify as CL-CM, use dual symbol GC-CM or SC-SM.
H If fines are organic, add "with organic fines" to group name.
I If soil contains 15% gravel, add "with gravel" to group name.
J Atterberg limits plot in hatched area. Soil is a CL-CM, Silty Clay
K If soil contains 15 to 25% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L If soil contains ≥ 30% plus No. 200, predominately gravel, add "gravely" to group name.
N PI ≥ A and plots on or above "A" line.
O PI < A and plots below "A" line.
P PI plots on or above "A" line.
Q PI plots below "A" line.



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E-mail: cel.engineer@palanisami.com

CITY OF MAPLE PLAIN
LAND USE APPLICATION REVIEW SIGN OFF

Name of Development Review Team Member: Dave Eisinger, Fire Chief

Firm/Agency: FD

Materials Distributed: **Date:** 5-6-14

Materials Received: **Date:** _____

Materials Provided:

Need hydrants as suggested by Dan

Brief Project Description: Meadows of Maple Plain

Review Completed: **Date:** _____

☐ Project does not require my review

Comments Returned: **Date:** 5-20-14

David Eisinger 5-20-14
Name (Signature) *Date*

Comments Received: **Date:** 5-20-14

Margaret McCall 5-20-14
Name (Signature) *Date*

Return form and comments to: City of Maple Plain
1620 Maple Avenue, P.O. Box 97
Maple Plain, MN 55359

CITY OF MAPLE PLAIN
LAND USE APPLICATION REVIEW SIGN OFF

Name of Development Review Team Member: Gary Knoells, Police Chief

Firm/Agency: WHPS

Materials Distributed: **Date:** 5-6-14

Materials Received: **Date:** 5-6-14.

Materials Provided:

3 parking stalls at park area.
Park use only for using parking area. Not for public parking for the street.

Brief Project Description: Meadows of Maple Plain

Review Completed: **Date:** 5-6-14

☐ Project does not require my review

Comments Returned: **Date:** 5-6-14

Gary S. Knoells — 5-6-14.
Name (Signature) *Date*

Comments Received: **Date:**

Name (Signature) *Date*

Return form and comments to: City of Maple Plain
1620 Maple Avenue, P.O. Box 97
Maple Plain, MN 55359

City of Maple Plain

Subdivision, Rezoning, Preliminary and Final Plat Approval Request for A New Eighteen Lot Subdivision to be Known as the Meadows of Maple Plain

To:	Planning Commission
From:	Mark Kaltsas, City Planner
Meeting Date:	June 5, 2014
Applicant:	Rose Creek Builders
Owner:	Rose Creek Builders
Location:	North of Highway 12 Between Boundary and Howard Avenues

Request:

Rose Creek Developers (Owner) requests that the City consider the following action for the property located near the intersection of Howard Avenue and Main Street East (PID No's. 25-118-24-11-0029, 25-118-24-11-0015):

a. Subdivision of the property into 18 single-family home sites.
b. Rezoning to Planned Unit Development – Mixed Use
c. General Plan/Preliminary Plat
d. Final Plat of Subdivision

Property/Site Information:

The property is located north of Highway 12 and in between Boundary and Howard Avenues. The subject property is accessed via Boundary and Howard Avenues just off of Highway 12. The property is currently vacant open space. The property has the following characteristics:

Property Information: PID No's. 25-118-24-11-0029, 25-118-24-11-0015
Zoning: *MU-G Mixed Use - Gateway*
Comprehensive Plan: *Mixed Use*
Acreage: *3.31 Acres*

Site Aerial

Discussion:
The applicant is seeking preliminary and final plat approval for an eighteen (18) lot subdivision to be known as the Meadows of Maple Plain. The proposed subdivision would create a new subdivision of single-family lots across three existing properties. The applicant previously approached the City with a sketch plat in January of this year. The City reviewed the sketch plan and offered comments to the applicant. The applicant is now proposing to formally seek approval to subdivide the property into the proposed subdivision. The City has provided the applicant with the necessary steps to move forward with a review of the project.

Comprehensive Plan

The City's comprehensive plan has designated this area as Mixed Use allowing uses such townhomes, commercial and offices to be considered appropriate developments. Conceptual plans created during the updating of the comprehensive plan had shown a possible development scenario for this area as townhomes. It was thought that the townhomes could be a compatible use separating the residential properties to the north and the commercial and highway businesses to the south.

The comprehensive plan identified a housing density range of 5-20 units per acre for the Gateway Mixed Use District. The proposed site is shown as having a total acreage of around 3.3 acres. A development of 18 units would yield a density for the project of just over 5 units per acre, achieving the City's desired density range.

Planned Unit Development (PUD)

The designation of mixed-use was established as part of the comprehensive plan update to provide flexibility in development to best accommodate market trends and needs. The City's zoning districts and design guidelines were then established to ensure City wide uniformity with new development. A Planned Unit Development (PUD) ties the two together by allowing the developer flexibility from the zoning standards in return for incorporating City objectives.

The zoning tool that allows flexibility from standard zoning requirements such as setbacks and building placement is the PUD. A Planned Unit Development is a project developed through negotiating development desires with City goals for a common good. Under a PUD the City could allow flexibility from standard zoning in lieu of a developer providing a public good that the City could not obtain during a normal process, such as added landscaping or amenities.

The PUD does not ignore the standards established within the zoning code but uses them as the base line for all development negotiations. The developer must work from what are the allowed standards and then if they need flexibility to improve the project they must provide justification to allow an alteration from the standard. Thus, in review of a PUD plan the City should first consider how the development would work with the district standards and determine if alterations form those standards improve the project and if they provide a public benefit.

Design Guidelines

The project is subject to the requirements of the design guidelines. Like zoning, the design guidelines will be the base line for reviewing the design elements of the project. Although the City may vary from the design guidelines reasons for the non-conformance should be justified. The design guidelines were established to provide uniformity and connectivity throughout development with the use of similar elements (lights & building materials) plus public paths.

Rezoning

A component of developing as a PUD is that the City must approve the rezoning of the land from Mixed-use to PUD Mixed Use. This identifies that the site was developed under specific requirements different than the zoning district standards.

The PUD process is intended to benefit both the City and developer such that the project is made better by allowing for the PUD. The Planning Commission and City Council should consider the projects ability to meet the intent of the PUD by providing the City with the following benefits:

- Development that complies with the City's Comprehensive Plan

- Allow for the appropriate mixing of land uses that is not currently allowed
- Flexibility in zoning standards (setbacks, height, etc.) for improvements of other amenities beyond the requirements of the city codes
- Create a more efficient approach to land use
- Preserve natural features
- Improve the efficiency of public streets and utilities
- Establish an appropriate transition to surrounding land uses

The applicant is proposing to establish standards for the proposed PUD that depart from the City's current standards. The City will need to determine if the proposed new standards along with the lot configuration, transportation, park and trail system and other aspects of the development satisfy the intent of the PUD provisions. The City has completed a review of the proposed development and provided a list of comments that will need to be addressed by the applicant. The City anticipates that the applicant will address the comments in a revised set of plans prior to consideration and review by the City Council. In addition to the review comments provided in this report, the City's engineer has prepared a comprehensive review of the development. The review letter is attached to this report. The following comments should be considered by the City in reviewing the request for approval of a PUD.

General Plat

1. The applicant is proposing to construct a new east west street and cul-de-sac to provide access into the development. The streets are proposed to be private and maintained by the homeowners association.

2. The utilities should be public and constructed in accordance with all applicable City standards.

3. The applicant is proposing to develop a tot lot on Outlot A to satisfy the City's park dedication requirements. The proposed park has been reviewed by the City (Park Commission) and recommended for approval as a City Park. The Outlot would be deeded to the City as a part of the development agreement and final plat. The developer will install playground equipment as a part of their park dedication requirements. The final park plans will need to be reviewed and approved by the Park Commission and Council prior to installation.

4. Lot standards proposed for the development compare to the underlying zoning as follows:

	Existing	Proposed
Minimum Lot Size:	6,000 SF	4,500 SF
Minimum Lot Width:	100 feet	varies
Front Yard Setback:	5-10 feet	20 feet
Side Yard:	10 feet	5 feet
Corner Side Yard:	20 feet	20 feet
Rear Yard:	20 feet	15 feet

A consideration relating to the proposed setbacks is that there will likely have to be a specific designation pertaining to decks. The applicant has provided several house plans which appear to utilize the entire building area shown on the plans. The City will need to consider whether or not an additional setback should be established for decks. A 5 foot rear and side yard setback could be considered to allow decks to be constructed in the rear yards of the proposed homes. Staff will be seeking direction from the City relating to an additional setback for decks.

Public Facilities

1. The City previously requested that the developer provide an easement along the north property line that would accommodate a future east west trail connection. The applicant has provided a 10' drainage and utility easement. The City should ensure that this easement can be used for trail purposes if required in the future.

2. The plans propose a sidewalk along the primary east west road. The sidewalk is proposed to be 4' in width. In order to accommodate multiple persons utilizing the sidewalk, it is recommended that the sidewalk be a minimum of 5' in width.

3. The pond proposed on Outlot B appears to encroach onto the several lots. It is recommended that the pond be adjusted to not encroach onto the private lots.

4. The proposed stormwater facility should be maintained by the homeowners associate. The City should consider requiring a stormwater maintenance agreement covering the proposed stormwater facility.

5. The proposed paved portion of the cul-de-sac is shown with a total diameter of 60 feet. This meets the minimum City requirement of 48 feet. This dimension is should be approved by the Fire Department.

6. The proposed subdivision does not currently indicate street light locations or types. The City will require the lights to meet all City lighting standards for both performance and design. This includes meeting the requirements of the City's design standards.

Landscaping

1. The applicant has prepared a tree preservation plan for the development. The plan provides a calculation of the total caliper inches removed and required to be replaced. The applicant is proposing to remove more than 30% of the total vegetation on the property. The City has a table which stipulates the required replacement planting based on the percentage of existing trees removed. The required number of caliper inches to be replaced for the proposed development is 92.5". The proposed landscaping plan includes 92.5" of new vegetation.

2. In addition to the replacement landscaping shown on the plans, it is recommended that the City require additional landscape screening along both the north and south property lines. Given the existing commercial use of the property to the south and the lower density residential to the north,

additional buffer landscaping could mitigate any adverse impacts while aiding in the transition between land uses. Increased landscaping is one of the criteria which could merit granting a PUD by the City. The City's ordinance requires that any landscaping required as a result of tree replacement should be in addition to all other applicable standards.

Signage

1. The applicant is not proposing any signage as a part of the proposed development. It should be noted that any signage will need to meet all applicable criteria of the City' sign ordinance.

Engineering/Storm Water/Utilities

1. See comment letter dated May 23, 2014 and prepared by Dan Boyum, City Engineer.

The applicant is asking the City to consider approving both the preliminary and final plat consecutively. The City allows for the subdivision of property in the MU-G zoning district if all applicable criteria for granting a subdivision are met by the applicant.

Planned Unit Developments allow for flexibility in design and relief from the traditional zoning and subdivision standards. It is the intent of the PUD to encourage creativity in design while meeting the general spirit of the underlying zoning standards. The City will need to determine if the proposed development meets the intent of the PUD as well as the subdivision and zoning requirements established by the City. Should the Planning Commission recommend approval of the subdivision, rezoning and preliminary and final plat, the City will work with the developer to address all outstanding comments prior to moving forward to the City Council.

Neighbor Comments:

The City has not received any written or oral comments regarding the proposed subdivision, rezoning and preliminary and final plat.

Recommendation:

Staff is seeking a recommendation from the Planning Commission for the request for a Subdivision, Rezoning and Preliminary and Final Plat with the following findings and conditions:

1. The proposed subdivision, rezoning and preliminary and final plats meet all applicable conditions, criteria and restrictions stated in the City of Maple Plain Subdivision and Zoning Ordinance.

2. City Council approval of the Subdivision, Rezoning and Preliminary and Final Plats is subject to the following:

    a) The Applicant shall address all engineering comments as outlined in the engineering review letter from Stantec, dated May 23, 2014.

    b) The Applicant shall make all revisions requested in the staff report, by the Planning

Commission and City Council.

c) The Applicant shall comply with all applicable regulations and conditions prescribed by Minnehaha Creek Watershed District.

d) The Applicant shall enter into a development agreement with the City for this development.

e) The Applicant shall provide a letter of credit as established by the development agreement for all improvements associated with this development.

f) The Applicant shall provide the City with copies of the HOA agreement and covenants, including information related to the maintenance plantings and storm water easements.

g) The Applicant shall obtain all necessary City, County, PCA and other regulatory agency approval and permits prior to construction.

3. The Applicant shall pay for all costs associated with the City's review of the subdivision, rezoning and preliminary and final plats.

4. The Applicant shall file the final plat with the county within six (6) months of approval.

Attachments:

1. Preliminary Plat
2. Tree Preservation Plan
3. Tree Replacement Plan

Stantec

Memo

To:	Mark Kaltsas	From:	Dan D. Boyum
	City Planner		City Engineer
File:	193801803	Date:	May 23, 2014

Reference: Proposed Meadows of Maple Plain

We have reviewed the preliminary plat package dated 3/23/14 (plotted 5/5/14) and storm water calculations dated 5/5/14 and have the following comments:

General and Preliminary Plat

1. It is our understanding the street will be private and maintained by homeowners association. Appropriate HOA documents will need to be approved by the City Attorney.

2. Utilities – I am not aware if the developer is proposing the sanitary sewer, water main, and storm sewer utilities to be public or private. We recommend utilities serving residential properties be public because of the:

    a. complexities for home owners associations related to operations and maintenance of these utilities

    b. future issues with Infiltration and Inflow, water leaks, hydrant and gate valves not working for a fire, MS4 permit issues, etc.

    The City should make a decision if the sanitary sewer, water, and storm sewer will be public or private.

3. Ownership of Outlot A – If the City agrees that the utilities will be public, then the City would need a drainage and utility easement over Outlot A.

4. Tot Lot – If this remains a private lot, then I would defer to the City Attorney and City Planner if this area should become its own Outlot. Right now it is all part of Outlot A.

5. Outlot B – The City has few maintenance responsibilities on existing ponds or basins currently in the City since most are considered private. As discussed in Item No. 2 above, the City should review the private versus public nature of the filtration basin. If it is agreed it will be public, then the City should get a drainage and utility easement over Outlot B. See other comments below related to Outlot B under "Grading and Erosion Control Plan" and "Stormwater Rate Control and Water Quality Design".

6. Existing electrical easement on Lots 6, Block 1 and Outlot A – The developer should update the City as to whether this existing electrical easement for overhead lines will be vacated and if the utilities will be buried and relocated to platted drainage and utility easements or abandoned. It appears the existing easement will conflict with the building pad on Lot 6, Block 1.

Reference: Proposed Meadows of Maple Plain

7. Lot 8, Block 1 – The easement should be squared off at the NE corner of the lot since drainage is crossing this area.

8. The bearing along south lot lines of Lot 8 and 9, Block 2 – The preliminary plat shows "05 seconds West" but the description under Parcel 3 shows "04 seconds West". This should be adjusted and one of them corrected.

9. Street Lights – The developer should confirm the style of street lights they are proposing to provide with the project. The City has design guidelines on street lights, and the street lights used recently on TH 12 and Main Street East meet those guidelines and are installed by the Xcel Energy Street Lighting Division.

10. Street Names – will need to be designated for the final plat.

11. Various permits need to be applied for by the developer (MPCA for sanitary sewer and NPDES, MN Department of Health for water main, Minnehaha Creek for wetland mitigation and other items, etc.). Copy the City and our office on all permit submittals and responses.

12. The developer's engineer should forward an engineer's estimate. We will use that information in preparing a letter of credit recommendation for the developer's agreement.

<u>Existing Conditions (Sheet C1)</u>

13. It appears adjacent property owners at the northwest corner of the plat have existing sheds that encroach upon the new development property. These property owners should be contacted about moving these sheds.

14. See Item No. 8 above.

<u>Grading and Erosion Control Plan (Sheet C2)</u>

15. The silt fence location is difficult to see on the grading plan, possibly due to the plat limits. This information should be shown on revisions.

16. A concrete washout area and detail should be shown on the plans.

17. Inlet protection should be shown on all inlets in and adjacent to the development.

18. The legend should be updated to show an inlet protection and erosion control blanket stabilization symbol.

19. A valley gutter should be located along the south curb line of the proposed east/west street, across the cul-de-sac entrance, since the slope in this area is less than 2%.

20. The City has experienced property owner issues with draintile used for rear yard drainage versus storm sewer piping. Thus, draintile in the rear yards of Lots 1-5, Block 1 should be replaced with 12-inch RCP (or HDPE) and shallow beehive catch basins along the north lot lines of Lots 1 through 5.

Reference: Proposed Meadows of Maple Plain

21. The proposed rear yard drainage swale in Block 1, Lots 5-9 should be pushed north within the drainage and utility easement.

22. The proposed pond should have a defined Emergency Overflow (EOF) a minimum of 0.5 feet below the top of berm elevation. The EOF should armored with rip rap.

23. The City standard for engineered soil in filtration areas is 70% clean sand and 30% MnDOT Grade 2 Organic Leaf Compost. The thickness of the material should be a minimum of 12-inches. The local watershed may have a different requirement, and that can be reviewed with revisions.

24. The proposed draintile installation in the filtration feature should follow the City or Watershed's standard. The City's standard is to have type 1 geotextile fabric wrapped around the coarse filter aggregate; however no sock should be around the draintile itself.

25. The pond slopes are shown greater than 3:1. It is preferred to have a pond with a 4:1 slope and not greater than 3:1 slope. Also, having a maintenance access (generally a minimum of 8 feet wide and at a 10:1 slope) along the side of the proposed pond should be provided.

26. Even though adjacent lots have a 5-foot drainage and utility easement along their lot lines next to the Outlot B basin, keeping the 100-year water elevation of the filtration basin within the outlot property can minimize future property owner concerns about water encroaching on their property. Currently the 100-year elevation goes outside of Outlot B.

27. The developer's engineer should review the flatter rear yard drainage swales on Lot 8 and 9, Block 1.

28. The slopes of the side yard of Lot 9, Block 2 appear to exceed 3:1.

29. The preliminary grading on Lot 4 and 7, Block 2 appears to be direct flows to the building pad and should be reviewed by the developer's engineer.

30. The NW corner of the building pad on Lot 6 and 7, Block 2 encroaches on the drainage and utility easement.

31. Some design contours along the SE corner of the plat boundary do not appear to tie into existing contours.

32. The City anticipates some grading is needed within the public right-of-way of Boundary and Howard Avenue. If there is other grading outside of the plat boundaries, the developer will need to get permission from adjacent properties to do this work. At this time it appears there is no proposed grading on adjacent private property.

<u>Stormwater Rate Control and Water Quality Design</u>

33. To prevent the filtration basin clogging up from sediment, additional pre-treatment of stormwater runoff prior to discharging into the proposed filtration basin is recommended (i.e. a sump catch basin is not sufficient). We anticipate the Watershed will comment on this

Reference: Proposed Meadows of Maple Plain

also. Pre-treatment options include a structural treatment device or reconfiguration of the proposed pond to incorporate a sediment basin cell that overflows to a filtration area.

34. There are concerns with a stormwater system that relies exclusively on filtration to drain dry. Thus, a pond outlet structure with a small diameter orifice set at an elevation that provides the required filtration volume, but also drains the pond down to a set elevation, should be provided. See the attached outlet structure option, which is a less expensive alternative to a typical round outlet control structure with an internal weir wall.

35. There is limited stormsewer capacity available in the existing Boundary Avenue and MNDOT stormsewer system to accommodate ponded development flows. We recommend the discharge rates from the proposed pond be limited to approximately 7 cfs for the 100-year storm event based on the downstream system.

36. The HydroCAD model should include a "summation" node to show the composite proposed discharge rate from the site.

37. The proposed pond outlet configuration in the HydroCAD model should match the pond outlet shown in the plans.

38. It appears that the required filtration feature treatment volume calculation reflects all new site impervious (from nodes C and E), but please confirm.

39. A minimum of 2 feet of cover over stormsewer in green space areas should be provided.

<u>Street and Utility Plan (Sheet C3):</u>

40. The stormsewer segment from CB 207 to CBMH 206 should be shown on the stormsewer profile sheets.

41. Per discussions with the fire chief, a hydrant and valve should be added at the entrance to Boundary and Howard Avenue to meet the fire department's 300' spacing requirement.

42. The watermain connection to Howard is being placed along the lot lines between Lot 8 and 9, Block 2. Generally, extending the watermain along the ROW of Howard or in drainage and utility easements along the east side of Lot 9, Block 2 is recommended to avoid future disturbance between these two homes if there are problems with the water line. Also, this new location will work better for placing the hydrant discussed in Item No. 42.

43. The water service to Lot 9, Block 2 will need to adjust if the watermain is rerouted as discussed in Item No. 42 above.

44. All DIP watermain should be changed to PVC, C900.

45. Lower the watermain at Station 4 + 60 so air is not trapped in the line. If a high point is needed in a water line, it should be at a hydrant so air can be released from the main.

Reference: Proposed Meadows of Maple Plain

46. Add a gate valve on the east side of the 8" x 6" tee located at Station +/- 3+40. Public Works should comment if they prefer the three valves in this location to be next to the tee or spread out, close to the ROW of the street.

47. The developer is proposing to test the watermain against the existing valve located at Boundary placed in 2012.

48. Private Street Width – The development is showing a street width of 24' from back of curb to back of curb. We would recommend a 24' width from face of curb to face of curb.

49. Driveway length from curb or sidewalk – it appears the driveways for the townhomes are shown at 20' in length from the building pad to the walk or curb, except for Lot 5, Block 2 which is 18'. Most people will not park right up to the garage door, so with larger vehicles, there may be overhang across the walk or curb if the building is placed on the front edge of the building pad. The developer should comment on whether garages will be set back more than the front building pad on the townhomes. If it is, this would help with this overhang concern and for public safety.

50. There are no signs restricting parking indicated on either side of the development roadways. We recommend parking be restricted on both sides of the street when street widths are 24' (face to face of curb) to allow for a 20' fire lane. Parking restrictions should be reviewed by Public Safety and the Fire Chief.

<u>Street and Utility Plan (Sheet C4):</u>

51. The stormsewer segment from OCS 211 to the existing manhole tie-in location should be shown on the stormsewer profile sheets.

52. Label watermain size and type (PVC, C900) in the cul-de-sac profile.

53. Cul-de-sac radius – the proposed radius for the cul-de-sac is around 28 to 29 feet, and the cul-de-sac is approximately 150 feet long. This dimension is less than other cul-de-sac radiuses in town that are between 40 and 45 feet. The smaller radius will not allow a standard bus or fire truck to turn around without making a few maneuvers. We recommend this cul-de-sac radius be reviewed by the Fire Chief to see whether this would be acceptable for the proposed shorter length street.

54. The right-of-way on a public street is used for snow storage. On these private streets, the drainage and utility easements will also be used for snow storage since Outlot A is so close to the curb and gutter. The east side of the cul-de-sac street is also close to the property line of the adjacent property. The HOA may need to reduce snow storage along this side of the cul-de-sac if snow storage goes outside of the plat and concerns are raised by the adjacent property owner.

Reference: Proposed Meadows of Maple Plain

Tree Replacement Plan (Sheet L2):

55. When placing trees in the field, make sure the two trees at the intersection with Howard and the one tree along the east side of cul-de-sac intersection stay out of the 20-foot sight triangle.

56. If the watermain is relocated as discussed in Item No. 42 above, then the tree located between Lots 8 and 9, Block 5 is okay.

57. Locate trees away from sewer and water service lines.

58. Depending upon the final maintenance access location for Outlot B, some of the tree locations may need to be adjusted.

Details (Sheet C8):

59. Based on soil conditions in Maple Plain, the City places draintile when new roads are reconstructed. This draintile also provides a location for sump connections. We understand the streets will be private and will not be maintained by the City; however we still recommend the developer consider placing draintile along the new private streets.

STANTEC CONSULTING SERVICES INC.

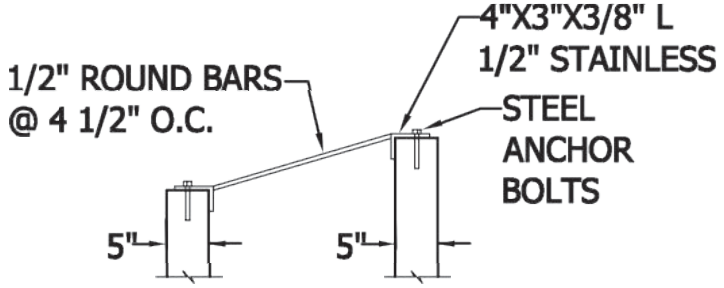
Dan Boyum
Associate
Phone: (651) 604-4829
Fax: (651) 636-1311
Dan.Boyum@stantec.com

Attachment: Pond Outlet Skimmer Structure Detail

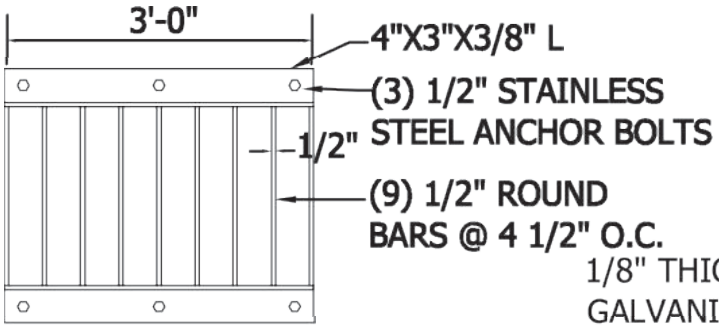
c. Tessia Melvin, Brent Mickolichek, Matt Morris, Maggie McCallum, Dave Eisinger, Gary Kroells, Jeff Carson, Andrew Berenberg, Michael Halley, Minnehaha Creek Watershed, Kellie Schlegel, Ann Dienhart

OUTLET STRUCTURE NOTES:

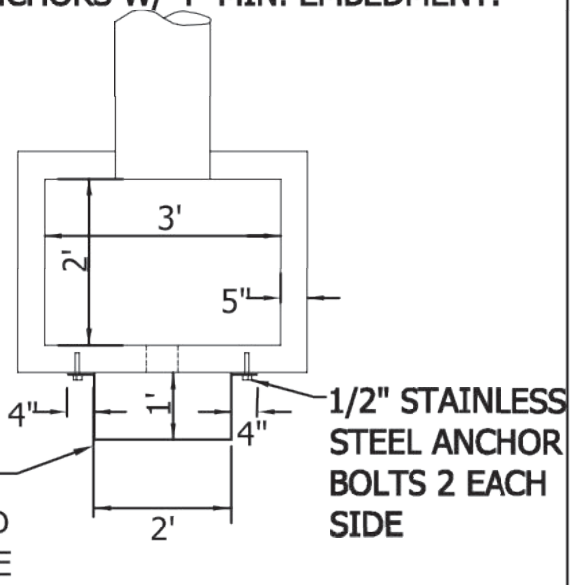
1. OUTLET STRUCTURE SHALL BE REINFORCED PRECAST CONCRETE.
2. GRATING SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.
3. ALL ANCHOR BOLTS SHALL BE 1/2"ϕ S.S. EXP. ANCHORS W/ 4" MIN. EMBEDMENT.



TOP VIEW



GRATE DETAIL



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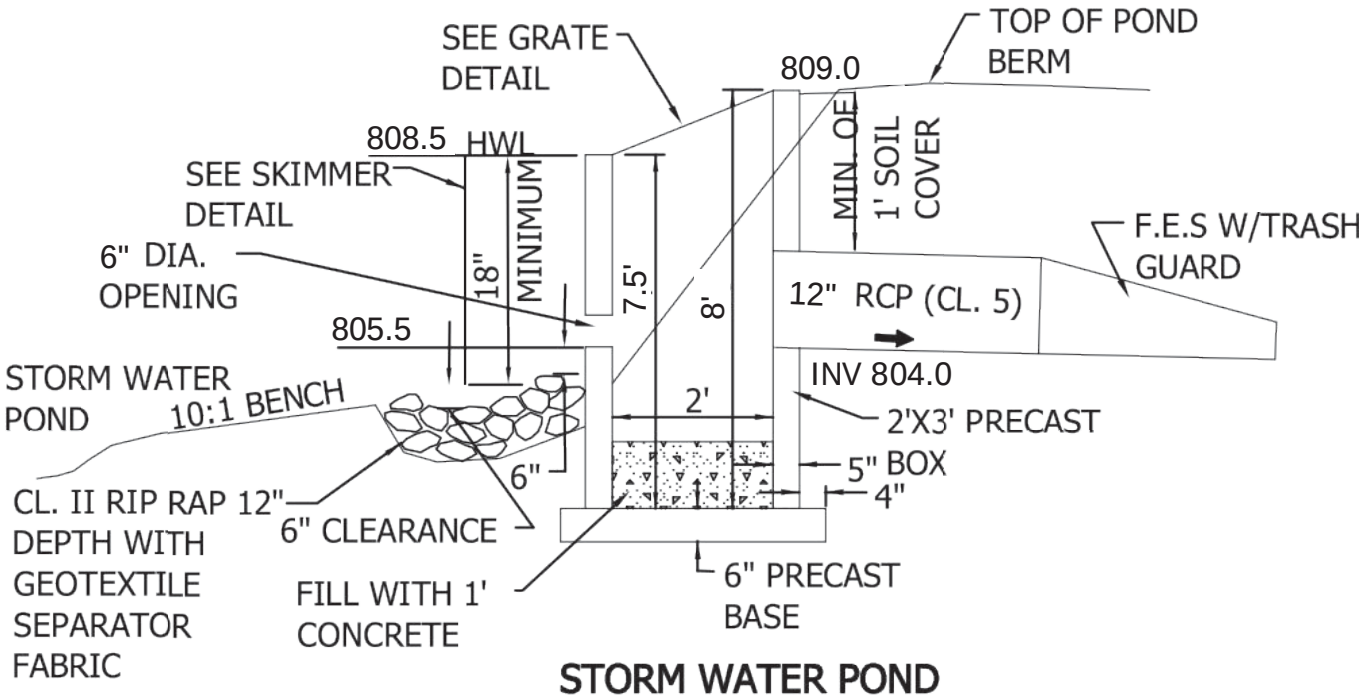

STORM WATER POND OUTLET STRUCTURE

NOT TO SCALE

City of Cottage Grove Minnesota

Stantec

STANDARD DETAILS

POND OUTLET SKIMMER STRUCTURE

COTTAGE GROVE, MINNESOTA

LAST REVISION: MARCH 2005

PLATE NO. STO-29

48_STO29.DWG