City of Ramsey
Agenda
Regular Planning Commission
Thursday, April 5, 2018
7:00 pm
Council Chambers, 7550 Sunwood Drive NW

1. Call to Order

2. Citizen Input

3. Approve Agenda

4. Approve Minutes

1. Approve the March 1, 2018 Planning Commission Meeting Minutes

5. Commission Business

1. Appoint Chairperson and Vice Chairperson of the Planning Commission.

6. Public Hearing

1. PUBLIC HEARING: Consider Home Occupation Conditional Use Permit for 5751 177th Ave NW (Project #17-152); Case of Tracer Landscape and Concrete LLC

7. Commission Business

1. Consider Site Plan for Sharp Industrial Building Located at 6590 141st Ave NW (Project No. 18-105): Case of Sharp & Associates

2. Consider Request for Extension for a Variance to Lot Depth for Homestead Road Addition (Project No. 16-32); Case of CTW Group Inc.

8. Comprehensive Plan Update Items

1. Review Draft Comprehensive Plan Update

9. Commission/Staff Input

1. Zoning Bulletins

10. Adjournment

Regular Planning Commission **4. 1.**

Meeting Date: 04/05/2018

By: JoAnn Shaw, Community Development

Information

Title:

Approve the March 1, 2018 Planning Commission Meeting Minutes

Purpose/Background:

N/A

Notification:

Observations/Alternatives:

Funding Source:

Recommendation:

Action:

Attachments

03 01 18 Minutes

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	JoAnn Shaw	03/30/2018 11:56 AM
Form Started By: JoAnn Shaw		Started On: 03/23/2018 12:00 PM
Final Approval Date: 03/30/2018		

PLANNING COMMISSION
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Ramsey Planning Commission conducted a regular meeting on Thursday, March 1, 2018, at the Ramsey Municipal Center, 7550 Sunwood Drive NW, Ramsey, Minnesota.

Members Present:	Chairperson Randy Bauer Commissioner Cheri Gengler Commissioner Cindy Nosan Commissioner Patrick Surma Commissioner Gary VanScoy
Members Absent:	Commissioner Bruce Anderson
Also Present:	Community Development Director Timothy Gladhill City Planner Chris Anderson City Planner Chloe McGuire Bergle

1. CALL TO ORDER

Chairperson Bauer called the regular meeting to order at 7:00 p.m.

2. CITIZEN INPUT

Chairperson Bauer thanked Commissioner Nosan for her years of dedicated service to the City of Ramsey on the Planning Commission and wished her well in her retirement.

3. APPROVAL OF AGENDA

Community Development Director Gladhill requested the Commission temporarily postpone action on Item 5.1 until the full applicant team was in attendance.

Motion by Commissioner VanScoy, seconded by Commissioner Surma, to approve the agenda as amended.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners VanScoy, Surma, Gengler, and Nosan. Voting No: None. Absent: Commissioner Anderson.

4. APPROVE PLANNING COMMISSION MINUTES

4.01: Approve the Following Planning Commission Minutes:

4.01.1: Planning Commission Meeting Minutes Dated February 1, 2018

Motion by Commissioner VanScoy, seconded by Commissioner Surma, to approve the following minutes as presented: Planning Commission Meeting Minutes dated February 1, 2018.

Motion Carried. Voting Yes: Commissioners VanScoy, Surma, and Gengler. Voting No: None. Abstain: Chairperson Bauer and Commissioner Nosan. Absent: Commissioner Anderson.

6. COMMISSION BUSINESS

6.01: Review Concept Plan for Sharp Office/Warehouse Building at 6950 Basalt Street NW

Presentation

City Planner McGuire Bergle presented the Staff Report stating the concepts plans are offered by Sharp and Associates for informal review. Sharp is considering purchasing the parcel in reference from the City of Ramsey. The proposed concept is an industrial building including office and warehouse space for 5 tenants. The site is vacant and zoned E-1 Employment District. Manufacturing, offices, warehousing and storage, research or testing labs, and truck terminals with buildings are all permitted uses in this district.

Commission Business

Chairperson Bauer asked if the developer had tenants for the space. City Planner McGuire Bergle explained the developer does not see it being a problem to find tenants for the space.

Commissioner VanScoy stated he had no problems with the request.

Commissioner Nosan requested as many trees be saved as possible.

Commissioner Surma stated he did not object to the proposed request.

6.02: Consider Sketch Plan for Centra Homes (Project #17-162); Case of Centra Homes

Presentation

Community Development Director Gladhill presented the Staff Report stating the purpose of this case is to provide the Planning Commission an opportunity to review the official sketch plan submitted by Centra Homes. The proposed residential development consists of forty (40) detached town home units located within The COR. The property consists of approximately 4.3 acres and is located at the southwest corner of Bunker Lake Blvd NW and Ramsey Blvd NW.

Commission Business

Commissioner Nosan requested further information on the sidewalk connection.

Community Development Director Gladhill described the pedestrian greenway and sidewalk connections that would be constructed through the proposed development. He noted staff had been in communication with Gables Terrace and they were not interested in making a connection to this development. He stated ideally the City would like to have a connection but explained these were private streets and the City could not force the issue.

Commissioner VanScoy asked how many parking stalls each unit would have.

Community Development Director Gladhill reported each unit would have four parking stalls, two in the garage and two on the driveway. He explained this met the City's parking requirements.

Commissioner Gengler questioned what the width of the private street would be.

Community Development Director Gladhill commented the minimum width of the private street would be 24 feet, which meant no on-street parking would be allowed.

Commissioner Surma asked if the street width could be increased without upsetting the plans for the development.

Community Development Director Gladhill stated staff could look at this but noted the development had met the City's minimum requirements. He noted if the roadways were made wider, the driveway length would be decreased, which could cause vehicles to overhang into the roadway. He reported this was an urban development and could work as proposed.

Commissioner VanScoy questioned the width of the roadways in the adjacent townhome development.

Community Development Director Gladhill indicated the roadways were 24 feet in width.

Commissioner Nosan asked if a private association would be responsible for plowing the private roadways.

Community Development Director Gladhill reported this was the case.

Commissioner Nosan questioned the width of the proposed lots.

Community Development Director Gladhill indicated the lots would be 30 feet in width.

Commissioner VanScoy asked how staff was defining these proposed units.

Community Development Director Gladhill explained they were being defined as detached townhome units or villas.

Chairperson Bauer asked what the project timeline would be for this development.

Community Development Director Gladhill stated the developer hoped to begin construction in the fall of 2018.

5. PUBLIC HEARINGS/COMMISSION BUSINESS

5.01: Public Hearing: Request for a Conditional Use Permit to Allow Motor Vehicle Sales at 6750 Highway 10 NW (Project No. 18-102); Case of 22 Properties

Public Hearing

Chairperson Bauer called the public hearing to order at 7:19 p.m.

Presentation

City Planner McGuire Bergle presented the staff report stating 22 Properties (the "Applicant") has submitted an application for a Conditional Use Permit at 6750 Highway 10 NW (the "Subject Property") to allow automobile sales and detailing. The Applicant is proposing to store, display, sell, and wash/detail vehicles. The Subject Property is currently used for boat sales by Son Watersports.

Citizen Input

Steve Fisher, 22 Properties representative, addressed the Commission regarding the requirements of the City. He noted he had met with the property owner and explained they were unwilling to help with paving the unimproved surface. He indicated 22 Properties was at the limit for their borrowing potential noting the applicant could purchase the building at this time but did not have the funds to pave the gravel area. He stated it would be nice to store additional cars in the fenced in area, however, the applicant could operate his business successfully on the current paved areas. He requested the applicant be able to grow into the space over time and be allowed to use the space as is.

Dave Evenson, 7867 Park Court NE, 22 Properties, commented he was trying to be proactive which led him to meet with the City regarding his purchase. He explained the fenced in portion of the lot was quite large and would cost roughly $80,000 to pave. He stated this was just not feasible for him at this time. He requested feedback from the Commission on this matter.

Commissioner Surma stated this was a nice-looking building with a well-maintained parking lot. He did not believe paving the gravel area was necessary at this time as it was to the rear of the building and for this reason, could remain as is.

Mr. Evenson explained the gravel area was packed down Class V and was almost like a concrete surface.

Commissioner Nosan asked why the City would not allow Mr. Evenson to use the gravel area.

City Planner McGuire Bergle explained the applicant was proposing to change the use of the site, which required a conditional use permit. This required approval from the City as well as compliance with the City's current zoning standards.

Community Development Director Gladhill reported the back gravel area did not comply with City Code. In order to comply with City Code, the gravel area had to be paved if used for business operations.

Mr. Evenson stated he would like to be able to use all of the land he was proposing to purchase and not just 70% of it.

Mr. Fisher noted the gravel area was fenced and was not visible from the public.

Chairperson Bauer asked when it would be realistic for Mr. Evenson to pave the gravel area.

Mr. Evenson indicated he hoped to pave this area in the next five years.

Community Development Director Gladhill reported the City Council had provided staff with direction to clean up the businesses along Highway 10 and not allow for variances that would detract from the view.

Commissioner VanScoy requested further information on the proposed phased approach for paving the gravel area.

Mr. Fisher discussed how Mr. Evenson hoped to pave the area over the next five years.

Chairperson Bauer questioned if a Temporary Conditional Use Permit could be considered for the applicant that would expire in five years, if the gravel area was not paved.

Community Development Director Gladhill stated this could be considered, but noted staff was still struggling with how to phase in the pavement of the gravel area.

Mr. Fisher asked if an Interim Use Permit could be considered for the applicant.

Community Development Director Gladhill stated this would not be in the City's best interest. He recommended a Conditional Use Permit with specific conditions be pursued to address the phasing of pavement of the gravel area. He commented further on the revocation process for a CUP that does not comply with the City approved conditions.

Mr. Evenson stated he would rather just not use the gravel area than have his Conditional Use Permit revoked at some point in the future, if he was not able to pave the entire gravel area.

Commissioner VanScoy asked if the applicant wanted to purchase the property and utilize only the paved areas currently while working to pave a portion of the gravel area in the next two years.

Mr. Evenson stated he would like the freedom to use the entire gravel area for the next five years as he worked to get the entire gravel area paved in phases. He noted the gravel area was currently Class V.

Commissioner VanScoy described how the gravel area would be used differently from boat storage to car parking.

Mr. Evenson explained he was uncertain that he would even use the gravel area a lot. He requested he be given five years to pave the gravel area.

Commissioner Surma commented Dave Evenson was a resident of Ramsey and respected business owner. He did not believe Mr. Evenson would be purchasing a property in the City in order to blight the parcel. He was of the opinion that Mr. Evenson would work to enhance his investment over time. He explained this property was not detracting from Highway 10 at this time. He recommended this property be required to be in compliance with City Code in alignment with the improvements planned for Highway 10.

Commissioner Gengler asked what would happen if the applicant were to sell his property in two or three years from now without making the required improvements.

City Planner McGuire Bergle stated the Conditional Use Permit would remain with the land and the property would have to be brought into compliance with the conditions within the CUP within the specified timeframe.

Mr. Fisher questioned if the property currently had a Conditional Use Permit.

Community Development Director Gladhill reported the property did not currently have a Conditional Use Permit. He explained the business was a lawful non-conforming use. He added that the gravel area was not approved by the City. He stated the City has made attempts to bring this space into compliance to allow for the seasonal boat storage. He discussed how the applicant was proposing to use the space differently which meant the site had to come into compliance with City Code.

Mr. Evenson explained in 1990 this property had used car sales for Mad Mac's. He questioned why a CUP was not in place.

Community Development Director Gladhill reported the City had a permit for construction of the building but noted a CUP was never granted for used car sales. He explained that after 12 months of not selling cars on the site, the lawful non-conforming use status goes away.

City Planner McGuire Bergle discussed the development permit that was issued for Mad Mac's.

Community Development Director Gladhill explained the previous car sales was limited to the paved area around the building.

Mr. Fisher stated Mr. Evenson would be paying a premium for this property and therefore did not have funding available at this time to pave the gravel area.

Commissioner VanScoy asked if it would be reasonable for the applicant to have the gravel area paved in its entirety by 2023.

Mr. Evenson stated this would be a good goal noting seven years would be even better. He explained he could agree to pave the east side over the next two years.

Commissioner Surma encouraged the City to be flexible and respect the property rights of the applicant.

Commissioner VanScoy stated the Planning Commission also had to respect City Code and the zoning regulations.

Motion by Commissioner VanScoy, seconded by Commissioner Surma, to close the public hearing.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners VanScoy, Surma, Gengler, and Nosan. Voting No: None. Absent: Commissioner Anderson.

Chairperson Bauer closed the public hearing closed at 7:58 p.m.

Commission Business

Commissioner VanScoy stated he would like to support this business by offering a phased approach for the paving of the gravel area. He suggested the east side be paved within two years and the remainder being paved by 2023.

Commissioner Nosan supported this recommendation. She stated she would rather see this business coming into Ramsey than for the site to remain as is.

Chairperson Bauer recommended the paving be completed two years and five years from the date of closing on the property.

Motion by Commissioner VanScoy, seconded by Commissioner Nosan, to recommend that City Council adopt Resolution #18-045 approving a Conditional Use Permit, contingent upon bringing the Subject Property into compliance with the Zoning Code ad amended requiring the unpaved area to the east be paved within two years of the date of closing and the remainder of the unpaved area be paved five years from the date of closing and if these dates are not met the unpaved portion cannot be used for car sales until the paving is complete.

Further discussion

City Planner McGuire Bergle stated she feared that the additional language would provide the applicant with zero incentive to pave the gravel area as he would be able to use it as is.

Commissioner VanScoy explained after two years if the area to the east of the building was not paved the entire gravel area could not be used by the applicant until paved.

Commissioner Gengler stated this was a compromise for her but she was willing to offer her support.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners VanScoy, Nosan, Gengler, and Surma. Voting No: None. Absent: Commissioner Anderson.

6. COMMISSION BUSINESS - CONTINUED

6.03: Review Resubmitted Concept of Shade Tree Cottages; Case of Shade Tree Communities

Presentation

City Planner McGuire Bergle presented the Staff Report stating Shade Tree Communities has contacted the City and expressed a desire to resubmit a proposed plat known as Shade Tree Cottages. This is a project that went through City review approximately ten (10) years ago and received final plat and site plan approval as well as a zoning amendment to rezone the parcel to Planned Unit Development (PUD). The project is a mix of small-lot single-family and detached townhomes (villas/detached single-family with HOA maintenance). While the final plat and site plan have expired, the zoning of PUD has not. The applicant has submitted a revised concept plan and PUD taking into account current zoning regulations. It was noted the number of proposed lots has decreased from 42 to 38.

Commission Business

Commissioner VanScoy asked how much of the land was buildable.

Community Development Director Gladhill reported 15 acres of the site was buildable which created a net density of 2.7+/- units per acre. He stated the lot sizes were the portion of the project that was deviating from City Code. He reported Lots 8 and 9 were staff's primary concern within this development. He noted these lots could create concerns long-term given the close proximity to the wetland.

Chairperson Bauer questioned if Lots 8 and 9 were removed if a PUD would still be required. He asked what other issues remained within the development that required PUD approval.

Community Development Director Gladhill stated the proposed lot depths and lot widths would still require a PUD.

Commissioner VanScoy asked if the entire development would have private streets.

City Planner McGuire Bergle explained 157th Avenue would be a private street, due to the fact it would be 24 feet in width, and the remainder would be public streets.

Commissioner VanScoy requested further information on how the development would be buffered.

City Planner McGuire Bergle described the buffering for the development and noted the proposed homes would be lower than the existing homes.

Commissioner VanScoy questioned what the public benefit was from the proposed PUD.

City Planner McGuire Bergle stated the developer was proposing to dedicate wetlands, to install trails and would consider architectural requirements.

Commissioner VanScoy recommended the applicant formalize the public benefits prior to this item being presented to the City Council.

Chairperson Bauer asked if Lots 8 and 9 should be eliminated.

Commissioner VanScoy stated these lots would be problematic.

Commissioner Gengler requested traffic counts along 157th Avenue and Nowthen Boulevard be considered.

Community Development Director Gladhill asked if the consensus of the Commission was to support the completion of a traffic study.

Commissioner Gengler commented she would not require this to be completed, but requested the safety of traffic entering and exiting Nowthen Boulevard be considered.

Community Development Director Gladhill thanked Commission for their feedback.

7. COMPREHENSIVE PLAN UPDATE ITEMS

Community Development Director Gladhill provided the Commission with an update on the Comprehensive Plan.

8. COMMISSION / STAFF INPUT

8.01: Receive Staff Update

The Staff Update was noted.

8.02: Zoning Bulletins

Zoning Bulletins were noted.

9. ADJOURNMENT

Motion by Commissioner Nosan, seconded by Commissioner VanScoy, to adjourn the meeting.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners Nosan, VanScoy, Gengler, and Surma. Voting No: None. Absent: Commissioner Anderson.

The regular meeting of the Planning Commission adjourned at 8:36 p.m.

Respectfully submitted,

_____
Tim Gladhill
Community Development Director

ATTEST:

_____
JoAnn Shaw
Community Development Assistant

Drafted by Heidi Guenther
TimeSaver Off Site Secretarial, Inc.

Regular Planning Commission **5. 1.**

Meeting Date: 04/05/2018

By: JoAnn Shaw, Community Development

Information

Title:

Appoint Chairperson and Vice Chairperson of the Planning Commission.

Purpose/Background:

Each year the Planning Commission appoints a chairperson and vice-chairperson. Currently, Commissioner Randy Bauer serves as Chairperson and Commissioner Gary Van Scoy serves as the Vice Chairperson. The term of appointment is April 5, 2018 -April 4, 2019.

Notification:

Observations/Alternatives:

Funding Source:

Recommendation:

Action:

Motion to appoint _____ as Chairperson of the Planning Commission.

-and-

Motion to appoint _____ as Vice Chairperson of the Planning Commission.

Attachments

No file(s) attached.

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	Tim Gladhill	03/30/2018 03:15 PM
Form Started By: JoAnn Shaw		Started On: 02/21/2018 02:44 PM
Final Approval Date: 03/30/2018		

Regular Planning Commission **6. 1.**

Meeting Date: 04/05/2018

Submitted For: Tim Gladhill, Community Development

By: Eric Maass, Community Development

Information

Title:

PUBLIC HEARING: Consider Home Occupation Conditional Use Permit for 5751 177th Ave NW (Project #17-152); Case of Tracer Landscape and Concrete LLC

Purpose/Background:

Through the code enforcement program, the City learned of a home based business being operated on the property located at 5751 177th Avenue NW. Upon receipt of a request for information notice from the City, the property owner submitted a completed Home Occupation questionnaire and subsequently submitted an application for a Home Occupation Conditional Use Permit for Tracer Landscaping and Concrete, LLC.

Notification:

Staff attempted to notify all Property Owners within 700 feet as well as all properties located on 177th Ave NW of the Public Hearing. A Public Notice was also posted in the City's official newspaper.

Observations/Alternatives:

The Applicant owns and operates Tracer Landscaping and Concrete, Inc. The business currently operates from the Subject Property with clerical work being completed within the home and equipment associated with the business stored outside on a class V gravel surface. The Subject Property is 7.92 acres in size and is in the R-1 Residential (Rural Developing) zoning district.

The Applicant is proposing to construct a detached accessory building that would store all associated business equipment and would provide adequate space and maneuvering to accommodate all loading and unloading of miscellaneous equipment. City Code Section 117-351 (Home Occupations) states that home occupations are permitted in detached accessory buildings as long as there is at least 400 square feet of accessory building space reserved/maintained for the primary residential garage. There is an attached garage on the Subject Property that satisfies this requirement.

City Code Section 117-351 (Home Occupations) states that there shall not be any exterior evidence of said home occupation such as displays, exterior storage of home occupation equipment and vehicles, materials, supplies, inventory or merchandise except for one motor vehicle affiliated with the home occupation shall be stored or parked outside on the site of the home occupation. In addition, one piece of commercial equipment affiliated with the home occupation shall be allowed to be stored or parked on the site of the home occupation in accordance with Section 117-355. Currently the business has nine (9) pieces of equipment which are currently stored outdoors on a gravel surface. The Applicant has proposed to construct a detached accessory building that would house all of the business equipment.

Alternatives:

Option #1: Recommend approval of the home occupation permit. There are several matters that need to be address by the Applicant, including the construction of the accessory building, removal of current gravel parking surface, and restoration of a residential driveway which adheres to City Code. However, each of these *could* be fairly easily remedied and done so in a timely matter. While there are two (2) non-resident employees, the intent of City Code is to limit how many non-resident employees work on the site of the home occupation. Both of the non-resident

employees come to the property two (2) times a day to drop off and/or pick up equipment and do not conduct any work on the property.

Option #2: Recommend denial of the home occupation permit. This matter was originally brought to the City's attention through the code enforcement program. Concerns have been raised related to vehicular traffic, outdoor storage, and loading and unloading of equipment on the public roadway. The City's off-street parking ordinance does allow one to bring commercial motor vehicles and/or equipment to their residential property under certain criteria and while certain corrective actions are needed to comply with this ordinance, it seems like they could be accomplished fairly easily.

Option #3: If the Planning Commission identifies other measures that it believes would help mitigate any concerns related to this request, it could direct Staff to modify the Home Occupation Permit to include those conditions prior to action by the City Council.

Funding Source:

All costs associated with the requested permit are the responsibility of the Applicant.

Recommendation:

While Staff understands the concerns that have been raised, based on the ordinances currently in effect, Staff would recommend approval of the request based on the proposed findings of fact and the conditions listed in Resolution #2018-066.

A Conditional Use Permit will afford the opportunity to allow the Owner to make appropriate corrections and amend the business operation to be compatible with the surrounding neighborhood. Should the operation prove to continue to be disruptive to the residential neighborhood, the City has the opportunity to revoke the permit and the operation would need to cease on the Property. Staff would recommend a review of the case at the end of this summer. **By agreeing to these terms, the Owner must also agree that the fact that an accessory building is constructed is not grounds to retaining the Home Occupation Permit should be be revoked.**

Action:

Motion to recommend that the City Council adopt Resolution #2018-066 issuing a home occupation permit to operate Tracer Landscaping and Concrete, LLC on the property located at 5751 177th Avenue NW based on those findings of fact and listed conditions for approval.

Attachments

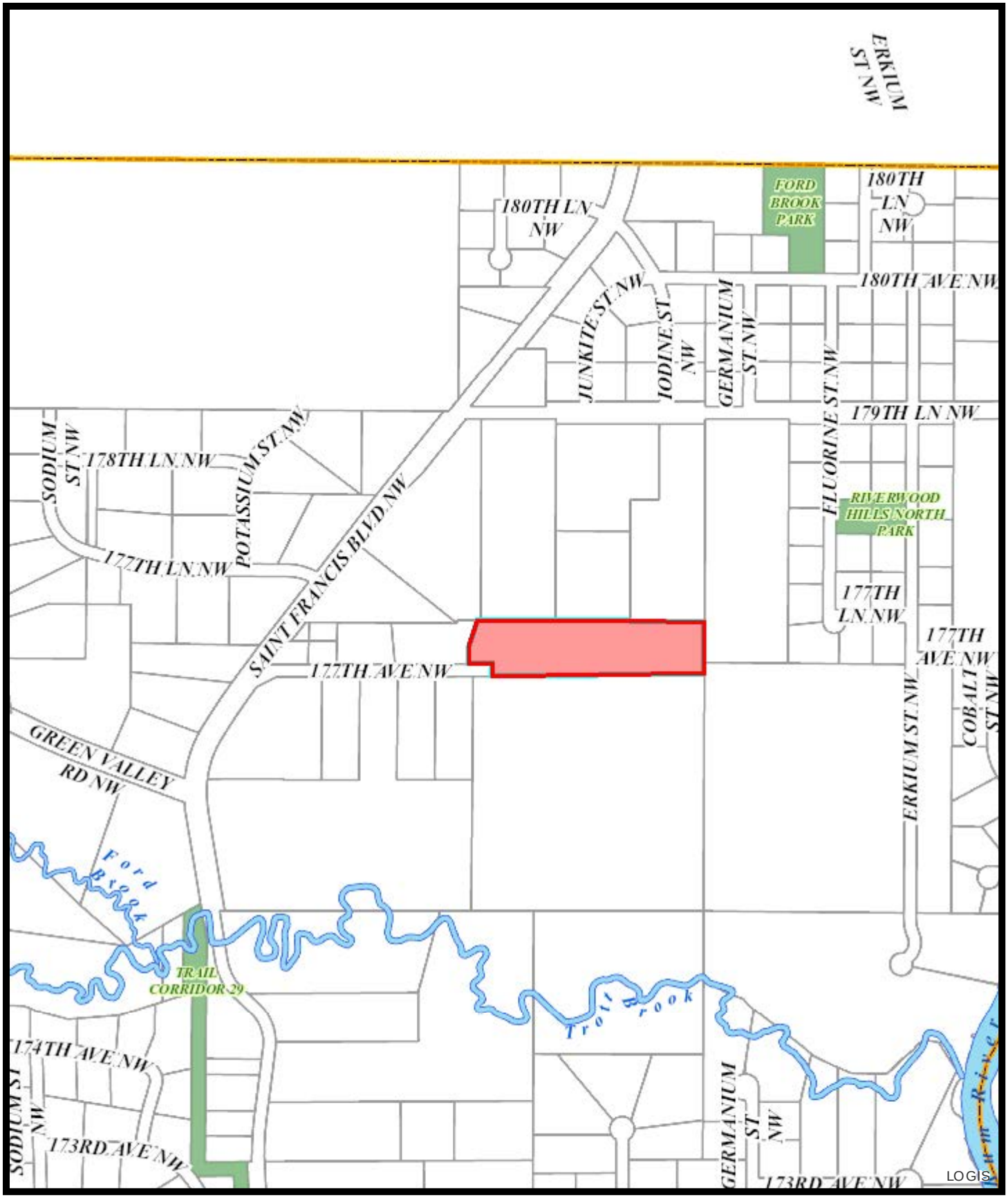
Site Location Map
Application Documents
Resolution #2018-066
Site Inspection Photos

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	Tim Gladhill	03/30/2018 03:22 PM
Form Started By: Eric Maass		Started On: 03/20/2018 09:50 AM
Final Approval Date: 03/30/2018		

5751 177th Avenue NW

02-32-25-14-0013
5751 177TH AVE NW



Print Date: March 20, 2018

Conditional Use Permit Application

RECEIVED
FEB 28 2018
BY:

Applicant/Contact Information

Applicant Name	Travis Longfield			
Applicant Address	*Street address* 5751 177th Ave. NW	*City* Ramsey	*State* MN	*Zip* 55303
Home Phone Number (763) 463-5042		**Work Phone Number** ( )		
Email Address traavis@tracercompanies.com		**Fax Number** ( )		
Name of Business (if applicable)	Tracer Landscape and Concrete, Inc.			
Business Address (if applicable)				
Business Phone Number		**Business Fax Number**		

Proposed site (subject property) of Conditional Use Permit

Address 5751 177th Ave. NW, Ramsey, MN 55303
PIN 02-32-25-14-0013
Legal Description Lot 2, Block 1, Echo Ridge 2nd Addition
(circle one) **Zoning** R-1 / R-2 / R-3 / B-1 / B-2 / E-1 / E-2 / TC other _____

Property Owner Contact Information

(if different from applicant's information)

Name	Kathryn and Travis Longfield			
Address	*Street Address* same as above	*City*	*State*	*Zip*
Phone Number	**Home phone number** ( )	**Work phone number** ( )		

Please provide a detailed description of your request and attach a copy of your property layout (if applicable)

A "Land Use Sign" will be placed on the Subject Property to allow Ramsey Residents the opportunity to obtain information about your request.

I understand that the application fee is non-refundable. All costs associated with the processing of this application are the responsibility of the applicant whether this application is approved or denied. Any excess of escrow account deposits over expenditures will be refunded at the time of account closure. I also understand that as the applicant, it is my responsibility to obtain all other permits or licenses required by any applicable regulatory agencies for this Land Use Application.

Kathryn Sinclair	2.28.18	Travis Hull	2-28-18
Applicant Signature	**Date**	**Co-Applicant Signature**	**Date**

I hereby certify that I am the fee title owner/contract for deed vendee of record for the above-mentioned property. Failure to prove ownership may void any agreements entered into by the City of Ramsey and I will be held liable for any and all costs incurred by the City.

Kathryn Sinclair	2.28.18	Travis Hull	2-28-18
Property Owner Signature	**Date**	**Co-Property Owner Signature**	**Date**

To be filled out by the City of Ramsey:

Application amount: _____
Escrow Amount: _____
Date Paid: _____
Cash Receipt: _____
Date Received: _____
Escrow Number: _____

Updated: January 2004

RECEIVED
OCT 16 2017
BY:

#2

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Sunday, October 15, 2017 6:31:29 PM
Last Modified:	Sunday, October 15, 2017 8:39:02 PM
Time Spent:	02:07:33
IP Address:	68.47.81.212

Page 1: Supplemental Questionnaire

Q1 What is the address of the parcel in question?

Address — **5751 177th ave nw**

Q2 Does the (will the) Home Occupation owner live in the home on the property? — **Yes**

Q3 Does the Home Occupation owner rent or own the Property? — **Own**

Q4 Will any part of the occupation be conducted in the home? — **Yes,**

If so, what activities will be conducted in the home and in which room(s)?:
All laptop work, wherever I want to do the work that particular day.

Q5 What is the gross square footage of the living area of the home?

2250

Q6 How much of that area will be used for the occupation?

Laptop sitting on my lap.

Q7 Will an attached garage or any detached accessory building or garage be used for the occupation? — **No**

Q8 Will there be at least 400 square feet of garage space reserved for the indoor residential parking and storage related to the residential use on the property? — **Yes**

Q9 Will any structural additions or alterations to home or garages be required for this occupation? — **No**

Q10 Will you employ persons that do not live in the home on the property? **No**

Q11 If you employ non-resident employees, how many will work on the Property?

zero

Q12 If you employ non-resident employees, how many will work off-site and not arrive on the Property?

Two

Q13 If you employ non-resident employees and they work off-site, will in be necessary at any point for these employees to come to the Property?

Yes they may come for a check or to carpool.

Q14 Will any customers or clients come to the Property? **No**

Q15 How many vehicle trips per day do you anticipate entering and leaving the property in a typical 24 hour period, including employees, customers, deliveries, etc.?

We have zero customers coming to our property, zero deliveries and 2 trucks that leave in the morning and come back at night Mon thru Fri, April-Nov.

Q16 Will any vehicles, other than your private vehicle(s), be used in connection with the home occupation?

Yes,
If so, provide number, size, and type of vehicles.:
2, Ford f250 Truck, Ford f550 dump

Q17 Do you intent to store supplies and/or materials on the site?

No,
Please describe items to be stored and were.:
Our house and yard is under construction so all materials on site are being used for this.

Q18 Are any of the home occupation processes or materials subject to review and permitting by Anoka County Environmental Services?

No

Q19 What is your contact information (the person filling out this form)?

Name	**Travis Longfield**
Company	**Tracer Landscape and Concrete INC**
Address	**5751 177th ave nw**
City/Town	**Ramsey**
State/Province	**Minnesota**
ZIP/Postal Code	**55303**
Email Address	**travis@tracercompanies.com**
Phone Number	**7634641691**

BACKGROUND INFORMATION RELEVANT TO APPLICATION

THE PROPERTY

The Property is composed of 8 wooded acres sitting at the very end of 177th Ave. NW, where it culminates in a cul-de-sac. The Property is heavily wooded, and surrounded by dense trees on all sides. The Property is zoned R-1(Rural Developing).

The Property is accessed by 177th Ave. NW, which culminates in a cul-de-sac. Only the Property and a 35-acre working farm to the South access their property at the end of the street.
The Property currently has an approximately 2000 square foot residential home on the Western portion of the property, and a small temporary foot horse stable. The Applicant residents in the home on the property with his family.

The Property's immediate neighbor to the south (5750 177th Ave. NW) is a 35-acre working farm (the "**Farm**"). To the North of the Property, is a 9.46 acre residential property at 5750 179th Ln NW, where the residence is to the northmost section of the property (farthest away from the Property). Also to the North of the Property is a 4.3 acre cemetery and an 8.07 acre vacant parcel, both owned by Cross of Hope Lutheran Church.

The only residential parcel abutting the Property to its West is 5829 177th Ave. NW, a 2.07-acre property with a single-family home. Also to the West, but not directly abutting the Property, is 5880 177th Ave. NW, a 5-acre property with a single-family home.

Aerial photographs showing the property and surrounding properties are attached.

THE PROPOSED BARN

The proposed barn is compliant with Code § 117-349 (Accessory uses and buildings), and may be built as a matter of right, without the need for a CUP. Code § 117-349 permits accessory structures of up to 4700 square feet and 22 feet high for an 8-acre property. Applicant will seek a building permit prior to construction.

The proposed barn also satisfies the requirements of the Home Occupation ordinance. The storage of equipment in the barn will be incidental and secondary to the residential use of the property, and Applicant will occupy the residence on the property with his family. Code § 117-351(1)(a), (b) & (c).

The proposed barn will eliminate any "exterior evidence" of the business. There will be no displays, exterior storage of equipment of vehicles, or signage relating to the business. Code § 117-351(1)(g).

STORAGE OF VEHICLES AND EQUIPMENT

Applicant' storage of trucks and landscaping equipment in the barn is expressly permitted. Code § 117-355(a). Indoor storage of vehicles is expressly permitted by Code § 117-355(a).

Additionally, the limited operation of the trucks outdoors for the purpose of pulling them out of and into the barn is permitted under the Code. The Code expressly provides that commercial motor vehicles and equipment may be stored outside provided that they are appropriately screened and parked in the side or rear yard. Code § 117-355 (c)(2).

TRAFFIC

The 5 round trips related to operation of the business would be fewer than what is permitted as a matter of right under Code §117-351, which defines "excessive vehicular traffic" for the purpose of a home occupation as in excess of any combination of eight round trips, not including one round trip per eligible employee. Code 117-351(1)(i). For any parcel three acres or greater, a home occupation can have up to three employees, including an owner. 117-351(2)(a)(1). Therefore, three of the round trips are not included in the calculation. Under this calculation, the business will generate 4 round trips.

CONSISTENT WITH NEIGHBORHOOD

The proposed use would be consistent with, and would not pose any nuisance to, surrounding properties. For instance, the traffic generated by Applicant is not only below the level already permitted by the Code, but would be consistent with that produced by neighboring properties. For instance, the Farm to the South was granted a CUP to construct a second dwelling on the property to be inhabited by employee caretakers of the farm (Resolution 00-02-038, 2/8/2000). Traffic related to Applicant's use is not expected to be any greater than that of the Farm property.

Furthermore, the limited use of the Property described in the Application will not generate any excessive noise or otherwise disturb the neighborhood.

REQUEST FOR CONDITIONAL USE PERMIT

Applicant seeks a conditional use permit permitting him to operate his landscaping business, Tracer Landscape and Concrete, Inc., from his property at 5751 177th Ave. NW, Ramsey, MN 55303 (the "**Property**"). While Applicant's business operation largely complies with the City Code 117-351 (Home Occupations), Applicant is seeking a seeking a Home Occupation permit through the CUP process at the suggestion of City staff.

Applicant wishes to use the Property for storage of landscaping equipment belonging to his business, Tracer Landscape and Concrete, Inc. Tracer performs landscaping work on properties belonging to others from April through November.

Equipment

The business uses the following equipment, which it proposes to store within a storage barn to be constructed at the rear of the property:

1. 1 Ford F-450 pickup truck (Applicant's personal vehicle)
2. 1 Ford F-250 pickup truck
3. 1 Ford F-550 dump truck
4. 1 enclosed trailer
5. 2 flatbed trailers
6. 2 skidsteer loaders
7. 1 excavator

The Proposed Storage Barn

Applicant intends to construct a storage barn at the rear of his property to store the landscaping equipment. The storage barn will be the sole accessory building on the property.[1]

- The building will be 60' by 78', and will be masked from view by extensive tree coverage surrounding the property, and by a privacy fence around the rear portion of the property. It will not be possible to see the storage building from the public roadway, or from neighboring homes.
- The storage building will be of sufficient size so that it can store all landscaping equipment, including the trucks and trailers entirely within the building, and allow for all loading and unloading of equipment entirely within the structure. No loading or unloading of equipment will need to occur outside of the storage building.
- The building will have no exterior signage.
- The building will be accessed by way of a crushed concrete driveway running from the road along the southern boundary of the property to the storage building.
- The class-5 surface currently in place at the front of the property abutting the street will be removed and replaced by a paver or concrete driveway that will comply with City

[1] A temporary horse shed on the property will be removed. The horses will be moved into the barn upon completion.

requirements. The class-5 surface remains in place there only to allow for access to the property by construction equipment necessary to build the storage building.

Applicant's plan is depicted on the enclosed rendering and survey.

Limited Operations On The Property

Tracer employs 2-3 employees seasonally. With the exception of two employees coming to the Property each morning to each pick up a truck and to return it at the end of the day, no employees will be present at or performing work at the Property.

Anticipated vehicle traffic relating to the business will be as follows:

Morning:

2 employees arrive and park their cars (2 vehicles) in the storage barn to be constructed at the rear of the Property.

3 pickup trucks leave the Property for the day (driven by 2 employees and Applicant)

Evening:

3 pickup trucks return to the Property and are promptly stored in the storage barn at the rear of the Property.

2 employees depart for the evening (2 vehicles)

Total: 5 round trips

The business will not receive delivery of materials to the Property, and landscaping materials to be used for commercial purposes will not be stored at the Property.

Capstone Law
Protecting What You Value Most

February 1, 2018

By Email
Mr. Eric Maass
Planning Consultant
Community Development Department
City of Ramsey
7550 Sunwood Dr. NW
Ramsey, MN 55303
Email: EMaass@ci.ramsey.mn.us

Re: Plan to store landscaping equipment at 5751 177th Ave. NW., Ramsey, MN

Mr. Maass:

Please accept this letter and enclosed documentation on behalf of Travis Longfield concerning his intended use of the real property at 5751 177th Ave NW, Ramsey MN (the "**Property**"). Mr. Longfield intends to operate his landscaping business from the Property in full compliance with Ramsey Ordinance 117-351. The purpose of this letter is to describe the steps that Mr. Longfield intends to take to ensure compliance with the ordinance.

The Property

The Property is composed of 8 wooded acres sitting at the very end of 177th Ave. NW, where it culminates in a cul-de-sac. The Property is heavily wooded, and surrounded by dense trees on all sides. The Property's immediate neighbor to the south (5750 177th Ave. NW) is a 35-acre working farm (the "**Farm**"). To the west, farther down 177th Ave. are several residential homes (5829 177th Ave. NW is a 2.07-acre property with a single-family home and 5880 177th Ave. NW is a 5-acre property with a single-family home). Only the owners of Farm and the Property access their homes by way of the end of the cul-de-sac.

Aerial photographs showing the property and surrounding properties are enclosed.

The Business

Mr. Longfield owns a landscaping business called Tracer Landscape and Concrete Inc. It primarily operates from May through November and performs landscaping work for other people's properties.

Although all of the landscaping work will be performed at other properties, Mr. Longfield intends to store his landscaping equipment on the Property. The property will not be used to

receive deliveries of materials for the landscaping business, nor will it be used as a staging point for employees.

The Plan

In order to ensure full compliance with the ordinance, Mr. Longfield intends to do the following this spring:

- Construct a 60' by 78' building at the very rear of my 8-acre property to store all landscaping equipment. The storage building will be masked from view by extensive tree coverage surrounding the property, and by a privacy fence around the rear portion of the property. It will not be possible to see the storage building from the public roadway, or from neighboring homes.
- The storage building will be of sufficient size so that it can store all landscaping equipment, including the trucks and trailers entirely within the building, and allow for all loading and unloading of equipment entirely within the structure. No loading or unloading of equipment will need to occur outside of the storage building.
- The building will have no exterior signage.
- The building will be accessed by way of a crushed concrete driveway running from the road along the southern boundary of the property to the storage building.
- The class-5 surface currently in place at the front of the property abutting the street will be removed and replaced by a paver or concrete driveway that will comply with City requirements. The class-5 surface remains in place there only to allow for access to the property by construction equipment necessary to build the storage building.

Mr. Longfield's plan is depicted on the enclosed rendering and survey.

Mr. Longfield looks forward to addressing these issues before the Planning Commission and City Council. Please provide this letter to the members of these bodies along with the enclosed supporting documentation.

Regards,



Rob Shainess
Attorney at Law
rob@capstonelaw.com

cc: Travis Longfield (by email) and Tim Gladhill (by email)


SAINT FRANCIS BLVD NW
5915
5905
5855
5829
5751
177TH AVE NW
177TH AVE NW
5910
5900
5880
5800
17515
5750

11.20.17 photo 1



11/20/2017

11.20.17 Photo 3



11/20/2017

11.20.17 Photo 4



11/20/2017

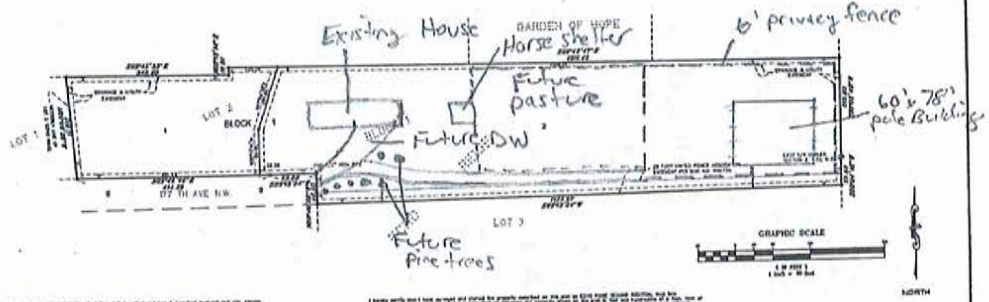

Crushed Concrete Driveway
Crushed Concrete Pad
60'
78'
<Privacy Fence 6'>

"Official Plat"

OFFICIAL PLAT

ECHO RIDGE SECOND ADDITON

City of Ramsey
County of Anoka
Section 2, T.32, R.25
Et. 10 of Twins, pg 47



LEGEND

TYPICAL DRAINAGE AND UTILITY EASEMENTS

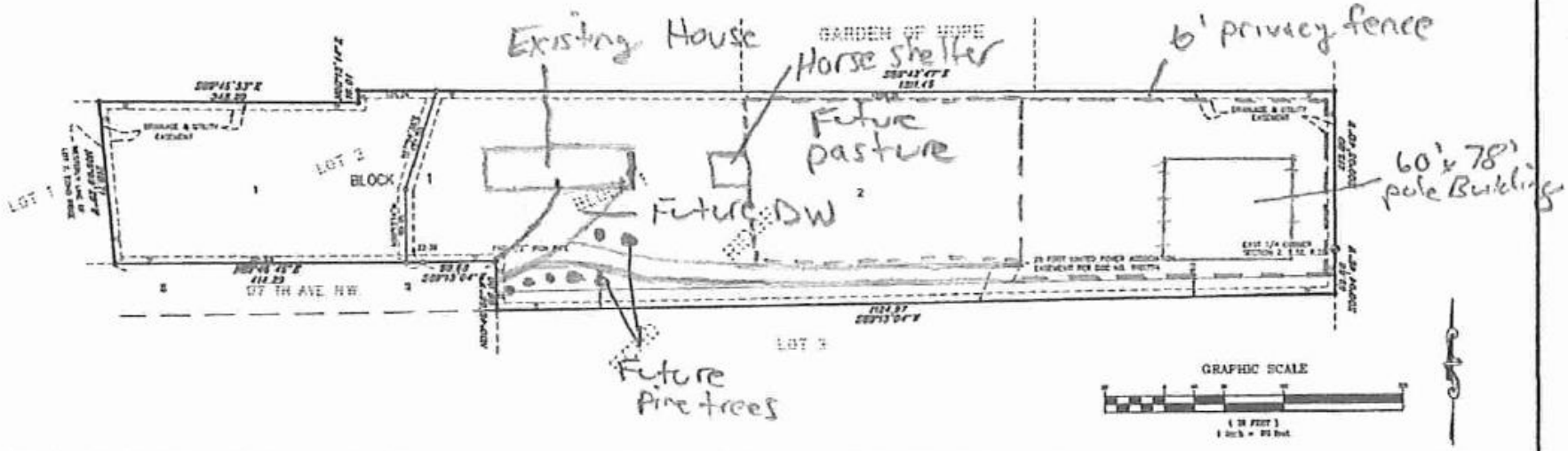
E. G. RUD & SONS, INC.
Land Surveyors

"OFFICIAL PLAT"

OFFICIAL PLAT

ECHO RIDGE SECOND ADDITON

City of Ramsey
County of Anoka
Section 2, T.32, R.25
Bk 18 of Trans, Pg 29



KNOW ALL MEN BY THESE PRESENTS: That Robert D. Langfield and Kim A. Langfield, husband and wife, owners, and Anoka Hennepin Credit Union, a Minnesota Corporation, mortgagee of the following described property situated in the State of Minnesota, County of Anoka, to wit:

Lot 2, Block 1, ECHO RIDGE

Have caused the same to be surveyed and platted as ECHO RIDGE SECOND ADDITON and do hereby dedicate to the public for public use forever the drainage and utility easements as shown on this plat.

In witness whereof said Robert D. Langfield and Kim A. Langfield, husband and wife, have hereunto set their hands this 15th day of November, 2002.

Robert D. Langfield — Kim A. Langfield

STATE OF MINNESOTA
COUNTY OF ANOKA
The foregoing instrument was acknowledged before me this 15th day of November, 2002, by Robert D. Langfield and Kim A. Langfield, husband and wife.

Virginia A. Hennen
Notary Public, Anoka County, Minnesota
My Commission Expires 1-31-2003

VIRGINIA ANN HENNEN
Notary Public
Minnesota

In witness whereof said Anoka Hennepin Credit Union, a Minnesota Corporation, has caused these presents to be signed by Tonya L. Bontjahan, its Senior Loan Officer of Anoka Hennepin Credit Union, a Minnesota Corporation this 25th day of November, 2002.

Signed: Anoka Hennepin Credit Union

Tonya Breaglup by Anna Bly, Its President
Tonya L. Bontjahan/ Senior Loan Officer

STATE OF MINNESOTA
COUNTY OF ANOKA
The foregoing instrument was acknowledged before me this 25 day of November, 2002, by Tonya L. Bontjahan, as Senior Loan Officer of Anoka Hennepin Credit Union, a Minnesota Corporation on behalf of the Corporation.

Virginia A. Hennen
Notary Public, Anoka County, Minnesota
My Commission Expires 1-31-2003

VIRGINIA ANN HENNEN
Notary Public
Minnesota

I hereby certify that I have surveyed and platted the property described on this plat as ECHO RIDGE SECOND ADDITON; that this plat is a correct representation of the survey; that all distances are correctly shown on the plat in feet and hundredths of a foot; that all monuments will be correctly placed in the ground as shown; and that the outside boundary lines are correctly designated on said plat; and that there are no wet lands as defined in Minnesota Statutes, Sec. 505.02, Subd. 1 or public highways to be designated other than as shown on said plat.

Jason E. Rud
Jason E. Rud, Land Surveyor
Minnesota License No. 41316

STATE OF MINNESOTA
COUNTY OF ANOKA

The foregoing surveyor's certificate was acknowledged before me this 21st day of November, 2002, by Jason E. Rud, Land Surveyor, Minnesota License No. 41316.

Caitlin R. Brand
Notary Public, Anoka County, Minnesota
My Commission Expires January 31, 2005

CAITLIN R. BRAND
Notary Public
Minnesota

This plat of ECHO RIDGE, SECOND ADDITION was approved by the City Council of Ramsey, Minnesota at a regular meeting thereof held this 9th day of September, 2002, and if applicable, the written comments and recommendations of the Commissioner of Transportation and the County Highway Engineer have been received by the City or the prescribed 30 day period has elapsed without receipt of such comments and recommendations, as provided by Minnesota Statutes, Section 505.03, Subd. 2.

By: Kathleen Kelly, Mayor
By: Sherri M. Haug, Clerk

This plat has been checked and approved this 23rd day of December, 2002.

Terry D. Sorel
Terry D. Sorel
Anoka County Surveyor

Office of Register of Deeds
State of Minnesota
County of Anoka
41611.0
I hereby certify that the within instrument was filed in this office for record on the 23 day of December, 2002 at 8:00 o'clock A.M. and was duly recorded in Book/Film 215 of Records, Page/Map 14
Document No. 1777
Deputy Register of Title

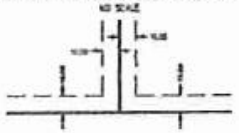
Dec 23, 2002
S. Cullen

LEGEND

- ● DENOTES FOUND 1/2 INCH IRON MONUMENT MARKED R.L.S. NO. 11029 UNLESS OTHERWISE NOTED.
- ■ DENOTES 1/2 INCH BY 18 INCH SET IRON PIPE MONUMENT MARKED BY R.L.S. NO. 41316.
- ◆ DENOTES ANOKA COUNTY CAST IRON MONUMENT.

FOR THE PURPOSES OF THIS PLAT THE WEST NORTHERLY LINE OF LOT 2, BLOCK 1, ECHO RIDGE IS ASSUMED TO HAVE A BEARING OF NORTH 07°W.

TYPICAL DRAINAGE AND UTILITY EASEMENTS
NO SCALE



BEING 10 FEET IN WIDTH AND ADJOINING SIDE LOT LINES, STREETS AND REAR LOT LINES UNLESS OTHERWISE SHOWN ON THIS PLAT.

CITY OF RAMSEY
ANOKA COUNTY, MINN.

E. G. RUD & SONS, INC.
Land Surveyors
20031624361 $160.00


177TH AVE NW
177TH AVE NW
5915
5901
5855
5829
5751
5910
5900
5880
5850
5750
17515



11/20/2017



11/20/2017

Councilmember _____ introduced the following resolution and moved for its adoption:

RESOLUTION #2018-066

A RESOLUTION APPROVING/DENYING THE ISSUANCE OF A HOME OCCUPATION CONDITIOINAL USE PERMIT TO OPERATE A LANDSCAPING AND CONCRETE CONTRACTING BUSINESS ON THE PROPERTY LOCATED AT 5751 177TH AVENUE NW 164TH BASED ON FINDINGS OF FACT #0985 AND DECLARING TERMS OF PERMIT

WHEREAS, the City of Ramsey received an application from Travis Longfield requesting a home occupation conditional use permit to operate Tracer Landscaping and Concrete Inc., on the property generally known as 5751 175th Ave NW and legally described as follows:

Lot 2, Block 1, Echo Ridge 2nd Addition, Anoka County, Minnesota

(the "Subject Property")

NOW THEREFORE, BE IT RESOLVED BY THIS CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA that the findings of fact relating to the request are determined to be as follows:

1. That on October 15, 2017 Travis Longfield, herein referred to as the "Applicant", submitted a completed Home Occupation Supplemental Questionnaire.

2. That on February 28, 2018 the **Applicant** applied for a home occupation conditional use permit to operate Tracer Landscaping and Concrete Inc., (the "Home Occupation") on the **Subject Property**.

3. That the **Applicant** appeared before the Ramsey Planning Commission for a public hearing pursuant to Section 117-51 of the City Code on April 5, 2018, and that said public hearing was properly advertised.

4. That the **Subject Property** is zoned R-1 Residential (Rural Developing), and the surrounding parcels are also zoned R-1 Residential (Rural Developing).

5. That the **Subject Property** is approximately 7.92 acres and is surrounded by lots of similar sizes to the north, south, and west and slightly smaller lots to the east.

6. That the **Subject Property** is guided as Rural Developing on the City's Future Land Use Map.

7. That the **Applicant** owns and occupies the dwelling unit on the site of the **Home Occupation**.

8. That there is currently exterior evidence of the existence of the **Home Occupation** on the **Subject Property** including the parking/storing of commercial vehicles and equipment as well as a large gravel parking area which is used primarily for the storage and maneuvering of equipment related to the **Home Occupation**.

9. That the commercial vehicles and equipment currently stored outside on the **Subject Property** include: one (1) Ford F-450 Pickup Truck (Applicants Personal Vehicle), one (1) Ford F-250 pickup truck, one (1) Ford F-550 Dump Truck, one (1) enclosed trailer, two (2) flatbed trailers, two (2) skidsteer loaders, and one (1) excavator.

10. That presently, the combined number of commercial and private use items stored outside on the **Subject Property** totals nine (9) which is less than the maximum number allowed which is ten (10) for parcels five (5) acres or greater in size.

11. That the **Home Occupation** is proposed to be entirely contained within a proposed detached accessory building located on the **Subject Property**.

12. That there will be at least 400 square feet of garage space reserved for indoor residential parking and storage related to the residential us on the **Subject Property**.

13. That there is no interior or exterior business signs or display related to the **Home Occupation** on the **Subject Property**.

14. That there shall be no more than two (2) vehicle trips per hour per standard eight (8) hour business day or sixteen (16) vehicular trips within a twenty-four (24) hour period, as established in City Code Sec. 117-351 (Home Occupations).

15. That the **City** finds the **Home Occupation** does not constitute a fire hazard to neighboring residences.

16. That the **Home Occupation** does not include operations related to internal combustion engines, body shops, ammunition manufacturing, motor vehicle repairs or sale.

17. That the **Home Occupation** does employ two (2) persons that do not live in the dwelling unit on the **Subject Property**. Two (2) additional non-resident employees will travel to the **Subject Property** for activities related to loading and unloading of equipment two (2) times per day, but will not work at the **Subject Property**.

18. That the **Home Occupation** does not involve operating methods that include transactions with the public (customers, clients, consultants, subcontractors, etc.) on the **Subject Property**.

19. That the **Home Occupation** does not conduct retail sales on the **Subject Property**.

20. That the **Home Occupation** business hours are proposed to be 7:00 a.m. to 6:00 p.m. Monday through Friday. The **Home Occupation** will not operate on Saturdays or Sundays.

21. That all structures shall comply with all applicable codes, including, but not limited to, building, fire and zoning.

22. That the **City** finds the **Home Occupation** operates beyond the parameters of a general and administrative home occupation permit requirements (117-351) and therefore requires Planning Commission and City Council review and approval.

23. That the **City** finds that the **Home Occupation** operates/does not operate beyond the intent and parameters of 117-351 (Home Occupations) and finds that the **Home Occupation** is/is not low-level and is not a use typically found in a residential area.

24. That the proposed use will/will not adversely impact traffic in the area.

25. That the proposed use will/will not be compatible with the residential neighborhood due to density and lot size of the surrounding lots.

26. That the proposed use will/will not be unduly dangerous or otherwise detrimental to persons residing or working in the vicinity of the use or to the public welfare.

27. That the proposed use will/will not substantially adversely impair the use, enjoyment, or market value of neighboring properties.

28. That the proposed use will/will not be hazardous or disturbing to existing or future neighboring uses.

29. That the proposed use will/will not be served adequately by public facilities and services such as highways and streets.

30. That the proposed use will/will not create excessive additional requirements at public cost for public facilities and services, and it will/will not be detrimental to the economic welfare of the community.

31. That the proposed use will/will not involve activities and uses that will be detrimental to any persons, property, or the general welfare by reason of excessive production of traffic, noise, smoke, fumes, glare, or odors.

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

This **Permit** is issued pursuant to Sections 117-51 and 117-351 of the Ramsey City Code. The conditions of this **Permit** are as follows:

1. That this resolution shall allow for Tracer Landscaping and Concrete, Inc., (the "Home Occupation") to operate on the **Subject Property**. The **PERMITTEE** shall be required to reserve at least 400 square feet of accessory structure space for the purposes of the primary residential use.

2. That the **PERMITTEE** shall construct a detached accessory building by no later than October 31, 2018 and that all vehicles and equipment associated with the **Home Occupation** shall be stored within that detached accessory building.

3. That the **PERMITTEE** shall reside in the dwelling unit of the **Subject Property**. The **PERMITTEE** may also employ two (2) non-resident employees that may only arrive on site to pick up, load, and/or drop off equipment. The two (2) non-resident employees may not perform any other function related to the **Home Occupation** on the **Subject Property**.

4. That the **PERMITTEE** may not lease portions of the accessory structure located on the **Subject Property** to any person(s) that does not reside on the **Subject Property**.

5. That the **PERMITTEE** agrees to comply with Chapter 117, Article II, Division 6, Subdivision 1 of City Code, titled "Signs".

6. That the **PERMITTEE** agrees to comply with section 117-355 of City Code relating to outside storage and maneuvering of vehicles and equipment on the **Subject Property**; all parking and

maneuvering areas on the **Subject Property** must be surfaced with class V gravel, concrete or asphalt.

7. That the **PERMITTEE** must obtain all applicable permits to ensure that the structures and driveway(s) are compliant with all applicable state and local codes.

8. That should the **PERMITTEE** die or sell the **Subject Property**, the **Permit** shall be automatically terminated, except that in the case of death, should a surviving spouse or child, residing at the same address, desire to continue the home occupation, written notice to that effect shall be given to the City Administrator and the City Council may authorize continuation of the **Permit** without further hearing.

9. The **PERMITTEE** shall reside on the **Subject Property**; if the **PERMITTEE** does not reside on the **Subject Property**, the **Permit** shall be terminated.

10. That adequate water supply and on-site sewage disposal facilities shall be the responsibility of the **PERMITTEE**.

11. The **PERMITTEE** shall be responsible for maintaining any applicable State or County licenses.

12. The **PERMITTEE** shall be responsible for all costs incurred in the administration and enforcement of this Permit.

13. That the City Administrator, or his/her designee, shall have the right to inspect the **Subject Property** for compliance and safety purposes annually or at any time, upon reasonable request.

The motion for the adoption of the foregoing resolution was duly seconded by Councilmember _____, and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

Whereupon said resolution was declared duly passed and adopted by the Ramsey City Council this the 24th day of April, 2018.

Travis Longfield and Kathryn Longfield, owner(s) of fee title to the Subject Property, hereby acknowledge receipt of this Permit and has reviewed the conditions of this Permit and has agreed to comply with the terms of this Permit.

_____ _____

Travis Longfield Kathryn Longfield

STATE OF MINNESOTA)
) ss.
COUNTY OF _____)

On this _____ day of _____, _____, before me a Notary Public, personally appeared Travis Longfield and Kathryn Longfield, owner(s) of fee title to the Subject Property, to me known to be the person(s) described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

_____
Notary Public

Travis Longfield and Kathryn Longfield, owner(s) of fee title to the Subject Property, hereby acknowledge receipt of this Permit and has reviewed the conditions of this Permit and have agreed to comply with the terms of this Permit.

_____ _____
Travis Longfield Kathryn Longfield

STATE OF MINNESOTA)
) ss.
COUNTY OF _____)

On this _____ day of _____, _____, before me a Notary Public, personally appeared Travis Longfield and Kathryn Longfield owner(s) of fee title to the Subject Property, to me known to be the person(s) described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

_____
Notary Public

CITY OF RAMSEY:

By: _____ By: _____
Mayor City Clerk

STATE OF MINNESOTA)
) ss.
COUNTY OF ANOKA)

On this _____ day of _____, _____, before me, a Notary Public, personally appeared Sarah Strommen and JoAnn M Thieling, to me personally known, who, being each by me duly sworn did say that they are respectively the Mayor and City Clerk of the City of Ramsey, the Municipal Corporation named in the foregoing instrument, and seal affixed to said instrument is the corporate seal of said Municipal corporation, and the said instrument was signed and sealed on behalf of said Municipal Corporation by authority of its City Council and said Sarah Strommen and JoAnn M. Thieling acknowledge said instrument to be the free act and deed of said Municipal Corporation.

_____
Notary Public

The document drafted by:
The City of Ramsey
7550 Sunwood Dr NW
Ramsey, Minnesota 55303

This document reviewed by:
Ratwik, Roszak & Maloney, P.A.
300 U.S. Trust Building
730 Second Avenue South
Minneapolis, MN 55402




2404CTG
Trailer


tracer


F250
G5292


tracer

Regular Planning Commission **7. 1.**

Meeting Date: 04/05/2018

By: Chloe McGuire Brigl, Community Development

Information

Title:

Consider Site Plan for Sharp Industrial Building Located at 6590 141st Ave NW (Project No. 18-105): Case of Sharp & Associates

Purpose/Background:

Sharp & Associates, LLC (the "Applicant") has submitted a Site Plan for review for an industrial, multi-tenant building on the property located at 6590 141st Ave NW (the "Subject Property"). The Applicant has a Purchase Agreement in place with the City of Ramsey to acquire the Subject Property.

Notification:

Notification is not required for Site Plan review.

Observations/Alternatives:

The City received an application for a site plan review for a new multi-tenant industrial building in the E-1 Employment District. The Subject Property is located on the corner of Basalt St NW and 141st Ave NW.

E-1 Regulations

The maximum building height allowed in the E-1 district is sixty-five (65) feet; the proposed building is one story. The E-1 District also allows up to 45% lot coverage; the proposed building covers 23.5% of the Subject Property.

Building Setbacks

The required front yard setback in the E-1 District is thirty-five (35) feet. The proposed site plan shows a thirty-five (35) foot setback off Basalt St (side corner lot line) and approximately seventy (70) feet off 141st Ave NW (front lot line). The required side yard setback is twenty (20) feet in this district and the eastern (side) setback is shown as twenty (20) feet. The rear setback is shown as slightly over sixty (60) feet. The proposed site plan meets the required setbacks.

Use

The Applicant is proposing a five (5) tenant commercial/industrial building with off-street loading bays. Permitted uses in this district include: manufacturing, research or testing labs, offices, supply yards with building, warehousing and storage, self storage facilities (indoor), truck terminals with building. The commercial offices are a permitted use. Off-street loading as an accessory use is allowed in this district.

Landscaping

The EPB has reviewed the Landscape and Tree Preservation plans and has recommended approval contingent upon compliance with the Staff Review Letter.

Funding Source:

All costs associated with processing the Application are the responsibility of the Applicant.

Recommendation:

Staff recommends approval of the Site Plan contingent upoon the Applicant executing a Development Agreement with the City and upon compliance with the Staff Review Letter dated March 15, 2018.

Action:

Motion to recommend City Council approve the Site Plan contingent upon the Applicant entering into a Development Agreement with the City and upon compliance with the Staff Review Letter dated March 15, 2018.

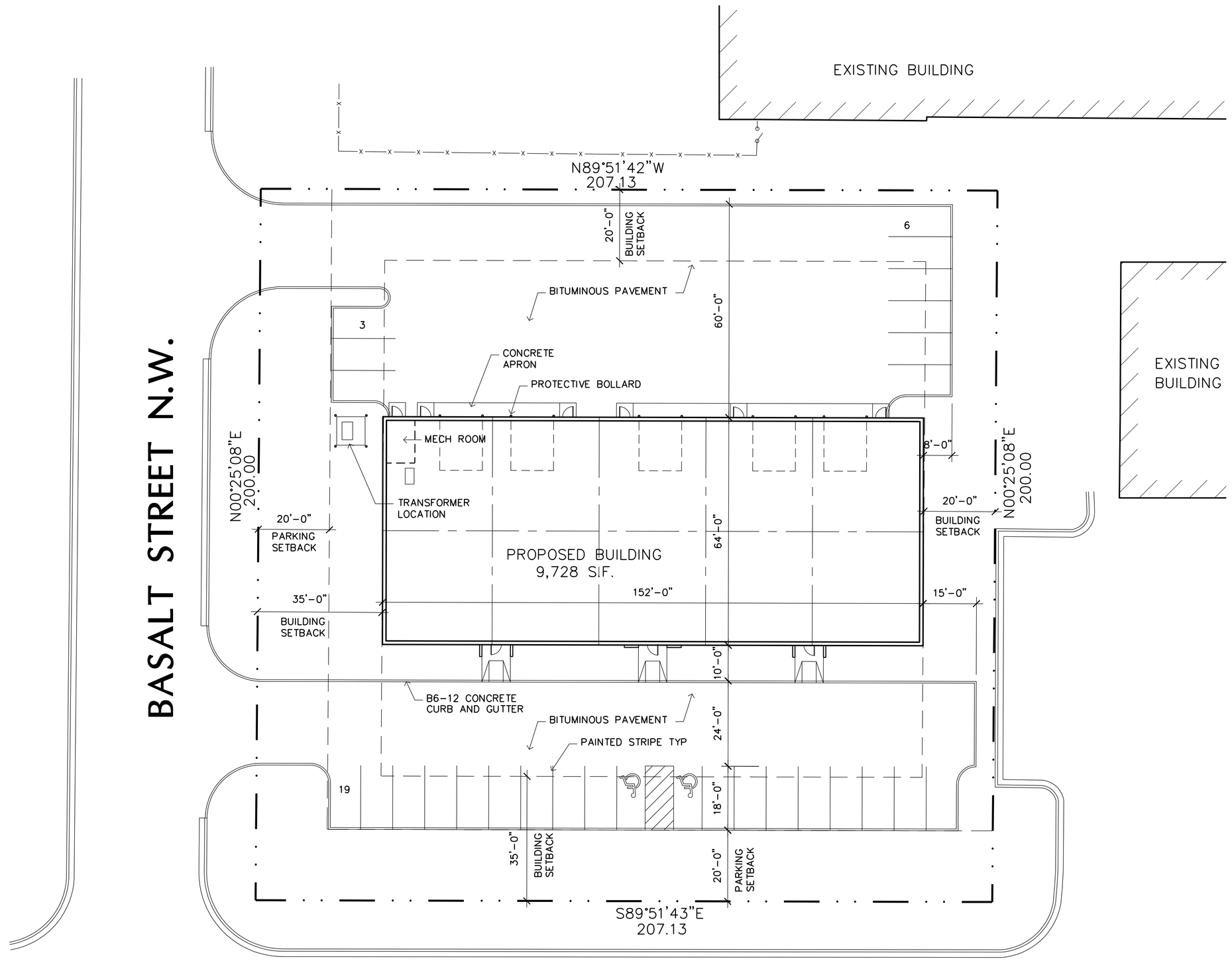
Attachments

Site Plan

EPB Tech Report 3/15/18

Form Review

Inbox	Reviewed By	Date
Chris Anderson	Chris Anderson	03/29/2018 04:53 PM
Tim Gladhill	Tim Gladhill	03/30/2018 03:16 PM
Form Started By: Chloe McGuire Brigl		Started On: 03/15/2018 11:37 AM
Final Approval Date: 03/30/2018		



SITE PLAN

LOT AREA – 41,363 S.F. = 0.95 ACRES
ZONING – E-1, EMPLOYMENT DISTRICT
BUILDING – 9,728 S.F. OFFICE/WAREHOUSE
BUILDING COVERAGE – 9,728/ 41,363 = 23.5% < 45% MAX

PARKING DATA

OFFICE (40%)
3,891 S.F. AT 1/300 = 13 STALLS
WAREHOUSE (60%)
5,837 S.F. AT 1/1,000 = 6 STALLS
19 STALLS REQUIRED
28 STALLS PROVIDED

1/A1 SITE PLAN
SCALE: 1" = 20'-0"

NORTH

Filename: BASALT INDUSTRIAL\BASALT INDUSTRIAL-A1

LAMPERT ARCHITECTS
420 Summit Avenue
St. Paul, MN 55102
Phone:763.755.1211 Fax:763.757.2849
lampert@lampert-arch.com

ARCHITECT CERTIFICATION:
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 ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE
LEONARD LAMPERT
PRINT NAME
13669
LICENSE
00/00/00
DATE

PRELIMINARY NOT FOR CONSTRUCTION

Sharp & Associates, LLC
500 Bunker Lake Blvd
Anoka, MN 55303
Ph (763) 425-2002
Fax (763) 425-6428

BASALT INDUSTRIAL
Ramsy, Minnesota

Copyright 2018
Leonard Lampert Architects Inc.

Project Designer: JAMES B
Drawn By: JRB
Checked By: LL
Revisions

2/22/18	PRELIMINARY

SITE PLAN

Sheet Number

A1

Project No. 180212-1

CITY OF RAMSEY LAND USE APPLICATION
TECHNICAL REVIEW FILE

DATE	MARCH 15, 2018	**PROJECT ADDRESS**	6590 141ST AVE NW
PROJECT. TITLE	BASALT INDUSTRIAL		
ESCROW #	116216		
DEPARTMENT:	Community Development: Planning Division (Landscape Plan & Environmental Resources)		
TECHNICAL REVIEWER:	Name: Chris Anderson, City Planner Phone: 763-433-9817 Email: canderson@cityoframsey.com		

We offer the following comments regarding the Civil Engineering and Landscape Plans, prepared by Hakanson Anderson dated February 28, 2018:

Sheet C6

- An Oak Wilt Management Plan is required due to the presence of oak trees both on this property and on adjacent parcels as well. This plan is subject to review and approval by the City and must outline what precautionary steps will be taken to avoid introduction of oak wilt to oak trees being preserved onsite or on adjacent parcels.
- Tree Save Fencing will be required rather than silt fence along the eastern boundary where tree preservation will occur to avoid impacting roots to trees being saved.
- Tree Save Fencing shall be placed no closer than the dripline of protected trees and shall remain in place and in tact throughout all construction activity. This note must be added to the plan set.

Sheet C8

- The use of seed rather than sod requires approval of City Council. Staff does not object to turf establishment via seed as proposed (this is applicable to all other Plan Sheets as well).

Sheet L1:

- Tree #18 is listed as a Siberian Oak, which doesn't exist. Please correct (presumably the tree is either a Siberian Elm or a Bur Oak).
- Add Landscape Note specifying that all areas, including boulevards, not otherwise improved with impervious surfaces shall receive four (4) inches of topsoil meeting the City's topsoil specification. Copies of the load tickets shall be provided to the City and a topsoil inspection shall be completed prior to installation of any landscaping.
- At least three (3) additional trees are required based on the proposed number of parking stalls.
- At least 30% of the DBH inches of existing, significant trees are required to be retained onsite or replanted. Based on the proposed removals and landscaping, an additional forty-three (43) inches of reforestation is required (after excluding invasive species and trees removed for ponding, and including all proposed plantings of trees). The Landscape Plan will need to be amended to meet this standard.

- Tree Save Fencing must be shown on this sheet also.
- Tree Save Fencing shall be placed no closer than the dripline of protected trees and shall remain in place and in tact throughout all construction activity. This note must be added to the plan set.

Regular Planning Commission **7. 2.**

Meeting Date: 04/05/2018

By: Chris Anderson, Community Development

Information

Title:

Consider Request for Extension for a Variance to Lot Depth for Homestead Road Addition (Project No. 16-32); Case of CTW Group Inc.

Purpose/Background:

On April 6, 2017, CTW Group, Inc. (the "Property Owner") was granted a variance to the lot depth standard for Lots 1 & 3, Block 1 Homestead Road Addition. A standard condition of the approved variance was that it needed to be initiated within one (1) year of the date of its approval and that recording of the plat of Homestead Road Addition (the "Plat") would constitute initiation. The Property Owner has not yet completed the necessary steps to record the approved Plat and thus, have requested an extension for their approved variance.

Notification:

Notification is not required.

Observations/Alternatives:

The Plat results in the creation of three (3) lots from the property generally known as 7131 166th Ave NW (the "Subeject Property"). Lot 1 required a variance to the lot depth standard as it was deficient of the required standard by 268 square feet. Lot 3 required a variance to the lot depth standard due to relocating the footprint of the proposed home in response to comments received from an adjacent property owner during the Public Hearing. The revised location moved the home closer to 166th Ave and away from the rear windows of the neighboring property but resulted in a lot depth deficiency of seventy-eight (78) square feet.

Per City Code Section 117-53 (d), an approved variance will become null and void if not initiated or utilized within twelve (12) months of final action by Planning Commission. A variance holder, by written request, can seek an extension of time to initiate the variance. The Property Owner has indicated that they are having difficulty securing an investor/builder willing to take on the project, due to the inclusion of rain gardens and the need to properly abandon the excess utility stubs in the street, as reasoning for the extension request.

The project is being marketed on the MLS and Staff has fielded a number of inquiries about the project from prospective buyers. However, without an extension, the variance will lapse, which would also render the Plat invalid as well as two (2) of the lots would not comply with the lot depth standard. Staff does not object to a one (1) year extension to the variance.

Funding Source:

All costs associated with this request are the Applicant's responsibility.

Recommendation:

Staff recommends approval of Resolution #18-067 granting an extension to initiate the variance to lot depth for Lots 1 and 3 Block 1 Homestead Road Addition.

Action:

Motion to adopt Resolution #18-067 granting a one (1) year extension to initiate the variance to lot depth standard for Lots 1 and 3 Block 1 Homestead Road Addition.

Attachments

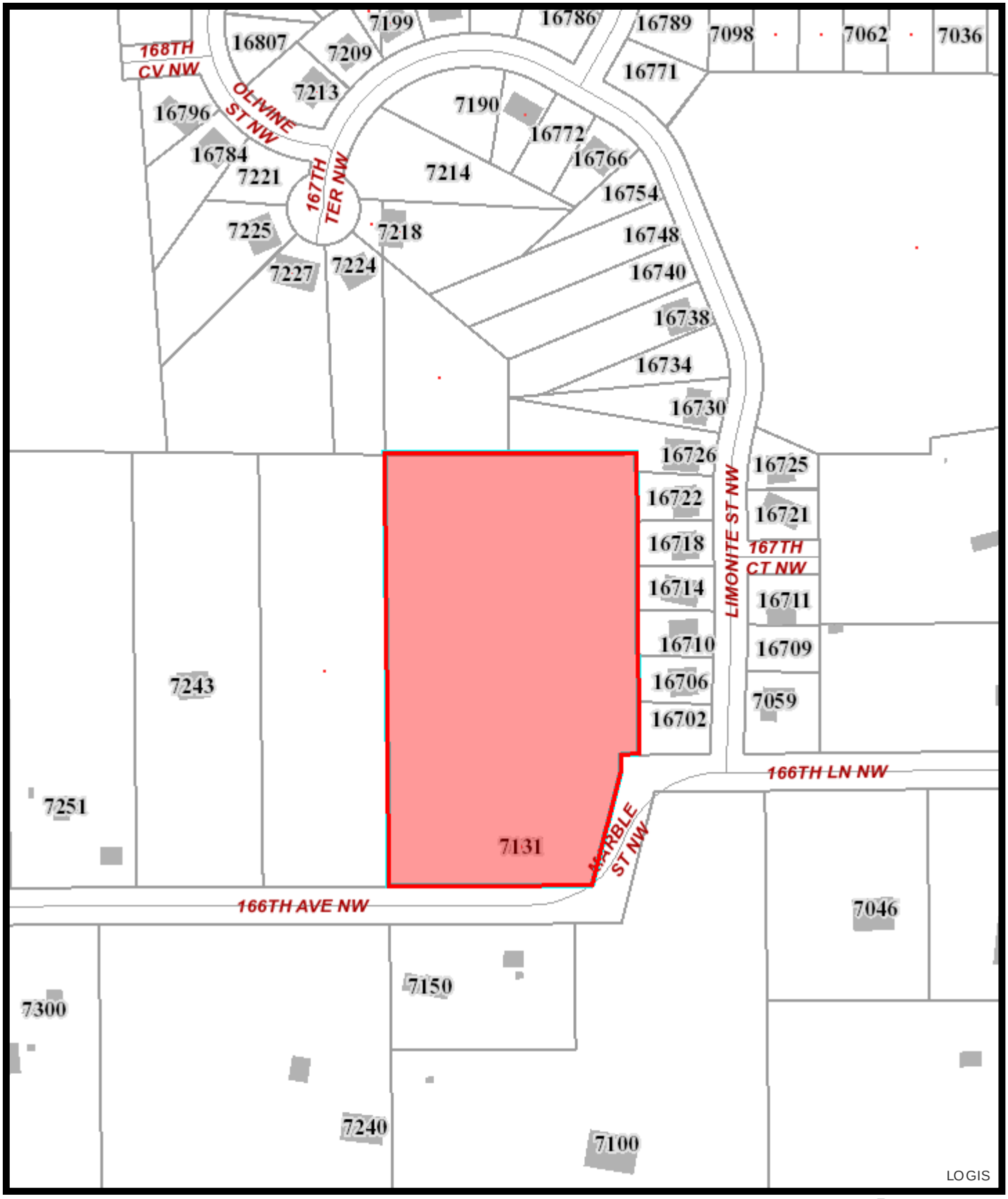
Site Location Map
Extension Request from Applicant
Final Plat
Lot 3 Exhibit
Lot 1 Exhibit
Planning Commission Meeting Minutes Dated April 6, 2017
Resolution #17-04-077: Approved Findings of Fact
Resolution #17-04-078: Approved Variance
Resolution #18-067: Extension to Initiate Variance

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	Tim Gladhill	03/30/2018 03:15 PM
Form Started By: Chris Anderson		Started On: 03/28/2018 10:58 AM
Final Approval Date: 03/30/2018		

10-32-25-33-0002
7131 166TH AVE NW

Site Location Map



Feet
0 60 120 240 360 480

Print Date: October 6, 2016

CTW GROUP INC DBA HOMESTEADROAD
5402 Parkdale drive, suite 101 Minneapolis MN 5516
Phone: 612-644-2757 Email:Info@homesteadroad.com

Payoff Statement

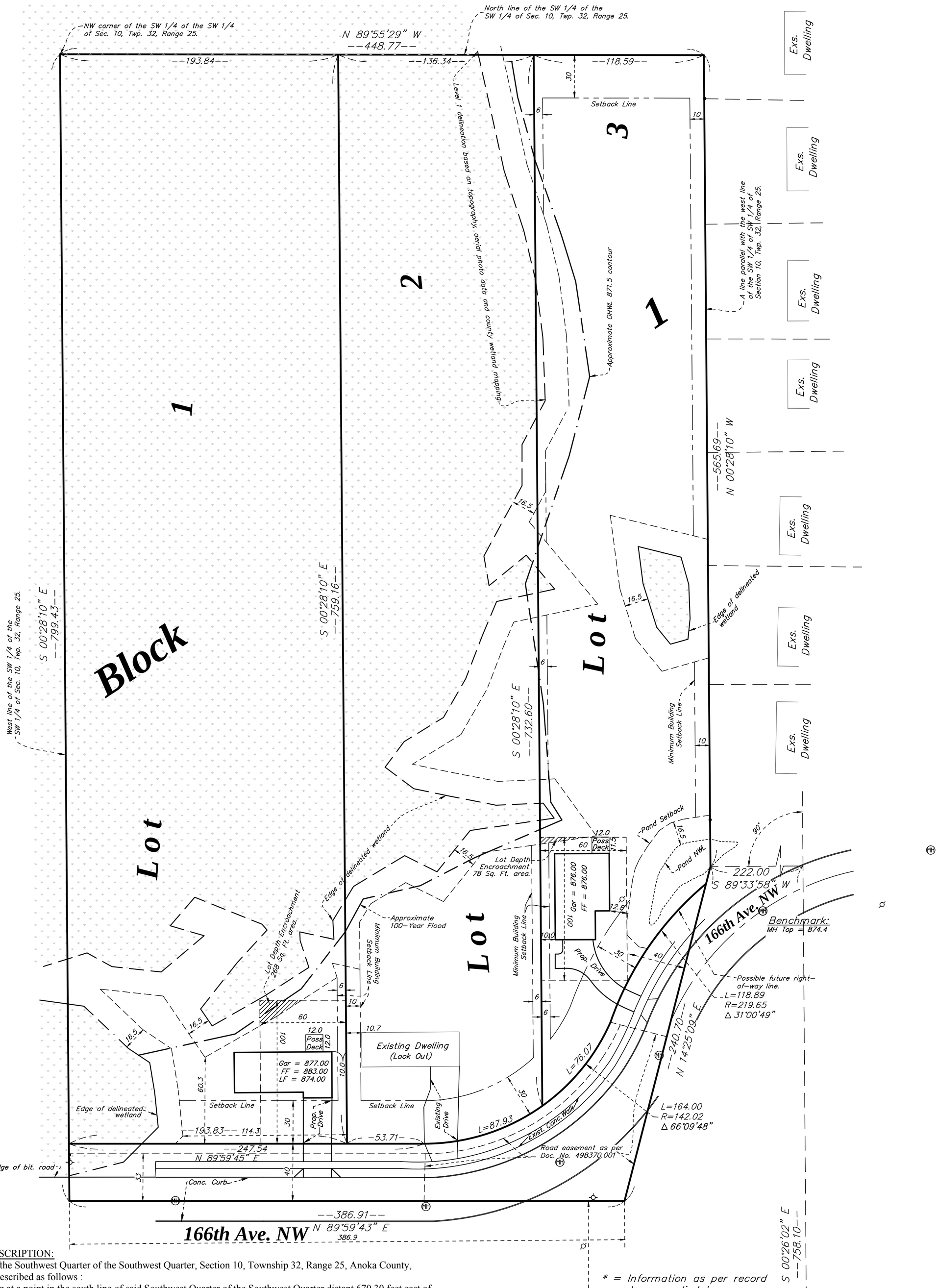
To: City of Ramsey

Dear Sirs

I would like to ask to extend the variance for the property at 7131 166th Avenue NW, Ramsey, MN 55303 that was approved for the development project and subdivision of the above property into 3 lots. Due to the fact that the project requires construction of rain gardens and capping of the utilities in the street we have been having difficulties of finding the investor/builder that would be willing to start it, and now as the weather permits we should be able to accomplish this task.

Please feel free to contact us with questions.
Sincerely
Alexander Delendik
Manager of CTW Group INC DBA HOMESTEADROAD
612.644.2757

Final Plat of Homestead Road Subdivision



* = Information as per record plans supplied to us.

LEGAL DESCRIPTION:

That part o fthe Southwest Quarter of the Southwest Quarter, Section 10, Township 32, Range 25, Anoka County, Minnesota described as follows :
Commencing at a point in the south line of said Southwest Quarter of the Southwest Quarter distant 670.30 feet east of the Southwest comer of said Southwest Quarter of the Southwest Quarter; thence North, parallel with the east line of said Southwest Quarter of the Southwest Quarter a distance of 758.10 feet; thence at a right angle West a distance of 222.00 feet, to the actual point of beginning of the tract of land to be described; thence northerly, parallel with the west line of said Southwest Quarter of the Southwest Quarter, a distance of 565.92 feet to the north line of said Southwest Quarter of the Southwest Quarter; thence westerly along the north line of said Southwest Quarter of the Southwest Quarter a distance of 448.32 feet to the northwest comer of said Southwest Quarter of the Southwest Quarter; thence southerly along the west line of said Southwest Quarter of the Southwest Quarter a distance of 799.89 feet to the intersection with the north line of the south 523.30 feet of said Southwest Quarter of the Southwest Quarter; thence East, along said north line of the south 523 .30 feet, a distance of 386.90 feet to the northeast comer of the west 386.90 feet of the said south 523.30 feet of the Southwest Quarter of the Southwest Quarter; thence northeasterly 240.62 feet, to the actual point of beginning.

SCOPE OF WORK & LIMITATIONS:

1. Showing the length and direction of boundary lines of the legal description listed above. The scope of our services does not include determining what you own, which is a legal matter. Please check the legal description with your records or consult with competent legal counsel, if necessary, to make sure that it is correct and that any matters of record, such as easements, that you wish to be included on the survey have been shown.
2. Showing the location of observed existing improvements we deem necessary for the survey.
3. Setting survey markers or verifying existing survey markers to establish the corners of the property.
4. Showing contours via the Anoka County GIS map.
5. While we show a proposed location for this home or addition, we are not as familiar with your proposed plans as you, your architect, or the builder are. Review our proposed location of the improvements and proposed yard grades carefully to verify that they match your plans before construction begins. Also, we are not as familiar with local codes and minimum requirements as the local building and zoning officials in this community are. Be sure to show this survey to said officials, or any other officials that may have jurisdiction over the proposed improvements and obtain their approvals before beginning construction or planning improvements to the property.

STANDARD SYMBOLS & CONVENTIONS:

"●" Denotes iron survey marker, set, unless otherwise noted.

Advance
Surveying & Engineering, Co.

17917 Highway 7
Minnetonka, Minnesota 55345
Phone (952) 474-7964
Web: www.advsur.com

I HEREBY CERTIFY THAT THIS PLAN, SURVEY OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

Thomas M. Bloom

42379
LICENSE NO.

OCTOBER 18, 2016
DATE:

DRAWING ORIENTATION & SCALE

N

0 40 80

JOB NAME / JOB ADDRESS

HOMESTEAD ROAD

7131 166TH AVE. NW
RAMSEY

OWNER NAME / ADDRESS

CTW GROUP INC.

5402 PARKDALE DR.
SUITE 101
MINNEAPOLIS, MN
55416

LEGEND

- = CATCH BASIN
- = FIRE HYDRANT
- = POWER POLE
- = MANHOLE
- = TELEPHONE PED.
- = ELEC. TRANSFORMER
- = WELL
- = GATE VALVE
- = LIGHT POLE
- = FENCE LINE
- SS = SANITARY SEWER LINE
- W = WATER LINE
- G = GAS LINE
- ST = STORM DRAIN LINE
- E = OVERHEAD UTILITY LINE

PRELIMINARY PLAT NOTES:

1. SQUARE FOOTAGE CALCULATION:
   - ENTIRE SITE – 351,393 SQ. FT. (8.1 ACRES)
   - LOT 1 – 147,143 SQ. FT. (3.4 ACRES)
   - LOT 2 – 102,790 SQ. FT. (2.4 ACRES)
   - LOT 3 – 77,394 SQ. FT. (1.8 ACRES)
   - DEDICATED RIGHT OF WAY – 24,037 SQ. FT. (0.6 ACRES)
2. THE ZONING INFORMATION FOR THIS PROJECT IS R-1 MUSA.

NET DENSITY INFORMATION

TOTAL NUMBER OF LOTS = 3
TOTAL AREA = 351,393 SF
WETLAND AREA = 218,066 SF

NET AREA = 133,327 SF

NET DENSITY =
133,327 / 3 = 44,442 SF OR 1.02 ACRES

DATE	REVISION DESCRIPTION
10/18/16	UPDATE PER CITY COMMENTS
11/18/16	CHANGE POSS. FUTURE HOUSE ON LOT 3
03/02/17	UPDATE PER CITY COMMENTS
05/01/17	UPDATE PER CITY COMMENTS
06/28/17	UPDATE PER CITY COMMENTS
08/08/17	UPDATE PER CITY COMMENTS

DATE SURVEYED: AUGUST 24, 2016

DATE DRAFTED: OCTOBER 18, 2016

SHEET TITLE

FINAL PLAT

DRAWING NUMBER

160806 TB
REV 6-28

SHEET NUMBER

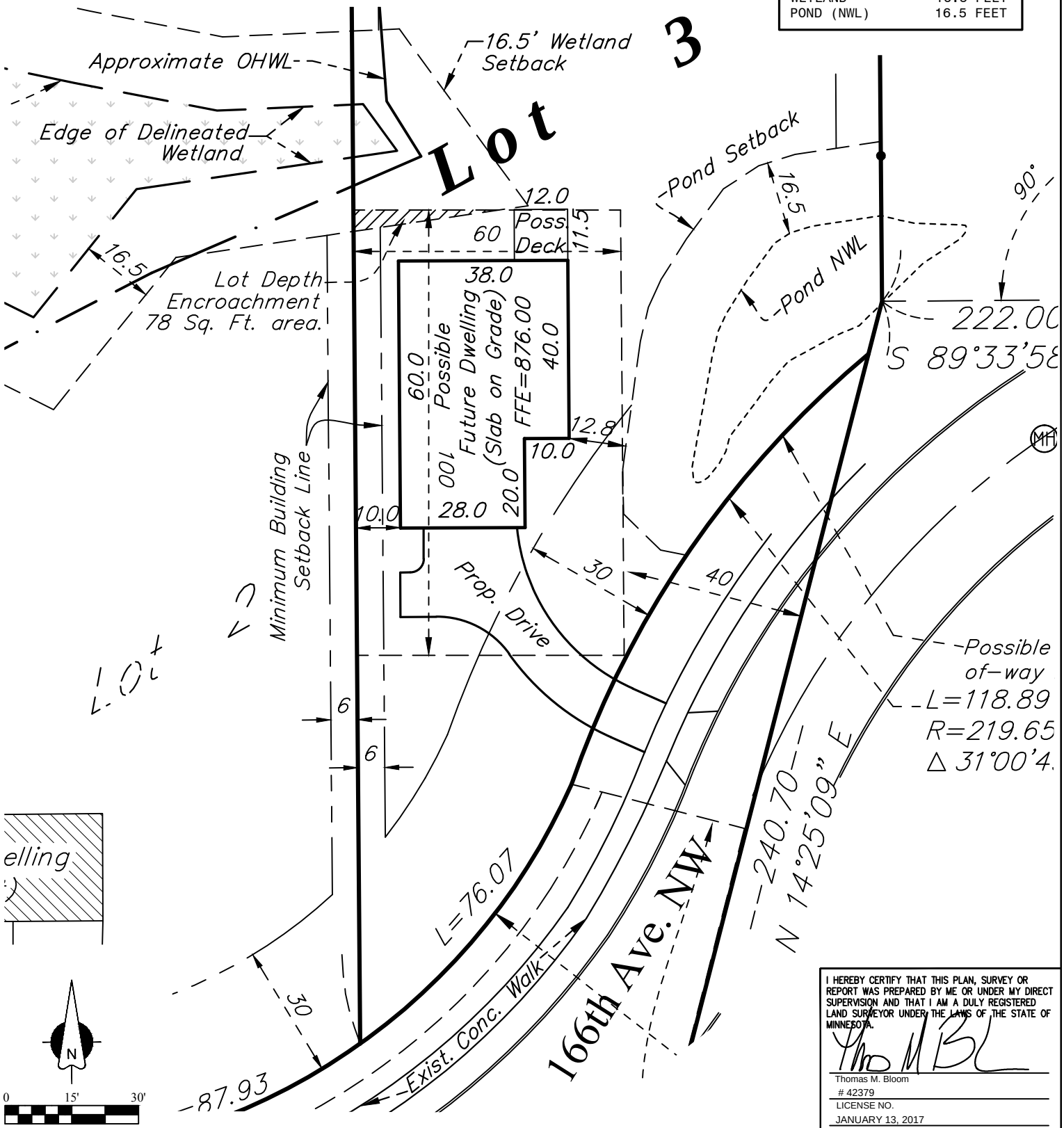
S1

LOT DEPTH VARIANCE EXHIBIT

LOT 3, BLOCK 1

HOMESTEAD ROAD SUBDIVISION, RAMSEY, MN

MINIMUM SETBACKS	
FRONT	30 FEET
SIDE (HOUSE)	10 FEET
SIDE (GARAGE)	6 FEET
REAR	30 FEET
WETLAND	16.5 FEET
POND (NWL)	16.5 FEET



I HEREBY CERTIFY THAT THIS PLAN, SURVEY OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

Thomas M. Bloom

42379
LICENSE NO.

JANUARY 13, 2017
DATE

DATE	REVISION DESCRIPTION

CLIENT: CTW GROUP INC.	JOB ADDRESS: 7131 166TH AVE. NW
JOB NUMBER: # 160806 JR	DATE DRAFTED: JANUARY 13, 2017
DATE SURVEYED: AUGUST 24, 2016	SURVEYED BY: ADVANCE SURVEYING & ENGINEERING, CO.

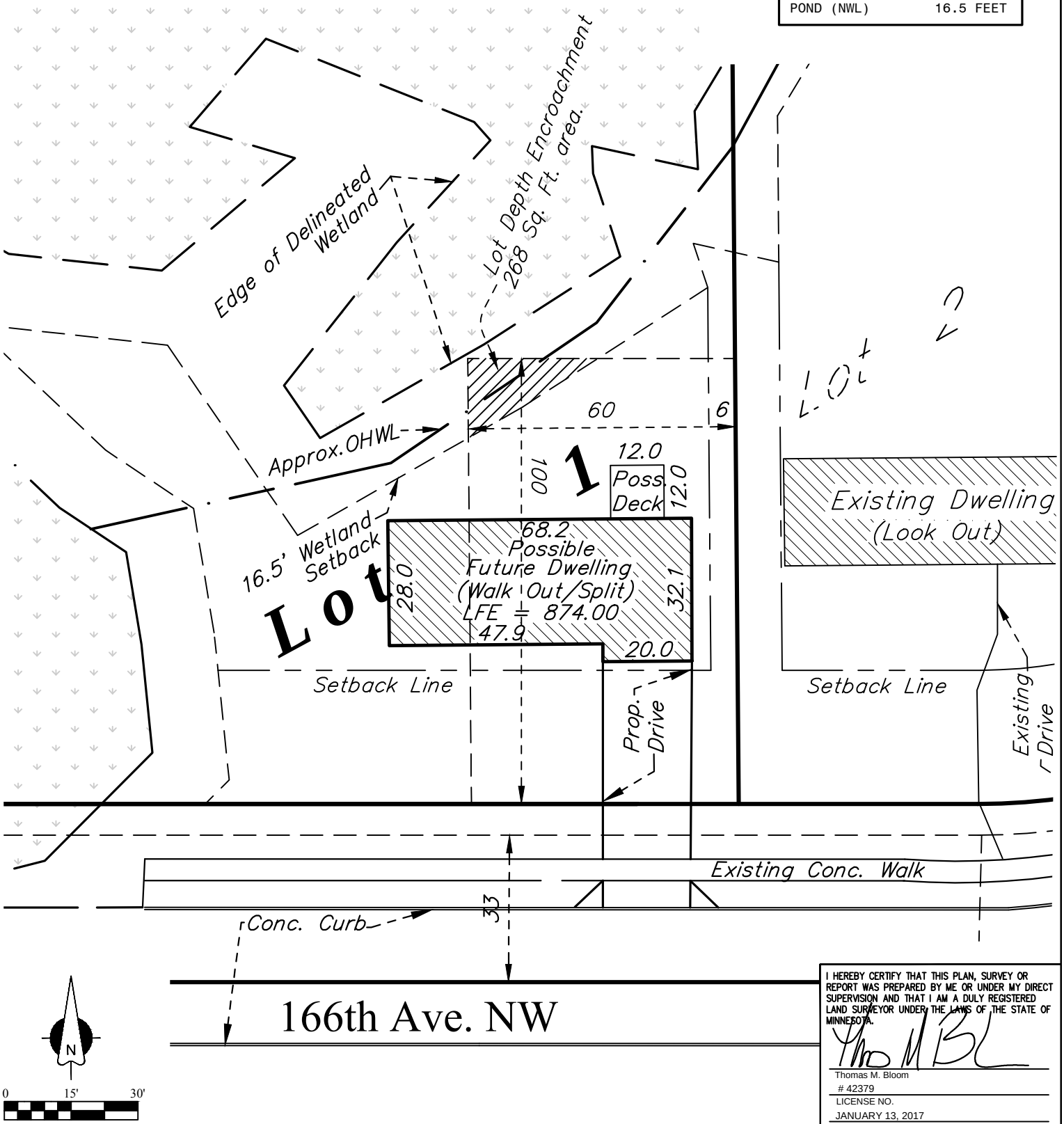
Advance
Surveying & Engineering, Co.
17917 Highway 7
Minnetonka, Minnesota 55345
Phone (952) 474-7964
Web: www.advsur.com

EX2

LOT DEPTH VARIANCE EXHIBIT

LOT 1, BLOCK 1
HOMESTEAD ROAD SUBDIVISION, RAMSEY, MN

MINIMUM SETBACKS	
FRONT	30 FEET
SIDE (HOUSE)	10 FEET
SIDE (GARAGE)	6 FEET
REAR	30 FEET
WETLAND	16.5 FEET
POND (NWL)	16.5 FEET



I HEREBY CERTIFY THAT THIS PLAN, SURVEY OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

Thomas M. Bloom
42379
LICENSE NO.
JANUARY 13, 2017
DATE

DATE	REVISION DESCRIPTION

CLIENT: CTW GROUP INC.	JOB ADDRESS: 7131 166TH AVE. NW
JOB NUMBER: # 160806 JR	DATE DRAFTED: JANUARY 13, 2017
DATE SURVEYED: AUGUST 24, 2016	SURVEYED BY: ADVANCE SURVEYING & ENGINEERING, CO.

Advance
Surveying & Engineering, Co.
17917 Highway 7
Minnetonka, Minnesota 55345
Phone (952) 474-7964
Web: www.advsur.com

EX1

5.02: Public Hearing: Consider Request for a Variance and Preliminary Plat Approval of Homestead Road Subdivision Located at 7131 166th Avenue NW (Project #16-32); Case of CTW Group, Inc.

Public Hearing

Chairperson Bauer called the public hearing to order at 7:17 p.m.

Presentation

City Planner Anderson presented the staff report stating the City has received an application from CTW Group, Inc. (the "Applicant") seeking a variance to lot depth standards and preliminary plat approval for a proposed three (3) lot subdivision on the property located at 7131 166th Ave NW (the "Subject Property"). The Planning Commission reviewed the Sketch Plan at their November 3, 2016 meeting. There is an existing dwelling on the proposed Lot 2 that would remain with two (2) new, buildable lots being created, one on each side of the existing dwelling. Staff reviewed the request in further detail and recommended approval of a variance and the preliminary plat for the Homestead Road subdivision.

Citizen Input

Alexander Delendik, representative for Homestead Road, stated he specialized in the rehabilitation of properties. He explained the previous owners were trying to subdivide the 8 acres into five lots. He believed that his plan was a better fit for the neighborhood. He reported he was working with the City, the watershed district and the neighbors to ensure this was a positive development for the community.

Motion by Commissioner Anderson, seconded by Commissioner Surma, to close the public hearing.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners Anderson, Surma, Brauer, Gengler, and Nosan. Voting No: None. Absent: Commissioner VanScoy.

Chairperson Bauer closed the public hearing closed at 7:26 p.m.

Commission Business

Motion by Commissioner Anderson, seconded by Commissioner Surma, to adopt Resolution #17-04-077 approving favorable Findings of Fact.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners Anderson, Surma, Brauer, Gengler, and Nosan. Voting No: None. Absent: Commissioner VanScoy.

Motion by Commissioner Anderson, seconded by Commissioner Brauer, to adopt Resolution #17-04-078 granting a Variance to lot depth for Lots 1 & 3, Block 1 contingent upon approval of the Preliminary Plat.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners Anderson, Brauer, Gengler, Nosan, and Surma. Voting No: None. Absent: Commissioner VanScoy.

Motion by Commissioner Anderson, seconded by Commissioner Nosan, to recommend that City Council approve the Preliminary Plat contingent upon compliance with the Staff Review Letter.

Motion Carried. Voting Yes: Chairperson Bauer, Commissioners Anderson, Nosan, Brauer, Gengler, and Surma. Voting No: None. Absent: Commissioner VanScoy.

Commissioner Anderson introduced the following resolution and moved for its adoption:

RESOLUTION #17-04-077

A RESOLUTION ADOPTING FINDINGS OF FACT #0980 RELATING TO A REQUEST FOR A VARIANCE TO LOT DEPTH FOR LOTS 1 AND 3, BLOCK 1 OF HOMESTEAD ROAD ADDITION.

WHEREAS, CTW Group, Inc., hereinafter referred to as "Applicant", properly applied to the City of Ramsey (the "City") for a variance to lot depth standards for development of portions of the property legally described as follows:

> That part of the Southwest Quarter of the Southwest Quarter of Section 10, Township 32, Range 25, described as follows: Commencing at a point on south line of said Quarter Quarter 670.30 feet east of southwest corner thereof, thence north parallel with east line of said Quarter Quarter 758.10 feet, thence at a right angle west 222 feet to point of beginning thence northerly parallel with west line of aid Quarter Quarter 565.92 feet to north line of said Quarter Quarter, thence westerly along said north line, 448.21 feet to northwest corner thereof, thence southerly along said west line 799.89 feet to appoint on said wet line 523.3 feet north of said southwest corner, thence east parallel with said south line 386.9 feet, thence northeasterly 240.62 feet to point of beginning, except roads subject to easement of record, Anoka County, Minnesota

Or upon recording of the Final Plat

> Lots 1 and 3 (exclusive), Block 1 Homestead Road Addition
>
> (the "Subject Property");

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF RAMSEY PLANNING, as follows:

1) That the Applicant appeared before the Planning Commission for a public hearing pursuant to Section 117-53 (Variances) of the Ramsey City Code on April 6, 2017, and that said public hearing was properly advertised, and that the minutes of said public hearing are hereby incorporated as a part of these findings by reference.

2) That the Subject Property is zoned R-1 Residential (MUSA) and the Applicant has made proper application to the City to plat the Subject Property into three (3) single family residential lots.

3) That newly created lots are required to have a depth of 100 feet for a continuous width of sixty (60) feet that is not encumbered by wetland, wetland setback area, or floodway.

4) That the Applicant has applied for a variance to the lot depth standard for Lot 1, Block 1 and Lot 3, Block 1 of the proposed Homestead Road Addition.

5) That as part of the reconstruction of 166th Ave NW, the City installed five (5) sets of utility stubs to the Subject Property.

6) That the Applicant is only proposing three (3) lots to minimize deviations from the lot depth standard.

7) That the Environmental Policy Board reviewed the request at their March 20, 2017 meeting.

8) That the location of the existing dwelling on Lot 2 restricts the Applicant's ability to adjust lot lines to reduce or eliminate the encroachment into the sixty (60) foot by 100 foot buildable area box.

9) That both lots still meet the spirit and intent of the lot depth standard as they do have buildable area available to accommodate typical homeowner improvements, such as a deck and/or a detached accessory building.

10) That there are significant areas of wetland and floodway encumbering the Subject Property.

11) That there is additional buildable area beyond the 60'x100' area on each lot.

12) That economic circumstances alone do/do not create the practical difficulties.

13) That the plight is/is not due to circumstances unique to the Subject Property.

14) That the plight is not created by the Applicant.

15) That, if granted, the variance will not alter the locality's essential character.

16) That, if granted, the variance will not impair an adequate supply of light and air to adjacent property.

17) That, if granted, the variance will not have the effect of allowing a use that is prohibited in the applicable zoning district.

18) That, if granted, the variance will not unreasonably increase the congestion on the public street.

19) That, if granted, the variance will not adversely impact the degree of public health, safety and general welfare provided for in the Ramsey City Code.

20) That, if granted, the variance will not diminish established property values within the neighborhood.

21) That, if granted, the variance requested is the minimum variance necessary to accomplish the intended purpose of the Applicant.

22) That the unique circumstances on the Subject Property do not result from the actions of the Applicant.

23) That, if granted, the variance will not grant the Applicant any special privilege that is denied to the owners of other land in the same district.

The motion for the adoption of the foregoing resolution was duly seconded by Commissioner Surma, and upon vote being taken thereon, the following voted in favor thereof:

Chairperson Bauer
Commissioner Anderson
Commissioner Surma
Commissioner Brauer
Commissioner Gengler
Commissioner Nosan

and the following voted against the same:

None

and the following abstained:

None

and the following were absent:

Commissioner Van Scoy

whereupon said resolution was declared duly passed and adopted by the Ramsey Planning Commission this the 6th day of April, 2017.

_____
Chairperson

ATTEST:

_____
City Clerk

Commissioner _____ introduced the following resolution and moved for its adoption:

RESOLUTION #17-04-078

A RESOLUTION APPROVING THE ISSUANCE OF A VARIANCE TO LOT DEPTH FOR LOTS 1 AND 3, BLOCK 1 OF HOMESTEAD ROAD ADDITION AND DECLARING TERMS OF SAME.

WHEREAS, CTW Group, Inc., hereinafter referred to as "Applicant", properly applied for a variance from the lot depth standard prescribed in Section 117-614, Subd. (h)(11) on portions of the property legally described as follows:

> That part of the Southwest Quarter of the Southwest Quarter of Section 10, Township 32, Range 25, described as follows: Commencing at a point on south line of said Quarter Quarter 670.30 feet east of southwest corner thereof, thence north parallel with east line of said Quarter Quarter 758.10 feet, thence at a right angle west 222 feet to point of beginning thence northerly parallel with west line of aid Quarter Quarter 565.92 feet to north line of said Quarter Quarter, thence westerly along said north line, 448.21 feet to northwest corner thereof, thence southerly along said west line 799.89 feet to appoint on said wet line 523.3 feet north of said southwest corner, thence east parallel with said south line 386.9 feet, thence northeasterly 240.62 feet to point of beginning, except roads subject to easement of record, Anoka County, Minnesota
>
> Or upon recording of the Final Plat,
>
> Lots 1 and 3 (exclusive), Block 1 Homestead Road Addition
>
> (the "Subject Property"); and

WHEREAS, the Planning Commission met on April 6, 2017, conducted the public hearing and adopted Findings of Fact #0980 relating to the request for a variance from the lot depth standard on the Subject Property.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF ADJUSTMENT OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows

1. Based on Findings of Fact #0980, a variance to the lot depth standards, as established in Section 117-614, Subd. (h)(11) of the Ramsey City Code, is hereby granted for the **Subject Property**.

2. The variance allows for the **Subject Property** that does not meet the requirement of 100 feet for a width of 60 feet that is not encumbered by wetland, wetland setback area, floodway, or other unbuildable areas.

3. No construction of any building shall commence without the issuance of a building permit.

4. The **Permittee** shall be responsible for all **City** costs incurred in administering and enforcing this variance if approved.

5. This variance, if approved, shall automatically become null and void if it is not initiated within twelve (12) months of the date of approval, unless an extension is granted at the written request of the **Permittee**. Approval of the plat of Homestead Road Addition shall be considered as initiation of the variance.

The motion for the adoption of the foregoing resolution was duly seconded by _____ and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

Whereupon said resolution was declared duly adopted by the Ramsey Planning Commission this the 6th day of April, 2017.

PERMITTEE

CTW Group, Inc., hereby acknowledges receipt of this variance and that they have reviewed the terms of the variance and have agreed that they will comply with the terms of the variance.

By: _____

Its: _____

STATE OF MINNESOTA)
) ss.
COUNTY OF ANOKA)

On this _____ day of _____, ____, before me, a Notary Public, personally appeared _____, the _____ of CTW Group, Inc., to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as their free act and deed.

_____
Notary Public

CITY OF RAMSEY:

By: _____ _____
Planning Commission Chairperson City Clerk

STATE OF MINNESOTA)
) ss.
COUNTY OF ANOKA)

On this _____ day of _____, ____, before me, a Notary Public, personally appeared Randy Bauer and JoAnn M Thieling, to me personally known, who, being each by me duly sworn did say that they are respectively the Planning Commission Chairperson and City Clerk of the City of Ramsey, the Municipal Corporation named in the foregoing instrument, and seal affixed to said instrument is the corporate seal of said Municipal Corporation, and the said instrument was signed and sealed on behalf of said Municipal Corporation by authority of its City Council, and said Randy Bauer and JoAnn M Thieling acknowledge said instrument to be the free act and deed of said Municipal Corporation.

_____
Notary Public

This document drafted by:
City of Ramsey
7550 Sunwood Dr NW
Ramsey, MN 55303

This document reviewed by:
Ratwik, Roszak & Maloney
730 Second Ave. S., Suite 300
Minneapolis, MN 55402

Commissioner _____ introduced the following resolution and moved for its adoption:

RESOLUTION #18-067

RESOLUTION GRANTING A ONE YEAR EXTENSION TO INITIATE THE VARIANCE TO THE LOT DEPTH STANDARD GRANTED ON APRIL 6, 2017

WHEREAS, CTW Group Inc., hereafter referred to as "Applicant", has requested an extension to initiate its variance to the lot depth standard on portions of the following described property located in the City of Ramsey:

> That part of the Southwest Quarter of the Southwest Quarter of Section 10, Township 32, Range 25, described as follows: Commencing at a point on south line of said Southwest Quarter of the Southwest Quarter distant 670.30 feet east of the Southwest corner thereof, thence north parallel with east line of said Southwest Quarter of the Southwest Quarter a distance of 758.10 feet, thence at a right angle west a distance of 222.00 feet to actual point of beginning of the tract of land to be described; thence northerly parallel with the west line of said Southwest Quarter of the Southwest Quarter a distance of 565.92 feet to north line of said Southwest Quarter of the Southwest Quarter, thence westerly along the north line of said Southwest Quarter of the Southwest Quarter a distance of 448.32 feet to northwest corner of said Southwest Quarter of the Southwest Quarter, thence southerly along the west line of said Southwest Quarter of the Southwest Quarter a distance of 799.89 feet to the intersection with the north line of the south 523.30 feet of said Southwest Quarter of the Southwest Quarter; then East, along said north line of the south 523.30 feet, a distance of 386.90 feet to the northeast corner of the west 386.90 feet of said south 523.30 feet of the Southwest Quarter of the Southwest Quarter; thence northeasterly 240.62 feet to point of beginning, except roads, subject to easement of record, Anoka County, Minnesota.
>
> Or upon recording:
>
> Lots 1 and 3, Block 1 HOMESTEAD ROAD ADDITION
>
> (the 'Subject Property');

WHEREAS, on October 21, 2016, the City of Ramsey received a sketch plan for Homestead Road Addition; and

WHEREAS, the Planning Commission reviewed the sketch plan on November 3, 2016; and

WHEREAS, the Ramsey Environmental Policy Board (EPB) considered the tree preservation plan, landscaping, and the requested lot depth variance pertaining to the preliminary plat on March 20, 2017; and

WHEREAS, on April 6, 2017, the Ramsey Planning Commission conducted a public hearing regarding the proposed preliminary plat and approved a variance to lot depth standard for the proposed Lots 1 and 3, Block 1 Homestead Road Addition; and

WHEREAS, on April 25, 2017, the City Council approved the preliminary plat; and

WHEREAS, on May 17, 2017, the Applicant applied for Final Plat approval; and

WHEREAS, on June 13, 2017, the City Council approved the Final Plat for Homestead Road Addition; and

WHEREAS, on March 13, 2018, the Applicant submitted a written request seeking an extension to initiate the approved variance; and

WHEREAS, City Code Section 117-53 (Variances) (d) (Lapse of Variance) states that a variance shall become null and void one year after final action by the Planning Commission if not initiated or utility; and

WHEREAS, City Code Section 117-53 (Variances) (d) (Lapse of Variance) further states that a variance holder may request the Planning Commission to grant an extension of time to initiate or utilize the variance; and

WHEREAS, on March 13, 2018, the City received a written request from the Applicant seeking an extension to utilize or initiate their variance that was approved on April 6, 2017.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

1) That the Ramsey Planning Commission hereby grants a one (1) year extension, ending on April 5, 2019, for the Applicant to initiate the variance to lot depth on Lots 1 and 3, Block 1 Homestead Road Addition, and that recording of the Final Plat of Homestead Road addition shall constitute initiation.

The motion for the adoption of the foregoing resolution was duly seconded by Commissioner _____, and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

whereupon said resolution was declared duly passed and adopted by the Ramsey Planning Commission this 5th day of April, 2018

_____
Chairperson

ATTEST:

_____
City Clerk

Our Mission: To work together to resposibly grow our community, and to provide quality, cost-effective, and efficient government services.

Regular Planning Commission **8. 1.**

Meeting Date: 04/05/2018

By: Tim Gladhill, Community Development

Information

Title:

Review Draft Comprehensive Plan Update

Purpose/Background:

The purpose of this case is to review a draft of the Comprehensive Plan Update. Staff has completed an initial draft of all Chapters, but not all are complete and ready to publish for review. These documents are still in draft format. The focus has been organization and content. The document will be formatted into a final design prior to final approval.

Note: by consensus at their March 27 Regular Meeting, the City Council asked that the following changes be made to be more consistent with the City Council's Strategic Plan (3 Year Organizational Plan):

- Key Goals/Themes Amended as Follows:
  - A Balance of Rural Character and Urban Development
  - An Active Community
  - A Connected Community
  - Smart, Citizen-Focused Government
  - Financial Stability
- In order to keep focus on priority on Highway 10 and Future Mississippi River Crossing as well as concerns about true impact, remove tactic to consider a Rum River Crossing connecting to the City of Anoka.

Notification:

Notification is not required at this stage. The City has hosted a variety of public engagement opportunities in person and online over the past two (2) years.

Upcoming Meetings for Review

- April 9 Public Workshop
- May 3 Planning Commission
- May 22 City Council (authorize for distribution/comment)
- December 6 Planning Commission
- December 11 City Council (approve final draft for Metropolitan Council)
- Early 2019 Planning Commission and City Council (adopt Final Plan)

Observations/Alternatives:

Every ten (10) years, the City is required (as all metropolitan area communities are) to submit a Comprehensive Plan to the Metropolitan Council for review and approval. Regardless of the statutory requirements, there were a number of planning projects and updates that warranted updates to the City's long-range vision (20 years). The City has seen significant benefit in terms of securing outside funding and community consensus by having a clear vision for our community. This long-range planning also helps plan and prioritize for larger capital items such as transportation improvements, utilities, parks, trails, etc. With a limited amount of resources, it is important to plan and prioritize these important capital investments.

Please note that we are required to attach our existing Water Supply, Wastewater, and Surface Water Plans/Studies as appendices. These attachments noted by 'Appendix' are not part of the formal review. There is a DNR Water Supply Template that the City must complete as part of this update, and that is being reviewed as part of this process. This template was previously approved for distribution for comment by the City Council.

The only Chapter not published for review at this point is the Parks and Recreation Plan. A draft of this plan has been completed, and Staff is working on edits and formatting before sending for review.

The next major milestone is intended to send the draft document for adjacent community review, as required. Adjacent communities are allowed six (6) months to comment. In order to make the December 31, 2018 submittal deadline to the Metropolitan Council, the draft plan must be sent for comment by the end of May. The document will be able to be updated throughout this adjacent review period.

For more information on the update, visit www.cityoframsey.com/ramsey2040.

Funding Source:

This case is being handled as part of normal Staff duties. Assistance on various Chapters is provided by WSB Associates, Bolton and Menk, and LHB/Bruce Jacobson. Funding for these services is provided through the General Fund as part of Departmental Professional Services Budgets.

Additionally, the City received a $32,000 Planning Grant from the Metropolitan Council for aide in the completion of the update.

Recommendation:

No action is being requested. General feedback on the draft is appreciated.

Action:

No action is being requested. General feedback on the draft is appreciated.

Attachments

Vision
Community Profile
Land Use Plan
Transportation Plan
Economic Development Plan
Housing Plan
Natural Resources Plan
Critical Area Plan
Water Supply Plan
Septic Plan
Appendix: Sanitary Sewer Study

Appendix: Surface Water Management Plan

Appendix: Water Supply Study

Form Review

Inbox	Reviewed By	Date
Kurt Ulrich	Tim Gladhill	03/30/2018 03:32 PM

Form Started By: Tim Gladhill Started On: 03/30/2018 03:22 PM

Final Approval Date: 03/30/2018

City of Ramsey 2040 Comprehensive Plan Update

Our Vision

Background on this Document

This document is a draft of the narrative to be used in the 2040 Comprehensive Plan Update. This is not a final version or actual layout. This document will be reviewed and revised multiple times. The City will try to add additional maps and figures to better tell the story of this vision.

Our Mission

It is our mission to work together to responsibly grow our community, and to provide quality, cost-effective, and efficient government services.

Our Vision

Ramsey will evolve through citizen-driven, collaborative processes that respect the balance and connectivity between its unique urban, rural, and natural environment for current and future generations.

Strategic Imperatives

1. A Balance of Rural Character and Urban Growth Balance
2. An Active Community (Parks, Recreation, and Open Space)
3. A Connected Community (Transportation)
4. A Positive Learning Environment

Core Values

These core values carry equal importance. They are not shown in a prioritized list.

- Encourage new pedestrian friendly neighborhoods and balanced transportation.
- Maintain landowner rights.
- Employ careful foresight that involves all citizens in decisions that affect their lives, property, and neighborhoods through collaborative public engagement.
- Nurture neighborhood and community interactions with flexibility to meet future needs without compromising the needs and interests of current residents.
- Develop and maintain a well-connected park and public space system for all ages.
- Attract and retain businesses that support the whole community.

DRAFT

Purpose of the Plan

Components of the Comprehensive Plan

The Land Use Plan serves as the foundation in a series of plans that guides the future of Ramsey. Policy decisions on how the community will change over the next twenty (20) years will have impacts on a variety of systems. This chapter sets the stage and tone for subsequent chapters. The Comprehensive Plan is a compilation of several chapters that are well integrated to form a vision for the community for the next twenty (20) years.

- Land Use
- Transportation
- Wastewater
- Surface Water
- Water Supply
- Parks and Trails
- Housing
- Resilience (Natural Resources)
- Economic Competitiveness
- Implementation (tying it all together in a plan of action)

Key Achievements of the Previous Plan

- Improved Public Engagement in Key Policy Decisions
- Secured the Ramsey Station on the Northstar Commuter Rail.
- Completed the Armstrong Interchange.
- Progressed on Completing The COR according to its Vision.

NOT FOR DRAFT/Topic List:

- Building in flexibility to respond to the market.
- Provide more regular updates.
- Explain the intent/purpose of this document. Ensure that it not intended to micro-manage the process.
- List out the process for amending the Comprehensive Plan.

DRAFT

City of Ramsey 2040 Comprehensive Plan Update

Community Profile

Background on this Document

This document is a draft of the narrative to be used in the 2040 Comprehensive Plan Update. This is not a final version or actual layout. This document will be reviewed and revised multiple times. The City will try to add additional maps and figures to better tell the story of this vision.

The Community

Located in the northwest Twin Cities Metro, the City of Ramsey boasts incredible outdoor recreation opportunities, a growing downtown in Ramsey COR, an impressive manufacturing sector, and a strong local government.

The City of Ramsey has experienced steady growth and development over the past 20 years. This trend is expected to continue as the City has over 1,000 acres of developable land in the COR located near U.S. Highway 10.

Our Neighborhoods

Ramsey's neighborhoods make up the fabric of our community and define the balance of Rural Character and Urban Development. Each neighborhood is uniquely connected to a variety of services.

Ramsey is a great place to live!

Ramsey boasts a robust recreation system, high-quality affordable housing, great jobs, and living wages.

Ramsey is a great place to locate a business!

Ramsey strives to provide high-quality, cost-effective government services while balancing a low tax rate. Ramsey.

DRAFT

City of RAMSEY

Snapshot of the City 2017

ABOUT OUR CITY

Population Trends[2]

1970	2,360
1980	10,093
1990	12,408
2000	18,510
2010	23,668
2020	26,400[3]

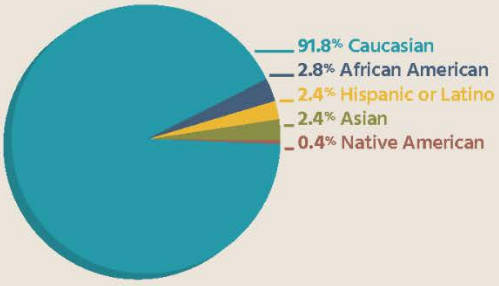
#1 Community priority is to protect the balance of rural character and new development[14]

#2 Second fastest growing city in Anoka County[1]

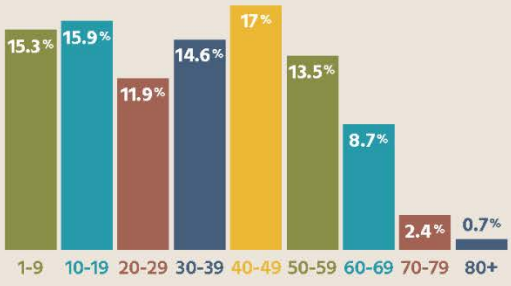


WHO WE ARE

Race and Ethnicity[4]



Population by Age[4]



Additional Demographics

49.7% Female[4]

50.3% Male[4]

34.9 Median age[4]

$86,794 Median household income[5]

4.5% Born outside of US[5]

7.6% Speak a language other than English at home[5]

City of RAMSEY

Snapshot of the City 2017

WHAT WE HAVE

5.6k Acres of undeveloped land[9]

8k Acres of developed land[9]

1k+ Acres of developable land[1]

15+% of land is protected wetland[10]

17+ Miles of shoreline[8]

50+ Miles of trail[7]

32 Parks[6]



HOW WE LIVE AND WORK

9,158 Total Number of Housing Units[4]

6,776 Single family detached

1,438 Townhome

37 Duplex, triple, quad

823 Multifamily (5 units or more)

84 Manufactured home

Septic vs. Sewer

4,000 Housing units on septic[13]

5,158 Housing units on sewer[13]

Employment

470 Places of work[11]

6,334 Number of jobs in Ramsey[12]

1. City of Ramsey Developers Document | 2. Decennial Census (1970, '80, '90, 2000, '10) | 3. Metropolitan Council Population, Households and Employment Forecast | 4. 2010 census
5. 2011 American Community Survey | 6. 2017 Ramsey New Residents Packet | 7. City of Ramsey Parks Department | 8. Google earth
9. Metropolitan Council Generalized Land Use Historical Data Set | 10. City of Ramsey Parks and Recreation webpage | 11. 2012 Economic Census
12. 2016 Quarterly Census of Employment and Wages – second quarter | 13. Rick Jarson, Ramsey Building Official | 14. City Comprehensive Plan Community Engagement

Forecasted Growth

Table 1: Forecasted Growth

	2016	2020	2030	2040
Households	8,973	9,500	11,500	13,500
Population	26,251	27,550	33,350	39,150
Employment	6,334	6,900	7,800	8,400

Ramsey acknowledges that these forecasts deviate from the approved 2040 forecasts for Ramsey. After careful consultation and analysis of recent growth trends, Ramsey requests these modifications to our 2040 Forecasts. For assistance in reviewing requested changes, the series of tables below are offered.

Requested Household Forecast Amendment

	2020	2030	2040
Published Forecast	9,400	11,300	13,000
Requested Amendment	9,600	11,500	13,500
Difference	+200	+200	+500

Requested Population Forecast Amendment

	2020	2030	2040
Published Forecast	26,400	30,700	34,700
Requested Amendment	27,550	33,350	39,150
Difference	+1,150	+2,650	+4,450

Requested Employment Forecast Amendment

	2020	2030	2040
Published Forecast	6,200	7,000	7,600
Requested Amendment	6,900	7,800	8,400
Difference	+700	+800	+800

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The People

Population

As of the 2010 US Census, the population of Ramsey was 18,510, and the most recent estimates from the 2015 American Community Survey (ACS) put the population at 25,362. The population has steadily increased since 1990. Although the number of households in the city has increased, the number of persons per household has decreased from 3.43 in 1990 to 2.95 in 2010. According to forecasts by the Metropolitan Council, the 2040 population is projected to nearly 40,000.

Figure 1: Historical and Future Population

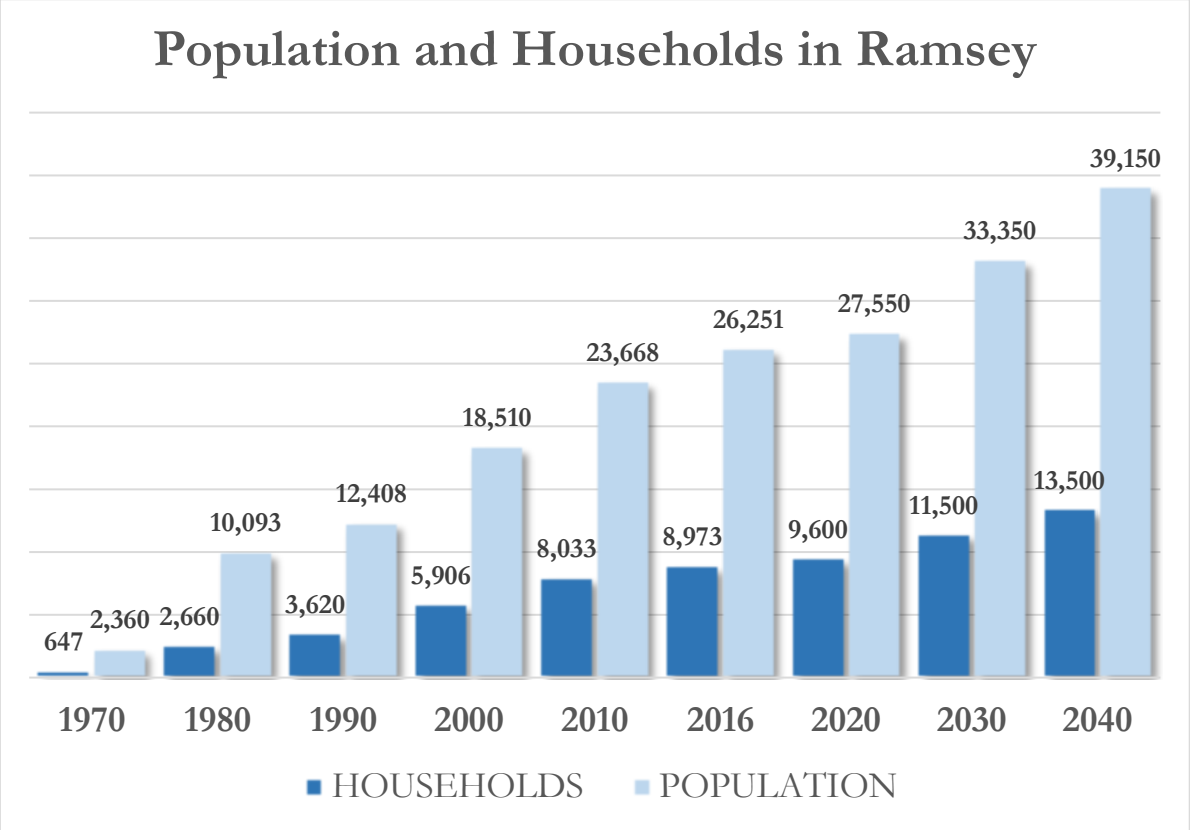
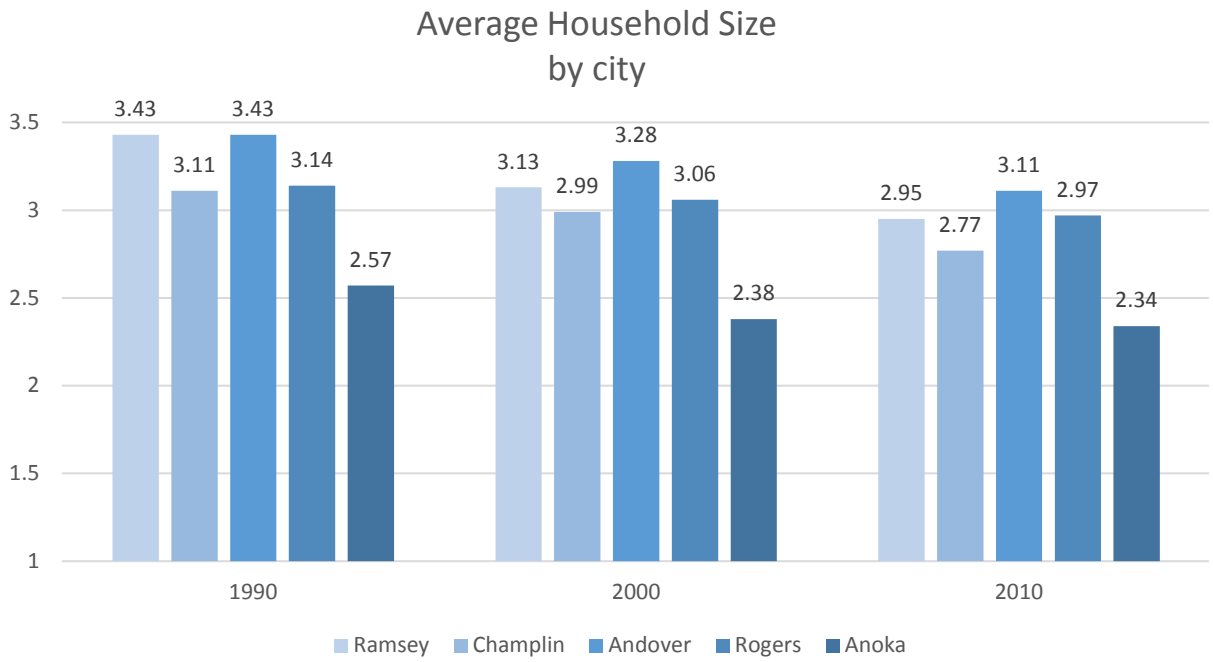


Figure 2: Average Household Size



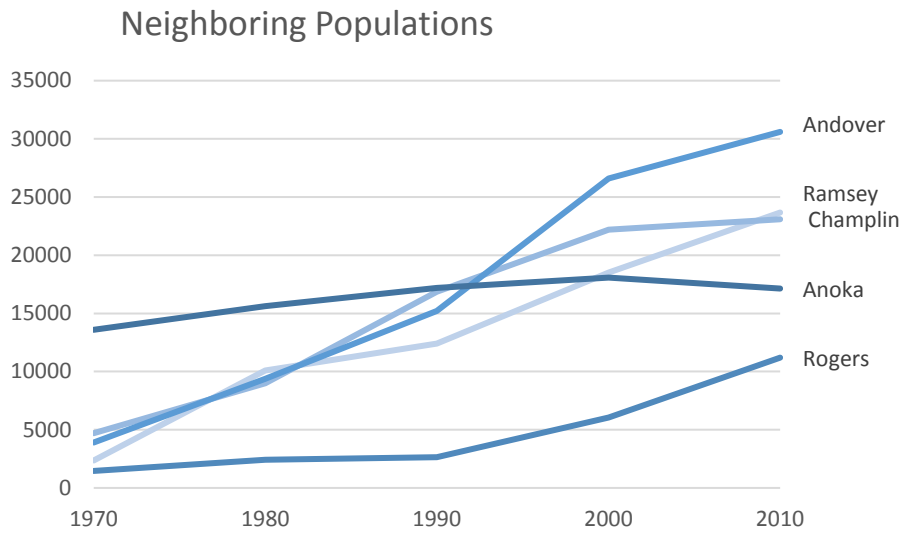
With the number of residents per household likely to continue to decline as the overall population of Ramsey ages, residential housing types will need to be accommodated through development of a variety of housing types including apartments and townhomes.

Ramsey's population experienced steady growth between 1990 and 2010, slowed from 2010 to 2015, and is projected by the Metropolitan Council to steadily increase yet again from 2020 to 2040.

As shown in Figure __-__Ramsey has been outpaced by only Andover in population growth since 1990 and has risen from to the second most populated City in the area.

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Figure 3: Population Comparison

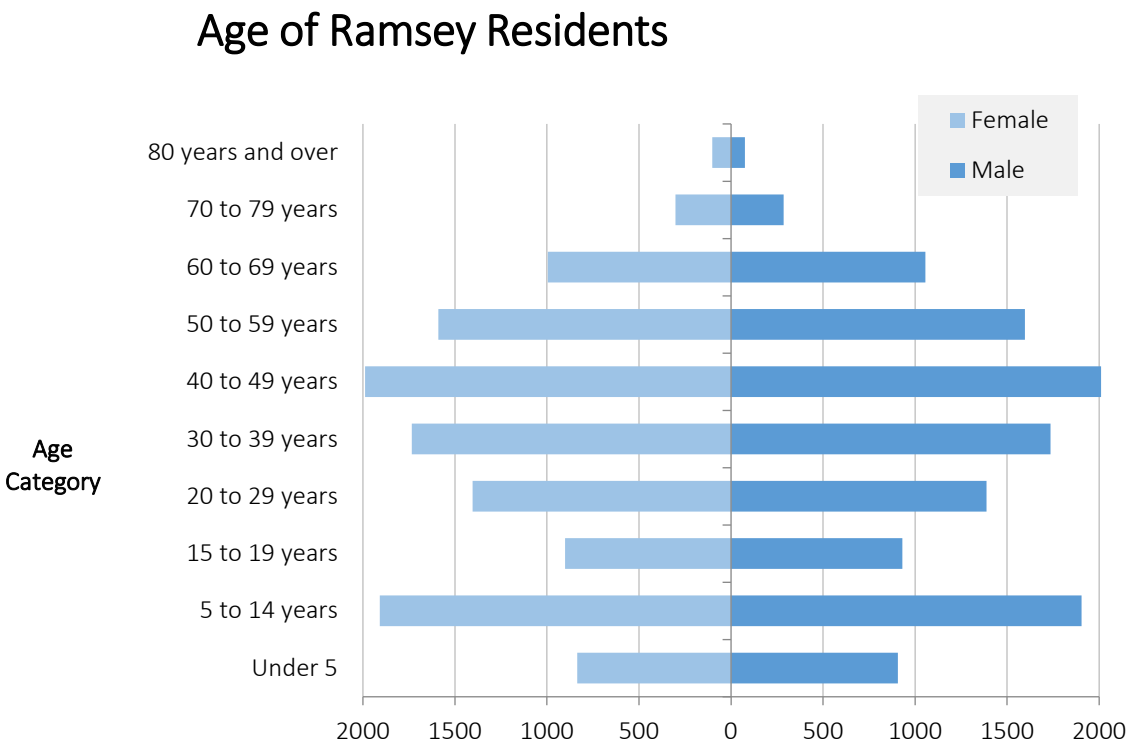


Age demographics

Consistent with most other communities across the region, Ramsey's population is aging. Figure __-__ shows that the largest segment of the population is in the 40-49 age range which is quite young compared to many other communities in the metropolitan region. It will be important for Ramsey to plan for alternative housing options for these residents as they age so that they can remain in the community. In addition, it will also remain important that Ramsey seek ways to be competitive in retaining younger residents as the data shows the second largest section of residents in the 5-14 age range.

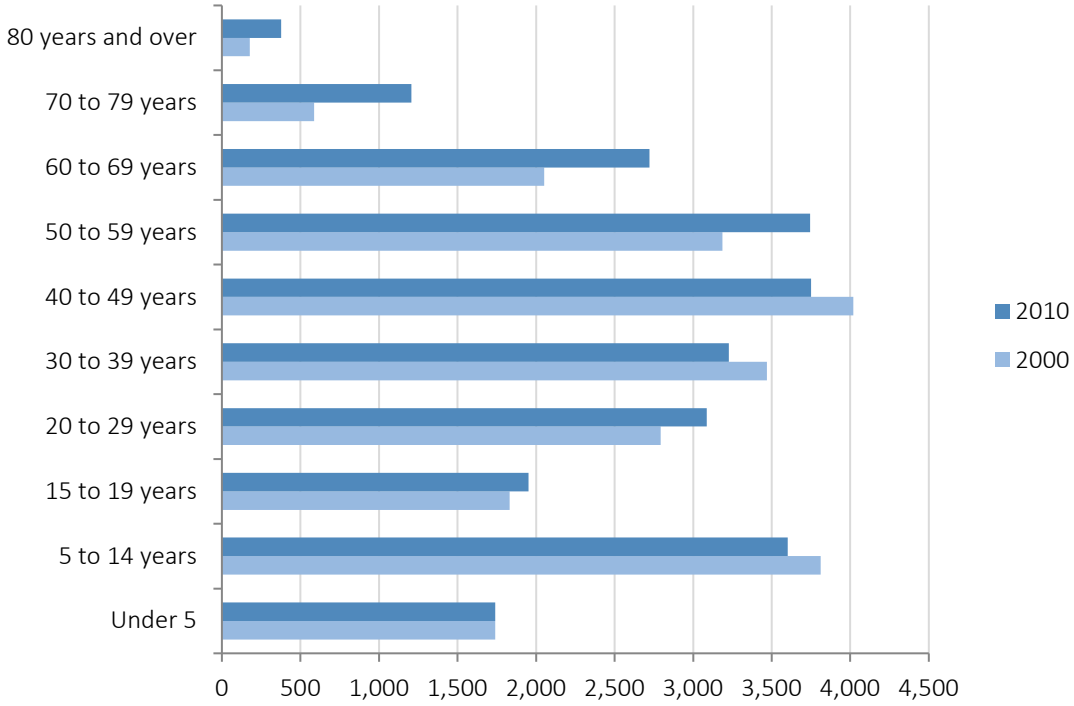
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Figure 4: Age Distribution



Looking at the changes in age demographics from 2000 to 2010, the greatest gains were in the categories of "empty nester" adults, while there were losses in population amongst 30- to 50-year-olds. This age demographic profile helps explain Ramsey's key themes pertaining to schools, parks, and recreation.

Figure 5: Age Cohort

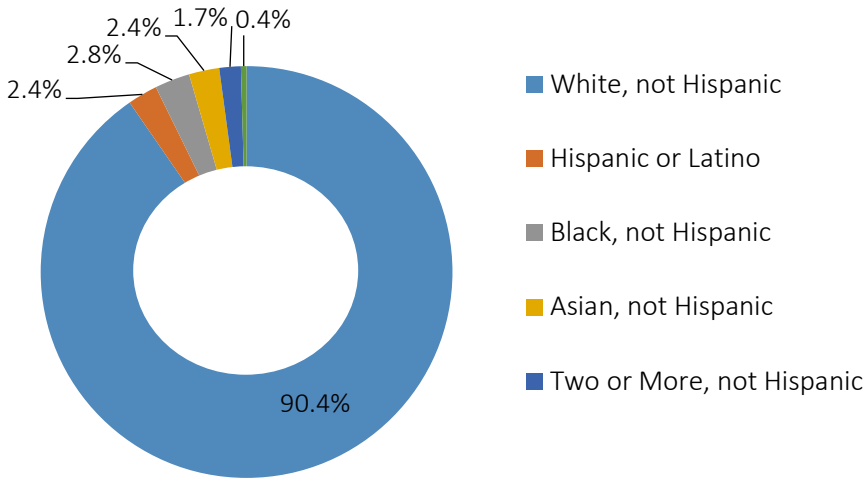


Race

At 90.4 percent, Ramsey residents are primarily white non-Hispanic individuals with the remaining 9.6% of residents being people of color. By comparison, the Twin Cities region is 24.6% residents of color, and Anoka County is 15.6% residents of color. As such, Ramsey is not diversifying at the same rate as Anoka County or the Twin Cities region. Regional trends indicate that in the Twin Cities metro area, residents of color will continue to comprise a greater share of our region's population, increasing from 24% in 2010 to 41% in 2040.

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Figure 6: Racial Demographics



The Neighborhoods

Housing Types

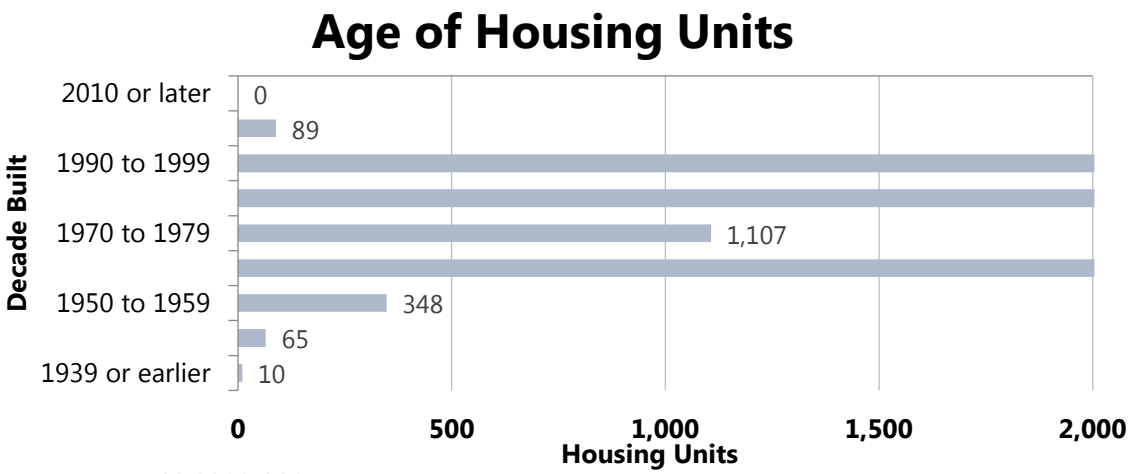
Housing is the predominant land use in Ramsey. Estimates from the Metropolitan Council indicate that there were 8,812 housing units in Ramsey in 2015. Around 75 percent of the housing units in Ramsey are single family detached homes with townhomes counting for an additional 15 percent of the total housing units.

Figure 7: Housing Type

Unit Type	Units	
Single Family Detached	6,692	75.9%
Multifamily (5 units or more)	680	7.7%
Townhomes	1403	15.9%
Duplex, triplex, quad	37	0.5%
Total:	**8,812**	100%

Source: Metropolitan Council Housing Stock Estimates (2015)

Figure 8: Age of Housing Stock

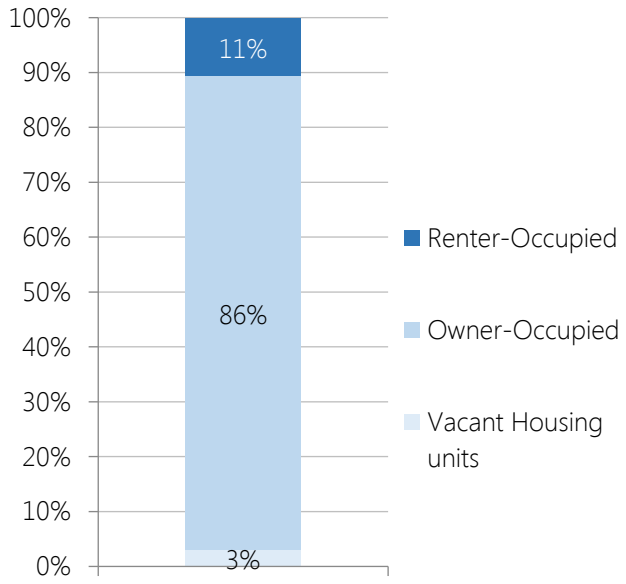


Data source: ACS 2011-2015

Housing Tenure

The City of Ramsey has a historically consistent foundation of owner-occupied housing which remains true today. Approximately 85 percent of Ramsey housing units are owner-occupied, and that percentage has remained largely the same since 1990. That percentage is higher than most of the cities surrounding Ramsey with the lowest percentage of owner-occupied housing of local communities being the City of Anoka at 52 percent.

Figure 9: Housing Tenure



The Economy

The Minnesota Department of Employment and Economic Development estimate approximately 6,150 jobs in the City of Ramsey in 2015. Average annual wages for 2015 are estimated at $46,637. A large reason for this average is likely due to the fact that manufacturing represents the largest employment industry in Ramsey at 34 percent, and these are typically living wage jobs. Anoka County as a whole has 16 percent devoted to Manufacturing.

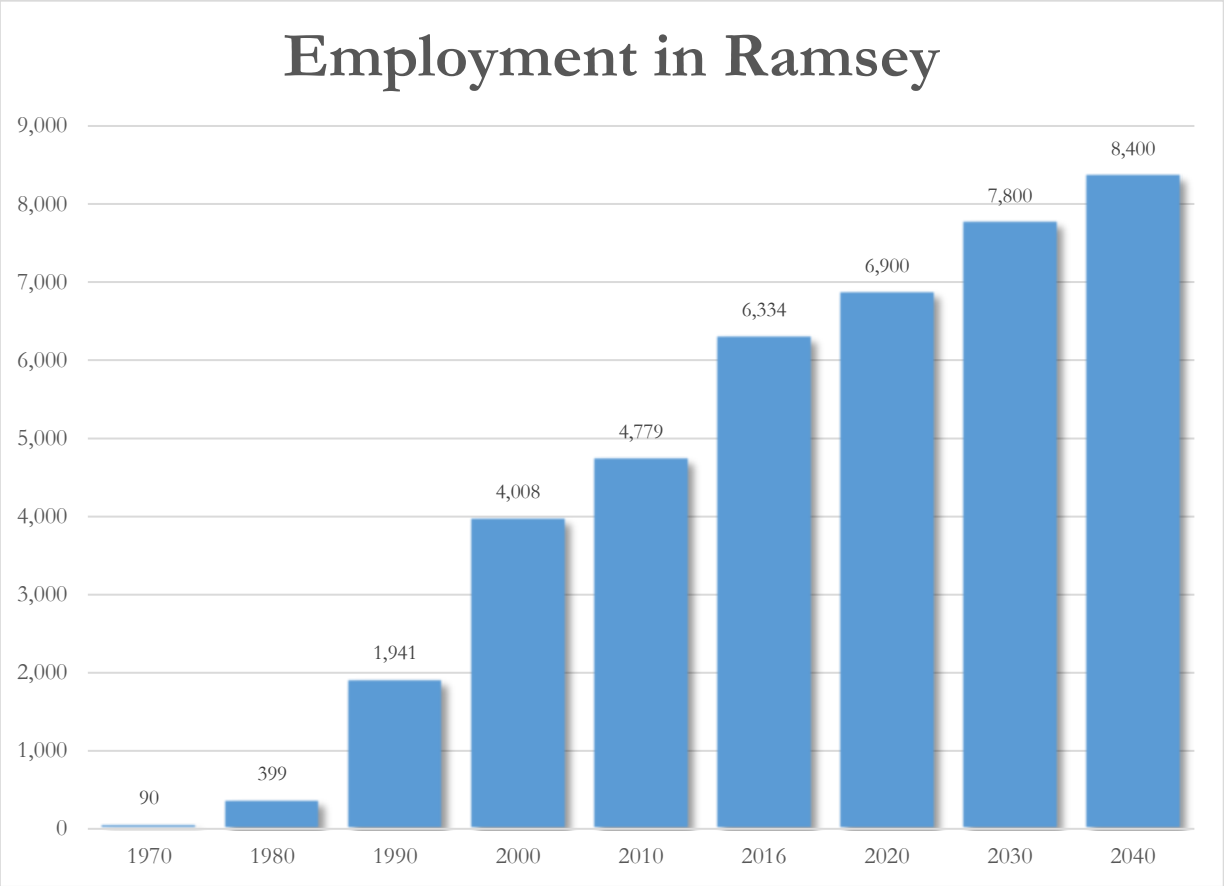
Figure 10: Jobs Located in Ramsey

Industry	Employment Total	Percentage
Retail Trade	554	9%
Health Care and Social Assistance	246	4%
Accommodation and Food Services	369	6%
Public Administration	185	3%
Manufacturing	2,091	34%
Other Services, Ex. Public Admin	308	5%
Educational Services	369	6%
Administrative and Waste Services	369	6%
Finance and Insurance	123	2%
Arts, Entertainment, and Recreation	123	2%
Information	62	1%
Wholesale Trade	308	5%
All Other Industries	1,046	17%
Total:	**6,150**	**100%**

The U.S. Highway 10 corridor is the commercial hub of Ramsey, running the length of the City. Ramsey faces the challenge of encouraging updates and redevelopment of its older and more outmoded buildings and businesses along U.S. Highway 10, while also developing greenfield properties within The COR and new business park east of Armstrong Boulevard.

Employment Forecasts

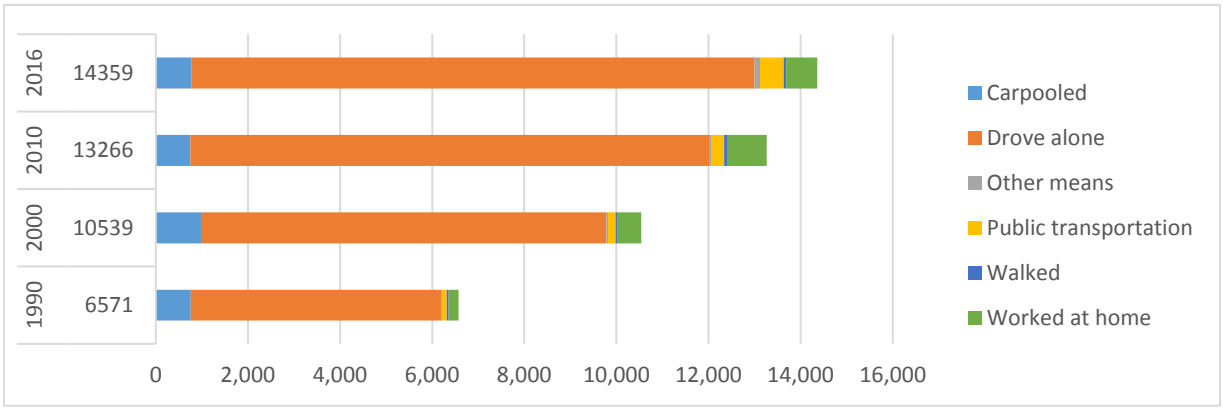
Figure 11: Employment Forecasts



Source: U.S. Census Decennial Survey, U.S. Census American Communities Survey, Metropolitan Council Forecasts

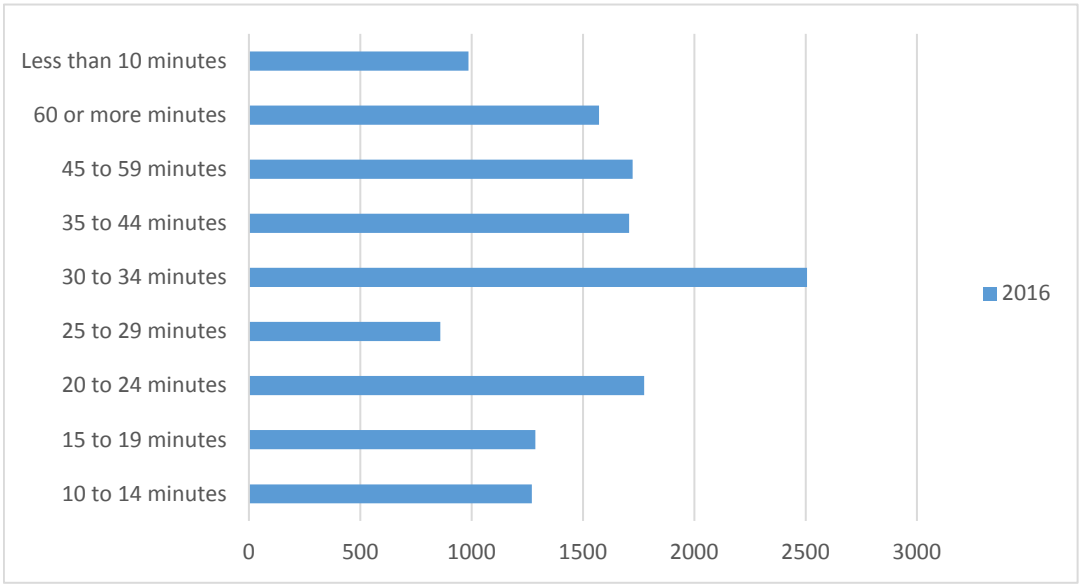
The Commute

Figure 12: Means of Commuting



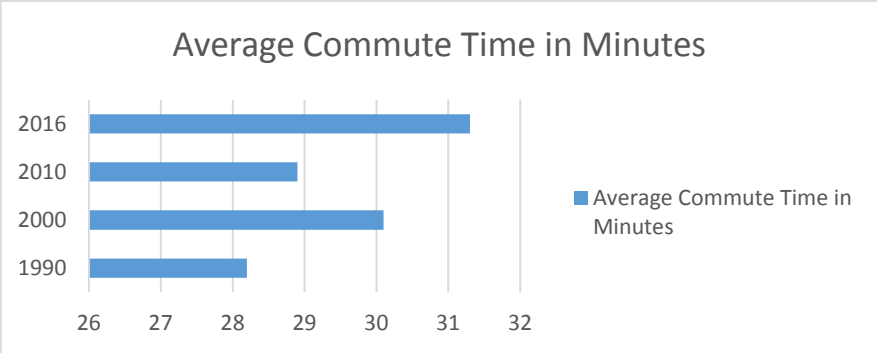
Source: U.S. Census American Communities Survey

Figure 13: Travel Time to Work



Source: U.S. Census American Communities Survey

Figure 14: Average Time to Work



Source: U.S. Census Decennial Census, U.S. Census American Communities Survey

Figure 15: Top Workplaces of Ramsey Residents

Workplace	Workers
Other	4,282
Minneapolis	1,722
Coon Rapids	1,062
Anoka	1,061
Ramsey	952
St. Paul	554
Plymouth	444
Brooklyn Park	433
Blaine	429
Fridley	425
Maple Grove	400

Figure 16: Top Residences of Ramsey Workers

Residence	Workers
Other	1,322
Ramsey	952
Coon Rapids	429
Andover	333
Anoka	280
Blaine	206
Nowthen	160
Brooklyn Park	145
Minneapolis	133
Oak Grove	121
Champlin	116

Proximity to jobs and commuting profiles are important to Ramsey's Transportation Goals and Economic Development Goals.

DRAFT

City of Ramsey 2040 Comprehensive Plan Update

Land Use Plan

Background on this Document

This document is a draft of the narrative to be used in the 2040 Comprehensive Plan Update. This is not a final version or actual layout. This document will be reviewed and revised multiple times. The City will try to add additional maps and figures to better tell the story of this vision.

2030 Land Use Plan Accomplishments

The last plan was adopted in 2010. While a number of factors changed since the last plan was adopted, the City can celebrate a number of successes as it relates to our land use vision. Subsequent chapters of the 2040 Comprehensive Plan will celebrate their own successes.

- Created a collaborative development review process for land use plans and project review.
- Implemented meaningful density transition into projects that are located adjacent to existing residential neighborhoods.
- Protected Ramsey's rural character in many areas of the community, representing the largest land area category in the community.
- Responded to changing market conditions to provide a variety of housing types and prices.
- Concentrated more dense developments in or near The COR to protect the City's rural character, create walkability, and create a unique identity for the community.
- Re-assessed the effectiveness of rural reserve and rural preserve practices and policies.
- Implemented design standards for walkable streets into review practices.
- Mitigated City's financial risks associated by new developments by encouraging new development to focus near existing infrastructure.
- Developed incentives for The COR to enhance its marketability.
- Maintained high quality design standards in The COR.
- Planned for adequate retail and commercial services.
- Expanded employment and industrial opportunities by facilitating a new, private business park.
- Ensured new development protected natural resources, made trail connections, and blended in with surrounding development.
- Employed conservation subdivision practices aimed to protect existing neighborhoods and natural resources.
- Struck a balance between land use planning, policy development, natural resource protection, and private property rights.

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Goals and Strategies

The following represents goals and strategies for future land uses. Subsequent chapters will include their own goals and strategies that integrate with the above. Resources above and beyond current budget approvals are indicated in the 'Additional Resources' column.

Comprehensive Plan Strategic Imperatives

- A Balance of Rural Character and Urban Growth
- An Active Community (Parks, Recreation, and Open Space)
- A Connected Community (Transportation)
- A Positive Learning Environment

Land Use Strategic Initiatives

A Balance of Rural Character and Urban Growth

- Maintain and Expand the Rural Character of Ramsey.
- Balance vision with market forces.
- Ensure a sense of place (public art)

An Active Community

- Create a diverse and robust offering of recreation opportunities.
- Create a healthy community

A Connected Community

- Improve the safety and mobility of major corridors.

A Positive Learning Environment

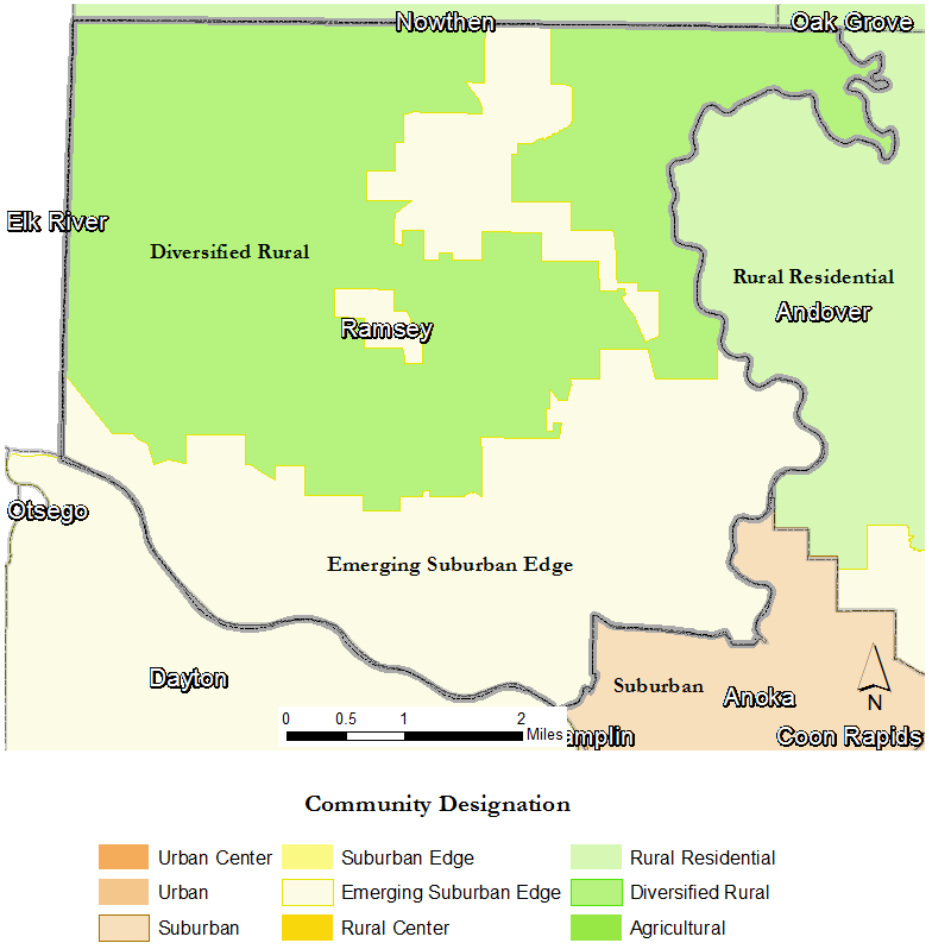
- Plan for future educational needs
- Ensure an Adequate Workforce for Business Community and Economic Development Goals

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Community Designation: Balancing Rural Character and Urban Growth

A primary theme from Ramsey public engagement and outreach efforts was the need to better plan for and communicate our vision for a balanced approach of rural preservation and urban growth. Ramsey supports continued urban growth in areas planned for growth, all while preserving some of the Rural Character that makes Ramsey unique. By guiding Ramsey in two categories, land use policies better reflect our overall vision.

Figure 1: Ramsey Community Designation



The Metropolitan Council uses community designations to group communities with similar characteristics in order to more effectively target its policies, similar to Ramsey's Future Land Use Categories and Zoning Districts. The Metropolitan Council uses these community designations to:

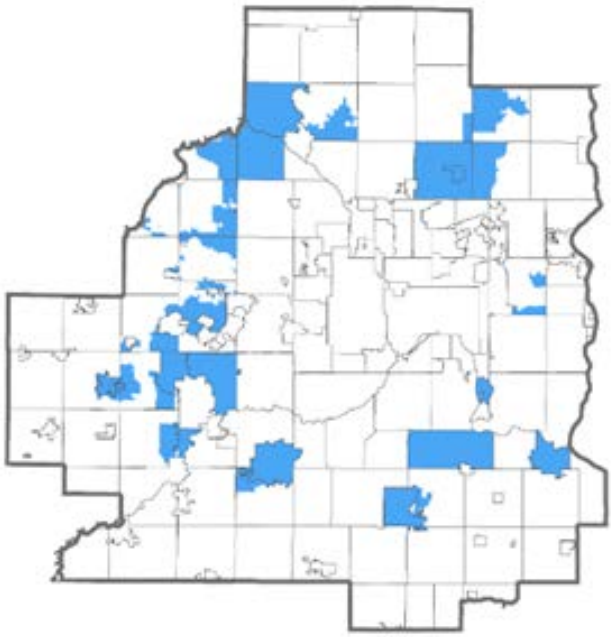
- Guide regional growth and development to areas that have urban infrastructure in place and the capacity to accommodate development and redevelopment.
- Establish land use expectations, including overall densities and development patterns, for different community designations.
- Outline the respective roles of the Metropolitan Council and Ramsey along with strategies for planning for forecasted growth.

Emerging Suburban Edge

An Emerging Suburban Edge Community is characterized as transitioning from rural to developed. It should be noted that although a portion of Ramsey certainly is transition in this manner, a significant portion of the community remains guided for larger-lot, single-family development on private well and septic along with goals to protect a significant amount of exceptional quality ecological resources.

The Emerging Suburban Edge includes cities, townships, and portions of both that are in the early stages of transitioning into urbanized levels of development. Strategically located between Suburban Edge and Rural communities, the Emerging Suburban Edge communities offer both connections to urban amenities and the proximity to open spaces that characterizes a rural lifestyle. Often, the cities and townships in the Emerging Suburban Edge are in more than one Community Designation. In the majority of Emerging Suburban Edge communities, less than 40% of the land has been developed.

Figure 2: Emerging Suburban Edge Communities



Communities in the Emerging Suburban Edge have a mix of residential, rural, and agricultural areas, often including lower-density single-family neighborhoods and small downtown service centers. The growth patterns in these communities demonstrate the challenges of changing from rural to suburban. New developments are typically built in a traditional suburban pattern, characterized by large curving streets, limited through-roadways, and auto-oriented street design. Emerging Suburban Edge communities have access to regional wastewater services (either municipally owned or regional services), access to the metropolitan highway system, and include existing or planned Regional Parks System facilities.

The Emerging Suburban Edge communities provide a variety of commercial activities along the main transportation corridors, and most encompass historic small downtowns with small town characteristics. These communities benefit from their proximity to more developed areas while retaining their local rural

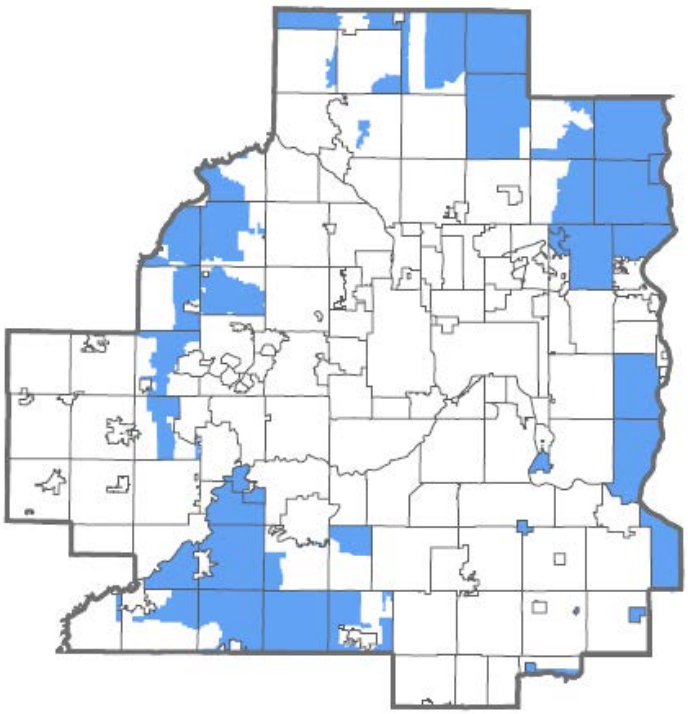
character and protecting natural resources. Commercial areas in the Emerging Suburban Edge tend to be individual large employers and smaller-scale commercial centers serving the local population.

Although these communities have some redevelopment potential in older areas such as historic downtown districts, the focus in the Emerging Suburban Edge is on greenfield development. Greenfields present opportunities to integrate natural resource preservation into site planning prior to development. Some of these communities have land available within their jurisdiction staged for future development, while others are expanding through orderly annexation agreements with neighboring townships. This mix of uses, availability of undeveloped land, and rich access to natural resources is a characteristic unique to Emerging Suburban Edge communities.

As of May 2014, the Metropolitan Council forecasts that the Emerging Suburban Edge area will add 201,000 residents, 93,000 households, and 58,000 jobs between 2010 and 2040. This represents growth of 66% in population, 87% in households, and 66% in employment over the three decades. Because most Emerging Suburban Edge communities also have areas designated as rural, these numbers are approximations. These numbers may change during the current comprehensive planning process, which will more precisely delineate how much community growth belongs inside the Metropolitan Urban Service Area.

Diversified Rural

Figure 3: Diversified Rural Communities



Diversified Rural communities are home to a variety of farm and non-farm land uses including very large-lot residential, clustered housing, hobby farms and agricultural uses. Located adjacent to the Emerging Suburban Edge of the Metropolitan Urban Service Area, the Diversified Rural Area protects rural land for rural lifestyles today and potential urbanized levels of development sometime after 2040.

Large areas of high-quality natural resources are located in these communities with some of these natural areas protected in state lands and regional parks, like Carlos Avery Wildlife Management Area in Anoka County and Carver Park Reserve in Carver County.

While these communities contain a mix of uses, large portions of communities in the Diversified Rural area contain prime agricultural soils, located primarily in Scott and Washington counties. Although these communities are not designated Agricultural communities, the Council supports the preservation of agricultural land in these areas.

Agricultural uses in Diversified Rural communities benefit from their proximity to the Metropolitan Urban Service Area and Rural Centers, but face challenges to their long-term continued use, including incompatible uses developing nearby and increased development pressures.

The Council discourages urbanized levels of residential development in Diversified Rural communities to avoid the premature demand for expansion of metropolitan systems and other urban public services.

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Forecasted Growth

Table 1: Forecasted Growth

	2016	2020	2030	2040
Households	8,973	9,500	11,500	13,500
Population	26,251	27,550	33,350	39,150
Employment	6,334	6,900	7,800	8,400

Ramsey acknowledges that these forecasts deviate from the approved 2040 forecasts for Ramsey. After careful consultation and analysis of recent growth trends, Ramsey requests these modifications to our 2040 Forecasts. For assistance in reviewing requested changes, the series of tables below are offered.

Requested Household Forecast Amendment

	2020	2030	2040
Published Forecast	9,400	11,300	13,000
Requested Amendment	9,600	11,500	13,500
Difference	+200	+200	+500

Requested Population Forecast Amendment

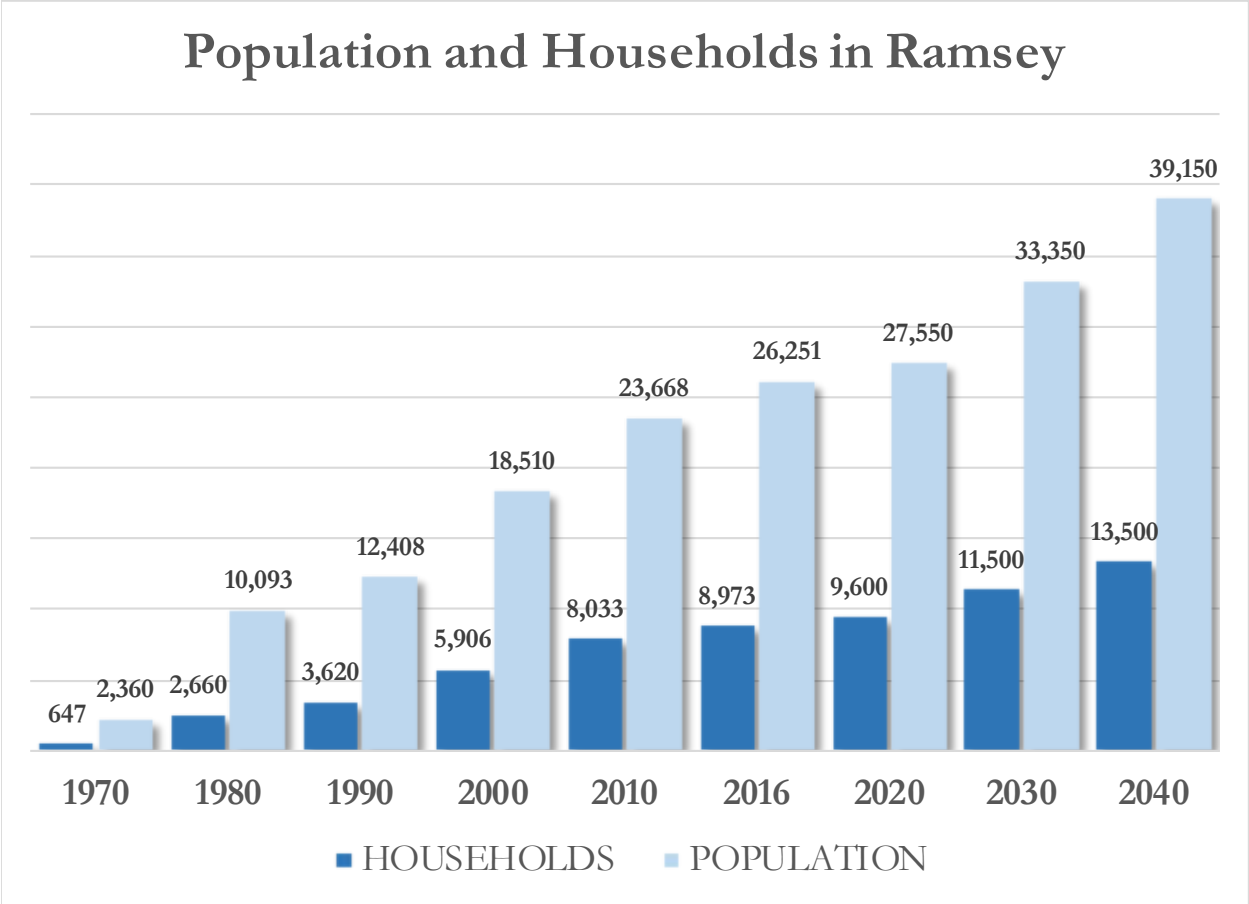
	2020	2030	2040
Published Forecast	26,400	30,700	34,700
Requested Amendment	27,550	33,350	39,150
Difference	+1,150	+2,650	+4,450

Requested Employment Forecast Amendment

	2020	2030	2040
Published Forecast	6,200	7,000	7,600
Requested Amendment	6,900	7,800	8,400
Difference	+700	+800	+800

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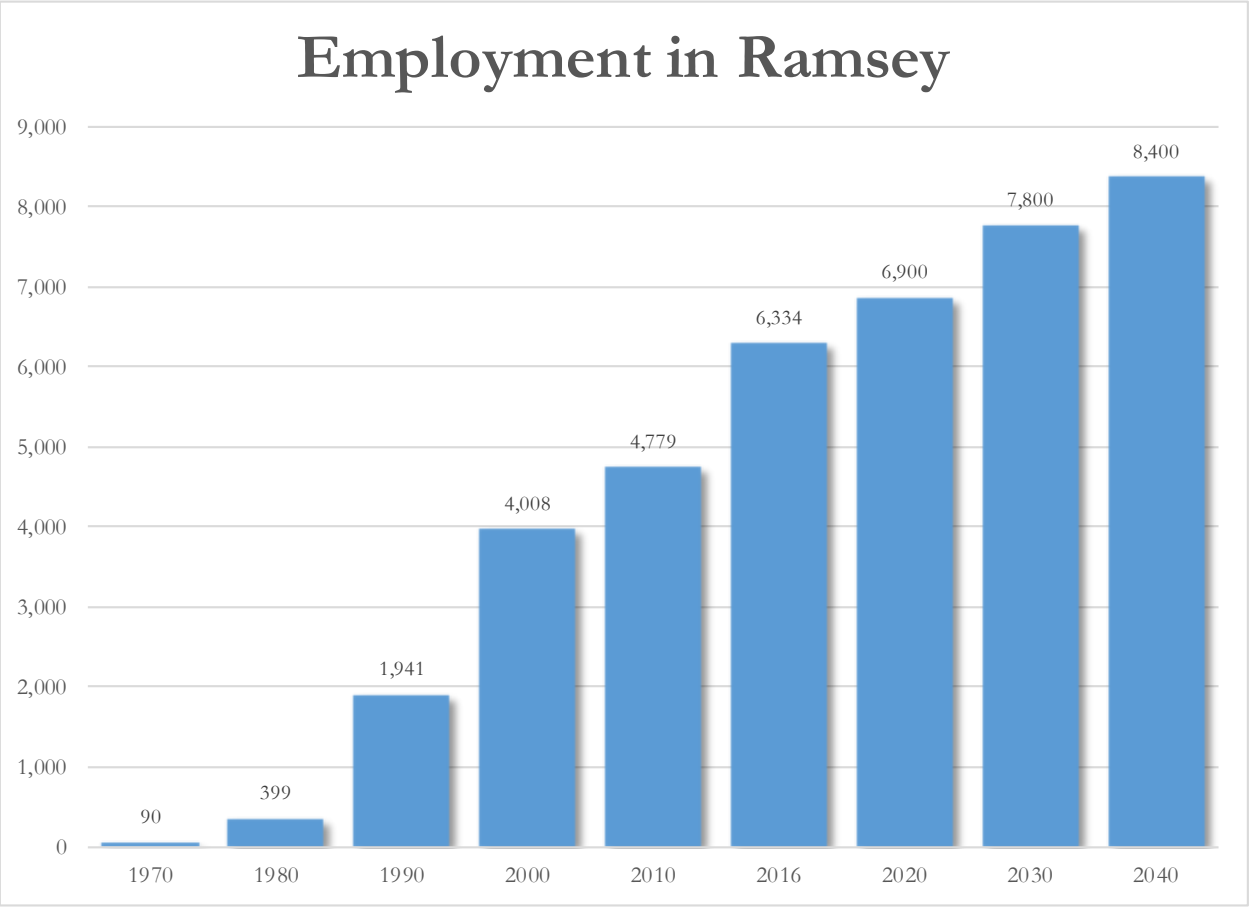
Figure 4: Forecasted Household and Population Growth



Planned Intensity of Employment

Ramsey plans for forecasting future employment growth by a metric of 45% building coverage of a parcel.

Figure 5: Forecasted Employment Growth



Existing Land Uses

Figure 6: Existing Land Use Map

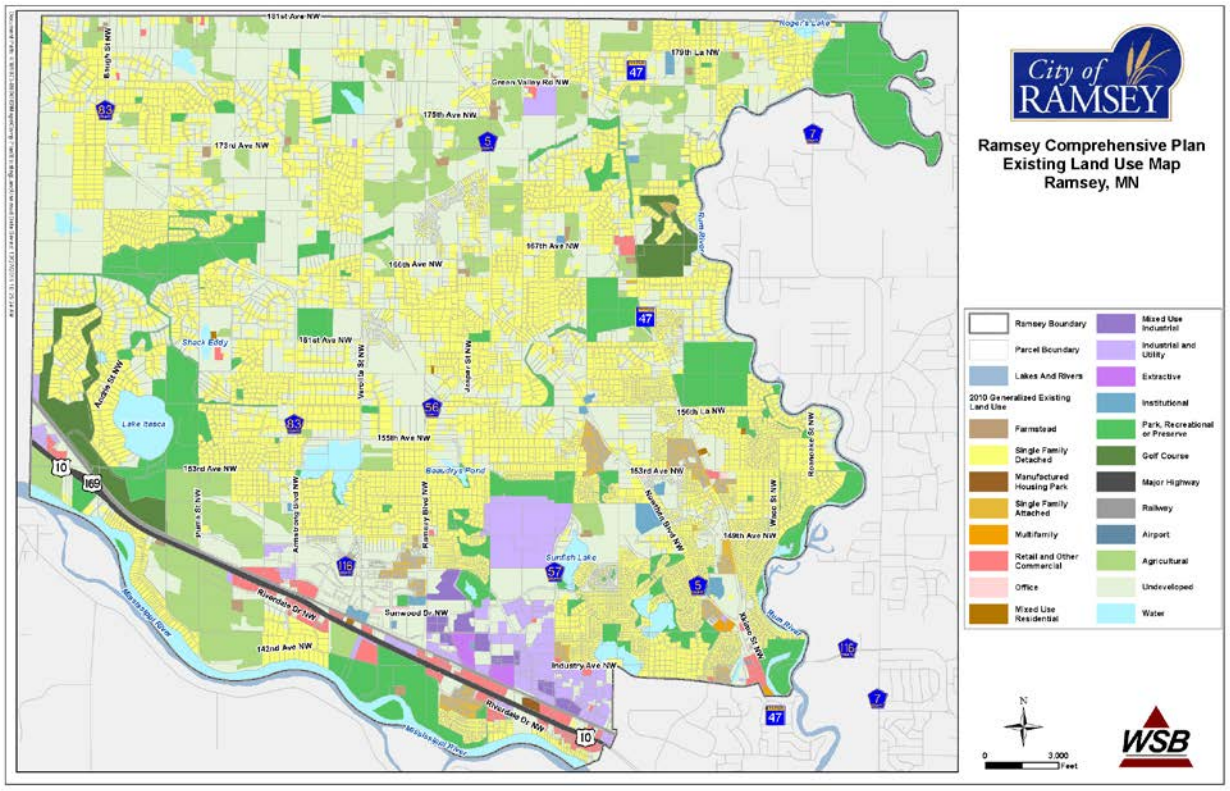


Table 2: Existing Land Use Categories

Year	Land Use	Acres	Percentage of Total
2010	Agriculture	1,659	9 %
2010	Airport	0	0 %
2010	Extractive	40	0 %
2010	Farmstead	65	0 %
2010	Golf Course	332	2 %
2010	Industrial and Utility	561	3 %
2010	Institutional	92	0 %
2010	Major Highway	144	1 %
2010	Manufactured Housing Park	7	0 %
2010	Mixed Use Industrial	107	1 %
2010	Mixed Use Residential	8	0 %
2010	Multifamily	12	0 %
2010	Office	14	0 %
2010	Open Water	753	4 %
2010	Park, Recreational or Preserve	1,960	10 %
2010	Railway	67	0 %
2010	Retail and Other Commercial	254	1 %
2010	Single Family Attached	227	1 %
2010	Single Family Detached	6,837	36 %
2010	Undeveloped Land	5,957	31 %

Note: over 8,000 acres of Ramsey is already developed.

Future Land Uses

Figure 7: Future Land Use Map

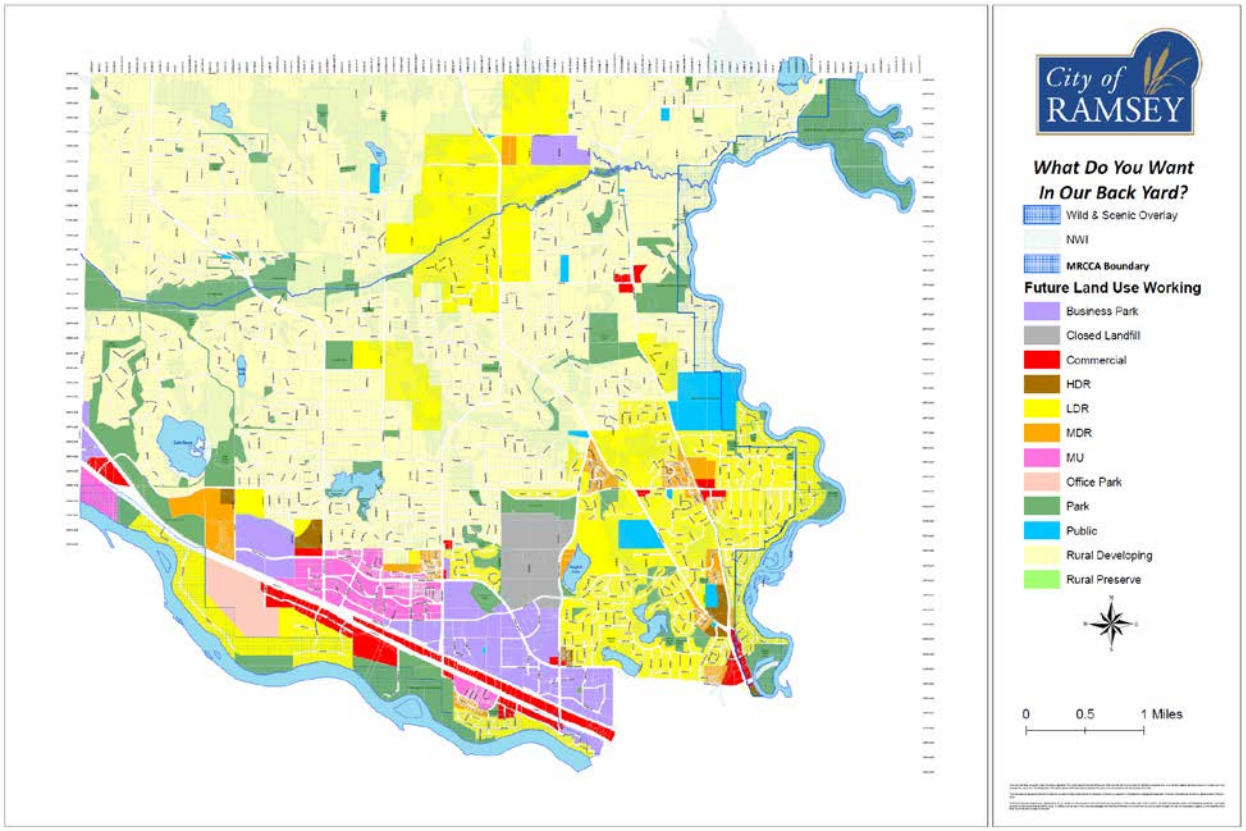


Table 3: Future Land Use Categories

To be tabulated later	

Future Land Use Descriptions

Lakes and Rivers

Low Density Residential

Areas guided Low Density Residential must have urban services before development can take place. These areas will average three (3) units per acre and contain single family, detached dwellings.

Where Low Density Residential is directly adjacent to areas guided Rural Developing that contain 2.5 acre lots, strategies for density transitioning will be employed. This means that while an area of Low Density Residential may average three (3) units per acre, those lots directly adjacent to 2.5 acre lots will be closer in size to 2.5 acres in order to provide an effective transition that maintains the existing character of the neighborhood. Screening methods, such as landscaping must also be employed to transition between very low density areas and urban lots.

Medium Density Residential

These areas are within the MUSA and intended to receive medium density housing including lower density multi-family housing and higher density single-family housing. Average density will be six (6) units per acre. Medium density detached single-family is becoming an increasingly popular development pattern for Ramsey.

High Density Residential

These areas are within the MUSA and intended to accommodate multi-family housing such as townhomes and apartment buildings. Average density will be ten (10) units per acre.

Business Park

Areas guided Business Park are reserved for office and industrial development.

Commercial

Areas guided Commercial may include a range of neighborhood and community commercial/retail development.

Mixed Use

Mixed Use areas may include a combination of residential, commercial, light industrial, open space, and a transit hub.

Public/Quasi-Public

This category generally includes city offices, public works facilities, churches, schools, other non-profit or government facilities, and bridges/major rights-of-way.

Park

Parks, trails and open space include the City Park and trail system, golf courses, regional parks, wetlands, and the greenway. Lands in this category are intended to preserve the natural resource base and provide an adequate supply of active and passive recreational lands in Ramsey.

Closed Landfill

The risk to public health and safety associated with the closed landfill in Ramsey is mitigated by implementing land-use controls that minimize public exposure to landfill hazards and protect the state's response action equipment. In other words, future use of land at and around closed landfills needs to be planned carefully and responsibly. The purpose, then, for preparing a Closed Landfill Use Plan (CLUP) for each landfill is to protect the integrity of the landfill's remediation and monitoring systems, protect human health and public

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safety at each landfill, and accommodate local government needs and desires for land use at the qualified facility with consideration for health and safety requirements.

Metropolitan Council Approved Master Plans

The Metropolitan Council has approved Master Plans for Rum River Central Regional Park and Mississippi West Regional Park (future). These Master Plan Boundaries are reflected in the Future Land Use Map and within the Parks and Recreation Plan.

Figure 8: Master Plan Boundaries

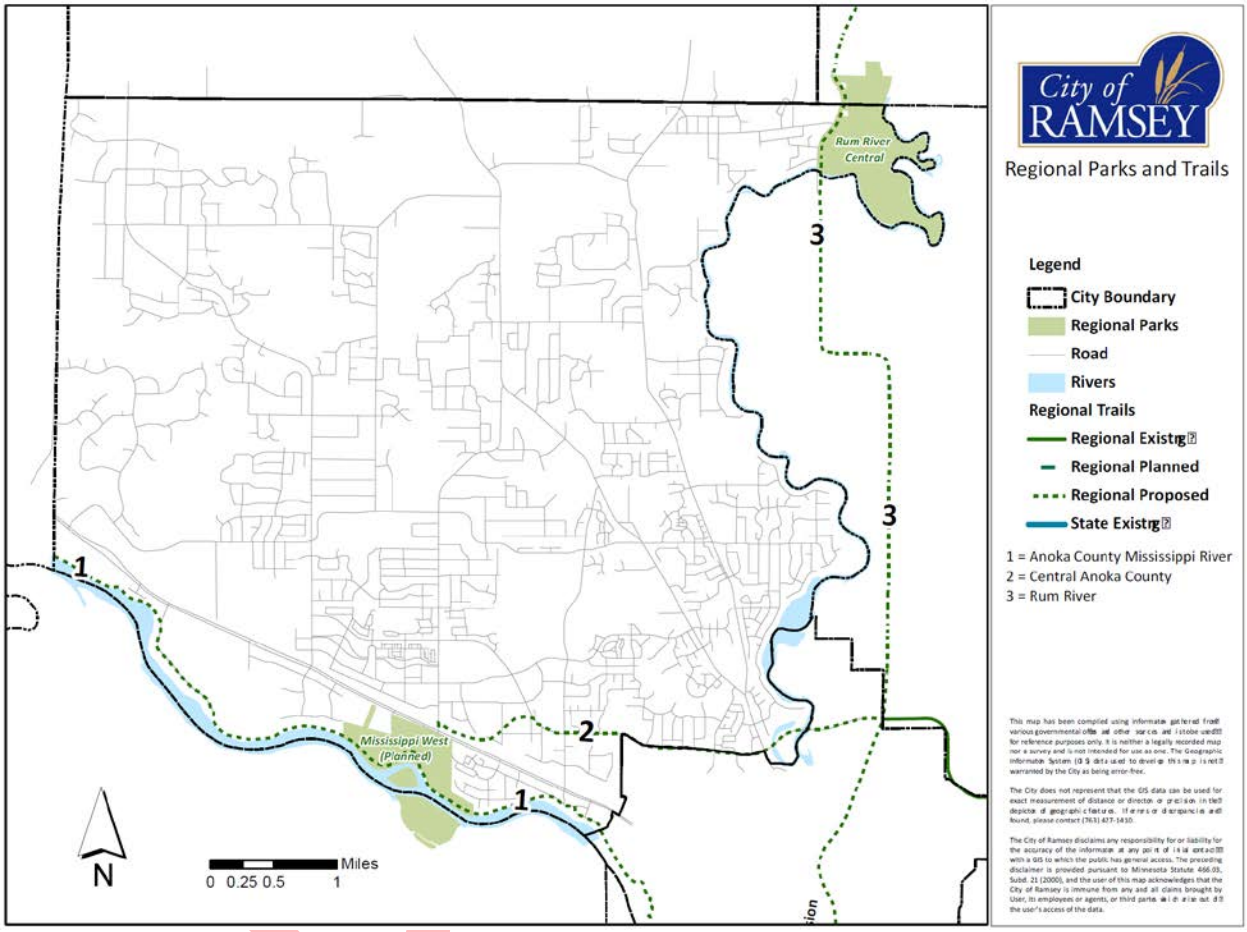


Figure 9: Local Parks

Local Park Map

Figure 10: Circle of Ramsey

Circle of Ramsey Map

Figure 11: Natural Resources

Natural Resource Inventory Map

Expected Density of Future Development

Figure 12: Expected Growth Areas (this map will be updated for better readability]

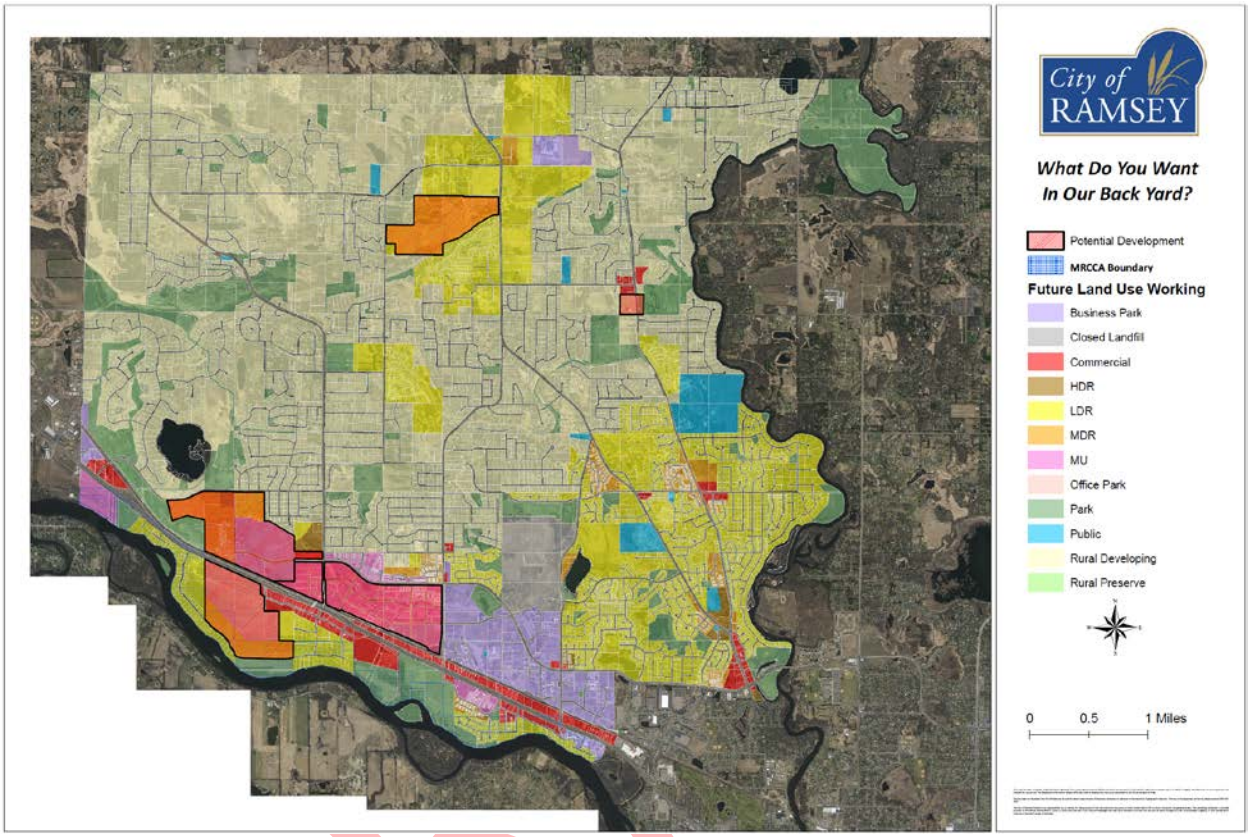


Table 4: Planned Density Ranges

	Minimum Density	Maximum Density	Average Density
Low Density Residential	2	4	3
Medium Density Residential	3	7	6
High Density Residential	7	15	10

Affordable Housing Allocation

The City participates in the Livable Communities Program of the Metropolitan Council, which provides access to a number of funding opportunities. As part of said participation, the City plans for an allocation of affordable housing. The City has confirmed that the Future Land Use Map/Plan is acceptable for anticipated affordable housing need.

The Comprehensive Plan Steering Committee should add some messaging here about what is defined as affordable housing, what is the need, and what is the benefit.

Affordable Housing Need	
At or Below 30% AMI	292
31% to 50% AMI	167
51% to 80% AMI	40
Total Units	499

AMI = Area Median Income

Staged Development Plan

Ramsey will need to complete this section on the final draft. The City needs further policy direction on the underlying assumptions before preparing a staging plan for future development. Future Development and supporting infrastructure shall be forecasted in the following periods.

- 2020
- 2030
- 2040

Planned Density

Table 5: Density Table

Land Use Category	Minimum Density	Maximum Density	Average Density
Rural Developing		0.4 units/acre	
Low Density Residential	2.5 units/acre	4 units/acre	3 units/acre
Medium Density Residential	3 units/acre	7 units/acre	6 units/acre
High Density Residential	7 units/acre	15 units/acre	12 units/acre
The COR – Low Density	4 units/acre	15 units/acre	4 units/acre
The COR – Medium Density	5 units/acre	15 units/acre	12 units/acre
The COR – High Density	15 units/acre	75 units/acre	20 units/acre

Table 6: Mixed Use Densities

Land Use Category	% Residential	% Commercial	% Office	Residential Density Range
Mixed Use	50%	25%	25%	10-15 units/acre

Staged Development and Redevelopment

Development and Redevelopment is likely to focus on the following areas.

- Armstrong West/COR West
  - Bunker Lake Industrial Park
  - Future Business Park
  - Riverstone
- Mississippi West
  - Pearson Agricultural Area
  - Riverside Farms
- Rum River Retail Node
  - Rum River Hills
  - Retail Node Revitalization
- The COR
- Trott Brook

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Armstrong West/COR West

Armstrong West is a planning area generally north of Highway 10 and west of Armstrong Boulevard. This area is approximately 350 acres and is current a mix of agricultural land, vacant land, and industrial land. Planned future land uses include a retail redevelopment area of the current industrial park, business park, low density residential, medium density residential, high density residential, and rural developing. Development is expected to commence in 2018. Full build out is expected in the next ten (10) to fifteen (15) years.

Mississippi West

Mississippi West is a planning area generally south of Highway 10 between Armstrong Boulevard and Bowers Drive. This area is predominantly agricultural.

Planned land use within this area is predominantly low density residential, with an area of natural resource protection along the Mississippi River. Development of this area is likely ten (10) to fifteen (years) in the future due to availability of infrastructure (2015 to 2025 timeframe).

Connexus Energy is planning a nineteen (19) acre solar farm within this planning district in 2018.

This area is also the location of a potential extension of Armstrong Boulevard to serve as a future river crossing to the City of Dayton. This improvement is not currently in official regional planning documents and is likely at least twenty (20) years away, if not longer. The cities of Dayton and Ramsey choose to plan for this long-term improvements to protect the necessary corridor.

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Rum River Retail Node/Rum River Hills

The Rum River Retail Node is a 1970s area rural commercial node. This node has shown evidence of blight and vacancy, with some recent renovations of existing structures. The City has excess land for sale, remnant from the construction of Water Tower #3. Rum River Hills Golf Course desires redevelop a portion of their property (two holes only) and reconfigure the two (2) holes displaced by redevelopment.

Background

The retail node located at 167th Avenue and Trunk Highway 47 has been a topic of discussion with City Councils and EDA boards for several years ("167/47 Node"). The 167/47 Node has struggled to become economically viable for some time, is experiencing high vacancy rates, an increase of blighted building conditions and escalating crime.

Goal

To improve and/or remove blight from properties-of-concern and encourage sustainable market-driven redevelopment of the 167/47 Node that will benefit the entire City of Ramsey.

Vision

A mixture of residential and retail uses. Residential users may include single family residential, townhomes, or senior living units as directed by the market. Retail will include a market driven neighborhood commercial node. Redevelopment of the 167/47 Node should include a connection to Elmcrest Park and/or nearby trails where feasible.

Rum River Hills Redevelopment Plan

Figure 13: Rum River Hills Redevelopment Plan

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The COR

The COR is a 320-acre master-planned community located adjacent to the Northstar Commuter Rail – Ramsey Station (The COR plus surrounding developable area is over 400 acres). Together with adjacent developed and developable area, there are approximately 400 acres of development of a mix of uses. Goals for this development include an identity for the community, a destination for retail to support the local community, walkability, and supportive of commuter-rail transit.

As an implementation strategy of this Comprehensive Plan Update, Ramsey will be updating the land use plans for The COR. To frame said update, the vision of the COR is as follows.

The COR will serve as a City Center primarily to bring people of Ramsey together that embraces natural market opportunities. The COR will also attract energy from the surrounding region. It will be a unique destination, technology-accessible, and serve as a gathering place. It will feature unique architecture stressing historical feel and function.

The COR is approximately 50% complete, and is likely to experience substantial completion in the next ten (10) years. Ramsey is updating this plan as a separate planning document known as The COR Development Plan Update.

Table 7: Development Progress in The COR

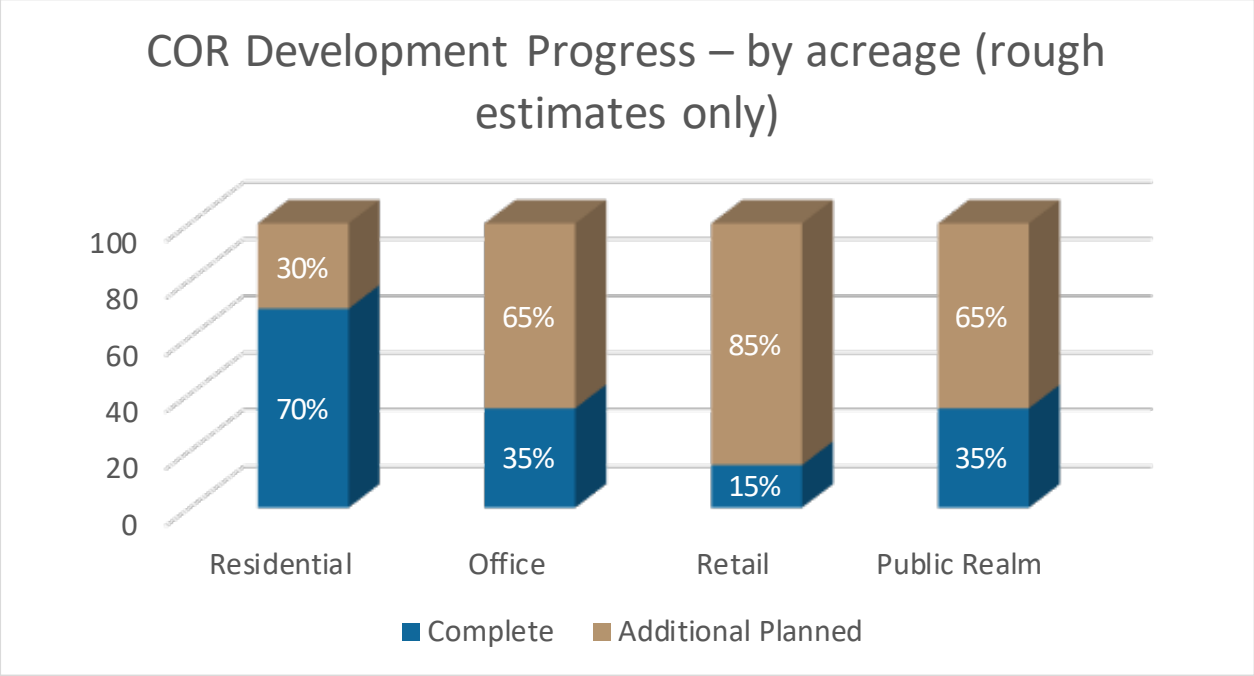
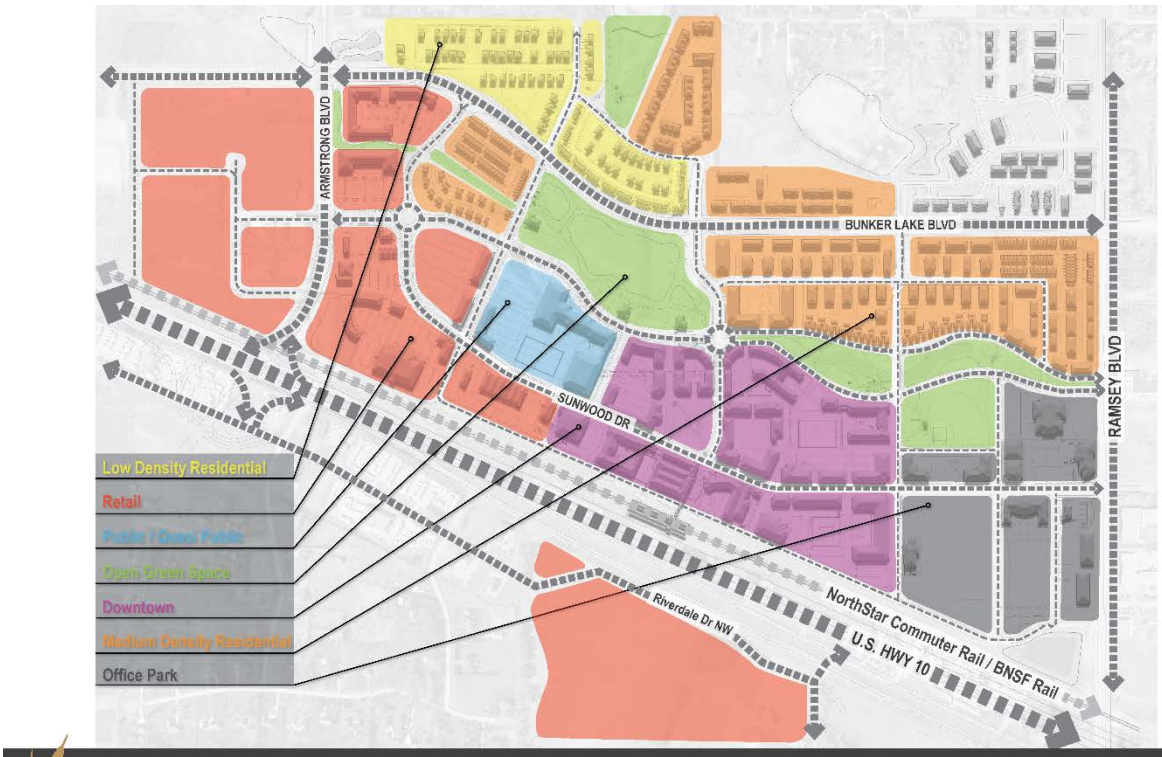


Figure 14: Land Use Plan for The COR


ARMSTRONG BLVD
BUNKER LAKE BLVD
RAMSEY BLVD
SUNWOOD DR
Riverdale Dr NW
NorthStar Commuter Rail / BNSF Rail
U.S. HWY 10
Low Density Residential
Retail
Public / Semi-Public
Open Green Space
Downtown
Medium Density Residential
Office Park
The COR Land Use
City of RAMSEY
WSB
N

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Trott Brook

A significant area for future development of primarily Low Density Residential uses is planned for north of Trott Brook. Trott Brook is a significant ecological resource for the City to protect, and also serves as an important recreational corridor. This development area will represent the first area in the community north of Trott Brook to receive municipal services (water and sanitary sewer).

Immediately adjacent to this area is the site of a planned second elementary school operated by Anoka Hennepin School District #11.

Natural Resources

Ramsey has established a number of land use goals focused on natural resources.

- Enhanced Protection of Natural Resources
- Enhanced Recreation Opportunities in Natural Resource Areas
- Clean Water and Clean Air
- Reduced Waste Stream in Landfills

These goals are defined within the Natural Resources Plan

There are no known aggregate resources within the community.

Special Resources Plan

Ramsey has two (2) special resources within the community.

1. Mississippi River Corridor Critical Area
2. Old Town Hall

Figure 15: Special Resources

To be added later.

Mississippi River Corridor Critical Area

The Minnesota Department of Natural Resources has adopted new rules for the Mississippi River Corridor Critical Area. Ramsey is awaiting guidance from the DNR before updating our Comprehensive Plan for this section. The City will prepare this plan as a separate chapter.

Old Town Hall

The former Ramsey Township Town Hall is the only structure within Ramsey on the National Historic Database. Ramsey is working with the Anoka County Historical Society to develop a long-term plan for this facility.

Other Opportunities

The City has partnered with the University of Minnesota through its Resilient Communities Project (RCP). One of these projects is evaluating other cultural and historical resources that may exist within the community.

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Mississippi River Corridor Critical Area

Portions of Ramsey are located within the Mississippi River Corridor Critical Area (MRCCA). Ramsey acknowledges the requirement to update MRCCA Plans based on new State of Minnesota Rules. Said Plan Amendment will be added to this document either as a section within this Chapter or as a separate chapter of the Comprehensive Plan.

Land Use Implementation

The Metropolitan Council's Regional Development Framework, ThriveMSP 2040, outlines roles for the Metropolitan Council and Ramsey for land use policy. Specific to land use policy, the Metropolitan Council has set a goal for the region to achieve Orderly and Efficient Land Use.

Ramsey Role	Metropolitan Council Role
• Plan and stage development for forecasted growth through 2040 and beyond at overall average net densities of at least 3-5 dwelling units per acre in the community. Target higher intensity developments in areas with better access to regional sewer and transportation infrastructure, connections to local commercial activity centers, transit facilities, and recreational amenities. • Ensure the efficient use of land when planning for and approving new developments and redevelopment projects.	• Support local efforts and policies to plan for growth that efficiently uses transportation and transit infrastructure and regional services. • Promote land use patterns with clear distinctions between urban and rural areas to protect natural resources and land for agricultural viability. • Provide technical assistance to communities on land use strategies and staged development to inform the local comprehensive planning process. • Partner with local communities to improve land use patterns to reduce the generation of carbon emissions.

Action	Priority	Timeframe
Amend Official Zoning Map	Required	June 1, 2019
Amend Zoning Code	Required	December 31, 2019
Update The COR Development Plan	Immediate	December 31, 2018

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Land Use Implementation Plan

Imperative #1: A Balance of Rural Character and Urban Growth

Initiative #1.1: Maintain and Expand the Rural Character of Ramsey

Tactic	Priority	Responsible Party	Resources
LU 1 Update Community Designation to Include Diversified Rural for Non-Urban Service Areas	Immediate Term	Community Development	Normal Staff Duties
LU 2 Establish a Policy for Urban Service Boundary Extensions	Immediate Term	Community Development	Normal Staff Duties
Update the Density Transitioning Ordinance	Immediate Term	Community Development	Normal Staff Duties

Initiative #1.2: Balance Land Use Vision with Market Realities

Tactic	Priority	Responsible Party	Resources
LU 3 Complete the Development Plan Update for The COR	Immediate Term	Community Development	Normal Staff Duties
LU 4 Create a Neighborhood Plan for Green Valley Greenhouse Area	Immediate Term	Community Development	$25,000
LU 5 Create a Neighborhood Plan for Mississippi West Neighborhood	Long Term	Community Development	$25,000
LU 6 Create a Neighborhood Plan for the Rum River Hills Neighborhood	Opportunity Driven	Community Development	$25,000
Complete a Comprehensive Plan Amendment/Refresh Prior to Completion of the Regional Development Framework	Long Term	Community Development	$25,000

Initiative #1.3: Ensure a Sense of Place

Tactic	Priority	Responsible Party	Resources
LU 7 Create a Public Art Plan	Long Term	Parks and Recreation	$25,000
LU 8 Complete the Community Identity and Streetscape Plan	Immediate Term	Community Development	$7,500 (already approved)

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Imperative#2: An Active Community

Initiative #2.1: Create a Diverse and Robust Offering of Recreation Opportunities

Tactic	Priority	Responsible Party	Resources
LU 9 Complete the Master Park and Recreation Plan	Immediate Term	Parks and Recreation	$50,000 (already approved)

Initiative #2.2: Ensure a Healthy Community

Tactic	Priority	Responsible Party	Resources
LU 10 Ensure all Comprehensive Plan Chapters are reviewed through the lens of Healthy Communities	Long Term	Community Development	Normal Staff Duties

Imperative #3: A Connected Community

Initiative #3.1: Improve the Safety and Mobility of Major Corridors

Tactic	Priority	Responsible Party	Resources
LU 11 Create a Corridor Plan for Highway 10	Immediate Term	Community Development and Engineering	$500,000
LU 12 Update Corridor Plan for Highway 47	Immediate Term	Community Development and Engineering	$75,000
LU 13 Create a Corridor Plan for Highway 5	Immediate Term	Engineering	$50,000
LU 14 Create a Corridor Plan for Green Valley Road	Long Term	Engineering	$50,000
LU 15 Create a Corridor Plan for Mississippi River Crossing	Opportunity Driven	Engineering	$250,000

Imperative #4: A Positive Learning Environment

Initiative #4.1: Plan for Future Educational Needs

Tactic	Priority	Responsible Party	Resources
LU 16 Advocate for a new Middle School and third Elementary School	Opportunity Driven	Administration	Normal Staff Duties
Encourage Updates to District Boundaries to	Long Term	Administration	Normal Staff Duties

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reflect neighborhood boundaries			

Initiative #4.2: Ensure an Adequate Workforce for Business Community and Economic Development Goals

Tactic	Priority	Responsible Party	Resources
LU 17 Create a Workforce Development Plan	Immediate Term	Economic Development	Normal Staff Duties

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Chapter X: Transportation

Introduction

The transportation system in Ramsey generally operates well today. The city's multimodal transportation system includes facilities for vehicles, freight, walking, bicycling and transit. Facilities are operated by a number of agencies, including the City of Ramsey, Anoka County, the Minnesota Department of Transportation (MnDOT), Metro Transit, and the Burlington Northern Santa Fe (BNSF) Railway.

This transportation chapter has been prepared in compliance with State of Minnesota Statutes and applicable Metropolitan Council guidelines. As part of this Plan, the city has reviewed existing and future conditions for each mode and identified safety, operations, and network improvements that will be important to address over the 2040 planning horizon. The city has also developed goals and strategies to preserve and improve the transportation system.

This transportation plan includes the following information:

1. Summary of Regional Strategies
2. Existing Roadway System
3. 2040 Traffic Forecasts and Roadway Network Planning
4. Existing and Planned Non-Motorized Transportation Network
5. Freight Network
6. Transit
7. Aviation
8. Goals and Multimodal Strategies
9. Proposed Short and Long Range Roadway Projects
10. Public Comments
11. Conclusion and Next Steps

Transportation Glossary

CIP: Capital Improvement Plan – five year plan for capital investments in the transportation system and in other capital assets owned by the city (equipment, buildings, etc.).

CR: County Road – county-owned roadway that does not receive State funding.

Critical Crash Rate: Statistical indicator of a safety problem at a location. If crash rates at a location are above the critical crash rate, it indicates that the location has a crash rate that is statistically significant compared to similar roadways.

CSAH: County State Aid Highway – county-owned roadway that receives State Aid funding.

MnDOT: Minnesota Department of Transportation.

RBTN: Regional Bicycle Transportation Network – existing and planned regional bicycle network established by the Metropolitan Council.

TH: Trunk Highway – State highway owned and operated by MnDOT.

TPP: Transportation Policy Plan – Regional transportation plan for the Twin Cities metropolitan region, developed by the Metropolitan Council.

1. Summary of Regional Strategies

This Plan has been prepared to be consistent with the regional transportation strategies outlined in the Metropolitan Council 2040 Transportation Policy Plan (TPP). Similar to this Plan, the TPP evaluates the existing transportation system, identifies transportation challenges to the region, and sets regional goals, objectives, and priorities to meet the transportation needs of current residents while accommodating the region's anticipated growth. The TPP also guides local agencies in coordinating land use and transportation and establishes regional performance measures and targets.

The TPP is guided by the following goals:

- **Transportation system stewardship:** Sustainable investments in the transportation system are protected by strategically preserving, maintaining, and operating system assets.
- **Safety and Security:** The regional transportation system is safe and secure for all users.
- **Access to Destinations:** People and businesses prosper by using a reliable, affordable, and efficient multimodal transportation system that connects them to destinations throughout the region and beyond.
- **Competitive Economy:** The regional transportation system supports the economic competitiveness, vitality, and prosperity of the region and State.
- **Healthy Environment:** The regional transportation system advances equity and contributes to communities' livability and sustainability while protecting the natural, cultural, and developed environments.
- **Leveraging Transportation Investment to Guide Land Use:** The region leverages transportation investments to guide land use and development patterns that advance the regional vision of stewardship, prosperity, livability, equity, and sustainability.

Funding is a key constraint that is acknowledged in the TPP. Current transportation revenue will not meet the region's transportation needs through 2040. As a result, the TPP includes two long-term investment scenarios: a fiscally-constrained scenario that identifies projects anticipated to be funded based on current revenue projections, and an increased revenue scenario that identifies project priorities should additional transportation funding become available.

Under the current revenue scenario, the TPP is focused on operations and maintenance of the existing transportation system. Investments in highway mobility and access are limited to those projects that address multiple TPP goals and objectives. The increased revenue scenario would allow additional investments in operations and maintenance, as well as regional mobility, access, safety, and bicycle/pedestrian improvements. However, congestion cannot be greatly reduced under even the increased revenue scenario. Under both scenarios, proposed investments are focused on areas of the metro with the greatest existing and future challenges and anticipated growth.

The Metropolitan Council classifies Ramsey under the Emerging Suburban Edge Community Designation. Based on *Thrive MSP 2040*, Emerging Suburban Edge areas are expected to plan for forecasted population and household growth at average densities of at least three to five units per acre for new development and redevelopment. These communities are also expected to target opportunities for more intensive development near regional transit investments.

2. Existing Roadway System

The sections below provide information about the existing roadway system in Ramsey, including existing number of lanes, existing roadway jurisdiction, existing functional classification, existing traffic, existing safety, and access management. This chapter also includes summary recommendations from recent plans and corridor studies.

2.1. Functional Classification

The functional classification system groups roadways into classes based on roadway function and purpose. Functional classification is based on both transportation and land use characteristics, including roadway speeds, access to adjacent land, connection to important land uses, and the length of trips taken on the roadway.

The functional classification system organizes a roadway and street network that distributes traffic from local neighborhood streets to collector roadways, then to minor arterials and ultimately the principal arterial system. Roads are placed into categories based on the degree to which they provide access to adjacent land and mobility for through traffic. Functional classification gives an indication of the relative hierarchy of roadways in the transportation network.

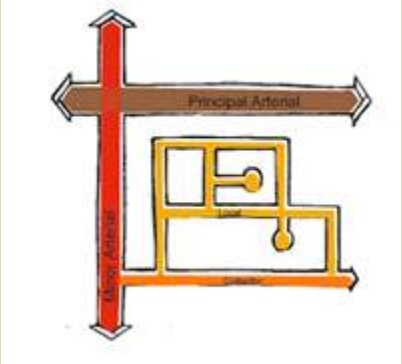


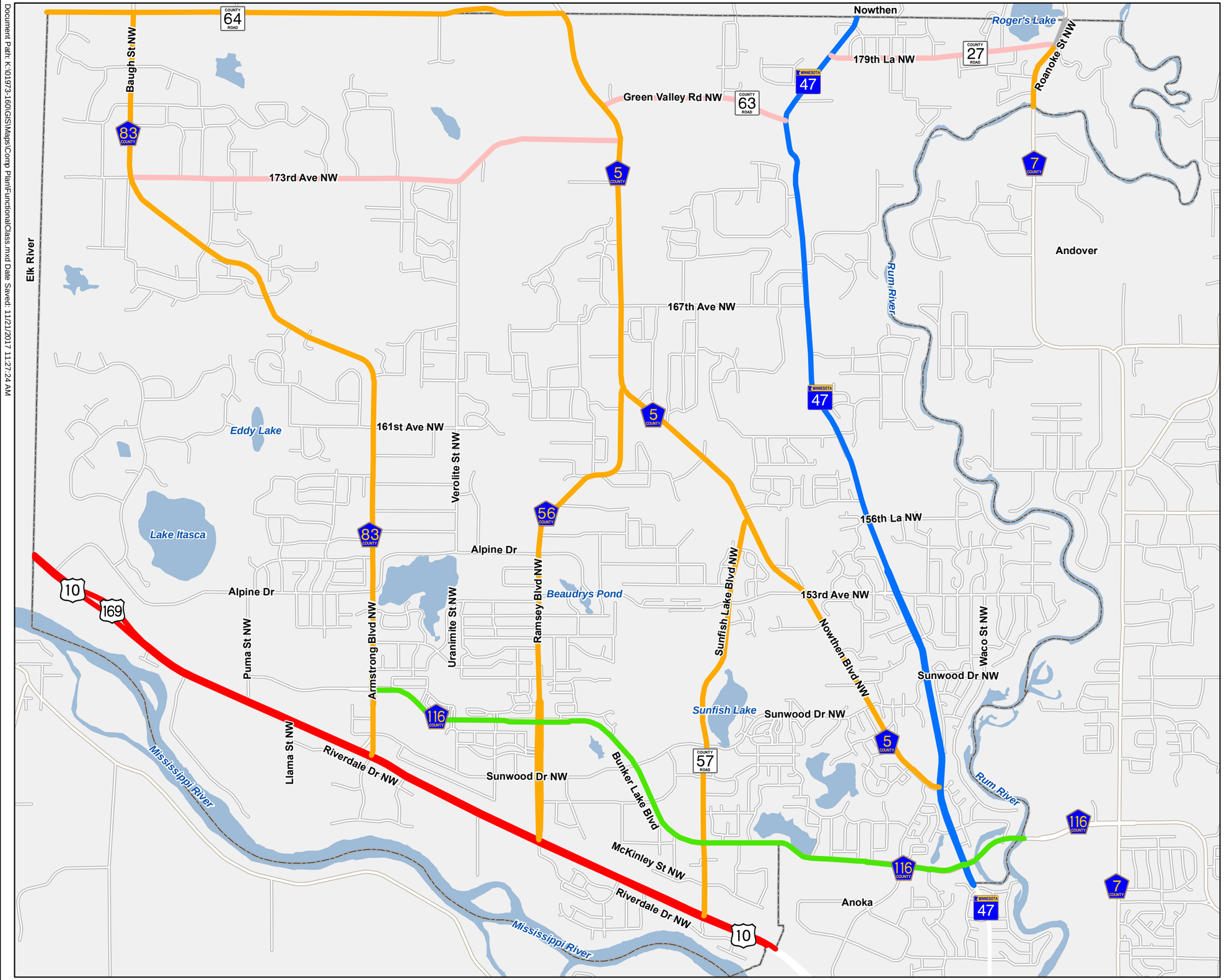
Image: MnDOT

Four classes of roadways are included in the seven-county metropolitan area functional classification system: principal arterials, minor arterials, collector streets, and local streets. **Figure 1** shows the existing functional classification of each road in the City of Ramsey and **Figure 2** shows the existing roadway jurisdiction. The following sections describe each functional class in greater detail and indicate which roadways fall into each classification.

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City of RAMSEY

Ramsey Comprehensive Plan
Figure 1: Existing Functional Classification
Ramsey, MN



Functional Classification

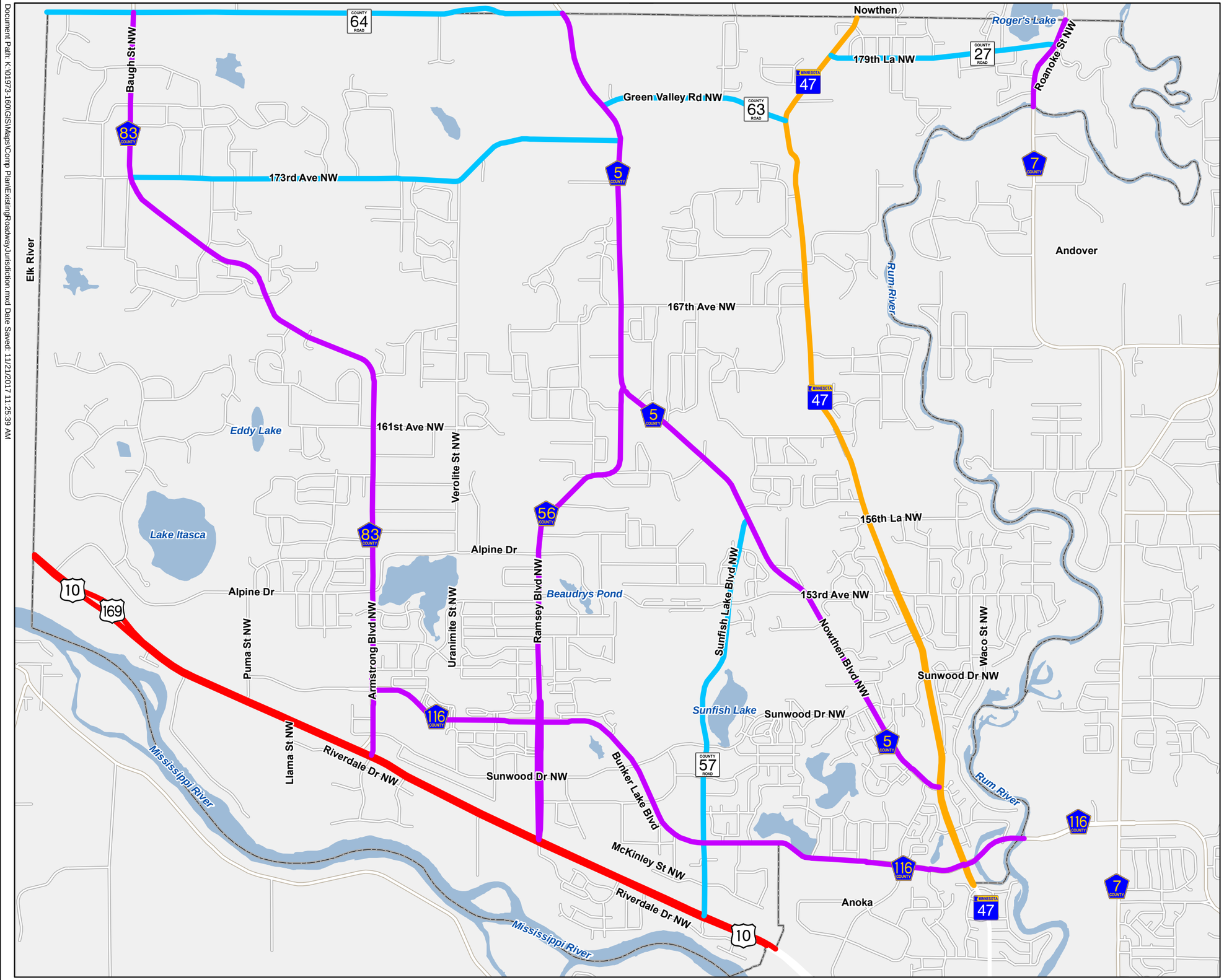
- Principal Arterial
- A Minor Reliever
- A Minor Expander
- A Minor Connector
- Other Arterial
- Major Collector
- Ramsey Boundary

N

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Ramsey Comprehensive Plan
Figure 2: Existing Roadway Jurisdiction
Ramsey, MN

Existing Roadway Jurisdiction

- US Highways
- State Highways
- County Roads
- County State Aid Highway
- Ramsey Boundary

N

0 3,000 Feet

2.1.1. Principal Arterials

Principal arterials are roadways that provide the greatest level of mobility and access control. Within the metropolitan area, the great majority of principal arterials are under MnDOT jurisdiction. Principal arterials are typically Interstate highways or other state or US freeways or expressways. These facilities are intended to serve trips greater than eight miles and express transit trips. Spacing of principal arterials varies within developing areas of the metropolitan area. Typically these facilities are spaced between two and six miles apart. These facilities connect regional business and commercial concentrations, transportation terminals, and large institutions within the metropolitan area. Principal arterials also connect to other cities, regions, and states outside of the metropolitan area.

Principal arterials are intended to maintain average speeds of 40 mph during peak traffic periods. To maintain mobility and speeds on principal arterials, land access and transportation system connections are limited. There is little to no direct land access from principal arterials. Intersections are limited to interstate freeways, other principal arterials, and "A" Minor arterials. Access points are typically grade-separated or controlled with a signal and are spaced one to two miles apart.

One existing principal arterial is located within Ramsey. US Highway (US) 169/US Highway 10 crosses the southern portion of the city in a northwest-southeast direction parallel to the Mississippi River. US 169 and US 10 join in the City of Elk River to the west of Ramsey and diverge again in the City of Anoka, just east of Ramsey. US 169 connects northern Minnesota with the Twin Cities metropolitan area, Mankato, and areas further south. US 10 provides a connection between the western portion of the state and the Twin Cities metropolitan area and Wisconsin. These roadways are also trunk highways (THs) on the MnDOT system, and these combined highways in Ramsey are hereafter referred to as "US 10" in this Plan. The 2040 Transportation Policy Plan does not propose any additional principal arterials within the city.

2.1.2. Minor Arterials

Minor arterials maintain a focus on mobility, but provide more land access than principal arterials. Within Ramsey, all minor arterials are under the jurisdiction of MnDOT or Anoka County. Minor arterials are intended to serve trips of four to eight miles in length. Within developing areas of the metro, these facilities are spaced between one and two miles apart. Minor arterials connect cities and towns within the region and link to regional business and commercial concentrations. Access points along minor arterials are generally at-grade and typically controlled with signals or stop signs.

During peak traffic, minor arterials in developing areas are intended to maintain 30 mph average speeds. As a result, transportation system connections are limited to interstate freeways, other principal arterials, other minor arterials, collectors, and some local streets. Land access is limited to concentrations of commercial and industrial land uses. The Metropolitan Council has established a system of "A" Minor and "B" Minor arterials. "A" Minor arterials are eligible for federal funding administered by the Metropolitan Council.

The Metropolitan Council has further split "A" Minor arterials into four types, described below:

- Relievers: Arterials located parallel to congested principal arterials. The purpose of "A" Minor Relievers is to provide additional capacity in congested corridors.
- Augmenters: Arterials that supplement the principal arterials system within urban centers and urban communities.
- Expanders: Arterials that supplement principal arterials in less-densely developed areas of the metro area.
- Connectors: Arterials that provide connections between rural towns and connect rural areas with the principal arterial system.

There are seven "A" Minor Expanders, one "A" Minor Reliever, and one "A" Minor Connector within the city:

"A" Minor Expanders:

- Anoka County State Aid Highway (CSAH) 5 (Nowthen Boulevard)
- CSAH 7 (Rum River Boulevard) south of 179th Lane
- CSAH 22 (181st Avenue)
- CSAH 56 (Ramsey Boulevard)
- CSAH/County Road 57 (Sunfish Lake Boulevard)
- County Road 64 (181st Avenue)
- CSAH 83 (Armstrong Boulevard/Baugh Street)

"A" Minor Reliever:

- CSAH 116 (Bunker Lake Boulevard)

"A" Minor Connector:

- Trunk Highway (TH) 47 (St. Francis Boulevard)

"B" Minor arterials have a similar focus on mobility above land access. These roadways connect major traffic generators in the region. "B" Minor arterials are not eligible for federal funding. "B" Minor arterials within the city include the following:

- CSAH 7 (Rum River Boulevard) north of 179th Lane

An additional B minor arterial connecting CSAH 5 with TH 47 in the northern section of the city is identified as a planned arterial in the 2040 Transportation Policy Plan.

2.1.3. Major and Minor Collectors

Major and minor collector roadways provide linkages to larger developments and community amenities. They generally do not link communities to one another. Collector roadways generally favor access to the system over mobility, but try to balance the two competing needs. Collector roadways are generally lower speed than the principal or minor arterial routes. Collector roadways are often owned and operated by cities, although counties operate some of

these facilities. Within Ramsey, two collector roadways are owned and operated by the city, and Anoka County operates two. Collectors are intended to serve trips of one to four miles in length. Collectors link minor arterials, other collectors, and local streets.

Major collectors typically serve higher density residential areas and concentrations of commercial and industrial land uses. These facilities tend to serve longer trips than minor collectors. Major collectors within the city include the following:

- 173rd Avenue Northwest
- 175th Avenue Northwest
- County Road 63 (Green Valley Road)
- County Road 27 (179th Lane Northwest)

There are no minor collectors within the city, and the 2040 Transportation Policy Plan does not propose any additional collector roadways within the city.

2.1.4. Local Roadways

The primary function of local roadways is land access. Local roadways connect individual land parcels with other local roadways and collectors. Trips on local roadways are typically under two miles. Speeds on local roadways are typically low. Longer trips are facilitated by local roadway connections to the collector and arterial systems. Local roadways are under the jurisdiction of the City of Ramsey. Local roadways are all roadways that are not arterials or collectors.

2.1.5. Planned Functional Classification

Aside from new proposed roadways, no functional classification changes are currently recommended in the city.

> **A note on transportation plan strategies:**
>
> Throughout this Plan, locations associated with numbered mode-specific strategies are identified on corresponding maps. These strategies are listed and described in further detail in **Table 8.**

2.2. Existing Roadway Capacity and Safety

Roadway capacity and roadway safety are two key indicators of how well the roadway system is meeting the city's transportation needs. The sections below provide information to better understand capacity and safety issues within Ramsey.

2.2.1. Existing Roadway Capacity

A roadway's capacity indicates how many vehicles may use a roadway before it experiences congestion. Capacity is largely dependent upon the number of lanes. **Table 1** below lists planning-level thresholds that indicate a roadway's capacity. Additional variation (more or less capacity) on an individual segment is influenced by a number of factors including: amount of access, type of access, peak hour percent of traffic, directional split of traffic, truck percent, opportunities to pass, and amount of turning traffic, the availability of dedicated turn lanes, parking availability, intersection spacing, signal timing and a variety of other factors.

Table 1: Planning-level Urban Roadway Capacities

Facility Type		Daily Two-way Volume	
		Lower Threshold	Higher Threshold
Arterials	Two-lane Undivided	10,000	12,000
	Two-lane Divided or Three-lane Divided	15,000	17,000
	Four-lane Undivided	18,000	22,000
	Four-lane Divided or Five-lane Undivided	28,000	32,000
Freeways	Four-lane Freeway	60,000	80,000
	Six-lane Freeway	90,000	120,000
	Eight-lane Freeway or Higher	Calculated on a segment-by-segment basis	

2.2.2. Existing Capacity Problems on Arterial Roads

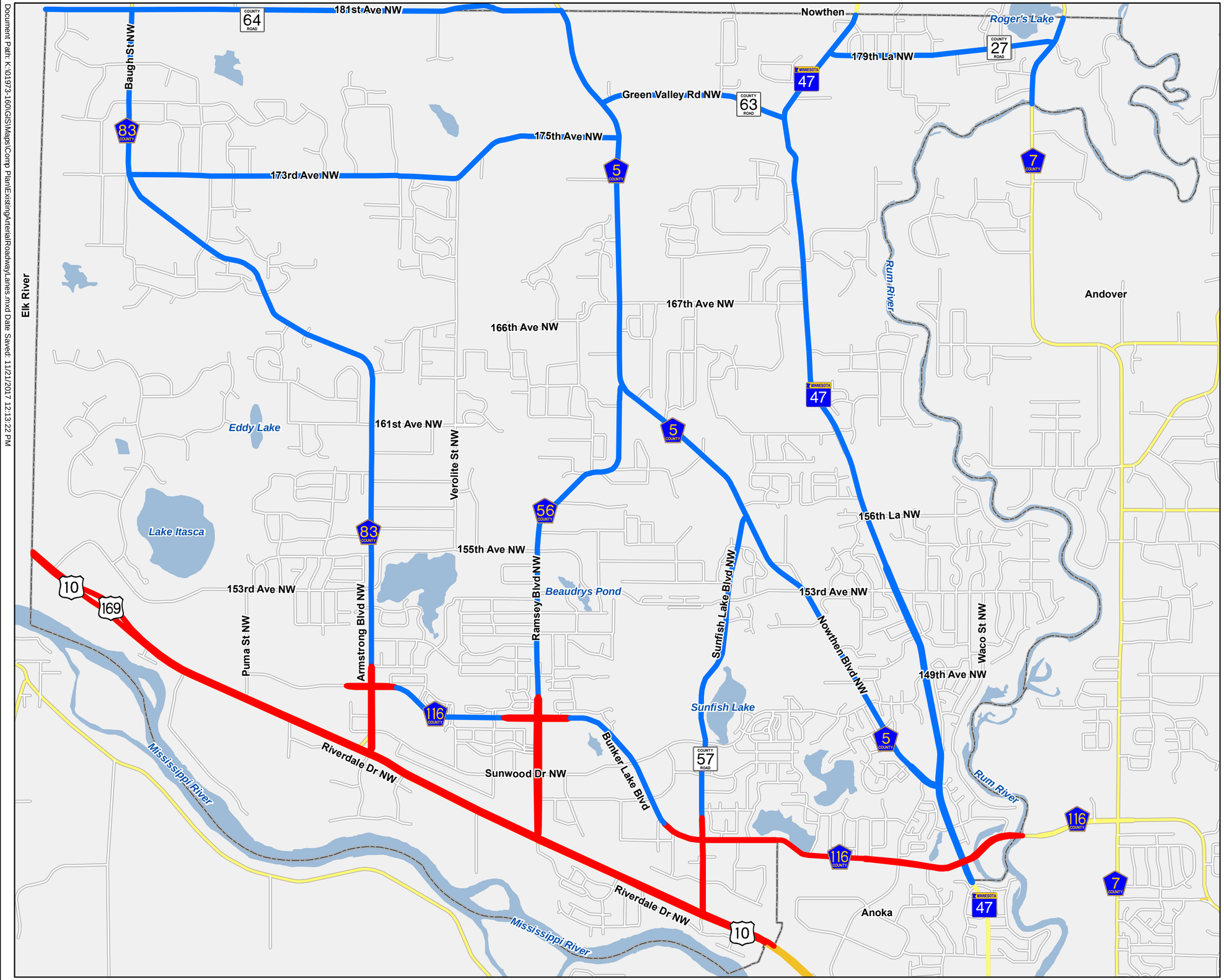
At the planning level, capacity problems are identified by comparing the existing number of lanes with current traffic volumes. **Table 2** and **Figure 3** illustrate the existing number of lanes on collector and arterial roadways within the city. **Figure 4** illustrates existing traffic volumes on Principal Arterial, A-Minor Arterials and other significant roadways within the city.

As shown in the table, US 10 has four lanes throughout the city, as do portions of CSAH 56 (Ramsey Boulevard), CSAH 57 (Sunfish Lake Boulevard), CSAH 83 (Armstrong Boulevard), and CSAH 116 (Bunker Lake Boulevard). All other arterial roadways have two lanes. Most of the arterials in Ramsey currently exhibit traffic volumes below or within the range of the planning level capacity thresholds shown in **Table 1**; however, existing volumes on TH 47 (St. Francis Boulevard) exceed these thresholds in the southeastern area of the city. This indicates that this roadway may be experiencing some levels of congestion during peak travel periods.

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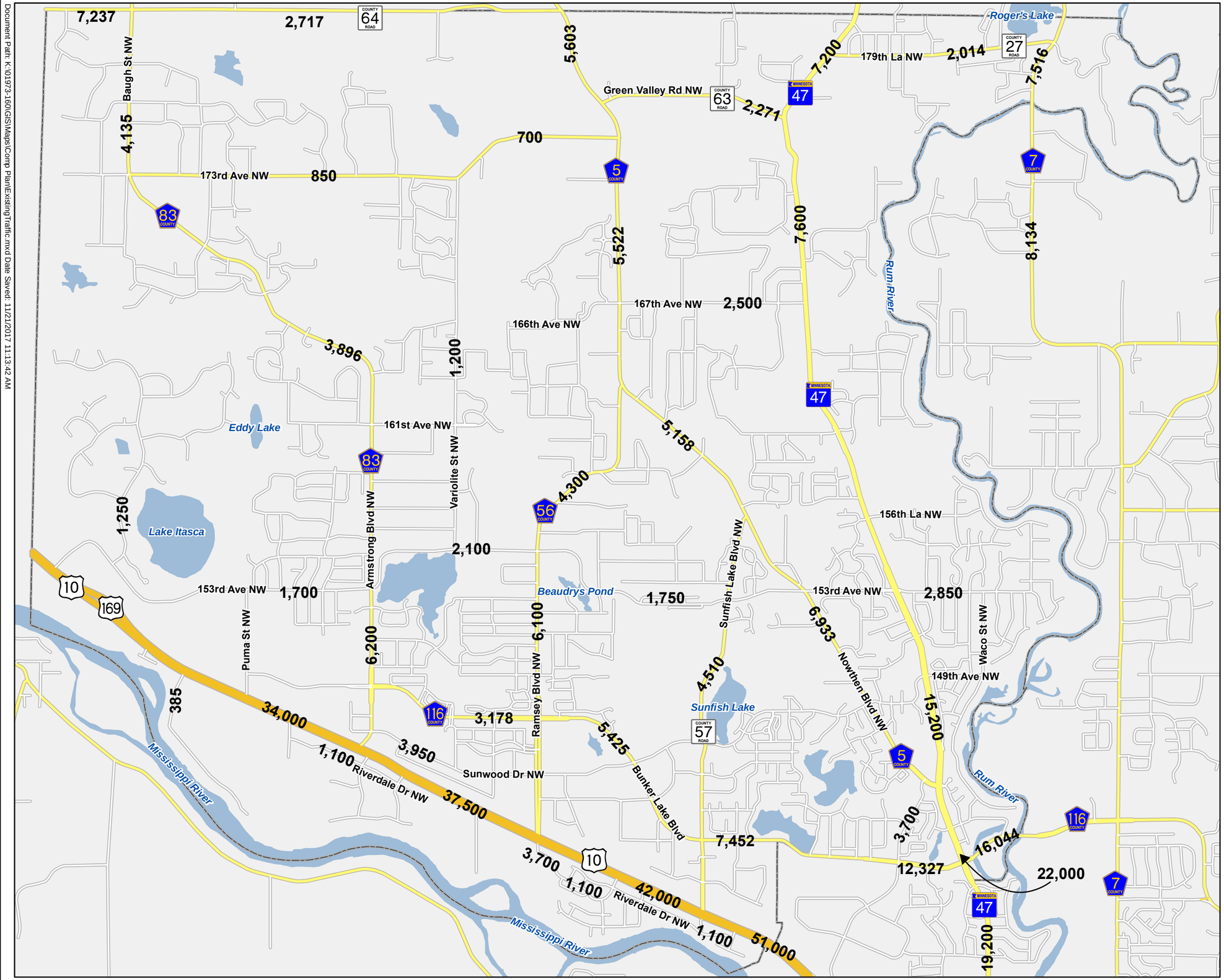
City of RAMSEY

Ramsey Comprehensive Plan
Figure 3: Existing Collector/Arterial Roadway Lanes
Ramsey, MN



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City of RAMSEY

Ramsey Comprehensive Plan
Figure 4: Existing Traffic Volumes
Ramsey, MN

XXX- Existing AADT (2012-2015)

AADT- Average Annual Daily Traffic From MnDOT Website

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Table 2: Existing number of lanes on arterial roads

Functional Classification	Roadway Name	Location	Number of Lanes
Principal Arterial	US 10	Ramsey-Elk River border to Ramsey-Anoka border	4
"A" Minor Expander	CSAH 5 (Nowthen Boulevard)	TH 47 to Ramsey-Nowthen border	2
	CSAH 7 (Rum River Boulevard)	Ramsey-Andover border to 179th Lane	2
	CSAH 22 (181st Avenue)	Ramsey-Elk River border to CSAH 83	2
	CSAH 56 (Ramsey Boulevard)	US 10 to CSAH 5	2–4
	CSAH/County Road 57 (Sunfish Lake Boulevard)	US 10 to CSAH 5	2–4
	County Road 64 (181st Avenue)	CSAH 83 to CSAH 5	2
	CSAH 83 (Armstrong Boulevard/Baugh Street)	US 10 to Ramsey-Nowthen border	2–4
"A" Minor Reliever	CSAH 116 (Bunker Lake Boulevard)	CSAH 83 to Ramsey-Anoka border	2–4
"A" **Minor** Connector	TH 47 (St. Francis Boulevard)	Ramsey-Anoka border to Ramsey-Nowthen border	2
"B" Minor	CSAH 7	179th Lane to Ramsey-Oak Grove border	2

2.2.3. Existing Safety and Operational Issues

There are a number of intersection locations within Ramsey where safety, geometric, or operational issues have been identified for motorists and pedestrians. These locations include:

- Armstrong Boulevard (CSAH 83) and Alpine Drive
- Armstrong Boulevard (CSAH 83) and 161st Avenue
- Ramsey Boulevard (CSAH 56) and Alpine Drive

- Ramsey Boulevard (CSAH 56) and Nowthen Boulevard (CSAH 5)
- Nowthen Boulevard (CSAH 5) and Sunfish Lake Boulevard (CSAH 57)
- Nowthen Boulevard (CSAH 5) and 167th Avenue
- Nowthen Boulevard (CSAH 5) and 175th Avenue
- Nowthen Boulevard (CSAH 5) and Green Valley Road



2.3. Access Management

The purpose of access management is to provide adequate access to adjacent land development while maintaining acceptable and safe traffic flow on higher level roadways. Access management consists of carefully controlling the spacing and design of public street intersections and private access points to the public roadway system. Because they are designed for higher speed, longer distance trips, arterials generally have restricted access, while local streets can accommodate much greater access. Collector roadways fall in between arterials and local roadways regarding the amount of access that is permitted.

The agency with jurisdiction over a roadway sets access management guidelines. Access to US 10 must meet MnDOT access management guidelines. See **Tables 3.1** and **3.2** for MnDOT Access Management Guidelines.

Anoka County has established access management guidelines for county roadways, as displayed in **Table 4**.

Table 3.1 – Summary of Recommended Street Spacing for IRCs

Category	Area or Facility Type	Typical Functional Class	Public Street Spacing		Signal Spacing
			Primary Full-Movement Intersection	Secondary Intersection	
1	**High Priority Interregional Corridors & Interstate System (IRCs)**				
1F	Interstate Freeway	Principal Arterials	Interchange Access Only		⊘
1AF	Non-Interstate Freeway		Interchange Access Only (see Section 3.2.7 for interim spacing)		See Section 3.2.5 for Signalization on Interregional Corridors
1A	Rural		1 mile	1/2 mile	
1B	Urban/Urbanizing		1/2 mile	1/4 mile	
1C	Urban Core		300-660 feet dependent upon block length		
2	**Medium Priority Interregional Corridors**				
2AF	Non-Interstate Freeway	Principal Arterials	Interchange Access Only (See Section 3.2.7 for interim spacing)		See Section 3.2.5 for Signalization on Interregional Corridors
2A	Rural		1 mile	1/2 mile	
2B	Urban/Urbanizing		1/2 mile	1/4 mile	
2C	Urban Core		300-660 feet, dependent upon block length		¼ mile
3	**Regional Corridors**				
3AF	Non-Interstate Freeway	Principal and Minor Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		Interim
3A	Rural		1 mile	1/2 mile	See Section 3.2.5
3B	Urban/Urbanizing		1/2 mile	1/4 mile	1/2 mile
3C	Urban Core		300-660 feet, dependent upon block length		1/4 mile

Table 3.2 – Summary of Recommended Street Spacing for Non-IRCs

Category	Area or Facility Type	Typical Functional Class	Public Street Spacing		Signal Spacing
			Primary Full-Movement Intersection	Secondary Intersection	
4	**Principal Arterials in the Twin Cities Metropolitan Area and Primary Regional Trade Centers (Non-IRCs)**				
4AF	Non-Interstate Freeway	Principal Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		Interim
4A	Rural		1 mile	1/2 mile	See Section 3.2.5
4B	Urban/Urbanizing		1/2 mile	1/4 mile	1/2 mile
4C	Urban Core		300-660 feet dependent upon block length		1/4 mile
5	**Minor Arterials**				
5A	Rural	Minor Arterials	1/2 mile	1/4 mile	See Section 3.2.5
5B	Urban/Urbanizing		1/4 mile	1/8 mile	1/4 mile
5C	Urban Core		300-660 feet, dependent upon block length		1/4 mile
6	**Collectors**				
6A	Rural	Collectors	1/2 mile	1/4 mile	See Section 3.2.5
6B	Urban/Urbanizing		1/8 mile	Not Applicable	1/4 mile
6C	Urban Core		300-660 feet, dependent upon block length		1/8 mile
7	**Specific Area Access Management Plans**				
7	All	All	By adopted plan		

Table 4: Anoka County Access Spacing Guidelines

Roadway Type	Route Speed (miles per hour)	Intersection Spacing		Signal Spacing	Private Access
		Full Movement Intersection	Conditional Secondary Intersection		
Principal Arterial	50 – 55	1 mi.	1/2 mi.	1 mi.	Subject to conditions for all roadway types and speeds
	40 – 45	1/2 mi.	1/4 mi.	1/2 mi.	
	< 40	1/8 mi.	300 – 660 ft.	1/4 mi.	
Arterial Expressway	50 – 55	1 mi.	1/2 mi.	1 mi.	
Minor Arterial	50 – 55	1/2 mi.	1/4 mi.	1/2 mi.	
	40 – 45	1/4 mi.	1/8 mi.	1/4 mi.	
	< 40	1/8 mi.	300 – 660 ft.	1/4 mi.	
Collector and Local	50 – 55	1/2 mi.	1/4 mi.	1/2 mi.	
	40 – 45	1/8 mi.	NA	1/4 mi.	
	< 40	1/8 mi.	300 – 660 ft.	1/8 mi.	
Specific Access Plan	By adopted plan/agreement/covenant on land				

2.4. Recommendations from Recent Plans and Studies

A number of recent planning efforts have been completed that identify potential improvements to the City of Ramsey's transportation system. This section describes these studies and summarizes their recommendations.

2.4.1. Highway 10 Access Planning Study

In 2014, MnDOT completed the Highway 10 Access Planning Study to identify safety and mobility along the US 10 corridor between the Anoka/Sherburne County line and the Rum River. Specifically, the purpose of the study was to identify high-benefit improvements that are fiscally responsible so that improvements can be funded, programmed, and implemented incrementally. The study area was divided into subareas and concepts were developed and evaluated, and recommendations for individual projects were broken into immediate priority, short-term priority projects, mid-term priority projects, and opportunity/development/safety-driven projects. The recommended projects specific to the City of Ramsey include the following:

- Immediate Priority projects
  - Construct North Frontage Road from Sunfish Lake Boulevard to Anoka Technical College
  - Construct North Frontage Road from Ramsey Boulevard to Sunfish Lake Boulevard
  - Construct South Frontage Road from Traprock Street to Ramsey Boulevard
- Short-Term Priority projects
  - Extend Riverdale Drive east of Tungsten Street (two alignment options)
- Mid-Term Priority projects
  - Grade separation at Sunfish Lake Boulevard – Highway 10 flyover with access or overpass with right-turn access
  - Grade separation at Ramsey Boulevard – Highway 10 flyover with access or overpass with right-turn access
- Opportunity/Development/Safety Driven Priority projects
  - Purchase ROW north of US 10 and west of Ramsey Boulevard
  - Extend Civic Center Drive to Ramsey Boulevard
  - Railroad grade separation at Sunfish Lake Boulevard
  - Railroad grade separation at Ramsey Blvd
  - Extend 156th Street from Jarvis Street to Alpine Drive
  - Construct a Reduced Conflict U-Turn (RCUT) intersection at US 10 and Alpine Drive
  - Construct a Reduced Conflict U-Turn (RCUT) intersection at US 10 and Bowers Drive
  - Extend Riverdale Drive from Bowers Drive to Llama Street

2.4.2. Mississippi Skyway Preliminary Engineering Report

In 2014, the City of Ramsey completed the Mississippi Skyway Preliminary Engineering Report to identify potential alignments for a new pedestrian bridge crossing of US 10 near Riverdale Drive. This study also produced a preliminary analysis of alternative profiles and aesthetic

design options, along with impacts associated with various alternatives. This study recommended an open air bridge with a helix approach ramp located just south of Riverdale Drive. A preferred bridge concept was also identified, with a prefabricated steel truss including dual modified bowstring arches.

3. Future Roadway System

This section addresses future roadway improvement needs and roadway design guidelines.

3.1. Roadway Capacity – Traffic Forecasting

To determine future roadway capacity needs, year 2040 traffic forecasts were prepared using the Metropolitan Council travel demand model. The 2040 projections were compared against the assumed 2040 roadway network to see where roadway segment capacity deficiencies may result. The 2040 roadway network assumed for this analysis is the same as the current roadway network, as the City and County Capital Improvement Plans (CIPs) do not include any projects that add significant capacity to the roadway network.

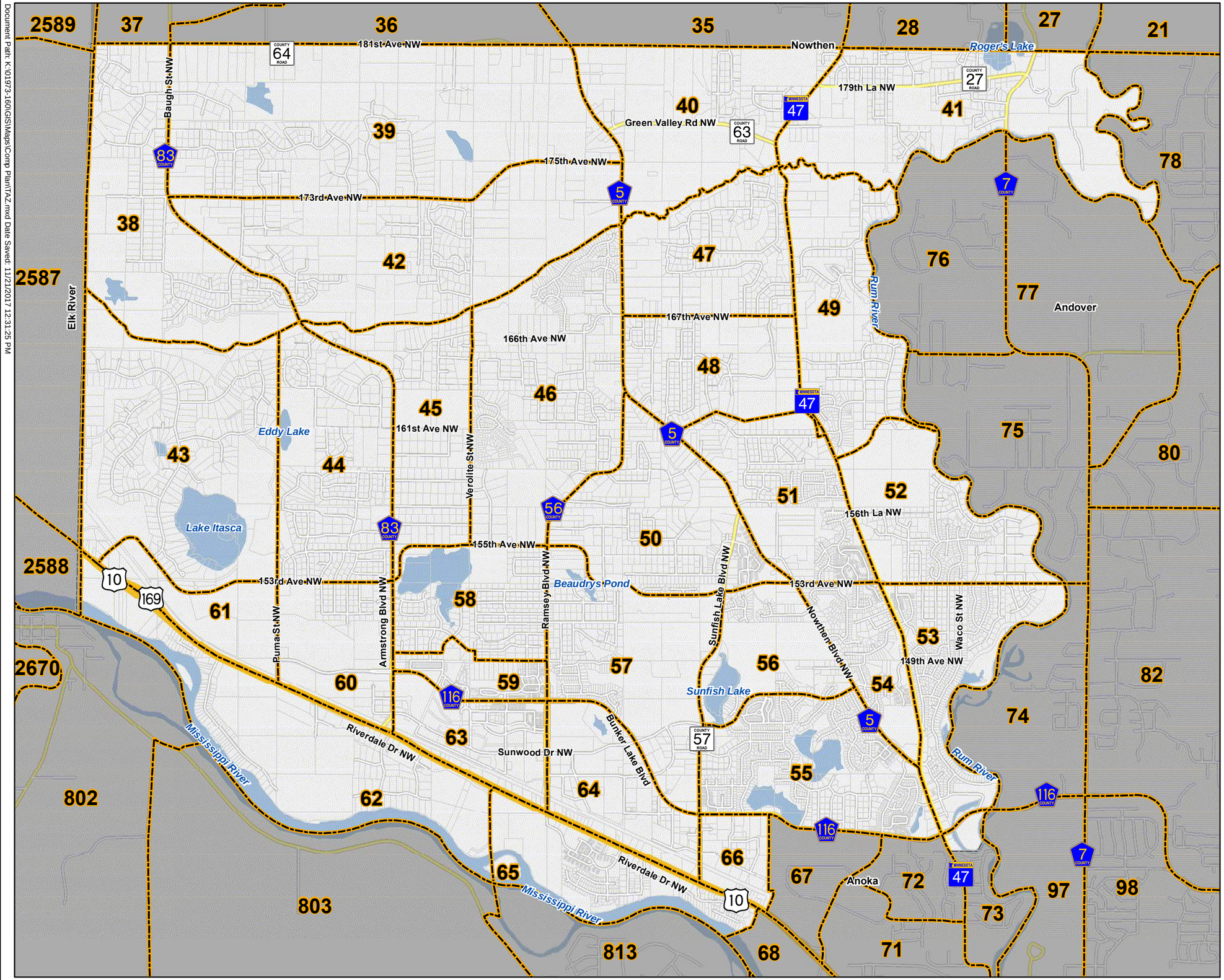
While the travel demand model is a valuable tool for identifying future traffic based on the proposed land use impacts, it is not meant for use in detailed traffic operations studies. For a more accurate representation of the transportation impacts from specific developments, detailed traffic studies should be conducted to determine the operational impacts on adjacent roadways and intersections.

A central concept of travel demand forecasting is the use of Transportation Analysis Zones (TAZs). Each forecast study area, in this case, the City of Ramsey, is divided into a series of TAZs. Each TAZ has population, employment, and household data that is used by the model to assign trips to the various network roadways. **Figure 5** displays Metropolitan Council TAZs within Ramsey.

The results of the Ramsey modeling process are summarized in **Figure 6**, which displays Metropolitan Council 2040 projected average daily traffic volumes compared to the existing (2012–2015) traffic volumes.

Tables 5a and **5b** provide a summary of existing and forecasted demographic growth by TAZ for Ramsey through the year 2040. The Ramsey population is forecasted to reach slightly over X,XXX by the year 2040, with households and employment increasing by XXX and XXX respectively. Allocated demographic growth and associated land use was generally located in the XXXXXX and XXXXXXX portions of the community. High density residential was also generally allocated to the southern portion of the city, with commercial and multi-optional development areas also generally identified within the southern portion of the city, consistent with the Center of Ramsey (COR) land use plan. For more information about the demographic allocation and associated land use forecast, please refer to the Ramsey Land Use Plan in Chapter X of the Ramsey Comprehensive Plan.

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Ramsey Comprehensive Plan
Figure 5: Transportation Analysis Zones
Ramsey, MN

Ramsey Boundary

Traffic Analysis Zone (TAZ)

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City of RAMSEY

Ramsey Comprehensive Plan
Figure 6: Existing Traffic Volumes & Adjusted Met Council Forecast
Ramsey, MN

XXX- Existing AADT (2012-2015)
XXX- Met Council Adjusted 2040 AADT

AADT- Average Annual Daily Traffic From MnDOT Website
AADT- Average Annual Daily Traffic Forecast from Met Council

NOTES:

* Adjusted forecast applies MET Council travel model growth to known existing volumes.

* Forecast is based on capacity constraint of existing roadway lanes: No improvements assumed.

N

0 3,000 Feet

WSB

12,037
7,237
Baugh St NW
2,717
COUNTY 64 ROAD
9,203
5,603
Roger's Lake
13,600
7,200
179th La NW
3,914
2,014
COUNTY 27 ROAD
7,516
Green Valley Rd NW
COUNTY 63 ROAD
2,271
MINNESOTA 47
6,835
4,135
700
173rd Ave NW
850
5 COUNTY
7 COUNTY
83 COUNTY
8,722
5,522
9,500
7,600
Rum River
10,334
8,134
167th Ave NW
2,500
166th Ave NW
8,996
3,896
1,200
Eddy Lake
161st Ave NW
6,858
5,158
MINNESOTA 47
Variolite St NW
7,500
4,300
56 COUNTY
1,250
Lake Itasca
2,100
156th La NW
10
169
153rd Ave NW
1,700
Armstrong Blvd NW
Beaudrys Pond
1,750
Sunfish Lake Blvd NW
153rd Ave NW
2,850
8,633
6,933
Nowthen Blvd NW
Waco St NW
Puma St NW
15,300
6,200
14,100
6,100
5,210
4,510
149th Ave NW
385
44,000
34,000
1,100
Riverdale Dr NW
3,950
Sunwood Dr NW
51,500
37,500
116 COUNTY
3,178
Ramsey Blvd NW
5,425
Bunker Lake Blvd
Sunfish Lake
57 COUNTY ROAD
15,200
17,700
Rum River
Mississippi River
7,452
3,700
16,044
12,327
22,000
3,700
1,100
Riverdale Dr NW
42,000
58,000
67,000
1,100
51,000
Mississippi River
22,200
19,200

Table 5a: Metropolitan Council Current TAZ Data – City of Ramsey (Raw Data – Unadjusted)

Table 5b: Ramsey 2040 Land Use Plan TAZ Growth Allocation

3.2. 2040 Future Roadway Capacity Improvement Needs

To identify the need for potential future capacity improvements, Metropolitan Council 2040 forecasts were compared to planning-level roadway capacities for Principal and A-Minor Arterial Roadways. Planning-level roadway capacities used for this analysis are illustrated in **Table 6** below. Based on this comparison, most roadways in the city have adequate capacity to accommodate forecasted Metropolitan Council 2040 travel volumes with little to minimal congestion. These roadways are expected to function well through the 2040 planning horizon.

Table 6: Planning-Level Roadway Capacity

Facility Type		Daily Two-way Volume	
		Lower Threshold	Higher Threshold
Arterials	Two-lane Undivided	10,000	12,000
	Two-lane Divided or Three-lane Undivided	15,000	17,000
	Four-lane Undivided	18,000	22,000
	Four-lane Divided or Five-lane Undivided	28,000	32,000
Freeways	Four-lane Freeway	60,000	80,000
	Six-lane Freeway	90,000	120,000
	Eight-lane Freeway or Higher	Calculated on a segment-by-segment basis	

Based on these planning level roadway capacities, portions of TH 47, US 10, Armstrong Boulevard (CSAH 83), and Ramsey Boulevard (CSAH 56) are expected to exceed capacity in 2040. TH 47 is currently a rural two-lane roadway with a planning-level capacity of 10,000–12,000 and a forecasted 2040 volume of 9,500–22,200. US 10 is a four-lane divided roadway with a planning-level capacity of 28,000–32,000 and a forecasted 2040 volume of 44,000–67,000. Armstrong Boulevard (CSAH 83) and Ramsey Boulevard (CSAH 56) each vary between two and four lanes within Ramsey, but each roadway includes a segment where the forecasted 2040 volume would surpass the associated planning-level capacity for a two-lane undivided roadway of 10,000–12,000 (15,300 for Armstrong Boulevard and 14,100 for Ramsey Boulevard). Accordingly, motorists will likely experience some congestion along these roadways during the 2040 planning horizon.

4. Existing and Planned Non-Motorized Transportation Network

This section addresses network needs for walking and bicycling within Ramsey. This section also addresses the needs of people using wheelchairs and assistive mobility devices such as mobility scooters, as they are considered pedestrians.

Enhancing the non-motorized elements of the Ramsey transportation system is a key goal in terms of improving transportation sustainability in the city and in the region. This approach gives residents an alternative to driving, supports transportation options for people who do not have consistent access to a personal vehicle, and encourages healthy activities and lifestyles.

This section includes information on the existing non-motorized transportation network within Ramsey, connections to land use planning, the planned local non-motorized transportation network, and the planned regional non-motorized transportation network. This section also includes recommendations for intersection improvements and design best practices.

4.1. Existing Non-Motorized Transportation Network

The non-motorized transportation network in Ramsey is comprised of sidewalks, on-street bicycle lanes/shoulders, local multi-use trail, and regional trail. As shown in **Figure 7**, there is existing sidewalk on many of the streets in the COR and on some residential streets in other areas of the city. There are also approximately 38 miles of city trails, which are largely paved with asphalt and primarily adjacent to roadways, connecting parks, schools, and other destinations within the city.

Additionally, there are two regional multi-use trails located in the City of Ramsey. The Central Anoka Regional Trail is an existing Anoka County regional trail that, when complete, will be 26 miles long, beginning at the Mississippi West Regional Park in Ramsey and ending at the Anoka-Washington County line. The completed portions of the trail within Ramsey are located along Bunker Lake Boulevard and Ramsey Boulevard. A route for the Mississippi River Regional Trail (which is also part of a national bikeway) crosses the southern portion of the city using a combination of on-street and off-street facilities.

4.2. Connections to Land Use Planning

Ramsey has development patterns largely consistent with its designation as an Emerging Suburban Edge community. In many areas of the city, existing residential development is lower in density compared with many urban and suburban areas, reflecting a community that has developed relatively recently. As a result, most commercial land uses are separated from largely single-family residential land uses. This means that people walking and bicycling must cover greater distances to reach commercial areas from their homes. In these areas of the city, development patterns are likely better suited to bicycling than walking for transportation for most trips due to the distance between residential and commercial areas of the city. However, the COR area demonstrates existing and planned land use patterns that are more similar to urban or suburban areas, including transit facilities and a mix of land uses at higher densities,

along with a more regular street grid. In this area, development patterns are better-suited to bicycling and walking.

The city's land use planning and coordination with developers can help improve opportunities for walking and bicycling for transportation. The city can continue to encourage mixed-use development that situates residents within a short walk of commercial destinations. The city can also work with developers to construct sidewalks and trails within developments. Additionally, the city can require pedestrian and bicycle connections in areas where the roadway network does not connect, such as cul-de-sac connector trails that provide shortcuts for people walking and bicycling.

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Ramsey Comprehensive Plan
Figure 7: Non-Motorized Transportation Network
Ramsey, MN

- Ramsey Boundary

Regional Bicycle Transportation Network Alignment
- Tier 2 Alignment

Regional Bicycle Transportation Network Corridor
- Tier 1 Priority Corridor
- Mississippi River Trail Route

Regional Trails
- Existing
- Planned
- Trott Brook Trail Corridor

City Trails
- Asphalt (37.52 miles)
- Tunnel (0.05 miles)
- Wooden Walkway (0.48 miles)
- Proposed Pedestrian Crossing (Grade Separation)
- On Street Bike Lanes
- Sidewalks

Parks and Open Space
- Parks
- Open Space/Trail Corridor
- Proposed Park
- Quasi-Public
- Regional
- Proposed Trailhead
- City Hall
- Fire Station
- Existing Trailheads
- Crosswalks
- Proposed Underpass
- Existing Underpass

0 3,000 Feet

N

4.3. Planned Local Non-Motorized Transportation Network

The city's planned local non-motorized transportation network includes sidewalk, paved multi-use trails, and on-street bicycle lanes or shoulders. The existing and proposed network is shown in **Figure 7**. When the network is complete, it will provide safe, convenient linkages between residential areas and commercial, institutional, and recreational areas within the city. This includes filling existing network gaps and adding facilities adjacent to developing areas. The planned network also includes completion of the Trott Brook Trail Corridor, which would generally follow Trott Brook from the city's border with Elk River to Rum River Regional Park. The network will improve options for people to walk and bicycle for transportation within the city, and facilitate regional connections (described in greater detail in the following section).

The planned non-motorized transportation network also includes construction of the planned Mississippi Skyway, a bicycle and pedestrian bridge that would cross US 10, providing a dedicated crossing between the COR and Mississippi West Regional Park for non-motorized users. While the project is being led by the City of Ramsey and is important in providing a local connection between the COR and the Mississippi River area, the Mississippi Skyway would be a key regional connection, likely becoming part of the Central Anoka Regional Trail and providing a key connection to the Mississippi River Regional Trail (MRRT).

4.4. Planned Regional Non-Motorized Transportation Network

The Metropolitan Council 2040 TPP encourages the use of bicycles as a mode of transportation and establishes a Regional Bicycle Transportation Network (RBTN) to establish an integrated network of on-street bikeways and off-road trails that complement each other to improve conditions for bicycle transportation at the regional level. The RBTN identifies Tier 1 and Tier 2 alignments where existing regional or other trails exist or where a specific alignment has been identified. The RBTN also identifies Tier 1 and Tier 2 corridors where specific alignments have not yet been defined.

Within Ramsey, the RBTN identifies one Tier 1 RBTN corridor. The corridor follows the alignment of US 10 west–east along the Mississippi River and the southern border of the city. This corridor substantially contains completed or planned off-street segments of the MRRT. In 2017, a segment of the MRRT was constructed within the US 10 right of way between Mississippi West Regional Park and the city's border with Elk River. The county's planned ultimate alignment for MRRT will include a segment closer to the river. The timing for construction of this portion of the MRRT is dependent on the pace of development in the area and available funding. The city proposes the ultimate MRRT alignment as the RBTN alignment.

The Rum River Regional Trail is a planned Anoka County trail that, when completed, would be 20 miles long stretching north to south through the county along the east side of the Rum River. A short segment of this trail is planned to pass through the City of Ramsey along CSAH 7 and connecting to Rum River Central Regional Park in the northeastern portion of the city. Anoka County also plans to complete the Central Anoka Regional Trail through the city, completing existing gaps in the trail. The city and county plan to realign Central Anoka Regional Trail to pass through the COR and over the Mississippi Skyway. This would provide an off-road connection to Mississippi West Regional Park.

The existing and proposed regional network is shown in **Figure 7**.

4.5. Roadway Crossing Improvements for Bicycling and Walking

Through public outreach, a number of intersections and other locations throughout the city have been identified for potential improvements based on safety issues for crossing pedestrians and bicyclists. In these locations, potential improvements could be made by adding or improving pavement markings or signals, constructing traffic calming elements, shortening crossing distances, and/or providing pedestrian refuges. In most cases, addition of these features would be evaluated and conducted as opportunities arise. For example, crossing improvements would be considered in concert with adjacent roadway improvements or as development/redevelopment occurs in an area.

4.6. Non-Motorized Transportation Design Considerations

Design dimensions for sidewalks are recommended to be five-feet or wider, with a minimum of a four-foot-wide boulevard between the sidewalk and the curb. Increased separation improves pedestrian comfort and provides space for street signs and snow storage.

Design considerations for bicycle facilities are somewhat more complicated due to the hierarchy of facility types. In order of their ability to provide a comfortable bicycling environment from largest improvement to smallest, facilities include: off-street facilities, protected bikeways, buffered bicycle lanes, conventional bicycle lanes, bicycle boulevards, and wide paved shoulders. **Figure 8** shows examples of these facility types.

Multi-use trails are recommended to be a minimum of eight-feet wide. Regional trails are recommended to be a minimum of ten-feet wide due to higher use and the design requirements to comply with federal funding. Trails must have a two-foot wide clear zone on either side to reduce hazards for bicyclists and provide a recovery zone if a bicyclist leaves the edge of the trail. The clear zone can be paved or turf surface. No signs, furnishings, trees, or other obstructions can be in the clear zone.

Paved shoulders should be a minimum of four-feet wide if intended for bicycle and pedestrian use. Four-foot wide shoulders are adequate on streets with traffic volumes below 1,000 vehicles per day. Six- to eight-foot shoulders are recommended when traffic volumes exceed 1,000 vehicles per day. A wider shoulder improves pedestrian and bicyclist safety and comfort when vehicle traffic speeds and volumes are higher.

As non-motorized facilities are planned and designed, the city should consult additional planning and design resources, including:

- Minnesota's Best Practices for Pedestrian/Bicycle Safety, MnDOT
- Bikeway Facility Design Manual, MnDOT
- Minnesota Manual on Uniform Traffic Control Devices, MnDOT
- NACTO Urban Bikeway Design Guide, Second Edition, National Association of City Transportation Officials

- Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials
- Complete Streets Implementation Resource Guide for Minnesota Local Agencies, MnDOT
- Public Rights of Way Accessibility Guidelines (PROWAG), US Access Board

A Complete Streets approach to planning and implementing non-motorized facilities, as described in the MnDOT Complete Streets Implementation Resource Guide, can provide a helpful framework for creating a community-supported, safe, comfortable, and convenient transportation network that serves all modes. A Complete Streets policy or process is intended to provide design guidance and implementation clarity, allowing the community and project designers to advance individual projects in a collaborative and cost-efficient manner.

Accessibility is a very important consideration for non-motorized design. All new pedestrian and bicycle facilities must meet the ADA accessibility guidelines established in PROWAG. The guidelines in PROWAG address the design needs of people with physical and/or visual impairments. Accessibility will become increasingly important over the next 20 years due to demographic changes. Baby boomers are aging and the population over age 65 is increasing. People over 65 are more likely to have physical and/or visual impairments that affect their ability to get around.



Off-street Facility
Source: www.pedbikeimages.org / Laura Sandt



Conventional Bicycle Lane
Source: www.pedbikeimages.org / Jennifer Compos



Protected Bikeway
Source: NACTO Urban Bikeway Design Guide



Bicycle Boulevard
Source: NACTO Urban Bikeway Design Guide



Buffered Bicycle Lane
Source: www.pedbikeimages.org / Lyubov Zuyeva



Wide Paved Shoulder
Source: www.pedbikeimages.org / Laura Sandt

Figure 8:
Example Bicycle Facilities
Ramsey Transportation Plan
Ramsey, MN

5. Freight

Freight transportation in Ramsey is primarily served by one rail line and arterial roadways. **Figure 9** shows the city's freight system and potential freight generators. A Burlington Northern Santa Fe (BNSF) rail line passes through the southern portion of the city, adjacent to TH 10.

There are no large freight traffic generators or intermodal facilities within the city. Most truck and rail traffic is passing through Ramsey on trips to, from, and through the Twin Cities. Freight traffic generators within Ramsey are located along the BNSF rail line and TH 10. Freight generators include concentrations of industrial and commercial land uses along the TH 10 corridor.

Figure 9 also shows Heavy Commercial Average Annual Daily Traffic (HCAADT) within the City of Ramsey. TH 10 carries the greatest number of heavy commercial vehicles (1,600 vehicles per day). TH 47 also carries a substantial amount of heavy commercial traffic within the city. The 2017 Regional Truck Highway Corridor study identifies TH 10 as a Tier 2 Corridor on the regional freight network.

As of January 2015, the BNSF rail line carries approximately 54 trains per day. The Metropolitan Council 2040 TPP notes that freight rail traffic has increased substantially since 2010. Throughout the region, freight rail traffic is expected to increase, especially as the regional population continues to grow.

With the recent construction of a grade separation at Armstrong Boulevard, there are three remaining locations in the city where the BNSF rail line crosses public roadways at grade: Alpine Drive, Ramsey Boulevard, and Sunfish Lake Boulevard. Each of these crossings is controlled by flashing lights and gates. The Ramsey Boulevard crossing includes sidewalk and the Sunfish Lake Boulevard crossing includes multi-use trail.

The Metropolitan Council 2040 TPP acknowledges several freight challenges that impact the city and the region. As mentioned above, freight traffic is expected to increase and place pressure on the region's highway and rail systems. East-west traffic on the BNSF lines has increased in recent years in part due to growth in the Bakken oil fields of North Dakota and Montana. Safety is also an increasing concern, particularly rail safety as related to Bakken crude oil being transported through the region on the BNSF lines. The volume of rail traffic has therefore raised concerns about compatibility between freight traffic and adjacent land uses. While land use adjacent to the city's primary freight routes is generally compatible with these uses (industrial, commercial, etc.), there are several areas of existing and planned multi-family residential housing or mixed use that lie adjacent to the rail lines, particularly in the COR area.

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City of RAMSEY

Ramsey Comprehensive Plan
Figure 9: Freight Facilities and HCADT
Ramsey, MN

Potential Freight Generators

- Business District
- Employment District
- Railroads
- XXXX — Heavy Commercial Average Daily Traffic (HCADT) Sources: MnDOT (2012), Counts and estimates (2017)

N

0 3,000 Feet

WSB

181st Ave NW
Nowthen
Roger's Lake
Baugh St NW
179th La NW
730
Green Valley Rd NW
175th Ave NW
173rd Ave NW
272
Elk River
270
770
Rum River
Andover
167th Ave NW
166th Ave NW
840
Eddy Lake
161st Ave NW
Verolite St NW
Lake Itasca
155th Ave NW
153rd Ave NW
Puma St NW
Armstrong Blvd NW
Beaudrys Pond
Ramsey Blvd NW
216
Sunfish Lake Blvd NW
281
156th La NW
Nowthen Blvd NW
Waco St NW
149th Ave NW
305
1600
Riverdale Dr NW
1300
1500
Sunfish Lake
248
Bunker Lake Blvd
Sunwood Dr NW
Mississippi River
Anoka
390

6. Transit

Ramsey is located within the Transit Capital Levy District as shown in the Metropolitan Council 2040 TPP. The TPP further classifies the metropolitan area into transit markets based on demographic and urban design factors. Ramsey is located in Market Area IV. Market Area IV generally supports public dial-a-ride services and can support beak-period express bus services if a sufficient concentration of commuters likely to use transit service is located along a corridor. However, with the presence of the Northstar transitway, Ramsey has a unique level of transit service for a city in Market Area IV.

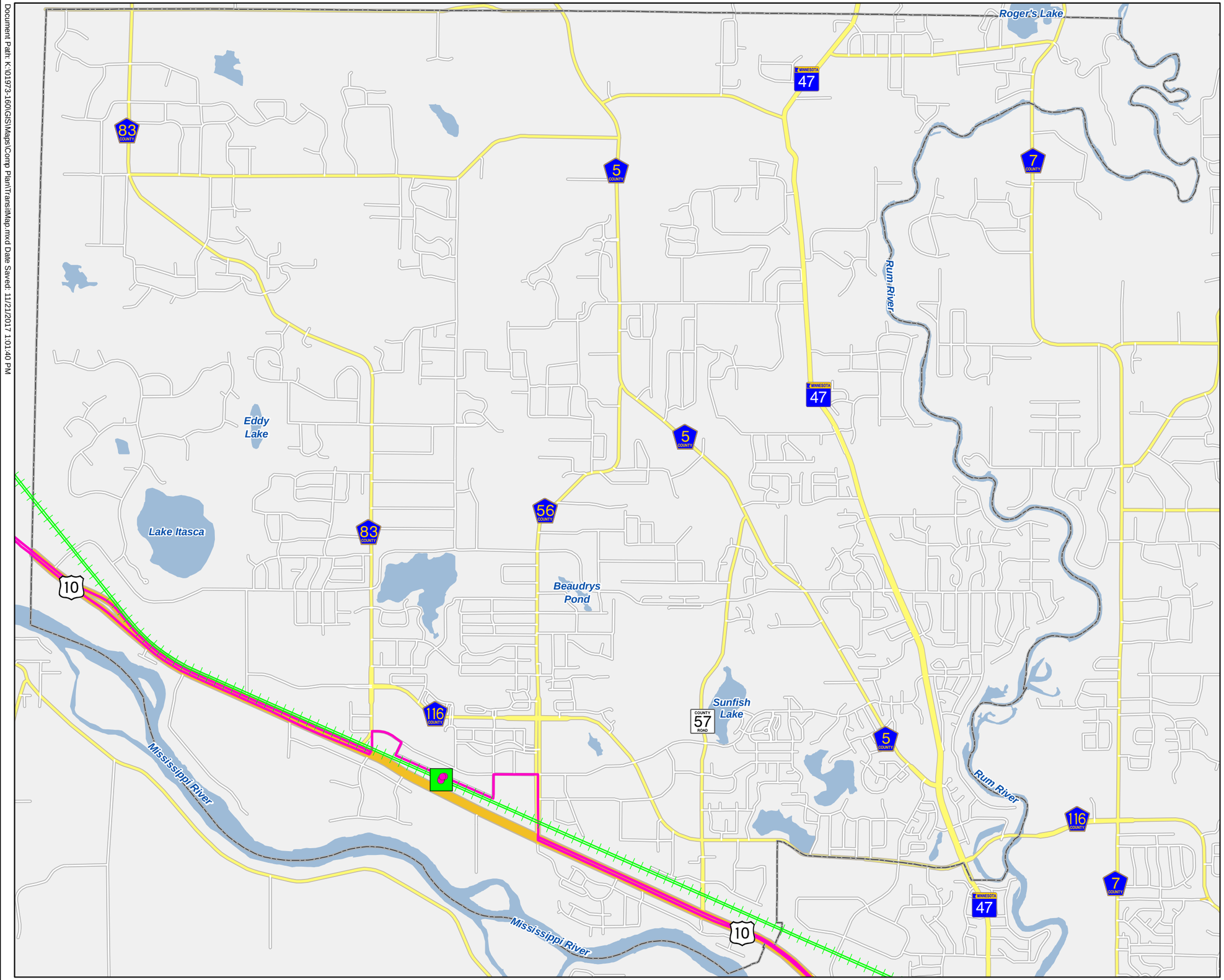
The Northstar transitway is a commuter rail line that runs six daily round trips between Big Lake and downtown Minneapolis, with stations in Elk River, Ramsey, Anoka, Coon Rapids, and Fridley. It uses the BNSF rail corridor, and the Ramsey station is located within the COR area, supporting transit-oriented development and providing an alternative for Ramsey residents commuting to Minneapolis. The station includes a park-and-ride lot with 350 free parking spaces as well as ticket machines, seating, and covered and enclosed waiting areas. The Northstar Link also provides commuter bus service to Ramsey on Fridays. Transit facilities in Ramsey are shown on **Figure 10**.

In addition to the fixed-route transit options, the city is also served by Anoka County Transit Link, a dial-a-ride service for the general public. Transit Link provides connections to destinations within Anoka County. Transit Link also connects to regular route transit for trips within the metro area, including outside of Anoka. Ramsey residents also have opportunities to participate in the Metro Vanpool program. This program provides financial assistance for vanpools to serve areas with limited regular-route transit service.

The TPP's transit investment plan does not show any additional regional transitway investments planned for Ramsey in the current revenue scenario. The city is interested in exploring the feasibility of future bus service between Ramsey Station and Anoka Technical College. Following additional growth in the COR, demand may be sufficient in the future to provide this service. There is also interest in partnering with Anoka Commuter Solutions in the future to provide circulator-type service between the city and Anoka and Coon Rapids, connecting the Northstar station and the COR with employment areas in neighboring communities.



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City of RAMSEY

Ramsey Comprehensive Plan
Figure 10: Transit Facilities
Ramsey, MN

- Northstar Commuter Rail
- Northstar Station
- Northstar Link (Fridays Only)
- Northstar Link Bus Stop
- Ramsey Boundary

N

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WSB

7. Aviation

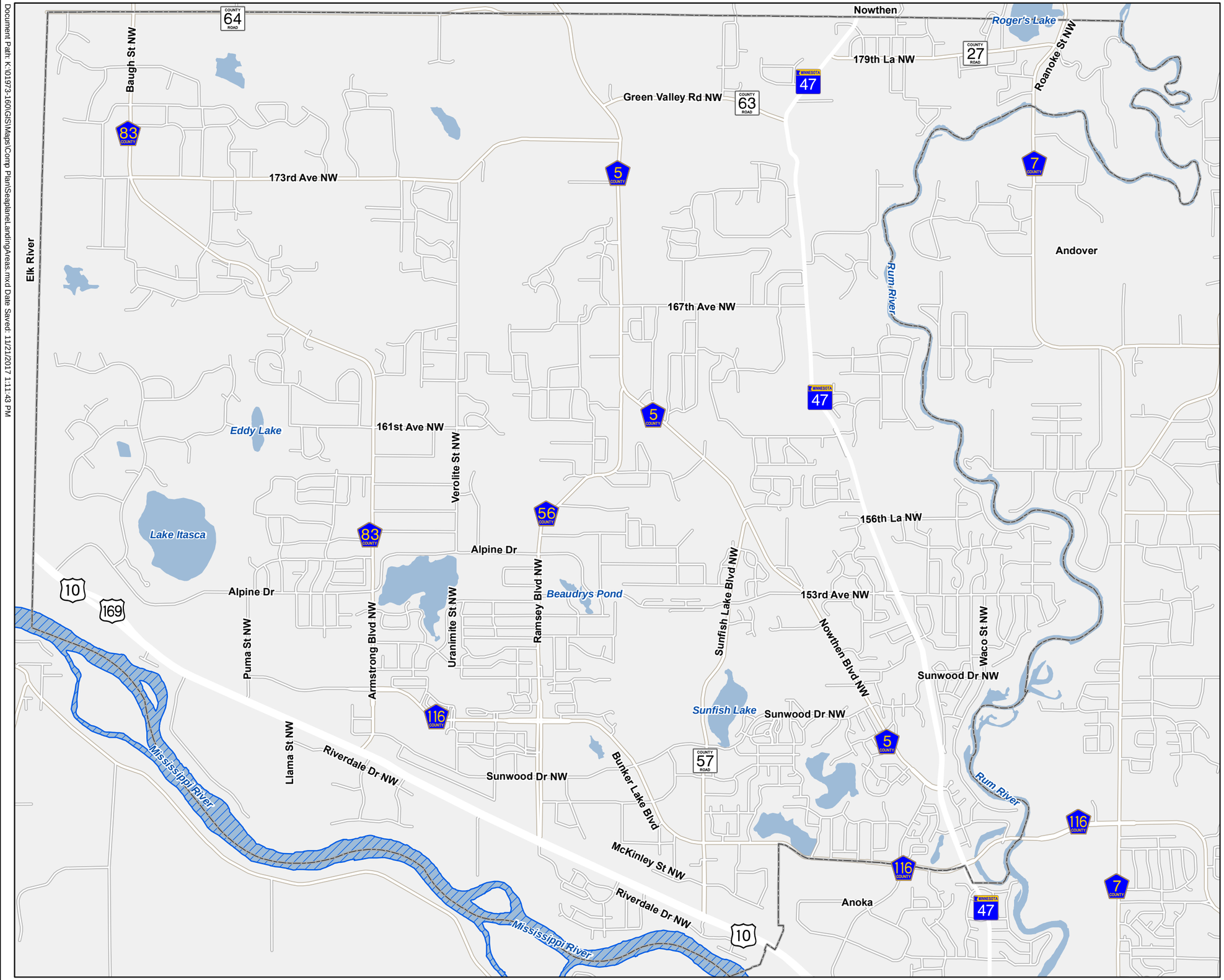
There are currently no existing or planned aviation facilities within Ramsey. However, the city is responsible for airspace protection in order to reduce hazards to air travel within the region. The closest airport is the Anoka County-Blaine Airport, approximately 10 miles southeast of Ramsey.

Due to the distance to the nearest airport, there are no radio beacons or other air navigation aids located in off-airport locations in Ramsey. The city is not within an area of influence, and is therefore not subject to associated land use restrictions.

Any person or organization who intends to sponsor the construction or alteration of a structure affecting navigable airspace as defined in Federal Regulation Title 14; Part 77 needs to inform the Federal Aviation Agency (FAA) of the project. This notification is accomplished through the completion and submittal to FAA of Form 7460-1, Notice of Proposed Construction or Alteration. In Ramsey, this requirement applies to any construction or alteration exceeding 200 feet above ground level. The city's zoning code also requires the zoning administrator to provide notification to MnDOT when an applicant proposes construction or alteration of a structure that would exceed 200 feet.

There are currently no heliports in Ramsey or any known plans to construct one. As shown on **Figure 11**, the Mississippi River within the city is identified by MnDOT as an authorized landing site for seaplanes.

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Ramsey Comprehensive Plan
Figure 11: Surface Waters Allowed for Seaplane Use
Ramsey, MN

Seaplane Use Allowed

Ramsey Boundary

N

0 3,000 Feet

WSB

8. Goals and Multimodal Strategies

This Plan, and the city's actions over the next 20 years, will be guided by the following transportation goals, objectives, and strategies.

8.1. Goals and Objectives

Table 7 below displays the goals and of the Ramsey Transportation Plan. These goals represent the city's overall vision for transportation over the next 20 years. The strategies listed in the following section provide guidance that the city can use to reach the transportation objectives.

Table 7: Transportation Plan Goals and Objectives [placeholder for Goals and Objectives]

Goals	Objectives
1. Facilitate efficient movement of people within and through the city	1.1. Improve local roadway system connectivity to county roadways and state highways.
	1.2. Provide safe and efficient routes for emergency and public safety vehicles.
	1.3. Provide adequate capacity to relieve congestion.
	1.4. Encourage sound access management.
	1.5. Preserve necessary rights-of-way for the 20-year planning horizon and beyond.
2. Facilitate efficient movements of goods within and through the city	2.1. Maintain a safe and effective network of roadways for freight movement.
	2.2. Coordinate with MnDOT and Anoka County to proactively address freight safety.
3. Provide a transportation system that is integrated with land use and development	3.1. Coordinate transportation system investments with the City of Ramsey Land Use Plan.
	3.2. Connect land use districts and provide safe access to major activity areas.
	3.3. Design, construct, and maintain roadways that fit the character of the adjacent land use (rural vs. urban development areas).
	3.4. Require private residential streets be designed to city standards.
4. Improve transportation safety for all users and modes of transportation	4.1. Implement safety improvements to address high crash locations.
	4.2. Proactively address bicycle and pedestrian safety concerns along roadways and at crossings.

	4.3. Bring sidewalks, trails, and intersections into compliance with ADA.
	4.4. Support traffic calming and design to minimize speed on minor city collectors and local roadways.
5. Develop a safe and convenient multimodal transportation system	5.1. Invest in multi-modal transportation solutions including bicycle and pedestrian infrastructure.
	5.2 Consider a "complete streets" approach to designing and constructing roadways in high pedestrian and bicycle traffic corridors.
	5.2. Preserve adequate right of way for sidewalk and trail construction.
6. Conserve and enhance environmental resources	6.1. Support investments in bicycle, pedestrian, and transit infrastructure to reduce environmental impacts of transportation.
	6.2. Manage storm water effectively and minimize the construction of new impervious surfaces.
	6.3. Support native plant landscapes along roadways.
	6.4. Design new roadways to preserve natural features.
7. Maintain the Existing Transportation System	7.1. Regularly assess transportation maintenance needs and include roadway, trail pavement, and other transportation infrastructure maintenance in the City of Ramsey Capital Improvement Program.

8.2. Multimodal Strategies

The multimodal strategies listed in this section are specific, actionable steps that the city can take in support of the goals of this Plan. These strategies are based upon existing and future transportation needs as described in detail in the previous sections of this Plan.

Each strategy is tied to one or multiple goals; however, not all goals are associated with a specific strategy. In these cases, the city's goals apply across individual projects, and the city will identify opportunities to achieve them throughout its existing project and policy development processes. **Table 8** on the following pages describes each strategy, notes which goal(s) is/are related to each strategy [placeholder for Table 8 goals column], and identifies the lead agency for the strategy. **Figures 12–13** following the tables illustrate the location-specific strategies geographically.

Table 8: Transportation Implementation Strategies

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
CR 63/TH 47/179th Avenue NW (CR 27 from CSAH 83 to Roanoke Street NW	Corridor Study	Conduct a multimodal safety/operations corridor study to evaluate potential elimination of intersection jog at Green Valley Road NW/County Road 5/175th Avenue NW. Also evaluate overall safety operations along entire corridor to evaluate speed, shoulder adequacy, signing, bicycling and pedestrian safety, traffic enforcement etc.	Figure 12	Anoka County/ City of Ramsey	
East/West Collector between CR 63 (Green Valley Road) and Bunker Lake Boulevard (CSAH 116)	Corridor Study	Conduct a multimodal corridor feasibility study to evaluate purpose and need and potential alignment alternatives for a new east/west collector roadway connecting Armstrong Boulevard (CSAH 83) to TH 47.	Figure 12	City of Ramsey	
Rum River Crossing	River Crossing Study	Conduct a feasibility study to evaluate purpose and need and potential alignment alternatives for a new Rum River bridge crossing connecting the City of Ramsey to the City of Andover somewhere between CR 27 and Bunker Lake Boulevard (CSAH 116)	Figure 12	City of Ramsey/ City of Andover	

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
Mississippi River Crossing	River Crossing Study	Conduct a feasibility study to evaluate purpose and need and potential alignment alternatives for a new Mississippi River crossing connecting the City of Ramsey to the City of Dayton	Figure 12	City of Ramsey/ City of Dayton/ Anoka County/ Hennepin County	
Bunker Lake Boulevard (CSAH 116) and Puma Street NW from Alpine Drive to CSAH 7	Corridor Study	Conduct a multimodal corridor study to evaluate safety, operations, and capacity deficiencies. As part of this study, the segment between Ramsey Boulevard (CSAH 56) and Sunfish Lake Boulevard (CSAH 57) should specifically be considered for a four-lane divided expansion and signals at Sunwood Drive NW	Figure 12	Anoka County/ City of Ramsey	
Armstrong Boulevard (CSAH 83) from Sunwood Drive to 161st Avenue NW	Corridor Study	Conduct a multimodal corridor study to evaluate safety, operations, and capacity deficiencies. As part of this study, a four-way stop or other intersection control options should be considered at Alpine Drive and updates/enhancements to the pedestrian crossing and associated signage will be considered at 161st Avenue NW.	Figure 12	Anoka County/ City of Ramsey	

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
TH 47 from north city limits to south city limits	Corridor Study	Conduct a multimodal corridor study to evaluate safety, operations, and capacity deficiencies.	Figure 12	MnDOT/ City of Ramsey	
TH 10/Ramsey Boulevard (CSAH 56)	Interchange and Railroad Grade Separation	Construct full access grade-separated interchange including railroad grade separation of BNSF mainline railroad per Highway 10 Access Planning Study Report (September 2014) and Metropolitan Council Principal Arteria Intersection Conversion Study (January 2017) – "low priority" in Metropolitan Council Study	Figure 12	MnDOT/ City of Ramsey/ Anoka County	
TH 10/ Sunfish Lake Boulevard (CSAH 57)	Interchange and Railroad Grade Separation	Construct full access grade-separated interchange including railroad grade separation of BNSF mainline railroad per Highway 10 Access Planning Study Report (September 2014) and Metropolitan Council Principal Arterial Intersection Conversion Study (January 2017) – "high priority" in Metropolitan Council Study	Figure 12	MnDOT/ City of Ramsey/ Anoka County	

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
TH 10	Frontage Roads	Construct north and south frontage roads through the City of Ramsey consistent with the Highway 10 Access Planning Study Report (September 2014)	Figure 12	City of Ramsey/ MnDOT/ Anoka County	
Alpine Drive and Armstrong Boulevard (CSAH 83)	Intersection Control	Explore need for intersection control and/or geometric improvements	Figure 12	City of Ramsey	
Sunfish Lake Blvd/157th Lane and Nowthen Boulevard	Safety/ Operations	Evaluate intersection for potential left-turn lane or other geometric improvements	Figure 12	City of Ramsey	
Bunker Lake Boulevard (CSAH 116)	Freight – Intelligent Transportation Systems (ITS)	Evaluate feasibility of installing advanced warning system to notify drivers of approaching trains along BNSF mainline to allow drivers time to consider alternate routes	Figure 12	Anoka County/City of Ramsey	
TH 10/Tungsten Street NW	Freight – Truck Ingress and Egress	Coordinate with MnDOT to explore solution to truck ingress/egress	Figure 12	City of Ramsey/MnDOT	

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
Ramsey Northstar Station	Transit Improvement	Consider long-term improvement of circulator shuttle bus service by Anoka Commute Solutions between Anoka businesses and the Ramsey Northstar Station	Figure 13	Anoka County/ Metro Transit	
Ramsey Northstar Station	Transit Improvement	Consider long-term improvement of adding shuttle bus service between Anoka Techncial College and the Ramsey Northstar Station	Figure 13	Anoka County/ Metro Transit	
COR Area	Transit-Oriented Development	Continue to implement urban design and land use policies (including the Design Framework for the COR) supportive of transit use within the COR area, including compacted, mixed use development patterns and convenient multimodal connections to Ramsey Northstar Station	Figure 13	City of Ramsey	
TH 10/Ramsey Northstar Station	Bicycle and Pedestrian Bridge	Construct Trunk Highway 10 pedestrian bridge extension of existing Ramsey Northstar Station pedestrian bridge between Ramsey Boulevard (CSAH 56) and Armstrong Boulevard (CSAH 83) consistent with the Mississippi Skyway Preliminary Engineering Report (December 2014)	Figure 13	City of Ramsey/MnDOT	

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
Rum River Regional Trail Corridor	Bicycle and Pedestrian Improvements	Construct trail between Ramsey–Anoka border and Ramsey–Oak Grove border as opportunities arise	Figure 13	Anoka County	
Mississippi River Regional Trail Corridor	Bicycle and Pedestrian Improvements	Construct final trail alignment along river as opportunities arise. Designate as Tier 1 RBTN alignment.	Figure 13	Anoka County/ City of Ramsey	
Central Anoka Regional Trail Corridor	Bicycle and Pedestrian Improvements	Realign regional trail along Bunker Lake Blvd. and E. Town Center Dr. through COR and over Mississippi Skyway to Mississippi West Regional Park	Figure 13	Anoka County	
Various Locations	Bicycle and Pedestrian Improvements	Sidewalks shall be installed with any street reconstruction project occurring within the City's urban service area		City of Ramsey	

Location	Type of Improvement	Strategy	Map Reference	Lead Agency(ies)	Goal(s)
Various Locations	Bicycle and Pedestrian Improvements	Continue to proactively pursue opportunities to make off-road multiuse trails and on-road bicycle lane and wide shoulder network connections to existing trails, schools, parks, commercial nodes, and residential areas		City of Ramsey	
Various Locations	Bicycle and Pedestrian Safety	Evaluate intersections for potential safety improvements such as intersection controls, crosswalks, etc.		City of Ramsey	
Various locations	Bicycle and Pedestrian Maintenance	Continue to monitor and maintain bicycle and pedestrian facilities to provide safe and convenient conditions for users		City of Ramsey/ Anoka County	

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Ramsey Comprehensive Plan
Figure 12: Roadway and Freight Strategies
Ramsey, MN

Additional east-west connection between Green Valley Rd. and Bunker Lake Blvd.

Possible Rum River Crossing

Truck Ingress and Egress at Tungsten

Eagle Brook Impacts on Tungsten

- Intersection Realignment
- Potential Intersection Improvements
- Existing Interchange
- Proposed Interchange
- Proposed Railroad Grade Separation
- Proposed RCUT Intersection
- Possible River Crossing (Long Term)
- Potential Capacity & Safety Improvements
- Proposed Connection
- Proposed Frontage Road
- Ramsey Boundary
- Parcel Boundary

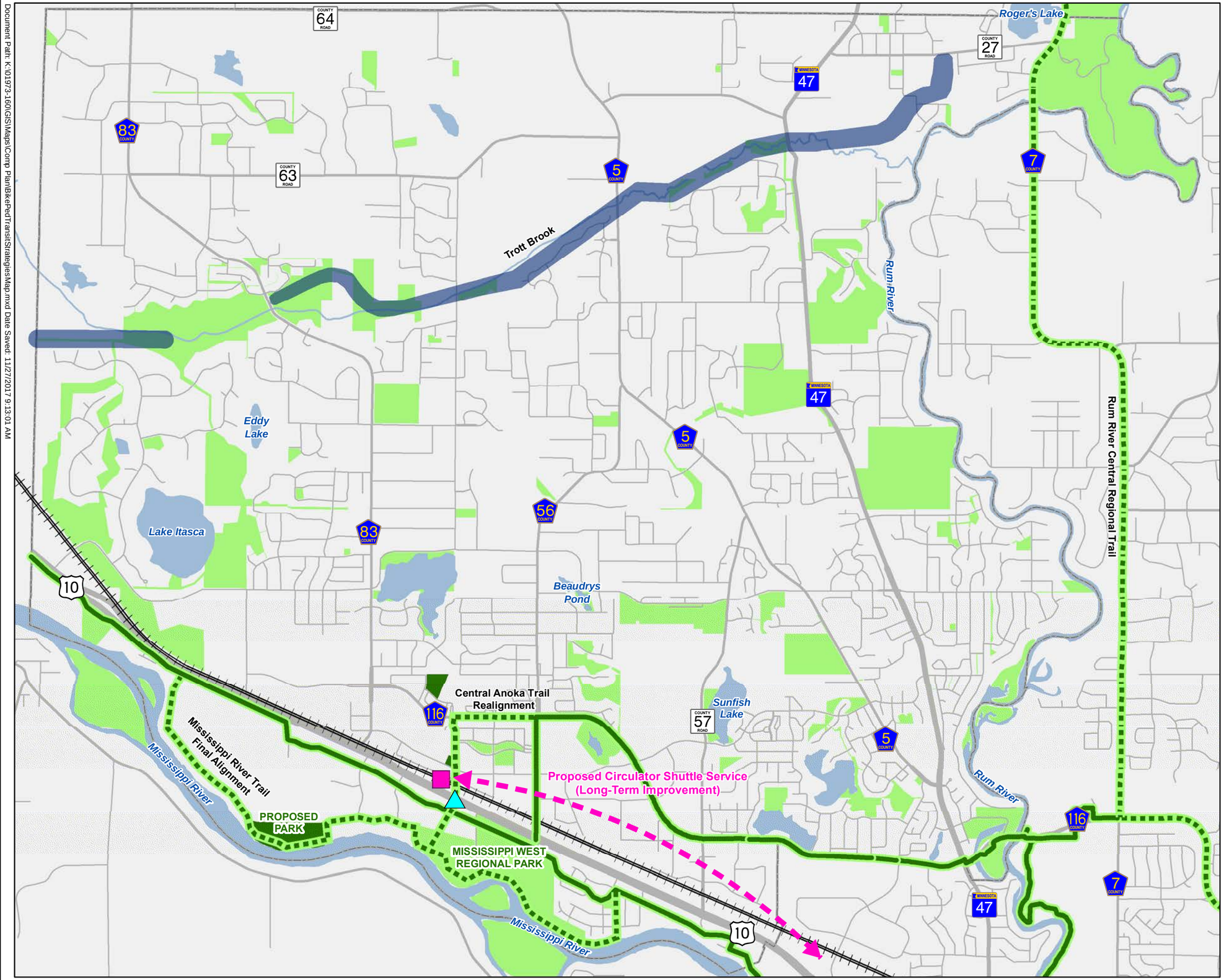
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City of RAMSEY

Ramsey Comprehensive Plan
Figure 13: Proposed Non-Motorized and Transit Strategies
Ramsey, MN



- Northstar Commuter Rail
- Northstar Station
- Proposed Pedestrian Overpass

Regional Trails

- Existing
- Planned
- Trott Brook Trail Corridor
- Existing Parks and Open Space
- Proposed Park
- Ramsey Boundary

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9. Proposed Short and Long Range Roadway Projects

The sections below identify proposed short and long range roadway projects identified in the city's CIP and based on the proposed land use and redevelopment activities described in previous sections of this Plan. This section does not include information on proposed projects from the Metropolitan Council 2040 TPP, as the TPP does not include any planned improvements to principal arterials in Ramsey (aside from the completed interchange at TH 10 and Armstrong Boulevard (CSAH 83). No additional interchanges, MnPASS lanes, dedicated busways, or bus-only shoulders are proposed in the Current Revenue Scenario of the 2040 TPP.

9.1.1. Proposed Projects from CIPs

The city's CIP identifies a number of roadway projects. These projects are primarily reconstruction and overlay projects intended to improve and maintain the roadway surface. However, there are also several projects that will extend or expand the operational capacity of the roadway network within the COR area, including improvements along Zeolite Street and Bunker Lake Boulevard. A number of projects identified in the Highway 10 Access Planning Study are also included in the CIP, including extension of Riverdale Drive, construction of a BNSF railroad underpass on Ramsey Boulevard, construction of north and south frontage roads along TH 10. Other road improvement projects included in the CIP include projects for striping, lighting, and landscaping.

There are also a number of non-motorized transportation projects identified in the city's CIP. These include completion of the off-road Mississippi River Regional Trail within the city, construction of a trail connection to McKinley Street in the City of Anoka, a number of other high-priority trail connections, and a pedestrian underpass at Alpine Drive.

9.1.2. Proposed Projects based on Land Use and Development

Transportation needs in the city will shift as development occurs. Narrow rural roadways may no longer be suitable in certain areas. Additionally, there may be areas where development occurs and requires new connecting roadways to ensure that roadways and intersections can accommodate additional traffic volumes. Similarly, areas with new development may require non-motorized transportation facilities to provide safe access to the transportation system for pedestrians and bicyclists. Consideration of roadway modifications, intersection traffic control improvements, and non-motorized facilities will continue as individual proposals for development move forward.

10. Public Comments

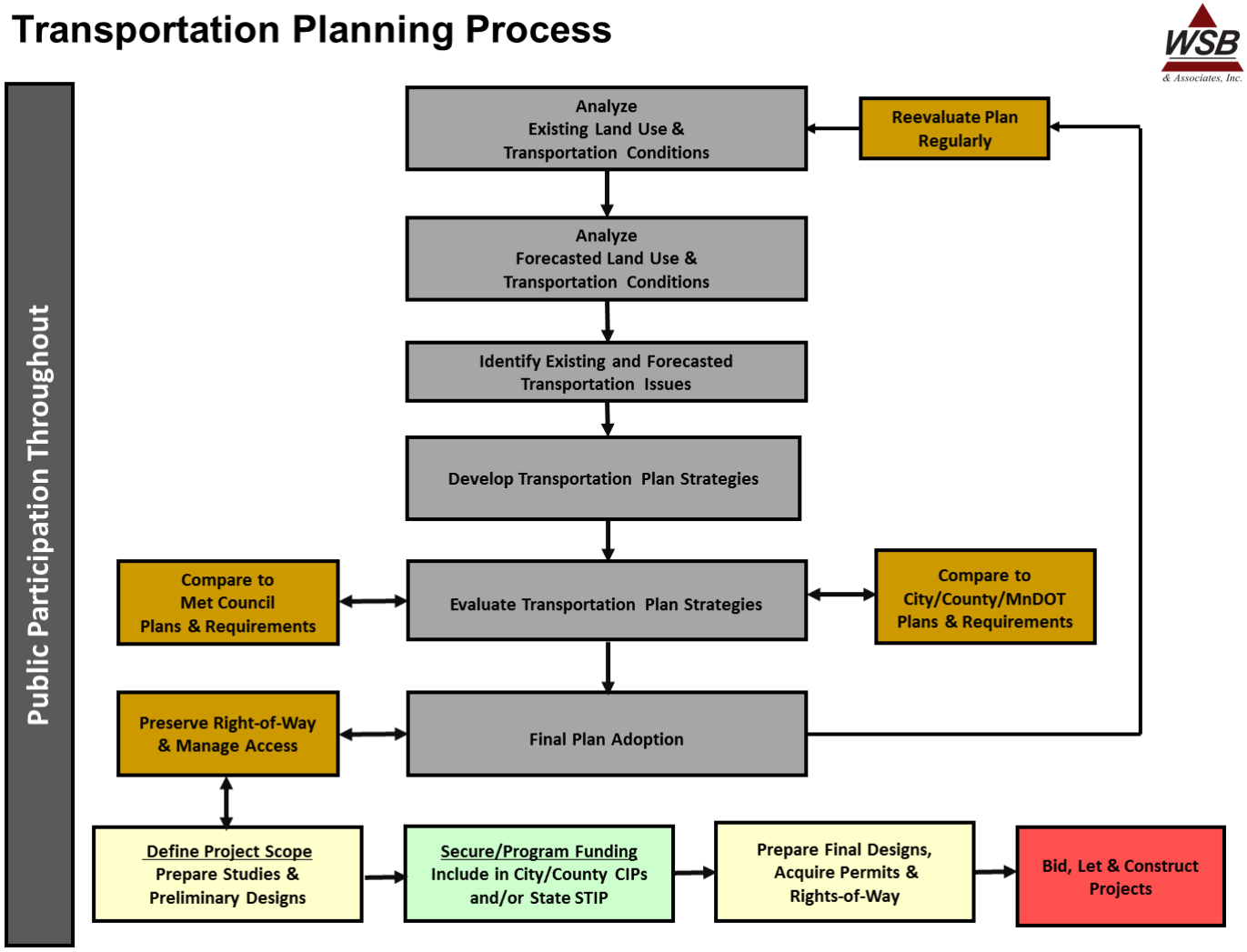
The city held a workshop to gather public input on the transportation plan. At this workshop, members of the public identified issues and opportunities related to transportation as well was parks, trails, and recreation. A wide range of topics was raised, including roadway speeds, pedestrian safety, congestion, enforcement of speeding/stop signs, general support for trails, support for additional river crossings, and a request for a new east/west road connection in the community. These comments were compiled and used to inform the strategies identified in **Table 8**.

11. Conclusion and Next Steps

The purpose of this Transportation Plan is to set a multimodal transportation vision for the City of Ramsey through the year 2040. Goals and specific strategies have been identified collaboratively by the city, Anoka County, MnDOT, and members of the public within the framework of Metropolitan Council requirements. The vision and associated strategies outlined in this Plan were established by considering existing and forecasted conditions, City of Ramsey priorities, regional travel patterns and a variety of other factors.

As the owners of the transportation network in Ramsey (i.e. City of Ramsey, Anoka County, MnDOT, Metro Transit, and the BNSF railway) advance their respective Capital Improvement Programs (CIPs), this Plan is intended to serve as an important resource and reference in establishing priorities and advancing transportation projects for implementation. Advancing these projects from a planning to implementation phase will require collaborative discussions among facility owners, adjacent communities, the Metropolitan Council, residents and others to conduct traffic studies, finalize designs, preserve rights-of-way, obtain environmental clearances and leverage necessary financial resources. **Figure 14** on the following page outlines the entire planning and project development process required for transportation projects from concept plans to construction implementation.

Figure 14
Transportation Planning Process



City of Ramsey 2040 Comprehensive Plan Update

Economic Development Plan

Background on this Document

This document is a draft of the narrative to be used in the 2040 Comprehensive Plan Update. This is not a final version or actual layout. This document will be reviewed and revised multiple times. The City will try to add additional maps and figures to better tell the story of this vision.

Ramsey's Long Range Imperatives

Four key themes have emerged as part of this Comprehensive Plan Update that transcend each section our Vision. Each Initiative, Tactic, and Policy should relate to one of these four Imperatives.

1. Rural Character and Urban Growth Balance
2. An Active Community (Parks, Recreation, and Open Space)
3. A Connected Community (Transportation)
4. A Positive Learning Environment



Economic Development Initiatives

1. Maintain and Expand our Employment Base
2. Increase and Construct Retail Options for Residents and Businesses
3. Improve Highway 10
4. Complete Built-Out of The COR according to the approved Development Plan.

5. Improve the Image of Ramsey and its Neighborhoods, Business Districts, and Key Corridors
6. Create a Robust Offering of Recreational Opportunities that benefit Businesses.









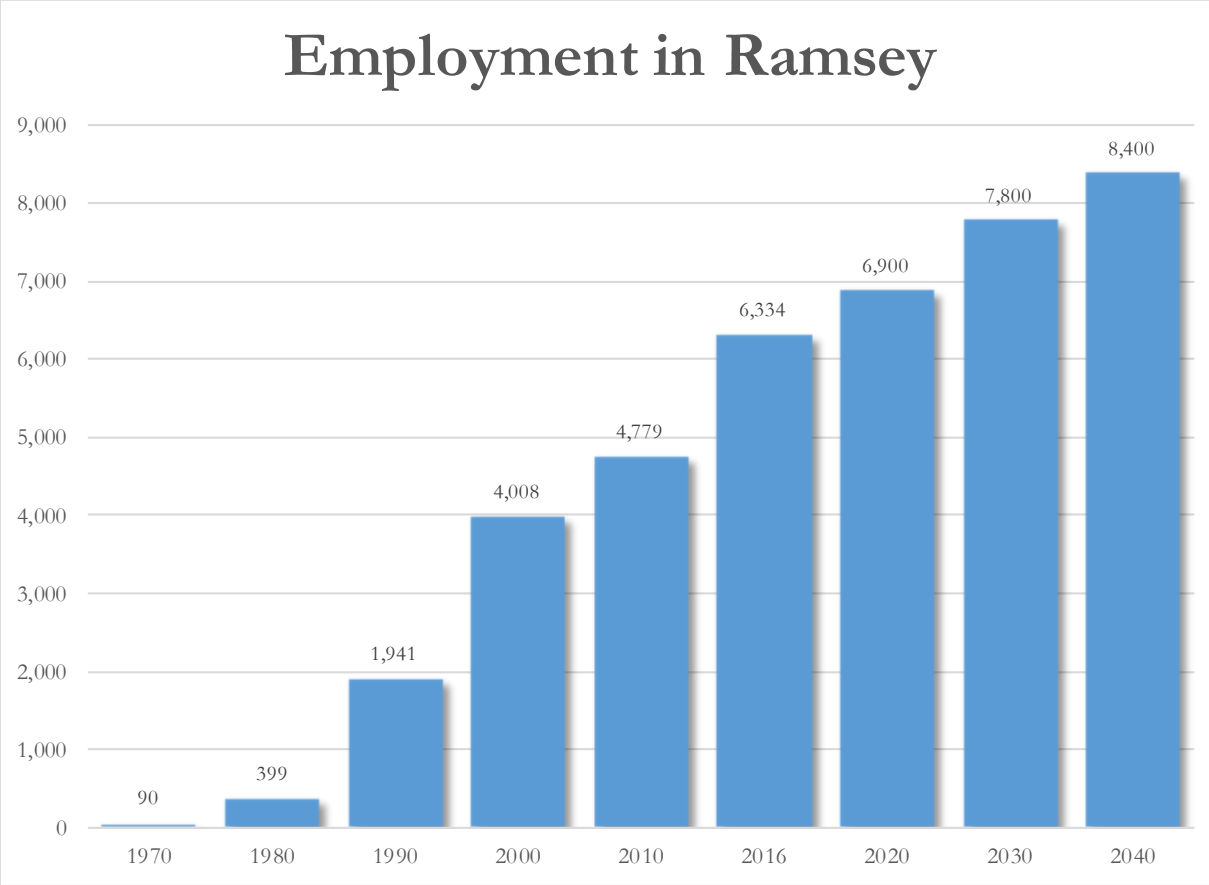




Economic Development Outlook

Ramsey has an estimated employment base of 6,334 employees working in Ramsey and approximately 634 acres of industrial land.

Figure 1: Employment Forecasts



Source: U.S. Census Decennial Survey, U.S. Census American Communities Survey, Metropolitan Council Forecasts

Industrial Development

Existing Industrial Conditions

Ramsey/Anoka Industrial Park.

Ramsey's existing industrial park area borders another large industrial park in the City of Anoka. Highlights of the combined industrial park area are below.

- Approximately 1,000 acres
- Approximately 15,000 jobs
- Hundreds of businesses, with a high concentration of manufacturing

Future Industrial Opportunities

Employment growth is expected to continue to grow through 2040. The current estimated employment within Ramsey is 6,334 jobs. The number is expected to grow 8,100 jobs in the year 2040.

Ramsey has been fortunate to be extremely successful in both greenfield development and redevelopment. Ramsey's supply of industrial land guided by the 2030 Comprehensive Plan is extremely low. In response, Ramsey amended its 2030 Comprehensive Plan to guide an additional 115 acres for future employment growth.

Highlights of existing employment growth opportunities include, but are not limited to the following.

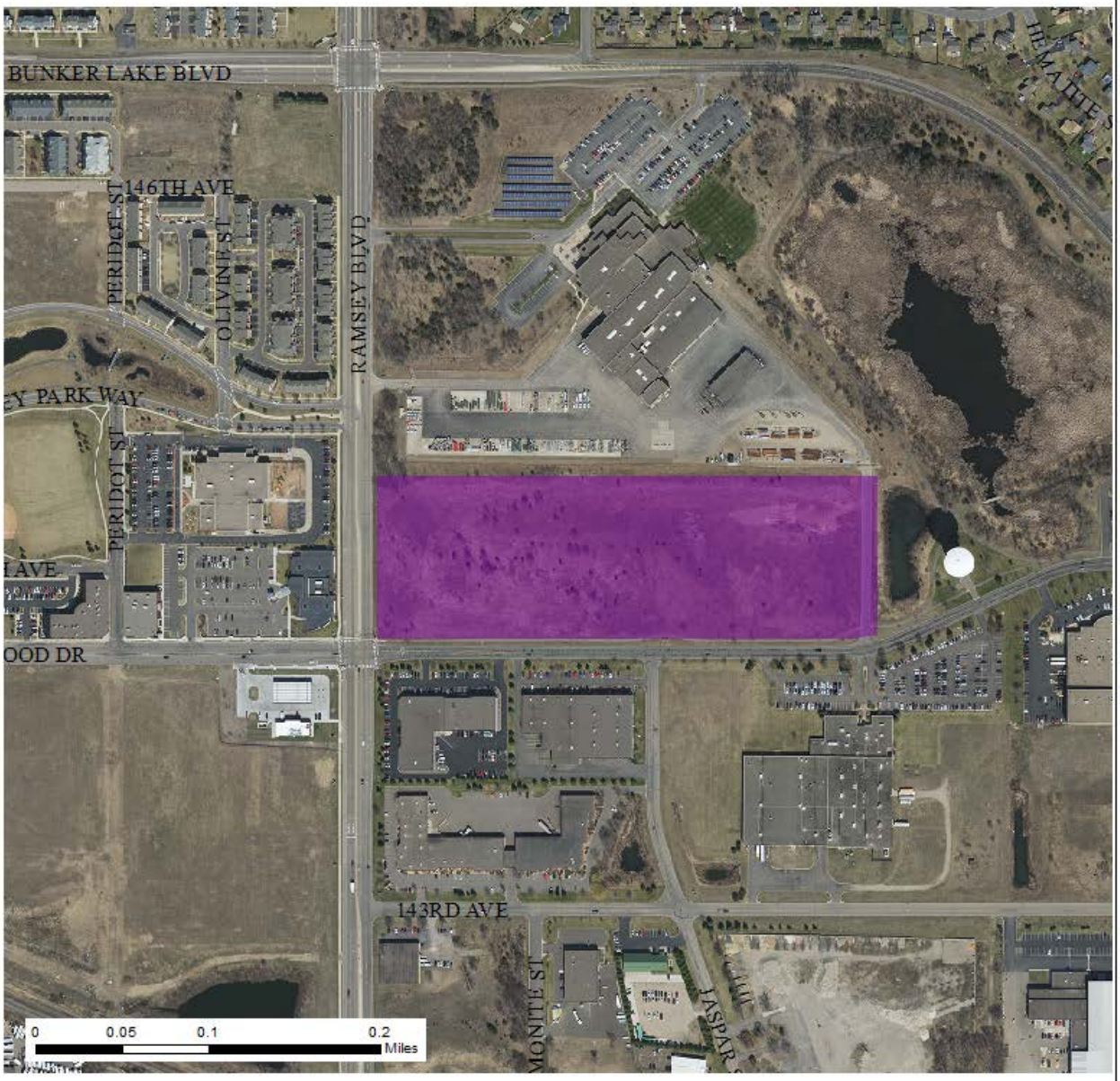
- AEC Energy Park (15 Acres)
- Bunker Lake Industrial Park (140 Acres)
- Highway 10 Business Park (150 Acres)
- Jaspar Industrial Park (9 Acres)



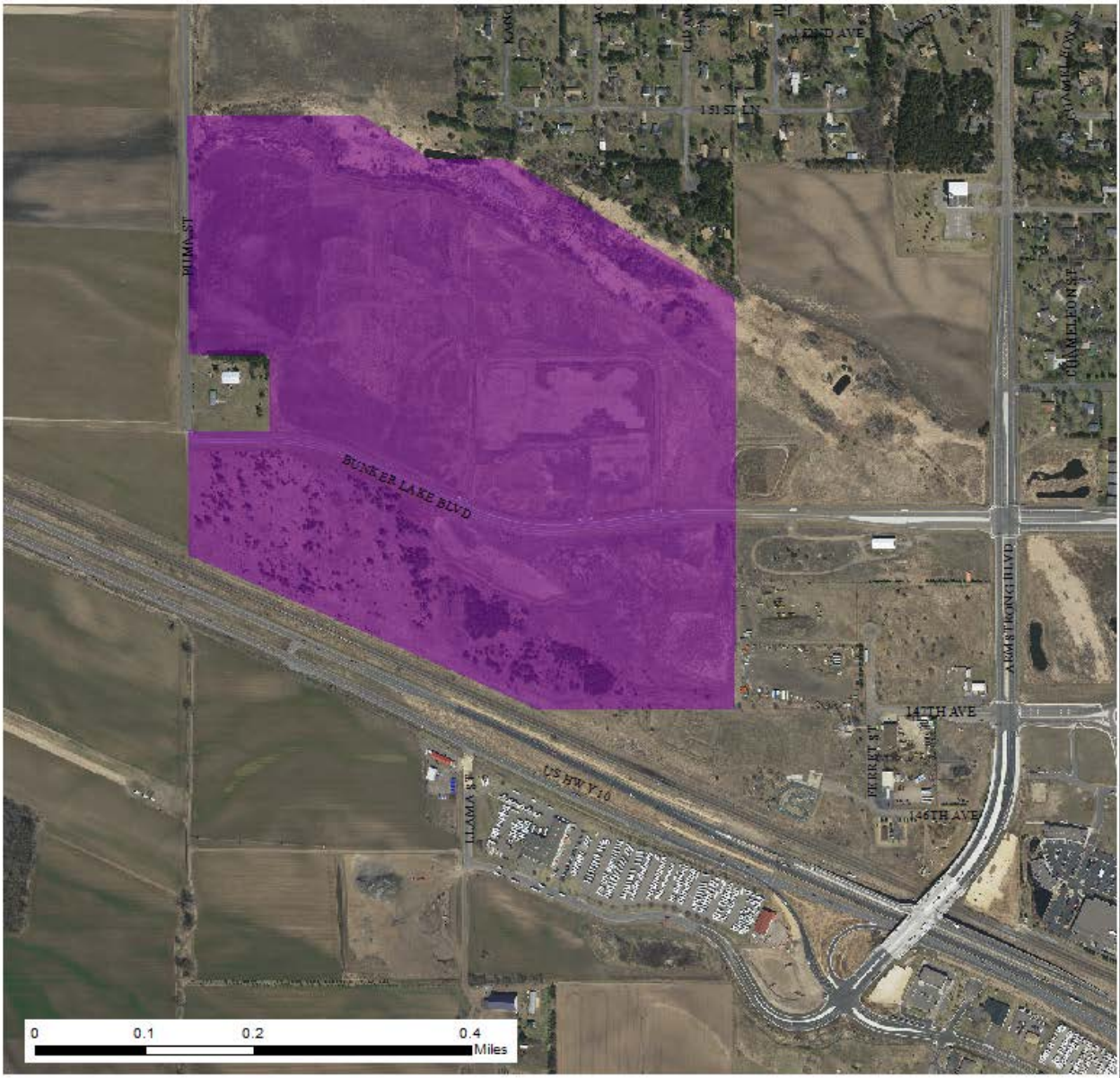


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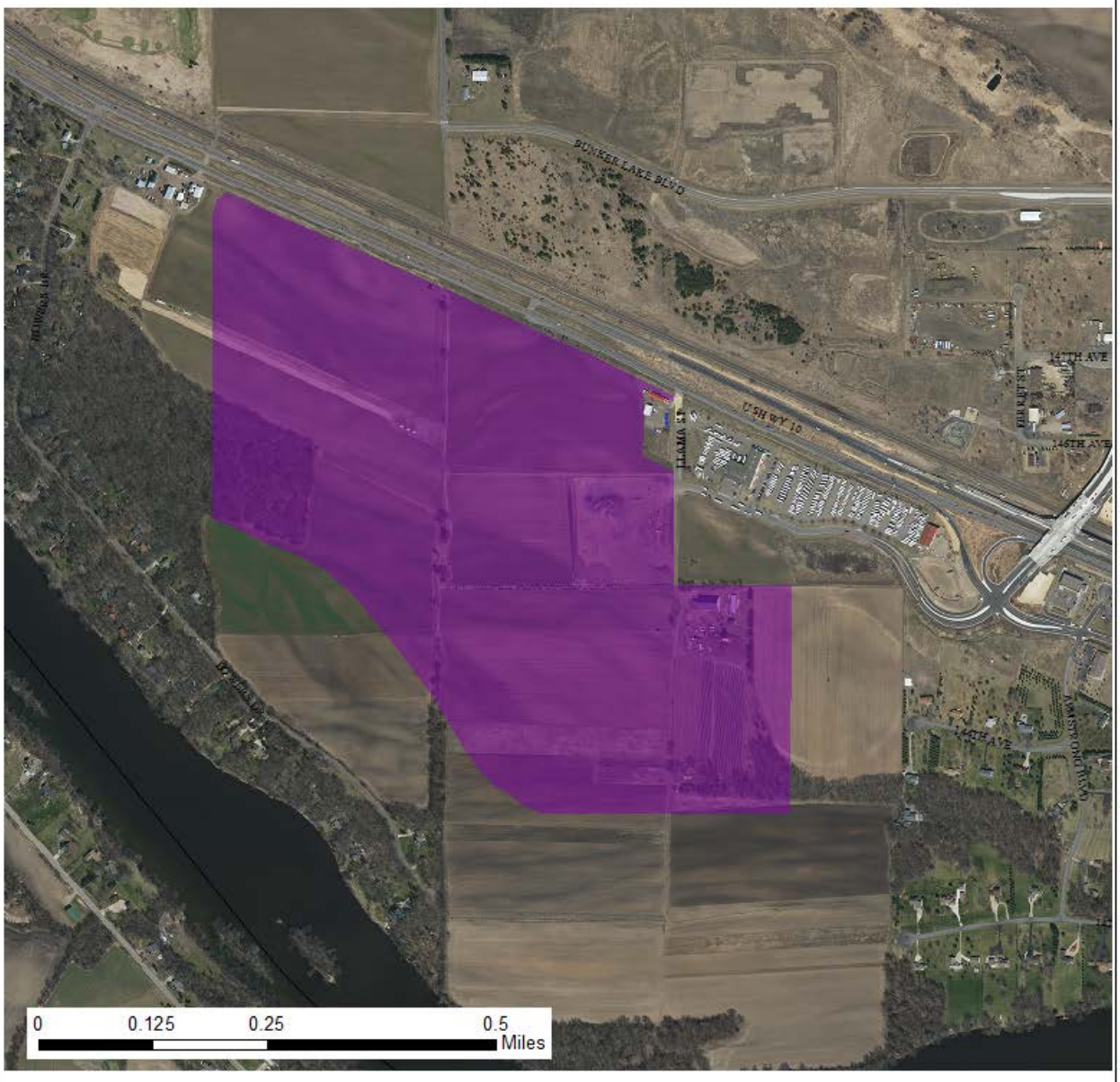
Future Industrial Opportunities



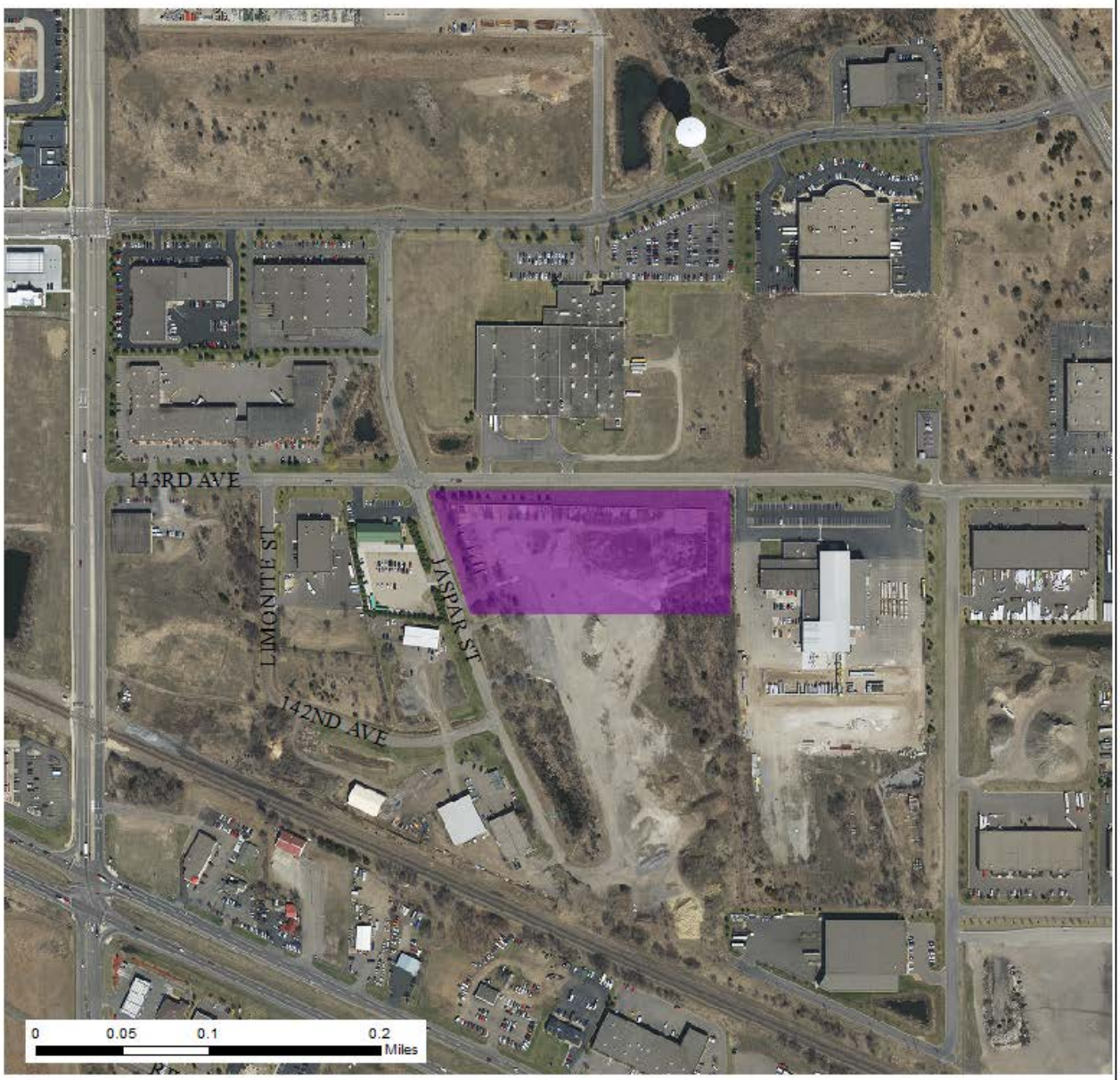
Future Industrial Opportunities



Future Industrial Opportunities



Future Industrial Opportunities



Retail Development

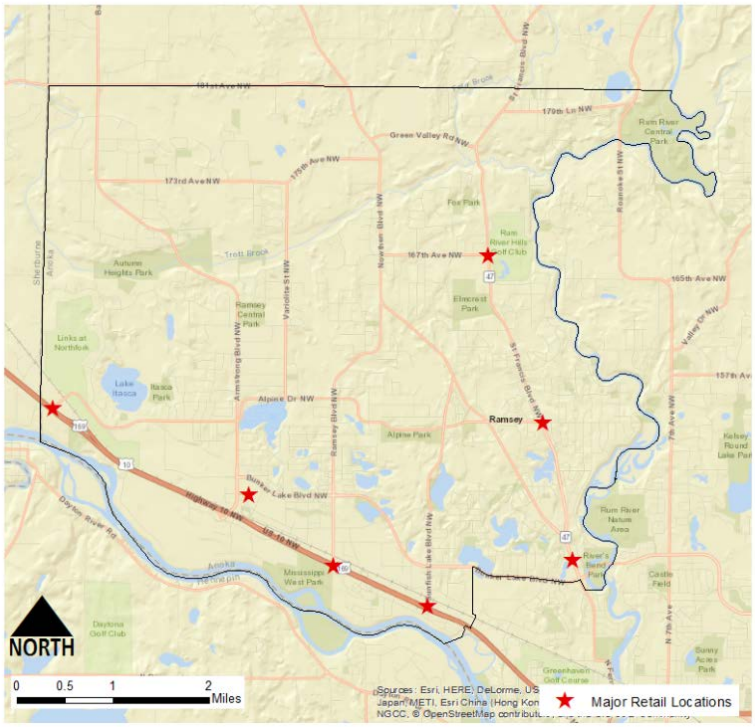
Existing Retail

Primary retail nodes are indicated on the map below. The City has approximately 125 acres of developable land available for development of new retail opportunities.

Market Conditions in Ramsey

Ramsey's Market Area for retail growth has a positive outlook, but is constrained by several factors. While the Mississippi River and Rum River are some of Ramsey's primary assets, they do constrain Ramsey's Retail Market Area, as these physical barriers restrict access for many in close proximity.

Retail Opportunities





Future Retail Opportunities

The COR

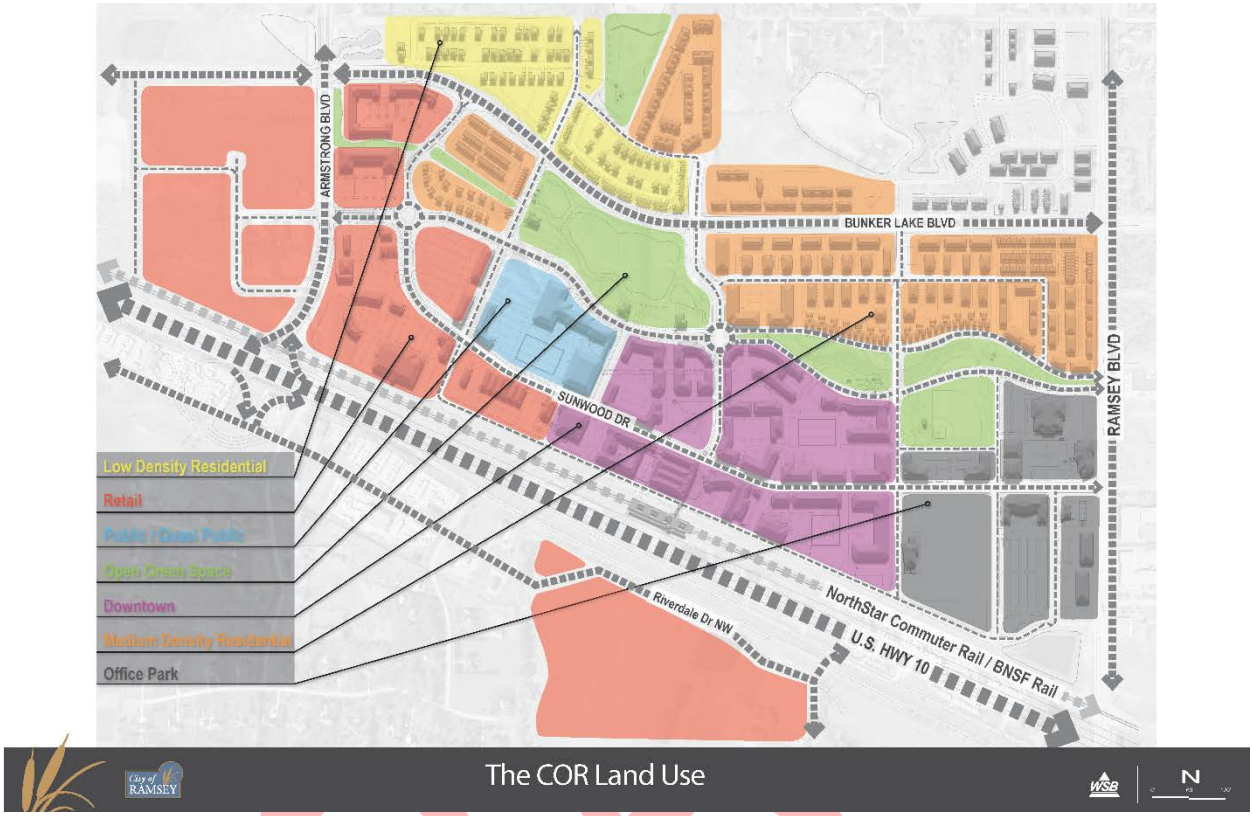
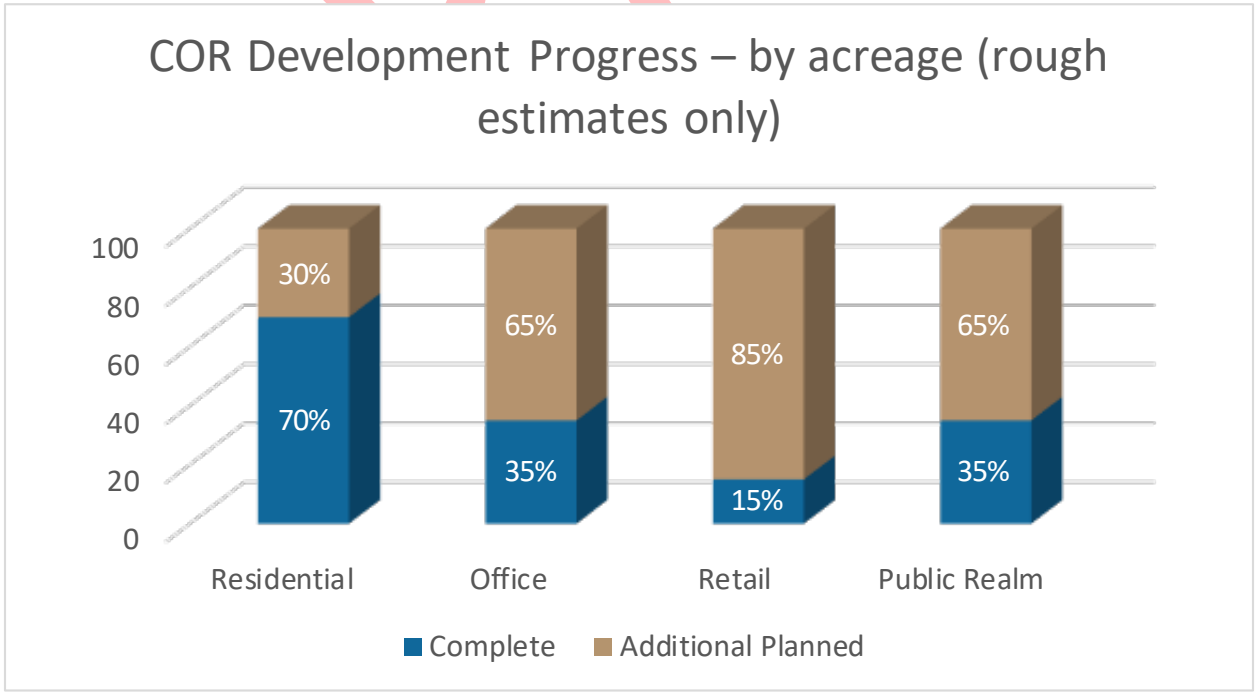


Table 1: Planned Growth in The COR



Rum River Hills (167th Avenue/TH 47 Retail Node)

The Rum River Hills Neighborhood is anchored by a small retail node at the intersection of 167th Avenue and Saint Francis Boulevard (T.H. 47). For a number of years, Ramsey has analyzed how to best revitalize this node that has experienced a high rate of vacancy and blight. This node has seen some private reinvestment in recent years. The Rum River Hills Golf Course has also expressed an interest in redeveloping a small portion of their land for residential development.

Rum River Hills Neighborhood Goal

To improve and/or remove blight from the retail node and encourage sustainable market-driven redevelopment that will benefit the entire City of Ramsey.

Rum River Hills Neighborhood Vision

Ramsey's vision for the neighborhood is a mixture of residential and retail uses. Residential users may include single family residential, townhomes, or senior living units as directed by the market. Retail will include a market driven neighborhood commercial node. Redevelopment should include a connection to Elmcrest Park and/or nearby trails where feasible.

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Final Draft Note:

A series of 'Site Profile Maps' will be added here. These 'Site Profile Maps' are similar to the individual site maps in the Industrial section of this Chapter.

- The COR
- South of Highway 10/South of Rail Station
- Highway 10 Corridor
- Bunker Lake Boulevard/TH 47
- Alpine Drive/TH 47
- 167th Avenue/TH 47
- Anoka Border – Highway 10
- Elk River Border – Highway 10

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Economic Development Tools

The City of Ramsey has a number of financial tools available for economic development projects. Below is an overview of the most commonly used economic development tools.

GAP FINANCING:

The City's RLF and the DEED MIF programs are used to fill the financial "gap" of a particular project. A financial gap occurs when private financing and/or owner equity cannot fund an entire project. Commonly, these programs are used to purchase equipment; however, other eligible uses exist. Interest rates and terms are negotiable.

DEED JOB CREATION FUND:

DEED assistance to projects that have capital investment and provide well-paying jobs. Program would allow for a company to receive a 5% rebate on capital expenditures (construction costs, materials etc.) up to $500,000. In addition, this program allows for up to $500,000 in job creation rebates based upon jobs created and their salary levels.

PROPERTY TAX PROGRAMS:

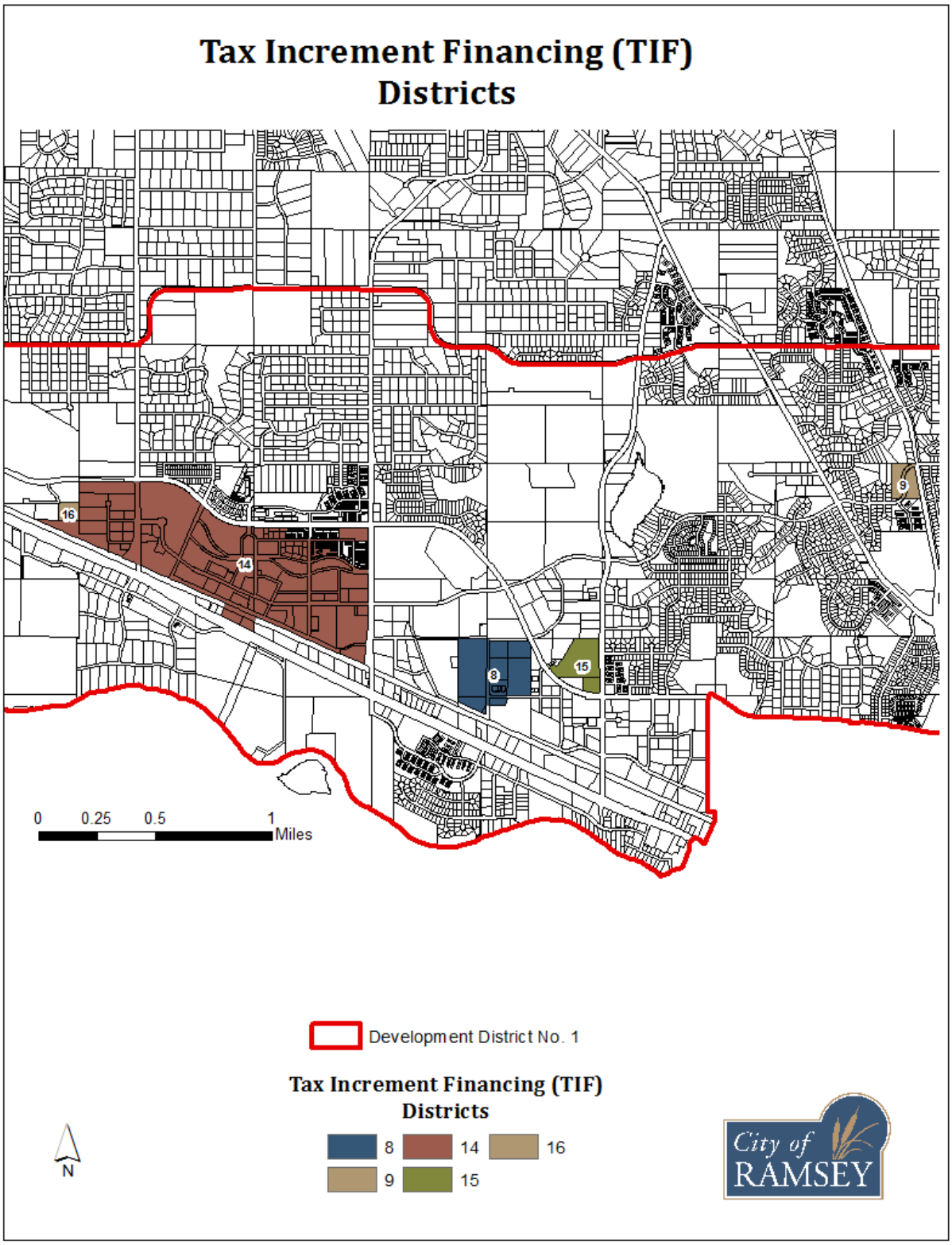
Tax abatement and TIF are local tax programs typically used for public infrastructure or land acquisition costs. In general, both programs work by capturing property taxes generated by a particular parcel then dedicating said tax revenue for a specific project cost.

Eligibility for financing tools based on the merit of an individual project, compliance with specific program requirements and in many cases approval from the Ramsey EDA and City Council. The City of Ramsey targets quality projects with high quality job growth. Typically, projects require owner equity and/or private financing. Most programs require specific job creation goals and annual reporting.

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Tax Increment Financing

Figure 2: Tax Increment Financing District



Economic Development Implementation

The Metropolitan Council's Regional Development Framework, ThriveMSP 2040, outlines roles for the Metropolitan Council and Ramsey for land use policy. Specific to land use policy, the Metropolitan Council has set a goal for the region to achieve Economic Competitiveness.

Ramsey Role	Metropolitan Council Role
• Consider how local efforts to focus economic development strategies along existing commercial centers (historic downtowns or commercial corridors) can contribute to the region's overall economic competitiveness through enhanced integration of local and regional planning efforts. • Protect sites for highway-, river- and rail-dependent manufacturing and freight transportation needs from incompatible uses and identify local land supply and transportation needs for effective use of those sites. • Identify important multimodal intersections, alternative freight routes, key intersections, and other existing opportunities that may contribute to local and regional economic competitiveness.	• Invest in regional amenities and services, including transit, regional parks and trails, and bikeways to support the Emerging Suburban Edge area as an attractive place to locate and do business. • Promote local planning around key intersections, regional infrastructure, and business needs. • Support the development of workforce housing to provide nearby housing options for employees of local employers. • Convene interested partners to further strategies towards increasing regional competitiveness and include discussion of how Emerging Suburban Edge communities can contribute to the region's overall economic growth.

Economic Development Tactics

- Maintain and Expand our Employment Base
  - Continue our Business Retention and Expansion Efforts.
  - Build Out the Bunker Lake Industrial Base.
  - Plan for the Highway 10 Business Park (next Business Park after Bunker Lake Industrial Park).
  - Make sites shovel ready.
  - Provide incentives to achieve our economic development goals.
  - Be flexible with zoning.
- Increase Retail Options for Residents and Businesses
  - Continue and Expand Current Marketing and Recruitment Efforts for New Retailers.
  - Improve Access and Visibility for Retailers from Key Corridors.
  - Consider free land and incentives.
  - Directly recruit businesses.
  - Execute a marketing campaign to draw businesses.
  - Coordinate with existing efforts (Anoka County, DEED, Chambers of Commerce, etc.)
- Improve Highway 10
  - Establish a Stakeholder Group for Highway 10.
  - Improve Traffic Conditions (Complete Highway 10 Traffic Plan).
  - Create a sustainable funding plan for right-of-way acquisition and construction.

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    - Remove Blight and Public Nuisances (Complete Highway 10 Land Use Plan).
- Complete Built-Out of The COR according to the approved Development Plan.
    - Complete the Development Plan Update.
    - Continue Current Recruitment Efforts.
- Improve the Image of Ramsey and its Neighborhoods, Business Districts, and Key Corridors
    - Improve signage.
    - Grade separate rail crossings to eliminate physical barriers.
    - Remove Blight and Public Nuisances at the Rum River Hills Node.
    - Remove Blight and Public Nuisances at the Highway 47 Corridor.
    - Improve Relationships Communitywide to Remove Blight and Public Nuisances.
- Create a Robust Offering of Recreational Opportunities that benefit Businesses.

Ongoing Policies

- Organization should be business-friendly (City Council, Advisory Boards, Staff)

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City of Ramsey 2040 Comprehensive Plan Update

Housing Plan

Background on this Document

This document is a draft of the narrative to be used in the 2040 Comprehensive Plan Update. This is not a final version or actual layout. This document will be reviewed and revised multiple times. The City will try to add additional maps and figures to better tell the story of this vision.

Our Mission

It is our mission to work together to responsibly grow our community, and to provide quality, cost-effective, and efficient government services.

Our Vision

Ramsey will evolve through citizen-driven, collaborative processes that respect the balance and connectivity between its unique urban, rural, and natural environment for current and future generations.

Imperatives

- A Balance of Rural Character and Urban Growth
- A Connected Community
- An Active Community
- A Positive Learning Environment

What We Heard

Through the City of Ramsey's Open Houses, Workshops, and updates to the Planning Commission and City Council regarding the 2040 Comprehensive Plan Update, as well as working directly with the Housing Committee, the City of Ramsey has created the following vision statement:

> "We envision a community with a variety of housing options, with options for residents of all socioeconomic statuses, races, income levels, preferences, and ages. We envision a community where residents can age in place, but also one where young families want to live. Our community provides homes with rural character, homes for those who prefer a more urban environment, and amenities for homeowners and renters."

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Imperative: A Balance of Rural Character and Urban Growth

Initiative 1: Rehabilitate and Improve Housing Stock to Preserve Rural Character and Enhance Existing Neighborhoods

Initiative 2: Provide Sufficient Housing Options for all Types of Residents; Provide Lifecycle Housing Options

Initiative 3: Promote Development that Preserves the Natural Environment and Respects Residential Health

Initiative 4: Support Affordable Housing Development

Imperative: A Connected Community

Initiative 1: Ensure that discrimination does not occur against persons seeking housing in Ramsey based on age, religion, race, ethnic origin, sexual preference, gender, status with regard to public assistance, marital or familial status, or disability.

Initiative 2: Ensure that individuals of similar income levels have equal access to Minnesota Housing programs, regardless of race, color, creed, religion, national origin, sex, marital status, status with regard to public assistance, disability, familial status, gender identity, or sexual orientation.

Imperative: An Active Community

Initiative 1: Plan for multi-family and senior residential developments near transit, bicycle routes, trails, sidewalks, etc. in order to reduce building footprints, energy consumption, and reliance on automobiles.

Initiative 2: Ensure new development projects support an active lifestyle.

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Existing Housing Supply

The following tables and figures represent the current context of the City of Ramsey. The data for the following tables, graphics, and narratives were provided by the Metropolitan Council or the American Community Survey 2016 5-Year Estimates. The City of Ramsey had approximately 8,776 units in 2016, as estimated by the American Community Survey 2016 5-Year Estimates. The Metropolitan Council estimated a slightly higher number for housing units in Ramsey – 8,896.

Total Housing Units

According to the American Community Survey (ACS) 2016 5-Year Estimates, the City of Ramsey has 8,776 units. The majority of these, 97 percent, are occupied housing units. Total housing vacancy was approximately 2.6% in 2016. This low vacancy rates shows a demand for existing housing units. Due to movement in and out of units, housing vacancy cannot reach zero percent. 2.6% vacancy is an extremely healthy vacancy rate for the City of Ramsey and is on par with other cities in the region.

Table 2:

Unit Type	**Total Units**
Occupied Housing Units	8,544
Vacant Housing Units	232
Total Housing Units	8,776

Source: ACS 2016 Estimates

Total Existing Affordable Housing Units

Affordable housing is based upon the Area Median Income (AMI) of the region. Half of those in the region earn more than the AMI, and half earn less than the AMI. Housing policies for affordable housing are based upon income thresholds related to this AMI.

In the Twin Cities Metropolitan Region, the U.S. Department of Housing and Urban Development (HUD) has defined the following affordability levels for a family of four.

Table 3:

Affordability Level	**Number of Units**
Affordable at 30% AMI	128
Affordable from 31 – 50% AMI	990
Affordable from 51 – 80% AMI	5,606
Total Affordable Units	6,724

Source: Metropolitan Council Existing Housing Assessment, total housing units 8,896

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Owner vs. Renter Occupied Housing Units

The majority of Ramsey units, around 87%, are owner-occupied housing units. In these owner-occupied housing units, the average household size is approximately 3.01. Renter-occupied housing units are approximately 11% of the total housing units in Ramsey. These renter-occupied housing units have an average household size of approximately 2.58. On average, gross rent in 2016 was $1,313 per month.

Table 1:

Unit Type	**Number of Units**
Renter-Occupied Housing Units	951
Owner-Occupied Housing Units	7,593
Vacant Housing Units	232
Total Housing Units	**8,776**

Source: ACS 2016 Estimates

Unit Type	**Vacancy Rate**
Owned Housing Units	1.5%
Rental Housing Units	0.3%

Source: ACS 2016 Estimates

Housing Types

The vast majority of Ramsey residents, over 80%, live in single family detached housing. While only 4 percent of residents live within multi-family housing, over half of those that do live in a building with 20 or more units. Very few residents live in multi-family buildings with less than 20 units.

Table 5:

Housing Type	**Number of Units**	**Percent of Total**
Single Family Housing Units	**8,462**	**96%**
1-unit, detached	7,169	82%
1-unit, attached	1,293	15%
Multi-Family Housing Units	**314**	**4%**
2 units	0	-
3 to 4 units	13	<1%
5 to 9 units	47	<1%
10 to 20 units	7	<1%
20 or more units	174	2%
Mobile home units	73	<1%
Total Housing Units	**8,776**	

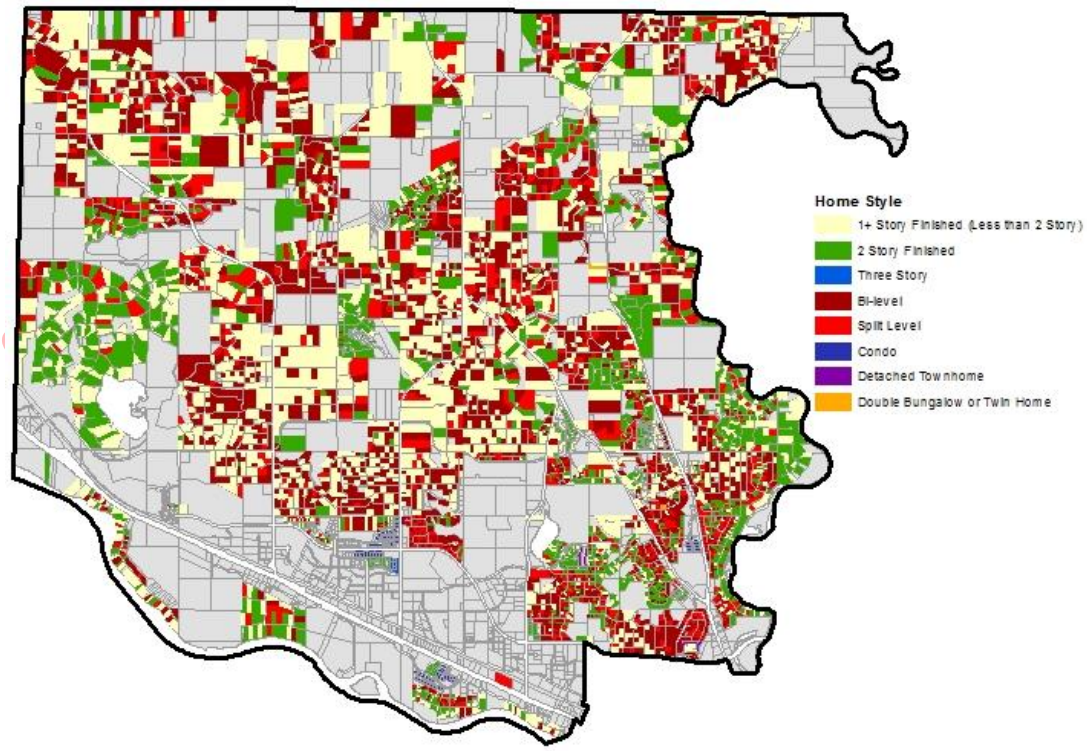
Source: ACS 2016 Estimates

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Single Family Housing Type	Count
One Story +, Less than 2 Story	2,205
2 Story	2,249
3 Story	43
Bi-Level	2,343
Split Level	1,156
Condo	580
Detached Townhome	56
Double Bungalow or Twin Home	3
No Data	576
Total	**8,635**

Source: Metropolitan Council GIS data, 2016

According to the Metropolitan Council data from 2016, the vast majority of homes in Ramsey are detached single family homes – bi-level, one story, or two story. Very few homes in Ramsey are double bungalow, twin homes, or three story homes. The map shows the geographic breakdown of these housing types. Almost all three story homes are near The COR, while one and two story homes are scattered throughout the City.

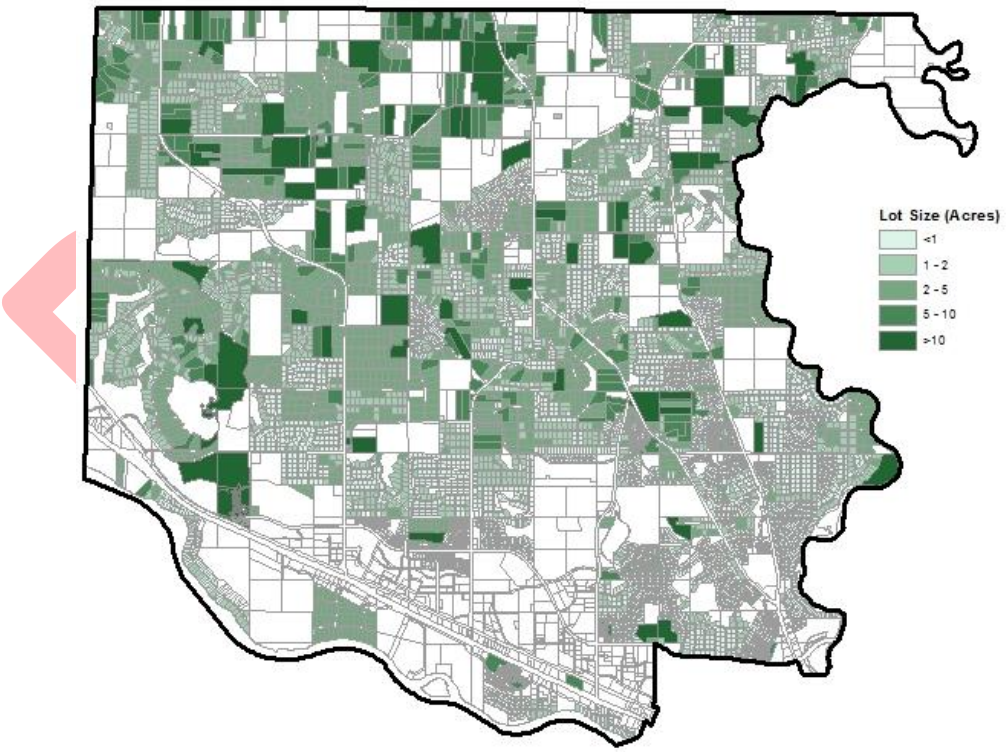


Lot Sizes

Of the residential lots with one unit (detached townhomes, single family homes, etc.), the majority are on lots less than one acre according to 2016 Metropolitan Council data. The map below shows the geographic distribution of different sized single-family residential lots. The larger lots are generally not near The COR, but are instead in the west, north, and northeast portions of the City. Lots in residential subdivisions are generally less than 5 acres, and usually less than 2 acres. Lot sizes tend to increase in the northern portion of the City, and are smaller in the central and southern portions of the City. This shift in lot size reflects the shift from rural character in the north into a more urban growth pattern in the central and southern parts of the City.

Lot Size	**Count**
Less than 1 acre	6,456
1 acre – 2 acre	1,417
2 acre – 5 acre	1,037
5 acre – 10 acre	181
10 acres or greater	111
Total	**9,202**

Source: Metropolitan Council GIS data, 2016



Publicly Subsidized Housing Units

Table 6:

Housing Type	Number of Units
Senior Housing	0
Housing for People with Disabilities	0
All other Publicly Subsidized Units	102
Total Publicly Subsidized Housing Units	102

Source: Metropolitan Council Existing Housing Assessment and HousingLink Streams Data, total housing units 8,896

Information on Publicly Subsidized Units:

The Seasons

Funding: LIHTC 9% Tax Credit
7436-7600 147th Cir NW
Year Built: 2013
Total Units: 50
Affordable Units: 49

Affordability by Bedroom
2 BR: 22
3 BR: 27

Affordability by AMI
60%: 49

Funding Dates & Programs
First known closing: 07/01/2013
Most recent closing: 07/01/2013
Earliest expiration: 07/01/2043
Last Activity: New construction

MHFA: Housing Tax Credits 9%
Close Date: 07/01/2013
Est. Expiration: 07/01/2043

Property Identifiers
HousingLink 10893
MHFA D7574
HUDLIHTC MNA2013019

Sunwood Village

Funding: Other
7550 Sunwood Dr NW
Year Built: 2016
Total Units: 47
Affordable Units: 47

Affordability by Bedroom
1 BR: 9
2 BR: 26
3 BR: 12

Affordability by AMI
30%: 4
50%: 43

Property Identifiers
HousingLink 10924
MHFA D7721

Funding Dates & Programs
First known closing: 09/24/2015
Most recent closing: 12/21/2016
Earliest expiration: 01/01/2017
Last Activity: New construction

County: County
Close Date: 12/21/2016
Expiration: 03/01/2047

MHFA: LHIA
Close Date: 12/21/2016
Expiration: 03/01/2047

MHFA: LMIR
Expiration: 03/01/2047
Close Date: 12/21/2016

MHFA: Bonds
Close Date: 12/21/2016
Expiration: 03/01/2047

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Sunwood Townhomes

Funding: LIHTC 9% Tax Credit
5350 – 5444 Sunwood Dr NW*

Year Built:	2003
Total Units:	34
Affordable Units:	27

Affordability by Bedroom

1 BR:	2
2 BR:	12
3 BR:	12
4 BR:	1

Affordability by AMI

60%:	49

Property Identifiers

HousingLink	4521
MHFA	D2743
TC9:	D2743, MNA2002095

*Some addresses within City of Anoka
Source: HousingLink – Streams Search, data through 12/31/2016

Funding Dates & Programs

First known closing:	07/01/2002
Most recent closing:	07/01/2003
Earliest expiration:	05/16/2023
Last Activity:	New construction

County: County

Close Date:	05/16/2003
Est. Expiration:	05/16/2023

MHFA: LHIA

Close Date:	05/16/2003
Est. Expiration:	05/16/2023

MHFA: ARIF

Close Date:	05/16/2003
Est. Expiration:	05/16/2023

MHFA: Housing Tax Credits 9%

Close Date:	07/01/2002
Est. Expiration:	07/01/2021

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Housing Cost Burden

According to the Metropolitan Council in 2018, 1,537 households in Ramsey are cost-burdened. Being cost-burdened is defined as spending more than 30% of your annual income on housing costs. Being cost-burdened by housing costs affects lower income residents at a higher rate than higher income residents.

In 2016, the ACS data showed that of those households making less than $35,000 annually (which is almost one third of Ramsey households), around 22% of those households spend more than 30% of their annual income on housing costs. The percent of households who spend more than 30% of their annual income on housing costs is much higher for lower income residents. Households that make more than $75,000 per year rarely pay more than 30% of their income to housing costs – less than 2%.

Approximately 17% of all households in Ramsey are cost-burdened to some extent.

Table 7:

Income Levels	Number of Households	Percent of Total
< 30% AMI	354	4%
31 – 50% AMI	438	5%
51 – 80% AMI	745	8%
Total	1,537	17%

Source: Metropolitan Council Existing Housing Assessment, total housing units 8,896

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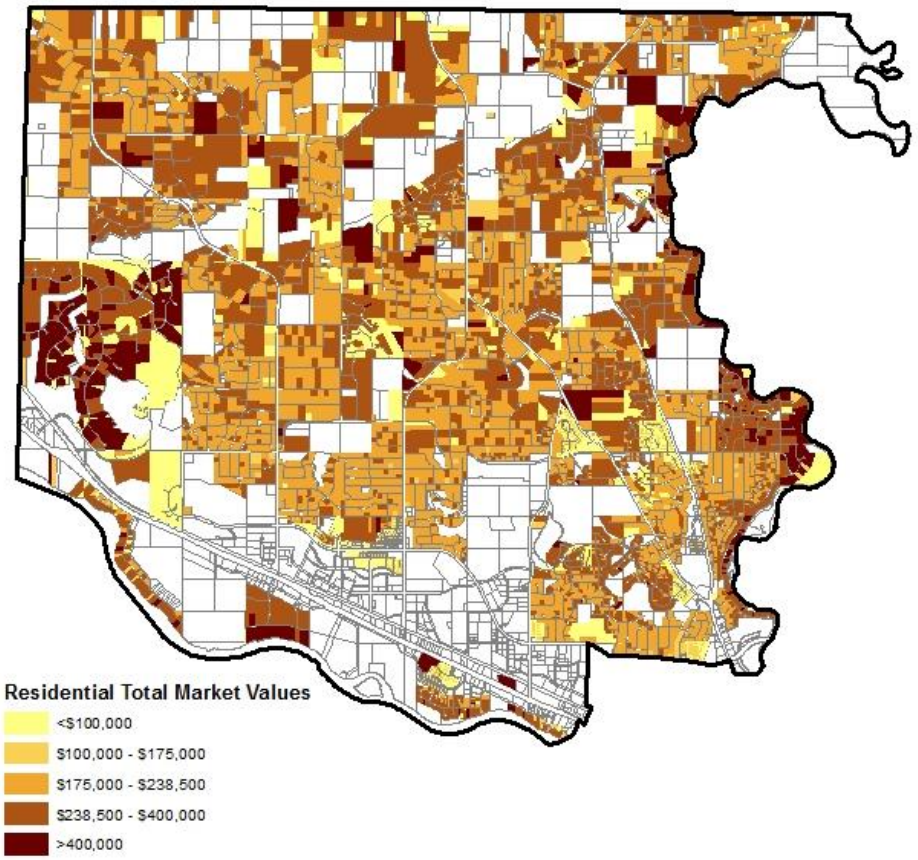
Assessed Values of Owner-Occupied Housing Units

Values above and below $238,500 are shown in the figure below. $238,500 represents the affordable purchase prize for a housing unit in 2015 for those at 80% of AMI. 2015 AMI was $86,600 for a family of four in the Minneapolis-Saint Paul-Bloomington Metropolitan Area. The median value for a home in Ramsey was approximately $210,200 in 2016.

Table 8:

Assessed Value	Number	Percent of Total
Less than $50,000	329	4%
$50,000 - $99,999	141	2%
$100,000 - $149,999	851	11%
$150,000 - $199,999	2,109	28%
$200,000 - $299,999	2,965	39%
$300,000 - $499,999	1,067	14%
$500,000 - $999,999	131	2%
$1,000,000 or more	0	-
Total Units:	7,593	
Median Value:	$210,200	

Source: ACS 2016 Estimates



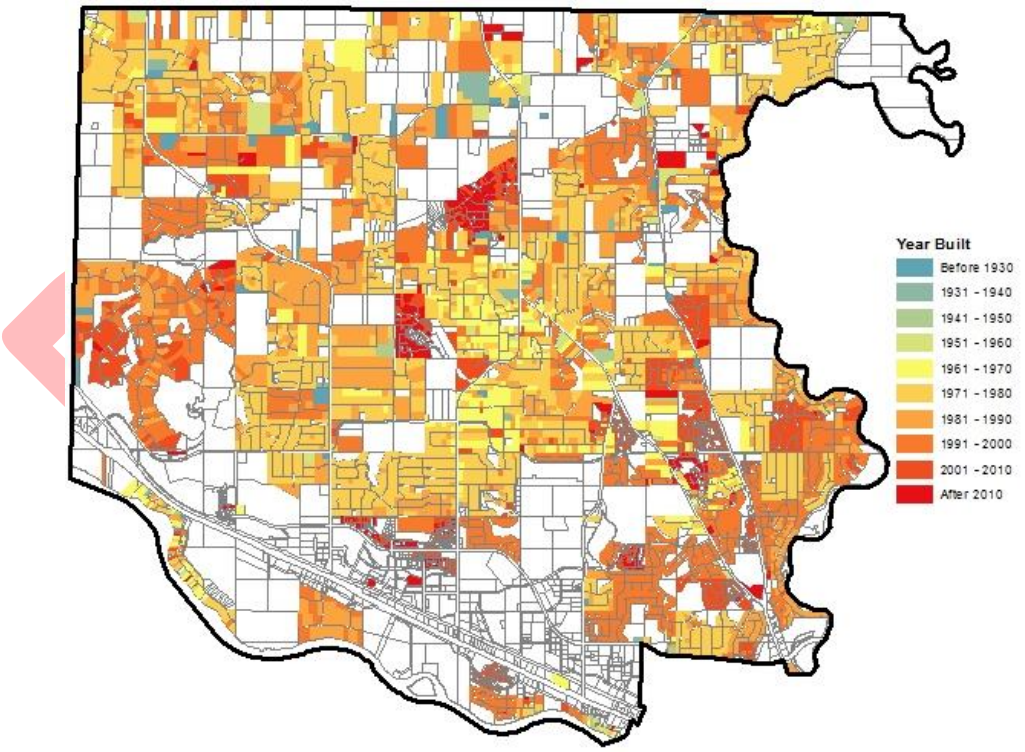
Housing Age (Single Family Homes)

The majority of single family homes were built between 1970 and 2009. Less than 10% of all single family homes in Ramsey were built outside this time period.

Table 5:

Year Built	Number of Houses	Percent of Total
Before 1939	53	<1%
1940s	16	<1%
1950s	56	<1%
1960s	375	4%
1970s	2,017	23%
1980s	1,322	15%
1990s	2,381	27%
2000s	2,397	27%
2010 to 2013	134	2%
2013 or Later	23	<1%
Total Housing Units	**8,776**	

Source: ACS 2016 Estimates



Summary of Existing Housing

Within Ramsey, most of the homes are owner-occupied, and rentals are approximately 11% of the total housing units. Ramsey has a healthy vacancy rate, less than 3%, showing the high demand for housing units within Ramsey.

Approximately 96% of all housing units in Ramsey are single family homes, both attached and detached. Only 4% of all housing units are multi-family units. Likely, future housing growth will be single family in the northern portions of the City, which represent and maintain Ramsey's rural character. Areas near The COR represent areas where multi-family housing is more likely to occur in the future, this area represents the urban, transit-oriented growth around the Northstar Commuter Rail Station.

The Future Land Use Map and Development Maps show future areas that are likely to change in land uses. There are areas in the northern half of the City that will likely accommodate future single family housing development projects.

17% of all Ramsey households are cost-burdened, and the percent of lower income residents who are cost-burdened (spending more than 30% of their income on housing) is much higher than higher income residents. Creating and maintaining affordable housing options is a key priority for the City of Ramsey, in order to support these residents.

In summary, the existing housing assessment shows that there are residents who could use assistance from the City in order to reduce their housing costs. One route to reduce the number of cost-burdened residents is to provide additional housing options, including affordable housing options, across the City. The existing housing assessment also shows that housing in Ramsey is sought-after. There is a low vacancy rate, and a low rental rate, which means that those who want to move to Ramsey likely have to buy a single family home in order to move to the community. In order to provide options for all types of residents, at all stages of life, different housing options, including multi-family options and single family rentals, the City should support these types of projects.

Most of the homes in Ramsey were built in 1970 or after, with very few built after 2010. Many of these homes will likely need reinvestment in coming years, such as putting in a new roof, updating well and septic, or upgrading the interior finishes in the home. The City could consider options to providing incentives for homeowners to make these improvements.

Land Supply

The Future Land Use Map guides the future land uses for the entire City of Ramsey. The areas designated low density, medium density, and high density residential are sufficient to absorb the City's necessary growth in housing and affordable housing allocations. The mass of the affordable housing allocation will likely be in The COR area, which provides flexibility and density bonuses for projects near the Northstar Commuter Rail Station.

With the City of Ramsey's knowledge of the area and land that is likely to develop, or projects that have been started on vacant land, the City does not expect to have any issues meeting the projected growth or affordable housing allocation.

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Existing Housing Programs

Anoka County Programs

When we would use these: The City of Ramsey cannot actively maintain or manage these programs; however, they are important to note as the City of Ramsey actively supports these programs and will lend their support to maintaining these programs in any way possible. Additionally, these tools are included in this section to provide additional resources for residents, and potential residents, of the City.

1. **Anoka County Community Action Program (ACCAP) for Affordable Housing**

Affordable Housing is a partnership between ACCAP and Anoka County Corrections to construct affordable housing in Anoka County. The goal of the program is to build two new homes each year using inmate labor to reduce construction costs making homeownership for eligible buyers very affordable. These homes are available to buyers who have completed the Home Ownership Program offered by ACCAP.

2. **Anoka County – Housing & Redevelopment Authority**

Anoka County Housing and Redevelopment Authority (ACHRA) was created in December 1994 and is responsible for the administration of federal, state, and Anoka County programs. They provide housing and redevelopment services to many communities in Anoka County, including Ramsey.

3. **Anoka County – Senior Housing**

Anoka County owns four properties, managed by Great Lakes Management Company, with market rate rental units for residents 55 years and older.

4. **Anoka County – MN Housing Rehabilitation Loan Program (MNRLP)**

Owner-occupied properties in Anoka County that are either single-family detached home, townhome, duplex, or condominium, or manufactured homes that are taxed as real or personal property can apply for eligible improvements including: Roof, furnace/boiler, insulation, radon mitigation, lead paint hazards, siding, handrails, plumbing, smoke/CO detectors, well and septic systems, electrical wiring, windows/doors. Applicants must meet the income requirements based on household size and other borrower requirements.

Regional Programs

Livable Communities Demonstration Account – Metropolitan Council Grant Fund

1. The Livable Communities Demonstration Account (LCDA) funds innovative projects that efficiently link housing, jobs, services, and transit.

   When we would use this: The City of Ramsey is actively seeking projects that align with the mission of the LCDA. Due to the funding schedule and timeline, partners in these types of applications must be able to wait approximately 6 months from application to award letters. Because of this timeline, City-initiated projects, affordable housing projects (likely for those less than 50% AMI), and senior living projects are likely the prime candidates for this program.

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2. Section 8 Housing

Section 8 programs for Anoka County are administered by the Metropolitan Housing and Redevelopment Authority (HRA), located in Saint Paul, MN.

When we would use this: The City of Ramsey attempts to support affordable housing projects that utilize the Section 8 Program by writing letters of support in their applications. In addition, the City of Ramsey will advocate for continuing this program to ensure its continuity.

3. Home Energy Loan Program

Center for Energy and Environment (CEE) offers low-interest home energy loans for homeowners to make improvements to their homes. Examples of eligible projects include: heating system upgrades, central air conditioning, light fixtures, window and exterior door replacement, attic air sealing and insulation, wall insulation and heater, and geothermal and heat pumps. Loans are typically from $1,000 - $2,000 dollars. There is no maximum income limit for these loans.

When we would use this: The City of Ramsey does not manage this program, but they do support this program. The City has resources available to residents of all income levels, and is able to point residents to Center for Energy and the Environment for additional information on which they are not experts (such as insulating attics). Specially, the City is able to direct residents whose homes have code enforcement issues to this type of program to help increase the safety, value, and appearance of the home. Because these loans do not have income limits, these are options for all residents, developers, and others throughout the City. This type of program supports small upgrades to homes that long-term increase cost savings and environmental savings. This program not only represents the City of Ramey's commitment to maintaining existing properties, but also our commitment to environmentally sensitive housing and design.

Statewide Programs

When we would use this:

1. Minnesota Housing – Coordinated Entry

Coordinated Entry is a HUD initiative to those who may be at-risk of losing their housing, or who are homeless. The Coordinated Entry initiative supports people in connecting their housing needs with the appropriate resources. Anoka County has a separate resource line to assist residents.

When we would use this: The City of Ramsey does not maintain this program, but does believe this program is an important tool they are able to point residents towards. The City of Ramsey provides a connection to this resource for residents who are at risk, or afraid of, losing their housing. They can also direct homeless individuals towards this program. The City of Ramsey will continue to support this program as they believe it is an important part of supporting their residents and maintaining their mission of equity.

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2. Minnesota Housing – Start Up Program

This first-time homebuyer program is meant to promote affordable interest rates and help homeowners better tackle their down payments and closing costs. Qualified first-time homebuyers must have a credit score of at least 640, they must meet certain income limits and must be able to obtain a mortgage from a lender. Borrowers must also attend a homebuyer education course.

In order to be eligible for this program, residents must be first-time homebuyers, have a credit score of at least 640, and meet the income requirements.

When we would use this: The City of Ramsey does not maintain this program, but believes it to be a great opportunity for potential homebuyers. Because so much of the City has naturally-occurring affordable housing, the City expects to see first time homebuyers purchasing properties in Ramsey. This type of program is an excellent tool to point those types of residents towards. Additionally, this type of program supports low-income individuals, and supports the City of Ramsey's goal and mission to provide lifecycle housing options and affordable housing options.

3. Minnesota Housing - Step Up

This is a loan can be used for home purchase or to help homeowners refinance. The loan is meant to promote affordable interest rates in the state of Minnesota. The monthly payment portion of this Minnesota Housing program is available to help buyers afford closing costs and the down payment of a home purchase. The loan allows borrowers to reduce or eliminate mortgage insurance costs. Qualified borrowers need to have a credit score of at least 640, they must meet program income limits and in some cases, borrowers must attend homebuyer education courses.

Summary:

- Loan can be used for home purchase or refinancing.
- Must have a credit score of at least 640.
- Must meet income limits.

When we would use this: The City of Ramsey does not maintain this program.

4. Minnesota Housing - Deferred Payment Loan

This loan is meant for first-time homebuyers to help ease the cost of home ownership. There are two loan options, a deferred payment loan and a plus loan. The deferred payment loan starts at $5,000 and up to $7,500. The maximum for the plus loan is higher, up to $10,000 for those borrowers who fit target criteria. Minimum credit score for qualified borrowers is 640. The borrowers must also attend a homebuyer education course. The loan term is equal to the first mortgage and has 0% interest - the loan is repaid when the property is sold, no longer the homestead of the homeowners, or the loan is refinanced.

Summary:

- Must be first-time homebuyers
- Two loan options — can borrow from $5,000 to $10,000
- Minimum credit score of 640

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5. Minnesota Housing - Monthly Payment Loan

This program is designed to help Minnesota homebuyers afford the costs of purchasing a home. Minnesota Housing has a monthly payment loan to help with 5% of the purchase price or $5,000, whichever is greater, to be put towards closing costs and the down payment. Borrowers need to get a Minnesota Housing first mortgage loan as well, which is either a Start Up (first-time homebuyers), Step Up (refinancing), or MCC (mortgage credit certificate). The ten-year loan term comes with monthly payments with an interest rate equal to first mortgage rate. Qualified borrowers need a minimum 640 credit score and must meet program income limits. Borrowers also need to attend a homebuyer education course.

Summary:

- Loan towards closing costs and home down payment
- Ten-year loan term with monthly payments
- Minimum 640 credit score
- Qualified borrowers must attend homebuyer education course

When we would use this: The City of Ramsey does not maintain this program.

6. Minnesota Housing - Mortgage Credit Certificate

This program was designed to help Minnesota homeowners better afford their mortgages. This Mortgage Credit Certificate allows homeowners to claim 35% of their mortgage interest paid every year as a federal income tax credit — this can provide households with up to $2,000 in tax savings. This certificate can used in conjunction with a Minnesota Housing mortgage, as well as the Monthly Payment Loan which helps with the home down payment and closing costs. This program is geared towards first-time homebuyers (not owned a home in at least three years and not displaced by divorce). The certificate has many qualifications like: borrowers must qualify for a mortgage on a house, meet the income limits of the program, plan to have the property as their primary residence and hold a federal income tax liability. In order to be eligible for this program, residents must be first-time homebuyers, qualify for a home mortgage, and meet the income restrictions

When we would use this: The City of Ramsey does not maintain this program.

7. Minnesota GreenStar Certification

In order to be eligible for this program, residents must be first-time homebuyers, qualify for a home mortgage, and meet the income restrictions

When we would use this: The City of Ramsey does not maintain this program.

8. Weatherization Program

The Weatherization Assistance Program through the Minnesota Department of Commerce provides free home energy upgrades to income-eligible homeowners and renters. The goal of this program is to allow homeowners to save energy and ensure their homes are healthy and safe. Weatherization services include: exterior wall and attic insulation, air leakage reduction, furnace, boiler, and hot water heater repair or replacement, and can help decrease energy costs by 30% annually. The 2017 income limit for a household of 4 to be eligible for this program was an annual income of $49,200.

When we would use this: The City of Ramsey does not maintain this program.

9. Low Income Energy Assistance Program

The Low Income Energy Assistance Program (EAP) helps pay for heating costs and furnace repairs for low-income households. In order to be eligible, households must be at or below 50% AMI for the state. This program is eligible to homeowners and renters. Services may include: payment of energy bills, education on safe energy use, repair or replacement of broken heating systems, and help with utility disconnections or fuel deliveries. The 2017 income limit for a household of 4 to be eligible for this program is $48,077.

When we would use this: The City of Ramsey does not maintain this program, but believes it to be a great opportunity for potential homebuyers. Because so much of the City has naturally-occurring affordable housing, the City expects to see first time homebuyers purchasing properties in Ramsey. This type of program is an excellent tool to point those types of residents towards. Additionally, this type of program supports low-income individuals, and supports the City of Ramsey's goal and mission to provide lifecycle housing options and affordable housing options.

When we would use this: The City of Ramsey does not maintain this program.

Federal Programs

When we would use this: Federal program are managed by the Federal Government; however, they are noted in this section of the Comprehensive Plan Update to provide additional information to residents seeking guidance or specific tools to increase homeownership. The City of Ramsey is supportive of these types of programs and will guide residents towards these programs in order to increase homeownership rates within the City, and provide opportunities for residents who many not have the option to purchase a home without these types of programs, specifically low-income residents and people of color. These programs have income limits, and therefore would be helpful for residents with lower incomes.

1. FHA Loans

Federal Housing Administration (FHA) loans typically have lower interest rates and smaller down payments than other loans. They also have low closing costs and are typically available to first-time homebuyers and those who are trying to make their homes more energy efficient (FHA Energy-Efficient Mortgage).

2. FHA Down Payment Assistance

Federal Housing Administration (FHA) loans typically have lower interest rates and smaller down payments than other loans. They also have low closing costs and are typically available to first-time homebuyers and those who are trying to make their homes more energy efficient (FHA Energy-Efficient Mortgage).

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Other Tools

10. Public-Private Partnerships

The City of Ramsey is actively creating relationships with local businesses, developers, and potential partners. The Economic Development Department works diligently to find opportunities for public-private partnerships, when private dollars can assist a public project with a mutually beneficial outcome.

When we would use this: Public-private partnerships work best when the City and the partner have similar goals and desired outcomes for a project. Potential projects that the City is actively looking at are new park spaces around affordable housing projects, a new parking ramp near affordable, multi-family housing, park spaces, and The COR, as well as roadway improvements. For new single-family housing development projects proposed through the PUD process, the City will attempt to suggest the cost-sharing of public amenities and improvements to adjacent spaces – such as parks, trails, open spaces, roadway improvements, or pedestrian crossings.

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Projected Housing Need

Ramsey's population is anticipated to steadily increase through 2040. In order to accommodate the future growth, there will need to be additional housing units within Ramsey. A variety of housing types will need to be provided in order to house residents of all income levels, stages of life, and housing preferences. For instance, young families may prefer single family homes or townhomes, while seniors may prefer a denser living environment near The COR.

By 2040, the City of Ramsey will need to provide almost 4,000 additional housing units for almost 8,000 additional residents. Population and housing projections through 2040 are shown below.

	2010	2020	2030	2040
Population	23,668	26,400	30,700	34,700
Households	8,033	9,400	11,300	13,000

Source: Metropolitan Council

Affordable Housing Allocation

The City participates in the Livable Communities Program of the Metropolitan Council, which provides access to a number of funding opportunities. As part of said participation, the City plans for an allocation of affordable housing. The total need for affordable housing in the region from 2021 – 2030 is 37,900 units. In order to reach this total need, the City of Ramsey will need to provide an additional 499 units by 2030. The breakdown of unit types is shown below.

Affordable housing is defined by different affordability levels depending on tenant income. Affordability levels for necessary affordable housing in Ramsey is shown at three different levels below. 292 units will be required for those who make less than 30% Area Median Income (AMI). In 2015, annual income for those in this type of housing would need to be less than $25,980 as the 2015 AMI was $86,600 for a family of four in the region.

The need for affordable housing is shown below. As the City of Ramsey meets its affordable housing need, less Ramsey residents will experience a housing cost-burden. These residents, many of whom are members of the workforce in Ramsey and surrounding communities, can reside in our community without fear of homelessness.

Table 8:

Affordability Level	Number of Units
At or Below 30% AMI	292
31% to 50% AMI	167
51% to 80% AMI	40
Total Units	499

Source: Metropolitan Council Existing Housing Assessment, total housing units 8,896

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Imperative: A Balance of Rural Character and Urban Growth

Initiative 1: Rehabilitate and Improve Housing Stock to Preserve Rural Character and Enhance Existing Neighborhoods

Tactic	Priority	Responsible Party	Resources
Provide Incentive-Based Approaches for Individual Improvements to Private Properties	Immediate	Community Development	
Eliminate blighting influences such as unkempt yards, glaring lights, unscreened storage, noise, inappropriate vehicle storage, etc.	Immediate	Community Development	
Create a policy allowing accessory dwelling units (ADUs) on single family lots in order to maintain rural character while increasing lifecycle housing options and increasing affordability levels	Immediate	Community Development	
Identify and remove substandard housing units that are economically unfeasible to rehabilitate	Long-term	Community Development	
Create a simple webpage that allows residents to anonymously voice code enforcement concerns	Immediate	Community Development	
Create relationships with neighborhood leaders and Community Development Staff	Long-term	Community Development	

Initiative 2: Provide Sufficient Housing Options for all Types of Residents; Provide Lifecycle Housing Options

Tactic	Priority	Responsible Party	Resources
Complete housing needs assessment and analysis	Immediate	Community Development	$15,000

Initiative 3: Promote Development that Preserves the Natural Environment and Respects Residential Health

Tactic	Priority	Responsible Party	Resources
Promote improvements to existing housing that meet or exceed energy efficiency standards and implement sustainable design features	Opportunity Driven	Community Development	

Initiative 4: Support Affordable Housing Development

Tactic	Priority	Responsible Party	Resources
Monitor the City's housing supply to ensure quality, low-income options	Immediate	Community Development	

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Imperative: A Connected Community

Initiative 1: Ensure that discrimination does not occur against persons seeking housing in Ramsey based on age, religion, race, ethnic origin, sexual preference, gender, status with regard to public assistance, marital or familial status, or disability.

Tactic	Priority	Responsible Party	Resources
Create Fair Housing Policy for City	Immediate	Community Development	
Provide resources to Ramsey residents, and those looking to become Ramsey residents, regarding Fair Housing policies at the state and local level	Opportunity Driven	Community Development	
Direct developers to the Affirmative Marketing Toolkit from the Fair Housing MN Resource Guide to make it easier for providers to meet federal requirements for planning fair housing	Opportunity Driven	Community Development	

Initiative 2: Ensure that individuals of similar income levels have equal access to Minnesota Housing programs, regardless of race, color, creed, religion, national origin, sex, marital status, status with regard to public assistance, disability, familial status, gender identity, or sexual orientation.

Tactic	Priority	Responsible Party	Resources
Direct developers to the Affirmative Marketing Toolkit from the Fair Housing MN Resource Guide to make it easier for providers to meet federal requirements for planning fair housing	Opportunity Driven	Community Development	
Direct those seeking assistance with housing programs to Minnesota Housing programs	Opportunity Driven	Community Development	

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Imperative: An Active Community

Initiative 1: Plan for multi-family and senior residential developments near transit, bicycle routes, trails, sidewalks, etc. in order to reduce building footprints, energy consumption, and reliance on automobiles.

Tactic	Priority	Responsible Party	Resources
Allow flexibility in regulations for multi-family or senior housing projects near Northstar Commuter Rail Station	Opportunity Driven	Community Development	
Create and maintain a policy that allows for density bonuses for new projects in The COR that provide additional public amenities, such as open space dedication or affordable housing, in exchange for densities greater than the Zoning Ordinance typically would allow	Immediate	Community Development	

Initiative 2: Ensure new development projects support an active lifestyle.

Tactic	Priority	Responsible Party	Resources
Continue to require internal trails and sidewalks on adjacent roads for new residential development projects	Opportunity Driven	Community Development	
Continue to require sidewalks on adjacent roads for all non-residential development projects	Opportunity Driven	Community Development	
Encourage new non-residential development projects to include bike racks, bike storage, and locker rooms for bicycle commuting employees	Opportunity Driven	Community Development	
Encourage new residential development projects to include items such as bike racks, bike storage, workout centers, and showers	Opportunity Driven	Community Development	

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Policies

- Provide Incentive-Based Approaches for Individual Improvements to Private Properties
- Monitor the City's housing supply to ensure quality, low-income options
- Create Eliminate blighting influences such as unkempt yards, glaring lights, unscreened storage, noise, inappropriate vehicle storage, etc.
- Require environmentally-sensitive site planning, green building design, and indoor environmental quality best practices. Continue to require stormwater management, strict wetland setbacks, tree preservation standards, and environmental review on development projects.

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City of Ramsey 2040 Comprehensive Plan Update

Natural Resources Plan

Background on this Document

This document is a draft of the narrative to be used in the 2040 Comprehensive Plan Update. This is not a final version or actual layout. This document will be reviewed and revised multiple times. The City will try to add additional maps and figures to better tell the story of this vision.

Add existing background info from current Comp Plan here.

Our Vision

Ramsey will evolve through citizen-driven, collaborative processes that respect the balance and connectivity between its unique urban, rural, and natural environment for current and future generations.

Goals and Strategies

The following represents goals and strategies for the management of natural resources. Subsequent chapters will include their own goals and strategies that integrate with the above. Resources above and beyond current budget approvals are indicated in the 'Additional Resources' column.

Comprehensive Plan Strategic Imperatives

- A Balance of Rural Character and Urban Grown
- An Active Community (Parks, Recreation, and Open Space)
- A Connected Community (Transportation)
- A Positive Learning Environment

Initiatives for the Natural Resources Plan

A Balance of Rural Character and Urban Growth

- Ensure sustainability of food supply and food web
- Maintain and enhance the public community forest (boulevard tree program)
- Reduce erosion along both the Mississippi and Rum Rivers
- Preserve significant ecological resources through conservation design.
- Improve Sustainability and Resilience

An Active Community

- Improve recreation opportunities along the City's Priority Greenway Plan
- Improve water quality of Mississippi River

A Connected Community

- Improve connections to significant ecological resources

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A Positive Learning Environment

- Improve awareness for groundwater planning
- Improve awareness for solid waste reduction

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2030 Plan Accomplishments

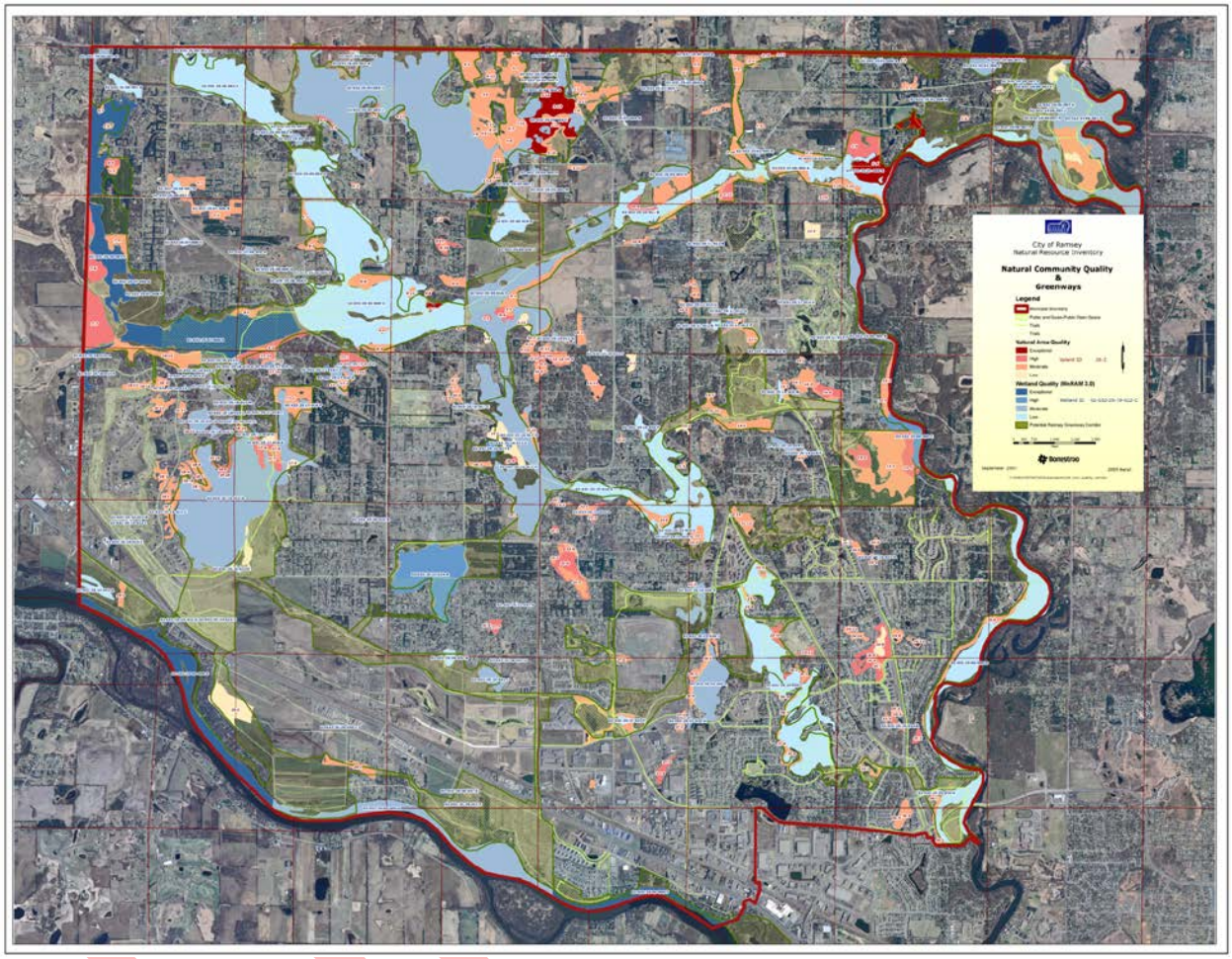
Before looking forward to what Ramsey will strive to accomplish within the timeframe of this Comprehensive Plan, it is always good to pause and look back to what it was able to accomplish over during the course of the 2030 Comprehensive Plan. The last plan was adopted in 2010. While a number of factors have changed since the adoption of the last plan, the City can celebrate a number of successes as it relates to natural resources. Subsequent chapters of the 2040 Comprehensive Plan will celebrate their own successes.

- Relied on the Natural Resources Inventory (NRI) to inform recommendations on subdivision design and areas of focused protection/preservation where feasible.
- Purchased two (2) Weed Wrenches to assist property owners with managing and eradicating certain invasive species, specifically Buckthorn.
- Protected Ramsey's rural character in many areas of the community, representing the largest land area category in the community.
- Mitigated City's financial risks associated by new developments by encouraging new development to focus near existing infrastructure.
- Ensured new development protected natural resources, made trail connections, and blended in with surrounding development.
- Employed conservation subdivision practices intended to protect existing neighborhoods and natural resources.
- Struck a balance between land use planning, policy development, natural resource protection, and private property rights.
- Refined the Tree Preservation Ordinance to establish a reforestation standard and proactively began working with developers to establish street trees rather than just front yard trees.
- Encouraged stormwater management systems/plans that incorporate rain harvesting techniques (reducing the demand on and use of groundwater for irrigation) and rain gardens (to promote infiltration and groundwater recharge).
- Employed new strategies to help residents recycle additional materials and divert more materials from landfills.
- Implemented an organics recycling drop-off program for residents.
- Secured grant funds to establish a 'mini-arboretum' of tree species native to Minnesota in North Commons.
- Continued to maintain the Tree City USA designation (twenty-five [25] years and counting).
- Updated the Floodplain Ordinance and adopted new Flood Insurance Rate Maps to remain compliant with the National Flood Insurance Program.
- Adopted an Emerald Ash Borer (EAB) Management Plan.

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Existing Natural Resources

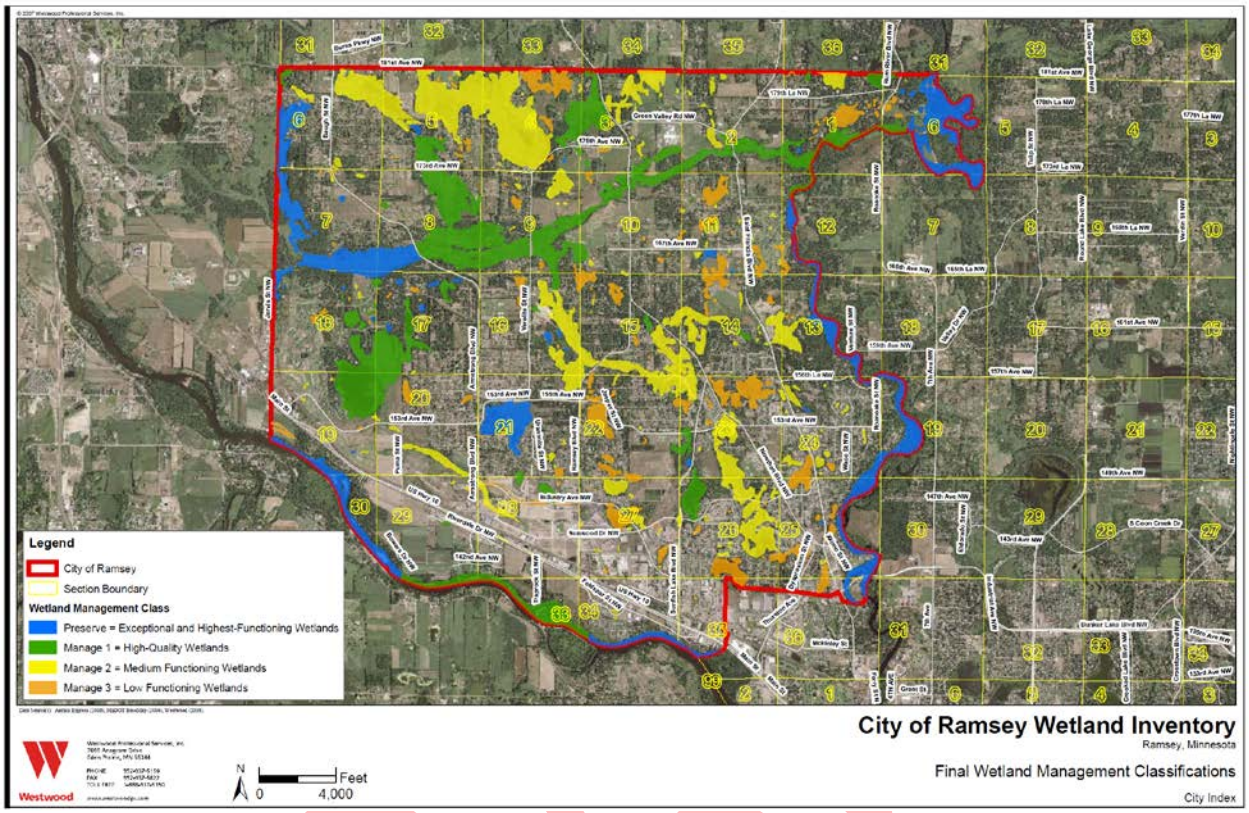
Existing Natural Resource Quality



The City's Natural Resources Inventory (NRI), which was completed in 2007, is relied upon to help inform good land use policy as it relates to stewardship of our natural resources. While wetlands are generally protected from modification by both state and federal regulations, that is not the case with high value upland areas. The NRI therefore provides a good baseline of data that helps inform Ramsey's review of proposed developments. The NRI also assists in identifying areas that may warrant greater protection from development and/or may be suitable candidate(s) for enhancement or expansion.

As part of the NRI, potential greenway corridors were identified. Thus, in addition to providing insight to the potential presence of higher value natural areas, the NRI can also be utilized as a reference and guide for critical corridor connections. As Ramsey continues to experience development pressures, the NRI will eventually need to be 'recalibrated' to ensure that it is still a meaningful and reliable data source.

Existing Wetland Quality



In 2006, Ramsey completed a Wetland Inventory utilizing the Minnesota Routine Assessment Method (MnRAM) to accompany a now repealed wetland buffer ordinance. While the wetland buffer standards are no longer codified, the Wetland Inventory is still relied upon to understand what, if any, impacts proposed development may have, especially regarding wetlands classified as high and exceptional.

Natural Resource Initiatives and Pilot Projects

Ramsey has completed a number of natural resource initiatives and pilot projects in recent years. Key programs include, but are not limited to the following.

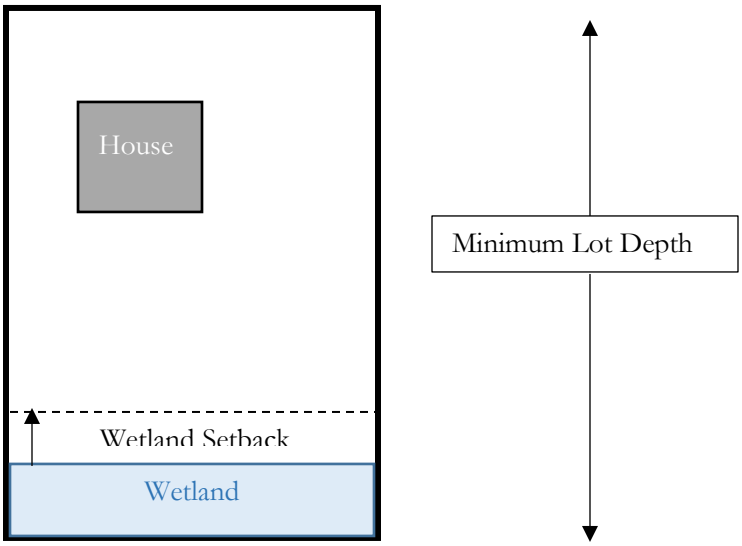
- Buildable Area Standards
- Pollinator Friendly Habitat
- Shoreline Protection

Buildable Area Standards

In 2016, the City adopted new standards related to lot depth as well as instituted a wetland setback. The purpose of both of these standards was to ensure that newly created lots would actually have sufficient buildable and usable area to accommodate typical homeowner additions, such as a deck, small shed, a yard to play in, etc. Too often, homeowners attempting to make improvements to their property were discovering that there was not sufficient space to accommodate a new deck, a detached accessory building, or even to establish what they viewed as a usable backyard. This was creating a lot of frustration on their part and was also resulting in code violations as well. By implementing these new standards, it not only assured that each newly created lot would have buildable and/or usable space beyond the footprint of their home, but also

helped to protect wetlands both from being filled in as well as from a water quality stand point (more filtration of runoff before entering the wetland).

Figure 1: Buildable Area and Wetland Setback Example



Pollinator Friendly Habitat

The City desires to encourage more pollinator friendly habitat for a multitude of reasons. First and foremost, Ramsey desires to ensure the sustainability of food supply and the food web, which relies heavily on pollinators. By promoting pollinator friendly practices and initiatives, the City not only helps foster the concept of local food through opportunities such as a local farmer's market, but also encourages the protection, restoration, and/or establishment of pollinator habitat.

Broadly speaking, pollinator habitat generally consists of native plants, shrubs and trees. Native species are generally more drought tolerant and require fewer inputs, such as water (irrigation) and chemicals (fertilizers and herbicides). Thus, by establishing more pollinator friendly habitat, the demand on groundwater for irrigation purposes should decrease. Furthermore, the reduced need for chemical applications should lower the potential of groundwater and/or surface water contamination from inappropriate application of these products on the landscape.

Protecting, restoring, and/or establishing pollinator habitat also creates habitat for a variety of wildlife. Where feasible, conglomerations of pollinator friendly landscapes can become the basis for wildlife corridors and potentially even a greenway corridor. Even small patches, such as a backyard butterfly garden, of pollinator friendly habitat can be beneficial for many pollinators whose populations are declining as habitat loss continues to incease.

Mayors for Monarchs

The City has taken the Mayors for Monarchs Pledge to affirm its support not only for the iconic monarch butterfly, but also for pollinators in general, whose habitat continues to be fragmented and/or destroyed.

Figure 2: Mayors for Monarchs Background

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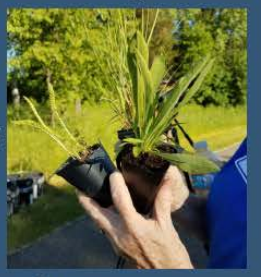
Mayors for Monarchs

Many people may not realize that Monarch butterflies play an important role in pollinating various plants, including many of our food crops. But their population has declined by more than 90% in the last two decades. That is why it is important to create special habitats for these pollinators in our yards and gardens. Recently, the City of Ramsey adopted a resolution to support pollinator initiatives throughout our community.



Ramsey Mayor, Sarah Strommen, launched the initiative by signing the Mayors for Monarchs Pledge to support Monarch butterflies in our community by implementing efforts to create, restore, and protect pollinator habitat and encouraging our citizens to do the same in their own backyards. The Mayors for Monarchs Pledge Signing event took place on June 6, 2017 at the Lake Itasca Trailhead in Ramsey.

At the pledge signing event Mayor Strommen designated a new "Monarch Trail" along the Lake Itasca Trail corridor. Together with the U.S. Fish and Wildlife Service, the City of Ramsey will be restoring six and a half acres of land along this trail to a natural habitat designed to support Monarch butterflies and other important pollinators.



Students from Youth First Community of Promise were there to jump-start the project by planting a small section of native plant plugs at this event, which was representative of the larger-scale planting that will happen this fall.

Fourth grade students from Ramsey Elementary also contributed to the event by creating 150 colorful butterflies, which served as the backdrop for this event and will also be on display in the Ramsey City Hall in honor of National Pollinator Week, June 19 - 25, 2017.

If you are interested in learning more about the Monarch butterfly, be sure to check out Ramsey Parks & Recreation's Monarch Lab on July 25. Visit www.cityoframsey.com/ParkEvents for more information on how to register.

City of RAMSEY

Lake Itasca Monarch Trail

In the summer of 2017, the City designated a portion of the Lake Itasca Trail as a Monarch Trail. This was in conjunction with the Mayor's Monarch Pledge proclamation. The Monarch Trail includes roughly seven (7) acres of land on both sides of an existing, well used trail segment along Lake Itasca. A ceremonial planting of a mixture of plugs was completed in the summer of 2017. Site preparations occurred over the following fall, winter and spring seasons. This included a prescribed burn to eliminate non-native and undesirable vegetation (forbs/grasses) and removal of red cedar and Siberian elms within approximately 100 feet of the trail. The site was then seeded with species favored by monarch butterflies and other pollinators. This project converted fallow land into a native, pollinator friendly landscape that abuts a heavily used walking/biking trail in the community. Thus, it not only created new habitat but also did so in a location that would is highly visible to the community.

Figure 3: Lake Itasca Monarch Trail

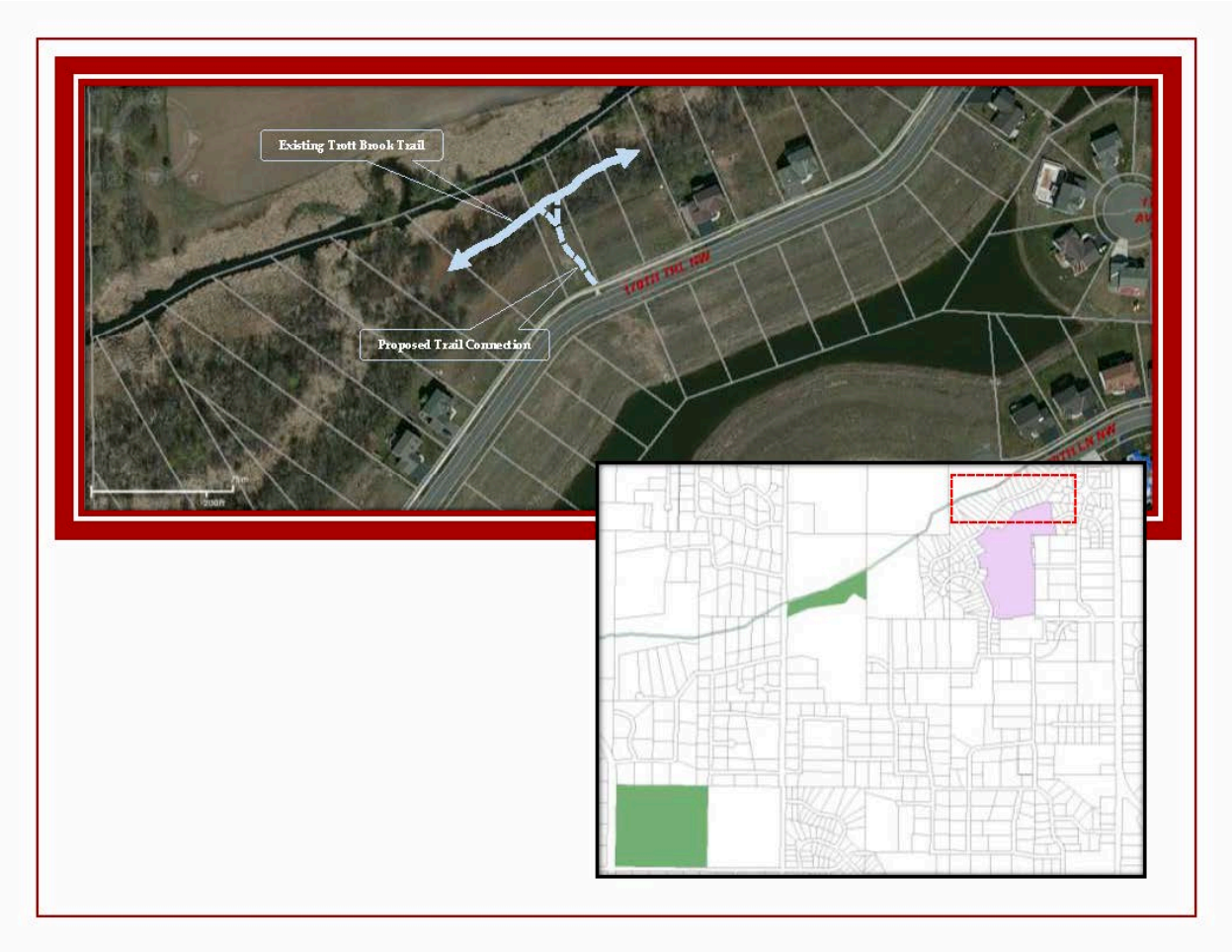
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Brookfield Trail Connection

In 2016, Ramsey identified an opportunity to create a new trail connection to the Trott Brook Trail, a very popular walking/biking trail that parallels Trott Brook. There were multiple facets to this project that, in concert, would improve mobility, create pollinator friendly habitat, promote infiltration and improve water quality. The new trail segment provided a 'mid-block' connection to the existing Trott Brook Trail. Since the existing pedestrian ramp was at the low spot in the road, an opportunity existed to incorporate a rain garden

into this project to promote infiltration and groundwater recharge while also improving the water quality of a large stormwater pond that serves as a 'water feature amenity' for this neighborhood also. Finally, rather than installing a typically turfgrass landscape that would require irrigation and regular, routine maintenance (mowing), a native, pollinator friendly landscape was established on both sides of the trail. This creates not only additional habitat for pollinators, but also will result in year round interest and variability in the viewshed.



Shoreline Protection

The Mississippi River and Rum River experience significant erosion that poses a threat to individual properties and water quality as well. The Anoka Conservation District completed an inventory of the Mississippi River shoreline in December of 2015 to assess the severity of erosion. While a formal shoreline erosion inventory has not been completed on the Rum River, the Lower Rum River Watershed Management Organization (LRRWMO), along with City Staff, do conduct annual inspections to identify potential erosion concerns (as well as potential violations of the Wild and Scenic River Overlay District).

One of the primary impetuses for the formal inventory of the Mississippi River shoreline was to identify the most problematic properties and to use that data to solicit funding assistance.

Acceptable Shoreline Stabilization Techniques

There are a number of potential acceptable stabilization techniques that can be employed. While Ramsey would look for guidance from other, more technically specialized agencies, such as the Anoka Conservation District, some potentially acceptable techniques may include:

- Vegetation
- Natural Barriers
- Rip Rap
- Wing Dams
- Other

Oftentimes, a combination of techniques may be necessary. However, each site likely will have specific conditions or circumstances that will, at least in part, determine which method(s) will be most effective.

New Preservation Efforts

Moving forward, Ramsey desires to enhance efforts in two (2) main categories.

1. Groundwater Supply Preservation
2. Solid Waste Reduction
3. Access to Solar
4. Alternative Energy
5. Greenway Planning
6. Water Quality
7. Public Realm Landscaping

Groundwater Supply Preservation

Ramsey desires to protect the quantity and quality of our groundwater supply and aquifers. The City will accomplish this goal with two (2) broad strategies.

1. Programs, Incentives, and Rebates
2. Educational Initiatives

Solid Waste Reduction

Ramsey contracts with a single hauler for curbside service for single-family residential . This not only helps with participation rates and education, but also helps reduce the number of trucks traversing local streets (less wear and tear and likely reduces air pollutants as well). The curbside program provides collection of recyclables on an every other week (EOW) schedule. Ramsey is divided into an east side and west side for collection purposes, generally along Sunfish Lake Blvd and Nowthen Blvd (with all residential properties south of Highway 10 being considered west).

In 2014, State Statute 115A.551 (Recycling) was amending to specify that by December 31, 2030, each metropolitan county will have a goal to recycle seventy-five percent (75%), by weight, of the total solid waste generated. Furthermore, it states that counties will develop or require political subdivisions within the county to develop and implement programs, practices, and/or methods designed to achieve this goal.

In recognition of this aggressive goal, Ramsey has created new and/or additional opportunities for residents to properly dispose of recyclable materials. This includes expanding the list of acceptable materials collected during Ramsey's Recycling Day events, which now accepts carpet, carpet padding, textiles, motor oil, oil filters, and antifreeze. Additionally, Ramsey has added a third Recycling Day (summer) event to provide an

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additional opportunity for residents to properly dispose of materials generally not accepted through the curbside program.

After review of a recent metropolitan waste sort (completed for Hennepin County in 2016), it is clear that organic materials represent the largest component remaining in trash. This represents a potential opportunity to boost Ramsey's recycling tonnage, which led the city to implement an organics recycling drop-off program.



Ramsey is providing 'starter kits' at no cost to encourage residents to participate in this program. There are carts located at the Public Works Campus for participants to drop off their organics. Ramsey is continuing to explore various options to expand and improve the organics program. This could include a larger scale drop-off site and/or a curbside program is yet another attempt to increase the amount of material diverted from the trash to the recycling stream.



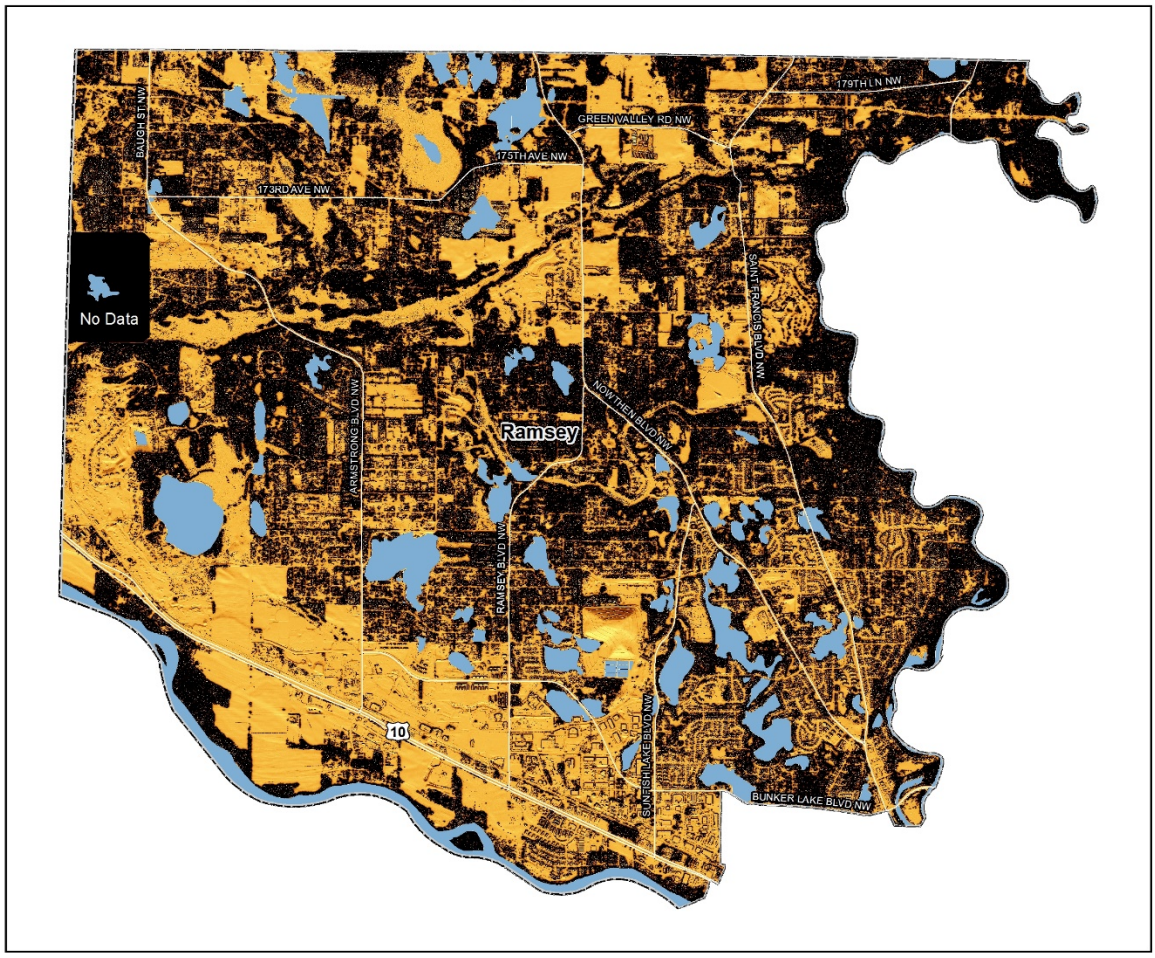
The greatest opportunity to realize significant gains in recycling, however, will likely come from the commercial sector. While Ramsey's recycling program is focused on the residential sector, primarily based on how the program is funded (Select Committee on Recycling and the Environment, aka SCORE), Anoka County does work with the commercial sector. They have partnered with Minnesota Waste Wise to conduct waste audits for interested commercial entities and guidance on how to increase recycling and reduce waste (and possibly costs too). Ramsey supports this work and will continue to explore opportunities to educate and assist the commercial sector with waste reduction measures where feasible.

Access to Solar

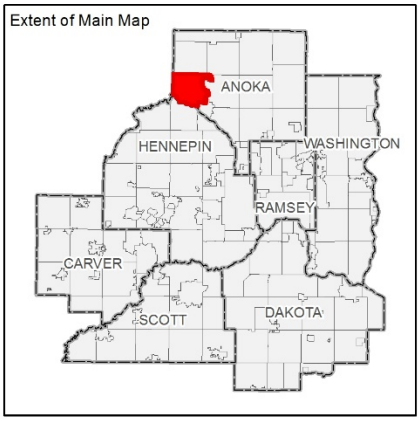
In the mid-2010s, Ramsey amended its Zoning Code to permit both ground mounted and building mounted solar arrays as an accessory use in any zoning district. This created the possibility for both the residential and commercial/industrial sectors to lawfully install solar energy systems if they so desired. In 2017, Ramsey amended its Zoning Code again to identify solar energy systems as a principal use with the issuance of a Conditional Use Permit within the Public/Quasi-Public zoning district.

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Gross Solar Potential
City of Ramsey, Anoka County



1/5/2017



0 0.5 1 2 3 4
Miles

Gross Solar Potential
(Watt-hours per Year)

High : 1266356

Low : 900001

Solar Potential under 900,000 watt-hours per year

County Boundaries

City and Township Boundaries

Wetlands and Open Water Features

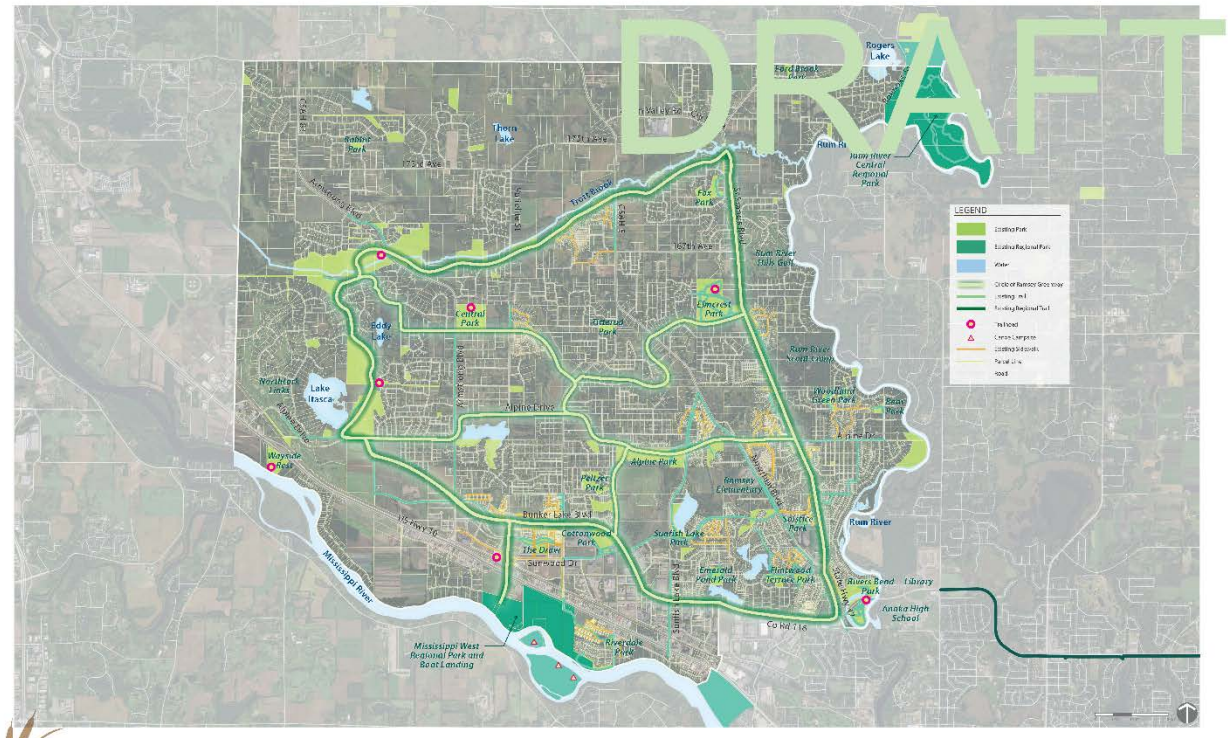
Source: University of Minnesota U-Spatial Statewide Solar Raster.

Alternative Energy

Ramsey recognizes the growing field of renewable energy sources and has taken steps over the past decade to include provisions in the Zoning Code that govern their installation. In addition to solar energy systems (as addressed above), Ramsey also permits, under certain conditions, Wind Energy Conversion Systems (WECS) and Ground Source Heat Pumps. Ramsey will continue to monitor the evolution of alternative energies and, where appropriate and supported by the community, will contemplate zoning amendments to avoid unintentionally prohibiting their installation.

Greenway Planning

Ramsey has developed a robust system of parks and trails. Trail connectivity is a key metric of success for our community. Ramsey desires to continue our tradition of prudent trail planning, connecting important recreational and ecological resources. In order prioritize limited resources to accomplish this goal, Ramsey has prioritized important trail connections around the 'Circle of Ramsey' connecting our system of Community Parks.



Water Quality

Chlorides (de-icing salts) are a growing concern, not only in Ramsey but across the state, due to their likely impact on water quality. Ramsey is committed to exploring opportunities to reduce the quantities of de-icing salts used on roadways as long as it does not negatively impact safety. Options that could be considered or further investigated include an outright reduction in salt applied to roadways and parking lots, installation of pervious pavement and/or pervious concrete roads, alternative road surfaces (e.g. 'solar' roads that aid in melting snow), etc.

Public Realm Landscaping

Ramsey is committed to growing its boulevard/street tree program. A well designed urban forest addresses several of the key imperatives that were identified throughout the public engagement process. Boulevard trees aid with reducing stormwater runoff (improved water quality and increased infiltration). As Ramsey continues to develop, it will inevitably result in a greater number of vehicles on the roads. Boulevard trees will help filter out pollutants and other particulates from the air while also having a traffic calming effect. Boulevard trees also add economic and aesthetic value to neighborhoods and commercial districts.

University of Minnesota Resilient Communities Project

During the 2017-2018 Academic School Year, Ramsey partnered with the University of Minnesota's Resilient Communities Project (RCP) to advance resilience planning and goals. A summary of the projects evaluated during the academic year is found below. Project reports are available upon requests. Many of the recommendations from the RCP partnership are integrated into this document's goals and implementation strategies.



RESILIENT COMMUNITIES PROJECT

What is the Resilient Communities Project?

The Resilient Communities Project (RCP) is a cross disciplinary program at the University of Minnesota whose mission is to connect communities in Minnesota with University faculty and students to advance local sustainability and resilience through collaborative, course-based projects. Ultimately, RCP strives to

- build local capacity to address community sustainability and resilience issues
- train students to be future sustainability practitioners in their fields
- produce case studies, tool kits, and other resources that advance sustainability and resilience practice at the community scale

How does RCP work?

Each academic year, RCP selects a partner community (typically a city, county, or tribal government) through a competitive process. RCP collaborates with the selected community to identify between 5 and 30 projects— based on community identified environmental, social, and economic issues and needs—that will advance local sustainability and resilience. Then, RCP serves as a matchmaker, strategically connecting the community's projects with existing U of MN courses that can provide appropriate research or technical assistance.

Staff and stakeholders from our partner communities work closely with faculty and students to provide local knowledge and deeper insight into the issues, ensuring the work students undertake is relevant to the community context. Outcomes from each University course are documented in a final report and presentation at the conclusion of the semester. Project results are shared with the community, and disseminated through RCP's website for use by other communities.

What are the benefits to students of collaborating with RCP?

- Efficient access to high-quality and well-organized community projects
- Experience applying your knowledge and skills to real-world issues
- Opportunities to build your resume or portfolio for future job interviews
- Potential to meaningfully advance local sustainability and resilience
- Local and regional visibility and recognition for your work
- Opportunities to network with local government and industry professionals

For more information:

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Resilient Communities Project
UNIVERSITY OF MINNESOTA
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RCP–RAMSEY PROJECTS, 2017–2018

For the 2017–2018 academic year, RCP is collaborating with the City of Ramsey on 20 projects that will engage dozens of U of MN courses and hundreds of students to provide information, ideas, and new perspectives on locally identified sustainability and resilience issues.

Community Identity and Engagement

Every Voice Matters
Resident Engagement and Volunteerism Plan

A Gathering Place for Community
Community Center Plan

Sustaining Our Legacy
Historic Town Hall Plan

Creating Community Identify
Branding and Marketing Plan

Land Use and Transportation

Highway 10: A Community and Regional Focal Point
U.S. Highway 10 Corridor Plan

Connecting Ramsey
City-Wide Greenway Plan

A Gathering Within: An Attraction Beyond
The CDR Development Plan Update

Paying for Future Infrastructure Needs
Development Fee Study

Environmental Stewardship

Integrating Resources into Our Future
Natural Resources Management and Outreach Plan

Preventing Flood Damage and Disaster
Floodplain Communications Plan

Reduce Waste, Reuse Resources
Organics Recycling Plan

Clean Water, Clean Soil
Septic System Communications Plan

Will the Faucet Turn On?
Water Conservation Toolkit

Restoring Our Edge
Mississippi Shoreline Plan

Housing and Economic Development

Encouraging Small Business Growth and Expansion
Business Incubator Plan

Creating Housing Opportunities for All Generations
Housing Plan

Creating Destination
Retail Market Analysis

Administration

Protecting Our Investments
Asset Management Plan

Sustaining Our Team
Employee Development Plan

Employee Benefits for the Next Generation
Employee Benefits Plan

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RCP is a program of the University of Minnesota's Center for Urban and Regional Affairs (CURA).

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Printed on recycled and recyclable paper with at least 10 percent postconsumer waste material.

Natural Resources Implementation

Imperative #1: A Balance of Rural Character and Urban Growth

Initiative #1.1: Ensure sustainability of food supply and food web

Tactic	Priority	Responsible Party	Resources
Promote pollinator friendly landscape practices	Immediate	Community Development	

Initiative #1.2: Maintain and enhance the community forest

Tactic	Priority	Responsible Party	Resources
Develop a boulevard tree program	Long Term	Community Development	

Initiative #1.3: Reduce erosion along shorelines

Tactic	Priority	Responsible Party	Resources
Create a Shoreline Protection Plan for the Mississippi River	Immediate	Community Development	
Create a Shoreline Protection Plan for the Rum River	Immediate	Community Development	

Initiative #1.4: Preserve significant ecological resources during development

Tactic	Priority	Responsible Party	Resources
Create a Conservation Subdivision Design Policy	Long Term	Community Development	
Create an Overlay District for Trott Brook	Long Term	Community Development	
Implement the Mississippi River Corridor Critical Areal Plan	Immediate	Community Development	

Initiative #1.5: Improve Sustainability and Resilience

Tactic	Priority	Responsible Party	Resources
Create a Community Resiliency Plan	Long Term	Community Development	TBD

Imperative#2: An Active Community

Initiative #2.1: Improve recreation opportunities along the City's Priority Greenway Plan

Tactic	Priority	Responsible Party	Resources
Complete the Priority Greenway Plan	Immediate	Parks and Recreation	

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Imperative #3: A Connected Community

Initiative #3.1: Improve connections to significant ecological resources

Tactic	Priority	Responsible Party	Resources
Inventory potential access points to significant ecological resources	Long Term	Community Development	

Imperative #4: A Positive Learning Environment

Initiative #4.1: Improve awareness for groundwater planning

Tactic	Priority	Responsible Party	Resources
Create an Outreach Plan for groundwater planning	Long Term	Community Development	

Initiative #4.2: Improve awareness for solid waste reduction

Tactic	Priority	Responsible Party	Resources
Create an Outreach Plan for Organics Recycling	Long Term	Community Development	

Relationship to Regional Planning

The Metropolitan Council's Regional Development Framework, ThriveMSP 2040, outlines roles for the Metropolitan Council and Ramsey for land use policy. Specific to land use policy, the Metropolitan Council has set a goal for the region to achieve Orderly and Efficient Land Use.

Ramsey Role - Natural Resource Protection	Metropolitan Council Role – Natural Resource Protection
• Include goals, priorities, and natural resource conservation strategies in the local comprehensive plan to protect and enhance natural resources identified in regional and local natural resource inventories. • Conserve, protect, and interconnect open space to enhance livability, recreational opportunities and habitats. • Adopt and implement ordinances for the conservation and restoration of natural resources within the community. • Work with regional partners and regional park implementing agencies to identify, plan for, and acquire natural areas and resources prime for preservation and protection. • Plan for aggregate resource extraction where viable deposits remain accessible, as required by the Metropolitan Land Planning Act.	• Integrate natural resource protection strategies into metropolitan system plans for infrastructure investments. • Collaborate with local, regional, and state partners to expand the Regional Parks System, as appropriate, to conserve, maintain, and connect natural resources identified as of high quality or of regional importance, consistent with the 2040 Regional Parks Policy Plan. • Collaborate and convene with state, regional, and local partners to protect, maintain, and enhance natural resources protection. • Maintain an up-to-date regional Natural Resources Inventory and Assessment in partnership with the Department of Natural Resources.

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• Complete local natural resources inventories, prioritize areas to protect, and integrate natural resources conservation into local ordinances. • Conserve natural resources and protect vital natural areas when designing and constructing local infrastructure and planning land use patterns. • Encourage site planning that incorporates natural areas as part of site development and redevelopment.	• Provide technical assistance and tools for natural resources protection, conservation, and restoration. • Promote the implementation of best management practices for habitat restoration and natural resource conservation.
Ramsey Role – Water Sustainability • Incorporate best management practices for stormwater management in planning processes and implement best management practices with development and redevelopment to control and treat stormwater. • Integrate water sustainability and protection of groundwater recharge areas into local plans. Consider how development, irrigation, reductions in infiltration and inflow, and increased surface runoff impact groundwater recharge and consider conservation strategies and best management practices to mitigate these impacts. • Adopt and implement best management practices for protection of natural resources, the quality and quantity of our water resources, and the preservation of water supply. • Explore alternative water supply sources to ensure adequate water resources beyond 2040. • Collaborate and convene with state, regional, and local partners to protect, maintain, and enhance natural resources protection and the protection of the quality and quantity of the region's water resources and water supply. • Prepare and implement local water supply plans and source water (wellhead) protection ordinances, consistent with Minnesota Rules part 4720, in all communities with municipal water supply. • Plan land use patterns that facilitate groundwater recharge and reuse, and	Metropolitan Council Role – Water Sustainability • Collaborate and convene with state, regional, and local partners to protect, maintain, and enhance natural resources protection and the protection of the quality and quantity of the region's water resources and water supply. • Work to maintain and improve the quality and availability of the region's water resources to support habitat and ecosystem health while providing for recreational opportunities, all of which are critical elements of our region's quality of life. • Update regional plans for water supply and pursue environmentally sound and cooperative water reuse practices, conservation initiatives, joint planning, and implementation efforts to maximize surface water infiltration to recharge groundwater supplies. • Support economic growth and development by promoting the wise use of water through a sustainable balance of surface and groundwater use, conservation, reuse, aquifer recharge and other practices. • Provide efficient and high-quality regional wastewater infrastructure and services. • Pursue wastewater reuse where economically feasible as a means to promote sustainable water resources. • Reduce the excess flow of clear water into the regional wastewater collection system (inflow and infiltration) to protect capacity for future growth. • Require proper management of subsurface treatment systems, consistent with Minn. Rules Chapters 7080-7083, to minimize

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reduce per capita water use to protect the region's water supply. • Plan for sustainable water supply options and groundwater recharge areas to promote development in accordance with natural resources protection and efficient use of land. • Partner with other water supply providers to explore options to reduce dependence on groundwater. • Prepare and implement local surface water plans as required by Minnesota Rules Chapter 8410, the Metropolitan Land Planning Act, and the 2040 Water Resources Policy Plan. • Reduce the excess flow of clear water into the local wastewater collection system (inflow and infiltration). Participate in inflow / infiltration grant programs as available. • Incorporate current MPCA regulations (Minn. Rules Chapters 7080-7083) as part of a program for managing subsurface sewage treatment systems (SSTS) in the comprehensive plan and local ordinances, and implement the standards in issuing permits. Describe the conditions under which the installation of SSTS will be permitted and the areas not suitable for public or private systems. • Adopt and enforce ordinances related to stormwater management and erosion control. • Adopt and implement best management practices for abating, preventing, and reducing point and nonpoint source pollution. • Develop and adopt critical area plans and ordinances consistent with Executive Order 79-19 and Critical Area Program rules in all communities with affected lands in the Mississippi River Critical Area Corridor. • Integrate drinking water source protection into local land use decisions, particularly in Drinking Water Supply Management Areas. • Develop programs that encourage stormwater management, treatment, and infiltration.	impacts on surface water, groundwater, and public health. • Assure adequate and high quality groundwater and surface water supplies to protect public health and support economic growth and development by promoting the wise use of water through a sustainable balance of surface water and groundwater use, conservation, reuse, aquifer recharge, and other practices. • Review watershed management plans in coordination with the Board of Water and Soil Resources. • Review local water plans in partnership with the watershed organizations that approve the local water plans. • Support implementation of volume reduction techniques such as infiltration or filtration for stormwater management. • Promote the implementation of best management practices for stormwater management. • Collaborate with the Minnesota Department of Natural Resources (DNR) to provide technical assistance to local governments in implementing the Mississippi River Critical Area Program, and coordinate with the DNR in review of those plans and ordinances.
Ramsey Role – Resilience	Metropolitan Council Role – Resilience

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- Identify local measures that would result in reductions in water use, energy consumption, and greenhouse gas emissions.
- Identify local mitigation and adaptation strategies and infrastructure resiliency plans to protect against potential negative impacts to local economies, local resources, and infrastructure systems that result from more frequent or severe weather events.
- Implement compact development patterns and create more connected places to reduce auto-dependency and related generation of greenhouse gas emissions.
- Address climate change mitigation and adaptation in locally meaningful ways in the local comprehensive plan.
- Identify local measures that would result in reductions in water use, energy consumption, and emission of greenhouse gases.
- Ensure that local comprehensive plans and ordinances protect and enable the development of solar resources, as required by the Metropolitan Land Planning Act, and consider the use of other alternative energy sources as part of the planning process.
- Consider the development or use of community solar gardens (CSGs) by public and private entities to enable fuller and more economic use of the community's solar resource, including participating as subscribers, assisting in marketing community solar garden opportunities for economic development, and providing sites for gardens to be developed.
- Identify local measures to address impacts to local economies, local resources, and infrastructure systems as a result of more frequent or severe weather events.
- Identify local initiatives as cost-saving measures that may, as a result, lower energy consumption, reduce the generation of greenhouse gas emissions, preserve water supply, reduce municipal waste, or increase participation in recycling programs.
- Participate in programs that evaluate and share city practices and provide technical

- Substantially reduce energy consumption at Council facilities, improve the efficiency of the Council's vehicle fleets including Metro Transit buses, and provide information to the public and partners to lead by example.
- With regional infrastructure, planning, and operations, increase efforts to reduce water use and energy consumption.
- Identify and address potential vulnerabilities in regional systems as a result of increased frequency and severity of storms and heat waves. Maintain dikes, emergency generators, and response plans for Council facilities facing extreme weather.
- Use the Council's investments and planning authorities to contribute toward meeting statutory goals for reductions in the generation of regional greenhouse gas emissions.
- Convene regional discussions about goals for climate change mitigation and adaptation.
- Encourage the preparation of adaptation, mitigation, and resiliency responses to climate change as part of the comprehensive plan update.
- Develop, collect, and disseminate information about climate change, including energy and climate data, GreenStep Cities best practices, and the next generation of the Regional Indicators data.
- Work with the State of Minnesota on a greenhouse gas emissions inventory that informs regional discussion on emissions reduction.
- Provide technical assistance and toolkit resources to communities in integrating climate change mitigation and adaptation strategies as part of local comprehensive plans.
- Develop and strengthen partnerships with experts in climate change to better assist and inform local communities on how best to evaluate and develop local climate changes strategies.
- Encourage communities to participate in regional programs which support efforts to

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support, such as the GreenStep Cities program and the Regional Indicators Initiative.	inform, plan for, mitigate, adapt, and respond to climate change issues of local significance such as water conservation, stormwater infrastructure adaptation, greenhouse gas reduction, use of alternative energy sources, infrastructure planning, and hazard mitigation planning. • Provide technical references and resources for communities seeking to mitigate and adapt to climate change in their own facilities and in their communities. Examples of these resources include stormwater, wastewater, and water supply management practices, and transit and land use planning. • Provide, or collaborate with partners to provide, technical references, and resources for communities seeking to mitigate and adapt to climate change, in their own facilities and in their communities, including, but not limited to, stormwater, wastewater, and water supply management practices,

DRAFT

Introduction

Designated by Governor's Executive Order in the 1970s, the Mississippi River Corridor Critical Area (MRCCA) is a land corridor along the Mississippi River in the Twin Cities Metropolitan Area governed by special land planning requirements and land development regulations. These regulations, which are implemented through local MRCCA plans and ordinances, protect and preserve the natural, scenic, recreational, and transportation resources of this section of the Mississippi River. The MRCCA comprises 72 miles of river and 54,000 acres of surrounding land in 30 local jurisdictions.

Ramsey adopted its first Critical Area Plan in 1980. Ramsey adopted its first Critical Area Ordinance in 1985, and has processed several amendments since that date.

Ramsey has ensured that plan preparation has included extensive public engagement. In 2013, Ramsey hosted a series of public workshops on the topic, and maintains a contact database. In addition, Ramsey's overall Comprehensive Plan Update has included the most extensive public engagement process Ramsey has hosted for any of its Comprehensive Plan Updates.

Goals for the Critical Area

- Improve water quality.
- Reduce shoreline erosion.
- Improve access to the river.
- Protect significant ecological areas.

Initiatives for the Critical Area

Improve Water Quality

Initiatives designed to advance the improvement of water quality.

- Reduce the amount of sediment entering the river.
- Reduce the amount of phosphorus entering the river.

Reduce Shoreline Erosion

- Reduce the amount of erosion of upland area.

Improve Access to River

- Provide guidance to private owners on creating private access points.
- Encourage utilization of existing public spaces to access and view the river.
- Prioritize areas of additional acquisition to improve public access to the river.

Protect Significant Ecological Resources

- Encourage the protection of significant tree canopy coverage.
- Encourage the protection of ecologically significant vegetation.
- Encourage the establishment of pollinator friendly landscaping.

Mississippi River Corridor Critical Area Districts

River Neighborhood

The river neighborhood district is characterized by primarily residential neighborhoods that are riparian or readily visible from the river or that abut riparian parkland. The district includes parks and open space, limited commercial development, marinas, and related land uses.

The river neighborhood district must be managed to maintain the character of the river corridor within the context of existing residential and related neighborhood development, and to protect and enhance habitat, parks and open space, public river corridor views, and scenic, natural, and historic areas. Minimizing erosion and the flow of untreated storm water into the river and enhancing habitat and shoreline habitat vegetation are priorities in the district.

Rural Open Space

The rural and open space district is characterized by rural and low-density development patterns and land uses, and includes land that is riparian or visible from the river, as well as large, undeveloped tracts of high ecological and scenic value, floodplain, and undeveloped islands. Many primary conservation areas exist in the district.

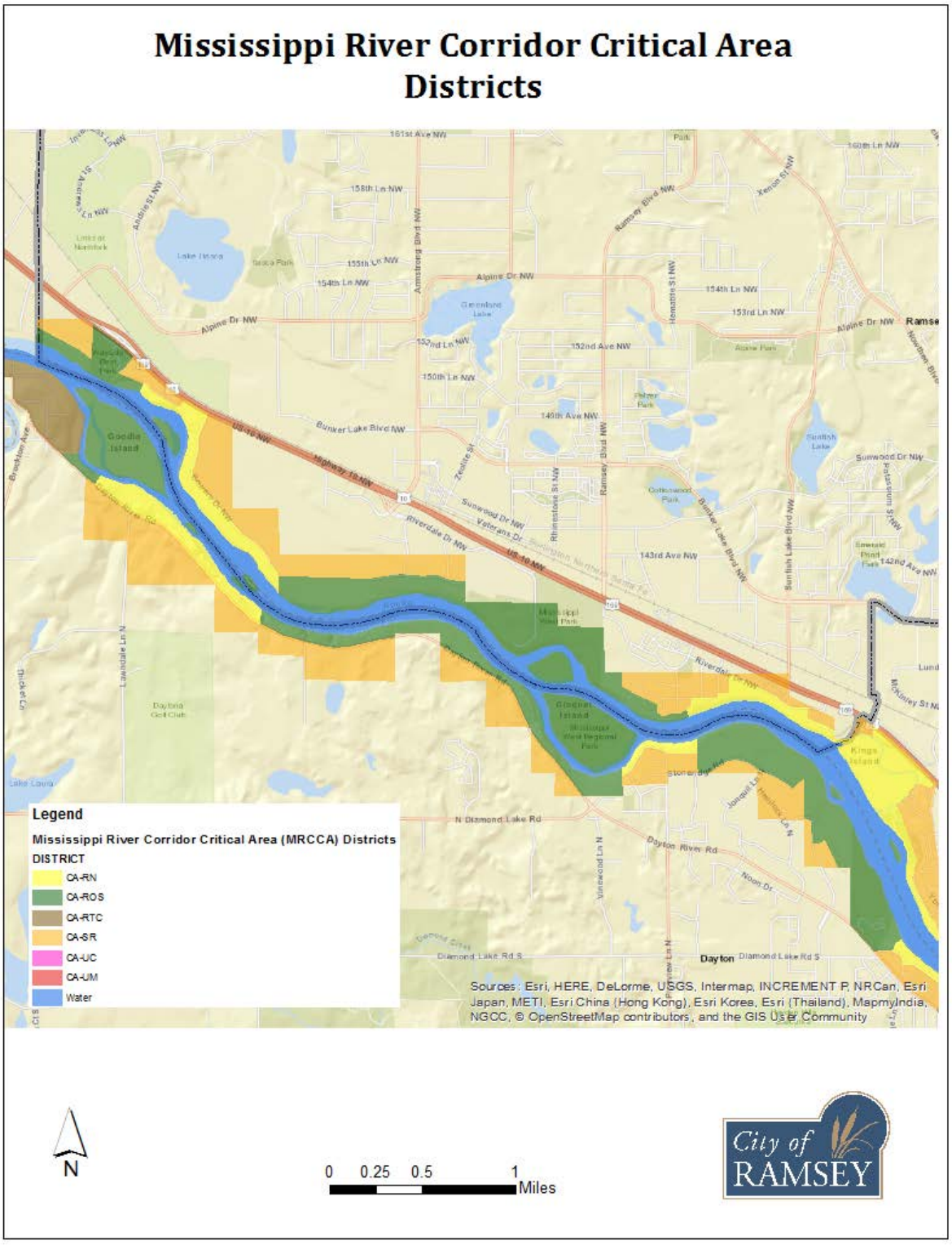
The rural open space district must be managed to sustain and restore the rural and natural character of the corridor and to protect and enhance habitat, parks and open space, public river corridor views, and scenic, natural, and historic areas.

Separated From River

The separated from river district is characterized by its physical and visual distance from the Mississippi River. The district includes land separated from the river by distance, topography, development, or a transportation corridor. The land in this district is not readily visible from the Mississippi River.

The CA-SR district provides flexibility in managing development without negatively affecting the key resources and features of the river corridor. Minimizing negative impacts to primary conservation areas and minimizing erosion and flow of untreated storm water into the Mississippi River are priorities in the district.

Figure 1: Mississippi River Corridor Critical Area Districts



Primary Conservation Areas

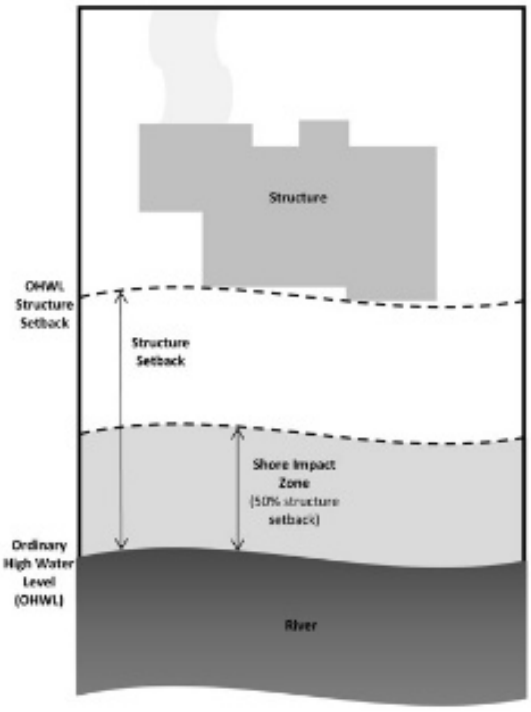
"Primary conservation areas" means key resources and features, including shore impact zones, bluff impact zones, floodplains, wetlands, gorges, areas of confluence with tributaries, natural drainage routes, unstable soils and bedrock, native plant communities, cultural and historic properties, significant existing vegetative stands, tree canopies, and other resources identified in local government plans.

General Overview and Description

Generalized maps of the Primary Conservation Areas below are included in the text below. Larger, more detailed maps are included as an appendix. Detailed maps will be available upon request.

Shore Impact Zones

"Shore impact zone" means land located between the ordinary high water level of public waters and a line parallel to it at a setback of 50 percent of the required structure setback or, for areas in agricultural use, 50 feet landward of the ordinary high water level.



Floodplains and Wetlands

"Floodplain" means the areas adjoining a watercourse which has been or hereafter may be covered by the regional flood.

Confluence with Key Tributaries

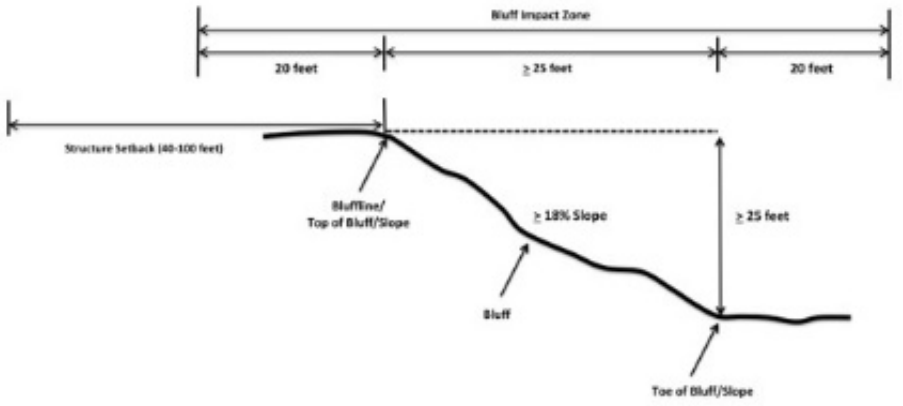
There are no confluences with key tributaries within Ramsey.

Natural Drainage Areas

The Critical Area Plan includes mapping of natural drainage areas that impact the Mississippi River.

Bluff Impact Zone

"Bluff impact zone" means the bluff and land within 20 feet of the bluff.



Native Plant Communities and Significant Existing Vegetative Stands

"Native plant community" means a plant community that has been identified as part of the Minnesota biological survey or biological survey issued or adopted by a local, state, or federal agency.

Cultural & Historic Properties

Historic property" means an archaeological site, standing structure, site, district, or other property that is:

A. listed in the National Register of Historic Places or the State Register of Historic Places or locally designated as a historic site under Minnesota Statutes, chapter 471;
B. determined to meet the criteria for eligibility to the National Register of Historic Places or the State Register of Historic Places; or
C. an unplatted cemetery that falls under the provisions of Minnesota Statutes, chapter 307, in consultation with the Office of the State Archeologist.

One area of cultural and historic significance is located in the corridor. It does not meet the definition above. The location of the first settlement in Ramsey is located within the corridor, originally known as Itasca Village. There are no remaining structures or assets from this original settlement.

Gorges

There are no gorges located in Ramsey.

Unstable Soils and Bedrock

There is significant areas of shoreline erosion located along Ramsey's Mississippi River Shoreline. This erosion is documented through a 2016 Anoka Conservation District Survey. The results of said survey are incorporated into this document by reference. Ramsey will be utilizing this information for education, outreach, and funding purposes to restore priority areas from further erosion.

Figure 2: Shore Impact Zone Map

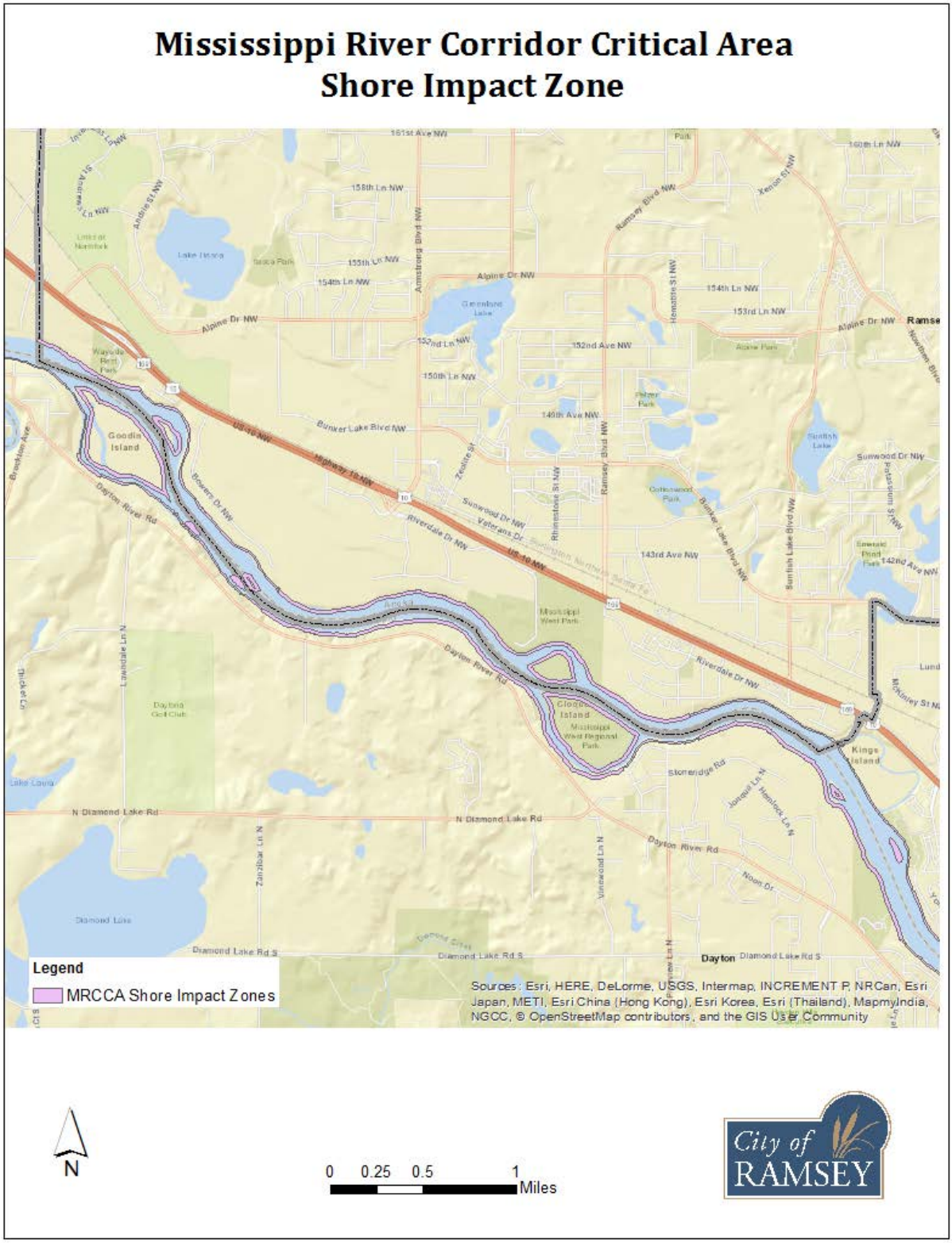


Figure 3: Floodplains and Wetlands

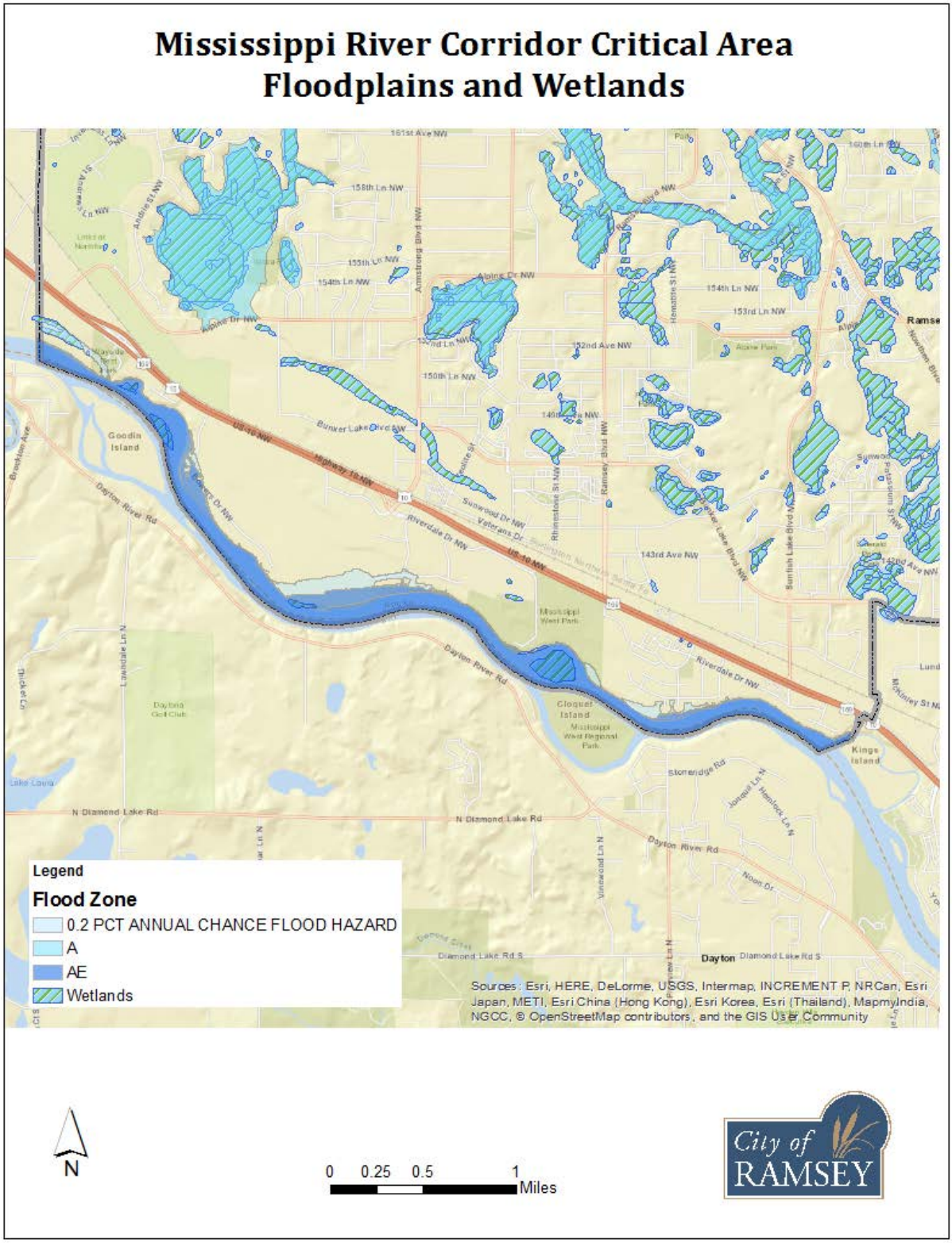


Figure 4: Confluence with Key Tributaries

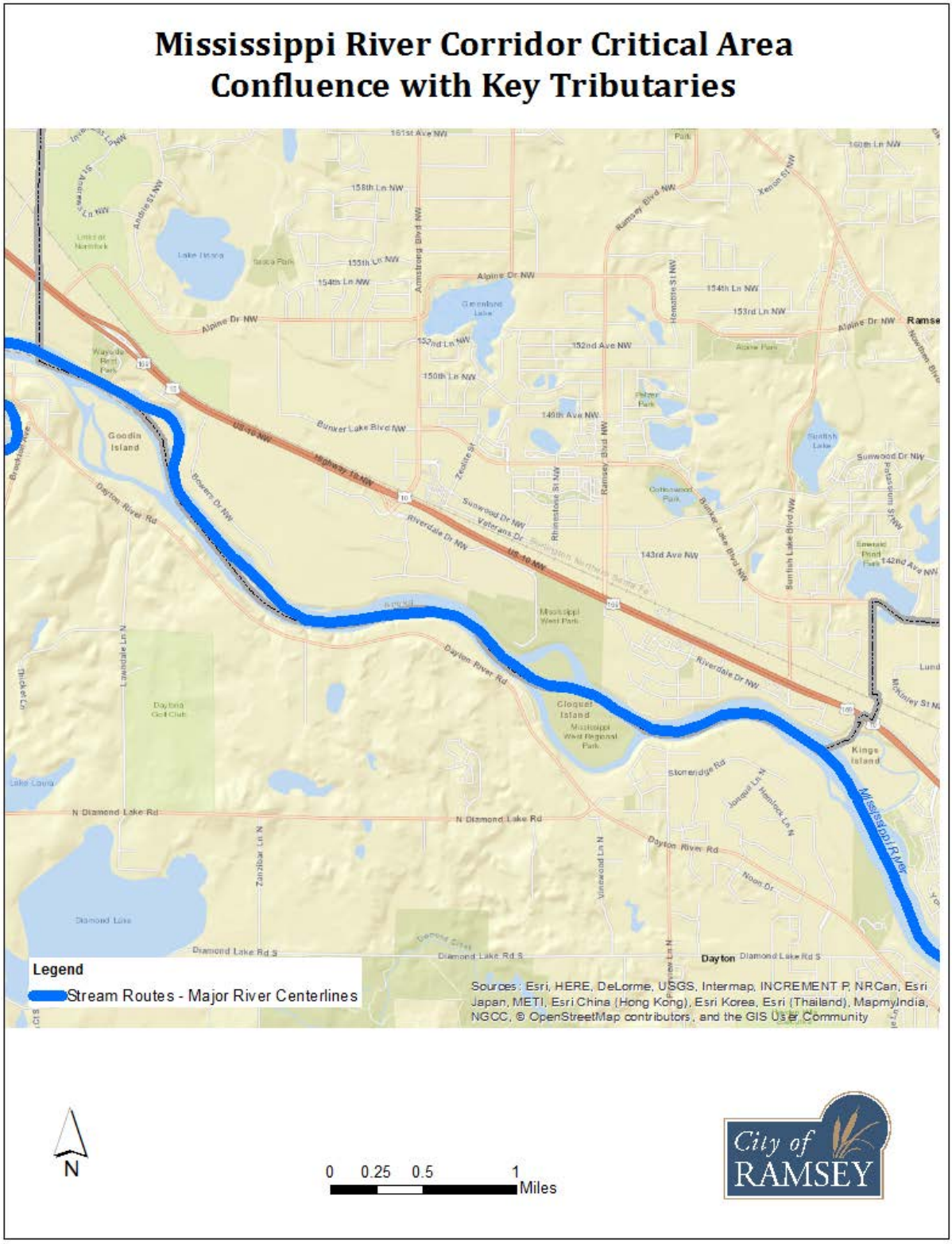


Figure 5: Natural Drainage Areas

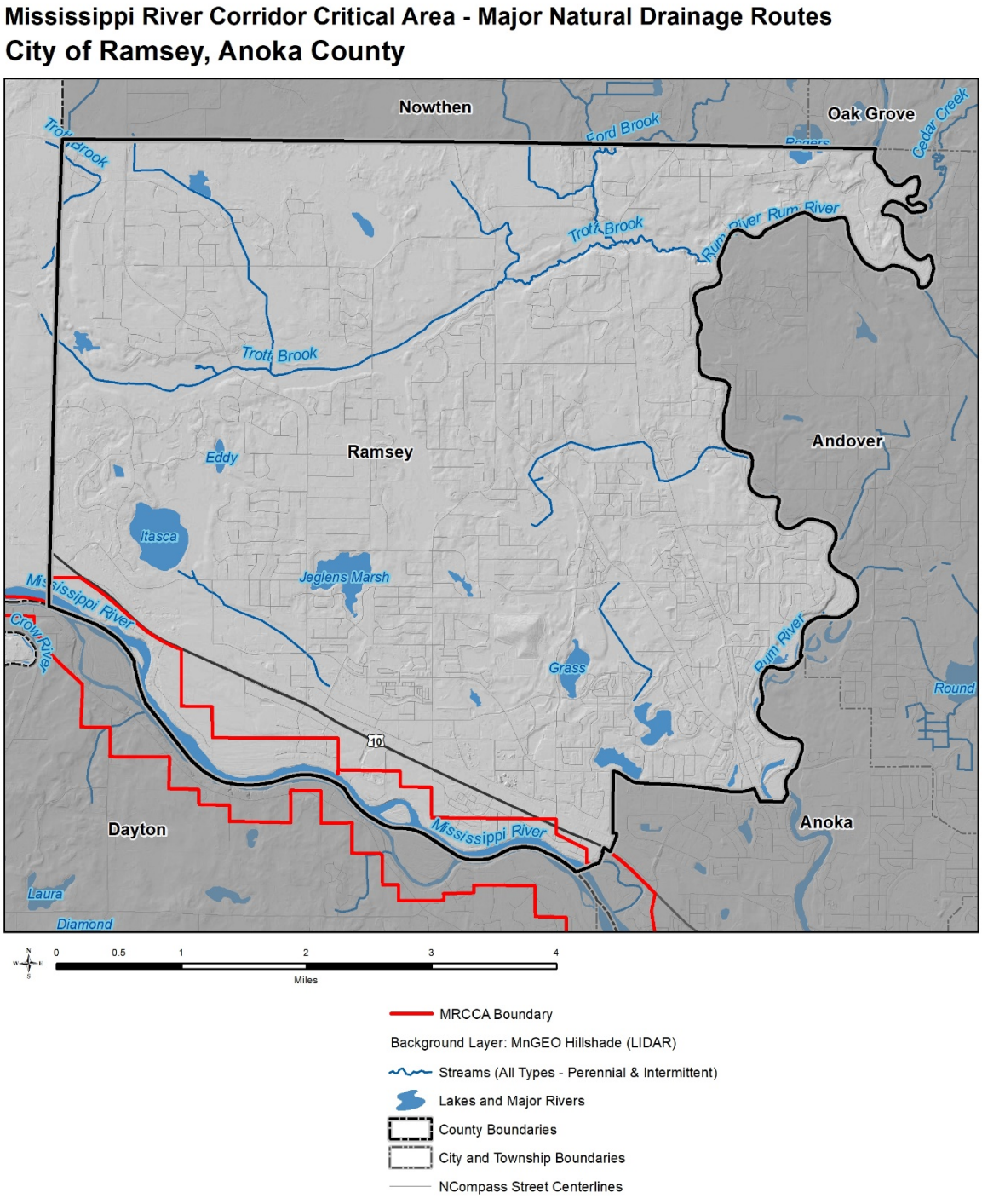


Figure 6: Bluffs and Bluff Impact Zones

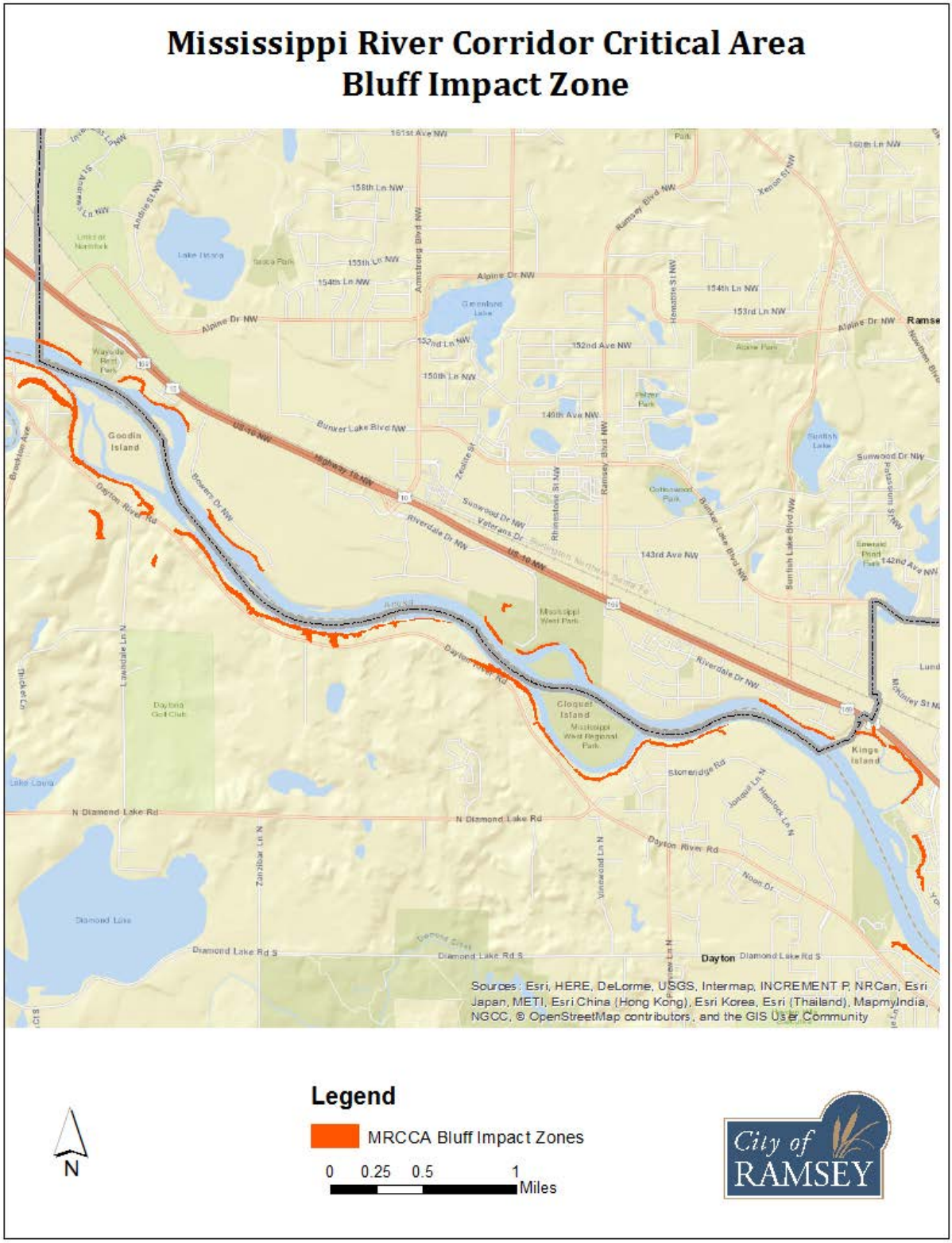
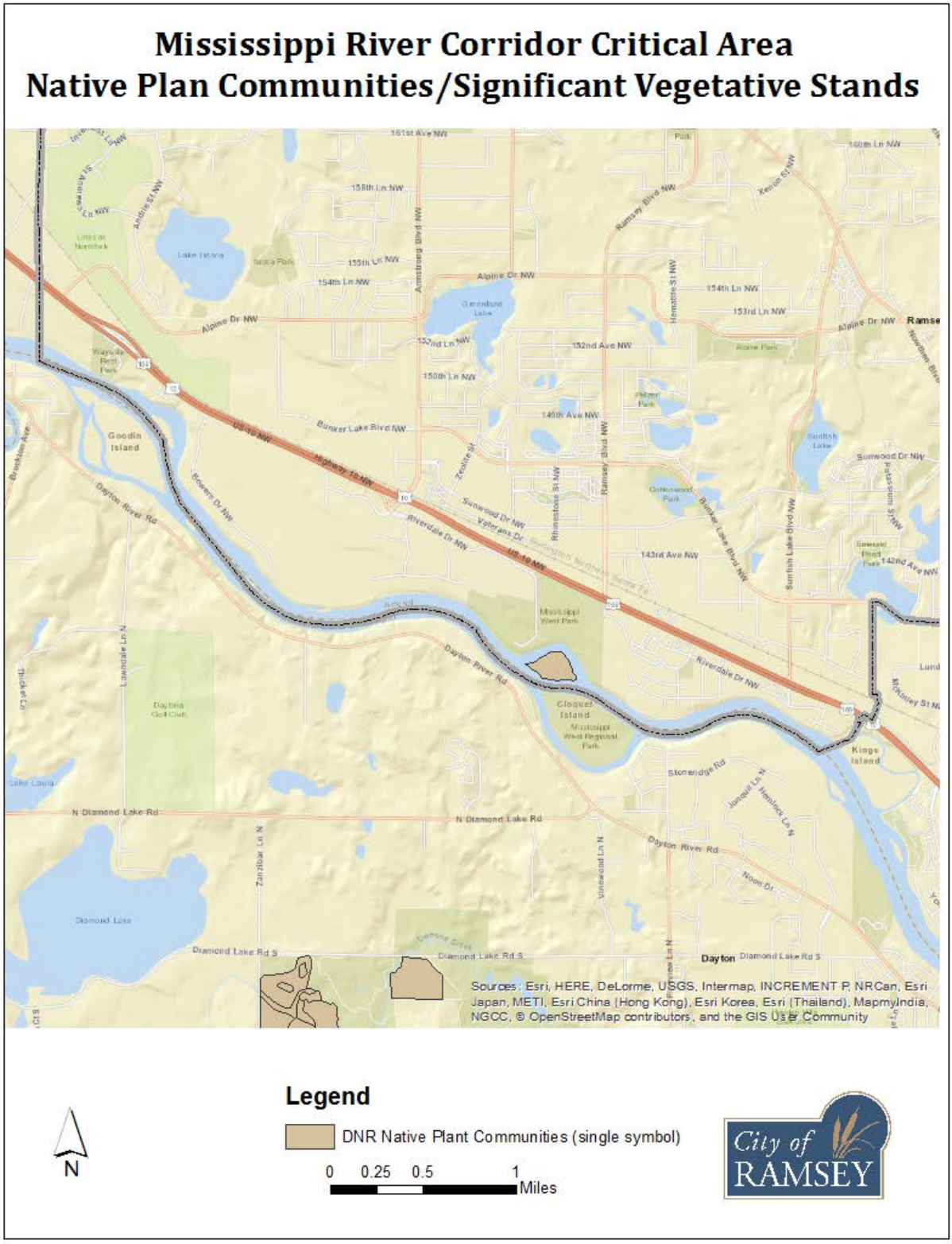


Figure 7: Native Plan Communities & Significant Existing Vegetative Stands



Public River Corridor Views

General Overview

Views Toward River from Public Places

Views Toward Bluffs from River

Rivlyn Neighborhood







Other Important Views

Priorities for Restoration

Ramsey's priority for restoration within the Corridor is protecting the Corridor from significant erosion as identified by the 2017 Anoka Conservation District Mississippi River Shoreline Inventory for Ramsey.

Figure 8: Vegetation Restoration Priorities

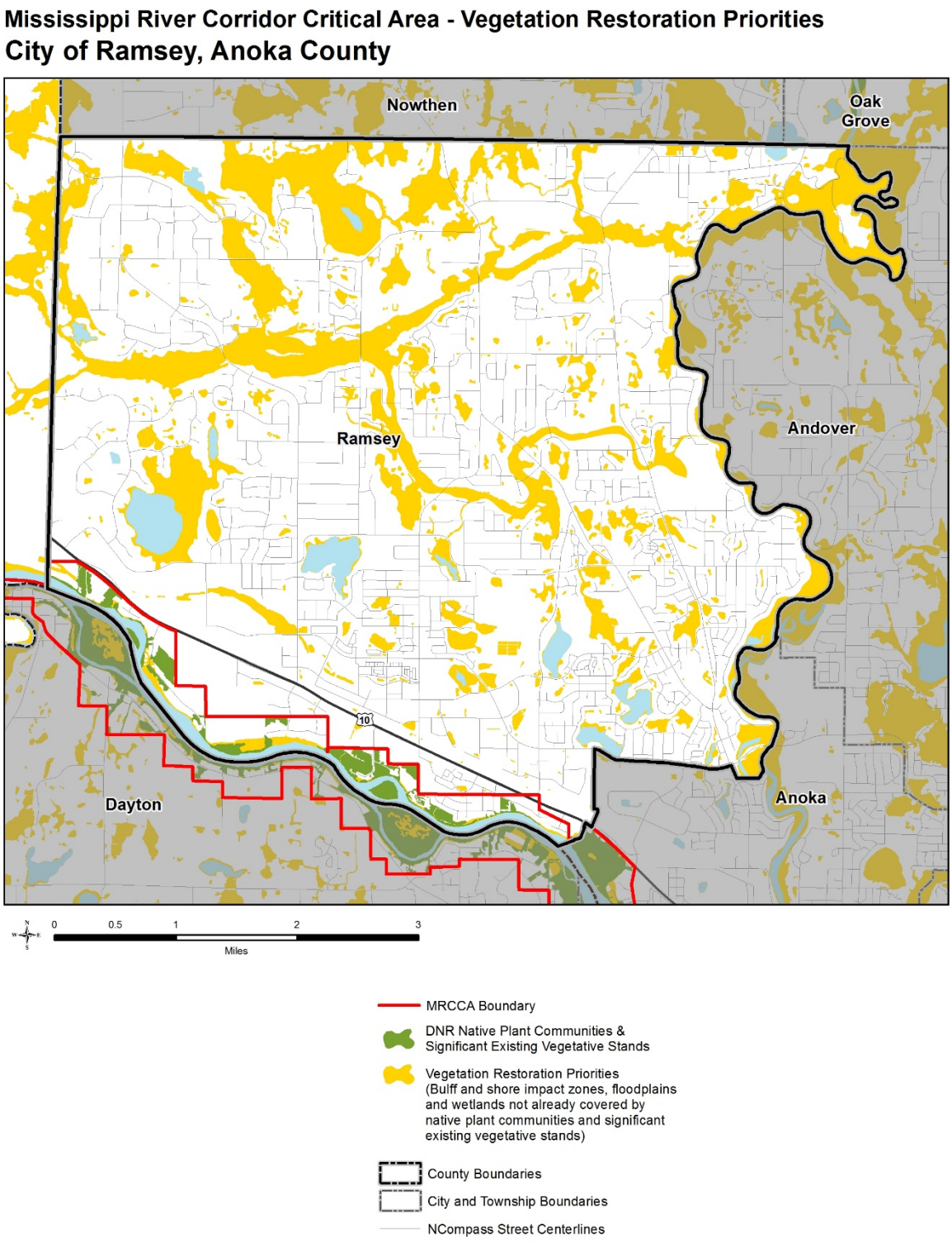
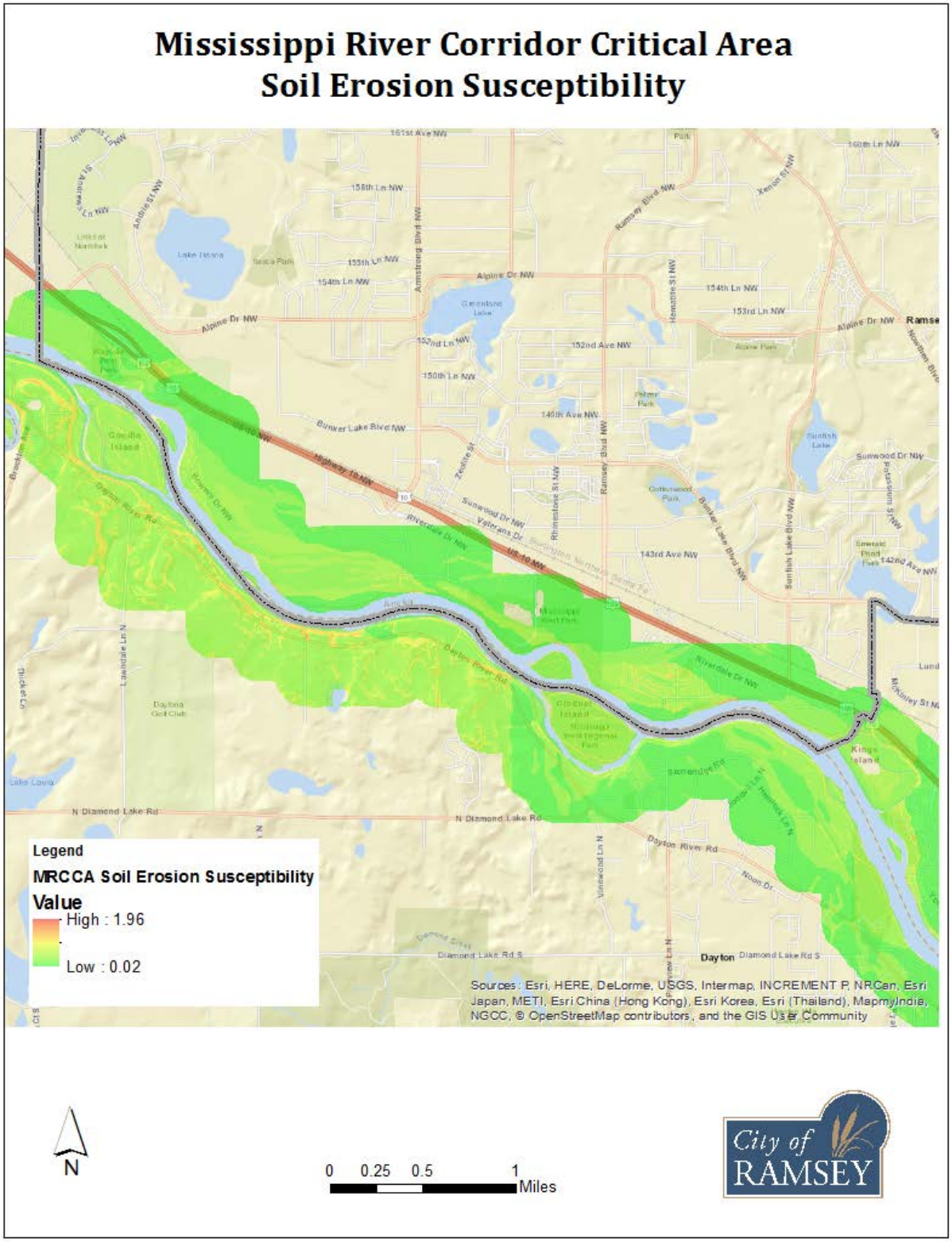


Figure 9: Soil Erosion Susceptibility



Surface Water Uses

Water-Oriented Uses

Open Space & Recreational Facilities

Existing Recreation Facilities

The Mississippi River Trail and Riverdale Park are currently located within the Corridor.

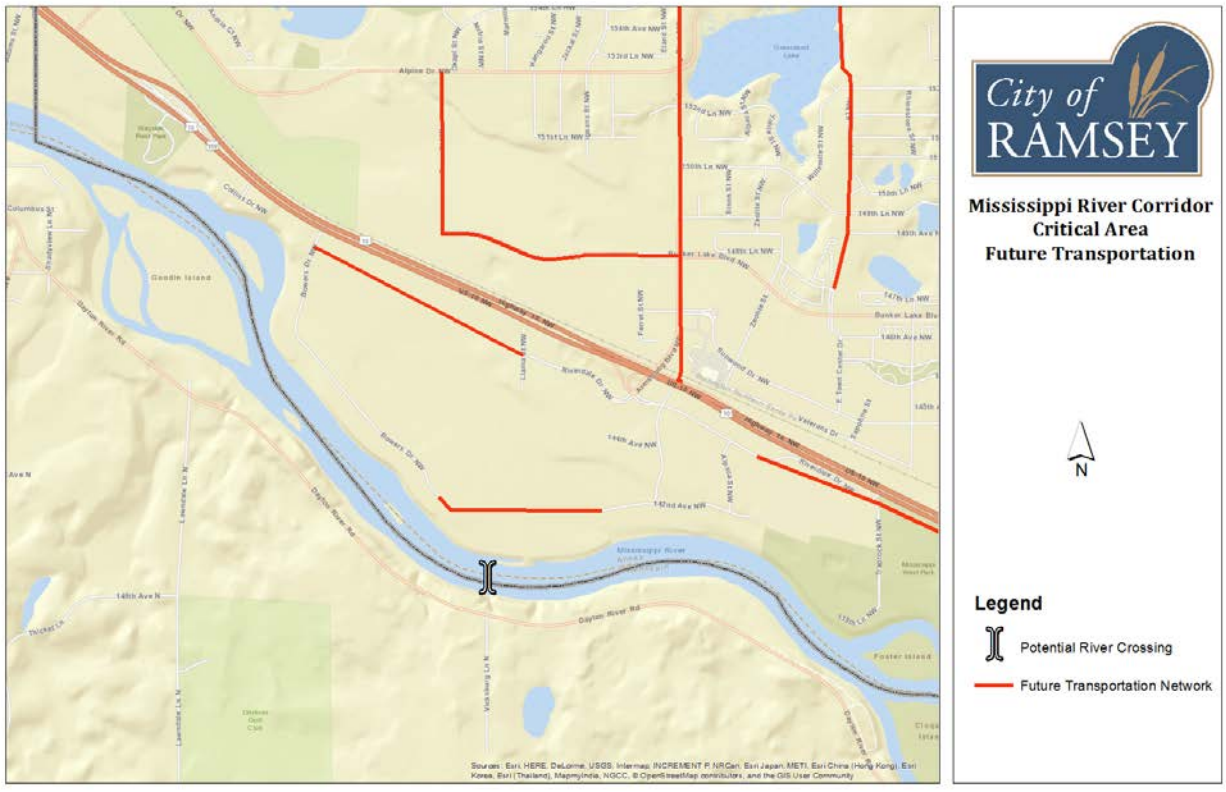
Future Recreation Facilities

The future Mississippi West Regional Park is located within the Corridor. In addition, the future alignment of Central Anoka County Regional Trail connect to the Corridor. A future component of the Central Anoka County Regional Trail is a grade-separated pedestrian crossing over the BNSF/Northstar Commuter Rail Corridor and U.S. Highway 10, known as the Mississippi Skyway.

Transportation & Public Utilities

An existing Connexus Energy Electric Transmission Line current crosses the Mississippi River connecting Ramsey and Dayton. Ramsey continues to plan for a future River Crossing between Ramsey and Dayton.

Figure 10: Mississippi River Bridge/Crossing



Policies

General

Districts/Land Use

Ramsey will implement the policies of the Critical Area by adopting the new districts within our Zoning Code.

Primary Conservation Areas

Public River Corridor Views

Restoration Priorities

Surface Water Uses

Ramsey will continue to support Anoka County's operation of a Boat Launch along Traprock Street.

Water-Oriented Use

Open Space & Recreation Facilities

Ramsey will continue to support planning and implementation for Mississippi West. Ramsey will continue to own and maintain Riverdale Park. Ramsey will continue to plan for a new municipal park along the Mississippi River between the Alpaca Estates and Bowers neighborhoods.

Transportation & Public Utilities

Ramsey will continue to support future planning for the future Mississippi River Crossing to the City of Dayton in Hennepin County.

Ramsey will continue to support Connexus Energy's electric transmission line across the Mississippi River to the City of Dayton.

Implementation

ACTION	TIMEFRAME
Ordinance/City Code Updates	
Amend MRCCA Overlay District (City Code)	2019
Amend Zoning Map	2019
Ordinance/City Code Administration	
Establish General Land Use Review Procedures	2019
Develop Administrative Procedures for Shoreline Stabilization	2019
Actively communicate with other communities to protect views they have identified in your community that are valuable, and vice versa.	2019
Establish a vegetation permitting process that includes permit review procedures to ensure consideration of restoration priorities identified in this plan in permit issuance, as well as standard conditions requiring vegetation restoration for those priority areas.	2020
Establish process for evaluating priorities for natural vegetation restoration, erosion prevention and bank and slope stabilization, or other restoration priorities identified in this plan in CUP, variances and subdivision/PUD processes.	2020
Develop visual analysis approach for CUPs for additional height in the RTC and UM districts (if applicable), as well as for proposed PUDs and variances.	2020
Develop a system for reviewing, tracking, and monitoring open space required as part of the subdivision process.	2020

ACTION	TIMEFRAME
Education and Outreach	
Create Informational Packet	2019
Develop a Communications Plan	2019
Create New MRCCA Webpage	2019
Create Signage Package for Public Places	2020
Capital Improvements	
Update Capital Improvement Program to Reflect MRCCA Plan Update	2019
Include Transportation Corridors Within MRCCA in CIP	2019
Land Acquisition	
Create Land Acquisition Plan for Select Parcels	2020
Additional Initiatives	
Adopt Surface Water Regulations	2019
Conduct Additional Research	??
Coordinate Jurisdictional Planning Efforts	??
Conduct Master Planning Efforts	??
Conduct Corridor Planning Efforts	??

Submittal to DNR and Metropolitan Council Incorporating DNR comments

City of Ramsey Local Water Supply Plan
Third Generation for 2016-2018

Formerly called Water Emergency & Water Conservation Plan



Cover photo by Molly Shodeen



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DEPARTMENT OF NATURAL RESOURCES – DIVISION OF ECOLOGICAL AND WATER RESOURCES AND METROPOLITAN COUNCIL

INTRODUCTION TO WATER SUPPLY PLANS (WSP)

Who needs to complete a Water Supply Plan

Public water suppliers serving more than 1,000 people, large private water suppliers in designated Groundwater Management Areas, and all water suppliers in the Twin Cities metropolitan area are required to prepare and submit a water supply plan.
The goal of the WSP is to help water suppliers: 1) implement long term water sustainability and conservation measures; and 2) develop critical emergency preparedness measures. Your community needs to know what measures will be implemented in case of a water crisis. A lot of emergencies can be avoided or mitigated if long term sustainability measures are implemented.

Groundwater Management Areas (GWMA)

The DNR has designated three areas of the state as Groundwater Management Areas (GWMAs) to focus groundwater management efforts in specific geographies where there is an added risk of overuse or water quality degradation. A plan directing the DNRs actions within each GWMA has been prepared. Although there are no specific additional requirements with respect to the water supply planning for communities within designated GWMAs, communities should be aware of the issues and actions planned if they are within the boundary of one of the GWMAs. The three GWMAs are the North and East Metro GWMA (Twin Cities Metro), the Bonanza Valley GWMA and the Straight River GWMA (near Park Rapids). Additional information and maps are included in the DNR webpage at http://www.dnr.state.mn.us/gwmp/areas.html

Benefits of completing a WSP

Completing a WSP using this template, fulfills a water supplier's statutory obligations under M.S. M.S.103G.291 to complete a water supply plan. For water suppliers in the metropolitan area, the WSP will help local governmental units to fulfill their requirements under M.S. 473.859 to complete a local comprehensive plan. Additional benefits of completing WSP template:

- The standardized format allows for quicker and easier review and approval.
- Help water suppliers prepare for droughts and water emergencies.
- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.

- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.
- Fulfill the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.
- Upon implementation, contribute to maintaining aquifer levels, reducing potential well interference and water use conflicts, and reducing the need to drill new wells or expand system capacity.
- Enable DNR to compile and analyze water use and conservation data to help guide decisions.
- Conserve Minnesota's water resources

If your community needs assistance completing the Water Supply Plan, assistance is available from your area hydrologist or groundwater specialist, the MN Rural Waters Association circuit rider program, or in the metropolitan area from Metropolitan Council staff. Many private consultants are also available.

WSP Approval Process

10 Basic Steps for completing a 10-Year Water Supply Plan

1. Download the DNR/Metropolitan Council Water Supply Plan Template www.mndnr.gov/watersupplyplans
2. Save the document with a file name with this naming convention: WSP_cityname_permitnumber_date.doc.
3. The template is a form that should be completed electronically.
4. Compile the required water use data (Part 1) and emergency procedures information (Part 2)
5. The Water Conservation section (Part 3) may need discussion with the water department, council, or planning commission, if your community does not already have an active water conservation program.
6. Communities in the seven-county Twin Cities metropolitan area should complete all the information discussed in Part 4. The Metropolitan Council has additional guidance information on their webpage http://www.metrocouncil.org/Handbook/Plan-Elements/Water-Resources/Water-Supply.aspx. All out-state water suppliers do *not* need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document to insure all data is complete and attachments are included. This will allow for a quicker approval process. www.mndnr.gov/watersupplyplans
8. Plans should be submitted electronically – no paper documents are required. https://webapps11.dnr.state.mn.us/mpars/public/authentication/login

9. DNR hydrologist will review plans (in cooperation with Metropolitan Council in Metro area) and approve the plan or make recommendations.
10. Once approved, communities should complete a Certification of Adoption form, and send a copy to the DNR.

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	**1985-6005**
Ownership	☒ Public or ☐ Private
Metropolitan Council Area	☒ Yes or ☐ No (and county name)
Street Address	**7550 Sunwood Drive, NW**
City, State, Zip	**Ramsey, MN 55303**
Contact Person Name	**John Nelson**
Title	**Utilities Supervisor**
Phone Number	763 286-0296
MDH Supplier Classification	Municipal

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

Wholesale deliveries are not part of Ramsey Water Demand

Table 2. Historic water demand (see definitions in the glossary after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	Water Supplier Services	Percent Unmetered/ Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2005	8,717	3307	327	200	20	N/A	542	576	N/A	8.50%	1.58	5.2	Jul-15	103	170
2006	9,263	3544	392	249	21	N/A	661	686	N/A	6.62%	1.88	5.6	Jul-10	116	196
2007	9,702	3720	424	244	35	N/A	704	705	N/A	5.23%	1.93	5.2	Jul-30	120	199
2008	10,101	3776	370	255	35	N/A	625	627	N/A	0.30%	1.72	5.2	Jul-06	100	170
2009	10,540	3820	397	226	30	N/A	623	640	N/A	2.70%	1.75	4.6	Jun-04	103	162
2010	11,669	3879	375	217	28	N/A	620	628	N/A	5.70%	1.72	4.1	Jul-06	88	146
2011	11,807	3901	353	205	20	N/A	577	590	N/A	5.42%	1.62	4.6	Jul-10	82	134
2012	11,987	3957	418	233	28	N/A	680	690	N/A	5.65%	1.89	5.5	Jul-25	96	155
2013	12,838	4050	386	213	18	N/A	617	620	N/A	3.34%	1.70	5.0	Aug-26	82	132
2014	13,535	4110	343	224	20	N/A	552	588	N/A	3.52%	1.61	4.6	Jul-23	69	112
2015	13,774	4186	360	231	22	N/A	613	661	N/A	10.63%	1.81	4.5	Aug-05	72	122
Avg. 2010-2015	12,602	4,014	373	221	23		610	629		5.71%	1.72	4.7		81	131

MG – Million Gallons **MGD –** Million Gallons per Day **GPCD** – Gallons per Capita per Day

See Glossary for definitions

Table 3. Historic water demand (see definitions in the glossary after Part 4 of this template)

Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer Rank	Name	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
1	City, Buildings and Park Irrigation	IRRIGATION	26,163,000	5.39	YES
2	Vision Ease Lens, Inc.	INDUSTRIAL	23,634,000	4.87	YES
3	Alpine Acres	IRRIGATION	12,518,000	2.58	UNKNOWN
4	Oak Terrace Park Properties	RESIDENTIAL	7,669,000	1.58	UNKNOWN
5	Cove at Mississippi	IRRIGATION	6,494,000	1.34	UNKNOWN
6	Holiday Companies #395 Ramsey Blvd	COMMERCIAL	5,076,000	1.05	UNKNOWN
7	Life Fitness	INDUSTRIAL	4,696,000	0.97	YES
8	Holiday Station Stores #323 TH 47	COMMERCIAL	4,351,000	0.90	UNKNOWN
9	Comfort Suites	COMMERCIAL	4,170,000	0.86	YES
10	Sauter & Sons, Inc.	INDUSTRIAL	4,109,000	0.85	UNKNOWN

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
Pump House 1 Wells 1 & 2	**1989**	**1,368,000**	**Chemical addition**	**Chlorination, fluoridation, Ortho Polyphosphate C5**	**N/A**	**N/A**	**N/A**
Pump House 2 Well 3	**1997**	**2,304,000**	**Chemical addition**	**Chlorination, fluoridation, Ortho Polyphosphate C5**	**N/A**	**N/A**	**N/A**
Well 4 added to Pump house 2	**1998**	**1,224,000**	**Chemical addition**	**Chlorination, fluoridation, Ortho Polyphosphate C5**	**N/A**	**N/A**	**N/A**
Pump House 3 Well 5	**2000**	**1,224,000**	**Chemical addition**	**Chlorination, fluoridation, Ortho Polyphosphate C5**	**N/A**	**N/A**	**N/A**
Well 6 added to Pump House 3	**2005**	**1,296,000**					**N/A**
Pump House 4 Wells 7 & 8	**2007**	**3,528,000**	**Chemical addition**	**Chlorination, fluoridation, Ortho Polyphosphate C5**	**N/A**	**N/A**	**N/A**
Total	**NA**	**10,944,000**	**NA**	**NA**		**NA**	

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
1	Elevated storage	1989	Steel	500,000
2	Elevated storage	2000	Steel	1,500,000
3	Elevated storage	2010	Steel	2,000,000
Total	NA	NA	NA	4,000,000

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier's projected average water demand over the next 10 years (see Table 7 for projected water demand):

The current treatment capacity is 11 MGD and storage is 4 MGD. Average day demand is projected to increase from 1.81 MGD in 2015 to 2.38 MGD in 2025. The additional 0.57 MGD of demand is within the system's storage and treatment capacity based on Ten States Standards recommendation 7.0.1 that total storage shall equal the average daily consumption.

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.
Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1.**

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Groundwater	Well #1	161441	1984	700	320	Active	No
Groundwater	Well #2	416183	1987	220	320	Active	No
Groundwater	Well #3	580303	1997	1450	345	Active	No
Groundwater	Well #4	580313	1998	850	321	Active	No
Groundwater	Well #5	593672	2000	850	316	Active	Yes
Groundwater	Well #6	706840	2005	900	390	Active	No
Groundwater	Well #7	743832	2007	850	332	Active	No
Groundwater	Well #8	743833	2007	1400	354	Active	No

Limits on Emergency Interconnections

Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections,

including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

Well 2 is used to meet seasonal peak demands only. The City has two (2) interconnections with Anoka, one is hard piped and one uses hoses.

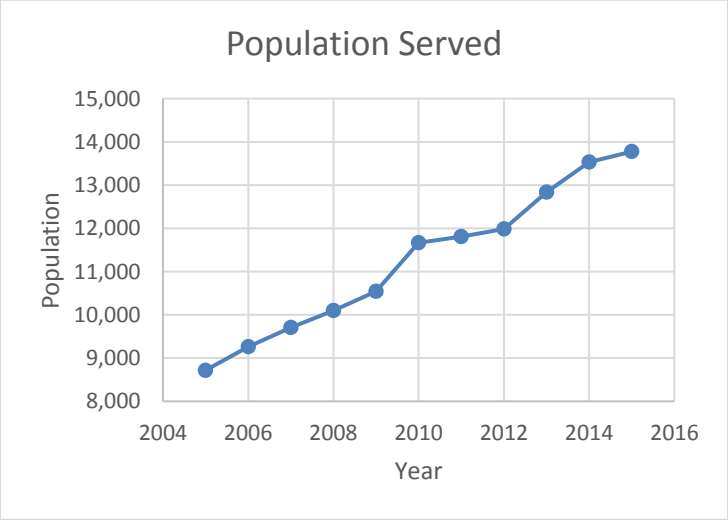
D. Future Demand Projections – *Key Metropolitan Council Benchmark*

Water Use Trends

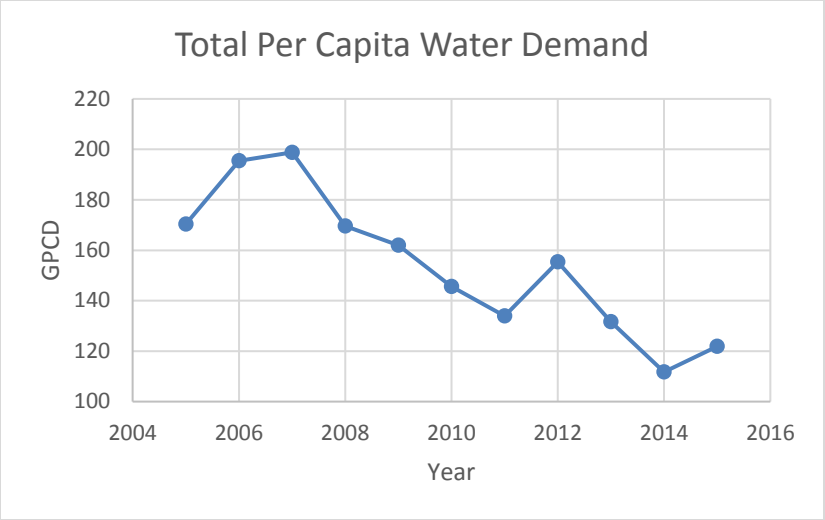
Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

The following trends are observed:

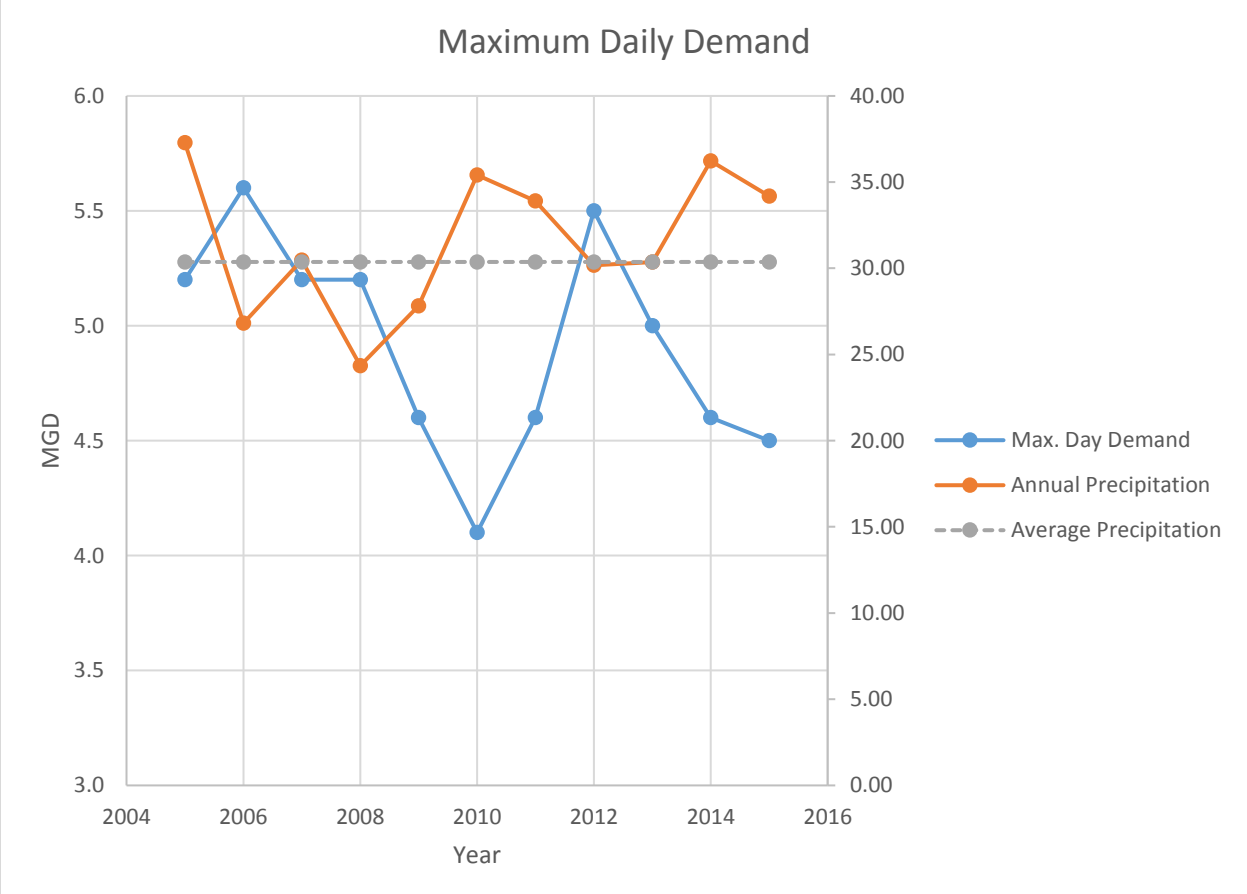
1. Population served increased to a peak in 2010, then dipped in 2011 and increased again. See graph below. The overall upward trend is caused by new connections added each year and construction that occurred in the past 10 years. There have been about 60 connections added per year on average over the last 5 years.



2. The total per capita water demand decreased from 170 GPCD in 2005 to 122 GPCD in 2015. Between 2005 and 2015, water use peaked at 196 GPCD and 199 GPCD in 2006 and 2007 respectively. The 5 year average from 2011 to 2015 was 131 GPCD. Several measures may have contributed to the overall decrease in total per capita water use, including replacing all residential meters in a 5 year period, implementation and enforcement of a new topsoil ordinance, changing the rate structure and increased enforcement of irrigation restrictions.



3. The average daily demand has fluctuated some between 2005 and 2015. Demand peaked in 2012, declined through 2014 then increased in 2015. The increased demand correlates with an uptick in housing construction in 2014 -2015.



4. The maximum daily demand decreased from 2006 to 2010, then increased until 2012 then decreased again to 2015. The decreasing trend is due to higher efficiency appliances, sprinkling bans and other conservation measures. The city had a flat fee residential rate structure in 2005. This was changed to a 7 tier sliding rate structure in 2006, with the rate increasing when each level. The City also has an escalating series of fines and penalties including water shutoff for those who consistently violate the odd-even sprinkling ban. The overall increase can be attributed to adding new customers as noted above. The spike in maximum daily demand in 2012 corresponds to two extremely dry months, August and September. These months saw less than one inch of precipitation in each month while the average is over 3.5 inches per month. The month of May saw 3 times the normal precipitation; however, eight (8) of the months were drier than normal. The year ended with close to normal precipitation.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2016	25,308	12,252	131	1.6050	4.6545
2017	25,581	12,524	131	1.6406	4.7579
2018	25,854	12,796	131	1.6763	4.8612
2019	26,127	13,068	131	1.7119	4.9645
2020	26,400	13,340	131	1.7475	5.0679
2021	26,830	14,150	131	1.8537	5.3756
2022	27,260	14,960	131	1.9598	5.6833
2023	27,690	15,770	131	2.0659	5.9910
2024	28,120	16,580	131	2.1720	6.2987
2025	28,550	17,390	131	2.2781	6.6065
2030	30,700	21,160	131	2.7720	8.0387
2040	34,700	23,920	131	3.1335	9.0872

GPCD – Gallons per Capita per Day **MGD** – Million Gallons per Day

Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

Populations were projected using linear interpolation of Metropolitan Council projections given in the 2015 System Statement for Ramsey.
The projected population served was estimated by multiplying the projected person per household by the projected residential connections. The projected residential connections were calculated by taking the average for the annual increase in residential connections from 2011 to 2015. (60 residential connections added per year) and added onto the 2015 actual residential connections and extrapolated out to 2040. The person/ household (PPH) was calculated to decrease from 3.1 in 2017 to 2.7 in 2040 by taking the projected total population and dividing it by the projected total households.

The average day demand was determined by multiplying the projected population served by 131 gallons per person per day (GPCD). The value 131 GPCD is the average GPCD for the last five years. The maximum daily demand was determined by multiplying the average day demand by 2.90, which is the max day peaking factor.

E. Resource Sustainability

Monitoring – *Key DNR Benchmark*

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. List should include all production wells, observation wells, and source water intakes or reservoirs. Add rows to the table as needed. Find information on groundwater level monitoring program at: http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
161441	☒ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
416183	☒ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
580303	☒ production well ☐ observation well ☐ source water intake	☐ routine MDH sampling ☒ routine water utility sampling	☐ continuous ☐ hourly ☐ daily ☒ monthly	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
	☐ source water reservoir	☐ other	☐ quarterly ☐ annually	
580313	☒ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
593672	☒ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☒ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☐ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
706814	☐ production well ☒ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☒ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
706815	☐ production well ☒ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☒ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
706840	☒ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
731127	☐ production well ☒ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☒ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
743832	☒ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☐ continuous ☐ hourly ☐ daily ☒ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge
713833	☒ production well ☐ observation well	☐ routine MDH sampling	☐ continuous ☐ hourly ☐ daily	☒ SCADA ☐ grab sampling ☐ steel tape

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
	☐ source water intake ☐ source water reservoir	☒ routine water utility sampling ☐ other	☒ monthly ☐ quarterly ☐ annually	☐ stream gauge
759582	☐ production well ☒ observation well ☐ source water intake ☐ source water reservoir	☐ routine MDH sampling ☒ routine water utility sampling ☐ other	☒ continuous ☐ hourly ☐ daily ☐ monthly ☐ quarterly ☐ annually	☒ SCADA ☐ grab sampling ☐ steel tape ☐ stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2**. If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed. Provide water level data graphs for each well in **Appendix 3** for the life of the well, or for as many years as water levels have been measured. See DNR website for Date Time Water Level http://www.dnr.state.mn.us/waters/groundwater_section/obwell/waterleveldata.html

Table 9. Water level data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
161441	Tunnel City Group	25	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____
416183	Tunnel City Group	0	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____
580303	Tunnel City Group	10	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____
580313	Tunnel City Group	40	☐ Falling ☒ Stable	MM/DD/YY: N/A MM/DD/YY:____

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
			☐ Rising	MM/DD/YY:____
593672	Tunnel City Group	90	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____
706840	Tunnel City Group	70	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____
743832	Tunnel City Group	130	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____
713833	Tunnel City Group	160	☐ Falling ☒ Stable ☐ Rising	MM/DD/YY: N/A MM/DD/YY:____ MM/DD/YY:____

Potential Water Supply Issues & Natural Resource Impacts – *Key DNR & Metropolitan Council Benchmark*

Complete Table 10 by listing the types of natural resources that are or could be impacted by permitted water withdrawals. If known, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the *Master Water Supply Plan Appendix 1 (Water Supply Profiles*, provides information about potential water supply issues and natural resource impacts for your community.

Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
☐ River or stream	N/A	☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐ Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☐ Calcareous fen	N/A	☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐ Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☐ Lake	N/A	☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		☐ Other: _____				
☐ Wetland	N/A	☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐ Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☐ Trout stream	N/A	☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐ Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☒ Aquifer	Tunnel City Group	☒ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural	☐ GIS analysis ☐ Modeling ☐ Mapping ☒ Monitoring ☒ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☒ Increase conservation ☐ Other	

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		resource impacts ☐ Other: _____				
☐ Endangered, threatened, or special concern species habitat, other natural resource impacts	N/A	☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐ Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	

* Examples of thresholds: a lower limit on acceptable flow in a river or stream; water quality outside of an accepted range; a lower limit on acceptable aquifer level decline at one or more monitoring wells; withdrawals that exceed some percent of the total amount available from a source; or a lower limit on acceptable changes to a protected habitat.

Wellhead Protection (WHP) and Surface Water Protection (SWP) Plans

Complete Table 11 to provide status information about WHP and SWP plans.

The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.

Table 11. Status of Wellhead Protection and Surface Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	☐ In Process ☒ Completed ☐ Not Applicable	August 11, 2009	August 2019
SWP	☐ In Process ☐ Completed ☒ Not Applicable		

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	☐ No action planned - adequate ☐ Repair/replacement ☒ Expansion/addition	2021 based on current demands and future projections	
Water Storage Facilities	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		
Water Treatment Facilities	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		
Distribution Systems (pipes, valves, etc.)	☐ No action planned - adequate ☐ Repair/replacement ☒ Expansion/addition	Based on development needs	

System Component	Planned action	Anticipated Construction Year	Notes
Pressure Zones	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		
Other:	☒ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		

Proposed Future Water Sources

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Groundwater	TBD	Tunnel City Group	1500	2020	
Surface Water	N/A				
Interconnection to another supplier	N/A				

Water Source Alternatives - *Key Metropolitan Council Benchmark*

Do you anticipate the need for alternative water sources in the next 10 years? Yes ☐ No ☒

For metro communities, will you need alternative water sources by the year 2040? Yes ☒ No ☐

If you answered yes for either question, then complete table 14. If no, insert NA.

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
☐ Groundwater	N/A					
☒ Surface Water	Mississippi River	100	2030	Met Council, Regional Partners	Current source aquifer lateral extent and capacity is unknown. Surface water connection would provide know supply.	Cost of new Water treatment plant and intake
☐ Reclaimed stormwater	N/A					
☐ Reclaimed wastewater	N/A					
☐ Interconnection to another supplier	N/A					

Part 2. Emergency Preparedness Procedures

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? Yes ☒ No ☐

If yes, what was the date it was certified? May 8, 2008

Complete Table 15 by inserting the noted information regarding your completed Federal Emergency Response Plan.

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	MATT KOHNER	763 433-9859	MKOHNER@CI.RAMSEY.MN.US
Alternate Emergency Response Lead	JOHN NELSON	763 286-0296	JNELSON@CI.RAMSEY.MN.US

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes ☒ No ☐

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280 . Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and

conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5**. A template is available at www.mndnr.gov/watersupplyplans

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes ☒ No ☐

Can staff access records and maps from a central secured location in the event of an emergency?

Yes ☒ No ☐

Does the appropriate staff know where the materials are located?

Yes ☒ No ☐

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Municipalities are encouraged to execute cooperative agreements for potential emergency

water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources. WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
CITY OF ANOKA	2000 GPM 2,880,000 GPD	EMERGENCY USE ONLY	MUTUAL AID AGREEMENT MNWARN

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
N/A				

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.

5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GDP)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	1,542,000	1,370,000
Institutional	2	14,600	10,000
Commercial	3	163,400	15,000
Industrial	4		
Irrigation	5		
Wholesale	N/A		
Non-Essential	6		
TOTAL		1,720,000	1,395,000

GPD – Gallons per Day

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
☐ Contamination ☒ Loss of production ☒ Infrastructure failure ☒ Executive order by Governor ☐ Other: _____	☐ Supply augmentation through ____ ☒ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☒ Water allocation through chart above ☒ Meet with large water users to discuss their contingency plan.	☐ Supply augmentation through ____ ☐ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☐ Water allocation through____ ☐ Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
☒ Short-term demand reduction declared (< 1 year)	☒ Website ☒ Email list serve ☒ Social media (e.g. Twitter, Facebook) ☒ Direct customer mailing, ☒ Press release (TV, radio, newspaper), ☒ Meeting with large water users (> 10% of total city use) ☐ Other: _____	☐ Daily ☒ Weekly ☐ Monthly ☐ Annually	
☒ Long-term Ongoing demand reduction declared	☒ Website ☒ Email list serve ☒ Social media (e.g. Twitter, Facebook) ☒ Direct customer mailing, ☒ Press release (TV, radio, newspaper), ☒ Meeting with large water users (> 10% of total city use) ☐ Other: _____	☐ Daily ☒ Weekly ☐ Monthly ☐ Annually	

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
☒ Governor's critical water deficiency declared	☒ Website ☒ Email list serve ☒ Social media (e.g. Twitter, Facebook) ☒ Direct customer mailing, ☒ Press release (TV, radio, newspaper), ☐ Meeting with large water users (> 10% of total city use) ☐ Other: _____	☐ Daily ☒ Weekly ☐ Monthly ☐ Annually	

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes ☐ No ☒

If yes, attach the official control document to this WSP as **Appendix 7**.

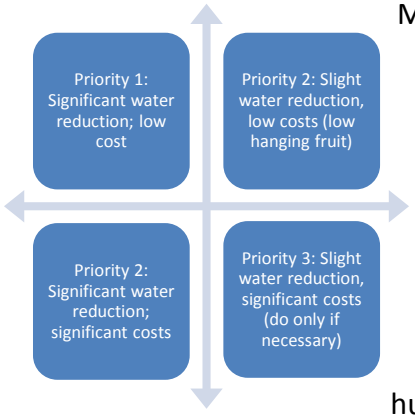
If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes ☒ No ☐

If yes, cite the regulatory authority reference: City Code 58-118 .

If no, who has authority to implement water use restrictions in an emergency?

PART 3. WATER CONSERVATION PLAN



Minnesotans have historically benefited from the state's abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.

There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is use to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: "How can I help save water?"

Progress since 2006

Is this your community's first Water Supply Plan? Yes ☐ No ☒

If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change water rates structure to provide conservation pricing	☒ Yes ☐ No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	☒ Yes ☐ No
Educational efforts	☒ Yes ☐ No
New water conservation ordinances	☒ Yes ☐ No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.	☐ Yes ☒ No
Enforcement	☒ Yes ☐ No
Describe other: Replaced all residential meters with Neptune Smart meters within last 10 years	☒ Yes ☐ No

What are the results you have seen from the actions in Table 21 and how were results measured?

Overall per capita demand dropped while adding new customers during this time period.

A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect surface water flows	☐ Low stream flow conditions ☐ Reports of declining wetland and lake levels	☐ Increase promotion of conservation measures ☐ Other: _____

Objective	Triggers	Actions
	☐ Other: _____	
Short-term demand reduction (less than 1 year	☒ Extremely high seasonal water demand (more than double winter demand) ☒ Loss of treatment capacity ☒ Lack of water in storage ☒ State drought plan ☐ Well interference ☐ Other: _____	☒ Adopt (if not already) and enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☐ Supply augmentation through ____ ☒ Water allocation through____ ☒ Meet with large water users to discuss user's contingency plan.
Long-term demand reduction (>1 year)	☒ Per capita demand increasing ☒ Total demand increase (higher population or more industry)Water level in well(s) below elevation of _____ ☐ Other: _____	☒ Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☐ Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. ☒ Meet with large water users to discuss user's contingency plan. ☐ Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor's "Critical Water Deficiency Order" declared	☒ "Critical Water Deficiency Order" issued	☒ Strictly enforce Odd/ Even Sprinkling Ban ☒ Reduce or eliminate irrigation at public buildings and parks

B. Conservation Objectives and Strategies – *Key benchmark for DNR*

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Waters Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your five-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

Yes ☐ No ☒

What is your leak detection monitoring schedule? (e.g. monitor 1/3rd of the city lines per year)

We get quarterly leak reports from our meter reading software. We follow up with a letter to the identified properties.

Water Audits - are intended to identify, quantify and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The American Water Works Association (AWWA) recommends that ten percent or less of pumped water is unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association www.mrwa.com . Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built.

What is the date of your most recent water audit? 2016 DNR Water Appropriation Permit

Frequency of water audits: ☒ **yearly** ☐ **other (specify frequency) _____**

Leak detection and survey: ☐ **every year** ☐ **every other year** ☒ **periodic as needed**

Year last leak detection survey completed: _____

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer's point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. AWWA also recommends that water suppliers conduct regular water audits to ensure accountability. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years
Residential	4105	4105	4105		8/10
Irrigation meters	145	145	145		/
Institutional	5	5	5		/
Commercial	255	255	255		/
Industrial					/
Public facilities	15	15	15		/

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years
Other					___ / ___
TOTALS	4525	4525	4525	NA	NA

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

All of our meters have advanced technology.

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years
Water source (wells/intakes)	8	10	0	_0_ / _10__
Treatment plant	N/A			___ / ___

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? Yes ☒ No ☐

What was your 2010 – 2015 five-year average residential per capita water demand? 87 g/person/day

Describe the water use trend over that timeframe:

Residential Per Capita Water use has declined during this period while the number of users has increased each year. There were two high years in the beginning of this 5 year period which affect the average. The last two years were 69 and 729 gpcd, respectively.

Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
☒ Revise city ordinances/codes to encourage or require water efficient landscaping.	2019

Strategy to reduce residential per capita demand	Timeframe for completing work
☐ Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	
☒ Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	Odd/ Even no Watering between 10 AM and 8 PM has been in code for several years
☐ Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	
☒ Make water system infrastructure improvements	Leak detection reports are generated, letters are sent to each customer. Follow up letters are sent. Toilet dye kits are available for residents.
☒ Offer free or reduced cost water use audits) for residential customers.	No
☒ Implement a notification system to inform customers when water availability conditions change.	We use the website, signs and the city newsletter.
☐ Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	
☐ Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
☐ Identify supplemental Water Resources	
☒ Conduct audience-appropriate water conservation education and outreach.	Water conservation tips for residents are posted on the website.
☐ Describe other plans	

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.

Complete Table 26 by checking which strategies you will used to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not allowed by the state plumbing code, M.R. 4715 (a variance is needed). However several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
☐ Conduct a facility water use audit for both indoor and outdoor use, including system components	
☒ Install enhanced meters capable of automated readings to detect spikes in consumption	Leak detection reports are generated, letters are sent to each customer. Follow up letters are sent.
☐ Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.)	
☐ Install water conservation fixtures and appliances or change processes to conserve water	
☒ Repair leaking system components (e.g., pipes, valves)	Leaks are investigated and repaired.
☐ Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	
☒ Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	The City is open to installation of rain gardens on commercial projects
☐ Train employees how to conserve water	
☒ Implement a notification system to inform non-residential customers when water availability conditions change.	The odd/ even signs are posted in locations where residents and commercial customers see them.
☐ Rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Proposed plumbing code 4714.1702.1 http://www.dli.mn.gov/PDF/docket/4714rule.pdf	
☐ Describe other plans:	

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

Water demand has been decreasing over the last 10 years. Non-essential use is not declining as fast as Residential or C/I/I. Residential has shown the largest decrease which correlates to the rate structure change and requiring better topsoil for all new construction green areas.

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6? Yes ☒ No ☐

Calculate a ten year average (2005 – 2014) of the ratio of maximum day demand to average day demand: 2.74

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of Health or before requesting an increase in water appropriations permit volume (*Minnesota Statutes*, section 103G.291, subd. 3 and 4). Rates should be adjusted on a regular basis to ensure that revenue of the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

Volume included in base rate or service charge: 15,000 gallons or ____ cubic feet ___ other

Frequency of billing: ☐ Monthly ☐ Bimonthly ☒ Quarterly ☐ Other:

_____

Water Rate Evaluation Frequency: ☒ every year ☐ every ___ years ☐ no schedule

Date of last rate change: 1/1/2017

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	☐ Monthly billing ☒ Increasing block rates (volume tiered rates) ☐ Seasonal rates ☐ Time of use rates ☒ Water bills reported in gallons ☐ Individualized goal rates ☒ Excess use rates ☐ Drought surcharge ☐ Use water bill to provide comparisons ☐ Service charge not based on water volume ☐ Other (describe)	☐ Uniform ☐ Odd/even day watering	☐ Service charge based on water volume ☐ Declining block ☐ Flat ☐ Other (describe)
Commercial/ Industrial/ Institutional	☒ Monthly billing ☒ Increasing block rates (volume tiered rates) ☐ Seasonal rates ☐ Time of use rates ☒ Water bills reported in gallons ☐ Individualized goal rates ☐ Excess use rates ☐ Drought surcharge ☐ Use water bill to provide comparisons ☐ Service charge not based on water volume ☐ Other (describe)	☐ Uniform	☐ Service charge based on water volume ☐ Declining block ☐ Flat ☐ Other (describe)
☐ Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
    - The first tier is for the winter average water use.
    - The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
    - The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands
- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates

- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals. **Excess Use rates**: if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons**: simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate**: rate per unit used is the same regardless of the volume used
- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at <u>least two</u> of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

☐	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 "Best Practices" for water
☐	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
☐	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
☐	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
☐	Adopt an outdoor lawn irrigation ordinance
☐	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
☐	Implement a stormwater management program

☐	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws-for vernal pools, buffer areas, restrictions on filling or alterations)
☐	Adopt a water offset program (primarily for new development or expansion)
☒	Implement a water conservation outreach program
☐	Hire a water conservation coordinator (part-time)
☐	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
☒	Revise the commercial development ordinance to allow low water landscaping practices and eliminate the requirement for installation of an irrigation system.

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

We will keep a record of new commercial developments that are constructed with low water or no water landscaping plans. We will record contacts and successes through the water conservation outreach program.

Tip: The process to monitor demand reduction and/or a rate structure includes:

a) The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
b) They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
c) The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
d) They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
e) If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

A. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
☒ Rainfall sensors required on landscape irrigation systems	☒ Ongoing

Regulations Utilized	When is it applied (in effect)?
Commercial, Parks and City Own Properties	☐ Seasonal ☐ Only during declared Emergencies
☐ Water efficient plumbing fixtures required	☐ New development ☐ Replacement ☐ Rebate Programs
☒ Critical/Emergency Water Deficiency ordinance	☒ Only during declared Emergencies
☒ Watering restriction requirements (time of day, allowable days, etc.) Odd/ Even Day, Time of day watering restrictions are enforced	☒ Odd/even ☐ 2 days/week ☐ Only during declared Emergencies
☐ Water waste prohibited (for example, having a fine for irrigators spraying on the street)	☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☐ Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	☐ New development ☐ Shoreland/zoning ☐ Other
☒ Soil preparation requirement s (after construction, requiring topsoil to be applied to promote good root growth) Approved topsoil is required under sod for all new construction projects.	☒ New Development ☐ Construction Projects ☐ Other
☒ Tree ratios (requiring a certain number of trees per square foot of lawn)	☒ New development ☐ Shoreland/zoning ☐ Other
☐ Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☐ Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	☐ Describe

B. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. It is recommended that municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

Water Use Targets	Outreach Methods	Partners
☐ Low flush toilets, ☒ Toilet leak tablets, ☐ Low flow showerheads, ☐ Faucet aerators;	☒ Education about leak detection ☒ Free distribution of toilet leak kits ☐ Rebate for ☐ Other	☐ Gas company ☐ Electric company ☐ Watershed organization
☐ Water conserving washing machines, ☐ Dish washers, ☐ Water softeners;	☐ Education about ☐ Free distribution of ☐ Rebate for ☐ Other	☐ Gas company ☐ Electric company ☐ Watershed organization
☒ Rain gardens, ☒ Rain barrels, ☒ Native/drought tolerant landscaping, etc.	☒ Education about rain gardens, rain barrels ☐ Free distribution of ☐ Rebate for ☐ Other	☐ Gas company ☐ Electric company ☒ Watershed organization

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

We will record and report on the number of rain gardens, rain barrels and native landscaping areas installed. We will continue to provide toilet leak tablets and information on detecting other leaks in homes and businesses.

C. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill	- Water conservation topics - Odd/ Even information - How much water does irrigation use	2	☐ Ongoing ☒ Seasonal ☐ Only during declared emergencies
Consumer Confidence Reports		1	☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)	- Water conservation topics - Odd/ Even information - How much water does irrigation use		☒ Ongoing ☒ Seasonal ☐ Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Presentations to community groups			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Staff training			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Facility tours			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Displays and exhibits	Signs for Odd/ Even Ban		☐ Ongoing ☒ Seasonal ☐ Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Community news letters	Odd/ even news letter articles		☐ Ongoing ☒ Seasonal ☐ Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Direct mailings (water audit/retrofit kits, showerheads, brochures)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Information kiosk at utility and public buildings			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Public service announcements			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Cable TV Programs	Odd/ Even Ban		☐ Ongoing ☒ Seasonal ☐ Only during declared emergencies
Demonstration projects (landscaping or plumbing)			☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)	Water Tower Tours for local elementary school		☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Community events (children's water festivals, environmental fairs)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Community education classes			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Water week promotions	Well Testing kits provided		☒ Ongoing ☒ Seasonal ☐ Only during declared emergencies
Website (include address: www.cityoframsey.com/utilities-water-system)			☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Notices of ordinances			☐ Ongoing ☐ Seasonal

Education Methods	General summary of topics	#/Year	Frequency
			☐ Only during declared emergencies
Emergency conservation notices			☐ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Other: City website	Page on Xeriscapes, Hardscape Page on Water Conservation Grant Opportunities Page on Irrigation Do's and Do Not's		☒ Ongoing ☐ Seasonal ☐ Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

The City meets with school age children once a year about water conservation, future water conservation practices, irrigation calculator, website and newsletter articles.
We will continue this practice and expand the audience when the opportunity arises.

Part 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.

Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The *Master Water Supply Plan* provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles).* This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of future water demand to be met using that approach, the timeframe to

implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.
As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? Yes ☐ No ☒

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
☐ None at this time		
☐ Comprehensive planning that guides development in vulnerable drinking water supply management areas		
☐ Zoning overlay		
☐ Other:		

Technical assistance

From your community's perspective, what are the most important topics for the Metropolitan Council to address, guided by the region's Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- ☒ Coordination of state, regional and local water supply planning roles
- ☐ Regional water use goals
- ☐ Water use reporting standards
- ☒ Regional and sub-regional partnership opportunities
- ☐ Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- ☐ Others:

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled "low flow". These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water "lost" by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category "Water Supplier Services".

Population Served - The number of people who are served by the community's public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community's public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.
Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.
Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.
Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.
Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.
Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".
Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.
Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.
Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.
Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association
C/I/I – Commercial/Institutional/Industrial
CIP – Capital Improvement Plan
GIS – Geographic Information System
GPCD – Gallons per capita per day
GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,
MDH – Minnesota Department of Health
MGD – Million gallons per day
MG – Million gallons
MGL – Maximum Contaminant Level
MnTAP – Minnesota Technical Assistance Program (University of Minnesota)

MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)

MRWA – Minnesota Rural Waters Association

SWP – Source Water Protection

WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries – see Part 1C
Appendix 2: Water level monitoring plan – see Part 1E
Appendix 3: Water level graphs for each water supply well - see Part 1E
Appendix 4: Capital Improvement Plan - see Part 1E
Appendix 5: Emergency Telephone List – see Part 2C
Appendix 6: Cooperative Agreements for Emergency Services – see Part 2C
Appendix 7: Municipal Critical Water Deficiency Ordinance – see Part 2C
Appendix 8: Graph showing annual per capita water demand for each customer category during the last ten-years – see Part 3 Objective 4
Appendix 9: Water Rate Structure – see Part 3 Objective 6
Appendix 10: Adopted or proposed regulations to reduce demand or improve water efficiency – see Part 3 Objective 7
Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates – see www.mndnr.gov/watersupplyplans

Appendix 1: Well Records and Maintenance Summaries

Well Records and Maintenance Summaries

Well No.	Construction	Maintenance	Type
1	1985		
2	1987		
3	1997		
4	1998	2013	Replace VFD
5	2000		
6	2005		
7	2007	2016	Replace check valve and drop pipe
8	2007		

Appendix 2: Water Level Monitoring Plan – see Part 1E

Water Level Monitoring Plan for the City of Ramsey

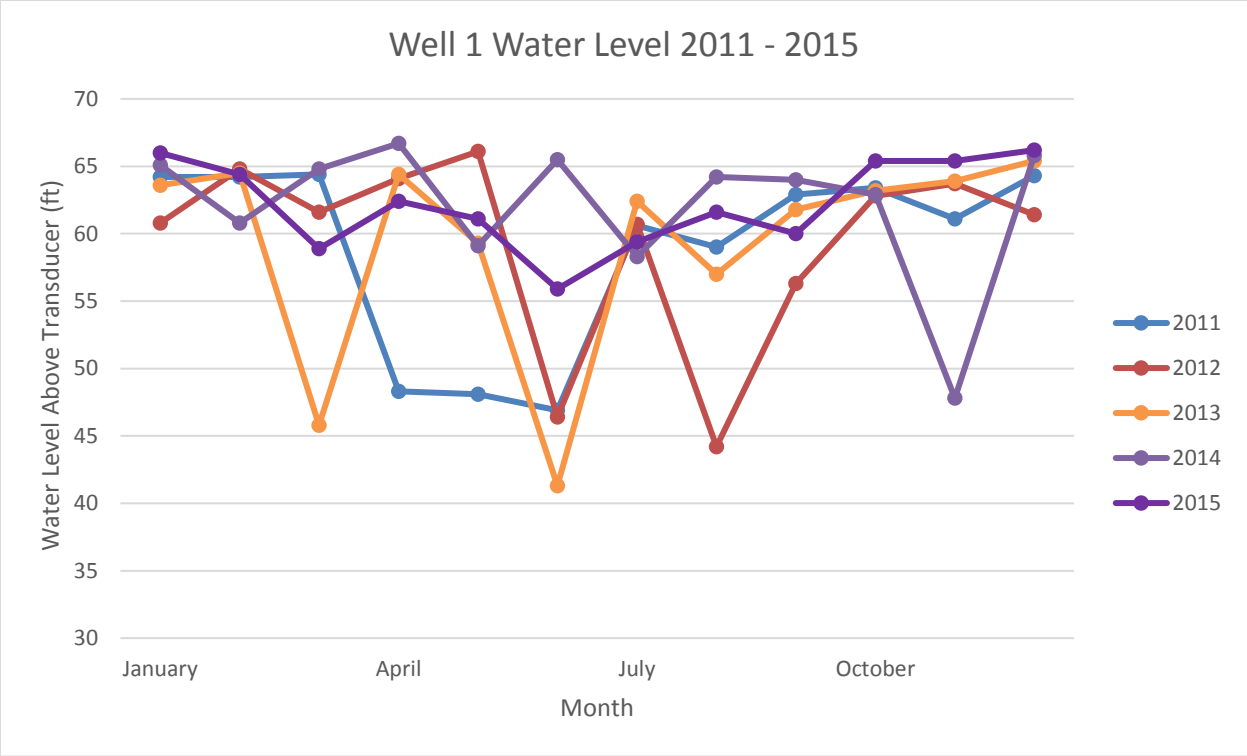
1. Purpose of the Water Level Monitoring Plan
   The purpose of the Water Level Monitoring Plan is to document the water level for wells 1 – 8 to track the seasonal variation in water levels and the long-term trends for each well.
2. Data Collection Method
   The water level is measured by recording the depth to water in feet from the top of the casing located at each will. The top of the casing is 2.5 feet above the ground surface for each well. The depth to water for each well is measured with a SCADA system.
3. Measurement Frequency and Timing
   The depth to water for each will is recorded on the last day of the month. The time the measurement is taken for each well is shown in Table 1.

Table 1 – Well Locations and Schedule for Water Level Readings

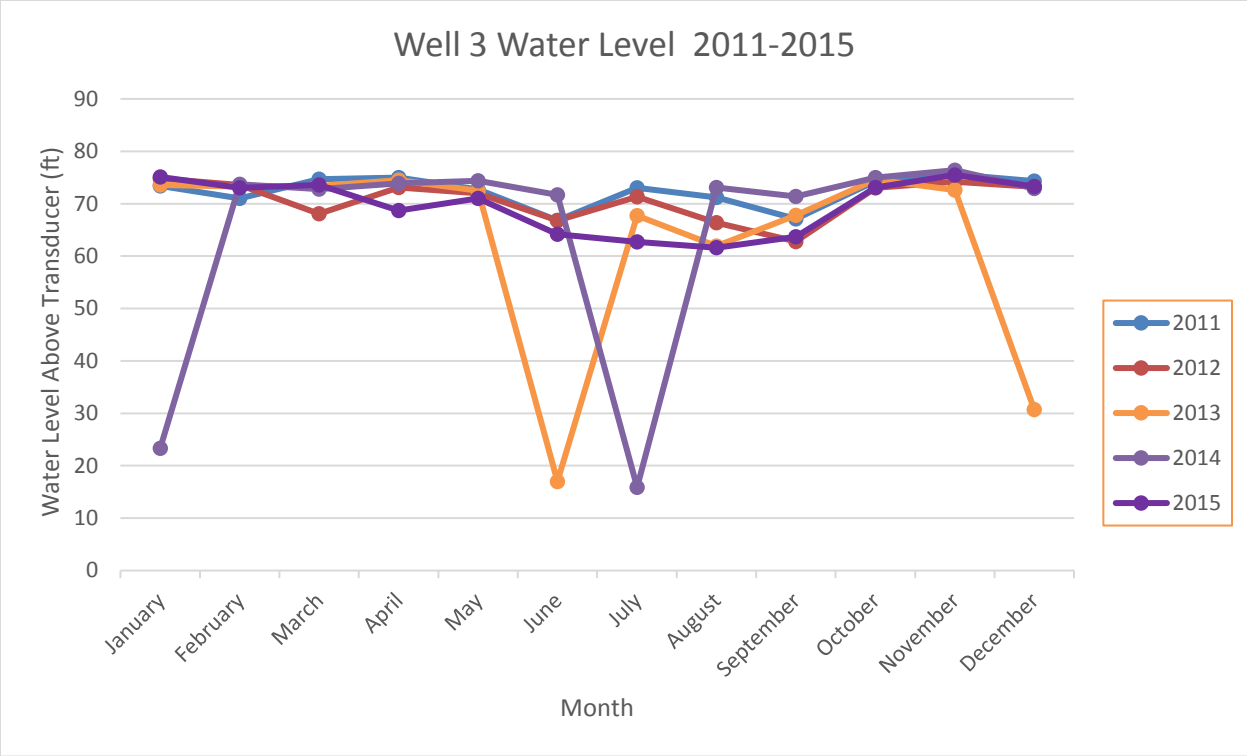
Permittee Well Number:	MDH Unique Well Number:	Well Address:	DNR Permit Number:	Measurement Frequency	SCADA Measurement Timing
1	161441	T32-R25-SEC 25-DCCA	1985-6005	1x/month (Last Day of Month)	11:30 pm
2	416183	T32-R25-SEC 25-ABAB	1985-6005	1x/month (Last Day of Month)	11:30 pm
3	580303	T32-R25-SEC 28-AACD	1985-6005	1x/month (Last Day of Month)	11:30 pm
4	580313	T32-R25-SEC 28-ABCC	1985-6005	1x/month (Last Day of Month)	11:30 pm
5	593672	T32-R25-SEC 28-ACCC	1985-6005	1x/month (Last Day of Month)	11:30 pm
6	706840	T32-R25-SEC 28-BCDC	1985-6005	1x/month (Last Day of Month)	11:30 pm
7	743832	T32-R25-SEC 20-DDAA	1985-6005	1x/month (Last Day of Month)	11:30 pm

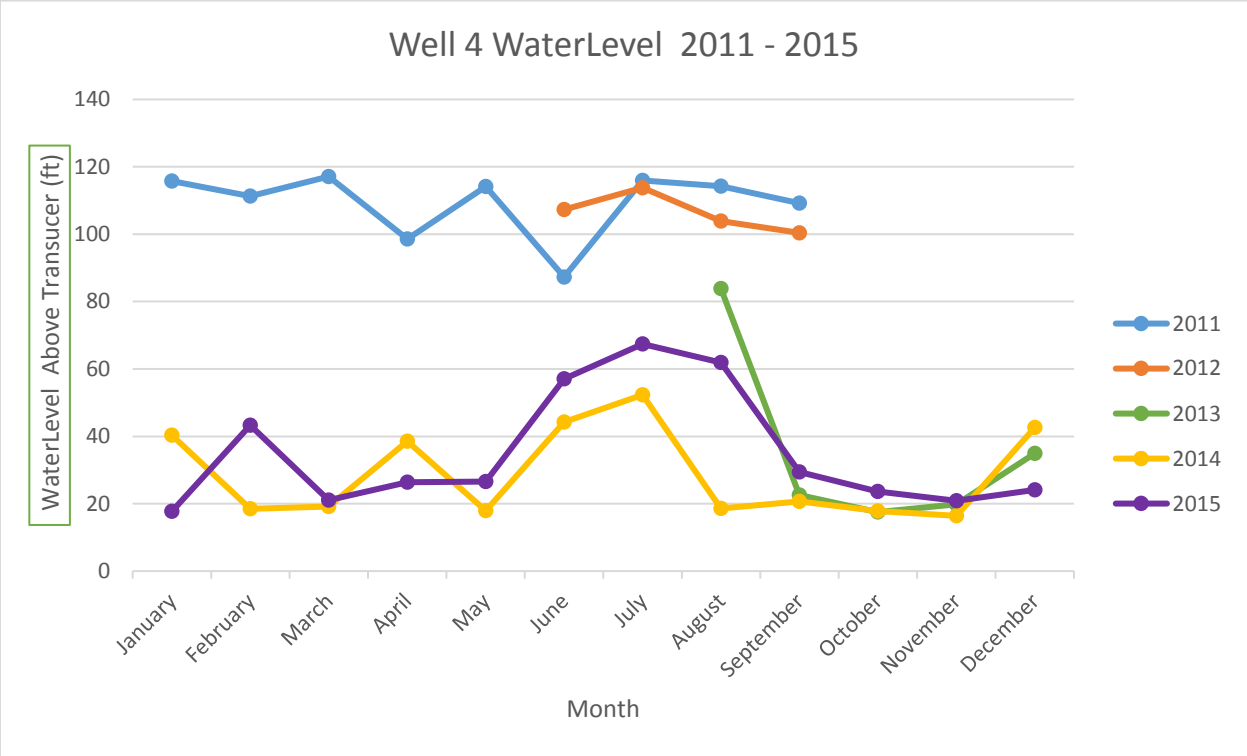
	731127	T32-R25-SEC 21-CCCC	1985-6005	Continuous	30 Min
8	743833	T32-R28-SEC 28-BABD	1985-6005	1x/month (Last Day of Month)	11:30 pm

Appendix 3: Water Level Graphs for Each Water Supply Well

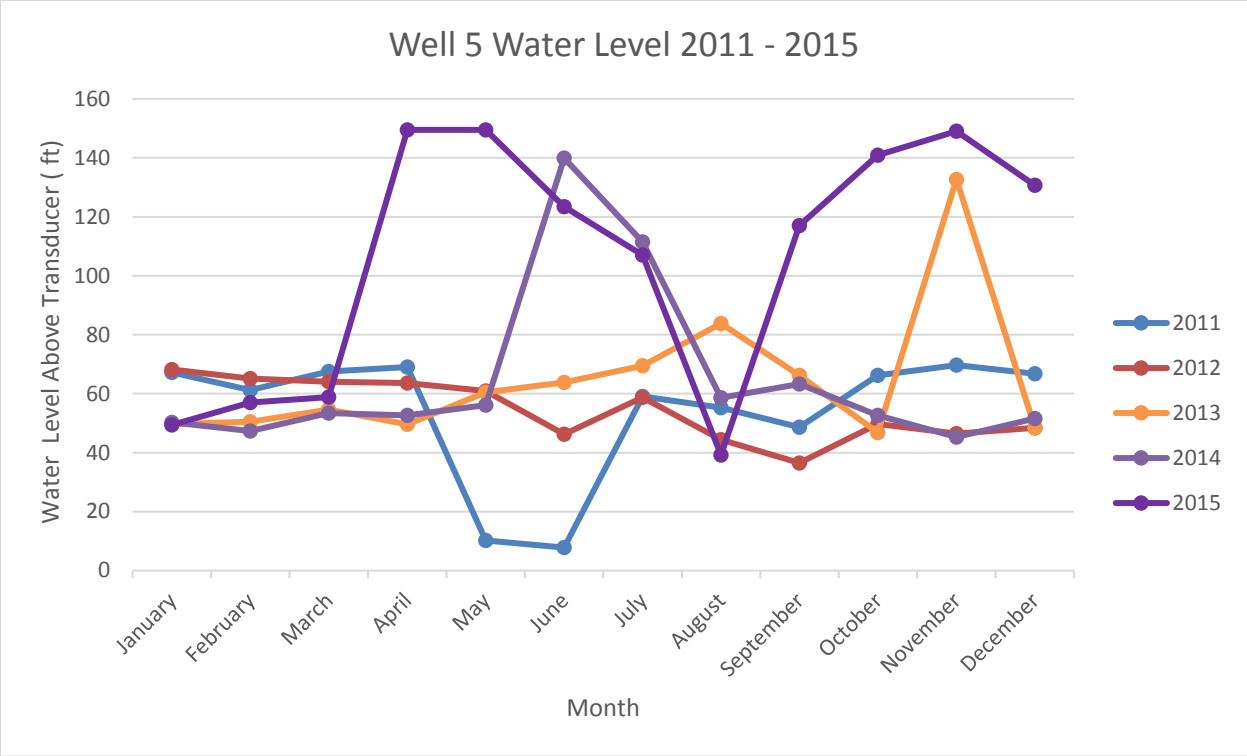


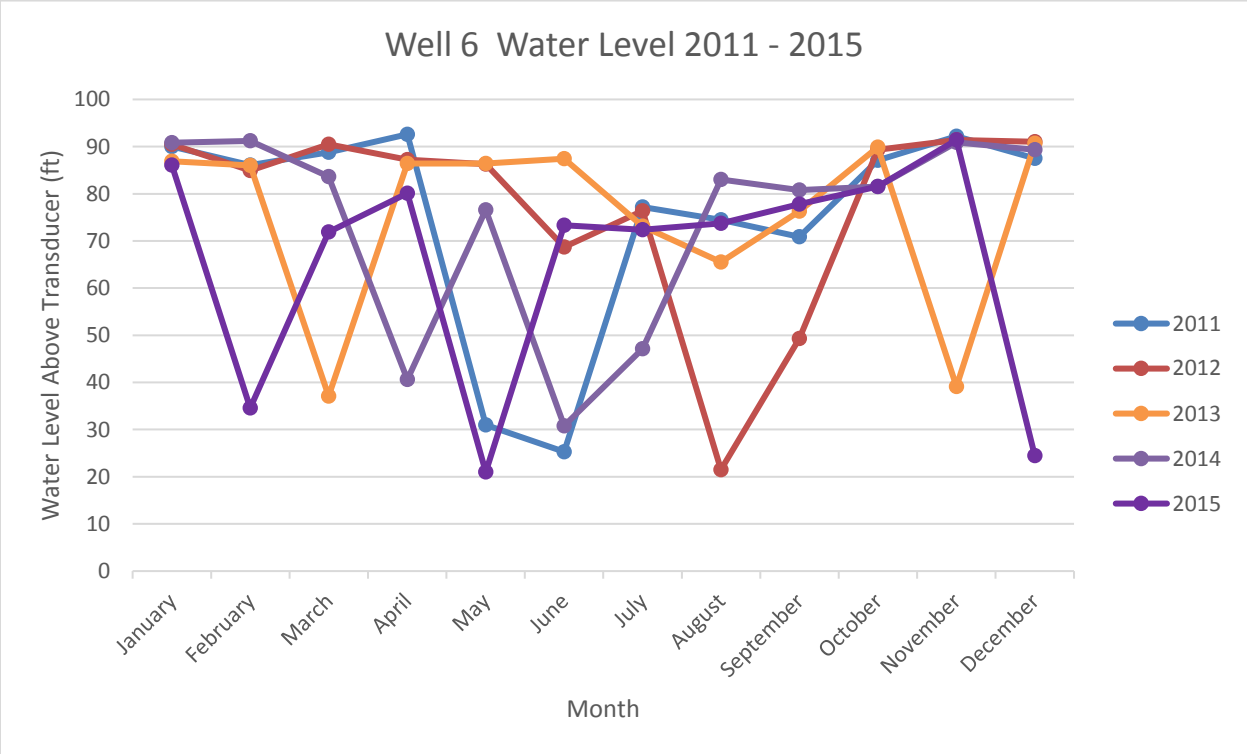
Well 2 is only used for extreme demand periods. It was not used in this period.

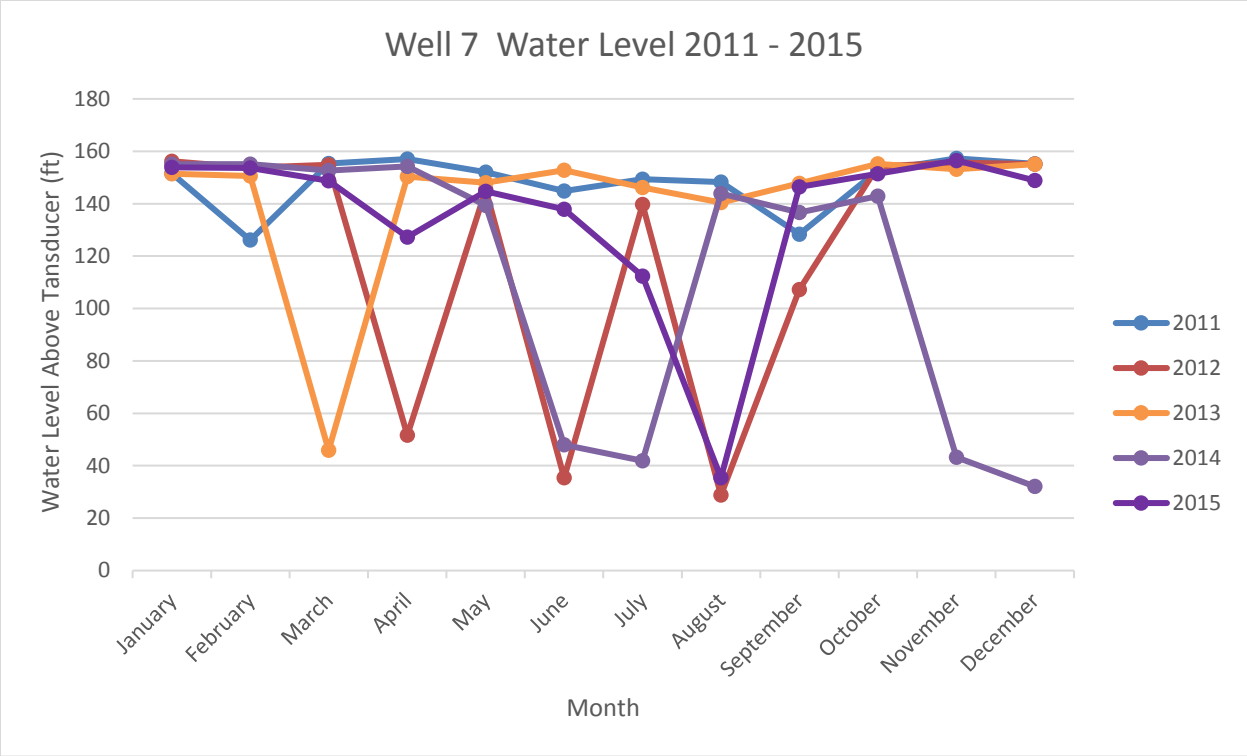


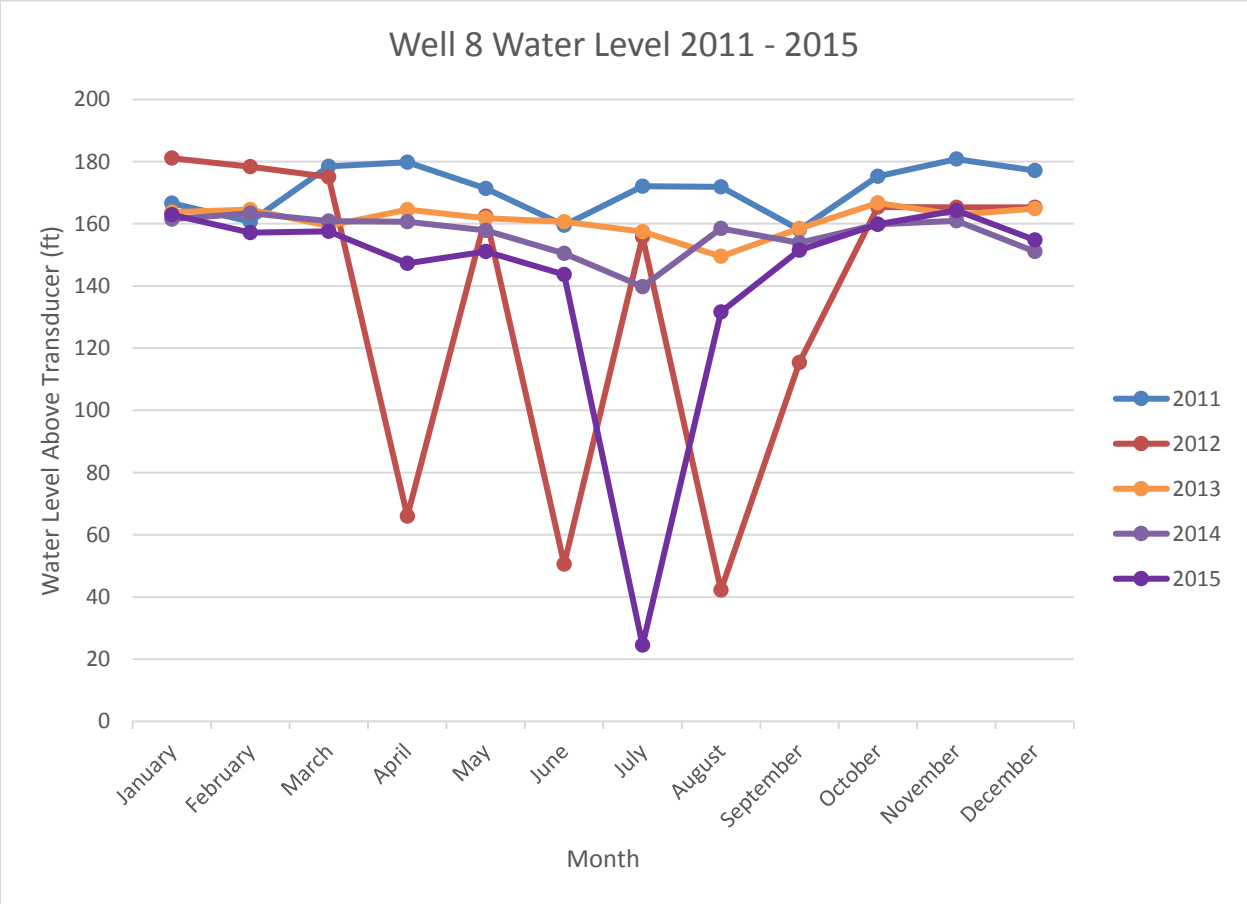


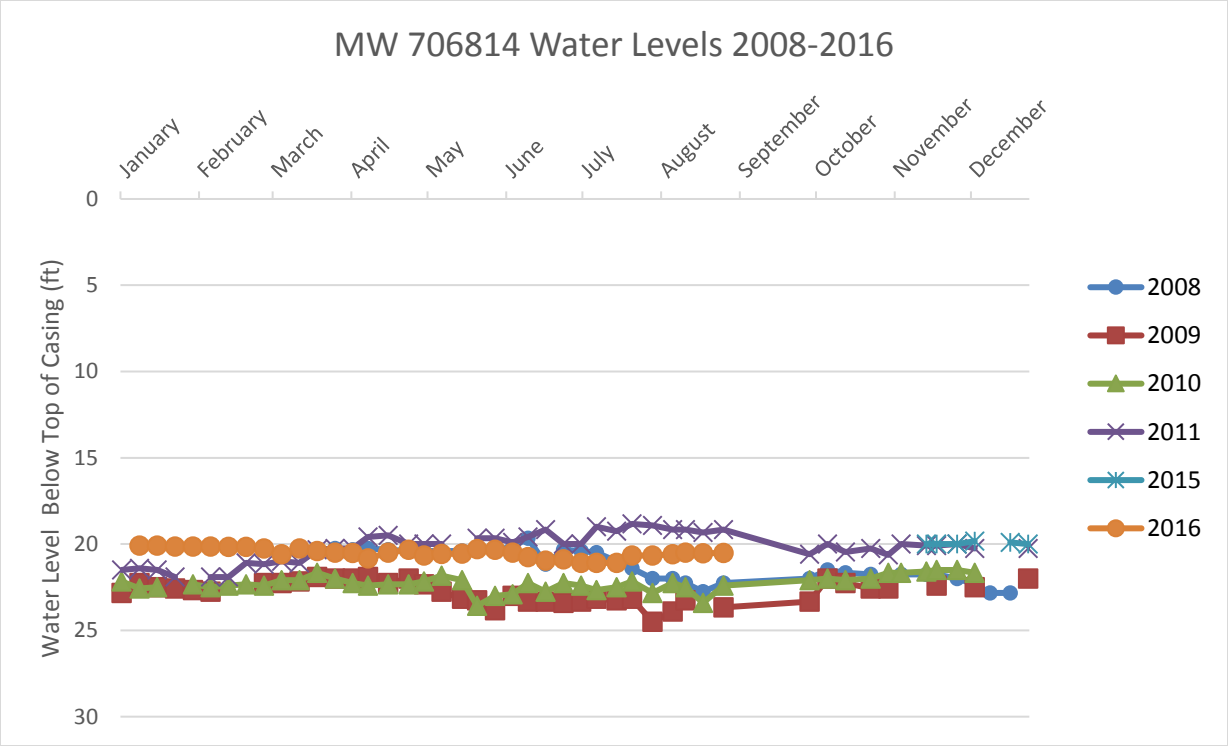
The Well 4 transducer was malfunctioning in late 2011 and early 2012 so there is no data for this period.

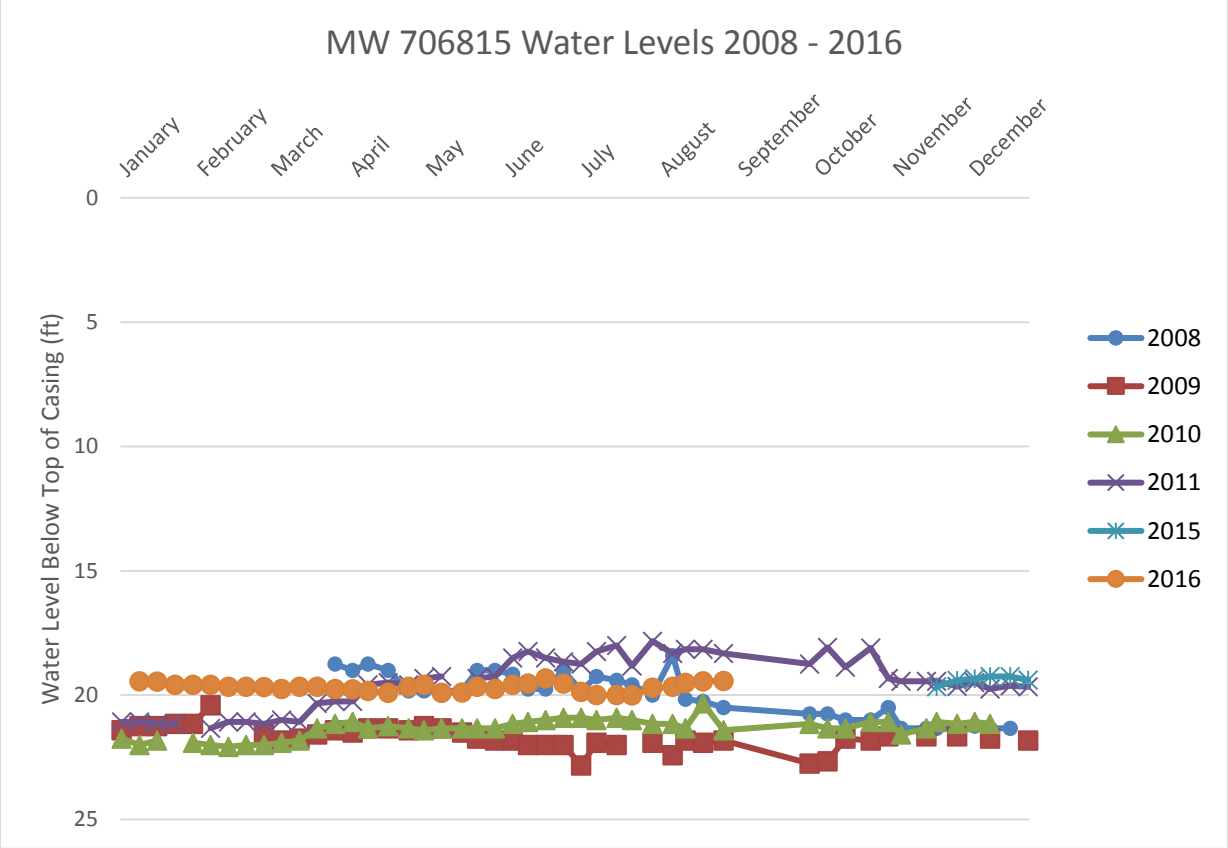

Well 5 Water Level 2011 - 2015
Water Level Above Transducer (ft)
160
140
120
100
80
60
40
20
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2011
2012
2013
2014
2015

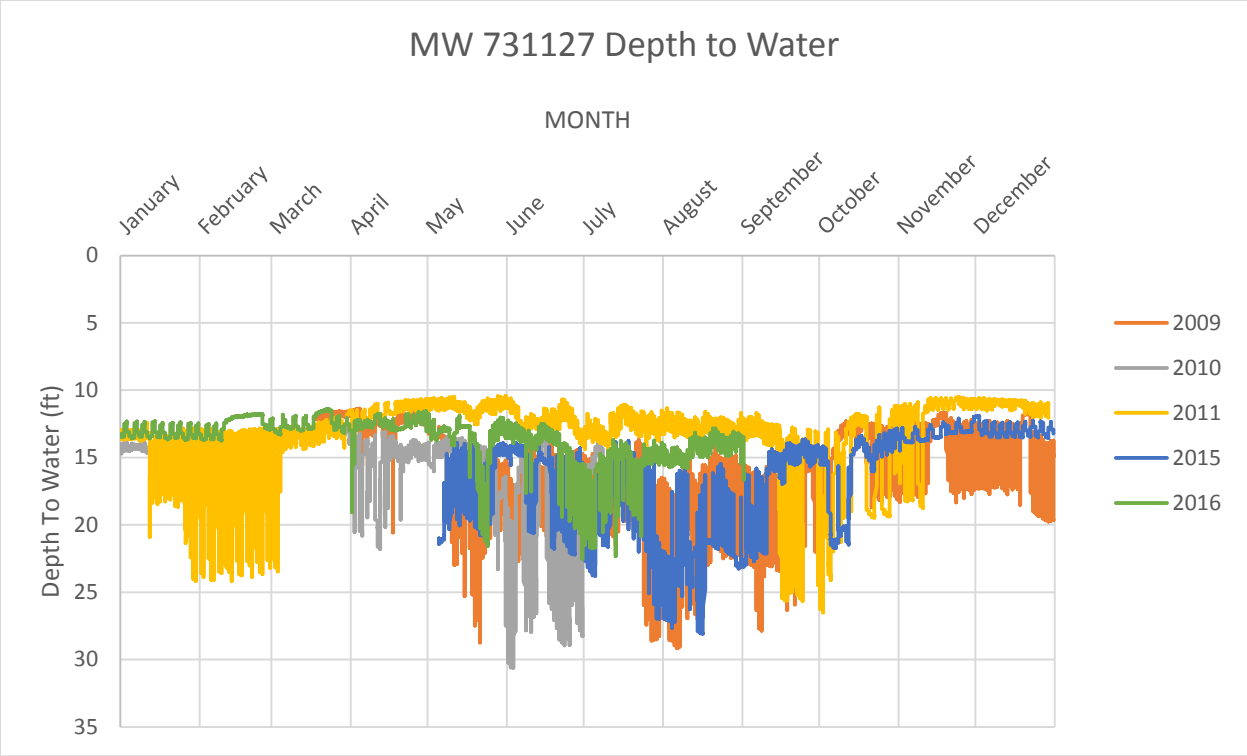

Well 6 Water Level 2011 - 2015
Water Level Above Transducer (ft)
100
90
80
70
60
50
40
30
20
10
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2011
2012
2013
2014
2015

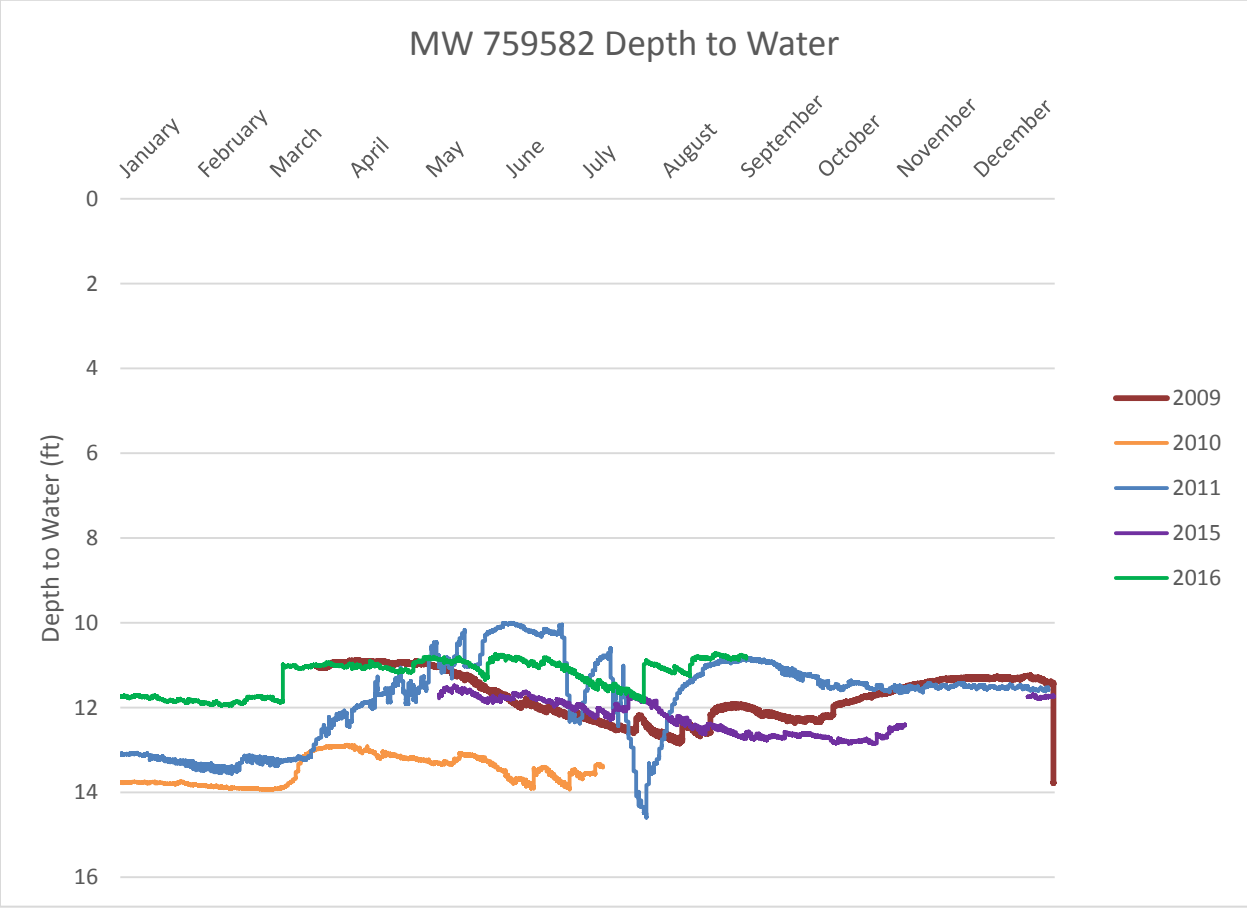

Well 7 Water Level 2011 - 2015
Water Level Above Tansducer (ft)
180
160
140
120
100
80
60
40
20
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2011
2012
2013
2014
2015


Well 8 Water Level 2011 - 2015
Water Level Above Transducer (ft)
200
180
160
140
120
100
80
60
40
20
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2011
2012
2013
2014
2015


MW 706814 Water Levels 2008-2016
January
February
March
April
May
June
July
August
September
October
November
December
0
5
10
15
20
25
30
Water Level Below Top of Casing (ft)
2008
2009
2010
2011
2015
2016


MW 706815 Water Levels 2008 - 2016
January
February
March
April
May
June
July
August
September
October
November
December
0
5
10
15
20
25
Water Level Below Top of Casing (ft)
2008
2009
2010
2011
2015
2016


MW 731127 Depth to Water
MONTH
January
February
March
April
May
June
July
August
September
October
November
December
Depth To Water (ft)
0
5
10
15
20
25
30
35
2009
2010
2011
2015
2016


MW 759582 Depth to Water
January
February
March
April
May
June
July
August
September
October
November
December
Depth to Water (ft)
0
2
4
6
8
10
12
14
16
2009
2010
2011
2015
2016

Appendix 4: Capital Improvement Plan

Project #	04-WTR-005
Project Name	Complete Pump House 3

Department	Water Utility
Contact	Unassigned
Type	Improvement
Useful Life	50 Years
Category	Water Utility Improvement
Priority	3-Existing Obligation (Med)
Status	Active
Total Cost	$60,000

Description

Install brick exterior to match building style of The COR buildings; landscape to match streetscape.

Justification

The intent is to have the building and grounds match The COR and adjacent developments.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost		60,000									60,000
Total		**60,000**									**60,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund		60,000									60,000
Total		**60,000**									**60,000**

229

Project #	04-WTR-009
Project Name	The COR Bunker Lake Blvd (Armstrong - Ramsey Blvd)

Department	Water Utility
Contact	Unassigned
Type	Improvement
Useful Life	60 Years
Category	Water Utility Improvement
Priority	3-Existing Obligation (Med)
Status	Active

Total Cost $340,000

Description

Upgrades Bunker Lake Blvd between Armstrong and Ramsey Blvds, necessitated by the COR Development. Watermain segments along this portion of roadway will be lowered and extended as necessary.

Total Cost for Bunker Lake Blvd. = $4,520,000
Street Improvements: $3,650,000
Storm Water Improvements: $530,000
Water Utility Improvements: $340,000
Total Cost for Regional Roadway improvements = $14,607,860 (Per JPA)

Justification

The construction of the COR will add additional traffic to Bunker Lake Blvd. This project will upgrade Bunker Lake Blvd between Ramsey Blvd and Armstrong Blvd to better handle the traffic.

See projects Core Armstrong, Core Hwy 10 and Core Ramsey Blvd and Storm Sewer south of Bunker Lake Blvd.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost				340,000							340,000
Total				**340,000**							**340,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund				340,000							340,000
Total				**340,000**							**340,000**

Project # 04-WTR-018

Project Name Watermain Looping: (Ramsey Blvd to Traprock St.)

Department Water Utility
Contact Unassigned
Type Improvement
Useful Life 60 Years
Category Water Utility Improvement
Priority 2-New Addition (High)
Status Active

Total Cost $129,250

Description

This project includes the looping of a 12" watermain from Ramsey Blvd to Traprock Street with the extension of Riverdale Drive along the south side of Highway 10.

Watermain Extension (04-WTR-018)	$ 129,250
Stormwater (16-STM-003)	$ 118,120
Street Improvement (12-STR-007)	$ 911,905
Right-of-Way	$ 200,000
*Street Lighting (16-STLT-001)	$ 275,000 (related project not included in costs)
Total Project Cost	$ 1,359,275 (not including street lights)

Justification

Development south of Highway 10 is anticipated as a result of The COR, including through the Mississippi West County Park. The project will provide dependable water pressure and supply to this developing area.

The city was awarded a MNDOT cooperative agreement funds grant to extend Riverdale Drive from Traprock Street to Ramsey Blvd in 2016/2017. Installation of water with street construction will eliminate the need to dig up the street in the future.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost	129,250										129,250
Total	**129,250**										**129,250**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund	129,250										129,250
Total	**129,250**										**129,250**

Project # 08-WTR-003
Project Name River Pines Lift Station Water Connection

Department Water Utility
Contact
Type Improvement
Useful Life 50 Years
Category Water Utility Improvement
Priority 5-Opportunity/Unfunded/Placeholder
Status Active

Total Cost $20,000

Description

This project involves extending the watermain in conjunction with extending gravity sewer to the River Pines Lift Station.

Total costs including street & water utility = $120,000.

Justification

This project adds a water loop at the same time a lift station is eliminated.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost				20,000							20,000
Total				**20,000**							**20,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund				20,000							20,000
Total				**20,000**							**20,000**

Project # 11-WTR-003
Project Name Fire Station #1 Extension of Water

Department Water Utility
Contact
Type Improvement
Useful Life 50 Years
Category Water Utility Improvement
Priority 5-Opportunity/Unfunded/Placeholder
Status Active

Total Cost $55,000

Description

Extend municipal water from parking lot into Fire Station #1 building.

Related Project 12-SEW-002 $60,000
Total Project Cost $115,000

Justification

Treated water is currently at the west end of parking lot on the property. This extension would allow for the installation of a sprinkler system within the building while also improving water quality inside of the building. The current well would be used for irrigation on the site.

Trunk charges are waived for public buildings.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost				55,000							55,000
Total				**55,000**							**55,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund				55,000							55,000
Total				**55,000**							**55,000**

Project #	12-WTR-001
Project Name	Watermain Sunfish Lk Blvd

Department	Water Utility
Contact	
Type	Improvement
Useful Life	50 Years
Category	Water Utility Improvement
Priority	4-New Addition (Med)
Status	Active

Total Cost $450,000

Description

Extend watermain along Sunfish Lake Boulevard from Sunwood Drive to Fox Knoll approx. 4,000 feet.

Justification

This project will complete another watermain loop connection, providing increased fire flows, increased pressure and enhanced system reliability.

Coordinate with development east of Sunfish Lake Blvd.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost				450,000							450,000
Total				**450,000**							**450,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund				450,000							450,000
Total				**450,000**							**450,000**

Project # 14-WTR-001
Project Name Refurbish Water Tower #2

Department Water Utility
Contact Unassigned
Type Improvement
Useful Life 15
Category Water Utility Improvement
Priority 1-Existing Obligation (High)
Status Active

Total Cost $1,300,000

Description

Interior and exterior coatings at water tower #2.

Justification

Ongoing maintenance of interior and exterior coatings on 1.5mg water tower to include inspections.
Project will be scheduled after full inspection of tower.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost	1,300,000										1,300,000
Total	**1,300,000**										**1,300,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund	1,300,000										1,300,000
Total	**1,300,000**										**1,300,000**

Project # 14-WTR-002
Project Name Refurbish Water Tower #1

Department Water Utility
Contact Unassigned
Type Improvement
Useful Life 15
Category Water Utility Improvement
Priority 3-Existing Obligation (Med)
Status Active

Total Cost $700,000

Description

Interior and exterior coatings at water tower #1.

Justification

Ongoing maintenance of interior and exterior coatings on 0.5mg water tower to include inspections.
Project will be scheduled after full inspection of tower.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost		700,000									700,000
Total		**700,000**									**700,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund		700,000									700,000
Total		**700,000**									**700,000**

Project #	16-WTR-001
Project Name	Emergency Power Supply for Well #3

Department	Water Utility
Contact	
Type	Improvement
Useful Life	
Category	Water Utility Improvement
Priority	1-Existing Obligation (High)
Status	Active

Total Cost $115,000

Description

Purchase and install a back up generator for Pumphouse #2, 7301 Bunker Lake Blvd. The generator is 150 KW 480 Volt, 3 phase 60 hz 1800 rpm.

Justification

Currently the City has a backup generator on one well that has the ability to produce 850 gallons per minute (gpm). Our average consumption rate is 1,120 gpm. In the event of a power failure our well cannot keep pace with demand. Well #3 can produce 1,600 gpm so with both wells running we will be able to produce 2,450 gpm, thus able to keep up with demand during a long power outage.

This project includes running a natural gas service to the well house to supply fuel for the generator. The project will also include SCADA upgrades for the site.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost	115,000										115,000
Total	**115,000**										**115,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund	115,000										115,000
Total	**115,000**										**115,000**

Project # 16-WTR-002
Project Name Construct Well and Pumphouse #9

Department Water Utility
Contact
Type Improvement
Useful Life 50 Years
Category Water Utility Improvement
Priority 5-Opportunity/Unfunded/Placeholder
Status Active

Total Cost $1,775,000

Description

Construct new municipal groundwater supply well with supporting pumphouse and chemical feed system to remove pollutants, including iron and manganese and to add chlorine and fluoride.

A study will be conducted in 2020 to determine a desirable site - $75,000 est.

Justification

This project will provide a ninth municipal groundwater well with pumphouse and chemical feed system to treat the groundwater before supplying for public consumption. This project was added in lieu of the previously proposed surface water supply treatment facility which was removed due to excessively large project costs and a general lack of regional support for funding the proposed surfacewater treatment facility. As the City of Ramsey continues to grow, additional wells or a surface water supply facility will be needed.

Expenditures	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Improvements Other than Building Cost				75,000			1,700,000				1,775,000
Total				**75,000**			**1,700,000**				**1,775,000**

Funding Sources	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Water Utility Fund				75,000			1,700,000				1,775,000
Total				**75,000**			**1,700,000**				**1,775,000**

Appendix 5: Emergency Telephone List

Ramsey Emergency Telephone List

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Matt Kohner	763 433-9859	
Alternate Emergency Response Lead	Jeff Katers	763 433-9882	
Water Operator	John Nelson	763 286-0296	
Public Works Superintendent	Grant Riemer	763 286-0282	
City Engineer	Bruce Westby	763 433-9825	
City Administrator/ Public Communications	Kurt Ulrich	763 433-9845	

State and Local Emergency Response Contacts	Name	Work Telephone	Alternate Telephone
State Incident Duty Officer	Minnesota Duty Officer	651 649-5451 Metro	800 422-0798 Out State
County Emergency Director	Terry Stoltzman	763 421-4760	
National Guard	Minnesota Duty Officer	651 649-5451 Metro	800 422-0798 Out State
Mayor	Sarah Strommen		
Fire Chief	Matt Kohner	763 433-9859	
Sherriff	Anoka County Sheriff	763 427-1212	
Central Communications	Anoka County Sheriff	763 427-1212	
Ambulance	Allina	763 576-9593	
Hospital	Mercy Medical Center	763 236-7144	
Doctor or Medical Facility	Allina Clinic Ramsey	763 236-0000	

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer			
MDH	Drinking Water Protection	651 201-4700	
State Testing Laboratory	Minnesota Duty Officer	651 649-5451 Metro	800 422-0798 Out State
MPCA	St. Paul Regional Office	651 296-6300	800 657-3864
DNR Area Hydrologist	Kate Drewry	651 259-5753	
Anoka County Environmental Services	Bart Biernat	763 422-6985	
MNWARN	Minnesota Duty Officer	651 649-5451 Metro	800 422-0798 Out State

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Connexus Energy	763 323-2660	763 323-2600
Gas Company	CenterPoint Energy	612 372-5050	612 372-4727
Telephone Company	Century Link	763 712-5020	763 712-5002
Utility Locations	Gopher State One Call	800 252-1166	651 454-0002
County Highway Department	Anoka County	763 862-4201	
State Highway Department	MNDOT	651 296-3000	911

Mutual Aid Agreements	Name	Work Telephone	Alternate Telephone
Neighboring Water System	City of Anoka	763 576-2980	763 576-2860
Emergency Water Connection	City of Anoka	763 573-2980	
Materials	HD Supply	952 937-9666	

Technical/ Contracted Services/ Supplies	Name	Work Telephone	Alternate Telephone
MRWA Technical Services	MN Rural Water Association	800 367-6792	
Well Driller/ Repair	E. H. Renner	763 427-6100	
Electrician	3 Way Electric	612 865-3262	
Water Main Repair	Dave Perkins Contracting	763 427-0109	612 363-6459
Chemical Feed	Hawkins Chemical	612 331-9100	
Meter Repair	City of Ramsey	763 433-9861	
SCADA System	Total Control	763 286-7365	
Valves, Pipes and Fittings	Ferguson Water Works	763 560-5200	
Laboratory	Twin Cities Water Clinic	953 935-3556	

Communications	Name	Work Telephone	Alternate Telephone
Newspaper	Star Tribune	612 673-4000	
	Pioneer Press	651 222-1111	
School Superintendent	David Law	763 506-1001	
Property and Casualty Insurance	League of MN Cities	651 281-1200	

Critical Water Users	Name	Work Telephone	Alternate Telephone
Long Term Care Center	Stoney River Assisted Living	612 615-9936	

Appendix 6: Cooperative Agreements for Emergency Services

JOINT POWERS AGREEMENT BETWEEN THE
CITY OF ANOKA AND THE CITY OF RAMSEY
FOR THE SUPPLY OF MUNICIPAL WATER SERVICE
TO PORTIONS OF THE CITY OF RAMSEY

THIS AGREEMENT is entered into between the City of Anoka, Minnesota, a Charter City under the laws of the State of Minnesota ("Anoka"), and the City of Ramsey, Minnesota, a Charter City under the laws of the State of Minnesota ("Ramsey"), on the 14th day of August, 1996.

WHEREAS, both Anoka and Ramsey own and operate municipal water systems for the purpose of providing municipal water service to their citizens, and

WHEREAS, Anoka's and Ramsey's corporate boundaries are adjacent and their respective water systems are in close proximity at the West boundary of Anoka and the East boundary of Ramsey; and

WHEREAS, Anoka has reserve municipal water system capacity beyond that which is currently needed to supply its peak day demand, and Ramsey has an expanding customer base which has exhausted Ramsey's municipal water system capacity, and

WHEREAS, it would be in the best interests of both cities to cooperate in providing municipal water service to portions of Ramsey and providing Ramsey with a secondary emergency water source, by utilizing Anoka's excess capacity, and

WHEREAS, such cooperation will provide revenue to Anoka and postpone the need for Ramsey to spend substantial amounts to expand its water system capacity.

NOW, THEREFORE, Anoka and Ramsey, pursuant to the authority contained in Minnesota Statutes, Section 471.59, commonly known as the "Joint Powers Act," in order to accomplish the foregoing purposes, agree as follows:

1. CONSTRUCTION OF INTERCONNECTIONS. Anoka and Ramsey shall and have constructed two interconnections between the Anoka municipal water system and the Ramsey municipal water system, as follows:

(a) Highway 10 Connection - a permanent connection located at the Anoka/Ramsey boundary on the North side of Highway 10 which consists of water main, a manhole, a back flow preventer, water meter, and valves and fittings. The purpose of this connection is to provide a supplemental source to Ramsey and an emergency water supply to Ramsey in the event of a water main break or interruption of Ramsey's water supply.

(b) County Road #116/Thurston Avenue Connection - a connection at the Southeast corner of the intersection of County Road #116 and Thurston Avenue. This connection is temporary in nature and has been accomplished by the connection of fittings and a hose line between two fire hydrants. Water drawn at this location will be for emergency use only. The connection contains a backflow preventer and meter.

2. OWNERSHIP OF HIGHWAY 10 CONNECTION EQUIPMENT. Anoka shall own all equipment East of the metering manhole and within the corporate limits of Anoka, and shall own and maintain the meter within the metering manhole and have access to the meter. Ramsey shall own and maintain the metering manhole and all equipment West of the manhole and within the corporate limits of Ramsey. All water flow through this connection shall be from Anoka to Ramsey and the one-way flow is insured by a double check backflow preventer owned and maintained by Ramsey. All equipment has been

purchased and installed by Ramsey, and Anoka has credited Ramsey for that portion of the equipment owned by Anoka. The construction, equipment, engineering, and other costs are described in Exhibit A attached hereto, as is the portion of the cost charged to Anoka and the credit given by Anoka. Ramsey has furnished Anoka a set of reproducible "as built" drawings of the connection.

3. **SALE OF WATER**. Anoka shall sell, at Ramsey's option, at least one million gallons of water per day through both connections described above, provided however:

(a) Anoka may, without notice to Ramsey, reduce or eliminate the amount of water sold to Ramsey in the event of a catastrophic event or emergency circumstance which causes an extraordinary demand for water within Anoka. The existence of any such catastrophic event or emergency circumstance shall be determined in the sole discretion and judgment of Anoka.

(b) Commencing upon and after January 1, 2000, Anoka may, upon nine months' written notice, reduce or eliminate the amount of water sold to Ramsey

4. **WATER CONSERVATION**. Ramsey agrees, with regard to its customers drawing water from Anoka, to implement water conservation and water restriction regulations similar to those imposed by Anoka on its water customers.

5. **COMPENSATION**.

(a) Ramsey shall pay Anoka for water supplied pursuant to this agreement according to the following schedule:

That standard industrial rate charged by Anoka to its industrial customers from time to time (currently 85 cents per 1,000 gallons) plus an additional monthly charge, based on the high usage day of each month, in the following amounts:

$150.00 if the high usage day of the month is less than 250,001 gallons.

IN WITNESS WHEREOF, the undersigned Cities, by action of their governing bodies, have caused this agreement to be executed in accordance with the authority of Minnesota Statutes, Section 471.59.

CITY OF RAMSEY

By: _____ Mayor Date

Attest: _____ City Clerk Date 8/14/96

Approved as to form: _____ City Attorney

CITY OF ANOKA

By: Peter M Beby 8-19-96 Mayor Date

Attest: Mark Nagel 8/16/96 City Clerk Date

Approved as to form: _____ City Attorney

5

Appendix 7: Municipal Critical Water Deficiency Ordinance

DRAFT

10-1-13: **DEFICIENCY OF WATER:**

A. General Requirements: The city shall not be liable for any deficiency or failure in the supply of water to consumers, whether occasioned by shutting the water off for the purpose of making repairs or connections or from any other cause whatsoever. In case of fire, or alarm of fire, or in making repairs or construction of new works, water may be shut off at such time and kept off as long as necessary. In addition, the City Council or City Administrator shall have the right to impose reasonable restrictions on the use of the city water system in emergency situations. (Amended Ord. 55, 5-5-1981; amd. 2003 Code)

B. Irrigation And Sprinkling Restrictions: The following irrigation and sprinkling restrictions shall apply to those persons on the municipal water system:

1. Cross Connections Prohibited: No person shall construct, cause to be constructed or operate any device which provides a cross connection between the municipal water supply and a private well or the sewer system.

2. Waste Of Water Prohibited:
    a. Customers shall maintain taps, faucets, valves and other water facilities so that water waste is eliminated from seeps, dripping faucets, etc.

    b. No person shall waste water deliberately by allowing irrigation or sprinkling water to run off onto the street or into the drains.

3. Permission To Use Hydrant: No person shall open, close or tamper with any fire hydrant except under the authorization of the Public Utilities Department personnel.

4. Odd-Even Day Sprinkling: Sprinkling will be curtailed from May 1 through August 31. Even numbered houses can sprinkle on even numbered calendar days. Odd numbered houses can sprinkle on odd numbered calendar days.

5. Prohibited Hours: There will be no watering in the city (on the city water system), odd or even, between the hours of twelve o'clock (12:00) noon and six o'clock (6:00) P.M.

6. Warning; Penalty: There will be only one written warning for violators of the sprinkling restrictions. Any subsequent violations carry a penalty as set forth by city ordinance.
7. Exemptions:

a. Newly sodded or seeded yards will be exempt from the odd-even restriction for a period of two (2) weeks only. Overseeding or spot patching of existing established yards can be watered every day with a hand controlled hose. No watering will be allowed between twelve o'clock (12:00) noon and six o'clock (6:00) P.M.

b. Other exemptions are: car washing, filling of children's swimming pools, children playing in a hose operated sprinkler or water toy.

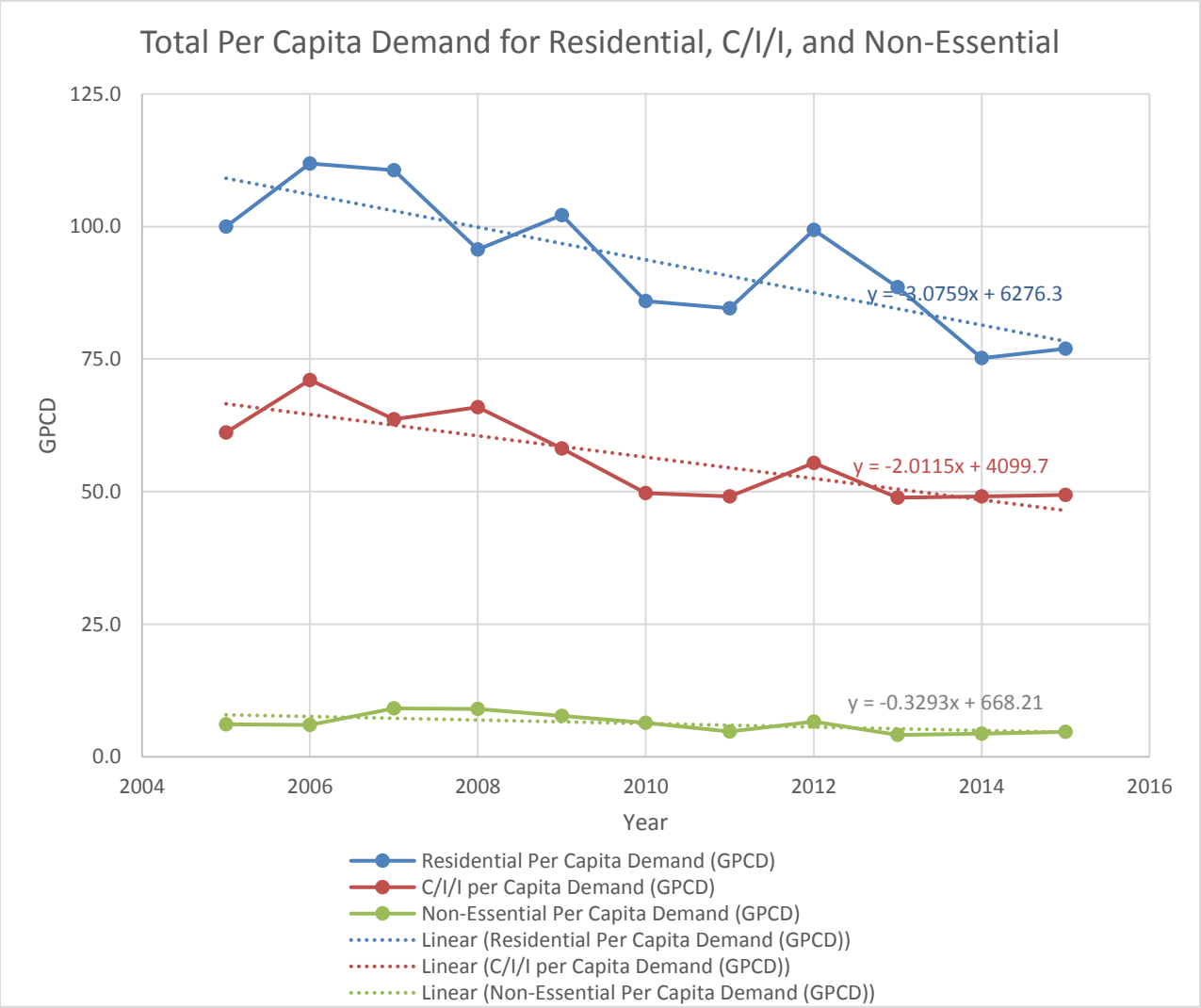
8. Additional Restrictions:

a. Additional curtailment of water usage in dry weather will be by order of the City Administrator. When restricted, no person shall discharge water for the purposes of watering lawns, shrubs, trees, washing cars or structures. All unnecessary uses of water are prohibited for the duration of the imposed restriction. If such restriction endangers the life of a new lawn, shrubs or trees, the Water Department shall be notified. If justified, limited permission may be granted to deviate from restrictions.

b. If more drastic restrictions are necessary, orders may issued by the City Administrator to take necessary action to protect the water system so that ample water may be available for health, sanitation and fire protection. (Amended Ord. 55, 5-5-1981; amd. 2003 Code)

Appendix 8: Graph Showing Annual Per Capita Water Demand for Each Customer Category During the Last 10 Years

Figure 1 – Annual Per Capita Water Demand for Each Customer Category During the Last Ten Years



Appendix 9: Water Rate Structure

Water Rate Structure for the City of Ramsey Effective 1/1/2016

Source: http://cityoframsey.com/utility-billing

Water Rates			2016
	Minimum usage fee/qtr	Per 2012 Comprehensive Water System Study	37.80
	Quarterly Rate Structure		
		Conservation Rates	$37.80 Minimum
			$2.61 per 1,000 for 15,001-25,000
			$2.69 per 1,000 for 25,001-40,000
			$2.86 per 1,000 for 40,001-60,000
			$3.08 per 1,000 for 60,001-99,000
			$3.40 per 1,000 for 99,001-201,000
			$4.07 per 1,000 for 201,001 and above
	Odd/Even Sprinkling Violations:	Effective day after Memorial Day thru Day after Labor Day	
		No Sprinkling between 10 am-8:00 pm	
	First Violation		Written Warning & Registered Letter
	Second Violation		50.00
	Third Violation		100.00
	Fourth Violation		Water Service turned off
	Meter Replacement Admin Fee for Non-Compliance		$75/qtr.

Appendix 10: Adopted or Proposed Regulations to Reduce Demand or Improve Water Efficiency

Adopted or Proposed Regulations to Reduce Demand or Improve Water Efficiency
Note: Ramsey is not proposing and new regulations to reduce demand. Listed in the table below are current regulations that are already in place.

Regulations Utilized	Website Link
☒ Rainfall sensors required on landscape irrigation systems	"Rain Sensors are required: Section 117-588, 589 (www.municode.com/library/mn/ramsey/codes/)
☐ Critical/ Emergency Water Deficiency ordinance	Ordinance will be developed within 6 months of plan approval by DNR.
☒ Watering restriction requirements (time of day, allowable days, etc.)	Rules for Lawn Irrigation Odd and Even Number Houses Time Restrictions 10:00 am – 8:00 pm Chapter 58 of City Code found at: (www.municode.com/library/mn/ramsey/codes/)
☒ Water waste prohibited	Chapter 58 of City Code found at: (www.municode.com/library/mn/ramsey/codes/)
☒ Soil preparation requirements (after construction, requiring topsoil to be applied to promote good root growth)	A minimum of 4" of approved topsoil is required under lawn areas of all newly constructed buildings. Section 117-348 of City Code found at: (www.municode.com/library/mn/ramsey/codes/)
☒ Tree ratios (requiring a certain number of trees per square foot of lawn)	Two trees are required per single family lot, additional trees are required for multi-family dwellings and commercial/ industrial lots. Section 117-111,112,113,114,115,116,117,118,119 (www.municode.com/library/mn/ramsey/codes/)
All air conditioning systems connected directly or indirectly with public water system must be equipped with water conserving and regulating devices.	

Appendix 11: Implementation Checklist – Summary All the Actions That A Community Is Doing or Proposes To Do, Including Estimated Implementation Dates

Implementation Checklist – Summary of all the Actions That a Community Is Doing or Proposes To Do, Including Estimated Implementation Dates

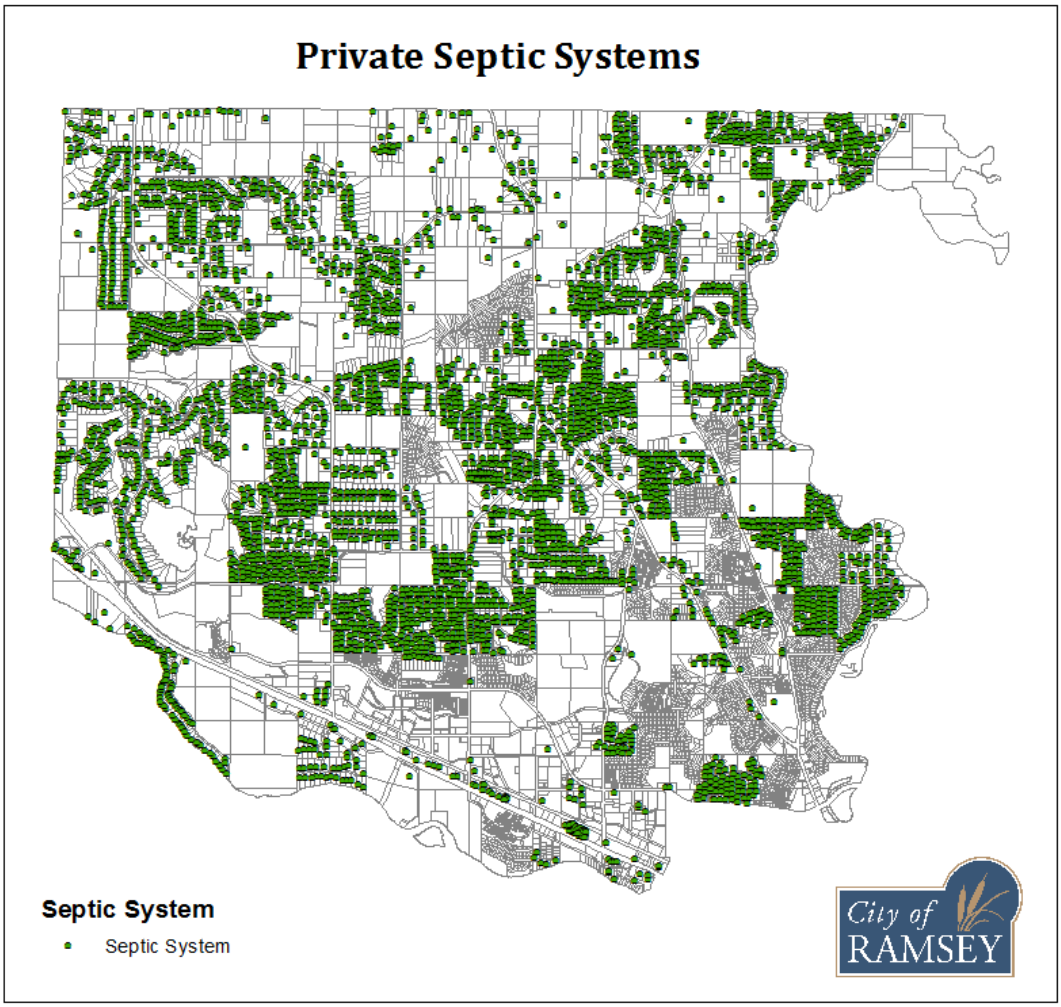
Ramsey is a developing city with an increasing number of irrigation systems. The City plans to focus on reducing irrigation to decrease the total per capita water demand. Listed below is a table summarizing the actions Ramsey is proposing to complete within the next five years to reduce irrigation usage.

Proposed Action	Implementation Date
Promote videos on how to operate and program irrigation systems. This will be done through Anoka County. The videos will be promoted through individual contact, QCTV, Newsletter, social media and "Know the Flow" website.	2021
Rain Sensor Promotion – Ramsey and Anoka County will promote installation of rain sensors. Ramsey has applied to participate in a study of irrigation water use for 2017.	2021

Community and Subsurface Treatment Systems

Community and Subsurface Treatment System Management Program

Ramsey maintains a database of approximately 4,100 private subsurface septic systems. A majority of these are for single-family homes. There is one group septic system for a six (6) unit townhome development owned and operated by a private Home Owners Association (HOA). In 2016, the Minnesota Pollution Control Agency (MPCA) reported a total of approximately 541,000 septic systems in Minnesota. Anoka County has an estimated 28,000 systems, the second highest number of septic systems per County in the State and the highest number of systems of any County in Metropolitan Area. When properly maintained, these systems are an adequate means of treating wastewater. However, given the number of private septic systems in the community, Ramsey must dedicate resources to ensure that these systems are being properly maintained in order to protect groundwater quality, prevent public health threats, and avoid public nuisances.



Ramsey is a Home Rule Charter City. Ramsey City Charter states the following.

> *Connection Policy.* The city may not compel any property owner with a functional private sewer and water system to connect to city sewer and/or water.
>
> *Assessment policy.* The city may not levy an assessment for any component of any project which includes sewer and/or water improvements against a property whose owner elects to remain on a functional private sewer and/or water system.
>
> *Request for urban services.* Property owners who remain on private sewer and water systems after urban services become available may request connection to urban services at any time. Upon connection to urban services an assessment may be levied provided it is consistent with the original assessment.

Ramsey tracks septic systems with a permit management system known as Permit Information Management System (PIMS). PIMS is a product of the Local Government Information System (LOGIS) consortium of local communities.

Public Treatment Systems

Ramsey has no public treatments in our community. Ramsey does have three (3) cluster systems serving four (4) units each, resulting in twelve (12) units being served by a clustered (shared) system.

Subsurface Treatment Systems

Ramsey has an estimated 4,170 subsurface treatment systems.

Public Education

Ramsey has set a goal to improve public education on proper maintenance of septic systems. Ramsey's primary clearinghouse for education materials is www.cityoframsey.com/septic. The website serves as a clearinghouse leveraging a number of existing resources including, but not limited to the Minnesota Pollution Control Agency (MPCA) and Know the Flow (Anoka County).

Ramsey actively participates in Septic Smart Week each September.

Additionally, during the 2017-2018 Academic Year, Ramsey collaborated with the University of Minnesota through its Resilient Communities Project (RCP). One of the projects this partnership worked on was septic education. The partnership developed printed materials and website content. Ramsey is working on incorporating these resources within our new website rolling out in 2018.

Required Pumping and/or Maintenance Reminders

Each year Ramsey sends reminders to septic system owners that are due for septic pumping and/or maintenance at an interval not to exceed once every three (3) years as required by the State of Minnesota.

Financial Assistance for Public Health or Safety Concerns

In instances where a septic system has failed to the point it poses a threat to public health or safety, Property Owners may request the City replace a private septic system and assess the costs of the replacement to the benefitted property. The Property Owner must enter into an Assessment Agreement

and the costs of replacement will be levied against the Property as a Special Assessment. The Property Owner must submit proof that they have exhausted all other financial options to replace the system.

Anoka County also has potential dollars and/or loans available for septic replacement needs.

Administrative Enforcement of Septic Rule Violations

Ramsey has established an administrative process to enforce violations of various sections of our City Code, including our Septic Code. When the City becomes aware of a septic system in violation of the Septic Code, we track the violation through our code enforcement management system. Property Owners are provided two (2) notices of violation with instruction on how to comply with Septic Code. The City is able to issue Administrative Fines in addition to the Notices of Violation.

Civil Prosecution

In the rare occasion where Ramsey's Administrative Enforcement is unsuccessful in achieving compliance, the City will file civil prosecution charges in order to obtain an injunction from District Court to remedy the situation.

Criminal Prosecution

In extremely rare occasions, especially in events of threats to public health or safety, Ramsey may choose to seek criminal charges to remedy the situation.

Future Community Treatment Systems

In certain instances, Ramsey may consider allowing private, community septic systems.

Land Uses and Physical Conditions

Ramsey will generally only allow a private, community system outside of the Metropolitan Urban Service Area (MUSA). In certain circumstances where an agreement for future connection is reached, Ramsey may allow private, community septic systems within the MUSA boundary.

Rural Residential

Private septic systems are generally reserved for rural residential lots of at least one (1) acre in size. Properties shall ensure adequate space for a primary and secondary drainfield area.

Shoreland Areas

Ramsey is supportive of private, community septic systems in areas located within our Shoreland Overlay District, Rum River Wild and Scenic Overlay District, and Mississippi River Corridor Critical Area (MRCCA). These are environmentally sensitive areas, and the public benefits from limiting the number of potential individual source points of pollution that could pose a threat to water quality.

Urban Residential

For areas in the future urban service area but future municipal utilities are not expected within the current planning period (20 years), Owners may cluster lots and serve through a private, community septic system. The Owners must enter into a Future Connection Agreement providing for future connections when municipal services are available.

Administrative Procedures

Ramsey will require that a legal entity be established prior to the construction of any private, community septic systems. Although Ramsey will have no enforcement responsibilities of the entity, Ramsey will require a review of the articles of incorporation by the City Attorney. The participating properties shall enter into a Maintenance Agreement with the City and shall agree to allow the City to assess the costs of future repair in the event of failure to repair a non-compliant system.

Compliance with Applicable Regulations

Owners and Installers of private, community septic systems shall design and construct consistent with Minnesota Rules, Anoka County Ordinances, and Ramsey City Code.

Ramsey Administration

Ramsey shall administer applicable Minnesota Rules consistent with other private septic systems. Ramsey shall require the issuance of a permit prior to installation and shall ensure ongoing compliance.

COMPREHENSIVE SANITARY SEWER STUDY UPDATE

IN COORDINATION WITH 2040 COMPREHENSIVE PLAN UPDATE

CITY OF RAMSEY, MN

SEPTEMBER 2017

Submitted by:
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COMPREHENSIVE SANITARY SEWER STUDY UPDATE
IN COORDINATION WITH
2040 COMPREHENSIVE PLAN UPDATE

CITY OF RAMSEY, MINNESOTA

A. PURPOSE

The purpose for this report is to update the City's 2012 Comprehensive Sanitary Sewer Study based on current population and land use projections. The 2012 Comprehensive Sanitary Sewer Study included a plan for meeting the City's infrastructure needs based on development projected within the City's 2030 Comprehensive Plan.

City staff has identified development which has occurred since the 2012 study was completed and has provided projections for development which is likely to occur in the next 23 years (Year 2040). This report evaluates the impact of the recent and projected development on the proposed sanitary sewer infrastructure implementation.

The following paragraphs present a summary of key updates to the 2012 plan. The intent is to complete the following:

- Estimate costs associated with infrastructure needed to serve future development areas,
- Provide estimations of growth and development anticipated through Year 2040, and
- Develop a connection amount based on the estimated costs and development.

B. SUMMARY OF INFRASTRUCTURE REVISIONS TO THE 2012 COMPREHENSIVE PLAN

Section 4 of the 2012 report describes the trunk infrastructure improvements needed to serve each defined subdistrict within the MUSA boundary. For this report, each subdistrict was reviewed and revisions were made to the required infrastructure based on:

- Improvements made over the last 5 years, and
- Considerations of improvements required.

Through discussions with the City, we were able to determine the improvements made within each subdistrict over the last 5 years. We also made revisions based on anticipated development patterns and anticipated future needs. The following paragraphs describe the revisions made within each subdistrict to allow us to quantify the total improvement costs throughout the City. We attached the updated 2017 "Proposed Trunk Sewer Extensions" map showing the subdistricts and the proposed trunk sewer extensions.

1. Subdistrict M3

This subdistrict is located in the Southwest corner of the City, south of Highway 10. The primary sewer crossing of Trunk Highway 10 has been completed and was removed from the figure and cost estimate. The Bower's Drive NW trunk sanitary sewer line has been converted from a trunk facility to a lateral sewer line. This line was removed from the 2017 proposed trunk sewer extensions as it is now anticipated to serve the area as a standard lateral line. All trunk line project costs have been updated to 2017 unit prices.

2. Subdistrict M4

This subdistrict is located north of Highway 10 and west of Armstrong Boulevard. The trunk sanitary sewer facilities have been modified to reflect the findings of the 2015 Future Business Park study that was completed for this area of the City. Lift station MLS-5 was added to the improvements required for this subdistrict. All project costs have been updated to 2017 unit prices.

Because portions of these improvements have been, or are programmed to be constructed in 2017, we included some in the Capital Improvement Plan and others in the future improvements plan.

3. Subdistricts R21 Through R25

These subdistricts are located north of Trott Brook in the north central portion of the City. No layout revisions to these trunk extensions were made. All trunk line project costs have been updated to current 2017 unit prices.

4. System Extension for 167th Avenue Future MUSA Study Area

The Future MUSA Study Area identifies an area to better understand the feasibility of extending a trunk sewer line to the 167th Avenue/Saint Francis Boulevard (TH 47) land use node. Municipal Water service exists to the area, but Sanitary Sewer does not. The City has a land use goal to revitalize this node and surrounding area, and the availability of Sanitary Sewer is a major variable in future land use decisions. The MUSA boundary does not currently include this area. Findings from this study area will be utilized to influence the City's 2040 Comprehensive Plan Update and discussions with private developers currently proposing certain land use scenarios.

C. TRUNK SANITARY SEWER SYSTEM COSTS

Attached are the updated cost estimates related to the above revisions, totaling $7,571,929. These costs include 25% for indirect costs such as administration, engineering, legal and financing. Additionally, we have included a 20% contingency for unforeseen improvements which may be required during the study period, for a total cost of $9,086,315 in 2017 dollars.

The City's current Capital Improvement Plan was used to determine expenditures for the years 2017 to 2020. For the years 2021 to 2040, the above described costs were spread evenly over the 20 year period, while being inflated at a rate of 3% per year.

D. DEVELOPMENTAL IMPACT ON THE COMPREHENSIVE SANITARY SEWER STUDY

Actual and projected development within the City of Ramsey since the 2012 Comprehensive Sanitary Sewer Study are summarized as follows:

- Actual Total Connections from 2012-2015 are as follows:
  - 2012: 295
  - 2013: 164
  - 2014: 66
  - 2015: 258
  - Avg: 196

- Projected development rates used in 2012 study (through 2030) were as follows:
  - 260 Residential Units/Year (25% High Density)
  - 25 Commercial/Industrial Acres/Year
- Projected development rates (through 2040) are anticipated to be as follows:
  - 160 Residential Units/Year (50% High Density)
  - 10 Commercial/Industrial Acres/Year

The projected Residential development rate was lowered by 38.5% to 80 Units/Year, the projected Commercial/Industrial development rate was lowered by 15 Acres/Year (-60%), while the projected number of high density units increased from 65 Units/Year to 80 Units/Year (+23%).

Based on these considerations, the Residential Equivalent Units (connections) is conservatively estimated at 160 per year.

The 2017 sewer connection charge is $1,154 per residential unit and $3,475 per commercial/industrial acre.

E. ANALYSIS

Many factors impact the actual fee required to sustain and expand the trunk sanitary sewer facilities. We have included a more comprehensive spreadsheet analysis of the sanitary sewer expenses and revenues. Assumption made in the spreadsheet are:

- Anticipated revenue from utility billings of $1,528,683 were used for 2017 and then inflated at 1% per year.
- Trunk Connection charges and SAC fees were set at $1,154 and $2,485 for 2017 and then inflated at 2.5% per year.
- Operating expenses were set at $1,014,301 for 2017 and then inflated at 3% per year.
- Capital expenditures for 2016 to 2020 were taken from the City's current Capital Improvement Plan.
- Capital expenditures for 2021 to 2040 was determined as described in Section 3 of this report.

The information provided in this report should be considered when setting sanitary sewer connection charges within the City.

2040 MUSA - Trunk Sanitary Sewer System Improvements (2021 - 2040)

DISTRICT	LOCATION	SIZE (IN.)	LENGTH (FT.)	COST PER FOOT*	LIFT STATION	COST
M3	MLS-2				$393,928	$393,928
	MLS-2 to MH-11A	12" FM	1750	$124		$216,660
	MLS-2 to MH-9A	18"	3600	$259		$931,921
				TOTAL M3 DISTRICT		**$1,542,510**
M4	MLS-5		(Constructed 2017. Included in CIP)			$0
	MH-92 to MLS-5	12"	1000	$146		$146,316
	MLS-5 to MH-9	6" FM	(Constructed 2017. Included in CIP)			$0
	MH-9 to MH-10A	18"	(Constructed 2017. Included in CIP)			$0
				TOTAL M4 DISTRICT		**$146,316**
R1	MH-89 to MH-92	21"	1300	$326		$424,317
				TOTAL R1 DISTRICT		**$424,317**
R23, 24 & 25	RLS-8				$343,280	$343,280
	RLS-8 to MH-82	8" FM	720	$90		$64,829
	RLS-8 to MH-82	8" FM Jacking	80	$281		$22,510
	RLS-8 to MH-84A	10"	4400	$129		$569,507
	RLS-8 to MH-83A	12"	2500	$146		$365,790
	MH-83A to MH-83	10"	2700	$129		$349,470
				TOTAL R23, 24 & 25 DISTRICT		**$1,715,388**
R21 & 22	MH-79 to MH-78	10"	5100	$129		$660,111
	MH-81 to MH-79	12"	900	$146		$131,685
	MH-81 to MH-82	18"	3900	$259		$1,009,581
	RLS-3 to MH-81	18"	850	$259		$220,037
				TOTAL R21 & 22 DISTRICT		**$2,021,414**
RLS-3	RLS-3				$241,984 (upgrade existing LS)	$241,984
				TOTAL RLS-3 DISTRICT		**$241,984**
FUTURE MUSA STUDY AREA						
RLS-9	RLS-9				$500,000	$500,000
	RLS-9 to MH-14	8" FM	10000	$98		$980,000
				TOTAL RLS-9 DISTRICT		**$1,480,000**
					SUB-TOTAL	**$7,571,929**
					20% CONTINGENCY FOR UNFORSEEN IMPROVEMENTS	**$1,514,386**
					TOTAL IMPROVEMENT COSTS	**$9,086,315**
					AVERAGE YEAR FOR 20 YEARS (2017 DOLLARS)	**$454,316**
					INFLATED AT 3% PER YEAR TO YEAR 2021	**$511,336**

* INCLUDES 25% INDIRECT COSTS

Sanitary Sewer System Rate Impact Summary
City of Ramsey, Minnesota
9/15/2017

	Actual 2016	Projected / Actual 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023	Projected 2024	Projected 2025	Projected 2030	Projected 2035	Projected 2040
Beginning Balance		**10,730,177**	**10,731,811**	**9,894,880**	**10,774,551**	**11,199,678**	**11,565,438**	**11,909,244**	**12,229,589**	**12,524,903**	**13,566,487**	**13,375,837**	**11,944,107**
Sanitary Sewer System Revenue													
Billings and Interest													
From Utility Billings (2016 is based on current activity and inflated 1% per year to 2040)		1,528,683	1,543,970	1,559,410	1,575,004	1,590,754	1,606,661	1,622,728	1,638,955	1,655,345	1,739,784	1,828,530	1,921,804
Internal Loan to offset Muni Center Debt beginning year 2010-2029 @ 2%		47,814	48,770	49,746	50,741	51,755	52,791	53,846	54,923	56,022			
Interal loan to offset RTC land Purchase - 10 Year @ 2% (When land proceeds received)		-	-	-	-	-	-	-	-	-			
Interest Earnings		107,302	160,977	148,423	161,618	167,995	173,482	178,639	183,444	187,874	203,497	200,638	179,162
Total Billings and Interest		**1,683,799**	**1,753,717**	**1,757,578**	**1,787,362**	**1,810,504**	**1,832,933**	**1,855,213**	**1,877,322**	**1,899,240**	**1,943,281**	**2,029,168**	**2,100,965**
SAC and Connection Charges													
New Customers (REUs)		**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**
Residential Connection (Trunk) Fees per Connection (Actual 2016 value and then inflated at 2.5% per year to 2040)		**1,154**	1,183	1,212	1,243	1,274	1,306	1,338	1,372	1,406	1,591	1,800	2,036
Residential Sewer Availability Charge (SAC) (Actual 2016 value and then inflated at 2.5% per year to 2040)		**2,485**	2,547	2,611	2,676	2,743	2,812	2,882	2,954	3,028	3,426	3,876	4,385
Trunk Revenue (Based on 2016 activity) (2017 to 2040 based on 160 REUs per year)		184,640	189,256	193,987	198,837	203,808	208,903	214,126	219,479	224,966	254,528	287,975	325,818
SAC Revenue (1% of Total) (Based on 2016 activity) (2017 to 2040 based on 160 REUs per year)		3,976	4,075	4,177	4,282	4,389	4,498	4,611	4,726	4,844	5,481	6,201	7,016
Total SAC and Conenction Fees		**188,616**	**193,331**	**198,165**	**203,119**	**208,197**	**213,402**	**218,737**	**224,205**	**229,810**	**260,009**	**294,177**	**332,834**
Sanitary Sewer System Expenses													
Operating Expenses (Personal Services, Supplies, Other Services & Charges) Based on 2016 Activity and inflated at 3% per year from 2017 to 2040)		**(1,014,301)**	**(1,044,730)**	**(1,076,072)**	**(1,108,354)**	**(1,141,605)**	**(1,175,853)**	**(1,211,128)**	**(1,247,462)**	**(1,284,886)**	**(1,489,535)**	**(1,726,780)**	**(2,001,811)**
CIP Projects-Sewer Utilities													
Bunker Lake Boulevard Trunk Sanitary Sewer		(105,658)											
Utility Truck(s)		(25,000)	(23,500)										
Puma Street Trunk Sanitary Sewer and Lift Station		(725,822)											
Abandon Wildlife Sanctuary Lift Station					(352,000)								
Public Works Campus			(1,715,750)										
Fire Station #1 Sanitary Sewer					(60,000)								
Abandon Liftstation River Pines					(45,000)								
Armstrong Boulevard Extend Sewer to Riverdale													
TOTALS Note: CIP Project 2021 to 2040 ($505,980/Year in 2017 Dollars. Inflated 3%/Year.)	**-**	**(856,480)**	**(1,739,250)**	**-**	**(457,000)**	**(511,336)**	**(526,676)**	**(542,476)**	**(558,751)**	**(575,513)**	**(667,178)**	**(773,442)**	**(896,631)**
Remaining Working Capital Balance	**10,730,177**	**10,731,811**	**9,894,880**	**10,774,551**	**11,199,678**	**11,565,438**	**11,909,244**	**12,229,589**	**12,524,903**	**12,793,554**	**13,613,065**	**13,198,960**	**11,479,464**

*** This fund is created to offset the repairs of lines. The city currently has over $21,000,000 of sewer lines (per 2013 audit) which includes over $5.8M of accumulated depreciation

Indicates adjustable values

CITY OF RAMSEY
MINNESOTA

FIGURE 1

PROPOSED 2040 SERVICE AREAS
COMPREHENSIVE SANITARY SEWER PLAN
PROPOSED TRUNK SEWER EXTENSIONS

SEPTEMBER 2017

R24
R21
R23
R25
R22
RLS-8
RLS-3
RLS3
RLS9
R1
R2
R19
M4
MLS-5
M3
MLS-2

N

0 1000 2000
SCALE FEET

LEGEND

- RUM RIVER SEWER DISTRICT
- MISSISSIPPI RIVER SEWER DISTRICT
- NORTH TROTT BROOK MISSISSIPPI RIVER DISTRICT
- NORTH TROTT BROOK RUM RIVER DISTRICT
- TRUNK SEWER IN PLACE
- 2030 MUSA
- FUTURE MUSA STUDY AREA
- PROPOSED TRUNK SEWER
- PROPOSED FORCEMAIN
- PROPOSED MH
- PROPOSED LIFT STATION
- EXISTING TRUNK SEWER
- EXISTING LATERAL SEWER
- EXISTING FORCEMAIN
- EXISTING LIFT STATION

NOTE:
The information for this map was obtained from various sources of existing maps, construction plans, and City records, some of which were prepared by others. While this information is believed to be reliable Bolton & Menk, Inc. is not responsible for its accuracy nor for errors or omissions which may have been incorporated into this document as a result.

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H:\RAMS\R161100561\CAD\2040_PROPOSED SEWER PLAN - 2016 UPDATED.DWG 10/21/16 2:58 PM

The City of Ramsey
Surface Water Management Plan

Project 14-31
October 21, 2015

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.

By: _____

Leonard L. Linton, P.E.

Date: October 21, 2015 Registration No. 21112

I hereby certify that this plan, specification or report was reviewed for Quality Control and Quality Assurance purposes and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____

Bruce Westby, PE

Date: October 21, 2015 License No. 40116

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APPENDICES

Appendix A - Ramsey Stormwater Pollution Prevention Plan (not included)
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I. PURPOSE OF PLAN

The purpose of this Surface Water Management Plan (SWMP) is to promote, preserve and enhance the natural resources within the City of Ramsey. The City will protect water quality and unique and fragile environmentally sensitive land from adverse effects that can potentially be caused by poorly sited development or incompatible activities. The City proposes to accomplish this by regulating land disturbances and development activities.

This plan was originally prepared in 2008 by Bolton and Menk, Inc. (the "2008 Plan"). This document is intended to update the 2008 Plan as required (the "2015 Update"). The City has prepared the 2015 Update utilizing the 2008 baseline data prepared by Bolton and Menk.

Minnesota Rules Chapter 8410 (Metropolitan Area Local Water Management) requires specific elements to be addressed in local water management plans. The various chapters of this report are designed to address each element required under these rules. In addition, this plan follows the Metropolitan Council's 2040 Water Resources Management Policy Plan requirements. At the time of drafting of this report, the Metropolitan Council was in the process of completing the 2040 Water Resources Policy Plan, which replaces the plan mentioned in this paragraph. As part of the City's 2040 Comprehensive Plan Update, the City will review the need to update this document. IN 2002, the Minnesota Pollution Control Agency designated the City of Ramsey as a mandatory Municipally Separate Storm Sewer System (MS4) community needing to submit a National Pollutant Discharge Elimination System (NPDES) permit regulating its storm water runoff. As such, the City submitted a Storm Water Pollution Prevention Plan (SWPPP) with its permit application in 2003. The permit was reissued in 2006 and 2013. The City has update the SWPPP to meet the requirements of each reissue. Accordingly, an additional purpose of this SWMP is to control or eliminate storm water pollution. Key contributors to storm water pollution are soil erosion and sedimentation. The city-wide SWPPP incorporates ordinance changes that address erosion control, sedimentation associated with construction activities as well as illicit discharges to surface waters, all primary contributors of storm water pollution.

The City's goal is to minimize conflicts and encourage compatibility between land disturbing activities, water quality and environmentally sensitive lands. This will be accomplished through detailed development ordinances, plan review standards and recommended pollution control procedures in an effort to strike a balance between urban growth and the protection of water quality and natural areas. This SWMP, in conjunction with the policies set forth in the City ordinances, establishes standards and specifications for conservation practices and planning activities to minimize storm water pollution, soil erosion and sedimentation.

This submittal is a culmination of research, mapping, land use analysis/planning and hydraulic design. The end product is a detailed design tool that can be used by the City of Ramsey in planning growth and infrastructure replacement. This summary report represents only a small part of the total work product created through the master planning process. The current City ordinances have also been revisited as part of this process, as they are the best means to implement the recommendations made in this report.

Following the approval of this SWMP by the Lower Rum River Watershed Management Organization (LRRWMO), the City will have administrative authority for the approved SWMP and ordinances. The City will also have the duty to enforce the SWMP and associated ordinances. The City places a high priority in improving impaired waters and intends to work with the LRRWMO and other agencies to achieve water quality goals by reducing the impact created by the City.

II. EXECUTIVE SUMMARY

A. Plan Purpose and Background

Storm water regulations have changed significantly since the original Comprehensive Storm Drainage Plan was approved in 1980 and the southeast growth area was revisited in 1997 and 2002. The plan was updated in 2008 and renamed the Storm Water Management Plan. The following is a listing of those regulatory changes:

1. 1982

   The *Metropolitan Surface Water Management Act* was passed. The Act was originally included in Minnesota Statute Chapter 509. The Act was recreated and modified in 1990 and became Minnesota Statue 103B.205 to 103B.255.

   Originally, the former State of Minnesota Water Resources Board oversaw implementation of the act. When that board was merged with two other boards to form the Minnesota Board of Water and Soil Resources in 1987, the Board of Water and Soil Resources assumed responsibility for the act. Forty-six watershed management organizations (36 joint powers Watershed Management Organizations and 10 Watershed Districts) were originally responsible for preparing plans to:

   - protect, preserve, and use natural surface and groundwater storage and retention systems
   - minimize public capital expenditures needed to correct flooding and water quality problems
   - identify and plan for means to effectively protect and improve surface and groundwater quality
   - establish more uniform local policies and official controls for surface and groundwater management
   - prevent erosion of soil into surface water systems
   - promote groundwater recharge
   - protect and enhance fish and wildlife habitat and water recreational facilities
   - secure the other benefits associated with the proper management of surface and groundwater [1]

2. 1985

   The Lower Rum River Water Management Organization (LRRWMO) was formed to meet the requirements of the Metropolitan Surface Water Management Act.

[1] Excerpt taken from the Minnesota Board of Water & Soil Resources Website: http://www.bwsr.state.mn.us/watermgmt/metroareasurface.html

3. 1987

The Federal Clean Water Act was amended to address storm water as a pollution source. This resulted in the EPA developing a NPDES Phase I permit that targeted Cities with populations in excess of 100,000. As a result, in 1991, Minneapolis and St. Paul were required to apply for permits. One permit requirement was the development of a city-wide Storm Water Pollution Prevention Plan (SWPPP) that included approximately 30 mandatory Best Management Practices (BMPs) addressing everything from education and good housekeeping for municipal operations to mandatory city ordinances.

4. 1991

The Minnesota Legislature passed the Wetlands Conservation Act (WCA). The WCA is administered according to Minnesota Rules Chapter 8420 to implement the purpose of the Act, which is to:

- Achieve no net loss in the quantity, quality, and biological diversity of Minnesota's existing wetlands
- Increase the quantity, quality and biological diversity of Minnesota wetlands by restoring or enhancing diminished or drained wetlands;
- Avoid direct and indirect impacts from activities that destroy or diminish the quantity, quality, or biological diversity of wetlands
- Replace wetland values where avoidance of activities is not feasible and prudent. [2]

5. 1992

The Board of Soil and Water Resources (BWSR) developed Minnesota Rules Chapter 8410. This set of rules consists of 18 parts that define the scope, general structure and content required for BWSR approval of a Local Surface Water Management Plan. The table of contents of this report and the content within each chapter has been structured to meet MN Rule 8410 as well as the specific requirements of the City of Ramsey.

6. 2003

NPDES Phase II, the second round of the 1987 Federal Clean Water Act amendment, targeted cities with populations over 10,000. The City submitted a permit application and SWPPP in accordance with MPCA deadlines.

The City finalized its most recent SWPPP in 2013. That SWPPP is attached in Appendix A to this report.

[2] Excerpt taken from the University of Minnesota Duluth website: http://www.d.umn.edu/fm/safety_envir/wetlands/pdf_pages/4.0%20Wetland%20Regulations.pdf

7. 2005

The Metropolitan Council has requirements for local governments to include local water management plans as part of their Comprehensive Plans. The Metropolitan Council does not have authority to set policy or administer local storm water regulations. This Surface Water Management Plan Update is designed to address current requirements governing local water management plans. The general boundary of the plan includes all property within the City limits of Ramsey. When accepted by all local, regional, state and federal agencies having jurisdiction, the City of Ramsey will be the sole responsible party for administering this plan.

8. 2012

The Lower Rum River Watershed Management Organization adopted their Third Generation Plan. The new plan requires infiltration for new and redeveloped sites, use of the Atlas-14 rainfall distributions and reductions in Total Suspended Solids (TSS) and Total Phosphorus (TP) for runoff discharged from new permitted projects.

B. General Content of Required Local Plans

This SWMP follows the general report structure listed in Minnesota Rules Chapter 8410.0170, the general requirements in Minnesota Statute sections 103B.205 - 103B.255, and the Metropolitan Council's requirements for local water management plans as adopted May 2005 as part of the Metropolitan Council's *Water Resources Management Plan*. As stated above, the City will update this plan subsequent to the adoption of the Metropolitan Council's 2040 Water Resources Policy Plan.

C. Summary of the Goals, Problems, and Potential Solutions

The general findings of this Surface Water Management Plan report are summarized as follows:

1. Ramsey is located in the Anoka Sand Plain. The area is well known for its highly permeable soil. As such, the runoff from significant rainfalls is generally reduced to the extent that the existing drainage network functions well with no significant flooding outside the Mississippi River, Rum River, Trott Brook, Ford Brook, County Ditch 43 and County Ditch 66 flood plains.

   Because of the pervious nature of the Anoka Sand Plain, the City will need to review its development ordinances to mitigate the adverse effect that a significant increase in impervious surfacing and mass grading can have on runoff conditions. The addition of significant amounts of impervious surfaces and the reduced permeability associated with the soil compaction in mass grading without a reasonable attempt to restore or duplicate the current infiltration pattern could create very significant increases in runoff volumes and downstream flooding. This is especially true in the Trott Brook, D66, EMISS and WMISS watersheds (see Figure 9), where improvements in uppermost watershed limits must flow a significant distance to the ultimate watershed outlet. The longer flow path associated with each of these watersheds allows greater opportunities for peak flows from conventional detention ponds to coincide.

   One solution to the problem of coincident peak flows is the use of low impact development techniques. There are a variety of low impact development

techniques. The current low-density residential developments in northern Ramsey are a close approximation of what a low impact development can be like. This area has a noticeably lesser storm water impact than that of either high-density residential developments or commercial/industrial developments.

However, Ramsey's land use plan creates a variety of land use types in which low-density residential is not planned for all areas of the community. With these development plans in mind to balance low impact development with the City's economic development goals, the City must consider other techniques to encourage maximized infiltration of storm water.

This report recommends modifying the current development ordinances to encourage infiltration and soil ripping of mass grading to compensate for lost infiltration conditions as well as requiring oversized retention ponding to mitigate and compensate for increases in runoff. Innovative solutions to the storm water runoff increases associated with the increase in impervious surface will be investigated and encouraged when deemed appropriate. Potential solutions include pervious pavements, rain gardens, infiltration basins and low impact development among others.

2. An integral part of this SWMP is updating the comprehensive storm water runoff modeling performed in 2008. The 2008 modeling effort captured the existing conditions throughout the entire city. This modeling includes:

   a. Mapping out the small watersheds draining to general collection points such as low points in roadways and intersections, wetlands or ponds.

   b. Estimating the runoff from the 2, 10 and 100-year rainfall events.

   c. Routing the runoff through the existing system.

   The existing system may be a pipe network, a pond, a wetland or a waterway. The modeling predicts the high water levels and flows associated with each rainfall event modeled.

   This modeling provides a baseline for comparison purposes as new developments change the drainage pattern. With this modeling information, City staff can readily review the cumulative impacts of large developments for effects on the baseline conditions across the entire watershed.

   Storm and Sanitary Analysis (SSA) software was used in the comprehensive modeling. This software is based on the industry standard EPASWMM process and the St. Vennant equations. The model can be used to input actual rainfall events from rain gauges and can model the transport of pollutants through the system. This will be very useful in evaluating the BMP measures to address future TMDLs.

3. Where the cumulative effect of regulated development is potential flooding, the recommended practice is the construction of retention ponds or detention basins, including infiltration, as a requirement of further development of the outlying growth areas. It is further recommended that the post construction peak outflows from new developments be limited to no more than the existing peak flow for the 2-, 10-, and 100-year storms. The Third Generation Lower Rum River Watershed Management Plan requires infiltration of the first 1" of runoff from new

impervious surfaces. This will better mitigate the cumulative effects of increased impervious surfacing and increased runoff volume from new developments.

Because the majority of the area is served by large stream/wetland complexes, regional ponding is not possible for a significant part of the city. Where they are possible, the creation of regional ponds is preferred because of the limited maintenance (compared to a multitude of individual development ponds) and the opportunity to control larger drainage areas. By contrast, a multitude of scattered ponds associated with each individual site development may be designed to reduce the peak outflow for its smaller area, by storing the excess runoff and releasing it at a lesser rate for a longer duration. This longer pond outflow duration may coincide with the reduced peak flows from other individual site ponds and create a larger combined peak flow than the original undeveloped condition. Hence, regional ponds are recommended where physically possible, because of the opportunity to control the runoff on a larger scale and ensure that the downstream system is not adversely impacted by uncoordinated development that meets a typical runoff ordinance. The greater control afforded by regional ponds may also reduce the flows to the downstream system and allow for decreased costs in downstream infrastructure improvements.

4. The proposed infiltration requirements and pond network is part of the goal of accommodating continued responsible growth. Revisions will be required as formal developer layouts are presented to the City. Although this plan forms a sound basis for future development, it is important to remain flexible in finding ways to manage runoff while still accommodating the continued development of the city.

5. The maps attached at the end of this report are for general illustration purposes. As part of the plan development, large scale maps and GIS compatible files have been prepared as part of the 2008 SWMP and updated with preparation of this plan. The GIS maps and files show more detailed information including watershed areas, proposed pond areas and storage volumes, estimated flow rates into and out of the proposed ponds for both the existing and developed conditions, proposed interconnecting pipe sizes between ponds, etc.

6. The City will pursue outside funding to help finance the recommended capital improvements described in this plan. Local financing will most likely come from a combination of storm sewer trunk fees and the City's storm water utility fund.

   Any determined storm water management charges or area charges to new developments should be reviewed on an annual basis to ensure that changes in land acquisition, construction cost, bonding cost, legal cost, etc. are included in the computed fee.

7. The 2008 SWMP included a complete wetland functions and values assessment as part of a greater wetlands management plan.

   The wetland buffers recommended in the Wetlands Function assessment were approved by City Council when the 2008 SWMP was approved. Further review of the buffers by the City Council resulted in a policy decision to delay the implementation of the wetland buffers recommendations.

   Wetlands are to be further protected by controlling discharges from developing areas. The proposed controls include pretreatment BMPs and runoff controls

designed to maintain the current hydrology and maintain or improve the current functions and values of the wetland.

D. Amendments and Updates

This report is intended for the coverage period to 2022. It should be considered as a working document that should be updated and amended in accordance with the procedures described in Section IX. Amendment will be needed as development progresses and actual new development data is integrated into the overall model.

The Minnesota Pollution Control Agency (MPCA) has not completed total maximum daily load (TMDL) studies for the impaired waters within the city boundaries of Ramsey (see Table 15 for the list), and is still completing the TMDL study of Lake Pepin (downstream from Ramsey). The Lake Pepin TMDL may have a major impact on all NPDES permittees in the metro area. The City of Ramsey is aware of the potential need to amend the local water management plan prior to 2022 based on the implications and requirements of the Lake Pepin TMDL and the TMDLs for the impaired waters within the city.

The City has updated the SWPPP in accordance with the reissuance of the MS4 permit in 2013. The SWPPP addresses the education components required by the surface water management plan.

III. REGULATORY REQUIREMENTS AFFECTING PLAN

The following is a brief summary of the primary Statutes and Rules governing storm water management in the 7-County metropolitan area. These requirements establish and control the content of this plan and cite objectives regarding surface water management:

A. Minnesota Rules Chapter 8410.0170

These rules outline the structure of a SWMP. Each SWMP must have the following at a minimum:

1. A purpose statement outlining the purposes of the water management programs required by MN Statute sections 103B.205 - 103B.255.
2. A section of water resource related agreements
3. A land and water resource inventory (required by part 8410.0060)
4. A section on the establishment of policies and goals
5. A section on assessment of problems
6. A section on corrective actions
7. A section on financial considerations
8. An implementation program discussing which components of the implementation program the City will prioritize
9. A section on the City's amendment procedures

This document is intended to meet these rules and hence each requirement is included.

B. Minnesota Statute 103B.235

This state law predates Minnesota Rule 8410 and includes additional requirements as follows:

1. Subdivision 1 - *Requirement* states that the City of Ramsey is required to submit a watershed management plan because it is within the 7-County metropolitan area.
2. Subdivision 2 - *Contents* states that the SWMP shall:
    a. Describe existing and proposed physical environment and land use;
    b. Define drainage areas and the volumes, rates, and paths of storm water runoff;
    c. Identify areas and elevations for storm water storage adequate to meet performance standards established in the watershed plan;
    d. Define water quantity and water quality protection methods adequate to meet performance standards established in the watershed plan;
    e. Identify regulated areas; and
    f. Set forth an implementation program, including a description of official controls and, as appropriate, a capital improvement program.
3. Subdivision 3 - *Review* states that, after consideration but before adoption by the governing body, the City shall submit its SWMP to the area water management

organization (WMO) for review for consistency with the watershed plan adopted pursuant to section 103B.231. The Lower Rum River Water Management Organization (LRRWMO) has WMO jurisdiction in Ramsey. According to the statute, the LRRWMO must approve or disapprove the plan or parts of the plan. The LRRWMO has 60 days to complete its review; provided, however, that the LRRWMO shall, as part of its review, take into account the comments submitted to it by the Metropolitan Council pursuant to subdivision 3a. If the WMO fails to complete its review within the prescribed period, the SWMP shall be deemed approved unless the City agrees to an extension.

3a. Subdivision 3a - *Review by Metropolitan Council* states that the City shall submit its SWMP to the Metropolitan Council for review and comment. The council shall have 45 days to review and comment upon the SWMP or parts of the plan with respect to consistency with the Metropolitan Council's comprehensive development guide for the metropolitan area. The Metropolitan Council's 45-day review period shall run concurrently with the 60-day review period by the LRRWMO. The Metropolitan Council shall submit its comments to the LRRWMO and shall send a copy of its comments to the City. If the Metropolitan Council fails to complete its review and make comments to the LRRWMO within the 45-day period, the LRRWMO shall complete its review as provided in subdivision 3 of State Statute 103B.235.

4. Subdivision 4 - *Adoption and Implementation* requires the City to adopt and implement its plan within 120 days after approval of the SWMP by the LRRWMO and to amend its official controls accordingly within 180 days.

5. Subdivision 5 - *Amendments* states that to the extent and in the manner required by the LRRWMO, all major amendments to the SWMP shall be submitted to the LRRWMO for review and approval in accordance with the provisions of State Statute 103B.235, subdivisions 3 and 3a for the review of plans. All minor amendments will be reviewed and approved by the City Council.

All of these required MS 103B.235 items are covered in this document.

C. **Local Ordinances**

The City of Ramsey will administer and enforce the water resource-related ordinances under the direction and control of, and subject to the powers expressly reserved to, the City Council. Following approval of this SWMP and ordinances, the City shall have administrative authority for the approved SWMP and ordinances. The Applicant, permittee or any other person or political subdivision with an interest in the determination of the City's interpretation or application of these ordinances may file a written appeal to the City Council within fifteen (15) business days of said determination. Said appeal shall state the specific grounds upon which the appeal is based. Within thirty (30) days of the date of receipt of the appeal, the City shall schedule the appeal for a regular or special meeting of the City Council. The City Council shall make its decision to affirm, reverse, or remand the determination by adopting a resolution stating findings of fact.

D. **Total Maximum Daily Loads and Impaired Waters**

The 1987 amendment to the Federal Clean Water Act required all impaired waters to be corrected. In making rules to meet the 1987 Amendment, the Environmental Protection Agency (EPA) first set criteria to determine a list of impaired waters depending on the potential use of the water. The Minnesota Pollution Control Agency (MPCA) worked to set guidelines to establish intended uses for the waters of the state and then set acceptable water quality criteria. After testing to determine the water quality, waters failing to meet the water quality criteria are placed on the 303d Impaired Waters list that is submitted to the EPA. Table 15 in Section IV, page 16 of this report, lists the current (2006) MPCA 303d Impaired Waters in Ramsey. It should be noted that, as of 2007, only about 25% of the waters of the State of Minnesota had been tested. Hence, the impaired waters list is likely to increase in the Ramsey area.

The process to remedy the impairment includes establishing a Total Maximum Daily Load (TMDL) allocation to each contributor to the problem. A TMDL is a calculation that determines the allowable pollutant load that can be discharged into the impaired water so that the limited load will ensure that the water improves to levels where it is no longer impaired. The typical process is initiated by the MPCA and includes a series of stakeholder meetings to formulate viable solutions and mutually work out a reasonable allocation of acceptable pollutant loading.

E. **Specific Lakes and Streams with Water Quality Problems**

Since a TMDL study has not been completed for the known impaired waters in Ramsey and downstream from Ramsey (such as Lake Pepin), the City should identify the priority it places on addressing impaired waters and how the City intends to participate in the development or implementation of TMDL projects. The Rum River and Mississippi River watersheds are too large for the City of Ramsey to take the lead on the TMDL Stakeholder process for these two waters. It is recommended that the City volunteers to participate in the Stakeholder process for these waters. Through this SWMP, the City of Ramsey has the capability of modeling contaminant transport using the SSA model. The City will work with the LRRWMO and the MPCA to formulate a TMDL for the impaired Rogers Lake.

Once a TMDL study is completed for the impaired water, the City must include, in this SWMP and its City-wide SWPPP, an implementation strategy including funding mechanisms that will allow the implementation of the TMDL requirements. As MPCA completes its TMDL process for each impaired water, the implementation of the measures to meet the TMDL will immediately become a priority item for the City of Ramsey.

F. **Lower Rum River Water Management Organization**

The City of Ramsey entered into a Joint and Cooperative Agreement for the Establishment of the *Lower Rum River Watershed Management Organization to Plan, Control and Provide for the Development of the Lower Rum River Watershed* in June of 1995. The Minnesota Board of Water and Soil Resources officially signed the Findings of Fact, Conclusions and Order accepting the Second Generation Watershed Management Plan on August 26, 1998. The LRRWMO updated its plan in 2012. The LRRWMO's plan update will trigger the mandatory re-evaluation and potential need for an update of the City's SWMP within two years from the date the LRRWMO's plan is approved by

BWSR. Update of the City's SWMP was delayed to incorporate the requirements associated with the reissuance of the MS4 permit in 2013.

G. **NPDES Requirements**

In 1987, the US Congress amended the Clean Water Act to include storm water pollution and directed the Environmental Protection Agency (EPA) to initiate rulemaking. The first round of EPA rules were implemented in 1991 when NPDES Phase I permits were required for all cities exceeding 100,000 in population. Phase II was implemented in 2003 and targeted all cities with populations exceeding 10,000. The Minnesota Pollution Control Agency (MPCA) assumed responsibility for implementing the rules and issuing all Phase II permits. The City of Ramsey was required to submit a permit for its Municipally Separate Storm Sewer System (MS4) in March of 2003. The permit was reissued in 2006 and 2013. The permit required the City of Ramsey to meet six minimum storm water control measures as follows:

1. Public education and outreach
2. Public participation and involvement
3. Detection and elimination of illegal discharges
4. Control of large construction sites runoff
5. Post construction storm water management
6. Pollution prevention or housekeeping for municipal operations

To show that the City of Ramsey is committed to implementing its Phase II permit, it was required to submit a Storm Water Pollution Prevention Program (SWPPP), which is essentially a list of promised steps the City proposes to make to meet these minimum control measures. The promises are in the form of Best Management Practices (BMPs) to be implemented at specified times over the life of the permit.

In general, the NPDES storm water discharge permit program is designed to reduce adverse impacts to water quality. The primary targets of acceptable storm water management plans are urban runoff and construction runoff. This is because urban runoff carries pollutants from cars, lawn fertilizers, pesticide spills and other contaminants into our lakes, wetlands and streams without entering wastewater treatment systems. Construction runoff is often laden with sediment caused by large amounts of un-vegetated soil that is loosened by excavation and grading.

The MPCA mandates are intended to regulate these sources of continued environmental degradation. To comply with the NPDES permit requirements, the City's SWPPP was drafted to establish measurable goals using the Best Management Practice (BMP) approach and to be able to track performance and progress.

Erosion and sediment control measures must be included in the City-wide SWPPP. The minimum standard is the General Permit Authorization to Discharge Storm Water Associated With Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program Permit MN R040000 (NPDES/SDS Permit) issued by the Minnesota Pollution Control Agency on August 1, 2013, as amended. Some components of the NPDES/SDS Permit include:

1. If land disturbing activity is taking place on a site where the soils are currently disturbed (e.g., a tilled agricultural site that is being developed), areas that will

not be disturbed as part of the development and areas that will not be disturbed according to the time frames and slopes specified in the NPDES General Construction permit Part IV.B.2, shall be seeded with temporary or permanent cover before commencing the proposed land disturbing activity.

2. Where one (1) or more acres of disturbed soil drain to a common location, a temporary (or permanent) sediment basin must be provided prior to the runoff leaving the site or entering surface waters. The basins must be designed and constructed according to the standards in the NPDES General Construction Permit Part III.B.

3. The Permittee or applicant must ensure final stabilization of the site in accordance with the NPDES General Construction Permit requirements. The site will be considered as having achieved final stabilization following submission of Certificate of Completion by the permittee or applicant, and inspection and approval by the City.

H. Non-Degradation Rulemaking

The MPCA is currently going through due process to update its non-degradation rulemaking effort and amend the state rules governing the non-degradation of waters (Minn. R. 7050.0180 and 7050.0185). Rules protecting Outstanding Resource Value Waters were adopted in 1984, while rules governing non-degradation of all waters were adopted in 1988. Since then, there have been many changes to the state and federal structure for water protection and to the understanding of water quality. The MPCA intends, with the assistance of a significant stakeholder effort, to thoroughly investigate the issues associated with non-degradation of waters, and to adopt rules that will address those concerns.

The MPCA has already taken the first steps in the rulemaking process by publishing two Requests for Comments regarding our intent to amend the current non-degradation rules. These Requests for Comments were published in the *State Register* on January 29, 2007, May 29, 2007 and February 25, 2013.[3]

This language was copied from the MPCA website in January 2015. The City of Ramsey will incorporate the non-degradation policies into this SWMP when they are formally adopted into the state rules.

[3] Excerpt taken from MPCA website: http://www.pca.state.mn.us/http://www.pca.state.mn.us/index.php/water/water-permits-and-rules/water-rulemaking/nondegradation-rulemaking.html

IV. LAND AND WATER RESOURCES INVENTORY

Each plan must contain an inventory of water resource and physical factors affecting the water resources based on existing records and publications. If data publications and maps are available at a convenient central location, they may be included by reference. The plan must include a brief summary of the data and must identify where the publication can be obtained. The following subsections are required.

A. Precipitation

The state climatology office has records of all official rain gauges throughout Anoka County. The monthly precipitation totals and county-wide monthly averages for Anoka County are available online at:

http://climate.umn.edu/HIDENannual/

The two closest high-density rain gauges are:

1. No. 211785, Coon Creek
2. No. 217308, Saint Francis

Information is readily available from 1971 to the present. Over this time period, the aggregate annual precipitation ranged as follows:

Lowest annual precipitation ..... 16.5 inches in 1976

Highest Annual Precipitation ..... 39.09 inches in 1983

Average Annual Precipitation ..... 29.54 inches per year

The following is the average annual precipitation per decade:

1970s ..... 26.8 inches per year

1980s ..... 29.9 inches per year

1990s ..... 31.2 inches per year

2000s ..... 29.6 inches per year

2010s ..... 29.2 inches per year

On the average, June is the wettest month, followed by July and May.

B. General Geology and Topographic Data

The City of Ramsey is nestled between the Rum and Mississippi Rivers and within 2 miles of the confluence of these rivers. The general terrain is relatively flat and is often called the Anoka Sand Plain. The elevations range from approximate elevation 920 feet above mean seal level in northwestern Ramsey to near 840 feet at the lower Rum River. The straight-line distance between these points is approximately 60,000 feet, making the average slope less than 1 percent. In general, the land slope is in the 2 to 5 percent range.

There are steep slopes within the shoreland protection zone of the Rum and Mississippi Rivers, as well as scattered locations throughout the City. From the aerial photographic contour map, the slopes near the rivers can be as high as 65 percent. A map showing the areas with slopes between 12 and 18 percent and separately showing the areas with slopes greater than 18 percent is attached as Figure 1.

Virtually all of the Ramsey city limits is within the Anoka Sand Plain, which consists of highly permeable soils. Figure 2 shows the general subsurface geology of aquifers in the vicinity of Ramsey. The Anoka Sand Plain is part of the undifferentiated drift (Layer 1). The Minnesota Department of Natural Resources and the Minnesota Geological Survey generated Figure 3 as part of the Regional Hydrogeologic Assessment for the Anoka Sand Plain.[4] Based on Figure 3, waterborne contaminants in the Ramsey area can reach upper aquifers within hours or months of release, necessitating additional care in regulating surface water contamination. The majority of Ramsey is rated with the highest geologic sensitivity to pollution in the uppermost aquifer.

The Board of Water and Soil Resources website indicates that Anoka County, though not participating in the official metropolitan groundwater planning process, has prepared a "groundwater protection assessment." The county public health department coordinates the county groundwater planning and management activities.[5] However, there is no mention of the assessment on Anoka County Health and Environment Department website.

The City Wellhead Protection Plan was completed in the September of 2007. The final draft of Part 1 was accepted by all review agencies and City staff is currently working on Part 2. Figure 4 shows the 10-year capture zone (Well Head Protection Area, WHPA) as well as the Drinking Water Supply Management Area (DWSMA) for the seven municipal drinking water wells in Ramsey. Storm water infiltration will not be allowed inside the 10 year capture zone.

C. Surface Water Resource Data

1. Public Waters

A map of the public waters, streams, lakes, and public ditch systems established under Minnesota Statutes, chapter 103D or 103E, including the location of existing dams and control structures is shown in Figure 5. A map of the natural drainage routes is also attached as part of the Parks Map in Figure 6.

The Minnesota Department of Natural Resources (DNR) uses the U.S. Fish and Wildlife classification system (Circular 39) for wetlands and currently requires a permit for alteration of wetland types 3-5 which are 2.5 acres or larger. Ramsey City Code Section 117-124, Environmental Protection Overlay Districts includes provisions designed to further protect wetlands. . As stated previously, this section of code does not include required vegetative buffers for new developments around the perimeter of wetlands.

[4] Minnesota Dept. of Administration / Office of Geographic and Demographic Analysis / Land Management Information Center. Website: http://www.lmic.state.mn.us/chouse/metadata/asp.html

[5] http://www.bwsr.state.mn.us/watermgmt/metrogroundwaterplans.html

In addition to the protected waters list, the Mississippi River has a designated Critical Area Corridor and the Rum River is designated as a Wild & Scenic Outstanding Resource Value Water (see Figure 6 – Parks Map).

2. Shoreland

In order to control the development and utilization of shoreland along protected waters thereby preserving the water quality, natural characteristics, economic values and the general health, safety and welfare, the following waters in the city limits have been given a shoreland management classification. These protected waters within the city limits have been classified by the Commissioner of Natural Resources as follows:

	Natural Environment Lakes	**DNR I.D. #**
1.	Lake Eddy	2-109
2.	Itasca	2-110
3.	Rogers	2-104

	Recreational Development Lakes	**DNR I.D. #**
1.	Jeglens Marsh	2-111
2.	Peltzer Pond	2-112
3.	Grass (Sunfish)	2-113

	General Development Lakes	**DNR I.D. #**
1.	Ramsey Terrace Pond	2-114
2.	Magnesium Street Pond	2-116
3.	Industry Avenue Pond South	2-117
4.	Industry Avenue Pond North	2-118

	General Development Streams	**Locations**
1.	Trott Brook	Sections 1, 2, 3, 7, 8, 9, T32N, R25W
2.	Ford Brook	Sections 1 & 2, T32N, R25W

The above shorelands of the city are designated as a Shoreland Overlay District. The purpose of the Shoreland Overlay District is to control the utilization of shoreland areas and to preserve the quality and natural character of these protected waters within the City. The shoreland overlay districts are shown on the City's Mississippi/Rum River Overlay Districts Map. Boundaries of the overlay districts can be determined by scaling distances off the official environmental overlay map.

All wetlands on the National Wetlands Inventory map are shown on Figure 7. The National Wetlands Inventory Map is not all inclusive, wetlands exist in the

City of Ramsey that are not shown on the map. Each site proposed for development must be evaluated for wetlands as required in City Code.

Pretreatment of all storm water from new developments is required prior to discharge into any wetlands. Wetlands may be, and are currently being used for storm water storage for larger rainfall events. They may continue to be used for this purpose – even after upstream development, provided that:

1. There is acceptable Best Management Practice pretreatment of the runoff in accordance with the MPCA NPDES/SDS Construction Permit, Section III.D., Permanent Stormwater Management System.
2. The impacts of stormwater from new development discharging into a wetland will be determined through a Minnesota Routine Assessment Methodology (MnRAM) assessment of the wetland.

The Minnesota Wetland Conservation Act (WCA) requires the designated Local Governmental Unit (LGU) in charge of administering the WCA to generate a Notice of Wetland Conservation Act Decision for any impact to wetlands within the City of Ramsey. In all but minor decisions, the LGU will call for a Technical Evaluation Panel (TEP) review of the application or impact prior to issuing a decision. The LGU must give notice of proposed actions affecting wetlands to all of the following:

a. The Minnesota Board of Water and Soil Resources
b. The Soil and Water Conservation District
c. The Minnesota Department of Natural Resources
d. The Lower Rum River Watershed Management Organization
e. The U.S. Army Corps of Engineers
f. Interested citizens requesting notification of such actions

If a TEP meeting is required, all listed parties are invited to review the proposed action. However, it is not uncommon for a TEP meeting to consist of only a small contingent of this list, as some invitees may have no jurisdiction over the proposed action.

3. Watersheds

A general watershed map breaking the City of Ramsey into seven primary watersheds is attached as Figure 8. The naming convention for the nodes (i.e., pipes, channels, junctions, manholes, and ponds) is based on the county section and quadrant numbers and is described in Figure 9. The subsequent Figure Nos. 10 through 23 show the subwatersheds and drainage pattern within each of the separate primary watersheds. Storm water ponds, 100-year peak pond elevations and outfalls are also shown on these maps.

The City Storm Sewer infrastructure is also shown on the individual primary watershed maps. In the GIS database for these maps, the pipe network is color coded to reflect the various pipe sizes.

4. Flood Levels

Floodplains are covered by City of Ramsey Code Section City Code Chapter 117, Article II, Division 4, Subdivision III. A comprehensive map showing all of the FEMA Flood Insurance Rate Map (FIRM) flood plains is attached as Figure 24. Flood studies have been performed for the following waterways:

a. Mississippi River

b. Rum River

c. Trott Brook

d. Ford Brook

Copies of the flood studies are available at the office of the City Engineer or online at the FEMA Map Service Center. These studies have been incorporated into the Official Zoning Map in accordance with Ramsey City Code Section II Chapter 117, Article II, Division 4, Subdivision III... The Official Zoning Map is on file in the Office of the City Administrator and the City Zoning Administrator.

In addition to the flood levels predicted by the FEMA flood studies, Bolton & Menk performed a flood study of County Ditch 66 using the HEC-RAS stream modeling program. This information has been coordinated with the SSA modeling software and submitted to FEMA for agency acceptance as a flood plain elevation. The 100-year flood plain has been recorded on the map along with the FEMA data. The color-coded legend of Figure 24 helps to differentiate between the federally modeled floodplain and the unofficial City flood plain.

In addition to the flood map, Tables 1 through 7, located in the Tables Appendix of this report summarize the modeled 100-year flood levels and peak discharges of existing storm water ponds and natural depressions that correspond to the peak discharges of channel flow passing through the watershed.

After a detailed review of the new and available flood profile information, the results appear consistent and provide a reasonable hydraulic grade from the upper reaches of the various flood channels to the ultimate confluence with the Rum and/or Mississippi Rivers.

5. Water Quality Information

Section 303d of the Clean Water Act requires that each state submit a list of Impaired Waters. The MPCA website lists the impaired waters as officially designated in 2014. Table 15 lists the impaired waters found in Ramsey:

Table 15

303d Impaired Waters List Excerpt from MPCA

Name	Affected Use	Pollutant or Stressor	Year Designated	Target Start	Target Completion
Rogers Lake	Aquatic Recreation	Excess Nutrients	2006	2013	2017
Rum River	Aquatic Consumption	Mercury, FCA	1998	2008	2025
Mississippi River	Aquatic Consumption	Mercury, FCA	1998	2008	2025
	Aquatic Consumption	PCB, FCA	2002	2002	2025

The Minnesota DNR maintains a database on all Minnesota lakes. Some of this data is very limited or not available, while other lakes have been studied in great detail. To find the most current data on the lakes in Ramsey, access the Lake Finder on the DNR Website.

The WMO document has a list of monitoring locations. The Anoka Conservation District (ACD) has water quality information. The ACD has also published a water atlas.

6. Water Appropriations

Upon approval by all of the review authorities, the City's approved Wellhead Protection Plan will be incorporated into this plan by reference. At present, the draft includes all of the current municipal ground water appropriations. The City is considering obtaining surface water appropriations from the Mississippi River for a 20 MGD water treatment plant. The scope of the project will require Regional Participation. The City is working with the Metropolitan Council and other regional partners to explore a regional funding solution to locally operated surface water supply treatment plant. The water treatment plant is intended to supply water for the anticipated population growth of the City. When the new water treatment plant is approved and constructed, the existing City wells and permitted groundwater appropriations are planned to remain unchanged to be readily available as backup for water needs.

7. Soil Data

Ramsey City Code, Section 117-424 covers types of soil that are adequate for septic systems. According to Ramsey City Code, the City adopts the Anoka County Soil Survey, 1977 (Soil Survey) and supplemental operational soil surveys as its official soil survey and makes it a part of the City Code. The Anoka County soil survey map of the Ramsey area is attached as Figure 25. In general, the City of Ramsey has soils in SCS Hydrologic Soil Type A. Table 16 lists the recommended infiltration rates based on SCS hydrologic soil types.

Table 16
Infiltration Rates per Soil Type

Hydrologic Soils Type	Unified Soil Classification	Infiltration Rate	Soil Texture
A	GW, GP	1.63 inches/hour	Gravel, sandy gravel, and silty gravels
A	GM, SW, SP	0.8	Sand, loamy sand, and sandy loam
B	SM	0.45	Silty Sand
B	ML, OL	0.3	Silt loam, loam
C	GC, SC	0.2	Sandy clay loam
D	CL, CH, OH, MH	0.06	Clay, clay loam, silty clay loam, sandy clay, and silty clay

Source: Minnesota Stormwater Manual.

8. Land Use and Public Utility Services

   Necessary land use and public utility services information is limited to information that existed at the time the plan or plan amendment was developed, including:

   a. A general map of existing land uses (Figure 26A);

   b. A general map showing anticipated land uses (Figure 26B); and

   c. A reference to the location of the metropolitan urban service area.

   Land use is one of the primary mechanisms that affect flooding and water quality. As prairie and forested areas are converted to agricultural and urban uses, the volume and rate of storm water runoff increases. This increase in storm water runoff can cause a change in the bank full flow of area streams and conveyances. This can cause stream bank erosion and deterioration of the stream. In addition, increased area runoff can cause erosion in steep areas. The conversion of natural land cover also increases the amount of pollutants in storm water runoff such as the levels of pesticides and nutrients from agricultural land use, and trace metal concentrations from urban land use. Pollutant loading analysis has not been included within this report. This plan estimates the future land use throughout the study area in order to evaluate the drainage system needs.

   Although pollutant concentrations may not vary greatly between land uses, pollutant loadings are a function of both runoff volume and concentration. The volume of runoff is directly related to the amount of impervious surface from a particular land use. For example, if a fictitious *Area A* has twice the runoff due to higher impervious land cover as *Area B* with the same pollutant concentration, *Area A* will have twice the pollutant loading. This is the basis for the major difference in water quality between residential and commercial land uses and affects surface water planning strategies for the different land uses. The Minnesota Land Cover Classification System (MLCCS) cover types for the Ramsey area are shown in Figure 26C.

9. Water-based Recreation Areas and Land Ownership

   Figure 6 – Parks Map shows the location of all Parks and the location of all DNR public water accesses within the City of Ramsey.

10. Fish and Wildlife Habitat

    The City of Ramsey has applied to the DNR for an updated list and description of the conclusions and recommendations of biological surveys or reconnaissance studies in December of 2014. The list has been received. Since this list is sensitive it is not included in this report, but is on file in the office of the City Engineer.

11. Unique Features and Scenic Areas

    The Mississippi and Rum River Corridors within the City are unique and valuable local, state, regional and national resources. The rivers are an essential element in the local, regional, state and national transportation, sewer and water and recreational systems and serve important biological and ecological functions.

The prevention and mitigation of irreversible damage to these resources and the preservation and enhancement of their natural, aesthetic, cultural and historic values is in furtherance of the health, safety and general welfare of the City. The Mississippi River Corridor Critical Area and the Rum River Scenic River are protected under Ramsey City Code Chapter 117, Article II, Division 4, Subdivisions II and V Respectively.

Ramsey City Code Section 117-252 regulates bluff land and river land development in order to protect and preserve the outstanding scenic, recreational, natural, historical, and scenic values of the Rum River in the city of Ramsey in a manner consistent with Minnesota Statutes, §104.31 - 104.40, Minnesota Regulations NR78-81, and the Management Plan for the Rum River (6 MCAR 1.2700 - 12720).

The City has an Environmental Policy Board that has been actively documenting and mapping the City's existing natural features, through a Natural Resources Inventory and a Wetland Functions and Values Assessment, including:

a. Native prairie communities

b. Woodlands

c. Functions and values of wetlands

d. Rare and endangered species

e. Historic and heritage buildings and features

Their report, which may be found on the City website, is included in this document by reference. The link is: http://cityoframsey.com/environmental-services.

The Scenic River Land Use District is divided into two areas designated as the Urban Area Overlay District, or Rural Area Overlay District and are covered under City of Ramsey Code Section 117-254.

Pollutant Sources

The City of Ramsey has one closed landfill (the Anoka Regional Solid Waste Facility). The MPCA keeps the records. The City is not aware of any other landfills.

There was a high nitrate area east of Armstrong Boulevard between 158th Avenue and 161st Avenue that was attributed to agricultural activity. There was a hog farm west of TH47 at 157th Avenue. The City does not have any permitted wastewater discharges.

The City does not keep a list of storage tanks. These records are currently kept at the Anoka County Environmental Services office.

The MPCA "What's in My Neighborhood?" website lists known and potential sources for soil and groundwater contamination. The majority of the sites listed are Voluntary Investigation and Cleanup (VIC) sites. There are 215 sites listed in Ramsey. A text based search for Anoka County and Zip code 55303 will list over 600 permits; however, some of the addresses were in the Cities of Anoka or Andover which share a zip code with Ramsey. Additionally many sites had multiple permits at the same address. These are listed in Table 17.

Table 17

Known or Potential Sources of Soil or Groundwater Contamination

Activity ID	Activity Name	Address	
VP20690	14140 Azurite	14140 Azurite St NW	Ramsey
VP24480	A1O0143 - Alpine Park	6600 Alpine Dr NW	Ramsey
MND985724061	Aca Management 367	5195 142nd Ave NW	Ramsey
MNR000058230	Accent Precision Wood Products	6250 McKinley St NW	Ramsey
MNR000118802	Accurate Auto Inc.	9716 Highway 10	Ramsey
MND982220089	Accurate Auto Inc.-Ramsey	9617 Highway 10 W	Ramsey
VP18690	Ace Solid Waste - Ramsey	6601 McKinley St NW	Ramsey
MND985702851	Adrien Mechanic Services	6021 Bunker Lake Blvd NW	Ramsey
MNR000079889	Aero Restoration & Repair Co	7101 143rd Ave NW Ste B	Ramsey
MNRNE35D6	All-Brite Graphics LLC - ISW	6320 Highway 10 NW	Ramsey
MNS000177972	Allina Health Ramsey Clinic	7231 Sunwood Dr NW	Ramsey
MNR000060970	Allina Medical Clinic - Ramsey - Alpine Drive	5300 Alpine Dr NW	Ramsey
MND985752047	Alloy Recovery Co Inc.	7060 142nd Ave NW	Ramsey
MNR000027722	Alpha Power & Technology	14000 Unity St	Ramsey
SA7044	Alsil Stephens Dump	See location description	Ramsey
MND089476451	Altron Inc.	6700 Bunker Lake Blvd NW	Ramsey
MNR000081067	Amcor Precast Inc.	6640 Industry Ave	Ramsey
MND982071714	American Trade A Bus Inc.	14000 Sunfish Lake Blvd NW	Ramsey
MNR000078246	Anderson & Dahlen Inc.	6850 Sunwood Dr NW	Ramsey
MNR000015057	Anderson Wade	15031 Hematite St NW	Ramsey
SA7100	Anoka County State Hospital Demo Fill	See location description	Ramsey

Activity ID	Activity Name	Address	
SA7111	Anoka Municipal Regional Landfill	14730 Sunfish Lake Blvd NW	Ramsey
MND985705292	Anoka Ramsey Automotive - Hwy 10	6262 Highway 10 NW	Ramsey
MND985753730	Anoka Ramsey Dental	5300 153rd Ave NW Ste 3	Ramsey
MNR000032169	Anoka Ramsey Sport Center	6760 Highway 10 NW	Ramsey
MNS000177618	Anoka-Ramsey Dental	5400 140th Ave NW Ste 104	Ramsey
MNR000114918	AR Honing	6250 Bunker Lake Blvd NW Ste 219	Ramsey
MNS000143404	Arrow Components Corp	6230 McKinley St NW Ste A	Ramsey
3789	Auto Ranch	7665 Highway 10 NW	Ramsey
MN0000036038	Auto Truck Hydraulics	7445 Highway 10 NW Ste 3	Ramsey
MNR000115139	Automated EDM Inc.	6231 McKinley St NW	Ramsey
MNR000023234	B & A Cylinder Head - Ramsey	14165 Ramsey Blvd NW	Ramsey
MND985684406	B & D Auto	14966 Nowthen Blvd NW	Ramsey
MND982642936	B & D Repair - Ramsey	9451 Highway 10 NW	Ramsey
MNS000172445	B&K Swiss Inc.	14220 Basalt St NW	Ramsey
MNR000115022	Bailey Woodworking	6250 Bunker Lake Blvd NW Ste 216	Ramsey
MNR000101824	Baker White Inc.	6111 Highway 10 NW	Ramsey
MNS000131292	Barnett Family Dentistry	7962 Sunwood Dr NW Ste 200	Ramsey
VP4771	Barnett Olds #2	6415 Hwy 10 NW	Ramsey
MNS000178897	B-Brothers Auto	7103 Highway 10 NW	Ramsey
VP8482	BK Ramsey Site	7205 Hwy 10 NW	Ramsey
MND985709401	Blass Automotive	6100 Industry Ave	Ramsey
MND982212045	Blatz Automotive	7105 Highway 10 NW	Ramsey

Activity ID	Activity Name	Address	
MND985720952	Blue Line Collision Center	6260 Highway 10 NW	Ramsey
VP8481	BNSF R-O-W #2	See location description	Ramsey
MN0000380881	Boart Longyear Co - Anoka	6300 Industry Ave	Ramsey
MNR000064659	C & F Race Cars	7101 143rd Ave NW Ste P	Ramsey
VP18650	Cabinetry Concepts	14410 Azurite St	Ramsey
MNRNE35J5	Carbon Products/ Division of Graphel Corp - ISW	6251 McKinley St NW	Ramsey
MN0000043513	Champlin Towing	14300 Sunfish Lake Blvd NW	Ramsey
MNS000133942	Chips Tool Repair Inc.	6250 Bunker Lake Blvd Ste 206	Ramsey
MND985695808	Cjs Auto Repair	17600 Gibbon St NW	Ramsey
MNS000135558	Class C Components Inc.	6825 Sunwood Dr NW	Ramsey
MND985738293	Coated Abrasive Products Co	14059 Sunfish Lake Blvd	Ramsey
MNS000174011	Coborn's Pharmacy 33	7900 Sunwood Dr NW	Ramsey
MNS000118869	Collision 2000 Inc.	3345 Viking Blvd	Ramsey
MNR000042424	Command Tooling Systems	13931 Sunfish Lake Blvd NW	Ramsey
MND985680040	Commercial Asphalt Co - Plant 906	6640 141st Ave NW	Ramsey
MNS000141010	Concrete Masonry Unlimited	9411 Alpine Dr NW	Ramsey
MNR000033787	Connexus Energy	14601 Ramsey Blvd NW	Ramsey
MNRNE373P	Countryside Printing Inc. - ISW	6250 Bunker Lake Blvd NW Ste 113	Ramsey
MNS000186908	Courage Kenny Sports & Physical Therapy Center Ram	7231 Sunwood Dr NW Ste A	Ramsey
VP26500	CSAH 116 Reconstruction - ROW	6100 Industry Ave NW	Ramsey
VP25020	CTT Properties, LLC	6600 Sunwood Dr NW	Ramsey
MNS000140152	Cullinan Rigging & Erecting Inc.	6815 McKinley St NW	Ramsey

Activity ID	Activity Name	Address	
MN0000012450	D Cobey Co Inc.	9340 Highway 10 NW	Ramsey
MND006220719	Dahlheimer Beverage LLC	13554 Tungsten St NW	Ramsey
MND982640476	Danny's Trannys Inc.	14050 Basalt St NW	Ramsey
MNR000004036	Detail Tool & Engineering Inc.	6511 Industry Ave	Ramsey
MND985669936	Diamond Automotive Inc./ Auto Fitness & Service Ctr	7029 Highway 10 NW	Ramsey
MNS000141085	Diamond Graphics	14350 Azurite St NW	Ramsey
PW6124218640	Dickenson Diesel	NW Highway 10	Ramsey
MNR000119271	Die Concepts Inc.	13915 Radium St NW Ste F	Ramsey
MNR000077495	Digital Tool & Automation	6501 McKinley St NW	Ramsey
MNR000103978	Dynamic Group Inc. - Ramsey	13911 Unity St NW	Ramsey
MND985729847	E & L Machine	5944 168th Ln NW	Ramsey
MNS000168625	Eddy's Auto & Body Repair Inc.	6845 Highway 10 NW	Ramsey
MNR000076554	Egan Oil Co	500 Bunker Lake Blvd NW	Ramsey
MNR000013532	Erin Contracting	8050 147th Ave NW	Ramsey
MNR000119669	E-Z Auto Sales Inc.	7751 Highway 10 Ste 6	Ramsey
MNR000115501	Falcon Machine Inc.	7101 143rd Ave NW Ste N	Ramsey
MNR000060186	Ferrellgas - Anoka	7255 Highway 10 NW	Ramsey
MNR000100057	First Cut Products Inc.	6250 Bunker Lake Blvd NW Ste 104	Ramsey
MNNONGEN1170	Flavor Midwest Inc.	9459 Highway 10 NW	Ramsey
MN0000275925	Food N Fuel C15	13939 Saint Francis Blvd	Ramsey
MN0000196147	Galindo Electric	15645 Traprock St NW	Ramsey
MN0000083741	GEC Auto Service ink - Ramsey	7129 Highway 10 NW Site C	Ramsey
MND985722420	Gerdes Racing	7321 152nd St	Ramsey

Activity ID	Activity Name	Address	
MNS000177170	Gibbs Lawn	6300 Bunker Lake Blvd NW	Ramsey
MNR000080655	Gibbs Lawn - Radium Street	13915 Radium St NW Ste D	Ramsey
MNRNE39NX	Graphel Carbon Products ISW	6251 McKinley St NW	Ramsey
MNR000015867	H Ten Sports	8110 Highway 10 NW	Ramsey
VP26700	Harber Industries	6690 Sunwood Dr NW	Ramsey
MND985749530	Harold's Our Own Hardware	6000 167 Ave NW	Ramsey
MNRNE39BB	Health Care Marketing Inc. dba Perry Products ISW	6023 167th Ave NW	Ramsey
MNS000147306	Heartland Tire	7151 Riverdale Dr	Ramsey
MND982642894	Heichel Brian	6933 164th Ln NW	Ramsey
MN0000036061	Hi Tech Collision Frame	7445 Highway 10 NW Ste 2	Ramsey
3700	Hills Property	7443 Highway 10	Ramsey
MNR000066407	Hitech Motorsport Inc. - Ramsey	13915 Radium St NW Ste C	Ramsey
3473	Hi-Ten Sports Center	8110 Highway 10 NW	Ramsey
MNS000117358	Home Dame Brothers Painting	15621 Barium St NW	Ramsey
MNR000117317	Import Auto Sales Inc.	7443 Highway 10	Ramsey
MNR000115113	Intech Industries Inc.	7180 Sunwood Dr NW	Ramsey
MNR000051607	Integrity Tool & Engineering	6221 McKinley St NW	Ramsey
MNR000022061	Intercity Oil	6021 Highway 10 NW	Ramsey
MNR000076778	ISD 11 Ramsey Elementary	15000 Nowthen Blvd NW	Ramsey
MND985704634	Jac Auto Repair & Sales	6336 Highway 10 NW	Ramsey
MND985764141	Jacks Auto Repair	14290 Sunfish Lake Blvd NW	Ramsey
MNS000130245	JDI Signs & Graphics	6451 McKinley St NW Ste P	Ramsey

Activity ID	Activity Name	Address	
MNR000112235	JR Data Solutions Inc.	6250 Bunker Lake Blvd NW Ste 204	Ramsey
MN0000367144	Julian M Johnson Construction Corp	6191 140th Ave NW	Ramsey
MNR000078725	Just Precision Inc.	6250 Bunker Lake Blvd Ste 213	Ramsey
MND071773733	Kens Automotive	15415 St Francis Blvd	Ramsey
MNR000111534	Kit Masters Inc.	6250 Industry Ave NW Ste 211	Ramsey
MNS000214106	Kovar Sales	14047 Azurite St NW	Ramsey
MND985721208	Ksiazek Charles	15710 Juniper Ridge Dr NW	Ramsey
MND981535230	Lamey Dave	15940 Sodium St NW	Ramsey
MND981802390	Lano Equipment Inc.	6140 Highway 10 NW	Ramsey
MNR0534DB	Life Fitness Div of Brunswick Corp - SW	14150 Sunfish Lake Blvd NW	Ramsey
MN0000190736	Links At Northfork	9400 153rd Ave NW	Ramsey
A00002353	Listul Industries Inc. - SW	13900 Sunfish Lake Blvd NW	Ramsey
MNR000007898	Mach 5 Auto Service	7129 Highway 10 NW	Ramsey
MND985714658	Marshall Concrete Products Inc. - Ramsey	14141 Unity St NW	Ramsey
MNR000058859	Mat Inc.	6230 McKinley St NW Ste E	Ramsey
MND057087678	Mate Punch & Die Co	6400 Industry Ave	Ramsey
MND022705834	McKay's Auto Sales	6415 Highway 10 NW	Ramsey
MNS000191544	Metro Dentalcare - Ramsey	7600 Sunwood Dr NW	Ramsey
MNR000078980	Midwest Car Care - Ramsey	6745 Highway 10 NW	Ramsey
MNR000027802	Midwest Overhead Crane Corp	13900 Sunfish Lake Blvd NW	Ramsey
MN0000625962	Minnesota Sawdust & Shavings Co Inc.	14100 Jasper St NW	Ramsey

Activity ID	Activity Name	Address	
MNR000069252	Minnesota Tool & Die Works Inc.	6220 McKinley St NW	Ramsey
VP22410	Minnesota Waterjet	See location description	Ramsey
MNS000111344	Mississippi West Regional Park	13935 Traprock St NW	Ramsey
VP21480	MNDOT TH 10 & CTY RD 56	Ramsey Blvd & Hwy 10	Ramsey
MND982605495	MPCA Ramsey Municipal Center	15153 Nowthen Blvd NW	Ramsey
MNS000172833	Multisource Manufacturing LLC Ramsey	6690 Sunwood Dr NW	Ramsey
MND982613234	Noard Machine Tool Inc. - Anoka	6760 Highway 10 NW	Ramsey
MND008797938	Noons RV Center	7405 Highway 10 NW	Ramsey
MNR000069179	North Country Concrete	7040 143rd Ave NW	Ramsey
MN0069396	Northern Lights 2009-2010 Zone EF	Address Unknown	Ramsey
MNS000174284	Northwest Metro VA Clinic	7545 Civic Center Dr NW	Ramsey
MNU000661	Oak Terrace Mobile Home Park	6545 Highway 10 NW	Ramsey
MNR000016972	Oil Change Anywhere Inc.	14620 Fluorine St NW	Ramsey
MNS000138859	Oldcastle Precast Inc.	6820 143rd Ave NW	Ramsey
MNS000179796	Optimum Appliance & Recycling Center LLC	9539 Highway 10 W	Ramsey
MN0000998948	Outside Services Inc.	14140 Azurite St	Ramsey
MNS000107490	PACT Charter School - Ramsey	7250 Ramsey Pkwy E	Ramsey
MNR000119677	Park RV	9919 Highway 10 W	Ramsey
MND982212532	Pearsons Trucking Inc.	14050 Azurite Blvd	Ramsey
4542	Peck Construction	13900 Sunfish Lake Blvd NW	Ramsey
MNR000026880	Pine Ridge Pet Care - Ramsey	7245 Highway 10 NW	Ramsey

Activity ID	Activity Name	Address	
MNR000080648	Plateworks Inc. - Ramsey	6230 McKinley St NW Ste B	Ramsey
MNS000162735	Pleasureland RV Center	7900 Riverdale Dr	Ramsey
MN0068691	Prairie Meadows/Kelly Acres	Armstrong Blvd NW & Tiger St NW	Ramsey
MNR000023374	Pro Power Sports & Marine Inc.	6781 Highway 10 NW	Ramsey
MND985717925	Production Products Inc.	14161 Basalt St NW	Ramsey
VP15161	QDP and JBT Alliance Site (see Waste Management Site)	See location description	Ramsey
MNS000100776	Quail Manufacturing Co Inc.	6250 Bunker Lake Blvd NW Ste 222	Ramsey
MNS000147835	Qwest - Ramsey Garage	6651 141st Ave NW Ste 2	Ramsey
MNS000147546	Rain for Rent	9550 156th Ave NW	Ramsey
MNS000113290	Ramsey Brake & Exhaust Inc.	5143 179th Ln NW	Ramsey
MNR000013086	Ramsey city of Public Works	14100 Jasper St NW	Ramsey
MND985703941	Ramsey Dental Center	15243 Nowthen Blvd NW	Ramsey
MNS000177782	Ramsey Police Department	7550 Sunwood Dr NW	Ramsey
MND985677723	Ramsey Public Works Shop	St Francis Blvd & 142nd Ave	Ramsey
VP26860	Ramsey School Site	See location description	Ramsey
VP22580	Ramsey Vacant Land Parcel	See location description	Ramsey
MND985764968	Renolette Trucking	6100 Industry Ave Ste 201	Ramsey
MNS000210823	Residence - 9131 178th Ave	9131 178th Ave NW	Ramsey
4573	Rivenwick Village North	6897 139th Ln NW	Ramsey
3591	Rivenwick Village Outlot B	Riverdale Dr & Highway 10	Ramsey
MNS000123760	RJM General Paper Products Inc.	6650 143rd Ave NW	Ramsey
MND982219297	Rockford Autobody	14000 Basalt St NW	Ramsey
VP19380	Rotary Systems	Azurite St NW	Ramsey
MND985700012	Royal Concrete Pipe Ramsey	6640 Industry Ave	Ramsey

Activity ID	Activity Name	Address	
MND138781364	Rum River Hills Golf Club Inc.	16600 Saint Francis Blvd	Ramsey
MNR000109751	Sauter & Sons Inc.	6651 141st Ave NW Ste 2	Ramsey
MND099055691	Sauter & Sons Inc. - Azurite St	14050 Azurite St NW	Ramsey
VP19550	Senior Housing Parcel	County Road 116	Ramsey
MNR000059618	Shorewood RV Center	8390 Highway 10 NW	Ramsey
MNR000103952	Signature USA Inc.	8781 162nd Ln	Ramsey
MNR000078733	Simhof Manufacturing Tech	6250 Industry Ave Ste 112	Ramsey
A00022596	Solo Manufacturing Inc. - ISW	6230 McKinley St NW Ste C	Ramsey
MN0000341545	Sorby Jan	16301 Azurite St NW	Ramsey
MNR000080069	Specialized Coatings Inc.	6250 Bunker Lake Blvd NW Ste 214	Ramsey
MN0001025162	Spider Staging Corp	6250 Industry Ave Ste 108	Ramsey
VP19590	St. Anthony Gun Club	16128 Variolite St NW	Ramsey
VP18800	St. Paul Terminals - Ramsey	14050 Basalt St NW	Ramsey
MNR000055376	Star Auto Sales Inc.	7009 Highway 10 NW	Ramsey
MNR000023036	State Of Minnesota Weigh Scale	9225 Highway 10 NW	Ramsey
VP16770	Sunfish Business	See location description	Ramsey
MNR000017889	SuperAmerica 4508	14000 Saint Francis Blvd	Ramsey
MNR000004333	Superior Striping Inc.	14021 Basalt St NW	Ramsey
MNR000056010	Tech One Motorsports Inc.	6250 Industry Ave Ste 106	Ramsey
4270	The Lighthouse Bar And Grill	6937 Highway 10	Ramsey
MND985749522	Tim’s RV Service	14050 Azurite St NW	Ramsey
MND922222135	Trade A Bus	Sunfish Blvd	Ramsey
MNR000056887	Utili Trax Contracting Partnership	6300 Industry Ave	Ramsey

Activity ID	Activity Name	Address	
MND982619983	Vance Brothers Inc.	14021 Azurite St NW	Ramsey
SA7043	Ve-Ve, Inc. Caustic Soaps	See location description	Ramsey
MN0065501	Vision-Ease LP dba Vision-Ease Lens	7000 Sunwood Dr NW	Ramsey
MNR000109900	V-Tech Motorsports Inc.	14000 Sunfish Lake Blvd Ste I	Ramsey
MNR000100792	Walser Outlet Center	7955 Riverdale Dr NW	Ramsey
VP5021	Waltek Inc. II	14310 Sunfish Lake Blvd	Ramsey
VP15160	Waste Management Site	Sunfish Lake Boulevard	Ramsey
MN0000234179	Welsh Engine Sales	6150 Highway 10 NW	Ramsey
MND985677970	Welsh Engine Sales	15443 Ramsey Blvd NW	Ramsey
VP31280	Wendell's Inc.., Ramsey	6601 Bunker Lake Blvd NW	Ramsey
MN0000010769	Westside Auto Body	6140 1/2 NW Highway 10	Ramsey
VP20930	Wildlife Research Center	Azurite St	Ramsey
PW6124274140	Wuorio Truck Sales	9619 Highway 10 W	Ramsey
MNRNE35LF	Zero Zone Refrigeration - ISW	6151 140th Ave NW	Ramsey

D. **Design Requirements**

The Ramsey SWMP has a dual purpose: 1) It will serve as a guide for the construction of storm drainage facilities, and 2) It will provide a basis for a consistent approach to the preservation of lakes, wetlands, streams, and the Mississippi and Rum Rivers. The following issues have been incorporated into this plan:

1. Division of the City into major watersheds based on contour maps, grading plans and natural topography
2. Determination of storm water runoff problems under current land use conditions
3. General layout and sizing of trunk storm sewers and open channels
4. Tributary areas, storage volumes, and high water levels of all existing ponding areas
5. Recommendations to accommodate the ultimate land use conditions
6. Recommendations for the revision of the current development ordinances
7. Recommendations for standard Operations and Maintenance procedures
8. Recommendations for specific construction site erosion control practices
9. Estimated construction and implementation costs of the SWMP
10. Recommendations for education of City residents, staff, and development community.

The primary function of an urban storm drainage system is to minimize economic loss and inconvenience due to periodic flooding of streets and other low-lying areas. Adequately designed storm drainage facilities provide flood control, minimize hazards and inconvenience associated with flooding, and protect or enhance water quality. The SWMP takes the entire drainage basin with future saturation development into consideration.

Design of stormwater facilities shall be governed by Appendix E of the LRRWMO Third Generation Plan and City Code. These standards are summarized below:

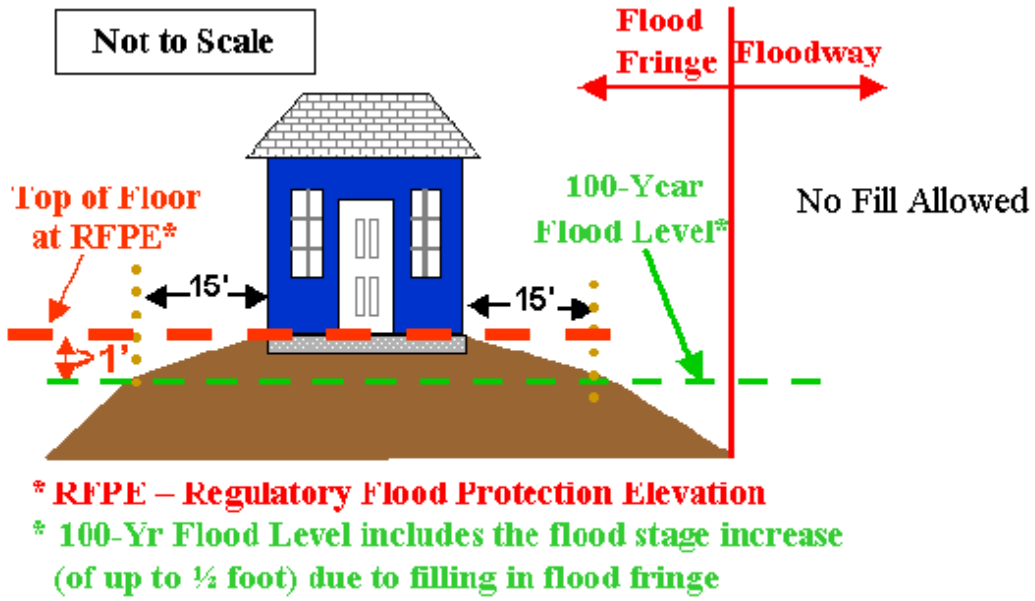
- Volume control – infiltration of the first 1 inch of runoff from all impervious surfaces on site.
- Peak Flow Rate Control – Post Development peak runoff rates shall not exceed existing rates for the 2, 10 and 100 year storm peak discharges.
- Water Quality – Storage areas shall be designed to NURP standards and provide annual removal efficiencies of 60% total phosphorus and 90% total suspended solids.
- Precipitation Data Sources – rainfall amounts for hydrologic analyses shall be based on NOAA Atlas 14.
- Storage Design – ponding areas shall be designed to retain the 100-year event. Ponding areas without a discharge shall be designed to retain runoff from the 100-year/10-day runoff or 100-year/10-day snowmelt, whichever is more restrictive.

Wet water quality ponds upstream of dry regional infiltration basins (where possible) will help control the rate and the volume of storm water runoff. To provide flood protection for adjacent property, the design storm interval for ponding areas is a 100-year storm as compared to a 10-year storm for design of storm sewer piping. Any new residential, commercial, industrial and other habitable structures shall be constructed with the following low floor elevation: The low floor elevation of all development, including basements, must be at least 3 feet above the highest anticipated ground water table, 2 feet above the designated or designed 100-year flood elevation, or 1 foot above the emergency overflow, whichever is higher. The area of a pond's HWL plus 1 foot of freeboard shall be contained entirely within an outlot that is owned and maintained by the City or within a drainage and utility easement.

In areas adjacent to designated flood plains as mapped on a Flood Insurance Rate Map, the Regulatory Flood Protection Elevation (RFE) applies. The RFE is defined as the mapped 100-year flood elevation plus 1 foot. However, the LRRWMO requires that the low floor elevation of structures be 2 feet above the calculated flood elevation. Therefore, all structures, including accessory structures, must be elevated on fill so that the lowest floor including basement floor is 1ft above the Regulatory Flood Protection Elevation or 2 foot above the mapped 100-year flood elevation. The finished fill elevation for structures shall be no lower than the Regulatory Flood Protection Elevation and the fill shall extend at such elevation at least fifteen (15) feet beyond the outside limits of the structure erected thereon. The following drawing better defines the Regulatory Flood elevations.[6]

[6] Taken from the Minnesota DNR website: http://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/rfpe.html

The following exhibit applies <u>only when fill is required</u> to bring a structure at least two (2) feet above the 100-year flood level.



Minimum Standards for Structures in 100-year floodplain

The numerous natural depressions found throughout Ramsey have been incorporated into the SWMP as ponding areas. The effective use of ponding areas enables the installation of outflow sewers with reduced capacities since the design storm duration is effectively increased over the total time required to fill and empty the ponding reservoirs. Storm sewers represent a sizable investment for the community and this investment can be more efficiently utilized by ponding storm water in designated ponding areas and allowing smaller diameter pipes to be used as outfall lines.

Equally as important as flood control and cost considerations, is the use of ponding areas to:

1. Improve water quality;
2. Return storm water to the groundwater table;
3. Increase water amenities in developments for aesthetic, recreational and wildlife purposes.

For water quality ponds, the storage below the outlet is the most important consideration. The area and depth of the ponds may differ from the values presented here, storage below the outlet must be provided so that the prescribed pollutant loading of the system is not exceeded.

From time to time, local developers proposed enhancing required storm water ponds to also serve as an amenity for new development. Most frequently, this entails allowing the storm water pond to consistently maintain a certain level water. Amenity aspects are maximized by careful planning in the initial development of any residential or industrial

area and by integrating the ponding system into an overall comprehensive SWMP. However, care should be given to make the developer responsible for the design water level to serve as the amenity above and beyond the base storm water requirements. If development plans show a permanent water level, it is strongly advised that the City include a provision in its development agreements making the developer and ultimately the subdivision or development area responsible for maintaining the water level. The City's review should include wording that specifically addresses water quality and hydraulics and not the permanent water level. The Anoka Sand Plain is known for its high infiltration capacity as well as its fluctuating water levels. The City of Ramsey should not be involved in maintaining or engineering water level maintenance.

The wildlife aspects of the ponding areas shall be maximized in design and the proper location of the trail system will allow good access to these areas for wildlife observation.

It is extremely important that each area be re-evaluated at the time of final design to confirm the criteria used in this study and to make any changes that a proposed development may dictate. Special consideration must be given to areas that develop differently than shown in the Comprehensive SWMP, especially when a higher runoff coefficient (higher impervious surface ratio) is likely to result from development.

All storm sewer facilities, especially those conveying large quantities of water at high velocities, shall be designed with efficient hydraulic characteristics. Special attention shall be given during final design to those lines that have extreme slopes and create high hydraulic heads.

The Best Management Practices (BMPs) recommended by the MPCA shall be followed wherever necessary or plausible. Before the City would enforce any of these BMPs, they first need to be adopted by ordinance on a case by case basis. This paragraph is not intended to be a blanket adoption of BMPs.

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Rain gardens and infiltration basins are a viable alternative to storage ponds. These structures are encouraged by many review agencies as a way to mimic the original runoff conditions from a site. By incorporating infiltration, the basin provides volume and water quality management. A water quality basin does not need to have standing water, just a permanent "dead-pool" volume to meet the MPCA water quality requirements. The rain gardens and infiltration basins will assist in meeting MPCA regulations. However, rain gardens and infiltration basins are not recommended in a wellhead protection zone. Figure Nos. 3 and 4 show areas where rain gardens and infiltration may not be the best runoff management solution. City Policy adopted in conjunction with infiltration requirements of the LRRWMO Third Generation Plan permits infiltration in areas within the Drinking Water Supply Management Area (DWSMA), so long as it is not also within the 10-year capture zone.

The process outlined in the LRRWMO Third Generation Plan shall be followed when a development is proposed inside the 10-year capture zone and infiltration is not permitted on site.

The LRRWMO Third Generation Plan includes specific Wetland Protections that are stated below (refer to Appendix G of the LRRWMO plan for details):

- Temporary Wetland Protections During Construction – Areas within 16.5 feet of a wetland boundary must be protected from land grading and other disturbance during the construction process. The area shall be demarcated with properly installed heavy duty silt fence.
- Native Plant Seeding in Common Spaces at the Conclusion of Construction – Within common spaces, areas adjacent to wetlands that are disturbed through the construction process and ponding areas (stormwater management areas) should be seeded with a BWSR native seed mix that matches site conditions.
- Wetland Protections after Construction – Following construction, site stabilization, and vegetation establishment certain activities shall be prohibited within 16.5 feet of the wetland edge. Activities prohibited include:
    - Structures, excluding fences. Fences are not allowed inside the wetland boundary.
    - Paving, except projects with a public purpose such as public trails.
    - Retaining walls.
    - Filling, dumping or yard waste disposal.
    - Fertilization
    - Septic Systems.
- Relationship to Drainage and Utility Easement - Drainage and utility easements must encompass the area within 16.5 feet from the wetland edge.

The process outlined in the LRRWMO Third Generation Plan shall be followed when a development is proposed adjacent to wetlands.

E. Storm Water Modeling

1. Runoff

Storm water runoff is defined as that portion of precipitation, which flows over the ground surface during, and for a short time after, a storm. The quantity of runoff is dependent on the intensity of the storm, the length of storm, the amount of rainfall, the type of ground cover, and the slope of the ground surface.

The intensity of a storm is described by the amount of rainfall that occurs during a specific time interval. A specific rainfall amount occurring during a given time interval will statistically recur, on the average, at a certain frequency (usually measured in years). This is called a return frequency. A return frequency designates the average time span during which a single storm of a specific magnitude is likely to occur. For example, a 100-year rainfall event in Ramsey is that 24-hour rainfall amount (7.1 inches) that recurs, on the average, once in 100 years.

The degree of protection afforded by storm sewer facilities is determined by selecting a return frequency to be used for design based on good economic sense and current engineering practices. See section E.3 for further discussion.

2. Hydrographs

Storm sewer and associated detention basin design is typically based on hydrograph analysis. A hydrograph is graphical depiction of the time versus rate of runoff for a particular area. For example, if a rainstorm started at midnight, the first few minutes is spent with sprinkles and wetting the various surfaces. As the storm intensifies, the rainfall overwhelms the ability of the pavement and adjacent ground to absorb it, and water begins to runoff. At the peak of the storm, the water runs off at its greatest rate. Finally, as the storm passes, the runoff begins to slowly taper off. Figure 28 is an example of a typical runoff hydrograph.

The U.S. Soil Conservation Service (SCS) has performed extensive research in hydrograph analysis and developed a standard hydrograph. Technical Release No. 20 (SCS TR 20) describes a methodology that is generally accepted by the reviewing authorities and hydrologic engineers across the United States. The SCS procedure is based on a standard rainfall hydrograph that is modified by local parameters (i.e., rainfall, soil type, watershed size, watershed shape, the fall across the watershed, etc.). Based on local conditions, the SCS hydrograph was used for development of the Ramsey storm water models in this plan.

A SCS 24-hour Type II storm distribution with 100-year intensity was used for the design of ponds and drainage systems. The Soil Conservation Service has determined from National Weather Bureau data that a Type II distribution is the storm event recommended for the upper-Midwestern United States.

The SCS hydrograph method is based on sound hydrologic theory and is commonly used to analyze runoff for the design and analysis of flows and water levels. The detailed modeling computations for this plan have been performed using the SSA Modeling Software as developed by Boss International, Inc.

3. Rainfall Probability

Rainfall amounts for hydrologic analyses should be based on:

NOAA Atlas 14: Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin (2013). NOAA Atlas 14, Volume 8, Version 2, *Precipitation-Frequency Atlas of the United States, Midwestern States*. NOAA, National Weather Service, Silver Spring, MD.

More recent updates of these documents shall be used, if available.

The SCS National Engineering Handbook snowmelt data shows the 100-year, 10-day snowmelt event is 7.3 inches over 10 days.

4. Pond and Pipe Design Criteria

To provide reasonable protection of downstream facilities, analysis of flood levels, storage volumes and flow rates for water bodies and detention basins shall be based on the range of rainfall and snow melt durations producing the critical flood levels and discharges. This report recommends a 10-year frequency design for storm sewer pipe using the Rational Method[7]. It is further recommended that

[7] The Rational Method is markedly different than the SCS methodology in that it does not deal with runoff volumes, only flow rates. An explanation of the Rational Method is made later in this report.

pond design be based on the greater of the 100-year, 24-hour frequency SCS rainfall event, or the 100-year, 10-day snowmelt event for overland drainage and pond storage design. In comparing the peak pond elevations for each of these events, the 100-year SCS rainfall event, with the assumption that the infiltration rate was negligible, created the highest peak pond elevations. Hence, throughout the remainder of this report, the peak 100-year pond rates are discussed for typical pond High Water Levels (HWL). These design criteria were selected for the analysis and design of the drainage system for this SWMP. In addition, a 10-inch, 24-hour rain event has also been modeled over the entire city to analyze all ponds, overflow drainage ways and natural channels to evaluate whether the emergency over flows (EOFs) function as intended.

All detention facilities must be designed to limit discharge from to the existing rates for the 2, 10 and 100 year storm peak discharges.

Storm water detention facilities with peak discharge rates less than 2 cfs/40 acres are typically susceptible to high water levels during snowmelt conditions. Special consideration of the snowmelt condition becomes critical for areas, like the Anoka Sand Plain where infiltration dampens the effect of runoff from rainfall. These areas can accept high amounts of rainfall during the warm, summer months, but often remain frozen later in the season and are relatively impervious in the spring during the snowmelt. Hence, snowmelt runoff can be a greater flood hazard than a large summer rainfall due to the impermeable nature of frozen soil. Accordingly, final basin design must consider snowmelt conditions when sizing storage and outlet structures.

When rainfalls exceed the recommended 10-year storm sewer infrastructure design, the excess runoff will be accommodated by ponding in low spots in streets for short periods of time and outflow through overland drainage routes and/or EOFs. With proper planning, this short-term flooding and overland drainage should minimize damage to property that would occur if those facilities were not provided. Drainage routes and EOF locations should be protected and preserved either by ordinance or through recorded permanent easements. Where possible, storm water pond designs shall include an emergency overflow to provide an outlet one-foot below the lowest floor elevation of any adjacent structure for added safety.

The Rational Method is a flow rate design method that ignores volumes and assumes a peak flow to each pipe based on hydrologic parameters such as watershed area, time of concentration, and standard rainfall intensity curves. This design method requires the selection and/or computation of a time of concentration and a runoff coefficient. The time of concentration is the time required for the runoff from a storm to become established and for the flow from the most remote point (in time, not distance) of the drainage area to reach the design point. The time of concentration will vary with the slope and type of surface that the rain falls on. Rational Method design including design methodology and hydrologic references should be based on the Minnesota Department of Transportation Drainage Manual.

A minimum concentration time of fifteen minutes for residential areas and ten minutes for commercial/industrial areas shall be used for design of the trunk storm sewer systems. These minimum times shall be considered in the design of

lateral systems. As the storm water runoff enters the system, the flow time in the storm sewer is then added to the concentration time and compared to the downstream drainage area concentration time. The maximum of these values is used downstream, which results in a longer concentration time and peak runoff rate as the flow moves downstream from the initial design point.

5. Land Use Factors in Modeling (Runoff Coefficients)

The percentage of rainfall falling on an area that must be collected by a hydraulic facility is dependent on watershed variables such as soil permeability, ground slope, vegetation, surface depressions, type of development and antecedent rainfall. These factors are taken into consideration when selecting a runoff coefficient (C) for the Rational Method or a runoff curve number (CN) for use in SCS methodology.

Under ultimate (fully developed) conditions, the values of the coefficient will increase with increases in the amount of impervious surfaces caused by street surfacing, building construction, and grading.

The antecedent moisture condition (AMC) relates to the moisture content of the soil prior to a given storm event. Curve numbers based on land use can be adjusted based on an assumed moisture condition. For purposes of the model, normal antecedent moisture condition (AMC II) was assumed. Curve number values can be adjusted for dry conditions (AMC I) or wet conditions (AMC III).

Curve numbers are also dependent on the type of soil in a given drainage area. Soil types are classified into four basic hydrologic groups as follows:

Group A - Includes well-graded gravels, sandy gravels, gap-graded or uniform gravels, sandy gravels, silty gravels, silty sandy gravels, well-graded gravely sands, gap-graded or uniform sands, gravelly sands.

Group B - Includes silty sands, silty gravelly sands, micaceous silts, diatomaceous silts, volcanic ash.

Group C - Includes silts, very fine sands, silty or clayey fine sands.

Group D - Includes clayey gravels, clayey sandy gravels, clayey sands, clayey gravelly sands, low plasticity clays, sandy or silty clays, organic silts and clays of low plasticity, highly plastic clays and silty sands, organic silts and clays of high plasticity.

Curve numbers that were assumed in the development of the model were based on the hydrologic soil group for each watershed based on the information contained in the County Soil Survey. Development plans shall consider post-development site soil conditions when choosing runoff curve numbers for final design.

Curve numbers (CN) are given in SCS TR-55. Average CN values for each land use type are used in the design of the storm drainage facilities in undeveloped areas. For the modeling of existing facilities, CN values were determined for each type of development and current zoned land use in each subwatershed. In general, the unpaved, non-wetland areas were modeled with curve numbers that

most closely represent the Anoka Sand Plain. The curve numbers were then adjusted to reflect the percentage of impervious surfacing.

It should be noted that if land use changes to more or less impervious surfacing than the model, it will affect the model and updates may be needed.

V. GOALS AND POLICIES

Problem Statement

The increase in developed areas within the community, with its associated runoff and sediment-related pollutants will have an impact on wetlands and other water resources including the Rum River and Mississippi River.

Mission Statement

The City of Ramsey, in cooperation with the LRRWMO, Anoka County, state and federal agencies, will prepare a watershed plan which will accommodate anticipated community development and redevelopment while providing clear direction to the developers for controlling the quality and quantity of storm water runoff and properly managing surface and groundwater resources and the physical habitat of existing wetlands, lakes and the Mississippi and Rum Rivers in a consistent fashion. The City is committed to a goal of no adverse impact to, and nondegredation of, its water resources.

Goals

This plan identifies several specific goals to control the City's water resources planning and management functions. The goals of this plan were established in accordance with the purposes of the water management programs required by Sections 103B.201 to 103B.251.

Policies

Each goal has several corresponding policies. A policy is a governing principle that provides the means for achieving established goals.

Standards

Standards are an extension of the policies. They provide specific, detailed guidance regarding water management practices. Plan standards are included in the Implementation Program (Section VIII) of this document.

A. Water Quantity

The following runoff quantity goals and policies are considered part of this plan.

Goal 1: Control flooding and minimize public capital expenditures.

- Policy 1.1: Natural storm water storage areas and manmade detention areas should be utilized to control flooding.
- Policy 1.2: The storage capacity of the natural drainage system will be utilized to control rates of runoff. The City will jointly define and adhere to flow rates at municipal boundaries as established in this plan.
- Policy 1.3: The City will pursue regional detention wherever targeted land acquisition opportunities arise.
- Policy 1.4: All hydrologic studies will be based on standard hydrologic criteria and ultimate or anticipated development of the entire tributary drainage area.

Policy 1.5: Major storm water facilities (i.e., ponds, pond outlet systems, and major conveyance systems) will be designed using a return period of 100 years.

Policy 1.6: The peak outflow from all new developments shall be limited to the existing peak outflow for the 2-, 10- and 100-year SCS 24-hour rainfall events.

Policy 1.7: All minor drainage system analyses and design (i.e., piped collection systems and minor conveyance systems) will be based on a return period of 10 years unless otherwise specified. The minor drainage system pipe will be sized using the full gravity flow capacity of the pipe. Pressure flow based on surcharging the upstream manhole or structure to near the street will not be allowed.

Policy 1.8: Where plausible, detention facility design will include a paved access route or a "Netlon" or approved equal stabilized access route; and dedicated right-of-way, outlot access and/or drainage and utility easement for maintenance of the outlet structure and to the facility in general. Construction and long-term maintenance of these accesses will need to be negotiated on a case-by-case basis.

Policy 1.9: Where plausible, fences will be restricted from crossing drainage and utility easements. The City will consider encroachment of fences; however, the Owner will be responsible for entering into an Encroachment Agreement to allow the City to remove obstructions for necessary maintenance and waives the City of any liability stemming from improvements within the easement.

Policy 1.10: The design of storm water facilities will consider and identify location(s) of overflow(s) that prevent property damage to adjacent properties from extreme water levels.

Policy 1.11: Minimum building elevations should be above designed designated flood levels. The minimum building floor elevation shall be two (2) feet above the 100-year level or 1-foot above the EOF. The 100-year level shall be on the highest 100-year level resulting from a single event analysis; the 100-year, 10-day snowmelt event; a multiple day runoff event analysis, or the critical event analysis. This will likely require that the City begin to require As-Built Certificates of Grading, a practice that is not currently required by the City.

Policy 1.12: Landlocked runoff basins shall be sized to handle back-to-back 100-year Atlas14 24-hour rainfall events, the 10-inch SCS 24-hour rainfall event or the 100-year, 10-day snowmelt snow melt event, whichever produces the higher peak pond elevation (Landlocked HWL). The minimum building floor elevation around landlocked basins shall be two (2) feet above the Landlocked HWL.

Policy 1.13: Emergency overflows or outlets to drainage systems will be provided to any landlocked area if the available storm water storage capacity is inadequate to prevent flooding of residences and if the available downstream conveyance system capacity is adequate to accept additional flow.

Policy 1.14: The City will have standard hydrologic design criteria for all storm water systems to assure consistency.

Policy 1.15: The City will perform maintenance measures to assure proper function of the drainage system.

Policy 1.16: The City will adopt ordinances that control peak runoff consistent with standards and recommendations in the Minnesota Stormwater Manual.

Policy 1.17: New or expanded stormwater discharges to the Rum River are not allowed because it is classified as an Outstanding Resource Value Water by the DNR.

B. **Water Quality**

Goal 2: Achieve water quality standards in City lakes, streams, rivers, and wetlands consistent with intended use and classification, which include quantifiable limits on specific pollutants (i.e., phosphorus, turbidity, excess nutrients, etc.). The City's ultimate goal is to meet the standards for the designated use of each water body.

Policy 2.1: The ranking system established by the LRRWMO shall dictate intended use and water quality standards. The City will adopt best management practices for development that will result in an annual removal efficiency of 60% total phosphorus and 90% total suspended solids.

Policy 2.2: Future outlets to DNR protected waters must first pass through a sediment pond/trap prior to discharging into the protected water body.

Policy 2.3: Phosphorus loading to a drainage system or water body will be reduced to the greatest practical extent through the use of Best Management Practices (BMPs).

Policy 2.4: All construction plans developed for the maintenance and/or improvement of water quality will include a detailed access and maintenance plan and shall require approval by the City.

Policy 2.5: A community education program relating to preserving and improving water quality will be developed and implemented.

Policy 2.6: All on-site waste water systems will be the responsibility of the owner.

Policy 2.7: A water quality plan outlining education programs, water quality monitoring needs, water quality modeling requirements, phosphorus budgets for subwatersheds, and any other water

quality issues should be developed and implemented. The City-wide SWPPP and MS4 permit already addresses the education, monitoring, maintenance, good housekeeping, illicit discharges and construction erosion control.

Policy 2.8: The LRRWMO and the City should take an active role in implementing the necessary policies to allow development of regional water quality ponds.

Policy 2.9: The City will perform maintenance measures to minimize pollutant loadings to local water bodies.

Policy 2.10: The City will adopt best management practices for development that will result in TSS and TP reductions of 90% and 60%, respectively.

Policy 2.11: The City will adopt best management practices for redevelopment that will result in TSS and TP reductions consistent with the Minnesota Stormwater Manual.

Policy 2.12: The City will integrate their Stormwater Pollution Prevention Plan into their local water management plan, in accordance with MPCA requirements and schedules.

Policy 2.13: The City will revise its Stormwater Pollution Prevention Plan to include the required nondegredation information and summarize or integrate that information into its local water management plan when the nondegradation rules are finalized and become a mandatory part the Municipally Separate Storm Sewer System (MS4) permit.

Policy 2.14: The MPCA is in the process of preparing a TMDL for Trott Brook for macroinvertebrates, fish, dissolved oxygen and E.coli. The City will work with the MPCA and other agencies to implement the TMDL(s).

C. **Recreation, Fish and Wildlife**

Goal 3: Protect and enhance water recreational facilities, fish and wildlife habitat.

Policy 3.1: Natural areas, wildlife habitat and wetlands to be protected during construction should be clearly marked and/or fenced in the field.

Policy 3.2: Buffer zones of natural vegetation are encouraged in privately-owned areas around existing ponds and wetlands located within current wildlife corridors to provide habitat for wildlife in accordance with the Wetland Management Plan.

Policy 3.3: The water level fluctuation of a wetland or pond shall be maintained consistent with the management function of the water body. Wetlands used for stormwater overflow purposes shall be limited to a maximum bounce of 2-feet between the NWL and HWL.

Policy 3.4: The City has already assessed the functions and values of all wetlands over ¼-acre in size. The City will not be updating this assessment as part of this SWMP update. When a logical time in the furtherance of future development warrants, likely coinciding with a future Comprehensive Plan Update, the City will consider updating this assessment.

Policy 3.5: The City supports programs to control aquatic invasive species.

Policy 3.5: Activities related to recreation, fish and wildlife should be consistent with the Anoka County Regional Park objectives and the City's comprehensive plan.

Policy 3.6 The City supports the establishment of native vegetation around sedimentation ponds and wetlands following disturbance, and when new ponds are created whenever possible.

D. **Public Participation, Information and Education**

Goal 4: Increase public participation and knowledge in management of the water resources of the community.

Policy 4.1: The City must call an annual meeting to discuss its SWPPP as part of its MS4 permit. This opportunity will be used to discuss water resource issues affecting the City. The City will explore avenues to increase notification and publicity of this annual meeting. The City will consider holding a special meeting coinciding with major flooding events.

Policy 4.2: The City will utilize available resources and input from the public to address local water resources issues.

Policy 4.3: Citizen lake water quality monitoring is encouraged and supported by the City.

Policy 4.4: The City supports Anoka County's recreation and educational programs related to the water resources of the community.

Policy 4.5: The City will support natural environment programs in the public schools.

Policy 4.5: The City will provide information regarding water resource management and a summary of the on-going activities of the LRRWMO through the City newsletter or web site.

E. **Public Ditch System**

Goal 5: Maintain the current ditch system to convey water and maintain the current defined maximum flood levels to protect businesses and residences.

Policy 5.1: The City will continue to maintain public ditches to provide protection of private property and structures from flooding, provided that such maintenance is in accordance with the Minnesota Wetlands Conservation Act, Minnesota Statute 103E governing agricultural drainage, is acceptable to the U.S. Army

Corps of Engineers, and does not adversely affect the value of wetlands or water quality.

Policy 5.2: With the exception of County Ditch 66 and County Ditch 43 which have been turned back to the City, Anoka County is recognized as having authority over all public ditches within the watershed in accordance with Minnesota Statute 103E.

F. **Groundwater**

Goal 6: Promote groundwater recharge and prevent contamination of the aquifers.

Policy 6.1: Anoka County is recognized as the lead agency regarding groundwater controls.

Policy 6.2: Recharge areas identified by Anoka County shall be protected from adverse development and from potential contamination.

Policy 6.3: Infiltration of the first 1.0-inches of runoff from new impervious areas will be required. This is subject to proximity to wellhead protection zones as noted earlier in this report whereby infiltration shall not be allowed within the 10-year capture zone.

Policy 6.4: Whenever practical, ponds shall be designed as "wet ponds" with storage volume below the outlet to promote infiltration and/or groundwater recharge.

Policy 6.5: The use of grassed waterways shall be encouraged to maximize infiltration. Proper grades shall be maintained insure positive drainage.

Policy 6.6: Any spring area should be identified in the field, denoted on maps by the City and protected from development within the watershed.

Policy 6.7: The appropriate jurisdiction shall use both regulatory (ordinances, permits, etc.) and non-regulatory (Best Management Practices) tools to protect the land area within designated wellhead protection areas.

G. **Wetlands**

Goal 7: Maintain the amount of wetland acreage and try to increase the wetland values within the watershed.

Policy 7.1: The LRRWMO is the Local Government Unit (LGU) administering the requirements of the Wetland Conservation Act in Ramsey.

Policy 7.2: Use and function of all wetlands greater than ¼-acre in size has been determined as part of the 2008 SWMP plan preparation.

Policy 7.3: Restoration of poor quality wetlands shall be prioritized.

Policy 7.4: The City or Anoka County shall identify areas that can be used for wetland mitigation.

Policy 7.5: Wetland mitigation criteria will be established consistent with the Minnesota Wetland Conservation Act of 1991 and subsequent amendments and associated rules thereto (e.g., Minnesota Rule 8420), state and federal regulations, the LRRWMO and the needs of the City.

Policy 7.6: Alteration of wetlands is discouraged unless for restoration. Alteration may be allowed on an individual basis if the alteration can be properly mitigated in accordance with the Wetland Conservation Act (WCA). Allowable alternatives must comply with WCA sequencing requirements including, in order, avoidance, minimization and mitigation. In general, it will require a full Technical Evaluation Panel meeting and majority approval before any wetland impact is allowed.

Policy 7.7: Wetland banking opportunities will be pursued by the City and/or the LRRWMO in accordance with the Wetland Conservation Act.

Policy 7.8: The use of native vegetation for buffers in undeveloped and previously developed areas is recommended.

Policy 7.9: The LRRWMO wetland buffer requirements will be enforced when properties adjacent to wetlands are developed.

Policy 7.10: The City will implement new buffer requirements as they are adopted by the State.

H. Erosion Control

Goal 8: Prevent soil erosion.

Policy 8.1: The City will protect natural vegetation to the greatest extent possible.

Policy 8.2: Soil erosion shall be prevented through the installation of erosion control practices in accordance with MPCA's Best Management Practices Handbook.

Policy 8.3: Topsoil stockpiled for reuse shall be protected from erosion.

Policy 8.4: It shall be the responsibility of the developer/contractor to keep streets and property adjacent to construction areas free from sediment carried by construction traffic at site entrances and access points, from sediment laden site runoff and blowing dust.

Policy 8.5: The MPCA Storm Water Permit Program for Construction Activities shall be followed.

Policy 8.6: The City has adopted an erosion and sediment control ordinance including provisions that are consistent with NPDES Construction Stormwater permit and its MS4 permit requirements.

I. **Development Standards**

Goal 9: Residential Grading

Policy 9.1: Residential lots shall have a minimum surface slope of 2-percent in all directions. Lesser slopes, between 1-percent and 2-percent may be allowed with a certificate of grading.

Policy 9.2: In acknowledgement of historical consumption data, the City will require water conservation measures for new development such as, but not limited to four inches of topsoil shall be placed in the turf restoration areas of all new residential lots.

Policy 9.3: Where residential lots are newly graded and there is no immediate plan for new housing within the lot, the entire lot shall be covered with 4-inches of topsoil and seeded in accordance with the following schedule:[8]

Type of Slope	Time*
Steeper than 3:1	7 days
10:1 to 3:1	14 days
Flatter than 10:1	21 days

* The maximum time an area can remain open when the area is not actively being worked.

Policy 9.4 Bluff protection ordinances and shoreland protection ordinances shall govern steep sloped areas.

J. **Regulatory Responsibility**

Goal 10: Recognize the regulatory authority of other local, state and federal entities.

Policy 10.1: The City is responsible for establishing and implementing a local permitting program for water resources management. For smaller projects, an administrative Grading Permit shall be sufficient. For larger projects, an Interim Use Permit (IUP) shall be required

[8] Minnesota Pollution Control Agency, National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS), Application for General Storm-water Permit for Construction Activity (MN R100001)

Policy 10.2: Other governmental agencies with watershed management responsibility include:

- The Lower Rum River Watershed Management Organization (LRRWMO)
- Minnesota Department of Natural Resources (DNR)
- United States Army Corps of Engineers (USCOE)
- Minnesota Board of Water and Soil Resources (BWSR)
- Minnesota Pollution Control Agency (MPCA)

Policy 10.3: The WMO and the City will require a permit for certain activities, as described in this plan.

Policy 10.4 The LRRWMO Third Generation Plan requires development of an ownership/ responsibility plan for the Anoka Dam. The Rum River Dam is owned by the City of Anoka, and as such has primary responsibility for the maintenance plan. The City of Ramsey will work with Anoka and Andover to implement the plan adjacent to the corporate boundary.

K. **Finance**

Goal 11: Equitably finance water resources.

Policy 11.1: All developments should, to an extent determined by the City, provide land, funding, or a combination of both for management of local water resources, which includes development of regional facilities and planning studies.

Policy 11.2: The City may establish a fee structure charged to developers for analyzing the impacts of the proposed development.

Policy 11.3: The City has established a fee structure charged to developers for constructing capital improvements (i.e., trunk conveyance systems).

Policy 11.4: The WMO should establish an equitable cost allocation formula for water resource project implementation that affects more than one unit of government.

Policy 11.5: Grants may be sought by the City to fund watershed related projects.

Policy 11.6: The City should investigate the feasibility of alternative funding sources, such as Ad Valorem Taxes, bond sales, and user charges (storm water utility).

Policy 11.7: The City should encourage donations and in-kind contributions of public and private organizations and the school systems for plan implementation.

Policy 11.8: The City shall investigate and evaluate other funding mechanisms that support implementation and enforcement. This

shall include but not be limited to pursuing grants with the LRRWMO, utilizing stormwater utility funds for the local match, for water quality improvement projects.

L. **Records Management and Documentation**

Goal 12: The City shall preserve historic data, records, and files pertaining to the water resources of the LRRWMO.

Policy 12.1: The City should develop a classification to be recorded for each new detention area, including the basis for the classification.

Policy 12.2: Engineering calculations will be required in a standard format.

Policy 12.3: Past studies will be documented and filed by the City.

Policy 12.4: Immediately after extreme rainfall events, high water elevations should be noted and surveyed by the City.

Policy 12.5: The City will develop a history of flooding and water quality problems by noting past events and recording current floods.

Policy 12.6: The City will record changes in water quality, such as increased aquatic vegetation, changing thermal conditions, increased sedimentation, reduced fish numbers, and fish kills.

Policy 12.7: The City will document all items/BMPs provided in the SWPPP and MS4 permit.

VI. ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTIONS

This section assesses the water-related problems in the City, prioritizes the problems and includes actions to adequately solve each identified problem.

The City held a public open house on July 11, 2007 to gather input on water resources-related problems in preparation of the original 2008 plan. A public notice was published in accordance with City policies. Four residents attended the open house. The feedback that was received was primarily associated with the desire to protect the City's natural beauty including wetlands, wildlife habitat and wildlife corridors. The primary concern was that continued and uncontrolled development would adversely impact the current environment. All attendees expressed satisfaction that the SWMP is intended to protect these features.

Throughout the course of completion of the 2008 plan and subsequent flooding events in 2011 and 2014, prior to this 2015 update, City staff compiled a list of nuisance flooding areas either noted by maintenance staff or by resident complaints.

Figure 9 highlights all known nuisance flooding areas.

A. Specific Lakes and Streams with Water Quality Problems

Table 15 in Section IV, page 17 of this report, lists the current (2014) MPCA 303d Impaired Waters in Ramsey. There are also waters downstream of the City of Ramsey, such as Lake Pepin, that are impaired. The process to remedy the impairment includes establishing a Total Maximum Daily Load (TMDL) allocation to each contributor to the problem. A TMDL is a calculation that determines the allowable pollutant load that can be discharged into the impaired water so that the limited load will ensure that the water improves to levels where it is no longer impaired. The typical process is initiated by the MPCA and includes a series of stakeholder meetings to formulate viable solutions and mutually work out a reasonable allocation of acceptable pollutant loading.

Since a TMDL study has not been completed for these waters, the City should identify the priority it places on addressing impaired waters and how the City intends to participate in the development or implementation of TMDL projects. Furthermore, the City should volunteer to participate in the stakeholder process.

Once a TMDL study is completed for the impaired water, the City must include, in this SWMP and its City-wide SWPPP, an implementation strategy including funding mechanisms that will allow the implementation of the TMDL requirements. As MPCA completes its TMDL process for each impaired water, the implementation of the measures to meet the TMDL will immediately become a priority item for the City of Ramsey.

B. Flooding and Storm Water Rate Control Issues

Figure 9 is a map of all flooding areas either noted by staff or associated with a resident complaint compiled between 1985 and 2014.

The lake levels in Lake Itasca are historically variable, and have ranged from elevation 863.24 to elevation 871.9 with an average water level of 867.7. The DNR protects the lake to its Ordinary High Water Level of 871.4. To protect the properties around the lake, an emergency overflow should be established above the DNR protected level of 871.4. The overflow may be in the form of a pipe to the south or southeast, or it may be a new outfall to the Mississippi River.

The storm water modeling performed for the area shows few opportunities for property damage associated with rainfall. Ponding areas having a potential for property damage are shown in red on Figures 10 through 23. The relatively low percentage of potential property damage is presumed to be attributed to the high permeability of the Anoka Sand Plain and proper storm sewer system design.

Because of the pervious nature of the Anoka Sand Plain, the City should be cognizant of the impact that a significant increase in impervious surfacing and mass grading can have on runoff conditions. The addition of significant amounts of impervious surfaces and the reduced permeability associated with the soil compaction in mass grading without a reasonable attempt to restore and duplicate the current infiltration pattern could create significant increases in runoff volumes and downstream flooding.

The City will review and modify its current development ordinances to encourage infiltration and require soil ripping of mass grading to compensate for lost infiltration conditions as well as requiring extended retention ponding to mitigate and compensate for increases in runoff. Innovative solutions to the storm water runoff volume increases associated with the increase in impervious surface will be investigated. Potential solutions include pervious pavements, rain gardens and infiltration basins among others.

Comprehensive storm water runoff modeling of the existing conditions throughout the entire City was completed as part of the 2008 plan. The modeling was updated in 2015 to reflect new development and incorporate the Atlas 14 runoff rates. This modeling will provide a baseline for comparison purposes as new developments change the drainage pattern. With this modeling information, City staff can readily review the cumulative impacts of large developments for effects on baseline conditions across the entire city.

SSA software was used in the comprehensive modeling. This software is based on the industry accepted EPA SWMM process and St. Vennant equations. The model can be used to input actual rainfall events from rain gauges and can model the transport of pollutants through the system. This will be very useful in evaluating the BMP measures to address future TMDLs.

The 2008 plan addressed several previous flooding complaints the City had received over a number of years, beginning in 1980. It was determined in 2008 that several of these concerns were solved by later construction of storm sewer systems as the City developed. The areas that were not solved are shown on the flooding area map.

The City experienced high water levels in 2011 and 2014 caused by high snowfall over the winter and heavy spring rains. Staff logged the complaints received in each year. The lists were presented to the Public Works Committee for review.

The 2011 complaints sorted into three (3) categories, clean existing drainage ways and structures, water ponding outside of existing easements, and water ponding in existing easements. Where water was ponding in existing easements the action was homeowner education on the purpose of drainage and utility easements. The action where existing drainage was and structures needed cleaning was to add the work to the Public Works action list. The action where water was ponding outside of existing easements was a combination of performing a detailed study of each area using Consultant Pool and Staff resources. Cost estimates were generated from the studies and presented to the City Council. Several projects were selected for construction, the remainder were deemed infeasible at that time.

The 2014 complaints were also studied. Staff determined that the majority of these complaints would require additional study, these areas could not be drained without causing high water problems on downstream properties. The City wide storm water model is being used in the review of possible solutions to these problems. The Public Works Committee of the City Council has discussed stormwater ponding concerns several times in 2014 and 2015. Staff is preparing a feasibility study on potential solutions to be brought back to City Council for review.

C. **Impacts of Water Quality and Quantity Management Practices on Recreation Opportunities**

The current City ordinances together with the LRRWMO, County, regional, state and federal rules and laws are designed to protect the existing land and water resources within the City of Ramsey. The City believes that it can allow continued development while maintaining or improving its resources including water quality and recreation opportunities. With the implementation of this plan and the recommended policy and ordinance changes, the developers will be responsible for protecting water quality, mitigating the runoff quantity and ensuring that there will continue to be recreation opportunities in Ramsey. In addition, the City's Storm Water Pollution Prevention Plan is designed to educate the public to better protect the city's water resources, to implement temporary and permanent erosion and sediment controls for new developments, to ensure good housekeeping of the City's municipal operations, and to detect and eliminate illicit discharges.

D. **Impacts of Stormwater Discharges on Water Quality and Fish and Wildlife Resources**

As stated in C above, the current and proposed ordinances and the City's SWPPP are designed to protect the existing land and water resources within the City of Ramsey. This includes measures that are designed to maintain or improve the habitat of the fish and wildlife throughout the area.

E. **Impacts of Soil Erosion on Water Quality and Quantity**

As part of the City-wide SWPPP and MS4 permit, the City established an erosion and sediment control ordinance governing construction practices. The City will also evaluate existing erosion control problem areas that may not be associated with recent construction and formulate mitigation plans to rectify those issues. Given increased regulation of the typical causes of soil erosion and sediment transport, it is anticipated impacts of soil erosion on water quality in the Ramsey area will be greatly diminished.

The SWPPP and MS4 permit also call for the annual inspection of required structural BMPs (structural BMPs are physical devices designed to trap or filter pollutants from runoff or reduce runoff velocities; an example being silt fence). Maintenance is included in the City's annual budget to ensure that structural BMPs continue to work and provide the design storage needed to ensure continued flood mitigation.

F. **General Impact of Land Use Practices**

As stated in Section VI.B, increases in impervious surfacing will require mitigation to reduce the impacts related to change in permeability from the natural Anoka Sand Plain conditions. The preferred mitigation method is to encourage infiltration to duplicate the existing condition. In addition to infiltration, the City will consider low impact

alternatives and oversized regional retention basins to mitigate potential downstream flow changes.

The City also prepared a Wetland Management Plan along with this the 2008 SWMP that includes a function and value assessment of all wetlands in excess of ¼ acre in size. Although the wetland buffer requirements were later rescinded by the City Council, the City gathered a great degree of quantitative data to help study the effects of furtherance of developed areas within the community. The City will continue to use this data as a baseline for analysis as well as to consider potential outcomes of development in close proximity to wetlands Adequacy of Existing Regulatory Controls

The City of Ramsey believes it has adequate policies in place to self-regulate the anticipated growth without sacrificing its abundant water resources. In addition to its ordinances, the existing greater area regulatory controls of the LRRWMO, BWSR, the Metropolitan Council, the DNR, the U.S. Army Corps of Engineers, Anoka County, etc. are more than adequate to properly manage or mitigate adverse impacts on public waters and wetlands.

The City must rely on the regulatory authority of Anoka County, the LRRWMO and the regional, state, and federal plans to monitor and control the runoff entering the City from outside its jurisdiction. The City understands that it will also need to address issues brought to its attention by these outside regulating authorities.

The City is also concerned that the ordinance revisions, various permit fees and charges needed to finance the proposed changes will adversely affect development in Ramsey. To ensure that Ramsey has an equal chance of attracting development, the City must rely on outside agencies and WMOs in the area to regionally enforce similar environmental requirements with comparable financing obligations.

G. **Adequacy of Programs**

The City of Ramsey believes that the BMPs promised in its City-wide SWPPP and MS4 permit are designed to adequately:

1. Limit soil erosion and water quality degradation
2. Maintain the tangible and intrinsic values of natural storage and retention systems
3. Maintain water level control structures

H. **Adequacy of Capital Improvement Programs**

The storm water improvements recommended in the City's 5-year Capital Improvement Program are designed to address and correct problems related to:

1. Runoff Quantity
2. Water Quality Management
3. Fish and Wildlife Habitat and Public Waters and Wetland Management
4. Recreational Opportunities

I. **Future Potential Problems**

The greatest potential for future problems with storm water planning is associated with the ever-growing impervious footprint that is inevitable with growth. As stated earlier, highly pervious nature of the Anoka Sand Plain means that the cumulative effect of development could result in drastically increased runoff volume and flow rates.

The recommended ordinance revisions are designed to:

1. Encourage infiltration and soil ripping of newly graded sites so that developed sites can adequately mimic unimproved site runoff and flow rates.
2. Limit post development runoff rates to the existing condition so that multiple developments do not cause cumulative increases in the downstream condition.

In addition, regional pond modifications are also recommended where plausible because of the economic and runoff management capabilities of larger scale hydrologic systems. By implementing the recommendations in the SWMP, these potential future problems are being anticipated and adequately addressed within the City of Ramsey. As stated earlier, the City must rely on the regulatory authority of Anoka County, the LRRWMO and the regional, state, and federal agencies to monitor and control the runoff entering the city from outside its jurisdiction. The City understands that it will also need to address issues brought to the attention by these outside regulating authorities.

VII. FINANCIAL CONSIDERATIONS

Typically a Capital Improvement Program (CIP) is an itemized program for at least a five-year prospective period. The items and associated costs are subject to at least biennial review. The benefits include setting forth the schedule, timing, and details of specific contemplated capital improvements by year, together with their estimated cost, the need for each improvement, financial sources, and the financial effect that the improvements will have on the local government unit or watershed management organization.

The City recognizes that the detailed modeling exercise of the storm water system for the city laid out many areas of potential full pipes, inadequate flow structures, and potential flooding issues that will need to be constantly re-evaluated as more detailed information is available for the system and as the city grows. As this re-evaluation occurs, the CIP will need to be updated to reflect new projects.

A. 5-year Capital Improvement Program

The current 5-year Capital Improvement Program includes the following:

1. Annual Sediment Pond Cleaning $125,000
2. County Ditch 43 Cleaning $180,000
3. COR Bunker Lake Boulevard (Armstrong Blvd to Ramsey Blvd) $560,000
4. West Mississippi Outlet $680,000
5.
6. Whispering Pines Estates Plat 2 Storm Sewer $330,000
7. Annual Drainage Enhancements $675,000
8. Stormwater Drainage Improvements –Treatment before discharge to River $410,000
9. Storm Sewer South of Bunker Lake Boulevard -COR $250,000
10. Garnet Street Reconstruction $198,000
11. Reconstruction of Andrie Street/ 164th Avenue $1,020,600
12. Reconstruction of Streets -Ford Brook Estates $237,600
13. Alpine Drive Reconstruction $60,700
14. Reconstruction of Streets – Stanhope Terrace and North Forty $587,000
15.

Total Current 5-year Plan Expenditures $5,389,500

The financial impact of implementation of the proposed regulatory controls and programs identified in Section VI is anticipated to include the following:

16. Adopting and Enforcing the SWMP Local Controls and Standards[9] $25,000/year
17. SWPPP Annual Cost and Implementation[10] $100,000/year
18. Current Five Year Capital Improvements $5,389,500

Total 5-year Financial Impact $6,014,500

[9] Estimated cost is based on one half-time employee at salaries (plus benefits) of $50,000 per year.
[10] Estimated cost is based on two fulltime employees at salaries (plus benefits) of $50,000 per year.

Although the cost associated with these recommendations can be financed locally, the City will pursue all opportunities for outside funding. Without outside financing the City will need to finance the adoption of, and enforcement of, the local controls and standards, implementation of the specified programs, and capital improvements recommended in this SWMP using one or more of the following:

1. Increasing the storm water development charges (storm water trunk fees)
2. Increasing the storm water utility fees
3. Increasing the general levy (within levy limits)
4. Creating a storm sewer assessment district
5. Accessing funds from other City projects and funds

The City increased the storm water trunk fees and storm water utility fees in 2015.

Outside funding is greatly desired as the impact of increasing these taxes, fees and charges will increase tax burden against homes and farmsteads, increase the utility burden for all parcels or postpone other necessary improvements currently scheduled in the City's Capital Improvement Plan.

The following are potential sources of outside funding that may be available to assist in the financing of the various storm water related issues:

1. Minnesota Clean Water Legacy funds
2. Clean Water Partnership Funds
3. Clean Water Act, Section 319 funds, administered by the MPCA
4. Minnesota Public Facilities Authority (PFA) grants and low interest loans

There is significant competition for these limited funding sources. If these sources are pursued by the City, it will likely involve innovative treatment technologies in addition to timely requests for funding.

The application deadlines for Section 319 and PFA funds are published annually by the State. The PFA prepares an annual Intended Use Plan for each program that lists the projects eligible to apply for loans. A written request must be submitted by the City to the PFA to place a project on the IUP for consideration. The City routinely monitors the deadlines for these programs.

B. Local Financing Options

Development Charges or Trunk Fees According to City of Ramsey Code section 117-618, anyone creating a new residential lot or a new nonresidential site plan must pay a storm water trunk fee as established by ordinance. Each year the fee is reviewed and approved as part of the City's overall fee ordinance. For residential property, the fee is a flat fee per residential unit. For nonresidential property (commercial / industrial), the trunk fee is calculated on a per acre basis. The monies collected are deposited in the Storm Water Management Fund and are only used to pay for storm drainage financing and improvements. Maintenance of the storm water system is paid for with utility revenue deposited into the Storm Water Utility Fund.

1. Increased Storm Water Utility Fees

According to City of Ramsey Code Section 58-194, the City may impose just and reasonable charges for the use and availability of storm sewer facilities. Rates and charges for the use and availability of the system shall be determined through the use of a Residential Equivalent Factor ("REF"). For the purposes of the Ramsey City Code, one REF is defined as the ratio of the average volume of surface water runoff coming from one acre of land and subjected to a particular use, to the average volume of runoff coming from one acre of land subjected to typical single-family residential use within the City during a standard five-year rainfall event. Rates and charges for the use and availability of the system shall be determined through the use of a Residential Equivalent Unit ("REU"). For the purposes of the Ramsey City Code, one REU is defined as the product of the acreage of a particular parcel multiplied by the REF. The REF shall be based on the relative runoff generated by any land use compared to the expected runoff from a typical half-acre single-family dwelling. This relationship shall be interpreted as a function of the percent of the total lot area that is impervious and shall be applied as determined in City of Ramsey Code.

The City Storm Sewer Utility fee is intended to finance infrastructure maintenance, upgrading, reconstruction and new construction serving previously developed areas. It is not typically used to finance retrofitting the existing system to accommodate new developments. Most cities require the developer to finance the entire new storm sewer system associated with the development. Then, once the new system is accepted and turned over to the City, the municipal maintenance funds (typically storm sewer utility funds) are used to maintain the new system.

2. Increasing the General Levy

   If the City has not yet reached its levy limits, financing could come from increases in the general tax levy across Ramsey. This option is generally not favored because it may duplicate costs for property owners who have either directly or indirectly already financed their own developments. Unless tax expenditures for storm water needs can be uniformly spread to all properties, political opposition should be expected from entities that have already invested in storm water facilities.

3. Creating a Storm Sewer Assessment District or Storm Water Tax District

   If a watershed is well defined and the greater majority of the property owners have a share in the benefit of the proposed storm sewer improvement, the City could form a storm water assessment district. When improvements or repairs are needed within the district, an advertisement hearing process is required similar to that used for assessments in Minnesota Statute 429. Many cities are not choosing this financing option because it can be cumbersome. Cities also find it difficult, on occasion, to legally prove the level of benefit associated with the assessment.

C. **Recommended Local Financing**

1. The cost of existing system retrofitting and maintenance projects should be borne by the Storm Sewer Utility fund as this is the primary focus of these funds.

2. The cost of new improvements in undeveloped land should be borne by the developer.

3. The cost of retrofitting the downstream system to accommodate new developments should be borne by newly established New Development Charges or Trunk Fees.
4. Increasing the general levy for storm sewer related costs is not recommended.
5. Creating a storm sewer assessment district is not recommended.

VIII. IMPLEMENTATION OF PRIORITIES AND PROGRAM

A. Special Waters

According to the MPCA's Special Waters list (January 2004), special waters in the Ramsey area include:

1. The **Mississippi River** is considered part of the Mississippi River Corridor Critical Area (MRCCA) from the western borders of the cities of Ramsey and Dayton to Hastings. The cities of Ramsey and Dayton had previously also been included in the Wild and Scenic Designation until 2012, when these cities received an exemption from the Minnesota Legislature as these areas were also included in the MRCCA.
2. The **Rum River** is considered Scenic/Recreational from Highway 27 bridge in Onamia to Madison and Rice Streets in Anoka.

The City will meet State requirements for development near these waters as identified in the Minnesota Stormwater Manual by designing storm water basins using the sizing criteria described in *Design Calculations for Wet Detention Ponds*, by William Walker Jr. The City will also encourage storm water practices that promote infiltration/filtration and decrease impervious areas (better site design and integrated stormwater management), where practical.

B. City-wide SWPPP and MS4 Permit

The City-wide SWPPP, associated with its MS4 permit, is available on the City's website. The SWPP was updated to reflect the 2013 re-issuance of the MS4 Permit. A copy of the SWPPP is attached in Appendix A.

C. Implementation Schedule

In accordance with Minnesota Rule 8410.0010, the City of Ramsey must provide for the adoption of necessary regulatory controls, storm water design standards, education programs, data collection programs, and maintenance programs. This SWMP must clearly distinguish the City's responsibilities versus the responsibilities of the LRRWMO and Anoka County with respect to implementing each program element.

According to Minnesota Rule 8410, each organization plan must include a schedule for implementation by the organization, joint powers agreement members, and affected local units of government. All plan controls and programs to be implemented by the organization must be in effect within one year of plan adoption. All local plan controls and programs must be developed and in effect within two years of adoption of the last organization plan in the local unit of government.

Since this SWMP is an update to a previously accepted plan, most of the required programs have already been developed and coordinated with Anoka County and the LRRWMO.

D. Capital Improvement Program

This SWMP must include a capital improvement program that identifies specific capital improvements necessary to implement the water resource management goals and policies of the organization. The 5-year Capital Improvement Program is discussed in Section VII of this report.

A Capital Improvement Program, or CIP, already exists and is updated on annually for a projected 5-year period. The CIP includes projects to implement the recommendations in this SWMP.

E. **Enforcement**

This SWMP must identify the procedure to be followed to enforce violations of the controls of the organization as well as those of the local unit of government.

The City uses a permitting process with a surety requirement for new developments. If the developer fails to follow the conditions of the permit, the City can call on the surety to ensure immediate rectification. The surety must be in the form of a Letter of Credit or Cash Escrow.

The City has adopted the following ordinances:

1. Erosion and Sediment Control Ordinance
2. Illicit Discharge Ordinance
3. Post Construction Storm Water Management Ordinance.

Each of these ordinances will be enforceable locally and will carry fines for failure to adhere to them. In addition, the MPCA can impose significant fines for pollution discharges associated with these ordinance controls as well as any unauthorized pollution discharge.

The City will amend its ordinance to include the enforcement of storm water ordinances as part of City Code Chapter 2, Article VII entitled Administrative Enforcement of Ordinance Violations. The City will have to adopt an ordinance to establish the rates and charges associated with administrative fines for storm water ordinance violations.

F. **Administration Process**

This SWMP must specify the administrative process and timelines for the submittal, review, and approval of local plans and variances by the organization.

Requirement 1: All communities need to include information on the types of best management practices to be used to improve storm water quality and quantity and the maintenance schedule for the best management practices (BMPs).

Solution 1: *The City's SWPPP, available on the City website, includes the mandatory list of BMPs together with an implementation timeline. All of the BMPs in the SWPPP and designed to improve storm water quality. The City's current development ordinances are designed to regulate storm water quantity in accordance with the LRRWMO requirements. Within a year after the acceptance of this plan, the City will review its ordinances controlling development to include the recommendations of this SWMP, chiefly the recommended runoff volume controls.*

Requirement 2: All communities need to include a Wetland Management Plan or a process and timeline to prepare a plan. The Wetland Management Plan should incorporate a function and value assessment for wetlands.

Pretreatment of storm water prior to discharge is required for discharge into all wetland types.

Solution 2: *The City has completed a MNRAM evaluation of all of wetlands within city limits and greater than ¼ acre in size. The report is available at the Municipal Center. The implementation of the plan was postponed by the*

Requirement 3: The City needs to include funding sources for the various required activities.

Solution 3: *The required funding sources are described in detail in Section VII of this SWMP.*

Requirement 4: The City needs to include activities to be undertaken along with numerical goals, strategies and timelines.

Solution 4: *The City's SWPPP, available on the City website and attached in Appendix B, includes BMPs describing the necessary activities, numerical goals, strategies and timelines.*

Table 18 is an implementation process list of the recommended actions, timing, responsible party, and the cost or funding sources which are presented for the City Council's consideration based upon the data compiled in this report. Actions are listed in order of priority, from highest to lowest.

Table 18

Implementation Process List

Action	Timing	Responsible Party	Cost/Funding Source
Maintain and implement Capital Improvement Program.	On-going, updated on a 5-year period.	City of Ramsey	Storm water area charge and monthly storm water utility fee
A storm water maintenance program enforced to ensure the successful operation of the drainage system.	On-going.	City of Ramsey	Storm water area charge and monthly storm water utility fee
Corrective actions for storm water problem areas.	On-going, as problems come up.	City of Ramsey	Storm water area charge and monthly storm water utility fee
The erosion and sedimentation control criteria for new developments enforced.	On-going, as developments are submitted to the City for approval.	City of Ramsey	Funding by developer's fees and building permits
Low impact development/better site design for new developments encouraged.	On-going, as developments are submitted to the City for approval.	Developer's Engineers, City of Ramsey	City staff funding by developer's fees and building permits. Developers pay for design and construction of developments.
Conceptual regional Ponding areas established as described herein and made a part of the storm water management system.	On-going, as Developments are submitted to the City for approval. Right of first refusal purchasing at time of sale of property.	City of Ramsey	Cost sharing with Anoka County
Standard review procedures established to ensure all development within the City is in compliance with proper erosion control practices.	Currently in place. Update as necessary.	City of Ramsey	Funding by developer's fees and building permits
Detailed hydrologic analysis required during final design of all ponding areas.	Currently in place. Update as necessary.	Developer's Engineers, City of Ramsey	Developers pay for design and construction of developments. City staff funding by developer's fees and building permits.

Final high water levels governing building floor elevations adjacent to ponding areas and floodplains established as development occurs or when drainage facilities are constructed.	On-going.	Developer's Engineers, City of Ramsey	Developers pay for design and construction of developments. City staff funding by developer's fees and building permits.
Overflow routes established and maintained to provide relief during extreme storm conditions, which exceed design conditions.	On-going, as developments are submitted to the City for approval.	City of Ramsey	Developers pay for design and construction of overflow routes. City-conducted maintenance funded by developer's fees and building permits.
An education program for City residents, staff, and development community implemented.	On-going.	City of Ramsey	City of Ramsey, with help from LRRWMO, DNR, University of Minnesota Extension Service, SWCD, NRCS
Amendments to the SWMP adopted and implemented and the SWMP updated.	As warranted by future standards or regulations – by 2015 or earlier if needed.	City of Ramsey	Storm water area charge and monthly storm water utility fee
Regulate construction and land uses along the bluff, to prevent erosion.	On-going, as developments are submitted to the City for approval.	City of Ramsey	Funding by developer's fees and building permits
Encourage landowners to retain any areas of native vegetation, and to plant species native to the area, to protect and improve wildlife habitat and maintain the historic ecological role and appearance of the steeper riverbanks. The existing housing developments along steeper riverbanks have addressed retention of native vegetation in one of two ways: platting of the property in an outlot and deeding that to the City or	On-going, as developments are submitted to the City for approval.	Land Owners, Developers, City of Ramsey	Landowner, City of Ramsey, Future grant opportunities if they arise

through a conservation easement.			
Develop an implementation strategy for TMDLs.	Once TMDLs are formulated.	City of Ramsey, working with LRRWMO	LRRWMO, BWSR, DNR, etc.

IX. AMENDMENT PROCEDURES

This Updated SWMP extends to 2022. Amendments to the plan may be adopted and implemented as warranted by future standards or regulations. The City is aware that the Lower Rum River Watershed Management Organization will be updating its watershed management plan during the effective period of this plan which will trigger the mandatory re-evaluation and potential need for an update of this SWMP within two years from the date the watershed plan is approved by BWSR. The City will initiate any amendments by resolution of the City Council. The citizens of Ramsey, City Staff, the City Council, or any of the review authorities having jurisdiction may submit amendment requests.

The amendment request will be evaluated by City staff and a recommendation will be made to the City Council. If the Council deems the amendment necessary, it will order City staff and/or the City attorney to draft an amendment.

The draft amendment will be brought to the Council for review. If approved, the Council will pass a resolution calling for a hearing on the amendment. The amendment must be forwarded to each organization affected by the amendment. The proposed amendment will be published in the official city newspaper not less than 10 days before the hearing.

The hearing will be held in a public place, typically in the Council chambers at City hall. At the hearing, all interested citizens will be given the opportunity to submit a written statement or voice their opinion on the acceptability of the proposed amendment.

When all have been heard, the City Council will close the hearing and vote their decision on whether to pass a resolution accepting the amendment as written.

According to State Statute 103B.235, Subd. 5, Amendments, to the extent and in the manner required by the LRRWMO, all major amendments to the SWMP shall be submitted to the LRRWMO for review and approval in accordance with the provisions of State Statute 103B.235, subdivisions 3 and 3a for the review of plans. All major plan updates and amendments will be submitted to the Lower Rum River Watershed Management Organization and the Metropolitan Council simultaneously. All minor amendments will have a Public Hearing before the Planning Commission which will then recommend approval by the City Council. The City Council will review the amendments and approve or deny the changes.

X. SUMMARY AND RECOMMENDATIONS

A. Summary

The 2008 plan was prepared by Bolton & Menk, Inc. The technical analysis found within this 2015 update was prepared by Bolton & Menk, Inc. in 2008 and refreshed by City Staff in 2015.

The Ramsey SWMP has a dual purpose: it will serve as a guide for the construction of storm drainage facilities and provide a basis for a consistent approach to the preservation of lakes, wetlands, streams, and the Mississippi and Rum Rivers. The following issues have been incorporated into this plan:

1. Division of the City into major watersheds based on contour maps, grading plans and natural topography
2. Determination of storm water runoff under ultimate land use conditions
3. General layout and sizing of trunk storm sewers and open channels
4. Tributary areas, storage volumes, and high water levels of all existing ponding areas
5. Recommendations for the revision of the current development ordinances
6. Recommendations for standard Operations and Maintenance procedures
7. Recommendations for specific construction site erosion control practices
8. Estimated construction and implementation costs of the SWMP
9. Recommendations for education of City residents, staff, and development community.

The primary function of an urban storm drainage system is to minimize economic loss and inconvenience due to periodic flooding of streets and other low-lying areas. Adequately designed storm drainage facilities provide flood control, minimize hazards and inconvenience associated with flooding, and protect or enhance water quality. The SWMP takes the entire drainage basin with future saturation development into consideration.

Wet water quality ponds upstream or dry regional infiltration basins (where possible) will help control the rate and the volume of storm water runoff. To provide flood protection for adjacent property, the design storm interval for ponding areas with a known outfall is a 100-year storm as compared to a 10-year storm for design of storm sewer piping. For land locked ponds or wetlands, the design storm interval is a back-to-back 100-year storm or the 100-year, 10-day snow melt event, whichever is larger. Any new residential, commercial, industrial and other habitable structures shall be constructed with the following low floor elevation: Elevation of the lowest floor of a structure shall be a minimum of 1 foot above the Emergency Overflow, or 2 feet above the HWL of the nearby pond or waterbody, whichever is higher.

In areas adjacent to designated flood plains as mapped on a Flood Insurance Rate Map, the Regulatory Flood Protection Elevation (RFE) applies. The RFE is defined as the mapped 100-year flood elevation plus 1 foot. However, the LRRWMO requires that the lowest floor elevation be 2 feet above the calculated flood elevation. Therefore, all structures, including accessory structures, must be elevated on fill so that the lowest floor

including basement floor is at or above the Regulatory Flood Protection Elevation or 2 foot above the mapped 100-year flood elevation. The finished fill elevation for structures shall be no lower than the Regulatory Flood Protection Elevation and the fill shall extend at such elevation at least fifteen (15) feet beyond the outside limits of the structure erected thereon.

The area of a pond's HWL plus 1 foot of freeboard shall be contained entirely within an outlot that is owned and maintained by the City.

The numerous natural depressions found throughout Ramsey have been incorporated into the SWMP as ponding areas. Wetlands may be, and are currently being used for stormwater storage for larger rainfall events. They may continue to be used for this purpose – even after upstream development, provided that:

1. There is acceptable Best Management Practice pretreatment of the runoff in accordance with the MPCA NPDES/SDS Construction Permit, Section III.D., Permanent Stormwater Management System.
2. The bounce from the normal water level to the high water level does not exceed two feet.

The effective use of ponding areas enables the installation of outflow sewers with reduced capacities since the design storm duration is effectively increased over the total time required to fill and empty the ponding reservoirs. Storm sewers represent a sizable investment for the community and this investment can be more efficiently utilized by ponding storm water in designated ponding areas and allowing smaller diameter pipes to be used as outfall lines.

Equally as important as flood control and cost considerations, is the use of ponding areas to:

1. Improve water quality;
2. Return storm water to the groundwater table;

For water quality ponds, the storage below the outlet is the most important consideration. The area and depth of the ponds may differ from the values presented here, storage below the outlet must be provided so that the prescribed pollutant loading of the system is not exceeded.

The City will allow Developers to construct storm water ponds to serve a secondary purpose as a development amenity. However, the Developer shall be required to enter into a Development Agreement or Maintenance Agreement that outlines that the City will not take on maintenance obligations beyond basic storm water functions. If constructed as a water feature, the City will not guarantee water levels or water quality above basic storm water requirements.

The wildlife aspects of the ponding areas shall be maximized in design and the proper location of the trail system will allow good access to these areas for wildlife observation.

B. **Model Results**

Even numbered figures from Figure 10 through Figure 22 are maps of critical SSA pond data superimposed on the most recent aerial photo of Ramsey. They are color coded to highlight the 100-year storm conditions as follows:

Green – The pond functions properly and the peak elevation is fully contained within the pond

Yellow – The peak pond elevation is above the emergency overflow spillway

Red – The peak pond elevation may threaten structures

All red and yellow areas will be "ground truthed" to verify the condition depicted. These maps can be used to evaluate regional pond opportunities. In reviewing these maps, one can easily see where the current ponds or depressions are overtaxed for the 100-year event.

Odd numbered figures from Figure 11 through Figure 23 are maps of critical SSA pipe data superimposed on the most recent aerial photo of Ramsey. They are color coded to highlight the 10-year storm conditions as follows:

Orange – The pipe is flowing normally

Red – The pipe is flowing full

The following is a brief discussion of the opportunities and recommendations associated with each watershed:

Figures 10 & 11 – D43 Watershed

This is the Ditch 43 watershed. From Figure 10, it can be seen that this area is fully developed around a significant amount of existing wetlands. This leaves little opportunity to construct regional ponds.

The red areas on Figure 10 indicate ponds that are subject to flooding during the 100-year event. The yellow areas indicate that the emergency overflow is reached during a 100-year event. These ponds should be reviewed relative to the following:

- Should the outfall pipe be replaced with a larger one?
- Can the pond be enlarged?
- Can the overflow spillway be lowered?
- Can rain gardens be incorporated into the upstream watershed?
- Is the upstream watershed larger than allowed by the original design?
- Can some of the upstream watershed be diverted?

The two ponds in the southwestern part of the watershed that are highlighted in red, P26308 and P26310, appear to be infiltration ponds with no outlet pipe. Because our model conservatively assumes no infiltration, the threat of flooding from these ponds may be exaggerated. In comparing this area with the historic flooding map of Figure 8, there have been no reports of flooding in this area.

Pond P25454 appears to need a raised emergency overflow to the west in order to relieve potential flooding. Our model suggests that a 12-inch outfall culvert under Sunwood Drive with an inlet elevation of 866 will eliminate this threat from a 100-yr rainfall event.

Since the D43 watershed is comprised of a significant amount of wetland which acts as satisfactory runoff storage, no other significant designs are necessary with the exception

of the localized flooding associated with the red highlighted ponds. Otherwise, upstream watershed review for infiltration/rain garden opportunities is recommended.

Figures 12 & 13 – D66 Watershed

This is the Ditch 66 watershed. It is nearly identical in nature to the D43 Watershed in build out and wetland storage. Hence, the recommendation is the same: review the highlighted ponds and determine if they need upgrading through either upstream infiltration practices, pond enlargement or increasing the outfall.

From Figure 12, only one pond, P22110 is a potential threat to structures. In reviewing Figure 8, no residential complaints have been made for this area and City Staff has not highlighted this area as a nuisance flooding area. It currently exists as a small natural depression that may have infiltration capacity. Our modeling conservatively assumes that no infiltration occurs and that relief is only provided by storage and the capacity of the outfall pipe. Hence, the potential threat to structures may be exaggerated. If this pond proves to be a problem, the pond storage could be increased or the existing 15" outfall could be increased to a 21" pipe with a lower pipe inlet elevation of 883 to adequately relieve the potential flooding.

The yellow coded ponds in Figure 12 highlight ponds that are immediately adjacent to large wetlands. With the exception of pond P09308, in the northwest part of the watershed, these ponds have emergency overflows directly to these wetlands and there is no concern for public welfare or property damage associated with these ponds. Pond P09308 is another infiltration basin with no historic complaints in the vicinity. Because our model conservatively assumes no infiltration, any threat of flooding from this pond may be exaggerated.

Figures 14 & 15 – EMISS Watershed

This is the Eastern Mississippi watershed. The majority of the northern part of this watershed is adequate in storage and functioning properly. Where there is undeveloped land, the SSA model can be used to recommend appropriate pipe sizing and ponding to ensure that it remains free of flooding.

The southern part is more commercialized and also more prone to flooding. However, there are no historic complaints of flooding in the area (see Figure 9).

If additional flood protection is needed in the southern EMISS watershed, there are some opportunities to correct the ponds that are modeled to be surcharged. From the aerial photograph, it appears that there are a few opportunities for expanding troubled ponds and the creation of additional ponding that may be constructed as backflow basins to relieve the flood prone ponds in the area. Those best opportunities are immediately adjacent to the railroad. These would be best incorporated into future development of this area. Otherwise, retrofitting rain gardens, infiltration basins, and as a last resort, increasing outfall pipes may be considered for nuisance ponds.

Figures 16 & 17 – GOLF Watershed

This watershed is currently functioning well. There is only one pond, P11320, in the watershed that is a potential threat to structures. It appears to be a roadside ditch infiltration basin pond. Again, conservatively ignoring infiltration may exaggerate the flooding potential of this pond. There is no history of complaints of flooding in this area. If flooding becomes a problem, it may only need minor grading to correct its emergency

overflow spillway. Also, upstream watershed review for infiltration/rain garden opportunities may also suffice in correcting the problem.

The remaining yellow ponds appear to be in undeveloped areas and are probably natural depressions that fill and overflow.

For the few upstream areas that are not developed, careful retention, infiltration and outfall design review using the SSA model is the best way to accommodate continued development.

Figures 18 & 19 – MMISS Watershed

This watershed is only partially developed. The existing development is on the downstream end. The ponding areas within the developed part of the watershed are working well. As recommended earlier, infiltration and rain gardens should be incorporated into the upstream development where possible. The recommended ordinance changes should help ensure that this occurs.

Figures 20 & 21 – TROTT Watershed

This watershed is unique in that the majority of the area is currently designed as low impact development. The general nature of the Trott Brook watershed is that it is a linear wetland. The majority of the ponds are functioning well. City staff has noted that one area, near 179th Avenue and Azurite Street is a problem area (Figure 9). This area is also highlighted as a potential threat to structures in Figure 21. Regrading the roadside ditches or constructing a new outfall to relieve this area is recommended to alleviate the problem flooding in this area.

The remaining red highlighted pond and the only yellow highlighted pond in TROTT Watershed are infiltration areas with no historic complaints of flooding in the vicinity. Because our model conservatively assumes no infiltration, any threat of flooding from this pond may be exaggerated. If infiltration is not resolving the problem, the emergency overflow from this area should be regraded to protect the structures in the area.

Figures 22 & 23 – WMISS Watershed

This watershed includes the COR (former Ramsey Town Center) area. However, some ponds are indicated as being a threat. To ensure that this does not become a problem, we recommend using the SSA model to correct these potential problems as future expansion of the COR area occurs. The residential area to the northwest has several ponds that should be reviewed with the same considerations as the Trott and Ditch 43 watersheds.

Pond number P17306, located immediately west of 156th and Nutria, shows as a potential threat to structures and is in an area of property owner complaints. This appears to be a land locked infiltration pond that has very little infiltration capacity. The best solution to this pond is to provide an outfall to the west.

Pond P21210-E, immediately south of 151st Avenue and east of Rhinestone Street, is also shown as flooded. This is also an isolated infiltration with no outlet. The property owners in the vicinity of this pond have filed complaints of nuisance flooding in this area. Solutions for this pond include:

- Expanding the storage and working the pond invert to encourage infiltration
- Regrading to lower the existing emergency overflow channel
- Constructing a new piped outfall to serve the area.

There are two infiltration basins in the mid-eastern part of the watershed (Section 21 near 162nd Avenue and Zirconium Street that have been modeled to be either using the emergency spillway or a potential threat to structures. Although the peak elevation of these ponds may be exaggerated by neglecting infiltration in our model, nuisance flooding has been reported in the vicinity by area residents as shown in Figure 8. To alleviate this problem in Pond P21208, we recommend constructing an outlet culvert outlet under 161st Avenue may adequately address the problem flooding experienced there. The problem in Pond P21210, which is upstream from the residential nuisance flooding area, may be corrected by either expanding the infiltration basin storage or by re-grading the emergency overflow spillway at a lower elevation to alleviate the potential flooding threat.

We recommend that the undeveloped part of the WMISS watershed, lying immediately west of the COR, treated in a similar fashion as the COR. If a separate outfall can be created for this area, it could work in an almost identical fashion. If a separate outfall cannot be obtained, a large regional pond network is recommended. If the ponding alternative is taken, the regional pond network would need to store 100 percent of the runoff at a safe level prior to out letting into the COR system. This would ensure that the COR is not threatened by continued development upstream.

Finally, the Highway 10 corridor is appears to have some pond overflow problems that are only associated with using the ditches as storage. We believe that the best financial and hydrological solution to alleviate these problem areas is to coordinate with MNDOT on any future TH 10 improvements. Any improvements to TH 10 are likely to involve new corridor stormwater management and funding.

General

Figures 28 through 30 are typical SSA output files for a single pipe/pond corridor. These are intended to illustrate the output potential of the model and software. If similar output files were created for every aspect of the entire system, this report would be too cumbersome. The 2008 Plan provided Geographic Information System (GIS) data that allows the City to model virtually any pipe, pond or ditch within Ramsey.

It is extremely important that each area be re-evaluated at the time of final design to confirm the criteria used in this study and to make any changes that a proposed development may dictate. Special consideration must be given to areas that develop differently than shown in the Comprehensive SWMP, especially when a higher runoff coefficient is likely to result from development.

All storm sewer facilities, especially those conveying large quantities of water at high velocities, should be designed with efficient hydraulic characteristics. Special attention should be given during final design to those lines that have extreme slopes and create high hydraulic heads.

The Best Management Practices (BMPs) recommended by the MPCA and adopted by the City shall be followed as development or redevelopment occurs.

C. Recommendations

The following recommendations are presented for the City Council's consideration based upon the data compiled in this report:

1. The SWMP as presented herein will be adopted by the City of Ramsey.

2. The recommended corrections for flood prone areas will be made as described herein and made a part of the storm water management system, where feasible.
3. Standard review procedures will be established, where feasible, to ensure all development within the City is in compliance with proper erosion control practices.
4. Detailed hydrologic analysis will be required, where feasible, during final design of all new developments and ponding areas.
5. Final high water levels governing building elevations adjacent to ponding areas and floodplains will be established as development occurs or when drainage facilities are constructed.
6. Overflow routes will be established and maintained, where feasible, to provide relief during extreme storm conditions, which exceed design conditions.
7. An emergency overflow should be constructed for Lake Itasca to relieve the extreme fluctuation in lake levels of this isolated lake.
8. A storm water maintenance program will be enforced, where feasible, to ensure the successful operation of the drainage system.
9. The erosion and sedimentation control criteria for new developments will be enforced, where feasible.
10. An education program for City residents, staff, and development community will be implemented, where feasible.
11. Amendments to the plan will be adopted and implemented as warranted by future standards or regulations, where feasible.
12. That the plan should be updated in the year 2022 or earlier if needed and feasible.

The existing storm sewer system of the City of Ramsey is not adequate to handle the continued development around the presently developed area. If development continues, the existing system will need major improvement and enlargements to effectively serve the community without excessive flooding. The proposed infiltration and oversized ponding development scenario together with strategically located regional ponds presents one method of accommodating the present growth of Ramsey. However, this report and the proposed scenario is not necessarily the only method of accomplishing the goal of comprehensive storm water management.

Given this, it is imperative that this plan and the SSA model of the City is continually updated on a regular basis and compared to the baseline runoff of the existing conditions model to ensure that any adjustments in area developments continue to be coordinated. In addition, the proposed storm water development charges should be updated annually to ensure that the associated City costs are fully financed. In this manner, the plan can maintain its usefulness as a current document.

Finally, the EPA has initiated the NPDES Phase II requirements whereby cities with populations in excess of 10,000 people are required to apply for a Phase II permit. Some additional cities that are actually under 10,000 in population are also included. The City of Ramsey is a mandatory small MS4 community. One of the requirements of the NPDES permitting process is the existence of a storm water management plan.

As stated earlier, this report is predominantly based on information obtained from available topographic data, field verification of the watershed areas, "ground truthing" of modeled flood prone areas, and discussions with City staff relative to the historical flooding areas. Since the modeled existing system closely matches that described by observation, we feel that this plan has significant benefit as a planning and design tool. However, the quality and accuracy of this report could be further validated with more detailed survey data in the growth areas around the City.

XI. ACRONYMS AND GLOSSARY

A. Acronyms

BMP - Best Management Practices
BWSR - Minnesota Board of Water and Soil Resources
DNR - Minnesota Department of Natural Resources
EOF - Emergency Overflow
EPA - United States Environmental Protection Agency
EPB - Environmental Policy Board
EQB - Minnesota Environmental Quality Board
FEMA - Federal Emergency Management Agency
FIRM - Flood Insurance Rate Map
GIS - Geographic Information System
GPS - Geographic Positioning System
HWL - High Water Level, typically associated with the 100 year rainfall event
IDF - **I**ntensity-Duration-Frequency (for precipitation)
LID - Low Impact Development
LRRWMO - Lower Rum River Watershed Management Organization
LUST - Leaking Underground Storage Tank
MNDOT - Minnesota Department of Transportation
MNRAM - Minnesota Routine Assessment Method
MPCA - Minnesota Pollution Control Agency
MS4 - Municipal Separate Storm Sewer System
MSWMP - Metropolitan Surface Water Management Program
MUSA - Metropolitan Urban Services Area
NOI - Notice of Intent (for coverage under the NPDES Permit Program)
NPDES - National Pollutant Discharge Elimination System
NPDES/SDS - The General Permit Authorization to Discharge Storm Water Associated with Construction Activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program. Administered by the MPCA
NURP - Nationwide Urban Runoff Program
NWL - Normal Water Level or Low Outlet Elevation
SWCD - Soil and Water Conservation District
SWMP - Surface Water Management Plan
SWPPP - Storm Water Pollution Prevention Program
TP - Total Phosphorus
TEP - Technical Evaluation Panel, typically needed for WCA approval of wetland impacts
TSS - Total Suspended Solids
USEPA - United States Environmental Protection Agency
UST - Underground Storage Tank
WCA - The Minnesota Wetland Conservation Act and its subsequent Minnesota Rules 6115 and 8420.
WD - Watershed District
WMO - Watershed Management Organization

B. **Glossary**

100-Year Flood: The flood reaching water levels or flow rates with a one-percent (1%) chance of occurring in any given year. On the average, a 100-year flood is statistically probable to occur only once in a 100-year period. A 100-year flood is synonymous with Base Flood, Regional or 1% Chance Flood.

100-Year Storm Event: The rainfall event having a total precipitation over a 24-hour period with a one-percent (1%) chance of occurring in any given year. On the average, a 100-year storm event is statistically probable to occur only once in a 100-year period. NOAA Atlas 14: Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin (2013). NOAA Atlas 14, Volume 8, Version 2, *Precipitation-Frequency Atlas of the United States, Midwestern States.* NOAA, National Weather Service, Silver Spring, MD.**100-Year, 10-Day Snowmelt Event:** The storm event having a total precipitation over a 10-day period with a one-percent (1%) chance of occurring in any given year. On the average, a 100-year snowmelt event is statistically probable to occur only once in a 100-year period. The value for the Ramsey area is taken from the SCS National Engineering Handbook, which shows the 100-year, 10-day snowmelt event is 7.3 inches over 10 days.

Agricultural Land: Any land designated specifically for agricultural production. This may include row crops, pasture, hay land, orchards, or land used for horticultural purposes.

Anaerobic: Conditions either in water or soil where there is a lack of oxygen.

Army Corps of Engineers (COE or USCOE): The United States Army Corps of Engineers is a regulatory agency involved in design, permitting and construction projects related to or impacting navigable waters of the United States including lakes, waterways and wetlands.

Aquatic Bench: A 10- to 15-foot bench around the inside perimeter of a permanent pool that ranges from zero depth at the shore to 1-foot depth no less than 10-feet from the shore. Normally vegetated with emergent plants, the bench augments pollutant removal, provides habitat, conceals trash and water level drops, and enhances safety.

Best Management Practice (BMP): An action, procedure, or structural improvement designed to improve water quality. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the State. BMPs also include treatment practices such as ponds, rain gardens, vegetated buffers and vegetated swales, treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, or drainage from raw material storage.

Buffer: A vegetated area immediately adjacent to a wetland that is not mowed and/or managed. Buffers are ideally dominated by native vegetation and add to the ecological health of the wetland by adding habitat and assisting and filtering pollutants from surface water runoff.

Buffer Strip: An area of vegetated ground cover abutting a water body that is intended to remove sediment and other pollutants from runoff.

BWSR: Board of Water and Soil Resources. This is the lead regulatory agency that oversees Minnesota Statue 103B.205 to 103B.255, Minnesota Rule 8410 and the Minnesota Wetland Conservation Act.

Circular 39: A wetland classification system developed by United States Fish and Wildlife Service in 1956 that categorizes wetlands into eight types. This is the same classification system generally accepted by the State of Minnesota for wetland classification.

Comprehensive Plan: As defined in Minnesota Statutes 394.21, a Comprehensive Plan defines a City's the policies, statements, goals and interrelated plans for private and public land and water use, transportation and community facilities to assist in guiding future development and growth.

Cowardin Classification: A wetland classification system developed by the United States Fish and Wildlife Service in 1979. This system defines wetlands by a tiered system and is more detailed than the Circular 39 method. The Cowardin System is the classification System used in the National Wetlands Inventory.

Design Storm: A rainfall event of specified size and return frequency that is used to calculate the runoff volume and peak discharge rate to a BMP. In Ramsey, a 10-year design storm is 4.1-inches in 24-hours and a 100-year storm is 5.9-inches in 24-hours. If designing piped storm sewer, a 10-year design storm may also refer to an IDF curve used in the Rational Method of storm sewer design.

Detention: The temporary storage of runoff from rainfall and snowmelt events to control peak discharge rates and provide an opportunity for treatment to occur. Detention storage is typically designed in basins.

Development: The construction, installation or alteration of any structure, the extraction, clearing or other alteration of terrestrial or aquatic vegetation, land or the course, current or cross section of any water body or water course or division of land into two (2) or more parcels. See also re-development, new development and existing development.

Drawdown: The gradual reduction in water level typically due to the combined effect of infiltration and evaporation, but may be the result of human interference.

Draining: The removal of surface water or ground water.

Drop Structure: Placement of logs with a weir notch across a stream channel. Water flowing through the weir creates a plunge pool downstream of the structure and creates fish habitat.

Easement: A grant of one or more property rights by a property owner for use by the public, a corporation, or another person or entity.

Emergency Overflow (EOF): A hydraulic channel, swale, weir, etc. that provides an outlet from a pond or flooded area at an elevation below the point where property damage can occur.

End of Pipe Control: Water quality control technologies suited for the control of existing urban storm water at the point of storm sewer discharge to a receiving water. Due to typical space constraints, these technologies are usually designed to provide water **quality control rather than quantity control.**

Erosion: The wearing away of land surface and soil by the action of natural elements (wind and/or water).

Eutrophication: Process by which overabundance of nutrients in a waterbody lead to accelerated productivity and general decrease in water clarity and quality.

Exfiltration: The downward movement of runoff through the surface and into the subsoil.

Existing Development: A property or parcel of land that has previously been subject to development and no major changes are anticipated to the property in the near future.

Exotic Species or Invasive Species: Non-native plants or wild animals that can naturalize, have high propagation potential, are highly competitive for limiting factors, and cause displacement of, or otherwise threaten, native plants or native animals in their natural communities.

Extended Detention: A storm water design feature that provides for the gradual release of a volume of water (typically 0.25 to 1.0 inches per impervious acre) over a 12 to 48 hour time period. With proper design, the extended detention period allows for an increased settling of pollutants, and can protect channels from frequent flooding or scour.

Extended Detention (ED) Ponds: A conventional ED pond temporarily detains a portion of storm water runoff for a period of 12 to 48 hours after a storm using a fixed orifice. Such extended detention allows urban pollutants to settle out. ED ponds can be designed to be "dry" between storm events and thus do not have any permanent standing water or "wet" with a permanent pool of water. An enhanced ED pond is designed to prevent clogging and resuspension and provides greater flexibility in achieving target detention times. It may be equipped with plunge pools near the inlet, a micropool at the outlet, and utilize an adjustable reverse-sloped pipe at the ED control device. See also "wet pond" definition for diagram.

Extended Detention Wetland: A storm water wetland design alternative in which the total treatment volume is equally split between a shallow marsh and temporary detention of runoff above the marsh. After a storm, the normal pool of the shallow marsh may rise by up to two feet. The extra runoff is stored for up to 24 hours to allow pollutants to settle before being released downstream.

Finished Floor Elevation: The lowest elevation of the first floor or basement in a residential building or other structure that will or may be inhabited by a person or persons.

Filtration Basin: A treatment area designed to treat storm water by a process that physically removes particles from the water.

Flood: A temporary rise in stream flow or stage that results in inundation of the areas adjacent to the channel or water body.

Flood Frequency: The statistically determined average time period between events where a specific flood stage or discharge may be equaled or exceeded.

Flood Fringe: That portion of the 100-year floodplain outside of the floodway.

Flood Obstruction: Any dam, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel rectification, culvert, building, wire, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or regulatory flood hazard area that may impede, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water that may cause the flood level to rise and damage property or threaten life.

Floodplain: Floodplains are lowland areas adjoining lakes, wetlands, and rivers that are susceptible to inundation of water during a flood. For regulatory purposes, the floodplain is the area covered by the 100-year flood and it is usually divided into districts called the floodway and flood fringe. Areas where floodway and flood fringe have not been determined are called approximate study areas or general floodplain.

Floodplain (General) Area: The general floodplain area is determined using the best available data, in lieu of performing a detailed engineering study. These data may be from soils mapping, experienced high water profiles, aerial photographs of previous floods, or other appropriate sources. There are no associated published 100-year flood elevations with general floodplain delineations, unlike detailed study areas. General floodplain area is synonymous with approximate study area and unnumbered A-Zone.

Flood Proofing: A combination of structural provisions, changes or adjustments to properties and structures subject to flooding primarily for the reduction or elimination of flood damages to properties, water and sanitary facilities, structures and contents of buildings in a flood hazard area in accordance with the Minnesota State Building Code.

Floodway: The floodway is the channel of a river or other watercourse and the adjacent land areas which must remain open in order to discharge the 100-year flood.

Forebay: An extra storage area provided near an inlet of a pond or BMP to trap incoming sediments, reducing the amount that accumulates in a pond or BMP.

Freeboard: A factor of safety usually expressed in feet above a certain flood level. Freeboard compensates for the many unknown factors (e.g., waves, ice, debris, etc.) that may increase flood levels beyond the calculated level.

Forbs: Vegetation that does not consist of trees, grass or shrubs. Forbs are typically associated with flowering plants

Geographic Information System (GIS): Computer databases of georeferenced information on the cities various resources.

Global Positioning System (GPS): Network of satellites used to map and identify locations on the earth.

Hydric Soil: Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soil is one of the three criteria that define wetlands

Hydrophytic Vegetation: Macrophytic plant life growing in water, soil, or a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Hypereutropic: A very nutrient-rich lake characterized by frequent and severe nuisance algae blooms and low transparency.

Intensity-Duration-Frequency (IDF) Curve: A graphical representation of the rainfall intensity versus time of concentration for an area. The IDF curve is typically used in the Rational Method of storm sewer design to determine design rainfall intensity in inches per hour. The following IDF curve is taken from the Minnesota Department of Transportation Drainage Manual and applies is used in the rational method of storm sewer design for the Ramsey Area.

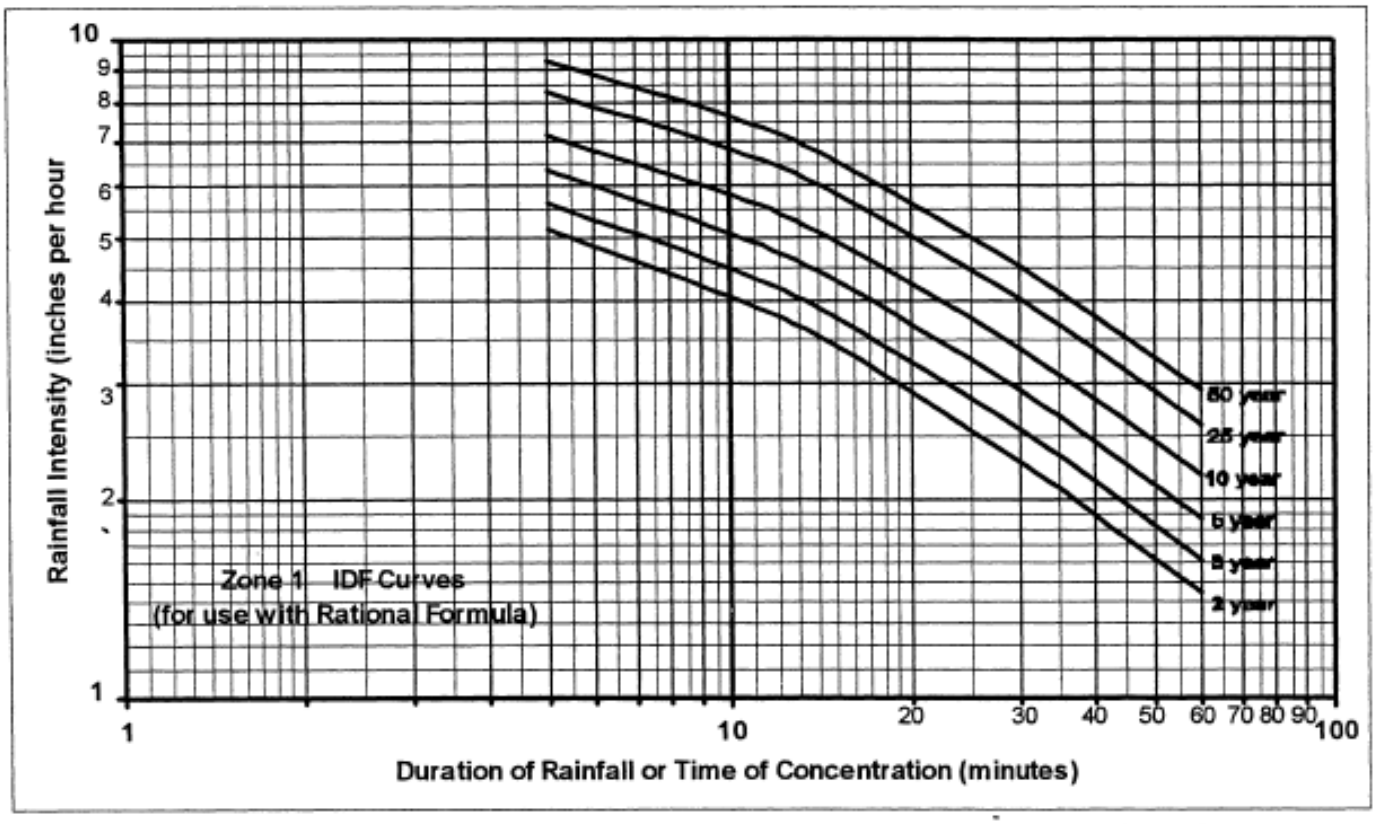


Figure 3.4 Zone 1 Southern Minnesota Rainfall Intensity - Duration - Frequency (IDF) Curves

Impervious Surface: The portion of the buildable parcel which has a covering which does not permit water to percolate into the natural soil. Impervious surface shall include, but not be limited to, buildings, all driveways and parking areas (whether paved or not), sidewalks, patios, swimming pools, tennis and basketball courts, covered decks, porches, and other structures. Open, uncovered decks are not considered impervious for the purposes of this ordinance. The use of patio blocks, paver bricks or class 5 gravel material are considered impervious surfaces as a majority of water runs-off the surface rather than being absorbed into natural soils underneath. Some exceptions to these conditions may include paver blocks or pavement systems engineered to be permeable with the underlying soils suitable for infiltration.

Infiltration Basin: An impoundment where incoming storm water runoff is stored until it gradually infiltrates into and through the soil of the basin floor.

Infiltration Trench: A conventional infiltration trench is a shallow, excavated trench that has been backfilled with stone to create an underground reservoir. Storm water runoff diverted into the trench gradually exfiltrates from the bottom of the trench into the subsoil and eventually into the water table. An enhanced infiltration trench has an extensive pretreatment system to remove sediment and oil. It requires an on-site geotechnical investigation to determine appropriate design and location.

Infrastructure: Public facilities and services, including transportation, storm water pipes, structures and ponds, water and sewer pipes and structures, telecommunications, recycling and solid waste disposal, parks and other public spaces, schools, police and fire protection, and health and welfare services.

Integrated Management Practice (IMP): A range of small-scale storm water controls or practices distributed throughout a site and intended to maintain flow patterns, filter pollutants and/or re-create or maintain existing site hydrology.

Invasive Species or Exotic Species: Non-native plants or wild animals that can naturalize, have high propagation potential, are highly competitive for limiting factors, and cause displacement of, or otherwise threaten, native plants or native animals in their natural communities.

Landlocked High Water Level or Landlocked HWL: The peak water level or high water level in a land locked basin. The HWL is the highest peak ponding elevation generated by the back-to-back 100-year SCS 24-hour rainfall events, the 10-inch SCS 24-hour rainfall event or the 100-year, 10-day snowmelt snow melt event.

Local Government Unit (LGU): Agency that has the primary responsibility of administering the Wetland Conservation Act. The City of Ramsey acts as LGU for all wetlands within the City limits and shares responsibility for basins that border adjacent municipalities.

Lowest Floor: The lowest floor of a structure, including basement.

Low Impact Development (LID): An approach to storm water management intended to protect water resources, reduce storm sewer infrastructure costs and provide a more attractive storm water management system. LID practices include infiltration systems, bioretention areas, rain barrels, green roofs, porous pavements and a long list of additional innovative storm water treatment practices.

Mesotrophic: Describes a lake of moderate photosynthetic productivity.

MNRAM: The Minnesota Routine Assessment Methodology as referenced by Minnesota Rules 8420. MNRAM is the primary tool used to assess wetland functions and values on a qualitative basis. MNRAM evaluates wetlands based on vegetation, wildlife habitat, water quality, flood and storm water attenuation, recreational opportunities, aesthetics, fishery habitat, groundwater interactions, and commercial use. The result of a MNRAM evaluation is a ranking of the wetland quality that can be used to monitor the wetland

changes over time and to set appropriate protection needs and techniques. The version referenced in this plan is Version 3.0.

Monotypic: Used to describe vegetation communities in which only one dominant species is present. Most often used to describe areas that are entirely dominated by reed canary grass or cattails.

Navigable Waters: Waters defined by the United States, 33 Code of Federal Regulations Section 329.4 as those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The U.S. Army Corps of Engineers has Federal Jurisdiction over Navigable Waters.

New Development: Development of a property or portion thereof that is currently undeveloped property.

NURP: Nationwide Urban Runoff Program, a study by the U.S. Environmental Protection Agency. A key component of this program was to assess the effectiveness of urban runoff detention/retention basins (e.g., ponds) in removing pollutants from storm water runoff.

Off-Line BMP: A water quality facility designed to treat a portion of storm water (usually 0.5 to 1.0 inches per impervious acre) which has been diverted from a stream or storm drain.

Off-Line Treatment: A BMP system that is located outside of the stream channel or drainage path. A flow diverter is used to divert runoff from the channel and into the BMP for subsequent treatment.

Ordinary High Water Level (OHWL or OHW): The Minnesota DNR jurisdictional boundary of public waters and wetlands that is depicted by an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs and flowage, the ordinary high water level is the operating elevation of the normal summer pool. In Ramsey all of the lakes have an OHW established. For streams and waterways, the OHW is considered the top of bank. Areas below the OHW are under the jurisdiction of the Minnesota Department of Natural Resources and are not regulated by the Wetland Conservation Act.

Permanent Pool: A 3- to 10-foot deep pool in a storm water pond system that provides removal of urban pollutants through settling and biological uptake (also referred to as a wet pond).

Porous Pavement: An alternative to conventional pavement whereby runoff is diverted through a porous asphalt or concrete layer and into an underground stone reservoir. The stored runoff then gradually infiltrates into the subsoil.

Protected Water: Any water or wetland designated by the Minnesota Department of Natural Resources and identified by statute on the Protected Waters Inventory.

Public Waters: Those waters of the state identified as public waters or wetlands under Minnesota Statutes, Section 103G.005.

Rational Method: A method of estimating the peak runoff from a watershed that is based on the formula Q = CIA. Where:

Q = peak flow rate in cubic feet per second
C = a runoff coefficient based on the percentage of impervious surface, type of vegetative cover, and soil type
I = rainfall intensity in inches per hour as determined from an area IDF curve
A = watershed area in acres

Reach: A hydraulic engineering term to describe a longitudinal segment of a stream or river influenced by the natural or man-made obstruction. In an urban area, the segment of a stream or river between two consecutive bridge crossings or between two reservoirs would most typically constitute a reach.

Redevelopment: Any development including but not limited to rebuilding, renovation, revision, remodeling, reconstruction or redesign of or at an existing development.

Regional Flood: A flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristics of what can be expected to occur on an average frequency in the magnitude of the 100-year recurrence interval. A regional flood is synonymous with the term "base flood" used in the Flood Insurance Study.

Regulatory Flood Protection Elevation: A point not less than one-foot above the water surface profile associated with the 100-year flood as determined by the use of the 100-year flood profile and surrounding technical data in the Flood Insurance Study plus any increase in flood heights attributable to encroachments on the floodplain. It is the minimum elevation the DNR requires Cities to regulate by ordinance.

Retention: The permanent storage of runoff from rainfall and snowmelt events with volume reduction coming from infiltration, evaporation or emergency release.

Riprap: A combination of large stone, cobbles and boulders used as an erosion control BMP. Riprap is typically used to line channels, stabilize banks, reduce runoff velocities, or filter out sediment.

Runoff (Storm Water): The overland and near surface flow from rainfall and snowmelt.

Runoff Coefficient: A measure of the rate of runoff that is statistically generated from a parcel of land that is based on the land use, percent of impervious surfacing, soil type and vegetative cover. The higher the coefficient, the higher the amount of runoff anticipated from the parcel. Rational method runoff coefficients range from 0.2 for meadow lands to 0.95 for paved surfaces.

Runoff Conveyance: Methods for safely conveying runoff to a BMP to minimize disruption of the stream network, and promote infiltration or filtering of the runoff.

Runoff Pretreatment: Techniques to capture or trap coarse sediments before they enter a BMP to preserve storage volumes or prevent clogging within the BMP. Examples include forebays and micropools for pond BMPs, and plunge pools, grass filter strips and filter fabric for infiltration BMPs.

Sand Filter: A technique for treating storm water, whereby the first flush of runoff is diverted into a self-contained bed of sand. The runoff is then strained through the sand, collected in underground pipes and returned back to the stream or channel.

Sediment Forebay: A storm water design feature that employs the use of a small settling basin to settle out incoming sediments before they are delivered to a storm water BMP. Often used full in tandem with infiltration devices, wet ponds or marshes.

Sequencing: The process used by the Local Government Unit to evaluate the necessity of an activity relative to its impact on a wetland. The party proposing the impact must demonstrate that the activity proposed complies with the following principles in descending order of priority.

1. Avoids direct or indirect impacts to the wetlands that may diminish or destroy them;
2. Minimizes the impact to the wetland by limiting the degree or magnitude of the wetland activity and its implementation;
3. Rectifies the impacts by repairing, rehabilitating, or restoring the affected wetland;
4. Reduces or eliminates the impact to the wetland over time by preservation and maintenance operations; and,
5. Replaces unavoidable wetland impacts to the wetland by restoring or, if wetland restoration opportunities are not reasonably available, creating substitute wetland areas having equal or greater public value as provided for under the Wetland Conservation Act.

Shoreland: Land located within the following distances from public waters:

1. One thousand feet from the ordinary high water level of a lake, pond, or flowage
2. Three hundred feet from a river or stream, or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater.

The limits of shoreland may be reduced whenever the waters involved are bounded by topographic divides which extend landward from the waters for lesser distances and when approved by the Commissioner of the DNR.

Short Circuiting: The passage of runoff through a BMP in less than the theoretical or design treatment time. For example, a properly designed treatment pond will have the inlet and outlet pipes located as far apart (along the water flow path) as possible. A short circuiting pond would have the inlet very close to the outlet and the water coming into the pond would leave the pond much sooner than if it were able to travel through the entire pond.

Storm Water Treatment: The use of accepted BMPs to treat runoff including **d**etention, retention, filtering or infiltration of a given volume of storm water to remove pollutants.

Stream Buffer: A variable width strip of vegetated land adjacent to a stream that is preserved from a disturbance and/or mowing to protect water quality and aquatic and terrestrial habitats. See also buffer strip.

Structure: Anything manufactured, built, constructed, erected, or a portion thereof which is normally attached to or positioned on land, whether temporary or permanent in character, including but not limited to buildings, fences, sheds, advertising signs, dog kennels, hard surface parking areas, boardwalks, playground equipment, concrete slabs.

Shoreland Wetland Protection Zone: The land located within 1,000 feet from the Ordinary High Water Elevation of a Protected Water, 500 feet from the Mississippi or Rum Rivers or the landward extent of the designated floodplain, and 300 feet from any stream designated in the shoreline management ordinance.

Storm Water: (See Runoff)

Storm Water Treatment Pond: Any waterbody that has been specifically created to remove sediment and nutrients and "treat" surface water runoff. Storm water ponds that were created from existing wetland are still regulated as jurisdictional wetlands. Storm water ponds created from upland areas are not wetland and are exempt from regulatory jurisdiction.

Subwatershed: A subdivision based on hydrology corresponding to a smaller drainage area within a larger watershed.

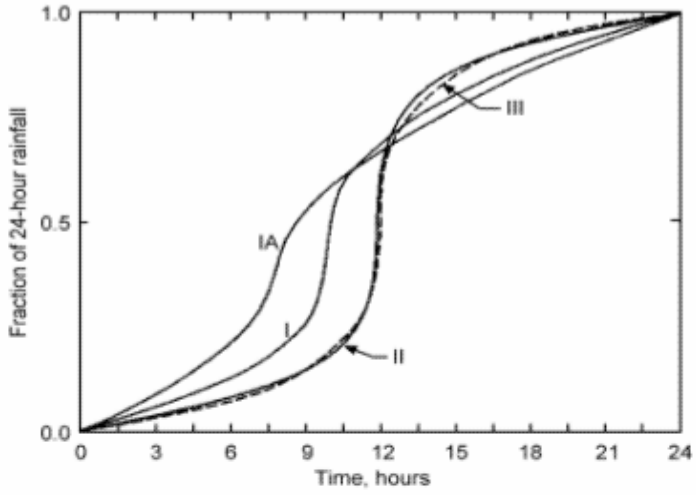
Technical Evaluation Panel (TEP): A panel of technical professionals from the Board of Water and Soil resources, the Anoka County SWCD, the LRRWMO and the LGU (City of Ramsey) at a minimum. This panel may also be expanded to include a Minnesota Department of Natural Resources representative, the U.S. Army Corps of Engineers and interested citizens requesting to participate in the wetland decision making process. Invitations to a TEP meeting are typically sent to all parties listed. The DNR, COE and interested citizens (if any) may elect not to attend. The TEP provides decision making support for the LGU for many wetland and regulatory issues.

Ten-Day Snow Melt Runoff with Type "C" Distribution (100-Year/10-day snow melt runoff): A modeled runoff event that represents snowmelt conditions over a 10-day period for a return period snow depth of 100 years. The runoff event is simulated for a curve number (CN) of 100 which represents frozen soil conditions or where all surfaces are considered impervious. For some Ramsey the ten-day runoff event is critical event for identifying the high water level of the basin or water body because the Anoka Sand Plain typically reduces runoff under unfrozen conditions. The Type C distribution is similar in concept to the Type I and II distributions, and for this event, establishes the time distribution of runoff volume over the ten-day period.

Treatment Volume (Vt): The volume of storm water runoff that is treated within a BMP or IMP storm water treatment facility. Typically the volume is expressed in terms of inches of runoff per impervious acre.

Type I, IA, II and III Storm Distributions - NRCS: These storm types represent the time distribution of a 24-hour rainfall event for areas throughout the United States. The total storm depth is distributed according to the diagram in subpart A. Type II storms are more "flashy" (i.e., convective/thunderstorms) than a Type I or IA storm. Subpart B illustrates that all of Minnesota is within the Type II rainfall distribution area.

A. SCS 24-hour rainfall distributions (SCS, 1986):



B. Approximate geographic boundaries for SCS rainfall distributions (SCS, 1986):



Underdrain: Typically perforated plastic pipes installed on the bottom of a filtration of infiltration BMP, or sand filter. The under drain is used to collect and remove treated storm water that exceeds the water holding and/or infiltration capacity of the soil.

Upland: General term to describe any area that is not a wetland.

Vegetated Filter Strip: A vegetated section of land designed to accept runoff as overland sheet flow from upstream development. It may adopt any natural vegetated form, from grassy meadow to small forest. The dense vegetative cover facilitates pollutant removal. Vegetated filter strips cannot treat high velocity flows; therefore, they have generally been recommended for use in agriculture and low-density development. A filter strip can also be an enhanced natural buffer, whereby the removal capability of the natural buffer is improved through engineering and maintenance activities such as land grading or the installation of a level spreader. A filter strip differs from a grassed

swale in that a swale is a concave vegetated conveyance system, whereas a filter strip has a fairly level surface.

Watershed: A topographically defined area within which all runoff water drains to a point.

Water Quality Volume: A design volume of water as defined by the MPCA that is required to be treated from a new development site. The MPCA defines the water quality volume as 0.5-inches of runoff from all new impervious surfaces associated with the development in the watershed.

Watershed-to-Lake Ratio: The relative surface area of the contributing watershed to the surface area of the lake or water body. In terms of water quality, generally the smaller the watershed-to-lake ratio, the better the quality of the lake. For example a lake with a ratio of 4 to 1 means that the watershed is four times the size of the lake (i.e., 200 acres contributing to a 50 acre lake).

Wetland: Transitional land between terrestrial and aquatic systems where the water table is at or near the surface or the land is covered by shallow water. The jurisdictionally accepted definition of a wetland includes the following three characteristics:

1. Have a predominance of hydric soil
2. Be inundated or saturated within 1-foot of the surface for at least 5 percent of the growing season. The inundation refers to a single continuous episode.
3. Support a prevalence of hydrophytic vegetation typically adapted for life in saturated soils.

Wetland Conservation Act (WCA): In 1991 Minnesota adopted the initial Wetland Conservation Act (Minnesota Laws Chapter 354) to protect the states wetland resources. This act has been amended and updated periodically, typically under Minnesota Rule 8420, and is used by reference to the current program, as well as any future amendments.

Wetland Delineation: The process and procedure by which an area is determined a wetland or non-wetland including a determination of the wetland boundary based on the point where the non-wetland areas shift to wetlands or aquatic habitats.

Wetland Mitigation: Wetlands created to replace wetland areas destroyed or impacted by land disturbances.

Wet Pond: A conventional wet pond has a permanent pool of water for treating incoming storm water runoff and a live storage component for flood storage and additional water quality treatment detention.

Tables

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P23202	880.0	L23240	873.2	CIRCULAR	18	881.9	11
P23218	882.0		0.0		0	876.8	1
P23310	874.0	L23308	870.0	CIRCULAR	15	871.8	9
P23320	866.5	OC23318	863.5	RECT_OPEN		863.9	55
P23400	866.0	L23320	864.0	CIRCULAR	24	866.4	16
P23402	872.5	L23400	864.5	CIRCULAR	42	868.0	49
P23404	874.0	L23402	866.0	CIRCULAR	24	869.3	13
P23406	874.0	L23404	868.0	CIRCULAR	18	869.8	8
P24212	861.0	L24TH47-1	858.9	ARCH	18.25	860.8	8
P24310	880.0	L24308	872.0	CIRCULAR	15	879.1	8
P24322	861.0	L24213	858.5	CIRCULAR	12	862.1	6
P24324	865.0	L24321	860.0	CIRCULAR	12	863.5	5
P24324A	867.0	ZC24324A	865.5	RECT_OPEN		866.3	5
P24324B	866.0	ZC24324B	865.5	RECT_OPEN		866.2	4
P24326	864.0	L24324	862.0	CIRCULAR	15	866.3	12
P24330	864.0	OC24213	863.5	RECT_OPEN		863.8	18
P24350	870.0	L24348	864.0	CIRCULAR	12	868.8	8
P24354	866.0	OC24327	865.0	RECT_OPEN		866.3	51
P24355	868.0		0.0		0	866.3	25
P24366	863.0	L24TH47	860.1	CIRCULAR	15	861.3	38
P24368	864.0	L24366	860.2	CIRCULAR	18	862.1	10
P24374	864.0	L24TH47-4	858.2	ARCH	18.25	863.7	30
P24389	867.4		0.0		0	861.0	0
P24391	860.5		0.0		0	862.1	4
P24392	868.0	L24387	864.0	CIRCULAR	12	866.2	5
P25204	858.0	L25202	854.0	CIRCULAR	24	855.6	12
P25216	850.0	L25214	847.8	CIRCULAR	48	850.8	107
P25304	856.0	L25302	852.0	CIRCULAR	15	856.9	18
P25315	862.3	L26215	859.4	CIRCULAR	12	861.8	17
P25317	867.0	L25319	861.9	CIRCULAR	12	866.2	6
P25319	872.5	L25321	866.0	CIRCULAR	15	866.9	3
P25321	879.5	L25329	875.6	CIRCULAR	15	877.8	3
P25328	858.0	C25326	852.8	RECT_OPEN		857.4	27
P25400	868.0	L25400	866.0	CIRCULAR	15	869.4	5
P25402	876.0	L25402	870.0	CIRCULAR	18	877.3	15
P25424	866.0	L25420	862.0	CIRCULAR	12	866.2	6
P25426	863.0	L25425	863.0	CIRCULAR	15	859.2	6
P25442	880.0	L25439	878.0	CIRCULAR	12	880.1	5
P25454	868.0	D43-P559	866.0	CIRCULAR	12	868.5	19
P25456	868.0	L25447	863.0	CIRCULAR	12	866.9	5
P25458	860.0	C25456	860.0	RECT_OPEN		860.0	33
P25484	872.0	L25482	870.0	CIRCULAR	12	872.0	5

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P25488	880.2	L25488	873.0	CIRCULAR	18	881.9	2
P25490	880.0		0.0		0	881.9	0
P25492	879.3		0.0		0	885.4	0
P26112	870.0	L26110	866.0	CIRCULAR	12	869.3	5
P26118	866.0	L26117	860.0	CIRCULAR	24	862.7	16
P26136	874.0	L26135	871.0	CIRCULAR	15	871.6	6
P26144	868.0	L26442	863.0	CIRCULAR	15	864.3	3
P26158	864.0	L26154	860.0	CIRCULAR	18	862.9	8
P26168	864.0		0.0		0	863.4	0
P26176	866.0	L25418	862.4	CIRCULAR	15	867.9	7
P26190	872.0	L26187	868.0	CIRCULAR	12	870.4	4
P26200	860.0	C25329	856.0	RECT_OPEN		857.5	24
P26204	862.0	L26200	858.2	CIRCULAR	15	861.6	9
P26206	864.0	L26209	858.4	CIRCULAR	30	863.8	30
P26226	866.0	L26415	865.2	CIRCULAR	15	864.1	0
P26302	862.0		0.0		0	856.0	23
P26304	874.0	L26323	868.0	CIRCULAR	18	874.2	10
P26306	876.0	L26326	871.0	CIRCULAR	15	873.5	5
P26308	872.0	C26313	871.5	RECT_OPEN		876.5	8
P26310	874.0		0.0		0	876.5	6
P26312	860.0	L28313	852.5	CIRCULAR	18	855.4	4
P26400	865.0		0.0		0	860.9	0
P26402							
864	864.0		0.0	0	0	864.1	0
P26420	865.0	L26418	861.0	CIRCULAR	15	863.5	7
P26424	866.0	L26423	860.0	CIRCULAR	24	861.5	11
P26428	865.0		0.0		0	864.1	7
P26458	872.0	L26456	868.9	CIRCULAR	15	869.9	5
P28313	858.0	L28315	850.0	CIRCULAR	18	854.3	4
P36400	855.0	L25236	850.8	CIRCULAR	36	853.3	34

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P09308	878.0	C16406	875.0	RECT_OPEN		875.3	12
P11338	874.0	ZC14436	872.0	RECT_OPEN		872.8	39
P11340	878.0	ZC11338	874.0	RECT_OPEN		874.4	29
P13314	872.0	ZC13312	871.0	RECT_OPEN		871.2	23
P13408	864.0	L13406	850.8	CIRCULAR	36	862.6	139
P14104	866.0	L14102	861.5	CIRCULAR	12	867.6	8
P14118	866.0	L14116	862.0	CIRCULAR	18	863.9	11
P14122	866.0	L14120	858.0	CIRCULAR	12	868.4	11
P14124	878.0	L14132	870.0	RECT_CLOSE	48	870.3	8
P14126	870.0	L14127	866.0	CIRCULAR	12	868.0	3
P14140	874.0	L14137	868.9	CIRCULAR	12	872.5	5
P14148	872.0	ZC14455	871.0	RECT_OPEN		870.3	0
P14156	874.0	ZC14156	865.5	RECT_OPEN		867.6	20
P14166	874.0		0.0			873.2	0
P14202	888.0	C23157	868.0	RECT_OPEN		869.3	98
P14218	864.0	ZC14215	861.0	RECT_OPEN		863.3	56
P14220	870.0	L14218	853.6	CIRCULAR	48	864.4	107
P14228	866.5	ZC14223	864.5	RECT_OPEN		865.1	49
P14230	872.0	ZC14228	871.7	RECT_OPEN		870.7	0
P14240	888.0	L14238	882.0	CIRCULAR	21	884.3	7
P14246	888.0	L14237	884.0	CIRCULAR	12	884.8	6
P14260	865.0	L14258	861.0	CIRCULAR	12	865.3	12
P14268	868.0	L14263	865.0	CIRCULAR	12	867.7	5
P14270	881.0	Link-12	878.0	CIRCULAR	15	879.5	5
P14334	870.0		0.0		0	869.3	0
P14432	870.0	L14430	861.4	CIRCULAR	36	867.0	112
P14436	874.0	L14434	870.0	CIRCULAR	15	872.3	10
P14438	874.0	L14438	871.0	CIRCULAR	15	873.1	14
P14440	872.0	ZC14422	871.0	RECT_OPEN		871.1	1
P14442	872.0	ZC14423	871.0	RECT_OPEN		871.5	21
P14446	872.0	ZC14456	870.5	RECT_OPEN		872.3	10
P14449	875.0	L14440	871.9	CIRCULAR	18	873.1	10
P14450	870.0	ZC14453	869.0	RECT_OPEN		869.2	6
P15102	876.0	C15334	875.2	RECT_OPEN		875.6	35
P15236	878.0	L15234	863.6	CIRCULAR	36	867.3	32
P15240	871.5	L15238	865.0	CIRCULAR	36	868.4	30
P15244	872.0	C15243	870.0	RECT_OPEN		870.5	88
P15246	872.0	C22145	872.0	RECT_OPEN		872.0	1
P15248	878.0	C15250	877.0	RECT_OPEN		873.5	0
P15250	874.0	C15246	873.2	RECT_OPEN		873.3	1
P15252	877.0	C15248	877.0	RECT_OPEN		875.8	0
P15350	874.0	L15348	867.5	CIRCULAR	36	871.0	80

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P15352	872.0	L15347	867.7	CIRCULAR	18	871.7	17
P15402	876.0		0.0		0	873.6	0
P16104	872.0	L16102	868.0	CIRCULAR	12	873.1	6
P16114	878.0	L16138	868.1	CIRCULAR	12	878.3	7
P16128	872.0	C16201	871.0	RECT_OPEN		870.5	0
P16140	873.0	L16254a	869.0	CIRCULAR	18	872.0	24
P16252	872.0	C15350	870.5	IRREGULAR		871.1	176
P16402	874.0	C16200	871.0	RECT_OPEN		872.0	44
P16404	874.0	L16402	872.0	CIRCULAR	15	873.3	5
P16406	874.0	L16404	871.0	CIRCULAR	15	873.5	9
P19E304	848.0	L19302	845.0	CIRCULAR	21	854.5	14
P22110	886.0	L22208	885.0	CIRCULAR	15	886.7	5
P22150	876.0	ZC23447	875.8	RECT_OPEN		875.9	4
P22208	886.0	L22206	881.4	CIRCULAR	15	884.6	6
P22216	874.0		0.0		0	873.1	0
P22220	876.0	L22218	872.0	CIRCULAR	15	876.5	8
P22402	872.0		0.0		0	871.1	7
P22404	872.0	L22402	868.5	CIRCULAR	15	871.0	12
P22406	874.0	L22404	868.4	CIRCULAR	15	871.0	4
P22408	872.0	ZC22408	867.7	TRAPEZOIDA		871.3	16
P22410	874.0	L22408	871.0	CIRCULAR	18	874.5	37
P22454	872.0	ZC22408A	866.5	TRAPEZOIDA		871.3	43
P23102	870.0	L23101	865.8	CIRCULAR	12	877.2	18
P23118	870.0	L24412	866.0	CIRCULAR	15	869.4	11
P23158	868.0	P23158	864.0	CIRCULAR	18	865.7	1
P23160	868.0	L23159	862.5	CIRCULAR	15	866.2	5
P23186	867.2	L23185	864.3	CIRCULAR	15	866.2	10
P23302	872.0		0.0		0	867.8	4
P23312	869.0		0.0		0	867.3	0
P23416	872.0	L23408	866.2	CIRCULAR	18	871.1	12
P23438	868.0	C23158	866.0	RECT_OPEN		867.1	37
P23444	872.0	C15241	868.9	RECT_OPEN		869.2	5
P23446	872.0	L23444	871.0	CIRCULAR	18	872.4	39
P24114	870.0	L24112	858.7	CIRCULAR	21	867.4	11
P24118	868.3	L24116	864.2	CIRCULAR	15	868.5	8
P24126	880.0	L24124	878.0	CIRCULAR	21	879.0	13
P24148	874.0	L24146	864.5	CIRCULAR	15	871.9	20
P24222	890.0	L24150	883.1	CIRCULAR	15	887.2	7
P24230	888.0	L24228	884.0	CIRCULAR	12	887.8	8
P24244	890.0	L24242	886.0	CIRCULAR	15	889.4	5
P24402	868.0	L24451	861.0	CIRCULAR	15	865.7	4
P24406	868.0	L24404	862.3	CIRCULAR	15	866.1	6

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P24426	868.0	L24425	864.2	CIRCULAR	15	866.3	7
P24440	868.0	L24138	857.4	CIRCULAR	15	865.9	6
P24450	866.0	L24448	862.0	CIRCULAR	18	865.4	12
P24452	872.0	L24449	870.0	CIRCULAR	18	872.2	14
P24454	872.0	C24450	871.2	RECT_OPEN		871.3	4

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P22302	870.0	L27116	864.5	CIRCULAR	12	866.4	2
P22304	870.0	L22302	866.0	CIRCULAR	15	866.7	4
P22306	888.0	C22304	887.6	RECT_OPEN		886.5	0
P27102	868.0	L27119	864.5	CIRCULAR	18	862.5	0
P27104	870.0	C27104	870.5	RECT_OPEN		869.5	0
P27106	872.0	C27108	871.2	RECT_OPEN		868.6	0
P27108	872.0		0.0			864.9	0
P27110	872.0	C27109	870.4	RECT_OPEN		867.0	0
P27112	872.0	C27107	870.0	RECT_OPEN		869.2	0
P27114	872.0	C27106	870.6	RECT_OPEN		869.8	0
P27116	870.0	C27411	870.3	RECT_OPEN		866.4	2
P27118	866.0		0.0		0	862.5	0
P27202	866.0	L27232	857.6	CIRCULAR	36	865.5	43
P27234	866.0	L27229	861.6	CIRCULAR	15	863.7	38
P27268	868.0	C27269	864.5	RECT_OPEN		864.8	7
P27270	866.0		0.0		0	862.6	0
P27276	880.0	C27270				873.8	0
P27302	867.0	L27344	858.2	CIRCULAR	15	866.0	12
P27316	866.0	L27301	865.0	CIRCULAR	24	865.5	2
P27330	866.0	L27328	858.0	CIRCULAR	18	865.4	8
P27338	862.0	C34176	862.0	RECT_OPEN		862.3	8
P27346	865.0	L27404	862.0	CIRCULAR	18	863.9	10
P27402	868.0	L27118	862.5	CIRCULAR	24	861.8	0
P27404	868.0	C27402	868.2	RECT_OPEN		867.4	0
P27406	868.0	C27403	868.2	RECT_OPEN		868.4	3
P27408	870.0		0.0		0	865.4	0
P27416	872.0	L27414	868.0	CIRCULAR	15	871.0	7
P27434	880.0	L27432	876.0	CIRCULAR	12	878.0	5
P27446	870.0	L27401	863.8	CIRCULAR	12	869.1	6
P27456	872.0		0.0		0	870.6	0
P34106	859.0	L34104	857.4	CIRCULAR	24	859.0	22
P34137	864.0	L34137	854.0	CIRCULAR	15	859.1	10
P34148	860.0	L34149	853.8	CIRCULAR	24	857.9	11
P34150	862.0	L34152	854.5	CIRCULAR	30	861.2	29
P34164	866.0		0.0		0	864.7	0
P34166	868.0		0.0		0	868.1	0
P34168	860.0		0.0		0	861.9	0
P34170	862.0	L34139	858.5	CIRCULAR	15	862.2	14
P34172	868.0		0.0		0	869.0	0
P34174	863.5	L27274	860.8	CIRCULAR	15	863.4	14
P34402	861.0	L34405	855.7	ARCH	36	860.7	8
P34408	860.0	C34106	858.5	RECT_OPEN		859.0	13

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P34410	862.0	C34408	862.0	RECT_OPEN		862.1	15
P34412	864.0	C34410	864.0	RECT_OPEN		864.1	8
P34414	862.0		0.0			860.5	0
P34416	862.0	C34414	862.0	RECT_OPEN		860.6	0
P35402	856.0	L35317	848.5	CIRCULAR	18	852.5	11
P35407	860.0	L35407	851.0	CIRCULAR	36	858.2	10
P35420	862.0	L35420	858.0	CIRCULAR	42	860.2	39
P35422	862.0	P35418	856.2	CIRCULAR	42	860.3	9
P35424	860.0		0.0		0	861.3	59
P35438	862.0	L35436	858.0	CIRCULAR	12	861.9	6
P35446	866.0		0.0		0	866.7	3
P35464	868.0	L35462	861.5	CIRCULAR	12	866.7	6
P35474	868.0	L35432	866.8	CIRCULAR	15	867.1	28
P35476	882.0		0.0		0	881.4	0
P35478	866.0		0.0		0	864.4	0
P35480	866.0		0.0		0	865.9	0

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P10242	884.0	C11340	883.0	RECT_OPEN		883.0	1
P10244	884.0	C10242	883.5	RECT_OPEN		883.6	0
P10246	878.0		0.0			875.1	0
P10248	878.0	C10246	876.3	RECT_OPEN		876.3	1
P10254	884.0	C10243	886.9	RECT_OPEN		882.4	0
P11104	884.0		0.0			885.7	0
P11106	882.0	C11105	880.6	RECT_OPEN		880.8	14
P11108	888.0	C11106	886.3	RECT_OPEN		878.4	0
P11110	884.0	C11107	882.9	RECT_OPEN		876.0	0
P11112	880.0	C11210	880.7	PARABOLIC		881.1	16
P11114	878.0	C11113	878.0	RECT_OPEN		878.1	10
P11116	882.0	L11118	877.7	CIRCULAR	18	879.4	2
P11118	878.0	L11120	873.0	CIRCULAR	18	874.1	9
P11202	874.0	L11211	868.0	CIRCULAR	12	870.6	3
P11206	876.0	L11204	871.5	CIRCULAR	24	872.9	11
P11208	878.0	C11205	875.9	PARABOLIC		873.9	0
P11210	878.0	C11208	877.4	PARABOLIC		877.6	1
P11212	878.0	C11215	875.5	TRAPEZOIDA		876.8	11
P11213	872.5	C11202	870.0	TRAPEZOIDA		870.7	8
P11306	886.0	C11104	885.1	RECT_OPEN		885.7	24
P11308	880.0	C11406	878.8	RECT_OPEN		875.6	0
P11310	881.0	C11308	880.1	RECT_OPEN		880.3	7
P11312	881.0	C11310	880.5	RECT_OPEN		880.7	12
P11314	881.0		0.0			880.7	1
P11316	876.0	C11407	872.1	CIRCULAR	18	872.9	8
P11318	878.0	C11316	877.5	RECT_OPEN		877.6	5
P11320	878.0	C11206	876.1	RECT_OPEN		876.5	40
P11338	874.0	C14436	872.0	RECT_OPEN		872.5	43
P11340	878.0	L11338	874.0	CIRCULAR	18	875.0	13
P11402	874.0		0.0		0	872.8	0
P11404	874.0	C11402	872.7	RECT_OPEN		873.0	44
P11406	878.0	C11404	877.5	RECT_OPEN		873.0	0
P11408	874.0	C11403	872.4	RECT_OPEN		873.5	73
P11410	882.0	C11408	880.5	RECT_OPEN		880.6	45
P12302	860.0	C12300	856.0	RECT_OPEN		856.7	45
P12304	862.0	C12302	860.0	RECT_OPEN		860.6	28
P12306	878.0	C12301	877.1	PARABOLIC		877.1	1
P12312	876.0	C12303	874.0	RECT_OPEN		874.2	30
P12313	860.0	L12306	857.8	CIRCULAR	15	858.1	9
P12314	858.0	C12307	856.0	TRAPEZOIDA		856.8	2
P13402	880.0		0.0			879.0	0
P13404	879.0	C13410	878.6	RECT_OPEN		878.4	0

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P13408	865.0	L13406	863.4	CIRCULAR	12	864.1	7
P13410	868.0	C13408	866.8	RECT_OPEN		866.9	2
P14106	876.0	L14104	874.5	CIRCULAR	12	876.7	6
P14108	881.0	C14106	880.2	RECT_OPEN		880.3	16
P14401	877.5	L14435	871.5	CIRCULAR	15.72	876.8	9
P14402	896.0		0.0		0	894.1	0
P14436	874.0	L14434	870.0	CIRCULAR	15	872.5	7
P15150	888.0	C10248	887.3	RECT_OPEN		884.3	0
P15152	888.0	C15150	888.7	RECT_OPEN		882.1	0

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P34304	848.0	P34304	842.0	CIRCULAR	24	848.9	36
P34311	854.0	P34311	850.0	CIRCULAR	15	853.5	5
P34316	856.0	P34316	852.0	CIRCULAR	15	855.7	7
P34418	856.0	P34418	850.1	CIRCULAR	24	859.8	29
P34434	856.0	P34434	853.0	CIRCULAR	15	859.3	7
P34451	854.0	P34451	849.1	CIRCULAR	18	853.6	10
P34452	854.0	P34452	849.3	CIRCULAR	18	853.6	5
P34460	858.0	P34460	853.2	CIRCULAR	27	856.3	11

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P01108	864.0	C01200	863.7	RECT_OPEN		863.4	0
P01304	858.0	C01301	856.5	RECT_OPEN		858.2	95
P01306	870.0	C01304	867.3	RECT_OPEN		867.5	19
P01307	864.0	C01303	862.7	RECT_OPEN		862.7	1
P01308	874.0	L01306	870.0	FILLED_CIR	18	871.8	7
P01314	870.0	C01305	869.0	RECT_OPEN		869.2	33
P01410	872.0	C01108	870.5	RECT_OPEN		870.8	40
P02110	890.0	C02208	888.9	RECT_OPEN		889.1	26
P02112	890.0	C02211	889.6	RECT_OPEN		889.9	9
P02114	900.0	C02112	899.5	RECT_OPEN		893.9	0
P02116	902.0	C02114	900.0	RECT_OPEN		900.0	0
P02206	868.0	C02204	858.0	IRREGULAR		861.9	475
P02208	864.0	C02205	863.8	RECT_OPEN		864.1	40
P02212	886.0	C01311	885.1	RECT_OPEN		885.1	2
P02310	872.0	C02209	871.0	RECT_OPEN		871.3	34
P02412	892.0	C02410	888.3	RECT_OPEN		888.6	39
P03212	874.0	C02310	873.5	RECT_OPEN		873.8	36
P03314	886.0	L03312	882.0	CIRCULAR	18	884.8	15
P03316	888.0	C03314	886.9	RECT_OPEN		888.7	38
P03330	886.0	C03315	884.9	RECT_OPEN		885.0	3
P03418	890.0	C03316	889.0	RECT_OPEN		889.5	37
P03432	892.0	L03419	889.0	CIRCULAR	18	889.5	3
P04220	896.0	C03418	892.0	RECT_OPEN		893.3	41
P05338	892.0	L05336	886.0	CIRCULAR	42	888.2	96
P05340	894.0	L05338	890.0	CIRCULAR	42	892.4	93
P05344	906.0	C08135	904.5	RECT_OPEN		906.0	112
P05346	908.0	C05344	905.6	RECT_OPEN		906.7	107
P05444	894.0	C05443	892.0	RECT_OPEN		892.0	1
P06148	900.0	C06146	899.5	RECT_OPEN		900.2	25
P06302	896.0		0.0		0	896.4	0
P06404	891.0	L04402	887.0	CIRCULAR	18	889.7	13
P06410	898.0	L06408	890.0	CIRCULAR	18	892.5	12
P06414	906.0	L06412	902.0	CIRCULAR	18	903.0	13
P06418	904.0	L06416	901.0	CIRCULAR	18	902.0	14
P06424	912.0	L06422	910.0	CIRCULAR	18	910.8	7
P07102	892.0	L07414	889.0	CIRCULAR	15	893.3	18
P07104	892.0	C07102	892.8	RECT_OPEN		893.3	16
P07106	892.0	L07107	889.2	CIRCULAR	24	894.1	20
P07107	892.0	L07102	889.0	CIRCULAR	24	893.6	13
P07112	892.0	L08410	890.0	ARCH	27.6	891.6	17
P07114	890.0	C08411	889.9	RECT_OPEN		890.4	24
P07116	894.0		0.0		0	892.0	0

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P07204	890.0	L07202	885.0	CIRCULAR	18	888.3	13
P07206	902.0	L07204	898.0	CIRCULAR	18	903.9	23
P07210	878.0	C07203	877.0	RECT_OPEN		877.1	4
P07340	880.0	C07338	879.0	IRREGULAR		880.0	8
P07414	892.0	C07112	893.0	RECT_OPEN		893.2	17
P08130	878.0	C08228	873.0	RECT_OPEN		875.5	468
P08134	884.0	C08132	880.0	RECT_OPEN		881.2	335
P08304	888.0	L08302	886.0	CIRCULAR	18	887.5	15
P08330	878.0	L08328	868.0	ARCH	60	871.4	197
P08406	888.0	C08304	887.0	RECT_OPEN		887.5	24
P08408	886.0		0.0			889.4	11
P08410	890.0	C08408	889.8	RECT_OPEN		890.0	29
P08412	890.0	C08409	889.5	RECT_OPEN		889.8	23
P08414	896.0	C08412	895.2	RECT_OPEN		895.5	36
P08416	886.0	L08408	882.2	CIRCULAR	15	887.8	11
P08418	896.0	L08407	891.7	CIRCULAR	18	892.6	14
P08420	900.0	L08418	893.5	CIRCULAR	15	897.7	11
P08430	880.0	C08229	879.0	RECT_OPEN		879.5	26
P08434	903.0	C08133	903.0	RECT_OPEN		901.7	0
P08436	904.0	C08434	904.0	RECT_OPEN		904.2	18
P09118	890.0	C09215	889.0	RECT_OPEN		889.0	3
P09120	902.0	C09118	899.0	RECT_OPEN		899.1	12
P09122	892.0	C09221	890.5	RECT_OPEN		890.6	12
P09124	900.0	C09122	898.2	RECT_OPEN		898.3	9
P09222	874.0	C09220	872.3	RECT_OPEN		872.4	2
P09320	872.0	L09218	864.0	ARCH	60	868.6	225
P09330	876.0	C09323	873.5	RECT_OPEN		873.7	10
P09422	890.0	C04220	899.3	RECT_OPEN		890.7	0
P09424	898.0	C09422	896.6	RECT_OPEN		893.3	0
P09426	896.0	L09324	893.0	CIRCULAR	15	893.6	3
P09428	894.0	L09326	892.0	CIRCULAR	15	893.0	2
P09432	892.0	L09330	886.5	CIRCULAR	15	889.7	7
P09434	890.0	L09123	889.0	CIRCULAR	15	886.8	1
P10114	890.0	L10112	886.0	HORIZ_ELLI	18	887.3	14
P10116	890.0	C10114	888.8	RECT_OPEN		889.0	5
P10118	890.0	C10116	889.1	RECT_OPEN		889.5	17
P10120	890.0	C10118	888.5	RECT_OPEN		889.5	4
P10122	890.0	L10122	888.0	CIRCULAR	15	889.0	5
P10214	890.0	C10413	889.8	RECT_OPEN		890.3	11
P10216	888.0	C10415	887.6	RECT_OPEN		886.0	0
P10412	867.0	L10110	863.0	ARCH	84	866.6	239
P10416	884.0	C10417	883.1	RECT_OPEN		883.3	42

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P10418	888.0	C10419	886.0	RECT_OPEN		886.4	30
P15424	876.0	C09222	875.3	RECT_OPEN		875.0	0
P15426	876.0	C15424	874.6	RECT_OPEN		875.0	12
P16424	892.0	C09325	890.4	RECT_OPEN		889.2	0
P17106	878.0	C17404	876.2	RECT_OPEN		875.6	0
P17108	898.0	C17106	897.2	RECT_OPEN		894.9	0
P17110	892.0	C17107	889.5	RECT_OPEN		889.8	52
P17124	886.0	C09321	885.0	RECT_OPEN		885.1	7
P17126	894.0	C08223	892.5	RECT_OPEN		892.6	12
P17402	880.0	C08329	878.2	RECT_OPEN		874.5	0
P17404	876.0	C17402	875.3	RECT_OPEN		875.4	1
P17407	880.0	L17405	878.0	CIRCULAR	15	874.9	0
P17409	874.0	C07233	873.0	RECT_OPEN		873.2	7
P17410	880.0	C17408	879.3	RECT_OPEN		878.9	0

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
1P	867.0	Link-40	858.5	CIRCULAR	18	869.6	128
2P	870.0	2 Pipe	864.0	CIRCULAR	21	869.7	107
3P	872.0	3 pipe	869.0	CIRCULAR	18	871.4	36
9P	869.0	9 outlet	867.2	CIRCULAR	15	869.0	3
P16300	900.0		0.0		0	900.6	0
P16302	900.0		0.0		0	900.9	0
P17200	888.0	C17307	888.0	RECT_OPEN		887.4	0
P17202	884.0		0.0			880.0	0
P17204	884.0	C17302	883.5	RECT_OPEN		883.6	4
P17300	872.0	C19105	872.0	RECT_OPEN		872.1	54
P17302	874.0	C17301	872.0	RECT_OPEN		872.2	69
P17304	874.0	C17300	872.0	RECT_OPEN		871.8	1
P17306	874.0		0.0		0	875.5	0
P17400	874.0	L17400	870.5	CIRCULAR	15	873.5	10
P17406	876.0	L174111	873.1	CIRCULAR	15	874.0	3
P17408	876.0	C17305	872.0	RECT_OPEN		872.5	26
P18100	876.0	C18102	883.6	RECT_OPEN		875.6	0
P18102	876.0		0.0			875.5	0
P18104	874.0	C18100	873.7	RECT_OPEN		875.6	25
P18106	874.0		0.0			873.0	0
P18108	874.0	C18106	874.0	RECT_OPEN		874.1	4
P18110	874.0	C18108	874.0	RECT_OPEN		873.8	1
P18112	874.0	C18107	874.0	RECT_OPEN		873.2	0
P18200	884.0		0.0			874.1	0
P18202	872.0	C19107	870.0	RECT_OPEN		871.9	74
P18300	886.0		0.0			868.9	185
P18334	885.0	C18332	881.0	RECT_OPEN		883.0	13
P18336	882.0		0.0			884.0	0
P18338	884.0		0.0			883.4	0
P18400	886.0	C18406	883.5	RECT_OPEN		884.0	60
P18402	894.0	C18400	886.0	RECT_OPEN		886.4	41
P18404	886.0	C18407	885.3	RECT_OPEN		885.8	61
P18406	884.0		0.0			880.3	0
P18408	882.0		0.0			881.6	0
P18410	878.0		0.0			875.1	0
P19100	874.0		0.0			871.9	0
P19102	888.0	C19109	886.0	RECT_OPEN		886.2	9
P19200	870.0	C20308	870.0	RECT_OPEN		869.4	0
P19202	872.0	C19101	875.0	RECT_OPEN		872.1	0
P19206	868.0	C19300	868.0	RECT_OPEN		868.2	71
P19304	858.0	C19302	856.0	RECT_OPEN		856.1	25
P19306	858.0	C19304	858.0	RECT_OPEN		858.2	12

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P19400	888.0	L19400	885.0	RECT_OPEN		886.7	59
P19402	884.0		0.0			886.0	0
P19404	882.0		0.0			879.8	0
P19406	882.0	C19404	880.6	RECT_OPEN		881.0	20
P19408	881.0		0.0			881.0	0
P19410	888.0	L19410	885.0	RECT_OPEN		886.5	42
P20100	880.0		0.0			875.1	0
P20102	880.0	C20100	880.0	RECT_OPEN		877.3	0
P20104	880.0		0.0			880.0	0
P20106	882.0	C20104	882.0	RECT_OPEN		882.1	8
P20200	874.0	C29107	874.0	RECT_OPEN		874.1	7
P20300	870.0		0.0			871.5	0
P20302	880.0	C29105	878.0	RECT_OPEN		878.5	31
P20304	868.0	C29104	868.0	RECT_OPEN		868.2	15
P20306	870.0	C20304	871.5	RECT_OPEN		871.0	0
P20308	868.0	C20305	868.0	RECT_OPEN		868.2	6
P20400	872.0	L20306	870.0	CIRCULAR	24	871.0	2
P20402	884.0	C20400	884.0	RECT_OPEN		884.1	5
P20404	878.0	C19103	878.0	RECT_OPEN		871.9	0
P21202-E	870.0	L28136-E	867.0	CIRCULAR	18	869.9	7
P21204-E	870.0	L21202-E	866.5	CIRCULAR	15	870.0	4
P21206-E	870.0	L21204-E	867.0	CIRCULAR	15	870.3	6
P21208-E	870.0	ZC21206-E	869.0	RECT_OPEN		870.3	25
P21210-E	872.0	ZC21208-E	871.4	RECT_OPEN		872.3	28
P21300	876.0	C21405	876.0	RECT_OPEN		876.0	0
P21400	876.0		0.0			868.8	0
P21402	882.0	L21400	876.0	CIRCULAR	24	877.9	24
P21404	881.9	C21401	881.1	RECT_OPEN		881.6	78
P21406	886.0	C21403	885.2	RECT_OPEN		885.6	44
P27306	862.0	L27301	862.0	CIRCULAR	18	863.5	3
P28102	867.0	L28100	860.0	ARCH	44.64	866.2	102
P28104	867.0	L28118	859.0	CIRCULAR	15	866.2	63
P28104-E	870.0	L28102-E	862.5	CIRCULAR	24	865.8	14
P28106-E	868.0	L28104-E	864.0	CIRCULAR	18	867.5	17
P28124	871.5	L28122	865.3	CIRCULAR	18	869.4	12
P28136-E	870.0	L28134-E	867.0	CIRCULAR	15	869.7	6
P28143-E	870.0	L28154-E	861.5	CIRCULAR	18	868.4	13
P28200	870.0		0.0		0	868.0	0
P28220	868.1	L28218	856.0	RECT_CLOSE	36	863.6	227
P28228	864.0	L28219	855.8	ARCH	72	863.4	110
P28242	864.6	L28240	858.5	CIRCULAR	42	865.3	29
P28244	864.9	L28237	859.5	ARCH	31.32	865.2	43

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P28248	864.0	L28246	858.8	CIRCULAR	33	865.7	22
P28258	862.0		0.0		0	862.2	0
P28304	864.0	L28302	850.8	CIRCULAR	42	861.3	80
P28310	865.0	L28201	853.0	CIRCULAR	48	863.0	139
P28320	866.1	L28318	859.2	CIRCULAR	48	865.6	62
P28326	865.4	L28244	860.4	ARCH	31.32	865.9	35
P28332	872.0		0.0		0	874.2	0
P28334	870.0	L28301	847.0	CIRCULAR	30	860.3	62
P28336	867.0	PipeÂ 16	858.5	CIRCULAR	15	864.6	9
P28342	865.0	PipeÂ 40	860.0	CIRCULAR	18	862.7	6
P28353	872.0		0.0		0	871.8	5
P28401	881.0		0.0		0	881.3	7
P28402	879.0		0.0		0	877.4	11
P28403	872.0	L28422	866.0	CIRCULAR	27	867.4	6
P28404	872.2	L28424	869.2	CIRCULAR	21	871.7	8
P28405	871.5	L28425	868.2	CIRCULAR	24	870.9	11
P28406	870.9	L28427	867.3	CIRCULAR	24	870.2	14
P28407	870.0	L28428	866.5	CIRCULAR	24	869.1	17
P28408	871.0	L28406	854.0	RECT_CLOSE	24	865.4	130
P28409	871.7	L28440	869.2	CIRCULAR	18	870.4	4
P28410	870.0	L28439	868.1	CIRCULAR	18	870.0	7
P28411	869.8	L28441	867.2	CIRCULAR	18	869.8	6
P28412	868.0	L28410	862.0	CIRCULAR	48	865.4	33
P28413	869.5	L28442	866.4	CIRCULAR	18	869.1	4
P28414	868.0	C28412	862.0	TRAPEZOIDA		865.4	32
P28415	868.9	Link-30	865.2	CIRCULAR	21	868.6	8
P28416	867.0	L28414	862.7	CIRCULAR	30	868.2	86
P28417	868.5	Link-31	864.4	CIRCULAR	24	868.3	4
P28418	868.0	C28416	862.7	IRREGULAR		868.2	17
P28420	868.0	L28449	865.0	CIRCULAR	15	863.9	2
P28440	865.5		0.0		0	865.1	14
P28441	868.0	LROut	865.7	TRAPEZOIDA		861.3	0
P28472	866.1	L28470	860.6	CIRCULAR	33	866.4	27
P28474	866.9	L28472	860.8	CIRCULAR	33	867.2	30
P28486	869.2	L28484	863.1	CIRCULAR	27	869.3	19
P28492	870.0	L28490	857.7	CIRCULAR	36	868.9	42
P29100	872.0	C29207	871.5	RECT_OPEN		870.9	10
P29102	874.0	L29100	868.5	CIRCULAR	18	870.1	5
P29104	869.0	L28416	864.0	CIRCULAR	24	867.9	23
P29202	856.0	C29200	854.0	RECT_OPEN		854.7	82
P29204	864.0	C29205	863.5	RECT_OPEN		863.8	12
P29304	858.0	C29203	857.5	RECT_OPEN		860.1	18

Pond ID	Ground Elev	DS Link	Outlet Invert Elevation (ft)	Outlet Shape	Outlet Size	100 Year Peak Elev (ft)	Peak Outflow (cfs)
P29400	870.0	C29304	869.5	RECT_OPEN		870.3	58
P29402	878.0	C29400	877.0	RECT_OPEN		877.4	41
P29404	878.0		0.0			880.6	0
P33402	862.0	C33400	861.5	RECT_OPEN		856.6	0
P34400	862.0	L27308	862.0	ARCH	18	864.2	16
P34402	862.0	C34400	862.0	RECT_OPEN		864.6	15
P34404	862.0	C34402	862.0	RECT_OPEN		864.6	19
P34406	862.0	C34404	862.0	RECT_OPEN		864.6	5
P-6	876.0	Link-35	866.0	CIRCULAR	36	874.5	244

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
D43-P559	P25454	P24366	100.00	4.00	CIRCULAR	12	12	7	867.5	860.6	7	No
L23138	CB23240	CB23238	19.83	0.35	CIRCULAR	18	18	6	880.2	879.9	9	Yes
L23200	CB23200	P23320	304.00	3.49	CIRCULAR	15	15	12	876.3	863.7	7	No
L23202	CB23204	P23202	50.00	0.60	CIRCULAR	24	24	18	880.6	880.6	14	Yes
L23203	CB23244	P23202	48.00	0.96	CIRCULAR	18	18	10	880.8	880.6	10	Yes
L23204	CB23206	CB23204	155.04	2.68	CIRCULAR	18	18	17	885.3	880.6	15	Yes
L23206	CB23208	CB23206	204.40	1.78	CIRCULAR	12	12	5	887.1	885.3	2	Yes
L23207	CB23212	CB23206	200.86	2.09	CIRCULAR	12	12	5	887.2	885.3	4	Yes
L23208	CB23110	CB23208	164.70	0.84	CIRCULAR	12	12	3	885.3	887.1	2	No
L23213	CB23214	CB23206	209.07	0.82	CIRCULAR	12	12	3	887.6	885.3	5	Yes
L23214	CB23216	CB23214	290.15	0.70	CIRCULAR	12	12	3	887.3	887.6	3	Yes
L23218	CB23220	P23218	161.77	3.14	CIRCULAR	12	12	6	881.0	874.3	8	Yes
L23219	CB23228	CB23220	230.80	0.36	CIRCULAR	12	12	2	876.7	881.0	5	No
L23220	CB23222	CB23220	334.25	0.54	CIRCULAR	12	12	3	887.0	881.0	6	Yes
L23221	CB23226	CB23220	110.70	0.53	CIRCULAR	12	12	3	882.5	881.0	4	Yes
L23222	CB23224	CB23222	164.49	2.53	CIRCULAR	12	12	6	889.2	887.0	4	Yes
L23232	CB23234	CB23232	221.08	0.27	CIRCULAR	18	18	5	878.2	873.9	8	No
L23234	CB23236	CB23234	42.31	0.21	CIRCULAR	18	18	5	878.6	878.2	8	Yes
L23236	CB23238	CB23236	213.89	0.25	CIRCULAR	18	18	5	879.9	878.6	8	Yes
L23240	P23202	CB23240	30.00	0.33	CIRCULAR	18	18	6	880.6	880.2	14	Yes
L23244	CB23246	CB23244	207.72	0.71	CIRCULAR	18	18	9	885.9	880.8	10	Yes
L23246	CB23248	CB23246	231.66	2.58	CIRCULAR	15	15	10	884.0	885.9	5	No
L23301	CB23302	J23316	116.00	2.10	CIRCULAR	27	27	45	868.0	862.4	26	No
L23302	CB23304	CB23302	55.85	1.00	CIRCULAR	21	21	16	869.9	868.0	23	Yes
L23304	CB23306	CB23304	139.87	0.99	CIRCULAR	18	18	10	872.2	869.9	12	Yes
L23306	CB23308	CB23306	203.63	0.78	CIRCULAR	15	15	6	877.0	872.2	10	Yes
L23308	P23310	CB23308	232.32	0.87	CIRCULAR	15	15	6	870.5	877.0	3	No
L23311	CB23312	J23316	114.00	4.52	CIRCULAR	15	15	14	868.0	862.4	3	No

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L23313	CB23314	P23320	180.00	0.71	CIRCULAR	15	15	5	869.0	863.7	3	No
L23320	P23400	P23320	140.00	0.14	CIRCULAR	24	24	9	865.4	863.7	7	No
L23321	CB23230	P23320	160.00	1.88	CIRCULAR	18	18	14	870.1	863.7	14	No
L23400	P23402	P23400	310.00	0.16	CIRCULAR	42	42	35	866.7	865.4	24	No
L23402	P23404	P23402	630.00	0.24	CIRCULAR	24	24	11	867.5	866.7	9	No
L23404	P23406	P23404	190.00	1.05	CIRCULAR	18	18	11	868.8	867.5	6	No
L24112	CB24314	CB24312	168.09	0.32	CIRCULAR	12	12	2	877.0	875.7	0	No
L24212	CB24214	P24212	196.00	0.09	CIRCULAR	18	18	3	862.2	859.6	13	Yes
L24213	P24322	P24212	48.00	0.54	CIRCULAR	12	12	3	860.3	859.6	4	Yes
L24214	CB24216	CB24214	227.10	0.11	CIRCULAR	18	18	4	862.2	862.2	3	Yes
L24216	CB24218	CB24216	138.13	0.10	CIRCULAR	18	18	3	862.1	862.2	3	Yes
L24218	CB24218	CB25104	177.74	1.16	CIRCULAR	18	18	11	862.1	859.5	13	Yes
L24219	CB24220	CB24218	162.72	0.92	CIRCULAR	12	12	3	868.1	862.1	6	No
L24266	CB24302	P24366	570.00	1.40	CIRCULAR	27	27	32	870.6	860.6	4	No
L24302	CB24304	CB24302	365.76	0.23	CIRCULAR	15	15	3	873.1	870.6	4	No
L24304	CB24306	CB24304	248.53	0.17	CIRCULAR	15	15	3	874.3	873.1	4	Yes
L24306	CB24308	CB24306	218.54	0.17	CIRCULAR	15	15	3	875.4	874.3	4	Yes
L24308	P24310	CB24308	77.00	0.48	CIRCULAR	15	15	4	875.7	875.4	4	Yes
L24310	CB24312	P24310	40.00	0.50	CIRCULAR	24	24	16	875.7	875.7	19	Yes
L24312	CB24314	CB24312	168.04	0.30	CIRCULAR	24	24	12	877.0	875.7	19	Yes
L24314	CB24316	CB24314	461.23	0.61	CIRCULAR	18	18	8	880.8	877.0	10	Yes
L24316	CB24318	CB24316	345.34	0.82	CIRCULAR	15	15	6	881.8	880.8	5	Yes
L24321	P24324	P24322	48.00	0.35	CIRCULAR	12	12	2	861.4	860.3	4	No
L24323	CB24330	P24322	20.00	0.35	CIRCULAR	15	15	4	860.3	860.3	8	Yes
L24324	P24326	P24324	610.00	0.49	CIRCULAR	15	15	5	863.0	861.4	4	No
L24326	CB25128	P24326	154.00	1.30	CIRCULAR	15	15	7	865.4	863.0	5	No
L24331	CB24332	P24330	133.00	0.45	CIRCULAR	24	24	15	863.6	863.6	15	Yes
L24332	CB24334	CB24332	125.88	0.47	CIRCULAR	24	24	15	863.6	863.6	12	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L24333	CB24342	CB24332	76.09	1.25	CIRCULAR	24	24	25	863.6	863.6	12	No
L24334	CB24336	CB24334	65.55	0.24	CIRCULAR	18	18	5	863.9	863.6	9	Yes
L24336	CB24338	CB24336	113.46	1.60	CIRCULAR	15	15	8	864.5	863.9	5	No
L24338	CB24340	CB24338	68.00	7.51	CIRCULAR	15	15	15	869.1	864.5	3	No
L24344	CB24346	CB24344	261.34	0.23	CIRCULAR	24	24	11	864.9	863.6	7	No
L24346	CB24348	CB24346	196.90	0.23	CIRCULAR	24	24	11	865.1	864.9	6	No
L24348	P24350	CB24348	36.00	0.19	CIRCULAR	12	12	2	866.7	865.1	6	Yes
L24350	CB24352	P24350	171.00	7.60	CIRCULAR	12	12	10	878.5	866.7	4	No
L24354	CB24356	P24354	36.00	1.39	CIRCULAR	24	24	27	867.1	865.1	28	No
L24356	CB24358	CB24356	194.91	1.80	CIRCULAR	24	24	30	870.6	867.1	28	Yes
L24357	CB24364	CB24358	163.15	0.61	CIRCULAR	12	12	3	872.7	870.6	4	Yes
L24358	CB24360	CB24358	428.23	3.74	CIRCULAR	24	24	38	885.0	870.6	18	No
L24359	CB24362	CB24358	36.32	3.30	CIRCULAR	12	12	6	881.0	870.6	7	Yes
L24366	P24368	P24366	100.00	0.20	CIRCULAR	18	18	4	861.2	860.6	3	No
L24368	CB24370	P24368	65.00	0.31	CIRCULAR	15	15	4	866.3	861.2	12	Yes
L24369	CB24374	P24368	52.00	0.96	CIRCULAR	15	15	6	862.4	861.2	5	No
L24370	CB24372	CB24370	247.55	1.94	CIRCULAR	15	15	9	871.1	866.3	9	Yes
L24374	CB24392	P24374	67.00	0.60	CIRCULAR	15	15	5	864.3	862.1	8	No
L24375	CB24376	P24374	135.00	0.19	CIRCULAR	21	21	7	864.9	862.1	14	No
L24376	CB25478	CB24376	427.93	0.68	CIRCULAR	21	21	13	868.3	864.9	14	Yes
L24387	P24392	CB24388	27.82	3.63	CIRCULAR	12	12	7	865.0	864.9	4	No
L24388	CB24388	CB24376	209.48	0.35	CIRCULAR	15	15	4	864.9	864.9	2	Yes
L24389	CB24390	CB24388	213.97	0.24	CIRCULAR	15	15	3	860.4	864.9	3	No
L24390	J24390	P24391	73.71	4.07	CIRCULAR	18	18	18	861.2	861.2	1	No
L24391	J24391	P24389	16.00	4.63	CIRCULAR	18	18	20	869.9	860.8	12	No
L24392	J24392	J24391	148.00	0.50	CIRCULAR	18	18	6	873.3	869.9	12	Yes
L24393	J24393	J24392	337.00	0.50	CIRCULAR	18	18	6	875.4	873.3	7	Yes
L24394	J24394	J24393	289.00	0.61	CIRCULAR	18	18	7	875.7	875.4	7	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L24395	J24395	J24394	96.01	1.84	CIRCULAR	15	15	8	871.8	875.7	10	Yes
L24396	CB23228	J24395	248.00	3.40	CIRCULAR	15	15	10	876.7	871.8	6	No
L24TH47	P24366	P24212	129.00	0.50	CIRCULAR	15	15	5	860.6	859.6	1	No
L24TH47-1	P24212	J24tH47-1	40.00	0.12	Arch	11	18	2	859.6	860.1	4	No
L24TH47-2	J24tH47-1	J24TH47-2	197.00	0.14	Arch	11	18	2	860.1	861.5	4	Yes
L24TH47-3	J24TH47-2	P24374	72.00	0.18	Arch	11	18	2	861.5	862.1	4	Yes
L24TH47-4	P24374	J24TH47-3	153.86	0.08	Arch	11	18	1	862.1	861.3	3	Yes
L24TH47-5	J24TH47-3	J24TH47-4	192.00	0.15	Arch	11	18	2	861.3	860.5	3	Yes
L24TH47-6	J24TH47-4	D43-CB444	270.00	0.15	Arch	11	18	2	860.5	860.4	3	Yes
L24TH47-7	D43-CB444	CB24390	30.00	0.27	Arch	11	18	3	860.4	860.4	3	Yes
L25100	CB25102	O-25-1-02	292.23	3.10	CIRCULAR	30	30	72	854.3	845.0	53	No
L25102	CB25104	CB25102	420.00	0.54	CIRCULAR	30	30	30	859.5	854.3	37	No
L25104	CB25106	CB25104	360.02	0.47	CIRCULAR	27	27	21	860.3	859.5	14	Yes
L25105	CB25108	CB25104	219.32	0.23	CIRCULAR	18	18	4	867.6	859.5	13	No
L25106	CB25110	CB25106	186.34	9.03	CIRCULAR	15	15	19	876.5	860.3	7	No
L25108	CB24390	CB25106	375.86	0.13	CIRCULAR	27	27	11	860.4	860.3	6	Yes
L25114	CB25116	CB25114	349.60	0.21	CIRCULAR	18	18	5	864.0	861.5	9	Yes
L25116	CB25118	CB25116	105.68	0.47	CIRCULAR	12	12	2	862.9	864.0	6	Yes
L25118	CB25420	CB25118	218.94	2.28	CIRCULAR	12	12	5	863.6	862.9	3	Yes
L25120	CB25122	O-25-1-01	215.00	7.44	CIRCULAR	18	18	29	866.7	851.9	13	No
L25200	CB25202	O-25-2-05	163.41	0.31	CIRCULAR	24	24	13	854.6	853.9	7	No
L25202	P25204	CB25202	115.84	0.43	CIRCULAR	24	24	15	854.9	854.6	6	No
L25204	CB25114	P25204	220.00	0.34	CIRCULAR	18	18	6	861.5	854.9	9	No
L25206	CB25208	O-25-2-04	214.21	0.23	CIRCULAR	18	18	5	853.5	850.7	10	No
L25210	CB25212	O-25-2-03	220.00	2.93	CIRCULAR	18	18	18	852.1	849.0	10	Yes
L25214	P25216	O-25-2-01a	140.00	0.21	CIRCULAR	48	48	66	850.1	849.3	38	No
L25216	CB25218	P25216	130.00	0.37	CIRCULAR	48	48	87	850.3	850.1	47	No
L25218	CB25220	CB25218	274.00	0.19	CIRCULAR	42	42	44	851.5	850.3	42	No

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L25220	CB25222	CB25220	133.11	0.44	CIRCULAR	30	30	27	852.5	851.5	27	No
L25221	CB25232	CB25220	555.34	0.61	CIRCULAR	15	15	5	857.9	851.5	7	Yes
L25222	CB25224	CB25222	575.08	0.39	CIRCULAR	30	30	26	854.2	852.5	21	No
L25224	CB25226	CB25224	59.08	0.41	CIRCULAR	27	27	20	854.7	854.2	18	No
L25225	CB25236	CB25220	349.00	0.10	CIRCULAR	36	36	21	851.6	851.5	20	No
L25226	CB25228	CB25226	296.51	0.42	CIRCULAR	24	24	15	855.2	854.7	10	No
L25228	CB25230	CB25228	133.48	0.78	CIRCULAR	12	12	3	858.4	855.2	5	Yes
L25232	CB36136	CB25232	208.57	0.48	CIRCULAR	12	12	2	859.2	857.9	5	Yes
L25233	CB25234	CB25232	76.26	3.93	CIRCULAR	12	12	7	858.7	857.9	4	Yes
L25236	P36400	CB25236A	236.00	0.33	CIRCULAR	36	36	39	852.4	851.6	20	No
L25236A	CB25236A	CB25236	90.00	0.71	CIRCULAR	36	36	56	851.6	851.6	20	No
L25301	CB25302	P36400	40.00	0.18	CIRCULAR	15	15	3	855.3	852.4	13	Yes
L25302	P25304	CB25302	89.63	0.30	CIRCULAR	15	15	4	855.1	855.3	8	Yes
L25303	FES25301	CB25340	217.12	1.65	CIRCULAR	15	15	8	867.8	864.4	8	Yes
L25306	CB25306	P25304	140.00	0.17	CIRCULAR	24	24	9	855.2	855.1	17	Yes
L25307	CB25308	P36400	172.00	0.10	CIRCULAR	36	36	21	853.6	852.4	41	No
L25308	CB25310	CB25308	280.08	0.10	CIRCULAR	36	36	21	854.2	853.6	29	Yes
L25310	CB25312	CB25310	314.81	0.10	CIRCULAR	36	36	21	855.5	854.2	23	Yes
L25312	CB25314	CB25312	289.61	0.09	CIRCULAR	24	24	7	854.7	855.5	7	Yes
L25313	CB25316	CB25312	170.00	0.29	CIRCULAR	30	30	22	854.9	855.5	16	Yes
L25316	CB25318	CB25316	154.03	0.14	CIRCULAR	27	27	12	855.1	854.9	15	Yes
L25317	CB36418	CB25312	129.05	0.42	CIRCULAR	12	12	2	856.5	855.5	3	Yes
L25318	CB25320	CB25318	145.08	0.05	CIRCULAR	27	27	7	855.1	855.1	15	Yes
L25319	P25317	P26200	164.00	1.15	CIRCULAR	12	12	4	864.0	856.7	4	No
L25320	CB25322	CB25320	112.54	0.08	CIRCULAR	27	27	9	855.1	855.1	14	Yes
L25321	P25319	CB25331	10.00	2.00	CIRCULAR	15	15	9	866.9	862.5	3	No
L25322	CB25324	CB25322	184.35	0.20	CIRCULAR	27	27	14	855.0	855.1	14	Yes
L25323	CB25323	CB25325	421.45	0.88	CIRCULAR	18	18	10	870.4	867.5	1	No

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L25324	CB25326	CB25324	93.53	0.10	CIRCULAR	27	27	10	855.3	855.0	14	Yes
L25325	CB25325	CB25328	493.16	0.50	CIRCULAR	24	24	16	867.5	865.5	9	No
L25327	CB25327	CB25325	203.11	1.88	CIRCULAR	15	15	9	872.2	867.5	9	No
L25328	CB25330	P25328	112.00	0.18	CIRCULAR	18	18	4	860.0	855.3	21	Yes
L25329	P25321	CB25329	283.09	-0.16	CIRCULAR	15	15	3	876.6	876.3	1	No
L25330	CB25332	CB25330	228.73	0.44	CIRCULAR	18	18	7	860.1	860.0	10	Yes
L25331	CB25329	CB25360	53.35	1.48	CIRCULAR	18	18	13	876.3	875.8	1	No
L25332	CB25335	CB25332	466.28	0.21	CIRCULAR	18	18	5	861.0	860.1	8	Yes
L25334	CB25336	CB25335	400.04	0.20	CIRCULAR	15	15	3	861.2	861.0	5	Yes
L25336	CB25338	CB25336	99.80	0.20	CIRCULAR	15	15	3	861.2	861.2	5	Yes
L25339	CB25331	P25328	72.05	0.28	CIRCULAR	15	15	3	862.5	855.3	12	Yes
L25340	CB25340	CB25341	99.97	0.17	CIRCULAR	18	18	4	864.4	863.5	8	No
L25341	CB25341	CB25342	170.25	0.64	CIRCULAR	18	18	8	863.5	861.0	8	No
L25342	CB25342	CB25344	186.28	0.27	CIRCULAR	30	30	21	861.0	865.8	13	Yes
L25344	CB25344	P25315	179.99	0.22	CIRCULAR	30	30	19	865.8	861.0	17	Yes
L25346	CB25346	CB25348	57.18	0.38	CIRCULAR	15	15	4	886.2	885.3	6	Yes
L25348	CB25348	CB25350	140.92	0.30	CIRCULAR	15	15	4	885.3	878.8	6	No
L25350	CB25350	P25321	198.40	0.25	CIRCULAR	15	15	3	878.8	876.6	6	No
L25352	CB25352	CB25354	65.35	0.58	CIRCULAR	12	12	3	876.6	876.6	0	No
L25354	CB25354	P25321	177.99	0.29	CIRCULAR	18	18	6	876.6	876.6	0	No
L25356	CB25356	CB25358	38.14	1.18	CIRCULAR	12	12	4	875.8	875.8	0	No
L25358	CB25358	CB25360	158.78	1.37	CIRCULAR	18	18	12	875.8	875.8	0	No
L25360	CB25360	CB25323	209.09	-0.21	CIRCULAR	18	18	5	875.8	870.4	1	No
L25362	FES25362	CB25364	150.25	3.37	CIRCULAR	15	15	12	872.1	867.0	0	No
L25364	CB25364	CB25342	160.13	3.73	CIRCULAR	15	15	12	867.0	861.0	0	No
L25366	CB25366	CB25368	145.00	1.12	CIRCULAR	12	12	4	878.8	876.8	3	No
L25368	CB25368	CB25370	101.00	3.18	CIRCULAR	12	12	6	876.8	867.2	3	No
L25370	CB25370	P25319	295.12	0.78	CIRCULAR	18	18	9	867.2	866.9	3	No

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L25372	CB25372	CB25370	53.00	0.32	CIRCULAR	12	12	2	867.2	867.2	0	No
L25374	CB25374	P25319	53.00	0.81	CIRCULAR	12	12	3	866.9	866.9	0	No
L25376	CB25376	P25319	49.00	0.59	CIRCULAR	18	18	8	866.9	866.9	0	No
L25400	P25400	P24366	1295.66	0.39	CIRCULAR	15	15	4	866.8	860.6	2	No
L25402	P25402	CB25442	193.44	1.66	CIRCULAR	18	18	14	873.2	870.8	12	Yes
L25404	CB25404	P24366	143.00	0.35	CIRCULAR	15	15	4	863.4	860.6	6	No
L25405	CB25406	P24366	142.00	0.14	CIRCULAR	21	21	6	865.1	860.6	19	No
L25406	CB25408	CB25406	191.02	0.19	CIRCULAR	21	21	7	866.8	865.1	16	Yes
L25408	CB25410	CB25408	131.76	0.45	CIRCULAR	21	21	11	867.2	866.8	12	Yes
L25410	CB25412	CB25410	444.78	2.21	CIRCULAR	15	15	10	876.1	867.2	9	Yes
L25413	CB25414	P24366	120.00	0.42	CIRCULAR	18	18	7	864.0	860.6	8	No
L25414	CB25416	CB25414	256.00	0.23	CIRCULAR	18	18	5	864.5	864.0	6	Yes
L25416	CB25418	CB25416	179.01	0.61	CIRCULAR	15	15	5	863.9	864.5	5	Yes
L25418	P26176	CB25418	120.00	0.18	CIRCULAR	15	15	3	864.7	863.9	5	Yes
L25420	P25424	CB25420	27.10	3.69	CIRCULAR	12	12	7	863.6	863.6	2	Yes
L25424	CB25422	P25424	63.00	3.97	CIRCULAR	15	15	13	866.9	863.6	2	No
L25425	P25426	P25424	237.73	0.21	CIRCULAR	15	15	3	857.3	863.6	1	No
L25432	CB25434	CB25432	95.62	0.52	CIRCULAR	18	18	8	881.2	880.6	0	No
L25436	CB25438	CB25436	414.27	1.45	CIRCULAR	15	15	8	880.1	879.9	6	Yes
L25438	CB25440	CB25438	42.73	0.47	CIRCULAR	15	15	4	880.2	880.1	5	Yes
L25439	P25442	CB25438	157.24	1.27	CIRCULAR	12	12	4	879.1	880.1	4	Yes
L25444	P25454	CB25444	180.08	0.28	CIRCULAR	18	18	6	867.5	865.8	7	No
L25445	CB25447	CB25444	223.34	1.00	CIRCULAR	15	15	6	871.2	865.8	7	No
L254454	CB25442	P25454	146.97	1.22	CIRCULAR	18	18	12	870.8	867.5	13	Yes
L25446	CB25444	CB25446	72.39	5.37	CIRCULAR	21	21	37	865.8	864.5	14	No
L25447	P25456	CB25446	58.38	3.24	CIRCULAR	12	12	6	865.1	864.5	5	Yes
L25448	CB25446	CB25448	66.72	0.91	CIRCULAR	24	24	22	864.5	863.9	17	Yes
L25450	CB25448	CB25450	215.21	0.23	CIRCULAR	24	24	11	863.9	862.4	18	Yes

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L25452	CB25450	CB25452	222.88	0.36	CIRCULAR	24	24	14	862.4	860.8	18	No
L25454	CB25452	P25458	115.80	0.43	CIRCULAR	24	24	15	860.8	860.0	20	Yes
L25468	CB25466	CB25468	47.11	1.13	CIRCULAR	12	12	4	875.7	875.7	2	Yes
L25469	CB25466	CB25468	47.30	1.12	CIRCULAR	12	12	4	875.7	875.7	2	Yes
L25478	CB25486	CB25478	57.35	0.51	CIRCULAR	15	15	5	868.8	868.3	7	Yes
L25479	CB25480	CB25478	137.75	2.06	CIRCULAR	15	15	9	870.9	868.3	9	Yes
L25480	CB25482	CB25480	336.30	0.15	CIRCULAR	15	15	2	871.4	870.9	4	Yes
L25482	P25484	CB25482	98.15	1.53	CIRCULAR	12	12	4	871.0	871.4	3	No
L25488	P25488	P25490	210.00	0.00	CIRCULAR	18	18	0	876.3	876.3	1	Yes
L26102	CB26104	CB26102	71.73	0.78	CIRCULAR	15	15	6	867.6	867.3	5	Yes
L26104	CB26106	CB26104	108.03	0.78	CIRCULAR	12	12	3	867.6	867.6	3	Yes
L26106	CB26110	CB26106	173.29	0.78	CIRCULAR	12	12	3	867.7	867.6	3	Yes
L26110	P26112	CB26110	25.76	0.70	CIRCULAR	12	12	3	867.7	867.7	2	Yes
L26113	CB26114	J26186	85.00	2.35	CIRCULAR	12	12	5	863.6	860.9	5	No
L26115	CB26116	J26184	75.00	0.37	CIRCULAR	15	15	4	863.3	860.8	8	No
L26117	P26118	J26186	125.00	0.16	CIRCULAR	24	24	9	861.5	860.9	9	No
L26118	CB26122	P26118	52.00	0.38	CIRCULAR	24	24	14	862.7	861.5	13	No
L26119	CB26120	P26118	45.00	1.11	CIRCULAR	15	15	7	865.0	861.5	7	No
L26123	CB26124	CB26122	81.07	0.74	CIRCULAR	15	15	6	865.4	862.7	2	No
L26124	CB26126	CB26122	397.31	0.80	CIRCULAR	18	18	9	865.8	862.7	9	Yes
L26126	CB26456	CB26126	646.00	0.63	CIRCULAR	18	18	8	869.2	865.8	6	No
L26127	CB26128	J26180	130.00	1.21	CIRCULAR	27	27	34	862.0	860.0	15	No
L26128	CB26134	CB26128	97.50	1.38	CIRCULAR	18	18	12	862.8	862.0	5	No
L26129	CB26130	CB26128	317.70	1.98	CIRCULAR	15	15	9	867.7	862.0	5	No
L26130	CB26132	CB26130	204.02	1.87	CIRCULAR	12	12	5	871.5	867.7	3	No
L26134	CB26138	CB26134	176.50	1.04	CIRCULAR	18	18	11	864.6	862.8	4	No
L26135	P26136	CB26134	235.90	3.76	CIRCULAR	15	15	13	871.3	862.8	2	No
L26138	CB26142	CB26138	199.09	0.86	CIRCULAR	15	15	6	865.7	864.6	0	No

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L26139	CB26140	CB26138	62.22	1.19	CIRCULAR	12	12	4	872.3	864.6	4	No
L26145	CB26146	J26180	138.00	1.30	CIRCULAR	24	24	26	864.2	860.0	17	No
L26146	CB26148	CB26146	307.50	0.47	CIRCULAR	21	21	11	866.4	864.2	13	No
L26148	CB26186	CB26148	664.02	0.47	CIRCULAR	21	21	11	868.6	866.4	9	No
L26149	CB26150	J26182	73.00	5.89	CIRCULAR	12	12	9	864.3	860.4	4	No
L26151	CB26152	J26182	92.00	3.59	CIRCULAR	15	15	12	863.5	860.4	6	No
L26153	CB26156	CB26154	83.15	0.36	CIRCULAR	18	18	6	860.9	860.6	5	No
L26154	P26158	CB26156	118.00	0.42	CIRCULAR	18	18	7	861.2	860.9	5	No
L26156	CB26162	CB26160	167.01	0.34	CIRCULAR	15	15	4	866.1	864.3	8	Yes
L26158	CB26160	P26158	51.00	0.33	CIRCULAR	15	15	4	864.3	861.2	11	Yes
L26159	CB26166	P26158	156.00	5.45	CIRCULAR	15	15	15	875.7	861.2	16	Yes
L26162	CB26164	CB26162	76.83	0.35	CIRCULAR	12	12	2	866.1	866.1	4	Yes
L26166	CB25468	CB26166	235.65	0.70	CIRCULAR	15	15	5	875.7	875.7	8	Yes
L26167	CB25472	CB26166	196.25	1.83	CIRCULAR	12	12	5	873.4	875.7	3	No
L26168	CB26170	P26168	141.00	0.71	CIRCULAR	15	15	5	865.6	861.5	11	No
L26169	CB25430	P26168	114.00	0.88	CIRCULAR	18	18	10	869.3	861.5	1	No
L26170	CB26172	CB26170	221.03	1.81	CIRCULAR	15	15	9	869.0	865.6	8	Yes
L26171	CB26174	CB26170	68.67	1.46	CIRCULAR	12	12	4	866.1	865.6	5	Yes
L26172	CB25436	CB26172	414.30	1.21	CIRCULAR	15	15	7	879.9	869.0	10	Yes
L26176	CB26178	P26176	343.00	0.76	CIRCULAR	15	15	6	867.9	864.7	4	No
L26178	CB23280	CB26178	237.00	0.16	CIRCULAR	15	15	3	869.1	867.9	4	No
L26187	P26190	CB26186	109.70	0.59	CIRCULAR	12	12	3	869.0	868.6	3	Yes
L26200	P26204	P26200	170.00	0.41	CIRCULAR	15	15	4	860.0	856.7	6	No
L26201	CB26102	J26188	320.00	0.18	CIRCULAR	15	15	3	867.3	861.1	7	No
L26203	CB26154	P26204	180.00	0.11	CIRCULAR	18	18	4	860.6	860.0	5	No
L26206	CB26206	P26204	150.00	2.47	CIRCULAR	15	15	10	865.8	860.0	13	Yes
L26207	CB26208	P26204	100.00	0.27	CIRCULAR	30	30	21	860.0	860.0	28	Yes
L26208	CB26210	CB26208	68.80	0.29	CIRCULAR	15	15	3	862.6	860.0	9	No

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L26209	P26206	CB26208	635.00	0.26	CIRCULAR	30	30	21	861.2	860.0	23	No
L26211	CB26212	P26204	115.00	2.17	CIRCULAR	30	30	60	861.8	860.0	22	No
L26212	CB26214	CB26212	71.93	1.39	CIRCULAR	27	27	37	863.1	861.8	18	No
L26214	CB26216	CB26214	90.91	0.77	CIRCULAR	24	24	20	863.7	863.1	12	No
L26215	P25315	P26204	52.00	0.54	CIRCULAR	12	12	3	861.0	860.0	4	No
L26216	CB26218	CB26216	73.09	0.82	CIRCULAR	21	21	14	864.2	863.7	10	No
L26218	CB26220	CB26218	85.90	1.98	CIRCULAR	15	15	9	866.1	864.2	8	Yes
L26220	CB26222	CB26220	193.09	0.26	CIRCULAR	12	12	2	869.0	866.1	5	Yes
L26302	CB26304	CB26302	66.94	0.25	CIRCULAR	18	18	5	863.8	863.7	11	Yes
L26303	CB26316	CB26302	672.41	0.52	CIRCULAR	24	24	16	868.2	863.7	15	Yes
L26304	CB26308	CB26304	334.10	2.28	CIRCULAR	18	18	16	871.4	863.8	15	Yes
L26307	CB26302	P26206	210.00	0.09	CIRCULAR	30	30	12	863.7	861.2	41	No
L26309	CB26314	CB26308	292.78	1.19	CIRCULAR	15	15	7	876.8	871.4	8	Yes
L26310	CB26312	CB26310	698.89	0.86	CIRCULAR	15	15	6	881.9	876.1	6	Yes
L26311	CB26328	P26308	120.00	0.40	CIRCULAR	24	24	14	874.9	874.1	26	Yes
L26315	CB26336	P26310	120.50	2.00	CIRCULAR	15	15	9	874.1	874.1	8	Yes
L26316	CB26318	CB26316	208.59	0.36	CIRCULAR	24	24	14	869.5	868.2	16	Yes
L26317	CB26338	P26310	188.00	4.52	CIRCULAR	30	30	87	877.6	874.1	35	No
L26318	CB26320	CB26318	190.70	1.30	CIRCULAR	21	21	18	870.1	869.5	16	Yes
L26320	CB26322	CB26320	138.21	0.12	CIRCULAR	18	18	4	871.1	870.1	12	Yes
L26321	CB26326	CB26320	346.62	0.78	CIRCULAR	15	15	6	870.2	870.1	4	No
L26322	CB26324	CB26322	301.46	1.86	CIRCULAR	15	15	9	876.2	871.1	8	Yes
L26323	P26304	CB26322	132.89	1.14	CIRCULAR	18	18	11	871.4	871.1	10	Yes
L26325	CB26348	P26312	22.00	0.23	CIRCULAR	18	18	5	856.2	854.8	13	No
L26326	P26306	MH28328	300.00	0.10	CIRCULAR	15	15	2	872.7	871.6	4	No
L26327	CB26344	P26312	30.00	0.67	CIRCULAR	21	21	13	858.0	854.8	17	No
L26328	CB28329	P26306	224.00	0.21	CIRCULAR	15	15	3	873.8	872.7	6	Yes
L26329	CB26330	CB26328	250.00	0.35	CIRCULAR	18	18	6	875.5	874.9	7	Yes

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L26330	CB26332	CB26330	297.42	0.31	CIRCULAR	18	18	6	876.5	875.5	7	Yes
L26331	CB26224	P26312	80.00	0.25	CIRCULAR	12	12	2	860.5	854.8	7	Yes
L26332	CB26334	CB26332	400.00	0.41	CIRCULAR	15	15	4	879.1	876.5	5	Yes
L26333	CB26354	P26312	165.00	0.91	CIRCULAR	15	15	6	868.0	854.8	9	No
L26338	CB26340	CB26338	459.35	0.11	CIRCULAR	24	24	7	881.8	877.6	18	No
L26341	CB28330	CB26328	30.00	1.20	CIRCULAR	15	15	7	874.2	874.9	6	Yes
L26344	CB26346	CB26344	142.48	4.74	CIRCULAR	15	15	14	865.8	858.0	16	Yes
L26345	CB26344	P26302	17.00	-1.18	CIRCULAR	24	24	2	858.0	856.0	23	Yes
L26348	CB26350	CB26348	87.98	6.50	CIRCULAR	15	15	16	865.6	856.2	13	No
L26350	CB26352	CB26350	54.36	2.72	CIRCULAR	15	15	11	866.7	865.6	6	Yes
L26402	CB26404	P26402	186.00	0.39	CIRCULAR	18	18	7	867.2	864.8	9	No
L26403	CB26412	P26402	28.00	2.14	CIRCULAR	15	15	8	865.9	864.8	6	No
L26404	CB26406	CB26404	127.71	0.98	CIRCULAR	18	18	10	867.3	867.2	4	No
L26406	CB26408	CB26406	221.12	0.92	CIRCULAR	15	15	6	868.9	867.3	4	No
L26408	CB26310	CB26308	265.14	1.44	CIRCULAR	15	15	8	876.1	871.4	8	Yes
L26409	CB26410	CB26408	156.28	0.47	CIRCULAR	15	15	4	870.0	868.9	4	No
L26413	CB26414	P26400	48.00	0.75	CIRCULAR	18	18	9	862.9	860.0	15	No
L26414	CB26416	CB26414	270.63	0.15	CIRCULAR	18	18	4	863.7	862.9	6	Yes
L26415	P26226	CB26414	120.00	4.20	CIRCULAR	15	15	13	862.0	862.9	0	No
L26416	CB26418	CB26416	88.01	0.27	CIRCULAR	18	18	5	864.0	863.7	6	Yes
L26418	P26420	CB26418	202.07	0.08	CIRCULAR	15	15	2	862.1	864.0	3	No
L26422	CB26422	CB26414	214.72	0.24	CIRCULAR	15	15	3	864.7	862.9	7	Yes
L26423	P26424	P26400	150.00	0.33	CIRCULAR	24	24	13	860.7	860.0	3	No
L26426	P26226	P26428	33.00	1.21	CIRCULAR	12	12	4	862.0	862.0	4	Yes
L26428	CB26430	P26428	80.00	0.21	CIRCULAR	36	36	31	862.0	862.0	12	No
L26430	CB26432	CB26430	68.14	0.76	CIRCULAR	15	15	6	869.4	862.0	1	No
L26431	CB26434	CB26430	138.90	0.22	CIRCULAR	36	36	31	862.0	862.0	9	No
L26434	CB26436	CB26434	294.96	0.19	CIRCULAR	33	33	23	862.2	862.0	7	No

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L26436	CB26438	CB26436	113.74	0.21	CIRCULAR	27	27	14	862.4	862.2	6	No
L26438	CB26440	CB26438	227.48	0.20	CIRCULAR	21	21	7	862.6	862.4	2	No
L26440	CB26442	CB26440	232.65	0.35	CIRCULAR	15	15	4	863.0	862.6	1	No
L26442	P26144	CB26442	306.76	0.15	CIRCULAR	15	15	2	863.6	863.0	1	No
L26445	CB26446	P26428	81.00	1.00	CIRCULAR	15	15	6	862.0	862.0	6	No
L26446	CB26448	CB26446	90.70	3.12	CIRCULAR	15	15	11	864.3	862.0	6	No
L26448	CB26450	CB26448	149.29	0.35	CIRCULAR	15	15	4	865.4	864.3	4	No
L26450	CB26452	CB26450	135.32	0.35	CIRCULAR	15	15	4	865.6	865.4	2	No
L26452	CB26454	CB26452	224.07	0.33	CIRCULAR	15	15	4	865.8	865.6	1	No
L26456	P26458	CB26456	69.80	0.90	CIRCULAR	15	15	6	869.2	869.2	1	No
L26458	CB26460	P26458	125.00	0.58	CIRCULAR	15	15	5	869.2	869.2	8	Yes
L26460	CB26462	CB26460	68.88	0.38	CIRCULAR	15	15	3	869.2	869.2	8	Yes
L26462	CB26464	CB26462	114.15	0.25	CIRCULAR	15	15	3	870.1	869.2	7	Yes
L26463	CB26263	CB26462	94.18	7.78	CIRCULAR	12	12	10	872.0	869.2	2	No
L26464	CB26466	CB26464	163.76	0.52	CIRCULAR	15	15	5	871.1	870.1	5	Yes
L26466	CB26468	CB26466	50.57	0.85	CIRCULAR	15	15	6	871.2	871.1	3	Yes
L26467	CB26476	CB26466	62.62	0.70	CIRCULAR	18	18	9	871.2	871.1	4	Yes
L26468	CB26470	CB26468	143.74	0.49	CIRCULAR	15	15	5	871.2	871.2	2	Yes
L26470	CB26472	CB26470	236.36	0.50	CIRCULAR	15	15	5	871.4	871.2	3	Yes
L26472	CB26474	CB26472	103.95	5.37	CIRCULAR	15	15	15	873.8	871.4	3	No
L26476	CB26478	CB26476	101.05	0.76	CIRCULAR	15	15	6	871.2	871.2	3	Yes
L26478	CB26480	CB26478	146.10	0.17	CIRCULAR	15	15	3	871.2	871.2	3	Yes
L26480	CB26482	CB26480	110.88	4.88	CIRCULAR	12	12	8	872.9	871.2	4	No
L26482	CB26484	CB26482	107.55	0.60	CIRCULAR	12	12	3	873.8	872.9	2	No
L26486	CB26188	CB26186	70.92	0.47	CIRCULAR	15	15	4	868.8	868.6	4	No
L28312	CB28330	CB28329	10.00	0.40	CIRCULAR	15	15	4	874.2	873.8	6	Yes
L28313	P26312	P28313	140.00	-1.09	CIRCULAR	18	18	9	854.8	853.9	2	No
L28315	P28313	J28317	35.00	0.00	CIRCULAR	18	18	1	853.9	853.9	4	Yes

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L28317	J28317	O28301	40.00	1.33	CIRCULAR	24	24	26	853.9	853.0	1	No
L28328	MH28328	MH28329	23.00	0.74	CIRCULAR	15	15	6	871.6	871.4	4	No
L28329	MH28329	CB26326	137.00	0.51	CIRCULAR	15	15	5	871.4	870.2	4	No
L36400	CB36406	P36400	240.00	0.42	CIRCULAR	24	24	15	855.2	852.4	21	No
L36401	CB36402	P36400	184.00	0.27	CIRCULAR	18	18	5	853.3	852.4	7	No
L36402	CB36404	CB36402	132.52	0.38	CIRCULAR	12	12	2	854.4	853.3	3	Yes
L36406	CB36408	CB36406	333.90	0.46	CIRCULAR	15	15	4	855.9	855.2	5	Yes
L36407	CB36414	CB36406	116.23	0.50	CIRCULAR	18	18	7	856.2	855.2	11	Yes
L36408	CB36410	CB36408	98.14	0.46	CIRCULAR	15	15	4	857.1	855.9	1	Yes
L36409	CB36412	CB36408	111.18	0.40	CIRCULAR	15	15	4	857.5	855.9	4	Yes
L36414	CB36416	CB36414	174.66	0.50	CIRCULAR	15	15	5	856.5	856.2	3	Yes
Link-28	CB25328	P25317	198.62	0.20	CIRCULAR	24	24	10	865.5	864.0	9	No

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L13202	CB13204	J144278	177.65	3.34	CIRCULAR	18	18	19	864.0	856.9	19	YES
L13203	J144278	O-13-2-01	144.46	3.39	CIRCULAR	18	18	19	856.9	857.6	18	YES
L13204	CB13206	CB13204 A	107.3	0.4	CIRCULAR	21	21	10	865.4	864.5	13	YES
L13204 A	CB13204 A	CB13204	55.47	0.7	CIRCULAR	21	21	13	864.5	864.0	13	YES
L13206	CB13208	CB13206	394.22	0.36	CIRCULAR	21	21	9	865.6	865.4	11	YES
L13208	CB13210	CB13208	138	0.11	CIRCULAR	21	21	5	864.5	865.6	19	YES
L13209	CB13312	CB13208	158.18	5.37	CIRCULAR	12	12	8	872.7	865.6	9	YES
L13210	CB24112	CB13210	259	0.15	CIRCULAR	21	21	6	864.6	864.5	8	YES
L13402	J13404	J13402	67.47	0.13	CIRCULAR	48	48	31	857.8	856.1	110	YES
L13406	P13408	J13406	64.21	0.16	CIRCULAR	36	36	31	859.4	857.9	104	YES
L14102	P14104	CB14102	32	-6.25	CIRCULAR	12	12	9	866.3	866.0	3	YES
L14104	CB14106	P14104	99	0.32	CIRCULAR	21	21	9	866.4	866.3	11	YES
L14106	CB14108	CB14106	154.29	0.4	CIRCULAR	18	18	7	868.0	866.4	9	YES
L14108	CB14110	CB14108	181.64	0.3	CIRCULAR	18	18	6	868.0	868.0	8	YES
L14110	CB14112	CB14110	131.54	6.13	CIRCULAR	15	15	16	873.5	868.0	4	NO
L14111	CB14114	CB14110	216.58	0.48	CIRCULAR	12	12	2	869.0	868.0	2	YES
L14112	CB14214	CB14212	464.48	0.11	CIRCULAR	18	18	3	887.0	885.6	7	YES
L14116	P14118	CB14116	91.84	0.54	CIRCULAR	18	18	8	863.1	862.2	7	NO
L14118	CB14120	P14118	24	2.08	CIRCULAR	12	12	5	864.5	863.1	6	NO
L14120	P14122	CB14120	25	-20	CIRCULAR	12	12	16	865.6	864.5	6	YES
L14121	CB14134	P14122	149	0.68	CIRCULAR	21	21	13	865.6	865.6	11	NO
L14122	CB14124	P14122	149	0.3	CIRCULAR	24	24	12	865.6	865.6	15	YES
L14123	CB14132	CB14124	186.87	0.49	CIRCULAR	15	15	5	865.9	865.6	3	YES
L14124	CB14126	CB14124	136.24	0.34	CIRCULAR	21	21	9	866.6	865.6	10	YES
L14126	CB14128	CB14126	143.75	0.24	CIRCULAR	18	18	5	867.3	866.6	7	YES
L14127	P14126	P14118	503.35	0.16	CIRCULAR	12	12	1	866.9	863.1	1	NO
L14128	CB14130	CB14128	411.79	0.45	CIRCULAR	15	15	4	869.1	867.3	5	YES
L14132	P14124	J14132	389.16	1.54	Rectangular	48	48	227	870.2	861.1	3	NO

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L14134	CB14136	CB14134	288.03	1.39	CIRCULAR	18	18	12	868.9	865.6	8	NO
L14135	CB14142	CB14134	127.76	3.24	CIRCULAR	15	15	12	868.6	865.6	3	NO
L14136	CB14138	CB14136	25.16	1.79	CIRCULAR	15	15	9	869.0	868.9	2	NO
L14137	P14140	CB14136	212.98	0.42	CIRCULAR	12	12	2	869.4	868.9	1	NO
L14202	CB14204	P14202	180	1.67	CIRCULAR	36	36	86	873.2	868.7	63	NO
L14204	CB14206	CB14204	216.41	1.39	CIRCULAR	36	36	79	876.0	873.2	52	NO
L14205	CB14242	CB14204	41.31	1.21	CIRCULAR	15	15	7	874.2	873.2	8	YES
L14206	CB14208	CB14206	184.31	0.43	CIRCULAR	36	36	44	877.4	876.0	46	NO
L14207	CB14230	CB14206	198.09	3.03	CIRCULAR	12	12	6	883.0	876.0	6	YES
L14208	CB14210	CB14208	64.52	1.86	CIRCULAR	24	24	31	878.4	877.4	22	YES
L14209	CB14216	CB14208	62.32	1.93	CIRCULAR	30	30	57	877.6	877.4	23	NO
L14210	CB14212	CB14210	709.04	0.78	CIRCULAR	21	21	14	885.6	878.4	16	YES
L14216	CB14258	J14216	20	51.3	CIRCULAR	12	12	26	863.4	859.7	4	NO
L14217	CB14232	CB14216	558.68	0.21	CIRCULAR	30	30	19	879.2	877.6	17	NO
L14218	P14220	J14218	79.04	0.14	CIRCULAR	48	48	46	860.1	859.7	63	YES
L14219	CB14102	P14218	368	0.27	CIRCULAR	12	12	2	866.0	861.4	3	NO
L14224	J14226	J14224	75.71	0.15	CIRCULAR	36	36	22	861.0	860.2	49	YES
L14232	CB14234	CB14232	182.64	0.33	CIRCULAR	21	21	9	879.8	879.2	9	YES
L14233	CB14238	CB14232	442.17	0.97	CIRCULAR	21	21	16	882.3	879.2	7	NO
L14234	CB14236	CB14234	44.1	0.45	CIRCULAR	15	15	4	880.3	879.8	6	YES
L14236	CB14248	CB14236	117.98	0.42	CIRCULAR	12	12	2	882.1	880.3	4	YES
L14237	P14246	CB14236	147.51	4.07	CIRCULAR	12	12	7	884.4	880.3	2	NO
L14238	P14240	CB14238	147.06	0.34	CIRCULAR	21	21	9	882.8	882.3	4	NO
L14242	CB14244	CB14242	143.49	2.44	CIRCULAR	12	12	6	878.4	874.2	6	YES
L14254	CB14256	CB14254	78.82	0.38	CIRCULAR	15	15	4	879.9	877.9	8	NO
L14258	P14260	CB14258	20	-10	CIRCULAR	12	12	11	864.1	863.4	4	NO
L14260	CB14262	P14260	334.13	0.38	CIRCULAR	18	18	6	869.1	864.1	8	NO
L14262	CB14264	CB14262	366.88	0.54	CIRCULAR	15	15	5	867.2	869.1	4	NO

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L14263	P14268	CB14262	184	0.42	CIRCULAR	12	12	2	866.4	869.1	3	YES
L14264	CB14266	CB14264	192.35	0.32	CIRCULAR	15	15	4	868.0	867.2	4	NO
L14430	P14432	J14430	83.02	0.13	CIRCULAR	36	36	21	863.7	862.5	45	NO
L14434	P14436	J14434	623.82	0.03	CIRCULAR	15	15	1	871.4	869.9	1	NO
L14438	P14438	P14436	30	3.33	CIRCULAR	15	15	12	872.0	871.4	9	NO
L14440	P14449	J14442	715	0.97	CIRCULAR	18	18	10	872.4	861.6	2	NO
L15234	P15236	J15234	157.83	0.19	CIRCULAR	36	36	29	866.9	866.7	18	YES
L15238	P15240	J15238	108.17	0.65	CIRCULAR	36	36	47	867.8	867.7	20	NO
L15347	P15352	J15352A	113.73	0.69	CIRCULAR	18	18	8	870.0	869.2	11	YES
L15348	P15350	J15348	178.72	0.04	CIRCULAR	36	36	14	869.8	869.3	26	NO
L15402	J15404	P15402	1090	0.37	CIRCULAR	18	18	6	884.6	872.0	2	NO
L16102	P16104	CB16102	28	0.36	CIRCULAR	12	12	2	871.9	871.7	5	YES
L16104	CB16106	P16104	172	0.23	CIRCULAR	18	18	5	874.9	871.9	9	YES
L16106	CB16108	CB16106	358.52	0.66	CIRCULAR	15	15	5	875.7	874.9	6	YES
L16107	CB16110	CB16106	157.42	0.26	CIRCULAR	15	15	3	873.6	874.9	3	YES
L16114	CB16117	P16114	195.62	0.42	CIRCULAR	33	33	34	876.2	874.7	16	NO
L16115	CB16134	P16114	57.69	0.38	CIRCULAR	12	12	2	874.7	874.7	5	YES
L16116	CB16118	CB16116	103.2	0.69	CIRCULAR	24	24	19	880.6	880.4	8	YES
L16117	CB16117	CB16116	175.89	1.18	CIRCULAR	15	15	7	876.2	880.4	10	YES
L16118	CB16120	CB16118	151.27	0.62	CIRCULAR	27	27	24	880.7	880.6	7	YES
L16119	CB16132	CB16118	251.79	0.26	CIRCULAR	15	15	3	881.0	880.6	2	YES
L16120	CB16122	CB16120	123.14	0.25	CIRCULAR	18	18	5	880.9	880.7	5	YES
L16122	CB16124	CB16122	407.52	0.64	CIRCULAR	15	15	5	882.5	880.9	4	YES
L16123	CB16126	CB16122	55.11	0.45	CIRCULAR	12	12	2	881.0	880.9	2	YES
L16127	CB16102	P16128	255	0.78	CIRCULAR	12	12	3	871.7	869.8	2	NO
L16128	CB16130	CB16117	332.14	1.83	CIRCULAR	12	12	5	886.0	876.2	4	NO
L16129	CB16138	P16128	255	0.24	CIRCULAR	12	12	2	873.7	869.8	4	NO
L16134	CB16136	CB16134	118.4	5.07	CIRCULAR	15	15	15	883.5	874.7	5	NO

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L16138	P16114	CB16138	64	0.16	CIRCULAR	12	12	1	874.7	873.7	4	YES
L16254a	P16140	J16254	72	-2.08	CIRCULAR	18	18	15	871.4	870.9	3	NO
L16255	P16140	J16254	72	-0.14	CIRCULAR	18	18	8	871.4	870.9	5	NO
L16402	P16404	P16402	110	0.45	CIRCULAR	15	15	4	872.6	871.5	2	NO
L16404	P16406	P16404	115	-0.87	CIRCULAR	15	15	5	872.7	872.6	2	NO
L19300	CB19302	O-19E-3-01	101.19	0.99	CIRCULAR	12	12	4	854.5	854.5	9	YES
L19302	P19E304	CB19302	50	2	CIRCULAR	21	21	22	854.5	854.5	21	YES
L19304	CB19306	P19E304	619.81	6.7	CIRCULAR	18	18	27	888.3	854.5	16	NO
L19306	CB19308	CB19306	123.51	0.4	CIRCULAR	18	18	7	889.4	888.3	9	NO
L22146	J22148	J22146	111.28	0.45	CIRCULAR	24	24	15	884.6	882.7	17	NO
L22204	CB22206	CB22204	468.08	0.75	CIRCULAR	15	15	6	882.0	877.9	6	NO
L22206	P22208	CB22206	145.84	0.53	CIRCULAR	15	15	5	883.0	882.0	5	YES
L22208	P22110	P22208	484	0.72	CIRCULAR	15	15	5	886.0	883.0	5	NO
L22216	CB22218	P22216	240	0.63	CIRCULAR	15	15	5	876.0	870.3	9	NO
L22218	P22220	CB22218	430	0.12	CIRCULAR	15	15	2	874.7	876.0	5	YES
L22220	J22222	P22220	145	0.32	CIRCULAR	15	15	4	875.0	874.7	5	NO
L22402	P22404	J22404A	108.91	0.33	CIRCULAR	15	15	4	869.8	869.8	4	YES
L22404	P22406	J122406A	124.72	0.26	CIRCULAR	15	15	3	869.8	869.8	3	YES
L22406	J22408A	P22408	96.96	0.55	CIRCULAR	15	15	5	869.8	869.8	4	YES
L22408	P22410	P22402	160	1.25	CIRCULAR	18	18	12	873.6	869.8	14	NO
L23101	P23102	P23158	55	0.55	CIRCULAR	12	12	3	872.6	865.3	10	YES
L23102	CB23104	P23102	104.77	1.34	CIRCULAR	30	30	47	872.8	872.6	37	YES
L23103	CB23106	CB23104	47.85	1.5	CIRCULAR	12	12	4	872.8	872.8	7	YES
L23104	CB23108	CB23104	245.93	1.5	CIRCULAR	27	27	38	874.4	872.8	32	YES
L23108	CB23112	CB23108	314.43	1.5	CIRCULAR	24	24	28	879.4	874.4	27	YES
L23109	CB23136	CB23108	207.37	2.47	CIRCULAR	15	15	10	876.9	874.4	7	NO
L23110	CB24412	CB23110	123.08	0.45	CIRCULAR	15	15	4	868.0	868.0	5	YES
L23112	CB23114	CB23112	115.59	1.5	CIRCULAR	21	21	19	881.4	879.4	20	YES

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L23114	CB23116	CB23114	147.64	1.49	CIRCULAR	18	18	13	883.5	881.4	17	YES
L23116	CB23118	CB23116	225.26	1.5	CIRCULAR	18	18	13	887.2	883.5	13	YES
L23117	CB24420	P23118	94	0.2	CIRCULAR	21	21	7	869.2	867.5	18	NO
L23118	CB23128	CB23118	207.78	1.49	CIRCULAR	15	15	8	888.2	887.2	7	YES
L23119	CB23120	CB23118	47.96	1.5	CIRCULAR	15	15	8	888.4	887.2	9	YES
L23120	CB23122	CB24420	154.67	0.2	CIRCULAR	21	21	7	871.6	869.2	18	YES
L23122	CB23124	CB23122	250.45	0.2	CIRCULAR	18	18	5	871.9	871.6	8	YES
L23129	CB23130	P23158	140	1.25	CIRCULAR	18	18	12	869.8	865.3	9	NO
L23130	CB23132	CB23130	48.84	0.31	CIRCULAR	18	18	6	870.2	869.8	8	NO
L23132	CB23134	CB23132	203.67	0.54	CIRCULAR	15	15	5	870.8	870.2	4	NO
L23138	CB23140	CB23138	171.5	0.99	CIRCULAR	15	15	6	872.5	868.5	7	YES
L23142	CB23144	CB23142	75.51	1.8	CIRCULAR	12	12	5	870.4	866.4	7	NO
L23144	CB23146	CB23144	345.73	1.82	CIRCULAR	15	15	9	873.9	870.4	5	NO
L23159	P23160	P23158	90	-1.11	CIRCULAR	15	15	6	865.3	865.3	3	YES
L23160	CB23162	P23160	130.62	0.38	CIRCULAR	18	18	7	867.1	865.3	13	NO
L23161	CB23168	CB23162	57.62	3.47	CIRCULAR	12	12	7	868.2	867.1	5	YES
L23162	CB23164	CB23162	103.54	0.97	CIRCULAR	15	15	6	869.3	867.1	9	YES
L23164	CB23166	CB23164	174.29	0.57	CIRCULAR	15	15	5	870.1	869.3	6	YES
L23169	CB23170	P23158	77	0.3	CIRCULAR	24	24	12	867.9	865.3	14	NO
L23170	CB23172	CB23170	113.96	0.3	CIRCULAR	24	24	12	868.5	867.9	14	NO
L23172	CB23174	CB23172	121.13	0.3	CIRCULAR	24	24	12	868.8	868.5	10	NO
L23173	CB23184	CB23172	96.08	0.3	CIRCULAR	12	12	2	869.4	868.5	3	YES
L23174	CB23176	CB23174	53.2	0.3	CIRCULAR	21	21	9	868.8	868.8	5	YES
L23176	CB23178	CB23176	80.98	0.3	CIRCULAR	21	21	9	868.9	868.8	4	NO
L23178	CB23180	CB23178	132.97	0.3	CIRCULAR	15	15	4	869.5	868.9	4	YES
L23180	CB23182	CB23180	64.98	0.31	CIRCULAR	12	12	2	869.9	869.5	3	YES
L23185	P23186	P23158	10	0.8	CIRCULAR	15	15	6	865.3	865.3	5	NO
L23186	CB23188	P23186	181	3.87	CIRCULAR	18	18	21	871.8	865.3	11	NO

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L23302	CB22204	P23302	165	4.3	CIRCULAR	15	15	13	877.9	865.9	10	NO
L23312	CB23314	P23312	130	0.22	CIRCULAR	18	18	5	865.9	865.9	5	NO
L23314	CB23314	P23302	60	1.58	CIRCULAR	15	15	8	865.9	865.9	7	YES
L23402	CB23404	CB23402	215.66	2.56	CIRCULAR	15	15	10	876.2	868.8	4	NO
L23403	CB23402	P23444	52	0.79	CIRCULAR	15	15	6	868.8	867.1	10	NO
L23404	CB23406	CB23404	63.3	1.42	CIRCULAR	15	15	8	877.0	876.2	2	NO
L23407	CB23408	P23444	197	0.15	CIRCULAR	18	18	4	868.8	867.1	8	NO
L23408	P23416	CB23408	48.31	-0.06	CIRCULAR	18	18	3	869.3	868.8	11	YES
L23410	CB23412	CB23410	111.09	1.04	CIRCULAR	18	18	11	874.3	872.9	6	NO
L23412	CB23414	CB23412	83.34	1.32	CIRCULAR	15	15	7	875.0	874.3	3	NO
L23416	CB23410	P23416	55.82	7.67	CIRCULAR	18	18	29	872.9	869.3	7	NO
L23417	CB23418	P23416	107	3.52	CIRCULAR	18	18	20	872.4	869.3	7	NO
L23418	CB23420	CB23418	213.98	0.34	CIRCULAR	15	15	4	873.7	872.4	4	NO
L23444	P23446	P23444	110	1.82	CIRCULAR	18	18	14	872.1	867.1	11	NO
L24111	J24113	CB24112	70	0.2	CIRCULAR	21	21	7	864.6	864.6	11	YES
L24112	P24114	J24113	80.47	-1.34	CIRCULAR	21	21	18	864.6	864.6	11	YES
L24113	CB24115	P24114	135	0.37	CIRCULAR	12	12	2	881.6	864.6	9	YES
L24114	CB24116	P24114	247	0.12	CIRCULAR	18	18	4	872.3	864.6	5	YES
L24116	P24118	CB24116	778	0.29	CIRCULAR	15	15	3	865.4	872.3	3	NO
L24118	CB24120	P24118	192	1.29	CIRCULAR	24	24	26	868.6	865.4	23	NO
L24119	CB24164	P24118	230	3.19	CIRCULAR	36	36	119	866.3	865.4	25	NO
L24120	CB24122	CB24120	220.75	2.42	CIRCULAR	21	21	25	873.3	868.6	12	NO
L24121	CB24128	CB24120	170	0.71	CIRCULAR	21	21	13	869.7	868.6	8	NO
L24122	CB24124	CB24122	145.6	0.37	CIRCULAR	21	21	10	874.1	873.3	8	NO
L24124	P24126	CB24124	223.44	2.27	CIRCULAR	21	21	24	878.6	874.1	5	NO
L24128	CB24130	CB24128	178	0.38	CIRCULAR	21	21	10	869.9	869.7	4	NO
L24130	CB24252	CB24130	331.49	2.91	CIRCULAR	15	15	11	879.6	869.9	4	NO
L24135	CB24136	CB24116	311	0.12	CIRCULAR	15	15	2	864.3	872.3	3	YES

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L24136	CB24138	CB24136	541	0.07	CIRCULAR	15	15	2	863.8	864.3	3	YES
L24137	CB24152	CB24136	220	2.32	CIRCULAR	15	15	10	873.0	864.3	3	NO
L24138	P24440	CB24138	50	-3.68	CIRCULAR	15	15	12	863.8	863.8	3	YES
L24140	CB24142	P24440	392.47	1.03	CIRCULAR	21	21	16	865.7	863.8	15	YES
L24142	CB24144	CB24142	203.48	0.49	CIRCULAR	18	18	7	867.8	865.7	11	YES
L24143	CB24150	CB24142	47.34	4.33	CIRCULAR	12	12	7	865.2	865.7	4	YES
L24144	CB24146	CB24144	102.3	0.27	CIRCULAR	18	18	6	867.7	867.8	5	YES
L24146	P24148	CB24146	482.84	0.37	CIRCULAR	15	15	4	868.2	867.7	4	YES
L24148	CB24154	P24148	189.27	0.77	CIRCULAR	30	30	36	868.3	868.2	15	YES
L24149	P24118	P24148	150	0.33	CIRCULAR	18	18	6	865.4	868.2	8	NO
L24150	P24222	CB24250	127	1.09	CIRCULAR	15	15	7	885.0	885.4	5	YES
L24152	CB24250	CB24252	917	0.28	CIRCULAR	15	15	3	885.4	879.6	4	NO
L24154	CB24156	CB24154	132.36	1.46	CIRCULAR	27	27	37	868.4	868.3	14	NO
L24156	CB24158	CB24156	220.97	1.05	CIRCULAR	21	21	16	870.8	868.4	10	NO
L24158	CB24160	CB24158	177.61	2.63	CIRCULAR	18	18	17	874.9	870.8	5	NO
L24159	CB24162	CB24158	223.7	0.59	CIRCULAR	15	15	5	871.8	870.8	3	NO
L24164	CB24172	CB24164	117.66	4.31	CIRCULAR	18	18	22	870.9	866.3	6	NO
L24165	CB24166	CB24164	384.44	0.18	CIRCULAR	33	33	23	867.6	866.3	14	NO
L24166	CB24168	CB24166	362.68	4.4	CIRCULAR	30	30	86	882.5	867.6	7	NO
L24167	CB24170	CB24166	46.52	12.75	CIRCULAR	18	18	38	879.9	867.6	6	NO
L24172	CB24174	CB24172	169.36	0.89	CIRCULAR	15	15	6	872.6	870.9	3	NO
L24175	CB24176	P24118	175	0.57	CIRCULAR	27	27	23	865.8	865.4	25	NO
L24176	CB24178	CB24176	35.75	0.28	CIRCULAR	24	24	12	866.3	865.8	22	YES
L24178	CB24180	CB24178	227.07	0.22	CIRCULAR	18	18	5	870.1	866.3	14	YES
L24180	CB24182	CB24180	108.04	8.33	CIRCULAR	15	15	19	876.0	870.1	14	YES
L24182	CB24184	CB24182	322.72	2.17	CIRCULAR	15	15	10	880.5	876.0	3	NO
L24183	CB24186	CB24182	189.5	0.26	CIRCULAR	12	12	2	877.2	876.0	5	YES
L24185	CB24188	P24118	400	1.36	CIRCULAR	15	15	8	871.8	865.4	8	NO

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L24186	CB24190	CB24188	154.69	3.38	CIRCULAR	12	12	7	879.3	871.8	8	YES
L24189	CB24194	P24118	231.55	1.51	CIRCULAR	15	15	8	868.7	865.4	5	NO
L24221	CB24238	P24222	150	3	CIRCULAR	18	18	18	887.2	885.0	18	YES
L24222	CB24224	P24222	140	0.26	CIRCULAR	15	15	3	885.1	885.0	7	YES
L24224	CB24226	CB24224	564.98	0.2	CIRCULAR	15	15	3	889.2	885.1	6	YES
L24226	CB24228	CB24226	63.11	0.13	CIRCULAR	15	15	2	889.1	889.2	3	YES
L24228	P24230	CB24228	198.62	0.35	CIRCULAR	12	12	2	886.8	889.1	4	YES
L24230	CB24232	P24230	40	0.25	CIRCULAR	15	15	3	886.5	886.8	5	YES
L24231	CB24234	CB24232	162.95	0.09	CIRCULAR	15	15	2	886.5	886.5	4	NO
L24232	CB24236	CB24232	994.12	0.1	CIRCULAR	15	15	2	889.3	886.5	4	YES
L24234	CB24234	O-24-2-01	143.71	21.57	CIRCULAR	12	12	17	886.5	854.5	15	YES
L24238	CB24240	CB24238	223.33	0.22	CIRCULAR	15	15	3	891.5	887.2	10	YES
L24241	CB24242	P24222	132	0.38	CIRCULAR	15	15	4	886.8	885.0	8	YES
L24242	P24244	CB24242	232.02	0.86	CIRCULAR	15	15	6	887.6	886.8	5	YES
L24245	CB24246	P24222	313	0.26	CIRCULAR	18	18	5	889.2	885.0	8	NO
L24246	CB24248	CB24246	123.85	0.16	CIRCULAR	18	18	4	891.0	889.2	7	YES
L24402	CB24104	P24402	240	0.17	CIRCULAR	15	15	3	864.0	863.1	5	YES
L24403	CB23150	P24402	110	1.82	CIRCULAR	18	18	14	870.1	863.1	12	NO
L24404	P24406	CB24104	90	0.44	CIRCULAR	15	15	4	864.5	864.0	5	YES
L24405	CB23138	P24406	98	0.82	CIRCULAR	15	15	6	868.5	864.5	7	NO
L24406	CB24408	P24406	22	2	CIRCULAR	15	15	9	865.9	864.5	16	YES
L24407	CB23142	P24406	86	1.8	CIRCULAR	24	24	30	866.4	864.5	10	NO
L24408	CB24428	CB24408	147.52	2.7	CIRCULAR	21	21	26	867.7	865.9	15	NO
L24409	CB23110	CB24408	298.32	0.69	CIRCULAR	15	15	5	868.0	865.9	6	YES
L24412	P23118	CB24412	51	1.86	CIRCULAR	15	15	9	867.5	868.0	8	YES
L24413	CB24414	CB24412	230.88	1.98	CIRCULAR	15	15	9	872.3	868.0	8	YES
L24414	CB24416	CB24414	167.29	0.54	CIRCULAR	12	12	3	873.6	872.3	3	YES
L24425	P24426	CB24408	186	0.04	CIRCULAR	15	15	1	864.0	865.9	4	NO

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L24428	CB24430	CB24428	219.66	1.63	CIRCULAR	18	18	13	870.9	867.7	8	NO
L24430	CB24432	CB24430	271.51	0.61	CIRCULAR	18	18	8	872.9	870.9	8	NO
L24432	CB24434	CB24432	173.89	0.88	CIRCULAR	15	15	6	875.0	872.9	7	YES
L24434	CB24436	CB24434	163.1	0.44	CIRCULAR	15	15	4	875.8	875.0	3	YES
L24440	CB24442	P24440	40	6.88	CIRCULAR	24	24	59	863.8	863.8	34	YES
L24442	J24444	CB24442	265.78	0.13	CIRCULAR	18	18	4	865.9	863.8	13	YES
L24444	J24446	J24444	798.9	0.13	CIRCULAR	18	18	4	866.5	865.9	3	YES
L24446	J24448	J24446	400.9	0.12	CIRCULAR	18	18	4	864.6	866.5	7	YES
L24448	P24450	J24448	70	0.17	CIRCULAR	18	18	4	863.0	864.6	12	NO
L24449	P24452	P24450	110	0.91	CIRCULAR	18	18	10	871.5	863.0	10	NO
L24451	P24402	P24450	146	-0.34	CIRCULAR	15	15	4	863.1	863.0	2	YES
L24453	P23158	P24402	205	0.3	CIRCULAR	18	18	6	865.3	863.1	1	NO
L25250	CB23152	CB23150	38.26	7.84	CIRCULAR	18	18	25	872.7	870.1	10	NO
Link-12	P14270	P14220	300	0.45	CIRCULAR	15	15	4	878.8	860.1	3	NO
ZC15352	J22454	J22454A	93.96	0.28	CIRCULAR	15	15	3	870.0	872.0	5	YES
ZC24414A	CB24416	CB24414	140.12	0.65	CIRCULAR	15	15	5	873.6	872.3	5	YES

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
C27270	P27276	P27270	90	2	CIRCULAR	18	18	13	873.8	862.6	0	No
L22302	P22304	P22302	85	1.76	CIRCULAR	15	15	5	866.7	866.4	3	No
L27116	P22302	P27116	75	0.4	CIRCULAR	12	12	1	866.4	866.4	2	Yes
L27118	P27402	P27118	150	0.13	CIRCULAR	24	24	7	861.8	862.5	0	No
L27119	P27102	P27118	150	0.33	CIRCULAR	18	18	6	862.5	862.5	0	No
L27168	CB27170	CB27168	205	0.15	CIRCULAR	15	15	2	867.7	867.4	0	No
L27202	CB27204	P27202	246.08	0.57	CIRCULAR	27	27	23	866.3	865.5	25	Yes
L27203	CB27216	P27202	253	0.09	CIRCULAR	36	36	20	866.1	865.5	43	Yes
L27204	CB27206	CB27204	249.76	0.2	CIRCULAR	27	27	14	869.3	866.3	25	Yes
L27206	CB27208	CB27206	358.38	0.2	CIRCULAR	27	27	14	869.8	869.3	25	Yes
L27207	CB27214	CB27208	355.78	0.2	CIRCULAR	24	24	10	870.6	869.8	12	Yes
L27208	CB27210	CB27208	274.29	0.3	CIRCULAR	24	24	12	870.4	869.8	15	Yes
L27210	CB27212	CB27210	249.7	0.3	CIRCULAR	15	15	4	870.1	870.4	6	Yes
L27216	CB27218	CB27216	411.98	1.28	CIRCULAR	21	21	18	867.1	866.1	12	Yes
L27217	CB27220	CB27216	432.3	0.13	CIRCULAR	30	30	15	866.3	866.1	21	Yes
L27220	CB27222	CB27220	56.19	1.25	CIRCULAR	18	18	12	867.6	866.3	16	Yes
L27221	CB27322	CB27220	90.48	0.13	CIRCULAR	18	18	4	866.3	866.3	9	Yes
L27222	CB27224	CB27222	239.52	2.3	CIRCULAR	15	15	10	869.6	867.6	6	Yes
L27226	CB27228	CB27226	242.8	0.1	CIRCULAR	36	36	21	863.2	862.6	47	Yes
L27228	CB27230	CB27228	92.2	0.1	CIRCULAR	36	36	21	863.7	863.2	39	Yes
L27229	P27234	CB27228	30	0.27	CIRCULAR	15	15	3	863.7	863.2	9	Yes
L27230	CB27232	CB27230	203	0.06	CIRCULAR	36	36	17	864.6	863.7	39	Yes
L27232	P27202	CB27233	24	-1.46	CIRCULAR	36	36	81	865.5	865.1	41	Yes
L27234	CB27236	P27234	60	0.42	CIRCULAR	36	36	43	863.9	863.7	38	Yes
L27236	CB27238	CB27236	261.17	0.51	CIRCULAR	36	36	47	864.5	863.9	30	Yes
L27238	CB27240	CB27241	53.52	0.3	CIRCULAR	30	30	22	865.7	865.1	29	Yes
L27238A	CB27241	CB27238	276.59	0.54	CIRCULAR	33	33	39	865.1	864.5	24	Yes
L27240	CB27242	CB27240	261.17	0.2	CIRCULAR	30	30	18	865.7	865.7	5	Yes

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L27242	CB27244	CB27242	184.51	0.26	CIRCULAR	24	24	12	865.8	865.7	4	Yes
L27243	CB27246	CB27244	68.2	0.22	CIRCULAR	18	18	5	865.9	865.8	4	Yes
L27244	CB27274	CB27244	38	0.71	CIRCULAR	21	21	13	864.9	865.8	18	Yes
L27248	CB27250	CB27248	107	0.21	CIRCULAR	15	15	3	858.2	858.0	0	No
L27250	CB27252	CB27250	247	0.18	CIRCULAR	15	15	3	858.7	858.2	0	No
L27252	CB27254	CB27252	291	0.15	CIRCULAR	15	15	3	859.1	858.7	0	No
L27254	CB27256	CB27254	250	1.84	CIRCULAR	15	15	9	863.7	859.1	0	No
L27256	CB27258	CB27256	400.78	0.21	CIRCULAR	15	15	3	864.5	863.7	0	No
L27258	CB27260	CB27258	394	0.12	CIRCULAR	15	15	2	865.0	864.5	0	No
L27260	CB27262	CB27260	387	0.1	CIRCULAR	15	15	2	865.4	865.0	0	No
L27262	CB27264	CB27262	400	0.21	CIRCULAR	15	15	3	866.3	865.4	0	No
L27264	CB27266	CB27264	403	0.12	CIRCULAR	15	15	2	866.8	866.3	0	No
L27266	CB27168	CB27266	403	0.15	CIRCULAR	15	15	2	867.4	866.8	0	No
L27272	CB27226	MH27235	136	0.16	CIRCULAR	42	42	40	862.6	862.6	47	Yes
L27274	P34174	CB27274	14	0.71	CIRCULAR	15	15	5	863.4	864.9	17	Yes
L27276	MH27235	P27270	40	0.55	CIRCULAR	42	42	75	862.6	862.6	47	Yes
L27301	P27316	P27302	120	0.67	CIRCULAR	24	24	18	865.5	866.0	5	No
L27302	CB27304	P27302	202.82	0.2	CIRCULAR	24	24	10	866.5	866.0	17	Yes
L27303	CB27310	P27302	156.58	0.32	CIRCULAR	18	18	6	866.2	866.0	17	Yes
L27304	CB27306	CB27304	412.06	0.1	CIRCULAR	24	24	7	866.5	866.5	13	Yes
L27306	CB27308	CB27306	333.84	0.1	CIRCULAR	24	24	7	866.6	866.5	11	Yes
L27310	CB27312	CB27310	502.07	0.22	CIRCULAR	18	18	5	866.6	866.2	7	Yes
L27312	CB27314	CB27312	131.05	0.31	CIRCULAR	15	15	4	866.6	866.6	2	Yes
L27322	CB27324	CB27322	273.79	0.13	CIRCULAR	18	18	4	866.7	866.3	7	Yes
L27324	CB27326	CB27324	220.51	0.13	CIRCULAR	18	18	4	865.5	866.7	10	Yes
L27326	CB27328	CB27326	268.85	0.54	CIRCULAR	18	18	8	865.4	865.5	10	Yes
L27328	P27330	CB27328	20	0	CIRCULAR	18	18	1	865.4	865.4	10	Yes
L27330	CB27332	P27330	128	0.31	CIRCULAR	30	30	23	865.4	865.4	24	Yes

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L27332	CB27334	CB27332	353.86	0.23	CIRCULAR	27	27	15	865.4	865.4	18	Yes
L27334	CB27336	CB27334	397.22	0.2	CIRCULAR	18	18	5	865.6	865.4	8	Yes
L27338	CB27340	P27338	136	0.2	CIRCULAR	21	21	7	862.5	862.3	9	Yes
L27340	CB27342	CB27340	396.9	0.2	CIRCULAR	21	21	7	863.1	862.5	9	Yes
L27342	CB27344	CB27342	388.64	0.17	CIRCULAR	21	21	7	863.8	863.1	9	Yes
L27344	P27302	CB27344	143.35	0	CIRCULAR	15	15	0	866.0	863.8	9	Yes
L27346	CB27348	P27346	70	0.71	CIRCULAR	30	30	35	864.4	863.9	31	No
L27347	CB27352	P27346	108	0.37	CIRCULAR	21	21	10	864.0	863.9	14	Yes
L27348	CB27350	CB27348	660.47	0.08	CIRCULAR	24	24	6	866.6	864.4	13	Yes
L27352	CB27354	CB27352	233.15	0.09	CIRCULAR	21	21	5	864.6	864.0	8	Yes
L27401	P27446	CB27447	81.71	-1.6	CIRCULAR	12	12	5	869.1	867.3	5	Yes
L27402	CB27447	P27102	96	0.72	CIRCULAR	12	12	3	867.3	862.5	5	No
L27404	P27346	P27402	100	0.5	CIRCULAR	18	18	7	863.9	861.8	10	No
L27407	CB27444	P27408	204	1.96	CIRCULAR	15	15	9	872.7	865.4	5	No
L27408	CB27410	P27408	174	0.34	CIRCULAR	21	21	9	868.1	865.4	10	No
L27409	CB27438	P27408	856.87	0.18	CIRCULAR	24	24	9	872.0	865.4	13	No
L27410	CB27412	CB27410	55.74	0.36	CIRCULAR	18	18	6	868.8	868.1	9	Yes
L27412	CB27414	CB27412	257.7	0.35	CIRCULAR	18	18	6	870.2	868.8	8	Yes
L27414	P27416	CB27414	55	0.55	CIRCULAR	15	15	5	871.0	870.2	7	Yes
L27415	CB27436	CB27414	184.49	0.6	CIRCULAR	18	18	8	870.2	870.2	3	No
L27416	CB27418	P27416	164	0.37	CIRCULAR	21	21	10	873.8	871.0	16	No
L27417	CB27426	P27416	148	0.54	CIRCULAR	21	21	12	871.1	871.0	13	Yes
L27418	CB27420	CB27418	209.66	0.29	CIRCULAR	21	21	8	874.7	873.8	11	Yes
L27420	CB27422	CB27420	94.92	0.32	CIRCULAR	18	18	6	875.7	874.7	9	Yes
L27422	CB27424	CB27422	167.88	0.3	CIRCULAR	15	15	4	878.0	875.7	7	Yes
L27426	CB27428	CB27426	35.71	0.56	CIRCULAR	18	18	8	871.3	871.1	11	Yes
L27428	CB27430	CB27428	63.59	0.79	CIRCULAR	15	15	6	872.9	871.3	9	Yes
L27430	CB27432	CB27430	407.35	1.35	CIRCULAR	12	12	4	880.0	872.9	4	Yes

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L27432	P27434	CB27432	158.66	0.63	CIRCULAR	12	12	3	878.0	880.0	4	Yes
L27438	CB27440	CB27438	247.67	0.81	CIRCULAR	18	18	9	874.0	872.0	12	Yes
L27440	CB27442	CB27440	220.83	0.91	CIRCULAR	15	15	6	876.1	874.0	8	Yes
L27446	CB27448	P27446	48	2.06	CIRCULAR	15	15	9	869.2	869.1	6	Yes
L27447	CB27454	P27446	160	1.08	CIRCULAR	12	12	4	869.5	869.1	2	Yes
L27448	CB27450	CB27448	144	1.14	CIRCULAR	15	15	7	870.1	869.2	7	Yes
L27450	CB27452	CB27450	124	1.05	CIRCULAR	15	15	7	870.8	870.1	4	No
L34104	P34106	CB34104	254.91	1.45	CIRCULAR	24	24	27	859.0	854.0	22	No
L34118	CB34120	CB35318	152.36	0.47	CIRCULAR	42	42	69	852.7	851.7	61	No
L34120	CB34122	CB34120	105.12	0.47	CIRCULAR	42	42	69	853.5	852.7	61	No
L34121	CB34152	CB34130	710	0.2	CIRCULAR	30	30	18	860.7	856.9	29	Yes
L34122	CB34124	CB34122	145.85	0.71	CIRCULAR	42	42	85	854.3	853.5	61	No
L34124	CB34126	CB34124	31	0.13	CIRCULAR	42	42	36	854.8	854.3	61	No
L34128	CB34130	CB34128	194	0.14	CIRCULAR	42	42	38	856.9	856.5	39	Yes
L34130	CB34132	CB34130	80	0.18	CIRCULAR	42	42	42	856.9	856.9	9	Yes
L34132	CB34134	CB34132	44	0.73	CIRCULAR	21	21	14	857.1	856.9	9	Yes
L34134	CB34136	CB34134	233	0.15	CIRCULAR	21	21	6	858.0	857.1	9	Yes
L34136	CB34138	CB34136	304	0.16	CIRCULAR	21	21	6	858.0	858.0	2	Yes
L34137	P34137	CB34136	41.71	-1.03	CIRCULAR	15	15	7	859.1	858.0	10	Yes
L34138	CB34140	CB34138	321.89	0.14	CIRCULAR	21	21	6	858.0	858.0	2	Yes
L34139	P34170	CB34182	200	0.08	CIRCULAR	15	15	2	862.2	861.3	6	Yes
L34140	CB34142	CB34140	324	0.21	CIRCULAR	21	21	7	858.0	858.0	2	Yes
L34142	CB34144	CB34142	404	0.13	CIRCULAR	18	18	4	858.0	858.0	1	No
L34144	CB34146	CB34144	396	0.17	CIRCULAR	18	18	4	858.0	858.0	1	No
L34146	CB27248	CB34146	386	0.19	CIRCULAR	18	18	5	858.0	858.0	0	No
L34149	P34148	CB34128	522	0.38	CIRCULAR	24	24	14	857.9	856.5	11	Yes
L34150	CB34154	P34150	141	0.23	CIRCULAR	36	36	32	861.3	861.2	39	Yes
L34152	P34150	CB34152	46	0.2	CIRCULAR	30	30	18	861.2	860.7	29	Yes

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L34154	CB34156	CB34154	270	0.05	CIRCULAR	36	36	15	861.8	861.3	40	Yes
L34156	CB34158	CB34156A	20.21	-0.54	CIRCULAR	36	36	49	862.2	862.0	41	Yes
L34156B	CB34156A	CB34156	18	0.61	CIRCULAR	36	36	52	862.0	861.8	41	Yes
L34158	CB34160	CB34158	344	0.09	CIRCULAR	36	36	20	863.1	862.2	37	Yes
L34160	CB34162	CB34160	311	0.13	CIRCULAR	36	36	24	863.8	863.1	35	Yes
L34174	CB34176	CB34178	300	0.1	Arch	15.48	26.04	3	862.0	861.4	9	Yes
L34178	CB34178	CB34180	350	0.1	Arch	15.48	26.04	3	861.4	864.3	10	Yes
L34180	CB34180	CB34162	352	0.1	CIRCULAR	36	36	18	864.3	863.8	25	Yes
L34182	CB34182	P34150	80	0.54	CIRCULAR	15	15	5	861.3	861.2	6	Yes
L34405	P34402	MH34404	44	-2.66	Arch	15.48	26.04	18	860.7	860.5	9	Yes
L34406	CB34406	P34402	47	0.06	CIRCULAR	24	24	6	860.7	860.7	8	Yes
L34412	CB34408	CB34406	188	0.16	CIRCULAR	24	24	9	860.8	860.7	8	Yes
L34416	CB34410	CB34408	247	0.09	CIRCULAR	24	24	7	861.0	860.8	8	Yes
L35126	CB34128	CB34126	417	0.14	CIRCULAR	42	42	37	856.5	854.8	61	Yes
L35300	CB35302	O35301	209.03	1.91	CIRCULAR	27	27	43	851.8	842.1	64	Yes
L35302	CB35304	CB35302	385.37	1.04	CIRCULAR	27	27	32	857.6	851.8	43	Yes
L35304	CB35306	CB35304	426.8	0.94	CIRCULAR	24	24	22	857.6	857.6	27	Yes
L35310	CB35312	O34204	269.57	0.48	CIRCULAR	48	48	99	849.7	847.9	92	No
L35312	CB35314	CB35312	73.86	0.47	CIRCULAR	48	48	99	850.5	849.7	92	No
L35314	CB35316	CB35314	86.54	0.46	CIRCULAR	48	48	98	851.0	850.5	75	No
L35316	CB35318	CB35316	431.98	0.47	CIRCULAR	48	48	98	851.7	851.0	66	No
L35317	P35402	CB35316	126.17	1.16	CIRCULAR	18	18	11	852.5	851.0	11	Yes
L35400	J34101	O34203	32	1.84	CIRCULAR	21	21	22	843.9	842.5	45	Yes
L35401	CB34102	J34101	470	1.1	CIRCULAR	21	21	21	855.0	843.9	23	Yes
L35402	CB35403	CB35404	430	0.1	CIRCULAR	36	36	21	857.1	857.6	24	Yes
L35403	MH34404	CB34176	150	0.12	Arch	15.48	26.04	4	860.5	862.0	9	Yes
L35404	CB35404	CB35406	225	0.1	CIRCULAR	36	36	23	857.6	858.1	24	Yes
L35406	CB35406	CB35407	110	0.14	CIRCULAR	36	36	25	858.1	858.2	24	Yes

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L35407	P35407	CB35407	40	-1.32	CIRCULAR	36	36	77	858.2	858.2	69	Yes
L35408	CB35408	CB35410	205	0.13	CIRCULAR	42	42	36	859.3	859.7	42	Yes
L35410	CB35410	P35420	296.71	0.27	CIRCULAR	42	42	52	859.7	860.2	39	Yes
L35411	CB35412	CB35410	109.33	0.91	CIRCULAR	42	42	96	859.7	859.7	11	Yes
L35414	CB35416	CB35414	355.99	0.27	CIRCULAR	48	48	75	860.8	860.3	53	Yes
L35416	CB35418	CB35416	349.36	0.27	CIRCULAR	48	48	75	861.6	860.8	38	Yes
L35419	CB35440	P35420	735.61	0.48	CIRCULAR	30	30	28	862.0	860.2	30	Yes
L35420	P35420	P35424	133	0.38	CIRCULAR	42	42	62	860.2	861.3	59	No
L35421	CB35414	P35420	148.95	0.34	CIRCULAR	48	48	83	860.3	860.2	53	Yes
L35422	SB35409	SB35411	220	0.27	CIRCULAR	36	36	38	858.5	859.2	44	Yes
L35423	CB35407	SB35409	202	0.21	CIRCULAR	36	36	31	858.2	858.5	47	Yes
L35424	CB35426	P35424	180	0.28	CIRCULAR	54	54	104	861.6	861.3	59	Yes
L35425	CB35403	CB35402	295	-0.1	CIRCULAR	36	36	21	857.1	856.9	24	Yes
L35426	CB35428	CB35427	374.3	0.11	CIRCULAR	48	48	49	862.6	862.4	41	Yes
L35427	CB34129	CB34128	41	0.39	CIRCULAR	36	36	42	856.6	856.5	25	Yes
L35428	CB35402	CB34129	502	-0.1	CIRCULAR	36	36	21	856.9	856.6	25	Yes
L35429	CB35434	CB35428	209.63	0.24	CIRCULAR	24	24	11	862.6	862.6	10	Yes
L35430	CB35430	CB35428	459	0.15	CIRCULAR	42	42	39	863.0	862.6	39	Yes
L35431	CB35432	CB35430	121.33	0.15	CIRCULAR	36	36	26	863.3	863.0	35	Yes
L35432	P35474	CB35432	331.18	3	CIRCULAR	15	15	11	867.1	863.3	2	No
L35434	CB35436	CB35434	50.99	0.59	CIRCULAR	12	12	3	862.3	862.6	4	Yes
L35436	P35438	CB35436	87.43	0.57	CIRCULAR	12	12	3	861.9	862.3	4	Yes
L35440	CB35442	CB35440	203.01	0.75	CIRCULAR	30	30	35	862.0	862.0	23	Yes
L35442	CB35444	CB35442	255.69	0.77	CIRCULAR	30	30	36	862.6	862.0	27	Yes
L35445	CB35454	P35446	497.39	0.6	CIRCULAR	30	30	32	866.7	866.7	18	Yes
L35446	CB35466	CB354466A	363	1	CIRCULAR	27	27	31	872.1	867.7	33	No
L35446A	CB354466A	CB35466B	180	4.28	CIRCULAR	27	27	64	867.7	866.7	33	No
L35446B	CB35466B	P35446	26	1.46	CIRCULAR	27	27	37	866.7	866.7	27	Yes

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L35447	CB35470	P35446	470.04	1.17	CIRCULAR	30	30	44	866.7	866.7	16	Yes
L35448	CB35448	P35446	187.07	4.01	CIRCULAR	21	21	32	866.8	866.7	17	Yes
L35449	CB35450	CB35448	492.25	0.81	CIRCULAR	18	18	9	868.3	866.8	6	No
L35450	CB35452	CB35450	332.39	3.16	CIRCULAR	15	15	11	877.9	868.3	3	No
L35454	CB35456	CB35454	121.65	2.06	CIRCULAR	24	24	32	866.7	866.7	4	Yes
L35455	CB35458	CB35454	110.77	0.45	CIRCULAR	24	24	15	866.7	866.7	7	Yes
L35458	CB35460	CB35458	127.61	1.41	CIRCULAR	18	18	12	866.7	866.7	3	Yes
L35460	CB35462	CB35460	41.58	0.48	CIRCULAR	15	15	4	866.7	866.7	2	Yes
L35462	P35464	CB35462	84.51	0.59	CIRCULAR	12	12	3	866.7	866.7	5	Yes
L35466	CB35468	CB35466	174.06	1.19	CIRCULAR	18	18	11	874.3	872.1	12	Yes
L35468A	CB35468A	CB35468	115	0.61	CIRCULAR	18	18	8	876.2	874.3	12	Yes
L35468B	CB35468B	CB35468A	40	0.6	CIRCULAR	18	18	8	877.2	876.2	12	Yes
L35470	CB35472	CB35470	545.93	0.22	CIRCULAR	24	24	11	866.7	866.7	6	Yes
P243	CB35476	CB35474	398.8	0.26	CIRCULAR	42	42	51	861.1	862.0	24	Yes
P244	CB35474	CB35418	399.36	0.27	CIRCULAR	42	42	52	862.0	861.6	34	Yes
P247	SB35411	CB35408	65	0.31	CIRCULAR	42	42	56	859.2	859.3	43	Yes
P248	CB35427	CB35426	518.65	0.11	CIRCULAR	48	48	48	862.4	861.6	59	Yes
P35418	P35422	CB35476	392.31	0.05	CIRCULAR	42	42	23	860.3	861.1	10	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
C11407	P11316	P11338	50	0.2	CIRCULAR	18	18	4	872.5	872.2	1	No
L11118	P11116	P11118	100	-1.1	CIRCULAR	18	18	11	879.2	874.1	1	No
L11120	P11118	P11402	100	1	CIRCULAR	18	18	11	874.1	871.5	9	No
L11204	P11206	J11204	85	0.24	CIRCULAR	24	24	11	872.5	872.0	7	No
L11211	P11202	J11206	398.43	-0.1	CIRCULAR	12	12	1	869.6	868.8	1	No
L11212	J11206	J11207	100	1	CIRCULAR	12	12	4	868.8	868.0	1	No
L11213	J11207	J11208	672.77	0.34	CIRCULAR	12	12	2	868.0	865.0	1	No
L11216	J11209	J11210	63.25	0.47	CIRCULAR	12	12	2	875.3	874.2	5	No
L11218	J11204	P11213	20	6.5	CIRCULAR	12	12	9	872.0	870.6	7	No
L11338	P11340	P11338	100	2	CIRCULAR	18	18	13	874.5	872.2	3	No
L11401	J11412	P11402	185	1.35	CIRCULAR	18	18	12	875.8	871.5	7	No
L12306	P12313	P12314	20	9	CIRCULAR	15	15	19	858.0	856.5	1	No
L13406	P13408	J13406	40	1	CIRCULAR	12	12	2	864.0	863.1	1	No
L14104	P14106	J14104	80	0.25	CIRCULAR	12	12	2	875.2	874.4	1	No
L14434	P14436	J14434	76	-0.66	CIRCULAR	15	15	5	871.5	870.6	3	No
L14435	P14401	O14429	715	0.91	CIRCULAR	15	15	7	874.9	866.3	8	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L34106	CB34108	CB34106	444.35	0.56	CIRCULAR	18	18	8	857.7	855.2	12	Yes
L34200	CB34202	O34300	181.87	7.15	CIRCULAR	27	27	83	849.7	843.0	15	No
L34201	CB34204	O34301	340.29	3.23	CIRCULAR	27	27	56	852.3	843.3	49	Yes
L34204	CB34106	CB34204	562.32	0.53	CIRCULAR	27	27	23	855.2	852.3	33	Yes
L34300	CB34302	O34400	43	0.67	CIRCULAR	24	24	19	847.7	843.6	59	Yes
L34302	P34304	CB34302	90	1.14	CIRCULAR	24	24	24	847.0	847.7	28	Yes
L34304	CB34306	P34304	150	0.5	CIRCULAR	27	27	22	848.1	847.0	33	Yes
L34305	CB34342	P34304	165	0.3	CIRCULAR	18	18	6	848.4	847.0	13	Yes
L34306	CB34308	CB34306	251	0.39	CIRCULAR	27	27	19	851.4	848.1	33	Yes
L34308	CB34310	CB34308	225	0.45	CIRCULAR	27	27	21	853.3	851.4	21	Yes
L34310	CB34412	CB34310	147	0.48	CIRCULAR	27	27	21	852.1	853.3	19	Yes
L34311	P34311	CB34310	65	1.08	CIRCULAR	15	15	7	852.0	853.3	6	Yes
L34328	CB34442	CB34440	279	0.42	CIRCULAR	27	27	20	854.9	854.4	14	No
L34340	CB34344	CB34342	320	0.37	CIRCULAR	18	18	6	854.0	848.4	13	Yes
L34342	CB34346	CB34344	270	0.26	CIRCULAR	18	18	5	854.8	854.0	7	Yes
L34344	CB34448	CB34346	472	0.2	CIRCULAR	18	18	5	854.8	854.8	6	Yes
L344100	CB34485	CB34487	28.54	0.7	CIRCULAR	30	30	34	854.3	854.3	2	Yes
L344101	CB34487	CB34489	33.67	0	CIRCULAR	30	30	2	854.3	854.3	2	Yes
L344102	CB34488	CB34489	46.54	5.35	CIRCULAR	18	18	24	854.3	854.3	0	No
L344103	CB34486	CB34485	71.93	1.11	CIRCULAR	18	18	11	854.3	854.3	0	Yes
L344104	CB34489	CB34497	241.59	0.41	CIRCULAR	30	30	26	854.3	854.3	2	Yes
L344105	CB34474	CB34476	97.57	1.47	CIRCULAR	30	30	50	854.3	854.3	0	No
L34412	CB34414	CB34412	217	0.3	CIRCULAR	27	27	17	855.5	852.1	19	Yes
L34414	P34418	CB34414	380	0.42	CIRCULAR	24	24	15	854.3	855.5	19	Yes
L34415	P34316	CB34414	30	12.17	CIRCULAR	15	15	23	852.3	855.5	4	No
L34416	CB34418	P34418	157	0.21	CIRCULAR	42	42	46	854.4	854.3	37	Yes
L34417	CB34430	P34418	51	1	CIRCULAR	18	18	11	854.4	854.3	9	Yes
L34418	CB34420	CB34418	155	0.43	CIRCULAR	36	36	44	854.4	854.4	35	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L34420	CB34422	CB34420	450	0.34	CIRCULAR	36	36	39	854.4	854.4	28	No
L34422	CB34424	CB34422	219	0.39	CIRCULAR	30	30	26	855.6	854.4	22	No
L34424	CB34426	CB34424	219	0.61	CIRCULAR	24	24	18	856.5	855.6	15	No
L34426	CB34428	CB34426	143	0.44	CIRCULAR	24	24	15	857.3	856.5	15	No
L34430	CB34432	CB34430	65	1.25	CIRCULAR	15	15	7	854.4	854.4	9	Yes
L34432	P34434	CB34432	32	3.28	CIRCULAR	15	15	12	854.4	854.4	4	Yes
L34433	CB34433	CB34432	30	1.97	CIRCULAR	15	15	9	855.5	854.4	11	Yes
L34434	CB34436	P34434	54	0.43	CIRCULAR	36	36	44	854.4	854.4	26	Yes
L34436	CB34438	CB34436	149	0.13	CIRCULAR	36	36	24	854.4	854.4	26	Yes
L34438	CB34440	CB34438	333	0.4	CIRCULAR	30	30	26	854.4	854.4	25	No
L34442	CB34444	CB34442	183	0.59	CIRCULAR	24	24	17	855.8	854.9	14	No
L34444	CB34446	CB34444	282	0.72	CIRCULAR	15	15	5	857.5	855.8	4	No
L34448	CB34450	CB34448	204	0.84	CIRCULAR	18	18	10	852.3	854.8	11	Yes
L34450	CB34454	CB34450	168	0.21	CIRCULAR	18	18	5	853.3	852.3	8	Yes
L34451	P34451	CB34450	32	0.31	CIRCULAR	18	18	6	852.2	852.3	15	Yes
L34452	P34452	CB34450	62	0.48	CIRCULAR	18	18	7	852.3	852.3	7	Yes
L34454	CB34456	CB34454	267	0.25	CIRCULAR	18	18	5	854.7	853.3	8	Yes
L34456	CB34458	CB34456	140	0.36	CIRCULAR	15	15	4	857.1	854.7	7	Yes
L34458	P34460	CB34458	2.61	100	CIRCULAR	27	27	310	855.0	857.1	84	No
L34459	CB34493	CB34494	33.37	0.27	CIRCULAR	18	18	5	854.3	854.3	0	No
L34460	CB34496	CB34497	122.82	1.15	CIRCULAR	18	18	11	854.3	854.3	1	Yes
L34461	CB34494	CB34496	136.81	1.36	CIRCULAR	18	18	12	854.3	854.3	0	No
L34462	CB34495	CB34496	103.55	0.69	CIRCULAR	18	18	9	854.3	854.3	2	Yes
L34463	CB34492	CB34493	81.16	0.36	CIRCULAR	18	18	6	854.3	854.3	0	No
L34464	CB34497	CB34498	38.88	1.8	CIRCULAR	36	36	90	854.3	854.3	3	Yes
L34465	CB34498	P34418	45	0.82	CIRCULAR	36	36	60	854.3	854.3	3	Yes
L34466	CB34491	CB34497	119.39	1.37	CIRCULAR	18	18	12	854.3	854.3	0	Yes
L34467	CB34490	CB34491	109.2	0.62	CIRCULAR	18	18	8	854.3	854.3	0	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L34468	CB344102	CB344103	36.58	0.36	CIRCULAR	18	18	6	854.3	854.3	0	Yes
L34469	CB344104	CB344105	132.01	-0.05	CIRCULAR	21	21	4	854.3	854.3	0	Yes
L34470	CB344103	CB344104	72.86	2.14	CIRCULAR	21	21	23	854.3	854.3	0	Yes
L34471	CB344105	CB344106	117.23	0.38	CIRCULAR	21	21	10	854.3	854.3	1	Yes
L34472	CB344106	P34418	47	0.21	CIRCULAR	24	24	10	854.3	854.3	1	Yes
L34473	CB344100	P34418	20	1	CIRCULAR	12	12	10	854.3	854.3	0	Yes
L34474	CB34499	P34418	20	1	CIRCULAR	12	12	7	854.3	854.3	0	Yes
L34475	CB34459	CB34460	31.4	7.36	CIRCULAR	12	12	10	858.5	856.2	0	No
L34476	CB34461	CB34462	23.73	12.73	CIRCULAR	12	12	13	858.5	855.5	0	No
L34477	CB34460	CB34462	69.2	0.94	CIRCULAR	18	18	10	856.2	855.5	0	No
L34478	CB34462	CB34463	77.68	0.33	CIRCULAR	18	18	6	855.5	855.3	0	No
L34479	CB34463	CB34465	94.68	0.25	CIRCULAR	18	18	5	855.3	855.0	0	No
L34480	CB34464	CB34465	24.77	4.84	CIRCULAR	12	12	8	856.2	855.0	0	No
L34481	CB34465	CB34474	38.36	5.14	CIRCULAR	18	18	24	855.0	854.3	0	No
L34482	CB34466	CB34467	36	0.44	CIRCULAR	12	12	2	855.9	855.8	0	No
L34483	CB34467	CB34468	42.89	0.49	CIRCULAR	12	12	2	855.8	855.6	0	No
L34484	CB34468	CB34469	89.41	0.83	CIRCULAR	18	18	10	855.6	854.8	0	No
L34485	CB34469	CB34470	179.48	0.53	CIRCULAR	18	18	8	854.8	854.3	0	No
L34486	CB34471	CB34472	32.86	0.79	CIRCULAR	12	12	3	855.9	855.6	0	No
L34487	CB34472	CB34470	61.69	2.8	CIRCULAR	12	12	6	855.6	854.3	0	No
L34488	CB34470	CB34473	60.49	0.31	CIRCULAR	18	18	6	854.3	854.3	0	No
L34489	CB34473	CB34474	59.35	1.1	CIRCULAR	18	18	11	854.3	854.3	0	No
L34490	CB34475	CB34476	42.98	7.38	CIRCULAR	18	18	29	854.8	854.3	0	No
L34491	CB34477	CB34478	35.24	6.07	CIRCULAR	18	18	26	854.3	854.3	0	No
L34492	CB34476	CB34478	147.21	0	CIRCULAR	30	30	1	854.3	854.3	1	Yes
L34493	CB34479	CB34480	139.99	0.34	CIRCULAR	18	18	6	854.5	854.3	0	No
L34494	CB34480	CB34481	118.29	0.74	CIRCULAR	18	18	9	854.3	854.3	0	No
L34495	CB34481	CB34483	99.83	0.56	CIRCULAR	18	18	8	854.3	854.3	0	No

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L34496	CB34482	CB34483	133.04	0.56	CIRCULAR	18	18	8	854.3	854.3	0	No
L34497	CB34483	CB34478	108.36	0.88	CIRCULAR	18	18	10	854.3	854.3	0	Yes
L34498	CB34478	CB34484	126.56	-0.37	CIRCULAR	30	30	25	854.3	854.3	1	No
L34499	CB34484	CB34485	123.45	0.5	CIRCULAR	30	30	29	854.3	854.3	2	No

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L01306	P01308	P01306	50	5	Filled Circula	6	18	4	871.1	867.4	1	No
L03312	P03314	J03312	70	1.43	CIRCULAR	18	18	11	882.7	881.1	4	No
L03419	P03432	P03418	150	0.67	CIRCULAR	18	18	7	888.8	888.3	0	No
L04402	P06404	J06402	98.38	0.51	CIRCULAR	18	18	6	888.4	887.3	9	No
L05336	P05338	J05136	20	5	CIRCULAR	42	42	195	887.2	885.2	32	No
L05338	P05340	P05338	150	2.67	CIRCULAR	42	42	142	891.2	887.2	31	No
L06408	P06410	J06408	107.95	0.93	CIRCULAR	18	18	9	891.0	889.1	6	No
L06412	P06414	J06412	96.03	2.08	CIRCULAR	18	18	13	902.5	900.1	2	No
L06416	P06418	J06416	99.94	2	CIRCULAR	18	18	13	901.5	899.1	3	No
L06419	J06420	J06419	39.28	20.37	CIRCULAR	18	18	41	909.0	900.2	20	No
L06422	P06424	J06422	106.7	0.47	CIRCULAR	18	18	6	910.3	909.6	1	No
L07102	P07107	P07102	100	0.5	CIRCULAR	24	24	14	892.2	892.2	6	yes
L07107	P07106	P07107	100	0.2	CIRCULAR	24	24	9	892.3	892.2	7	yes
L07202	P07204	J07202	300	4.33	CIRCULAR	18	18	13	885.6	872.4	3	No
L07204	P07206	P07204	77	10.39	CIRCULAR	18	18	20	900.4	885.6	20	No
L07206	J07208	P07206	100	0.5	CIRCULAR	18	18	6	901.3	900.4	13	yes
L07414	P07102	P07414	100	0.5	CIRCULAR	15	15	4	892.2	892.2	4	yes
L08302	P08304	J08302	90	2.78	CIRCULAR	18	18	15	886.4	883.6	1	No
L08328	P08330	J08328	91.17	1.1	Arch	60	108	481	870.2	870.1	81	No
L08406	CB08408	P08406	50	0.2	CIRCULAR	15	15	3	887.1	887.1	9	yes
L08407	P08418	P08408	50	11.4	CIRCULAR	18	18	22	892.4	885.0	10	No
L08408	P08416	P08408	35	0.57	CIRCULAR	15	15	4	885.0	885.0	8	yes
L08409	CB08406	P08406	50	3	CIRCULAR	18	18	16	888.6	887.1	19	yes
L08410	P07112	P08410	130	1.15	Arch	27.6	18	23	890.4	889.8	2	No
L08416	CB08420	P08416	30	13.33	CIRCULAR	15	15	20	885.0	885.0	10	No
L08417	CB08418	P08416	50	0.2	CIRCULAR	15	15	3	887.4	885.0	11	yes
L08418	P08420	P08418	105	1.05	CIRCULAR	15	15	6	896.2	892.4	9	No
L09123	P09434	P09122	1659.56	0.03	CIRCULAR	15	15	1	885.6	890.0	1	No

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L09218	P09320	J09218	110	0.23	Arch	60	108	219	867.1	866.9	89	No
L09324	P09426	P09424	100	0.5	CIRCULAR	15	15	4	892.8	892.0	0	No
L09326	P09428	P09426	1100.57	0.05	CIRCULAR	15	15	1	892.0	892.8	1	No
L09330	P09432	P09330	818.23	1.28	CIRCULAR	15	15	6	887.9	873.4	7	No
L10110	P10412	J10110	90	0.56	Arch	84	138	766	865.4	865.3	91	No
L10112	P10114	J10112	115	0.43	rizontal Ellip	18	24	11	886.8	885.7	6	No
L10122	P10122	P10120	100	1	CIRCULAR	15	15	6	888.5	888.6	1	No
L17405	P17407	P17404	100	3	CIRCULAR	15	15	10	873.5	874.2	0	No

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
2P Pipe	2P	1P	172	0.58	CIRCULAR	21	21	10	869.5	868.6	15	Yes
3P pipe	3P	2P	115	0.55	CIRCULAR	18	18	7	871.1	869.5	9	No
L17400	P17400	CB17400	107.87	-0.76	CIRCULAR	15	15	5	872.0	871.9	1	No
L17402	CB17401	MH17401	51.89	1.16	CIRCULAR	15	15	6	871.7	871.5	1	No
L174111	P17406	CB17402	100	0.3	CIRCULAR	15	15	3	873.3	873.0	0	No
L174112	CB17402	CB17403	31	0.65	CIRCULAR	15	15	5	873.0	872.8	0	No
L174113	CB17403	J17405	181.73	0.72	CIRCULAR	15	15	5	872.8	872.0	0	No
L18302	CB18304	J18302	195	0.39	CIRCULAR	24	24	14	883.1	868.7	27	No
L18304	CB18306	CB18304	48	0.15	CIRCULAR	24	24	9	883.2	883.1	8	No
L18305	CB18310	CB18304	168.05	1.79	CIRCULAR	15	15	9	885.4	883.1	8	Yes
L18306	CB18308	CB18306	224.92	0.12	CIRCULAR	15	15	2	883.7	883.2	5	Yes
L18307	CB18312	CB18304	484	0.4	CIRCULAR	15	15	4	886.5	883.1	6	Yes
L18312	CB18314	CB18312	169	0.5	CIRCULAR	15	15	5	887.0	886.5	6	Yes
L18316	J18318	L18316	164	6.9	CIRCULAR	15	15	15	879.2	868.5	6	No
L18318	CB18320	J18318	350	0.35	CIRCULAR	15	15	3	884.5	879.2	6	No
L18322	CB18324	J18322	320	4.54	CIRCULAR	15	15	14	881.9	868.6	12	No
L18326	CB18328	J18326	195	0.39	CIRCULAR	24	24	14	880.8	878.1	12	No
L18328	CB18330	CB18328	48	0.13	CIRCULAR	24	24	8	881.9	880.8	1	No
L18329	CB18340	CB18328	293	0.2	CIRCULAR	18	18	5	884.6	880.8	9	Yes
L18330	J18332	CB18330	275	0.1	CIRCULAR	15	15	2	882.5	881.9	1	No
L18336	CB18338	J18336	198	0.29	CIRCULAR	15	15	3	890.3	885.9	5	No
L18339	CB18339	CB18338	68	0.28	CIRCULAR	15	15	3	893.5	890.3	11	Yes
L20306	P20400	P20306	125	0	CIRCULAR	24	24	1	870.2	869.8	0	No
L21202-E	P21204-E	P21202-E	90	0.33	CIRCULAR	15	15	4	868.4	868.3	3	Yes
L21204-E	P21206-E	P21204-E	86	0.58	CIRCULAR	15	15	4	868.5	868.4	4	Yes
L21400	P21402	P21400	100	2	CIRCULAR	24	24	28	876.9	867.8	9	No
L27300	CB27302	J27300	176.06	0.01	CIRCULAR	18	18	15	863.5	863.4	5	No
L27301	P27306	J27300	120.3	0.06	CIRCULAR	18	18	3	862.9	863.4	4	No

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L27302	CB27304	CB27302	153.25	0.03	CIRCULAR	18	18	2	863.5	863.5	3	Yes
L27308	P34400	O27308	90	0	Arch	18	15	0	863.1	860.0	3	No
L28100	P28102	CB28100	1050	0.25	Arch	45	72	99	865.3	864.5	68	Yes
L28100-E	CB28102-E	CB28136	120.01	-0.52	CIRCULAR	24	24	16	865.5	865.4	11	Yes
L28101	J28116	P28102	10	0	CIRCULAR	15	15	1	865.3	865.3	5	Yes
9P outlet	9P	1P	108	4.31	CIRCULAR	15	15	12	868.6	868.6	3	Yes
L28102-E	P28104-E	CB28102-E	415	0.36	CIRCULAR	24	24	14	864.3	865.5	12	No
L28103	CB28130	P28102	50	0.1	CIRCULAR	24	24	7	865.4	865.3	21	Yes
L28104	CB28106	P28104	43	0.22	Arch	36	58	53	865.3	865.3	64	Yes
L28104-E	P28106-E	P28104-E	70	0.71	CIRCULAR	18	18	9	865.8	864.3	10	No
L28105	J28132	P28102	150	0.39	CIRCULAR	60	60	152	865.3	865.3	80	No
L28105-E	MH28154-E	P28104-E	90	0.11	CIRCULAR	18	18	42	865.9	864.3	8	No
L28106	CB28254	P28104	70	0.21	CIRCULAR	42	42	43	865.4	865.3	41	Yes
L28106a	CB28108	CB28106	56	0.2	Arch	36	58	50	865.4	865.3	58	Yes
L28106-E	CB28108-E	P28106-E	100	0.46	CIRCULAR	48	48	97	866.8	865.8	33	No
L28107	CB28120	P28104	67	0.55	CIRCULAR	33	33	36	865.4	865.3	37	Yes
L28107a	CB28146	P28102	50	0.76	CIRCULAR	48	48	116	865.3	865.3	76	Yes
L28107-E	CB28142-E	P28106-E	282.65	0.18	CIRCULAR	18	18	4	867.9	865.8	7	No
L28108	J28110	CB28108	208	0.5	CIRCULAR	36	36	44	868.1	865.4	28	Yes
L28108-E	CB28110-E	CB28108-E	94.51	0.28	CIRCULAR	30	30	22	867.8	866.8	31	No
L28109	J28156	P28102	120	0.1	CIRCULAR	54	54	58	865.3	865.3	58	Yes
L28109-E	CB28138-E	CB28110-E	209.73	1.56	CIRCULAR	12	12	4	868.5	867.8	2	No
L28110	CB28112	J28110	300	0.5	CIRCULAR	30	30	27	869.5	868.1	28	Yes
L28110-E	CB28112-E	CB28110-E	110	0.55	CIRCULAR	27	27	23	869.2	867.8	28	Yes
L28111	CB28256	P28104	50	0.38	CIRCULAR	21	21	9	865.3	865.3	5	Yes
L28111-E	CB28134-E	CB28110-E	163.57	0.41	CIRCULAR	15	15	4	868.2	867.8	4	Yes
L28112	CB28114	CB28112	320	0.5	CIRCULAR	24	24	15	870.0	869.5	13	Yes
L28112-E	CB28114-E	CB28112-E	186.54	0.36	CIRCULAR	27	27	19	870.6	869.2	23	Yes

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L28113-E	CB28140-E	CB28112-E	223.47	1.24	CIRCULAR	12	12	4	871.8	869.2	4	Yes
L28114-E	CB28116-E	CB28114-E	218.56	0.69	CIRCULAR	27	27	26	871.0	870.6	11	Yes
L17401	CB17400	CB17401	27	-0.3	CIRCULAR	15	15	3	871.9	871.7	1	No
L28115-E	CB28124-E	CB28114-E	62.98	0.79	CIRCULAR	24	24	20	870.9	870.6	14	Yes
L28116-E	CB28118-E	CB28116-E	286.64	0.23	CIRCULAR	21	21	8	871.8	871.0	6	Yes
L28118	P28104	N28118	10	0	CIRCULAR	15	15	1	865.3	865.3	7	Yes
L28118-E	CB28120-E	CB28118-E	134.75	1.22	CIRCULAR	15	15	7	870.9	871.8	1	No
L28119-E	CB28122-E	CB28118-E	78.67	0.6	CIRCULAR	18	18	8	872.6	871.8	5	Yes
L28120	J28122	CB28120	250	1	CIRCULAR	18	18	10	867.7	865.4	11	Yes
L28121	J28126	CB28120	191	0.5	CIRCULAR	30	30	27	865.8	865.4	24	Yes
L28122	P28124	J28122	40	0.5	CIRCULAR	18	18	7	868.2	867.7	12	Yes
L28124-E	CB28126-E	CB28124-E	332.53	0.23	CIRCULAR	24	24	11	871.3	870.9	11	Yes
L28126	CB28128	J28126	200	0.49	CIRCULAR	30	30	27	867.8	865.8	24	Yes
L28126-E	CB28128-E	CB28126-E	137.89	0.23	CIRCULAR	21	21	8	871.6	871.3	7	Yes
L28128-E	CB28132-E	CB28128-E	316.76	0.32	CIRCULAR	18	18	6	872.6	871.6	7	Yes
L28129-E	CB28130-E	CB28128-E	194.16	0.22	CIRCULAR	12	12	2	872.0	871.6	2	Yes
L28132	CB28134	J28132	300	0.09	CIRCULAR	60	60	74	865.3	865.3	81	No
L28134a	CB28136	CB28134	130	0.42	CIRCULAR	54	54	119	865.4	865.3	55	No
L28134-E	P28136-E	CB28134-E	193.08	0.83	CIRCULAR	15	15	6	867.8	868.2	4	No
L28136	J28138	CB28136	100	0.69	CIRCULAR	30	30	32	866.0	865.4	21	Yes
L28136-E	P21202-E	P28136-E	100	0.2	CIRCULAR	18	18	3	868.3	867.8	4	No
L28137	CB28144	CB28136	300	0.65	CIRCULAR	27	27	23	870.4	865.4	21	Yes
L28138	CB28140	J28138	250	0.44	CIRCULAR	27	27	19	869.9	866.0	21	Yes
L28143-E	MH28144-E	P28143-E	30	2.5	CIRCULAR	48	48	227	866.2	866.2	17	No
L28144-E	MH28146-E	MH28144-E	19.78	0.51	CIRCULAR	48	48	102	866.2	866.2	10	No
L28145-E	MH28148-E	MH28146-E	64.82	0.08	CIRCULAR	12	12	1	866.7	866.2	3	Yes
L28146	CB28148	CB28146	220	0.12	Arch	36	58	39	867.3	865.3	68	Yes
L28146-E	MH28150-E	MH28146-E	399.16	-0.03	CIRCULAR	36	36	11	866.4	866.2	7	No

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L28148	CB28150	CB28148	600	0.21	CIRCULAR	27	27	13	869.6	867.3	23	Yes
L28149	CB28154	CB28148	350	0.54	CIRCULAR	33	33	36	871.1	867.3	24	Yes
L28150	CB28152	CB28150	320	0.13	CIRCULAR	27	27	11	871.8	869.6	6	Yes
L28150-E	MH28152-E	MH28150-E	296.88	0.13	CIRCULAR	30	30	15	866.5	866.4	4	No
L28154-E	P28143-E	MH28154-E	40	0	CIRCULAR	18	18	1	866.2	865.9	12	Yes
L28156	CB28158	J28156	100	0.1	CIRCULAR	27	27	9	865.4	865.3	21	Yes
L28157	CB28162	J28156	300	0.1	CIRCULAR	30	30	12	865.3	865.3	14	Yes
L28158	CB28160	CB28158	180	0.39	CIRCULAR	21	21	9	866.4	865.4	14	Yes
L28159	CB28164	J28156	280	0.1	CIRCULAR	42	42	30	865.3	865.3	25	Yes
L28164	CB28166	CB28164	365	0.1	CIRCULAR	42	42	29	865.4	865.3	24	Yes
L28188	J28490	J28488	400	0.5	CIRCULAR	36	36	41	865.8	870.0	27	Yes
L28201	P28310	J28202	20	-0.15	CIRCULAR	48	48	52	862.4	861.4	111	Yes
L28202	J28204	J28202	120.29	0.12	CIRCULAR	60	60	218	861.4	861.4	37	Yes
L28204	J28206	J28204	141	0.1	CIRCULAR	60	60	76	861.4	861.4	37	Yes
L28206	J28208	J28206	343	0.1	CIRCULAR	60	60	71	861.3	861.4	37	Yes
L28208	J28210	J28208	360	0.1	CIRCULAR	60	60	76	861.1	861.3	37	Yes
L28210	J28212	J28210	360	0.1	CIRCULAR	60	60	76	861.0	861.1	37	Yes
L28212	J28214	J28212	360	0.1	CIRCULAR	60	60	76	860.9	861.0	37	Yes
L28214	J28216	J28214	360	0.1	CIRCULAR	60	60	76	860.8	860.9	37	Yes
L28216	J28218	J28216	246	0.1	CIRCULAR	60	60	77	862.2	860.8	151	Yes
L28218	P28220	J28218	210	2.33	Rectangular	36	84	352	863.5	862.2	151	Yes
L28219	P28228	P28220	591	-0.04	Arch	72	114	135	863.4	863.5	150	Yes
L28220	J28222	P28220	106	-0.33	Arch	54	88	193	863.6	863.5	94	Yes
L28221	CB28250	P28220	150	-0.31	CIRCULAR	36	36	35	864.9	863.5	50	Yes
L28222	CB28224	J28222	179	0.13	Arch	54	88	123	863.8	863.6	94	Yes
L28223	CB28252	P28220	200	-0.21	CIRCULAR	30	30	17	864.5	863.5	28	Yes
L28224	CB28226	CB28224	500	0.1	Arch	54	87	104	864.2	863.8	73	Yes
L28225	J27300	P28220	341.37	1.74	CIRCULAR	24	24	30	863.4	863.5	4	No

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L28226	CB28100	CB28226	300	0.1	Arch	54	87	102	864.5	864.2	73	Yes
L28228	CB28230	P28228	239	0.07	Arch	72	114	181	863.4	863.4	152	Yes
L28230	CB28232	CB28230	365	0.07	Arch	54	88	88	863.4	863.4	104	Yes
L28231	J28246	CB28230	750	0.17	Arch	36	58	46	865.4	863.4	32	Yes
L28232	CB28234	CB28232	265	0.07	Arch	54	88	87	863.3	863.4	77	Yes
L28234	J28236	CB28234	440	0.07	Arch	54	88	88	863.8	863.3	80	Yes
L28236	J28238	J28236	340	0.13	Arch	54	88	121	864.1	863.8	80	Yes
L28237	P28244	J28238	125	1.18	Arch	31	51	85	864.6	864.1	36	Yes
L28238	J28240	J28238	260	0.1	CIRCULAR	60	60	75	865.0	864.1	45	Yes
L28240	P28242	J28240	200	0.11	CIRCULAR	42	42	30	864.4	865.0	18	Yes
L28244	P28326	P28244	200	0.38	Arch	31	51	48	865.2	864.6	33	Yes
L28246	P28248	J28246	280	0.1	CIRCULAR	33	33	16	864.0	865.4	13	Yes
L28300	J28302	J28300	300	1.63	CIRCULAR	42	42	111	851.7	846.7	28	No
L28301	P28334	Mh28305	44	-3	CIRCULAR	30	30	62	854.3	853.5	28	Yes
L28302	P28304	P28334	146	0.25	CIRCULAR	42	42	47	854.4	854.3	25	Yes
L28303	Mh28305	J28302	400	0.1	CIRCULAR	42	42	28	853.5	851.7	28	No
L28305	MH28306	J28302	129.86	0.32	CIRCULAR	42	42	2	851.7	851.7	0	No
L28306	J28200	I28337	6.03	3.48	CIRCULAR	72	72	785	854.4	862.0	4	No
L28310	CB28312	P28310	187	0.18	CIRCULAR	54	54	153	863.0	862.4	137	Yes
L28312	CB28314	CB28312	560	0.1	CIRCULAR	84	84	188	863.3	863.0	119	No
L28314	CB28316	CB28314	357	0.1	CIRCULAR	84	84	188	863.6	863.3	105	No
L28316	CB28318	CB28316	506	0.1	CIRCULAR	84	84	188	863.8	863.6	95	No
L28317	CB28400	CB28318	650	0.1	CIRCULAR	72	72	124	863.9	863.8	66	No
L28318	P28320	CB28318	340	0.2	CIRCULAR	48	48	60	864.3	863.8	50	Yes
L28320	CB28324	P28320	300	1.34	CIRCULAR	18	18	11	868.1	864.3	10	Yes
L28321	CB28322	P28320	660	0.26	CIRCULAR	24	24	11	865.1	864.3	7	Yes
L28326	CB28328	P28326	400	0.1	Arch	26	43	16	866.5	865.2	23	Yes
L28400	J28102	CB28400	500	0.1	CIRCULAR	72	72	122	863.9	863.9	38	No

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L28401	J28488	CB28400	600	0.2	CIRCULAR	36	36	28	870.0	863.9	27	Yes
L28402	J28404	J28102	125	0.05	CIRCULAR	42	42	20	863.9	863.9	34	Yes
L28403	CB28476	J28102	420	0.27	Arch	45	72	106	864.2	863.9	53	No
L28404	J28406	J28404	605	0.05	CIRCULAR	42	42	21	864.2	863.9	34	Yes
L28405	CB28454	P28408	220	0.1	CIRCULAR	72	72	122	864.3	864.3	100	No
L28406	P28408	J28406	100	0.15	Rectangular	24	60	33	864.3	864.2	130	Yes
L28407	CB28430	P28408	100	0.6	CIRCULAR	21	21	11	864.3	864.3	13	Yes
L28408	CB28410	P28408	215	0.05	CIRCULAR	54	54	41	864.5	864.3	33	No
L28409	J28432	P28408	150	0.27	CIRCULAR	60	60	126	864.3	864.3	14	No
L28410	P28412	CB28410	107	0.05	CIRCULAR	48	48	29	864.3	864.5	24	No
L28411	CB28426	CB28410	330	0.1	CIRCULAR	42	42	30	866.0	864.5	36	No
L28413	CB28470	P28408	100	0.14	CIRCULAR	48	48	50	864.3	864.3	40	Yes
L28414	P28416	P28414	116	0.22	CIRCULAR	30	30	18	867.2	864.3	36	No
L28415	CB28401	P28402	220	0.5	CIRCULAR	18	18	6	877.4	876.6	3	No
L28416	P29104	P28416	60	0.1	CIRCULAR	24	24	6	866.3	867.2	17	No
L28417	MH28401	MH28402	24.7	2.06	CIRCULAR	15	15	8	873.1	872.7	1	No
L28418	MH28402	MH28403	232.36	0.5	CIRCULAR	18	18	6	872.7	871.4	1	No
L28419	MH28403	MH28404	43.44	0.99	CIRCULAR	24	24	20	871.4	870.9	1	No
L28420	MH28404	MH28405	30.14	1	CIRCULAR	24	24	20	870.9	870.7	1	No
L28421	MH28405	CB28406	324.57	1.04	CIRCULAR	24	24	20	870.7	866.2	5	No
L28422	P28403	CB28406	432.27	0.14	CIRCULAR	27	27	10	866.4	866.2	1	No
L28423	CB28407	P28404	94.17	0.46	CIRCULAR	18	18	6	870.4	869.9	3	No
L28424	P28404	P28405	164.3	0.6	CIRCULAR	21	21	11	869.9	869.2	4	No
L28425	P28405	P28406	177.99	0.47	CIRCULAR	24	24	13	869.2	868.5	6	No
L28426	CB28428	CB28426	380	0.21	CIRCULAR	33	33	22	866.8	866.0	19	Yes
L28427	P28406	P28407	148.52	0.55	CIRCULAR	24	24	15	868.5	867.9	8	No
L28428	P28407	CB28408	168.11	0.47	CIRCULAR	24	24	13	867.9	866.8	9	No
L28429	CB28408	CB28409	140.84	0.5	CIRCULAR	30	30	25	866.8	865.9	9	No

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L28430	CB28409	CB28412	149.41	0.91	CIRCULAR	33	33	44	865.9	865.1	12	No
L28431	CB28406	CB28411	281.54	0.25	CIRCULAR	48	48	63	866.2	865.7	6	No
L28432	CB28434	P28440	214	0.26	Arch	45	72	103	864.3	863.6	32	No
L28433	CB28411	CB28412	315.8	0.14	CIRCULAR	60	60	84	865.7	865.1	18	No
L28434	CB28413	CB28411	142.32	1.1	CIRCULAR	36	36	61	866.4	865.7	11	No
L28435	CB28414	CB28413	87.52	1.58	CIRCULAR	30	30	45	867.8	866.4	7	No
L28436	CB28415	CB28414	109.46	0.59	CIRCULAR	24	24	15	868.8	867.8	7	No
L28437	CB28416	CB28415	98.08	0.53	CIRCULAR	18	18	7	869.0	868.8	3	No
L28439	P28410	CB28415	75.79	0.51	CIRCULAR	18	18	7	869.1	868.8	4	No
L28440	P28409	P28410	220.74	0.49	CIRCULAR	18	18	6	869.8	869.1	2	No
L28441	P28411	P28413	173.23	0.5	CIRCULAR	18	18	6	868.3	868.0	4	No
L28442	P28413	P28415	220.61	0.5	CIRCULAR	18	18	6	868.0	867.6	4	Yes
L28449	P28420	CB28412	142	0.39	CIRCULAR	15	15	3	861.8	865.1	0	No
L28454	CB28456	CB28454	300	0.23	CIRCULAR	54	54	88	865.3	864.3	80	No
L28455	J28466	CB28456	290	0.33	CIRCULAR	42	42	54	866.0	865.3	34	Yes
L28456	CB28458	CB28456	445	0.28	CIRCULAR	42	42	49	866.2	865.3	34	Yes
L28458	CB28460	CB28458	389	0.28	CIRCULAR	42	42	49	866.6	866.2	32	No
L28460	CB28462	CB28460	188	0.28	CIRCULAR	42	42	49	866.9	866.6	31	No
L28462	CB28464	CB28462	400	0.41	CIRCULAR	27	27	19	871.1	866.9	23	Yes
L28466	J28468	J28466	350	0.53	CIRCULAR	27	27	21	868.5	866.0	16	Yes
L28470	P28472	CB28470	360	0.13	CIRCULAR	33	33	18	864.4	864.3	23	Yes
L28472	P28474	P28472	150	0.1	CIRCULAR	33	33	16	865.0	864.4	23	Yes
L28475	CB28186	CB28476	100	0.27	CIRCULAR	54	54	95	864.2	864.2	1	No
L28476	J28478	CB28476	130	0.28	Arch	40	65	79	864.3	864.2	27	Yes
L28478	CB28480	J28478	210	0.1	CIRCULAR	42	42	30	864.5	864.3	28	No
L28480	CB28482	CB28480	170	0.11	CIRCULAR	42	42	30	864.7	864.5	25	No
L28482	CB28484	CB28482	150	0.11	CIRCULAR	42	42	31	864.8	864.7	18	No
L28484	P28486	CB28484	470	0.2	CIRCULAR	27	27	13	865.7	864.8	13	Yes

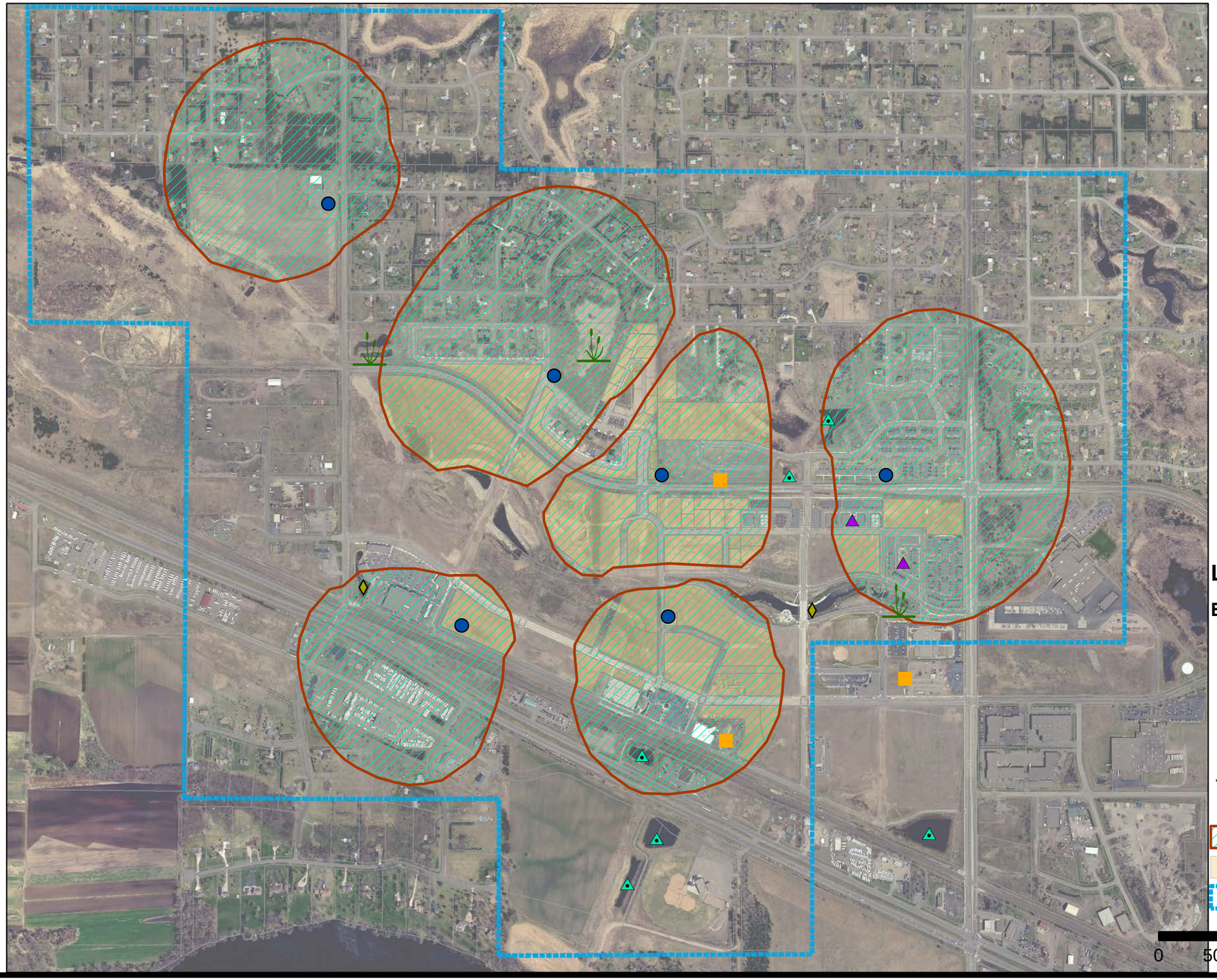
PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
L28490	P28492	J28490	56	-0.38	CIRCULAR	36	36	58	866.2	865.8	40	Yes
L28492	J28494	P28492	28	0.5	CIRCULAR	36	36	44	866.4	866.2	65	Yes
L28494	J28496	J28494	46	0.5	CIRCULAR	36	36	44	868.2	866.4	65	Yes
L28496	CB28498	J28496	12.5	0.4	CIRCULAR	36	36	39	869.0	868.2	65	Yes
L28497	CB29106	CB28498	80	0.2	CIRCULAR	36	36	28	869.4	869.0	39	Yes
L28498	CB28499	CB28498	76	0.5	CIRCULAR	24	24	15	870.1	869.0	25	Yes
L29100	P29102	CB29105	371.55	0.5	CIRCULAR	18	18	6	869.4	868.4	4	No
L29102	CB29105	P29100	26.71	1.87	CIRCULAR	18	18	12	868.4	868.4	4	Yes
L29104	CB29104	P29102	39.89	0.18	CIRCULAR	12	12	1	871.2	869.4	5	No
L30102	CB30104	O30101	345.94	0.23	CIRCULAR	24	24	11	852.8	849.0	16	Yes
L30104	CB30106	CB30104	244.41	0.08	CIRCULAR	18	18	36	852.0	852.8	9	Yes
L30106	CB30108	CB30106	802.88	1.18	CIRCULAR	12	12	4	862.0	852.0	4	Yes
L33404	J33408	O33404	10	10	CIRCULAR	4	4	1	842.5	850.5	4	Yes
L33408	J33410	J33408	176	1.51	CIRCULAR	42	42	107	861.3	842.5	98	Yes
L33410	J33412	J33410	294	1.5	CIRCULAR	42	42	114	843.0	861.3	28	No
L33412	J28300	J33412	300	1.49	CIRCULAR	42	42	114	846.7	843.0	28	No
L5065	5065	CB28100	257.71	0.57	CIRCULAR	24	24	15	867.8	864.5	22	Yes
L5066	5066	5065	214.13	0.51	CIRCULAR	24	24	14	866.4	867.8	11	Yes
L5067	5067	5066	218.78	0.42	CIRCULAR	18	18	6	867.5	866.4	4	Yes
L5073	5073	5065	66.74	0.72	CIRCULAR	15	15	5	868.9	867.8	4	Yes
L5074	5074	5066	65.95	0.86	CIRCULAR	21	21	13	866.5	866.4	10	Yes
L5200	5200	5067	103.59	0.29	CIRCULAR	15	15	3	866.5	867.5	2	Yes
L5202	5202	5067	41.18	0.44	CIRCULAR	18	18	6	867.2	867.5	3	Yes
L5203	5203	5202	94.35	0.35	CIRCULAR	18	18	5	867.2	867.2	4	Yes
L5204	5204	5203	99.58	0.27	CIRCULAR	18	18	5	866.7	867.2	5	Yes
L-A1	A1	5065	65	1	CIRCULAR	24	24	20	868.2	867.8	14	Yes
L-A2	A2	A1	165	1	CIRCULAR	21	21	14	868.2	868.2	9	Yes
L-A3	A3	A2	40	1	CIRCULAR	15	15	6	867.8	868.2	6	Yes

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
Link-05	J28353A	I28348	47	0.4	CIRCULAR	12	12	2	870.0	862.0	4	Yes
Link-06	J28376	J28374	7.13	1.96	CIRCULAR	18	18	13	874.0	873.9	0	No
Link-07	J28374	I28372	27.33	0.88	CIRCULAR	18	18	9	873.9	862.0	0	No
Link-08	J28362	P28336	127	0.31	CIRCULAR	30	30	23	860.8	860.4	23	No
Link-10	I28366	I28364	62.51	1.68	CIRCULAR	18	18	12	862.0	862.0	1	No
Link-11	CB28412	CB28434	57	0.14	Arch	45	72	72	865.1	864.3	32	No
Link-12	I28362	I28364	34.22	0.7	CIRCULAR	18	18	8	862.0	862.0	0	No
Link-13	I28364	I28368	56.5	0.81	CIRCULAR	18	18	8	862.0	862.0	2	No
Link-14	J28380	I28380	61.28	0.46	CIRCULAR	18	18	6	870.8	862.0	1	No
Link-15	I28380	J28378	21.43	1.49	CIRCULAR	18	18	11	862.0	870.3	2	No
Link-25	I28337	P28304	91.97	0.34	CIRCULAR	72	72	228	862.0	854.4	17	No
Link-26	J28433	P28418	371.31	0.08	CIRCULAR	42	42	25	867.3	867.2	13	Yes
Link-27	J28431	J28433	130.06	1.66	CIRCULAR	24	24	25	867.4	867.3	9	Yes
Link-30	P28415	P28417	162.38	0.5	CIRCULAR	21	21	10	867.6	867.3	7	Yes
Link-31	P28417	J28430	95.49	1.15	CIRCULAR	24	24	21	867.3	870.9	5	Yes
Link-32	J28430	J28433	163.57	0.62	CIRCULAR	33	33	36	870.9	867.3	12	Yes
Link-35	P-6	P29104	50	-1.6	CIRCULAR	36	36	219	874.3	866.3	4	No
Link-40	1P	1P outlet	32	-5	CIRCULAR	18	18	20	868.6	868.0	8	Yes
Link-42	1P outlet	RTC Connect	426	0.12	CIRCULAR	36	36	20	868.0	868.0	0	Yes
P-33	I28360	I28358	10.85	1.66	CIRCULAR	18	18	12	862.0	862.0	0	Yes
P-38A	I28352	I28356	69.17	0.39	CIRCULAR	15	15	4	862.0	862.0	3	No
P391	I28372	I28370	73.42	6.69	CIRCULAR	18	18	24	862.0	862.0	0	No
P392	I28370	J28372	92.42	0.94	CIRCULAR	18	18	9	862.0	868.6	5	No
Pipe - (11)	I28348	I28346	37.5	0.51	CIRCULAR	15	15	5	862.0	862.0	4	No
Pipe - (28)	I28378	I28376	36	0.33	CIRCULAR	18	18	10	862.0	862.0	2	No
Pipe 10	I28336	I28334	35	0.26	CIRCULAR	15	15	3	862.0	862.0	3	No
Pipe 11	CBMH13	J28360	55	0.58	CIRCULAR	24	24	17	862.0	857.6	8	No
Pipe 12	J28360	J28358	454	0.22	CIRCULAR	24	24	11	857.6	856.8	8	No

PIPE ID	FROM NODE	TO NODE	LENGTH (ft)	AVERAGE PIPE SLOPE %	PIPE SHAPE	PIPE DIAMETER (in)	PIPE WIDTH (in)	DESIGN FLOW CAPACITY (cfs)	MAXIMUM US HGL (ft)	MAXIMUM DS HGL (ft)	PEAK FLOW DURING ANALYSIS (CFS)	PIPE FLOWING FULL?
Pipe 14	CBMH 14	CBMH13	34	0.5	CIRCULAR	18	18	7	862.0	862.0	7	No
Pipe 15	I28340	I28338	36.74	0.49	CIRCULAR	15	15	5	862.0	862.0	2	No
Pipe 16	P28336	CBMH 14	116	0.72	CIRCULAR	15	15	6	860.4	862.0	6	No
Pipe 18	J28364	J28362	164	0.44	CIRCULAR	30	30	27	861.6	860.8	23	No
Pipe 19	J28366	J28364	243	0.44	CIRCULAR	30	30	27	862.6	861.6	23	No
Pipe 20a	I28338	J28366	320.21	0.44	CIRCULAR	30	30	27	862.0	862.6	23	No
Pipe 21	I28342	I28338	195	0.35	CIRCULAR	30	30	24	862.0	862.0	20	No
Pipe 22	I28346	I28342	164	0.35	CIRCULAR	27	27	18	862.0	862.0	17	No
Pipe 24	I28344	I28342	38.2	0.5	CIRCULAR	18	18	7	862.0	862.0	2	No
Pipe 25	J28368	I28346	384	0.24	CIRCULAR	27	27	15	866.3	862.0	12	No
Pipe 27	J28370	J28368	248	0.25	CIRCULAR	27	27	15	866.8	866.3	12	No
Pipe 28	I28354	J28370	236	0.49	CIRCULAR	24	24	16	862.0	866.8	12	No
Pipe 29	I28376	I28368	34	0.32	CIRCULAR	18	18	6	862.0	862.0	2	No
Pipe 3	J28356	I28337	96	0.36	CIRCULAR	18	18	6	861.8	862.0	0	No
Pipe 30	I28368	I28370	38	0.34	CIRCULAR	18	18	6	862.0	862.0	4	No
Pipe 31	I28374	J28376	33	0.64	CIRCULAR	18	18	8	862.0	874.0	0	No
Pipe 312	J28358	I28337	267	0.22	CIRCULAR	24	24	11	856.8	862.0	10	No
Pipe 32	J28372	I28354	121	0.6	CIRCULAR	18	18	8	868.6	862.0	5	No
Pipe 35	I28356	I28354	39.01	1.1	CIRCULAR	18	18	11	862.0	862.0	6	No
Pipe 36	J28378	I28378	34	0.5	CIRCULAR	15	15	5	870.3	862.0	2	No
Pipe 37	I28350	I28352	10.54	1.23	CIRCULAR	15	15	8	862.0	862.0	3	No
Pipe 4	J28354	J28356	164	0.35	CIRCULAR	18	18	6	862.4	861.8	0	No
Pipe 40	P28342	J28354	115.58	-1.3	CIRCULAR	18	18	10	861.7	862.4	5	No
Pipe 5	J28352	J28354	93	0.35	CIRCULAR	18	18	6	863.7	862.4	5	No
Pipe 6	J28350	J28352	321	0.35	CIRCULAR	18	18	6	864.8	863.7	5	No
Pipe 8	I28334	J28350	115	0.35	CIRCULAR	18	18	6	862.0	864.8	6	No
Pipe PL	P28340	I28344	26	1.96	CIRCULAR	12	12	5	867.3	862.0	0	No

Figures

2015 Infiltration Exhibit



SLOPE AREAS MAP

FIGURE NO. 1
OCTOBER, 2015

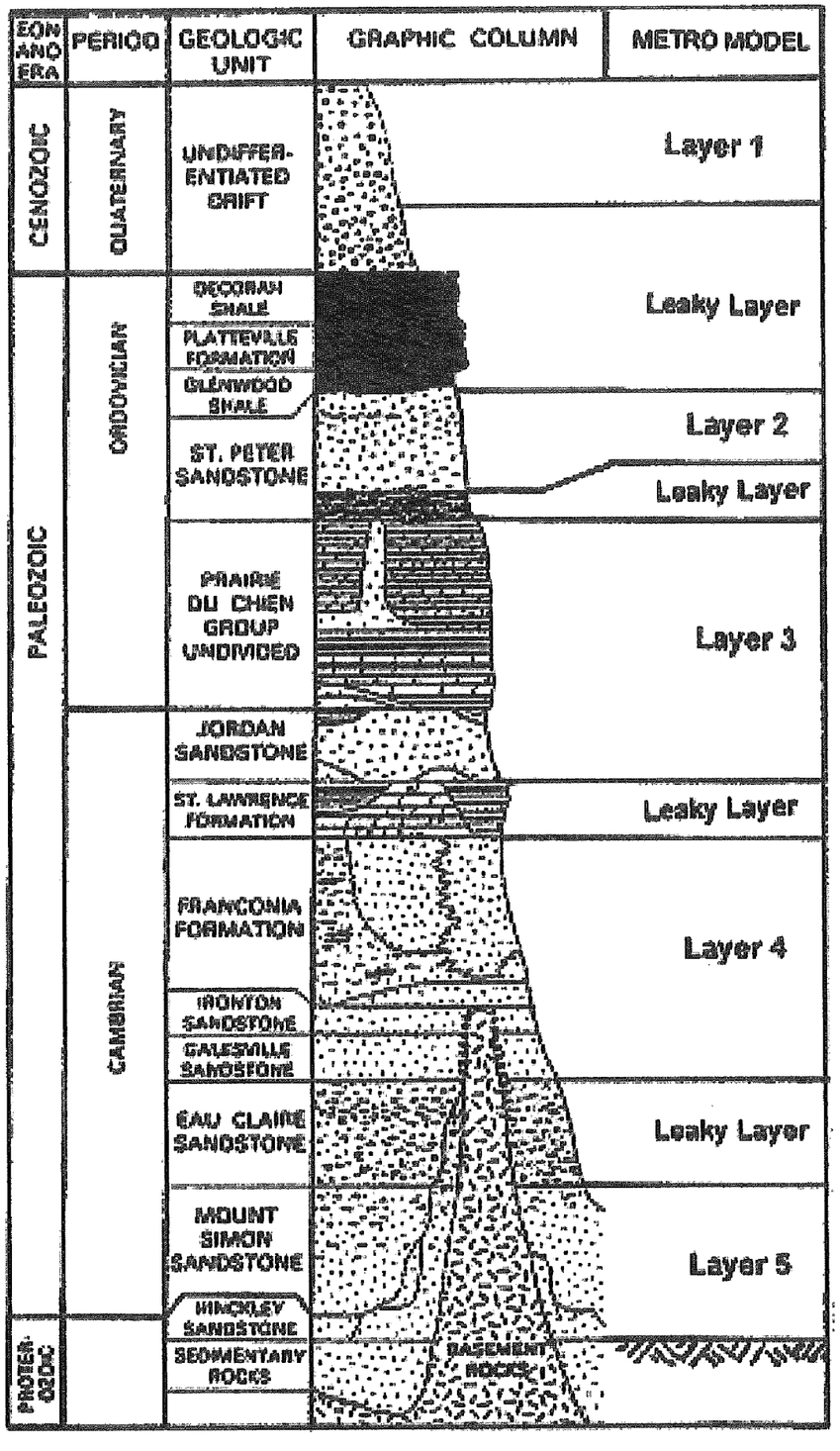
Legend

SLOPES

- Less than 12% Slopes
- 12% - 18% Slopes
- Greater than 18% Slopes

N

0 2,000 4,000 8,000 Feet



Source http://pca.state.mn.us/water/groundwater/mnoverview.html
2015 -Link Broken

City of RAMSEY

HYDROSTRATIGRAPHIC COLUMN AND CONCEPTURAL MODEL METROPOLITAN AREA GROUNDWATER MODEL - CONCEPTUAL

FIGURE 2
OCTOBER, 2015

GEOLOGIC SENSITIVITY OF THE UPPERMOST AQUIFER TO POLLUTION

FIGURE NO. 3
OCTOBER, 2015

Legend

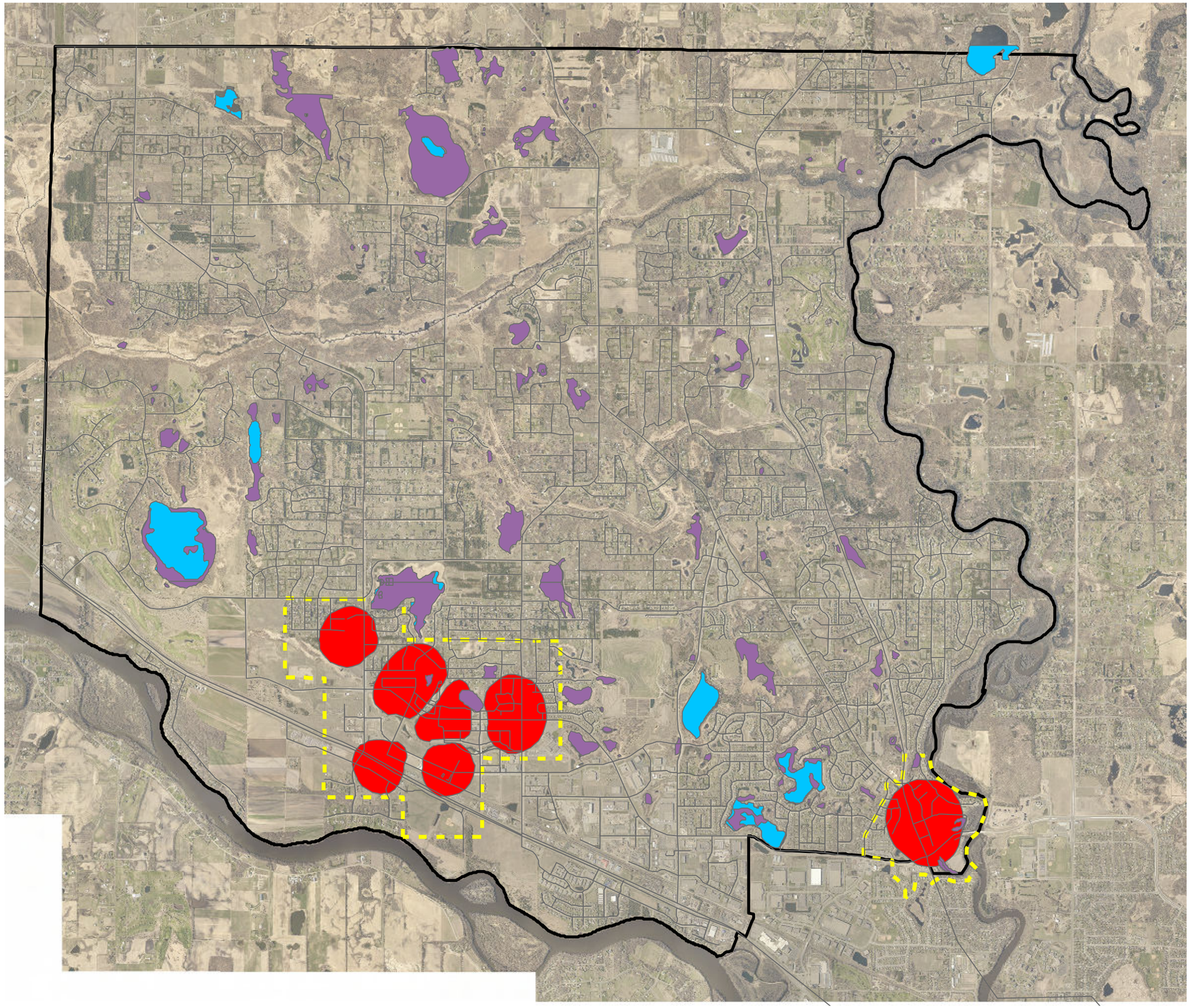
Sensitivity Ratings

- Very High - Hours to Months
- High - Weeks to Years
- Moderate - Years to Decades
- Low - Decades to Years
- Water
- City Limits

Estimated travel time for water-borne contaminants at the land surface to reach the uppermost aquifer.

N

0 2,000 4,000 8,000 Feet



City of RAMSEY

DRINKING WATER SUPPLY MANAGEMENT AREA MAP

FIGURE NO. 4
OCTOBER, 2015

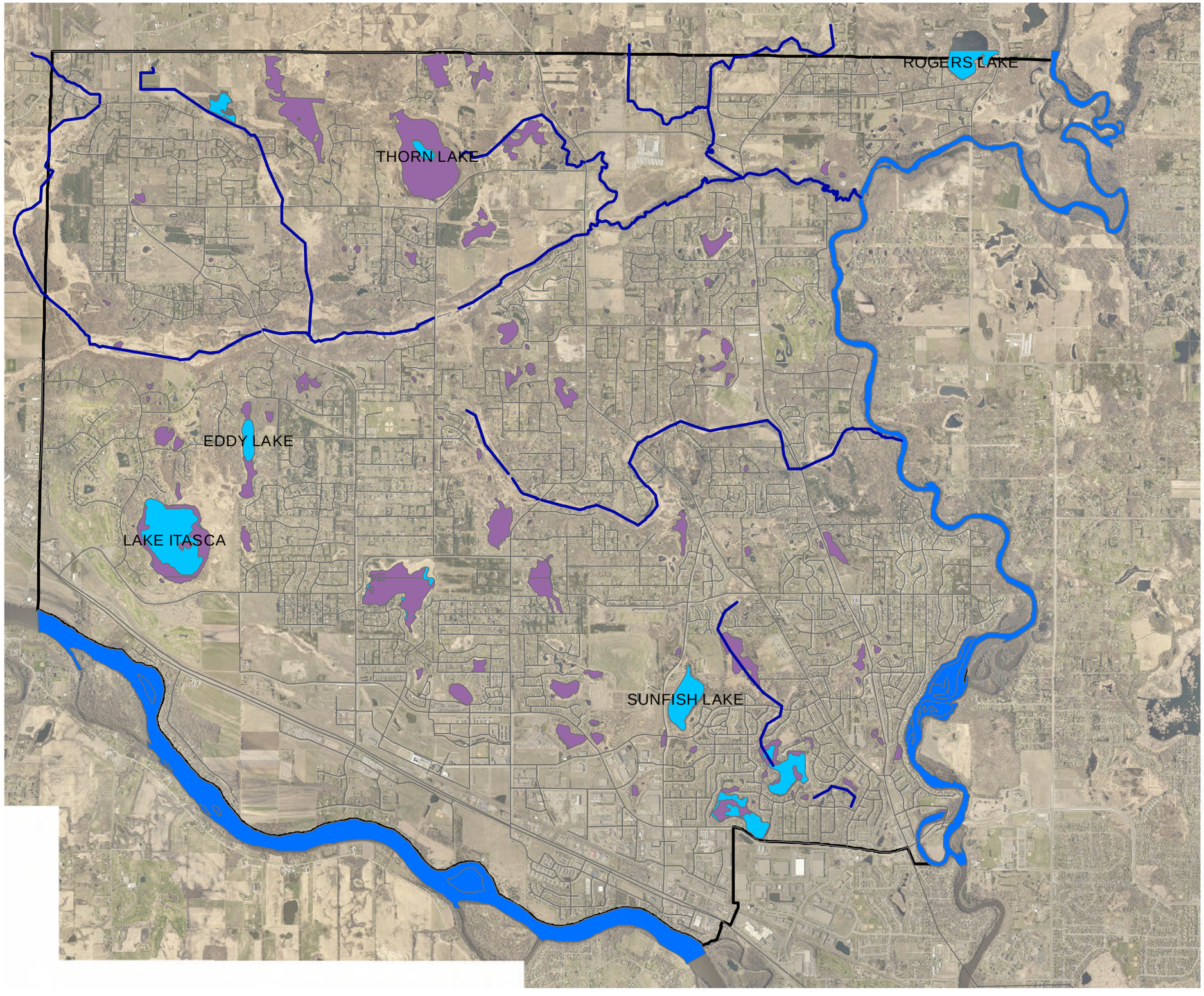
Legend

NWI_CODE

- Protected Waters
- Lakes and Ponds
- Capture Zones
- dwsma

N

0 2,000 4,000 8,000 Feet



City of RAMSEY

PUBLIC WATERS INVENTORY MAP

FIGURE NO. 5
OCTOBER, 2015

Legend

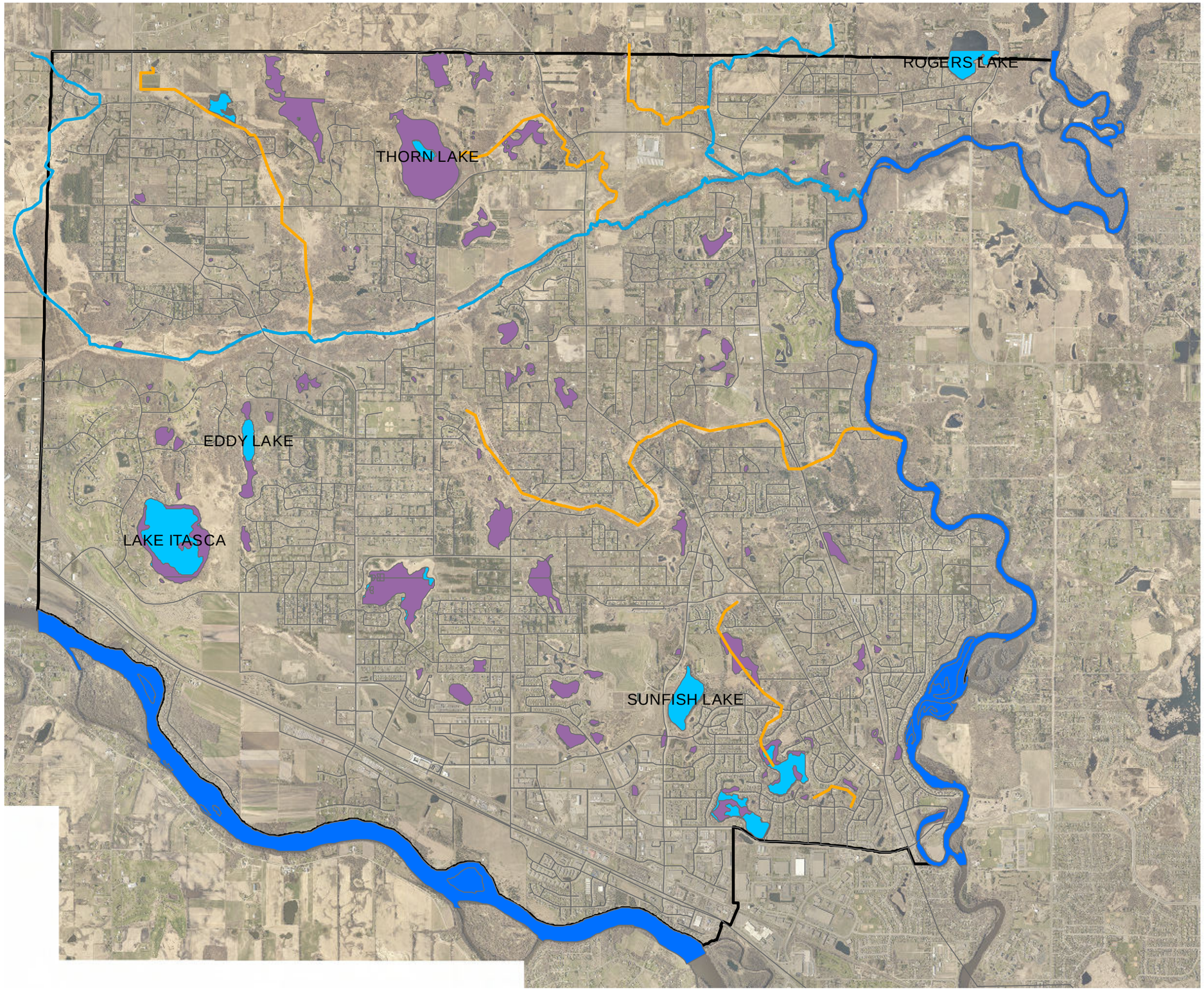
- Creeks and Ditches
- Rivers

NWI_CODE

- Protected Waters
- Lakes and Ponds

N

Feet
0 2,000 4,000 8,000



City of RAMSEY

PUBLIC WATERS INVENTORY MAP WITH PUBLIC DITCHES (MS 103E)

FIGURE NO. 5A
OCTOBER, 2015

Legend

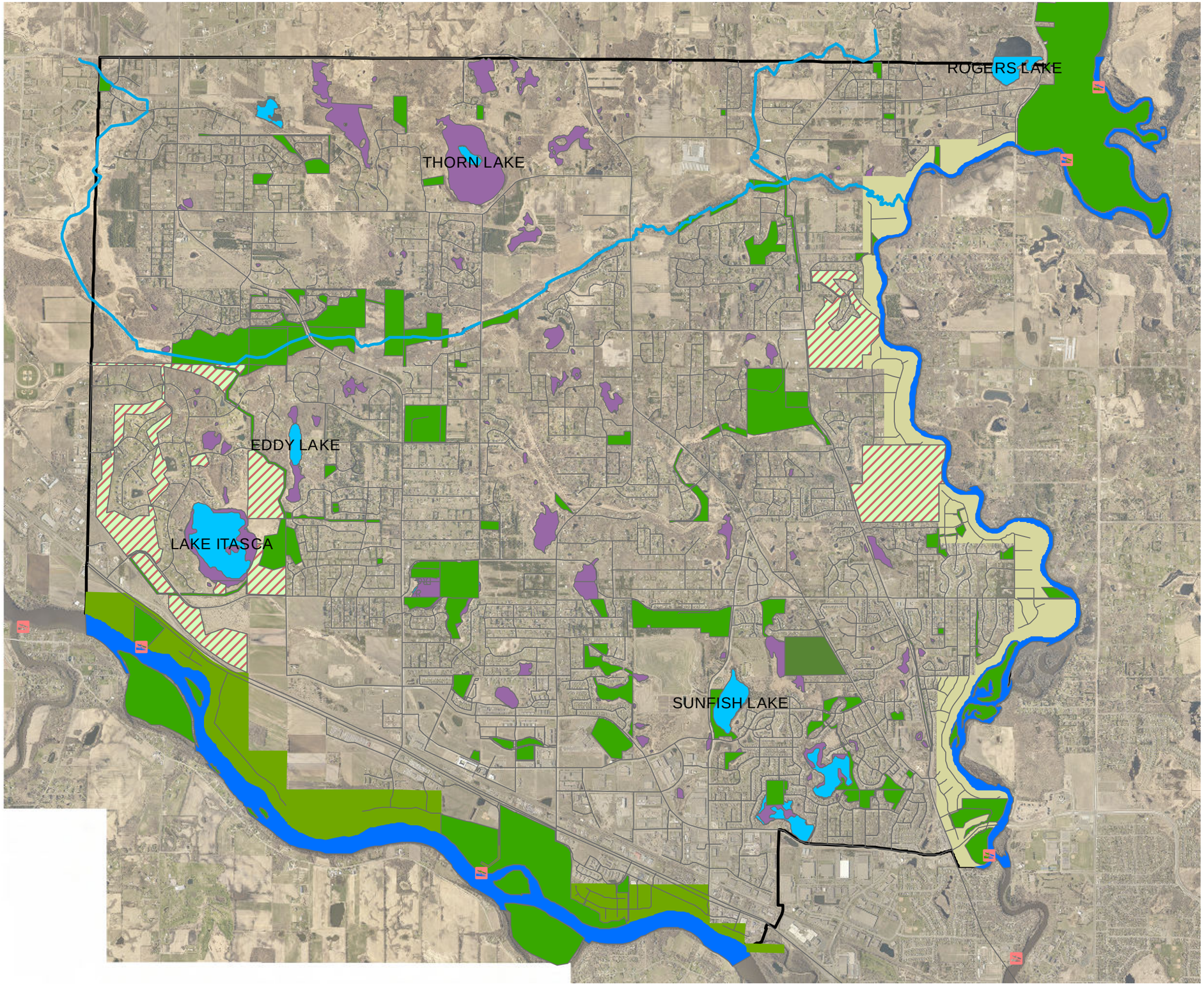
- County Ditches
- Brooks
- Rivers

NWI_CODE

- Protected Waters
- Lakes and Ponds

N

0 2,000 4,000 8,000 Feet



City of RAMSEY

PARKS MAP

FIGURE NO. 6
OCTOBER, 2015

Legend

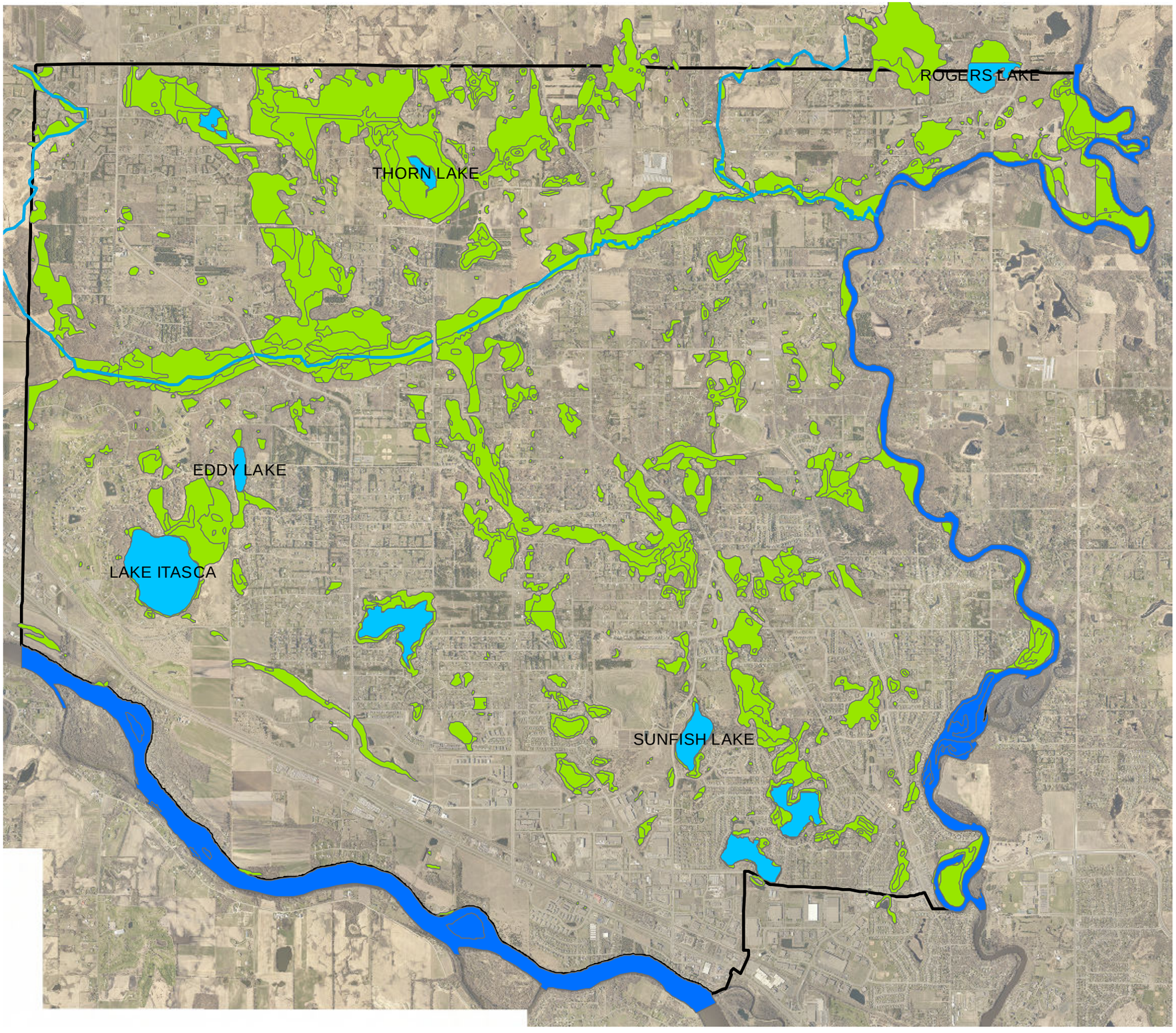
- Water Access Points
- Brooks
- Parks
- School
- Club Recreation Areas
- Mississippi River Corridor Critical Area
- Rum River Scenic Land Use District
- Rivers

NWI

- Protected Waters
- Lakes and Ponds

N

0 2,000 4,000 8,000 Feet



City of RAMSEY

NATIONAL WETLAND INVENTORY MAP

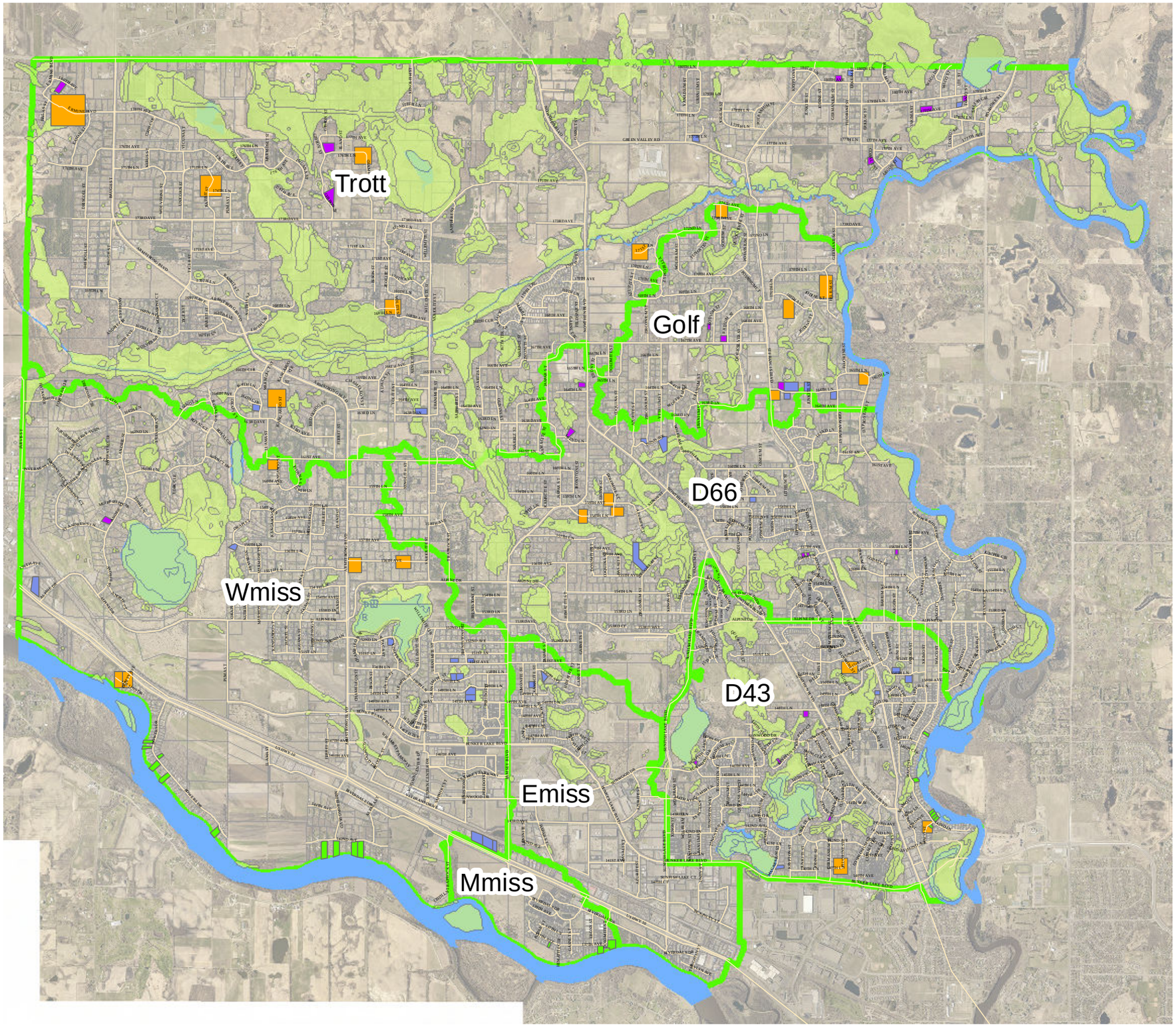
FIGURE NO. 7
OCTOBER, 2015

Legend

- Brooks
- Rivers
- Lakes and Ponds
- NWI

N

0 2,000 4,000 8,000 Feet



City of RAMSEY

GENERAL WATERSHED MAP WITH HISTORIC FLOODING LOCATIONS

FIGURE NO. 8
OCTOBER, 2015

Legend

- Streets

HISTORIC FLOODING

- 10-18-85 CITY COUNCIL MEETING
- 1997 LIST
- CITY STAFF 2007
- 2011 LIST
- 2014 LIST
- NWI
- Creeks
- Rivers
- Lakes, Ponds
- City Limits
- Watersheds
- Parcels

N

0 2,000 4,000 8,000 Feet

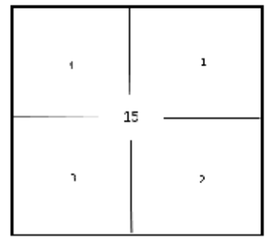
COUNTY SECTION NUMBERING AND MODELING ELEMENT NAMING CONVENTION

FIGURE NO. 9
OCTOBER, 2015

Trott
Golf
D66
Wmiss
D43
Emiss
Mmiss

Modeling Element Naming Convention

Elements are named based on the location of the item in the quadrant of the County Section, their numbered sequentially based on its relative position to the outfall. Outfall begins with O, unless multiple outfalls exist in a given watershed, and additional elements are numbered in the upstream direction. Pipes and Channels share sequencing numbers with the Junction, Catch Basin or Pond to which it flows. Also, catchbasins share sequence numbers with the Junction, Catch Sump or Pond to which it flows. There are exceptions to these rules where elements were added out of new developments, or when the sequencing numbers wouldn't fall in exact numerical order. Please see the figure below for the quadrant order and example. The thick black line is the section outline with the section number in the middle. The quadrant numbers start in the northeast quadrant and move clockwise.



Example: CB 5106

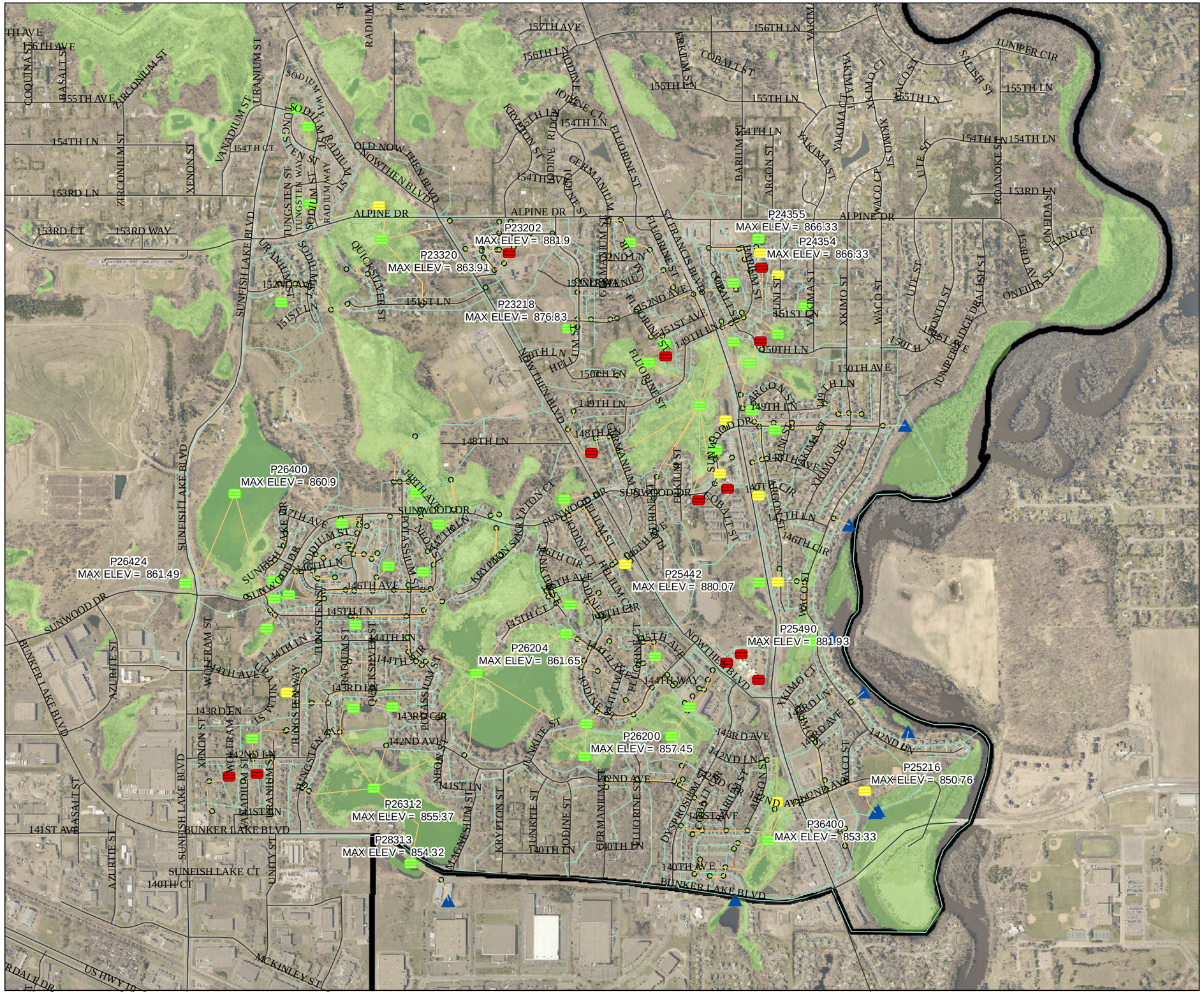
This would be catch basin number 6 located in quadrant 1 of section 15.

Legend

- Streets
- NWI
- Creeks
- Rivers
- Lakes, Ponds
- Watersheds
- Section_only
- Section_qtr
- City Limits

N

0 2,000 4,000 8,000 Feet



D43 POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 10
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 500 1,000 2,000 Feet

City of RAMSEY

D43 PIPE SUMMARY
10 YEAR PIPE CAPACITY

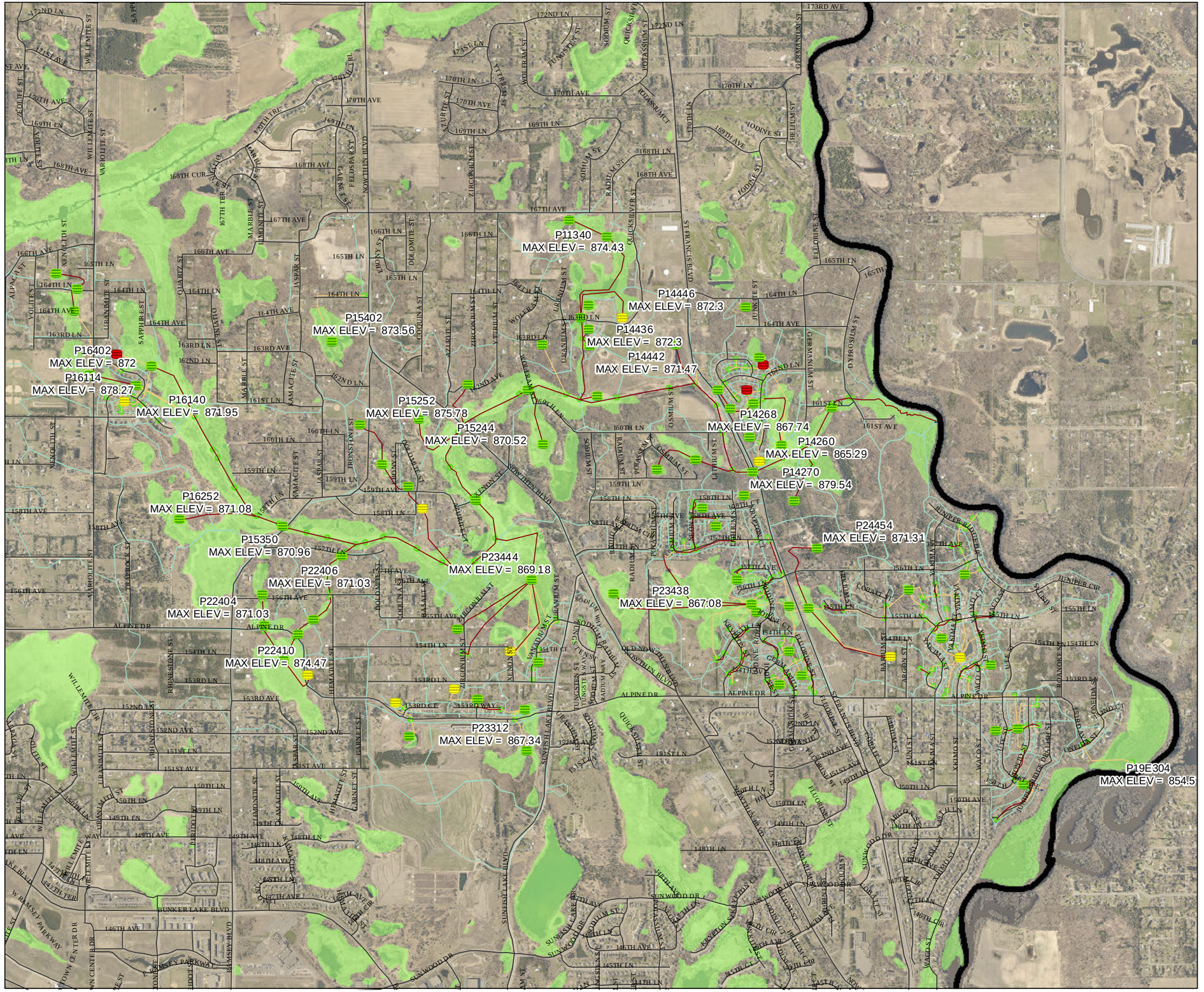
FIGURE NO. 11
OCTOBER, 2015

Legend

- Pond
- Pipe
- Pipe Flowing Full
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 500 1,000 2,000 Feet



City of RAMSEY

D66 POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 12
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures
- Channel
- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 1,000 2,000 4,000 Feet

D66 PIPE SUMMARY
10 YEAR PIPE CAPACITY

FIGURE NO. 13
OCTOBER, 2015

Legend

Pond

PIPE_FULL

Pipe

Pipe Flowing Full

Junc

Outfall

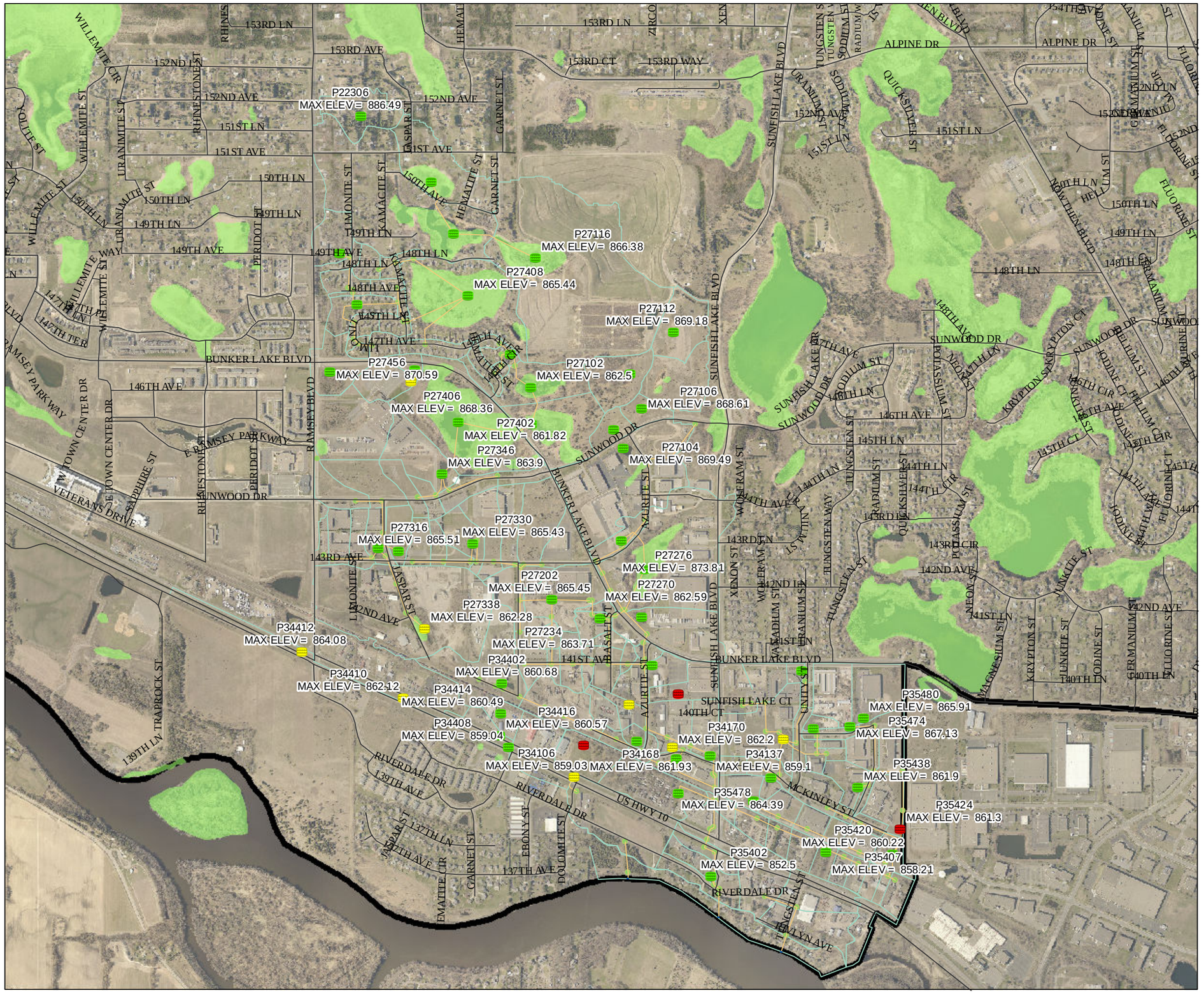
Subbasin

NWI

City Limits

N

0 1,000 2,000 4,000 Feet



EMISS POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 14
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

Pipe

Junc

Outfall

Subbasin

NWI

City Limits

N

0 500 1,000 2,000 Feet

City of RAMSEY

EMISS PIPE SUMMARY
10 YEAR PIPE CAPACITY

FIGURE NO. 15
OCTOBER, 2015

Legend

- Pond

PIPE_FULL

- Pipe
- Pipe Flowing Full
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 500 1,000 2,000 Feet

GOLF POND SUMMARY
100 YEAR PEAK ELEVATION

FIGURE NO. 16
OCTOBER, 2015

Legend

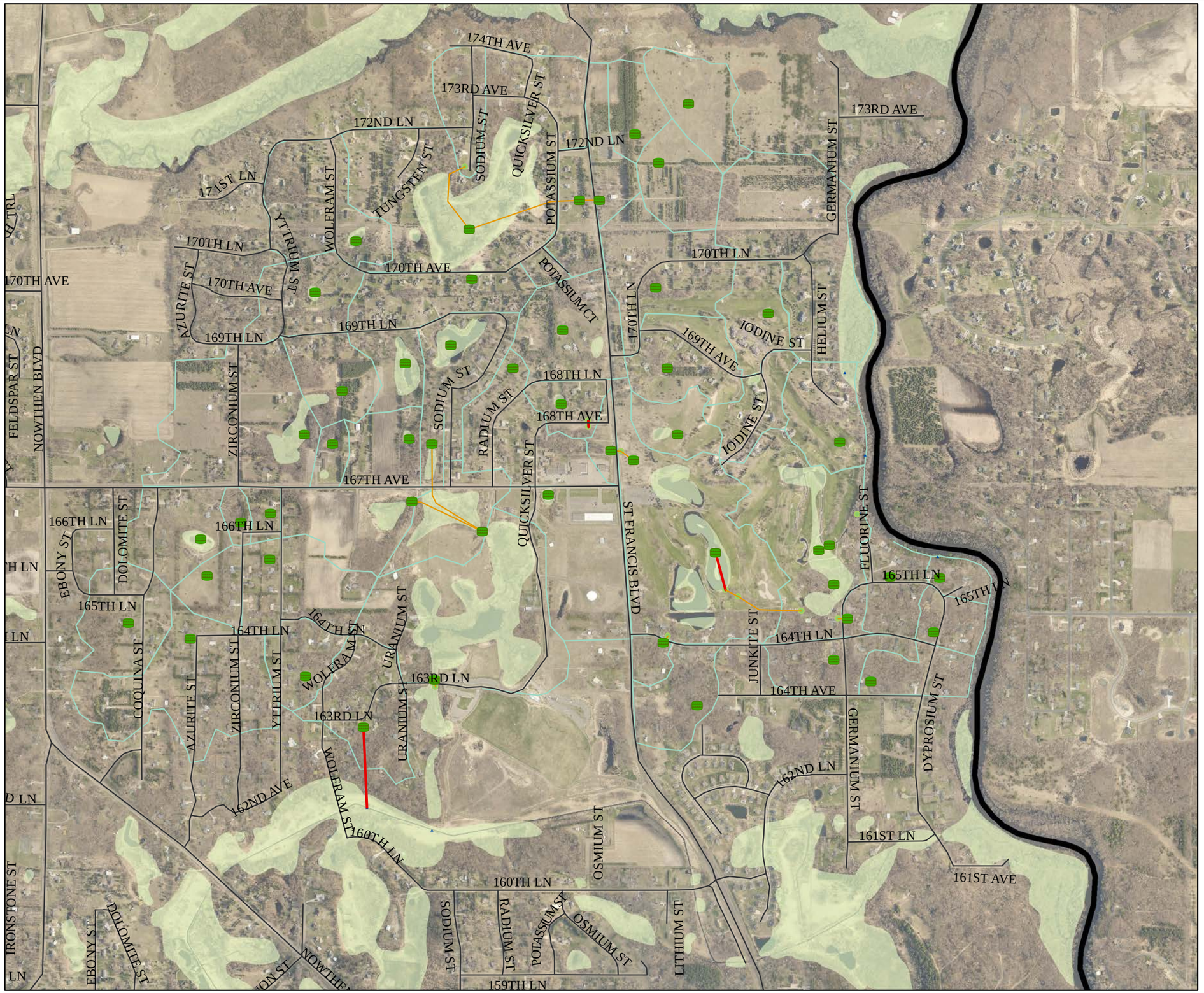
Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

- Channel
- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 500 1,000 2,000 Feet



City of RAMSEY

GOLF PIPE SUMMARY
10 YEAR PIPE CAPACITY

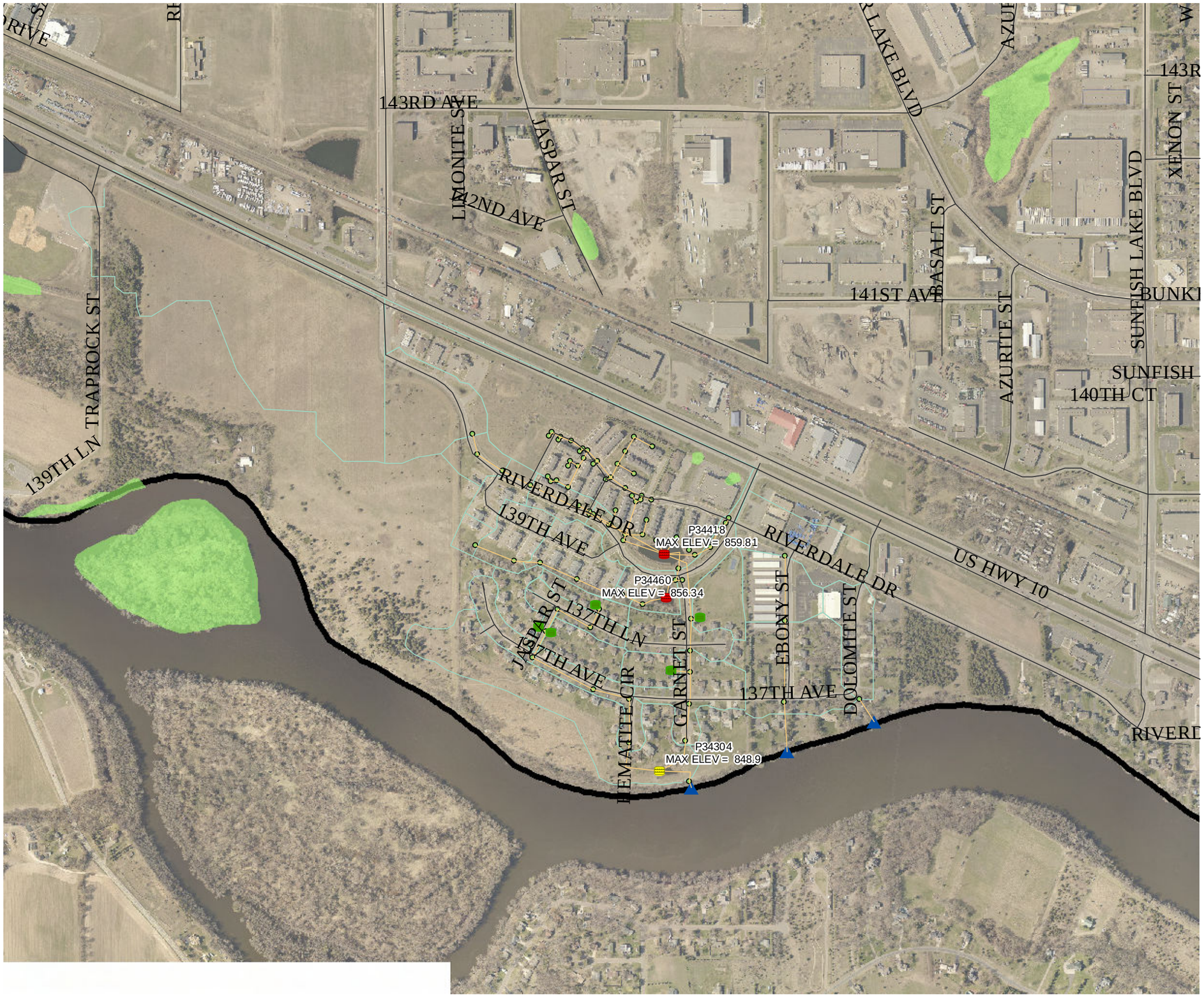
FIGURE NO. 17
OCTOBER, 2015

Legend

- Pond
- **PIPE_FULL**
- Pipe
- Pipe Flowing Full
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 500 1,000 2,000 Feet



City of RAMSEY

MMISS POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 18
OCTOBER, 2015

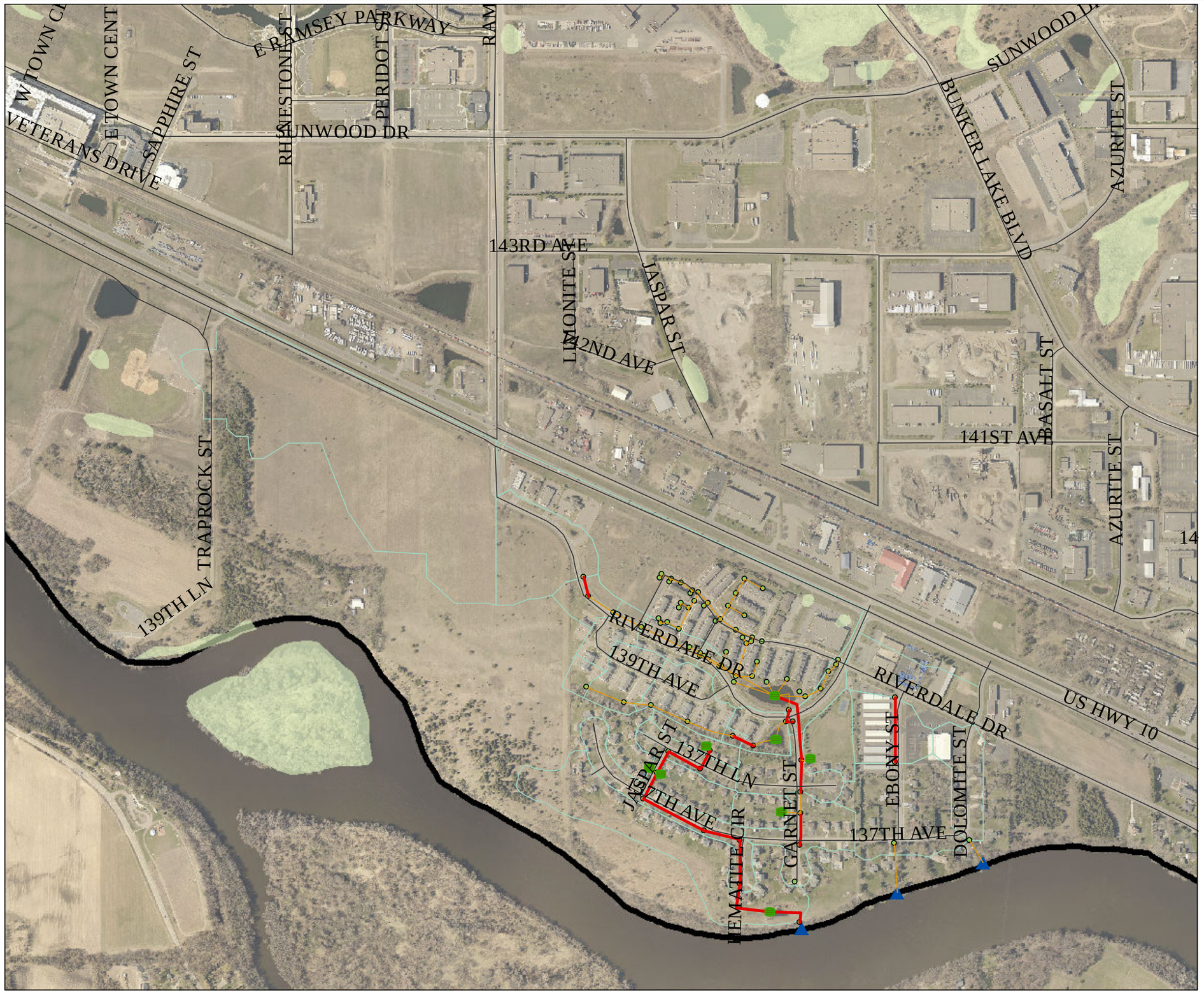
Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures
- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 300 600 1,200 Feet



MMISS PIPE SUMMARY
10 YEAR PIPE CAPACITY

FIGURE NO. 19
OCTOBER, 2015

Legend

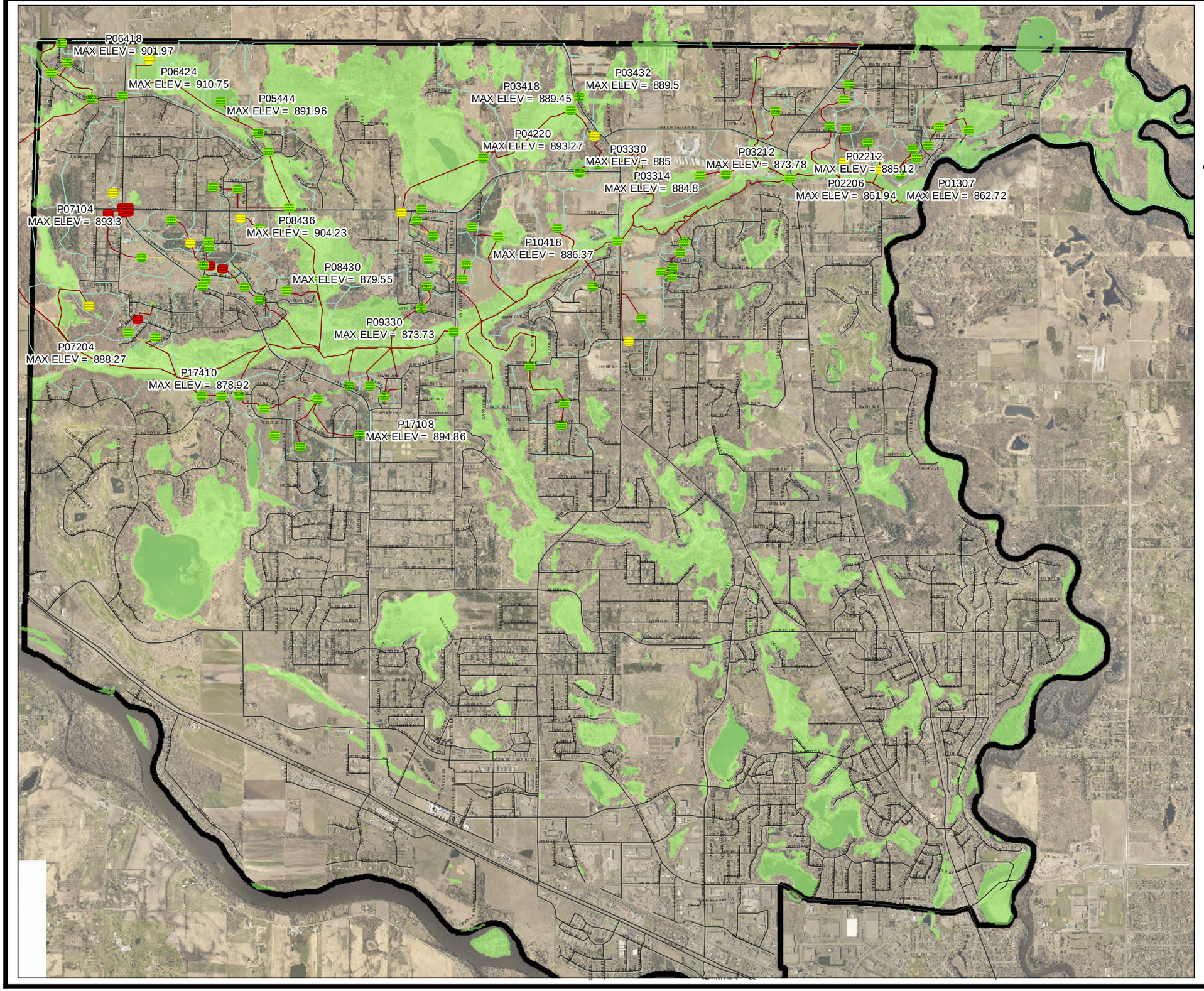
- Pond

PIPE_FULL

- Pipe
- Pipe Flowing Full
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

Feet
0 300 600 1,200



City of RAMSEY

TROTT POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 20
OCTOBER, 2015

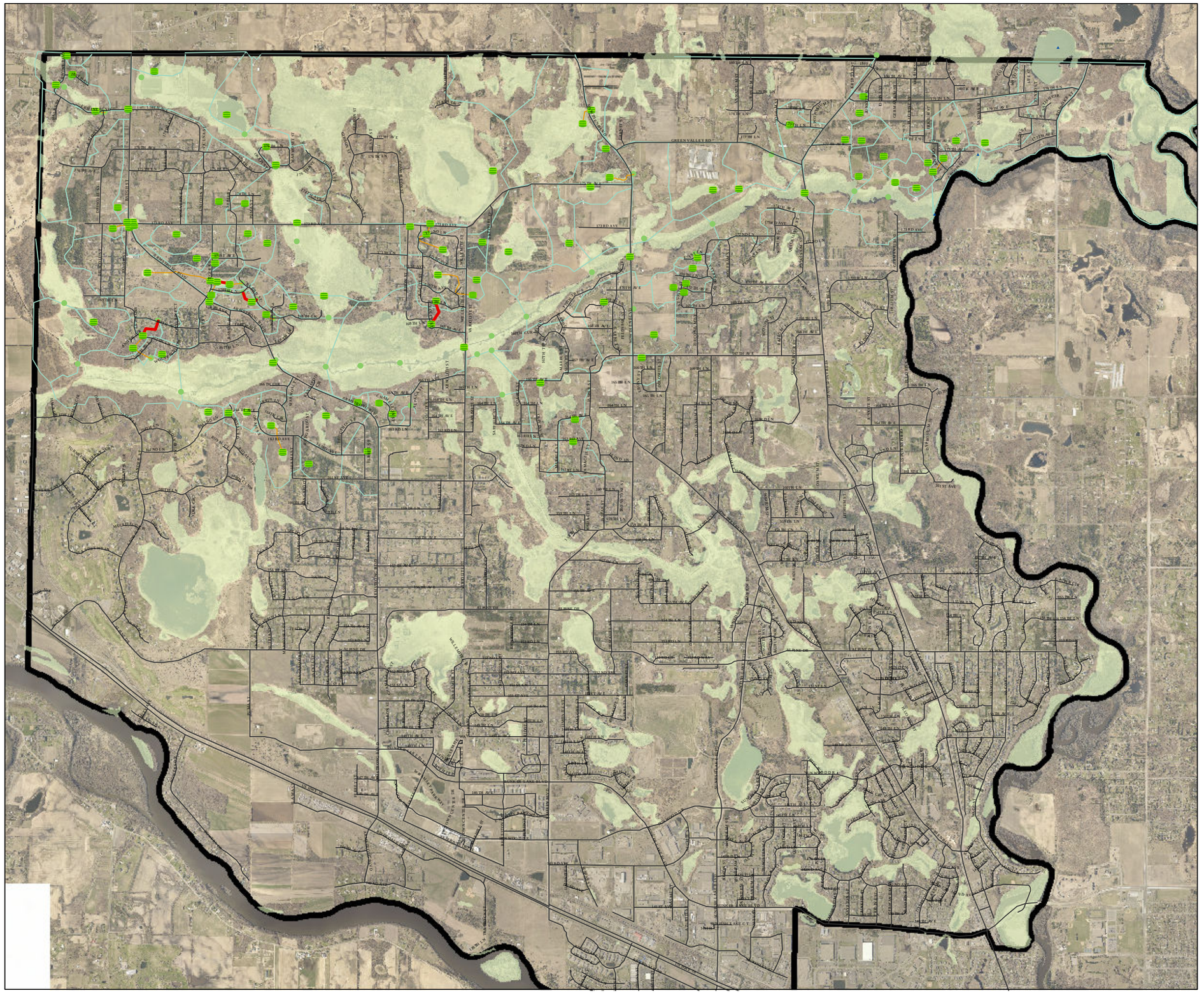
Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures
- Channel
- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 1,500 3,000 6,000 Feet



TROTT PIPE SUMMARY
10 YEAR PIPE CAPACITY

FIGURE NO. 21
OCTOBER, 2015

Legend

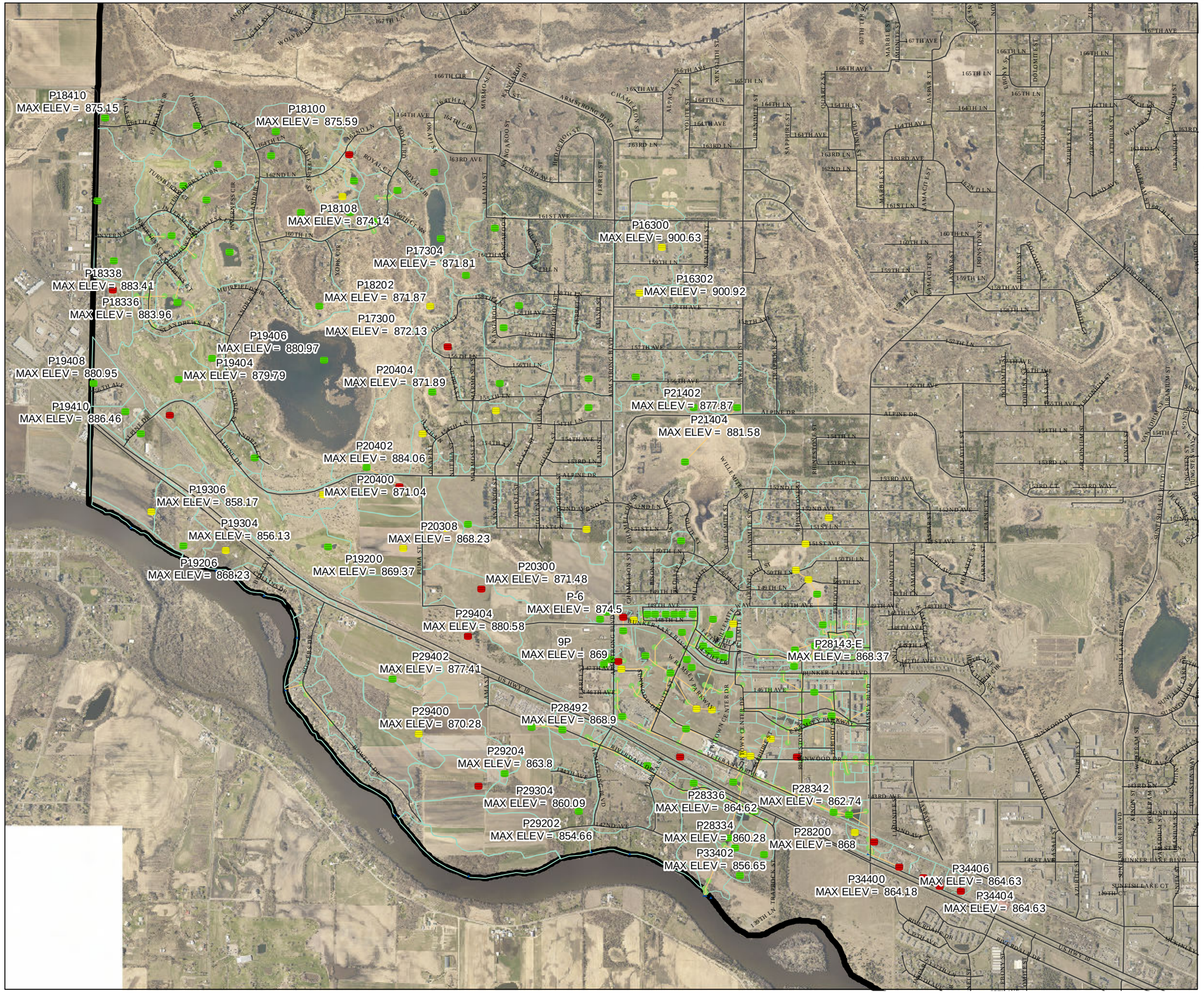
- Pond
- Streets2012

PIPE_FULL

- Pipe
- Pipe Flowing Full
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 1,500 3,000 6,000 Feet



WMISS POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 22
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures
- Streets2012
- Pipe
- Junc
- Outfall
- Subbasin
- City Limits

N

0 1,000 2,000 4,000 Feet

City of RAMSEY

WMISS PIPE SUMMARY
10 YEAR PIPE CAPACITY

FIGURE NO. 23
OCTOBER, 2015

Legend

- Pond
- Pipe
- Pipe Flowing Full
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

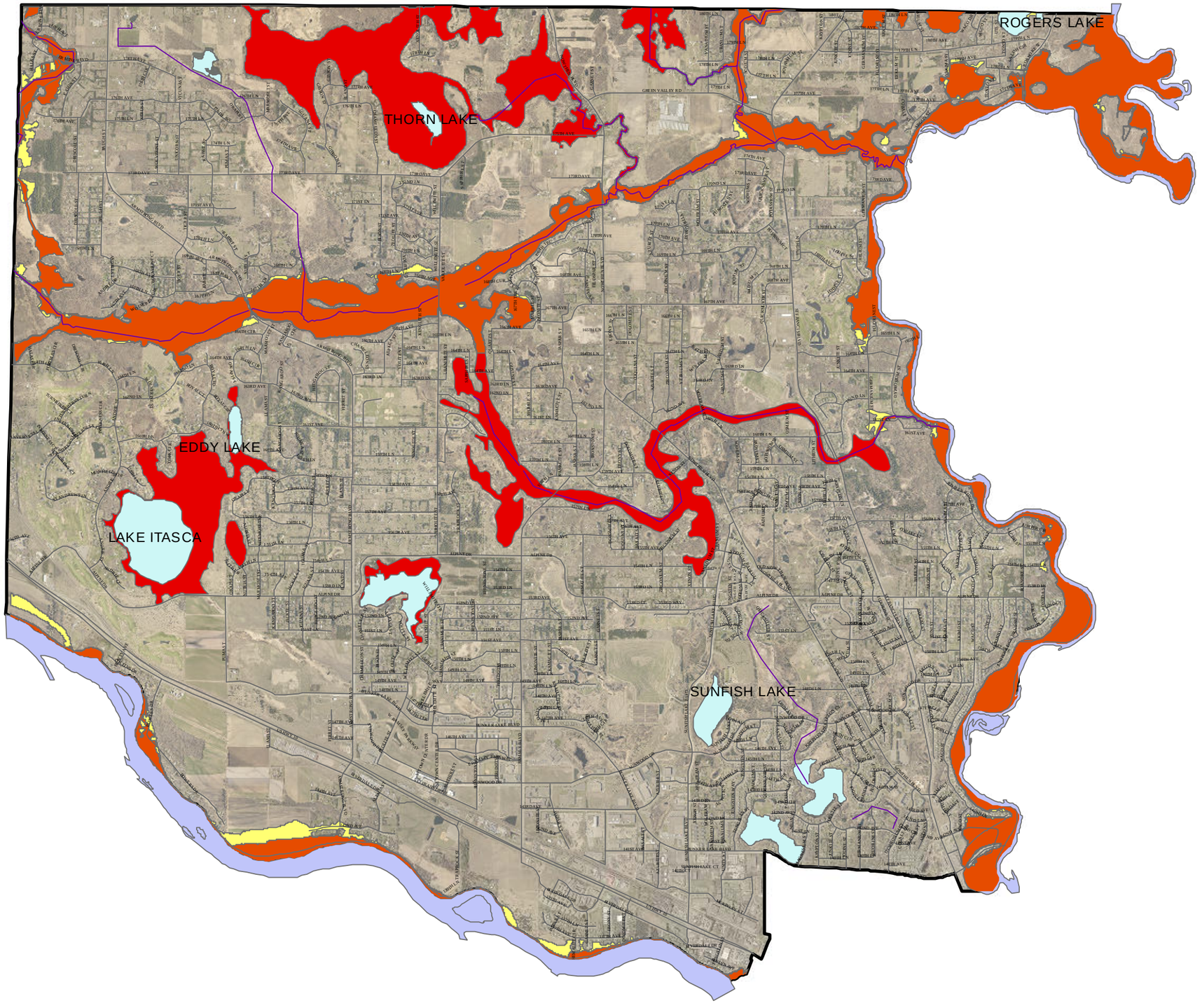
N

0 1,000 2,000 4,000 Feet

City of RAMSEY

FEMA FLOODPLAIN BOUNDARIES MAP

FIGURE NO. 24
OCTOBER, 2015



Legend

- Streams and Ditches
- Lakes_Ponds

FLD_ZONE

- 500 YR
- 100 YR Approximate
- 100 YR Detailed
- 100 YR Shallow
- Rivers

N

0 2,000 4,000 8,000 Feet

City of RAMSEY

HYDROLOGIC SOILS MAP

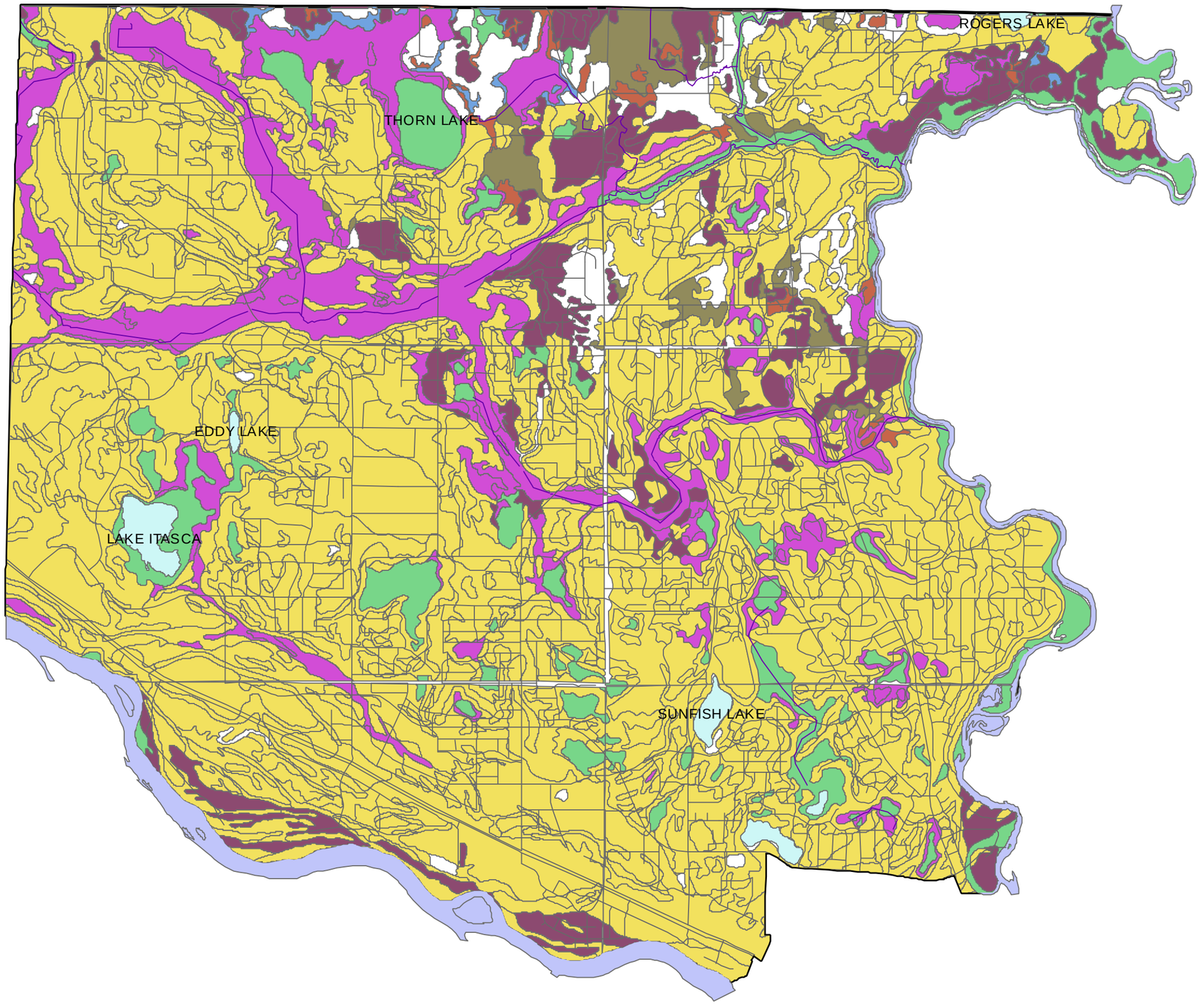


FIGURE NO. 25
OCTOBER, 2015

Legend

Streams and Ditches

Soil Hydrologic Groupings

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Lakes_Ponds
- Rivers

N

Feet
0 2,000 4,000 8,000

City of RAMSEY

EXISTING LAND USE MAP

FIGURE NO. 26A
OCTOBER, 2015

Legend

EXISTING LAND USES

- Agricultural
- Rural Estate Residential
- Single Family Residential
- Multi-Famil;y Residential
- Commercial
- Industrial
- Landfill
- Public/Quasi-public
- Park
- Vacant
- Right-of-Way
- Water

N

0 2,000 4,000 8,000 Feet

City of RAMSEY

FUTURE LAND USE MAP

FIGURE NO. 26B
OCTOBER, 2015

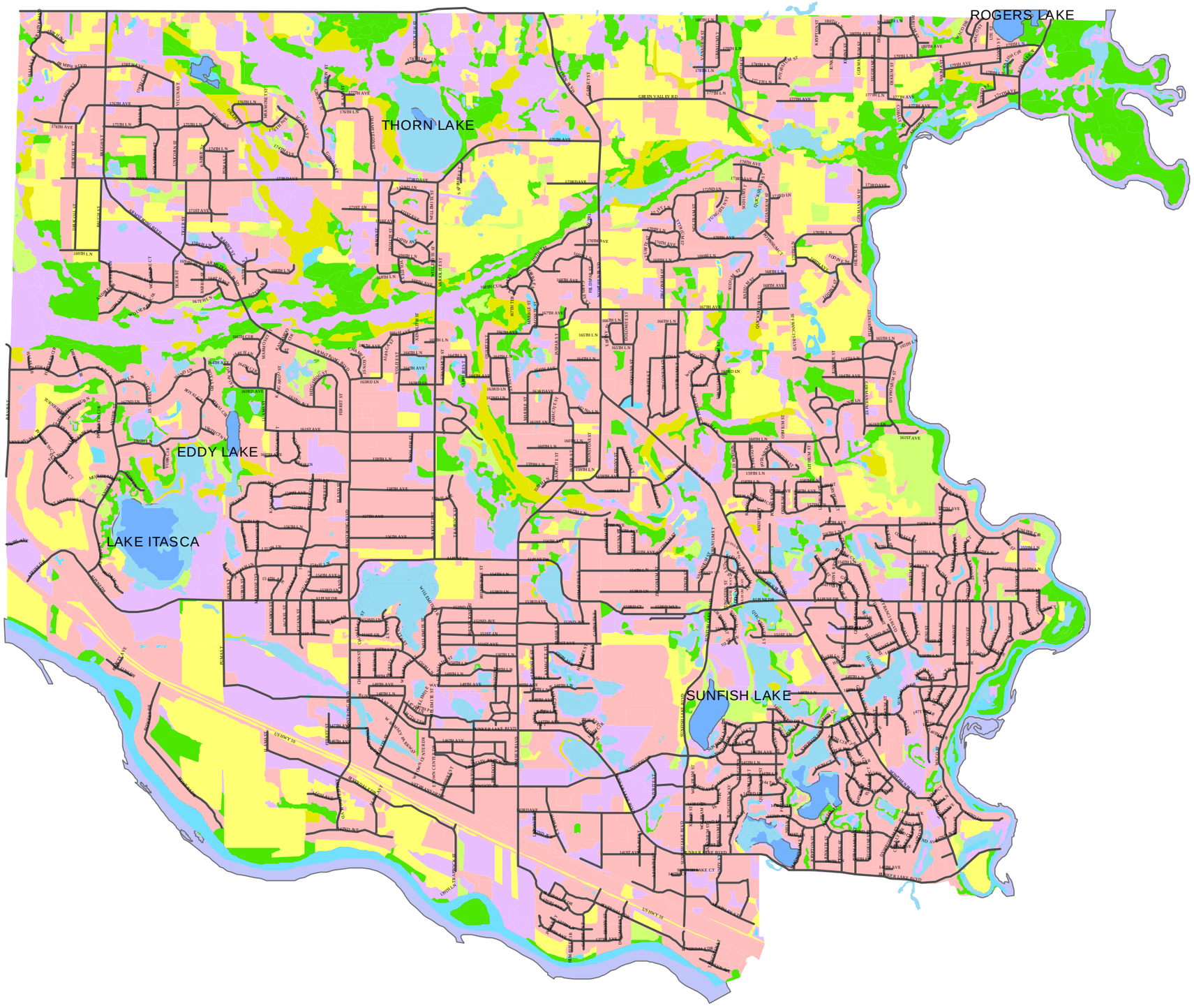
Legend

Future Land Use

- LDR
- MDR
- HDR
- Office Park
- Commercial
- MU
- Business Park
- Public
- Rural Developing
- Rural Preserve
- Park

N

0 2,000 4,000 8,000 Feet



City of RAMSEY

MINNESOTA LAND COVER CLASSIFICATION SYSTEM MAP

FIGURE NO. 26C
OCTOBER, 2015

Legend

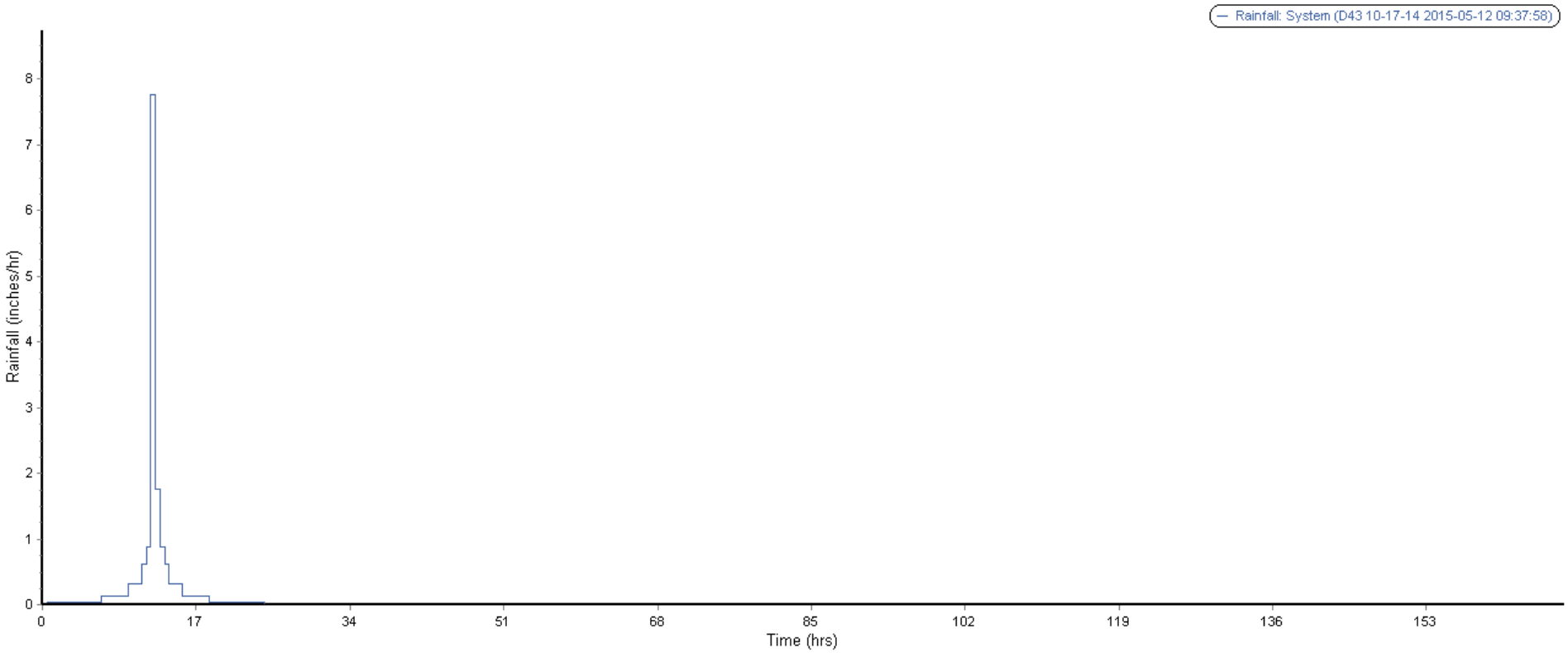
- NWI
- Protected Waters

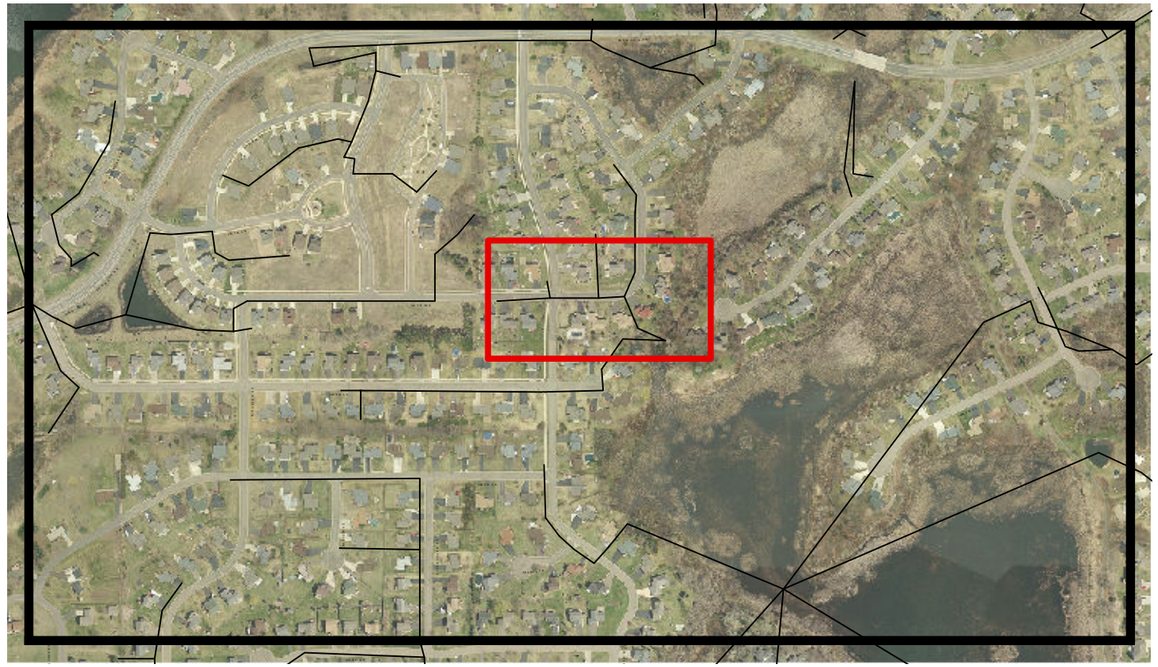
MLCCS

- <all other values>
- Artificial Surfaces and Associated Area
- Planted or Cultivated Vegetation
- Forests
- Woodland
- Shrubland
- Herbaceous
- Water
- Rivers

N

0 2,000 4,000 8,000 Feet


Rainfall: System (D43 10-17-14 2015-05-12 09:37:58)
Rainfall (inches/hr)
0
1
2
3
4
5
6
7
8
0
17
34
51
68
85
102
119
136
153
Time (hrs)





City of RAMSEY

PLAN VIEW PLOT OF 146TH AVENUE NW

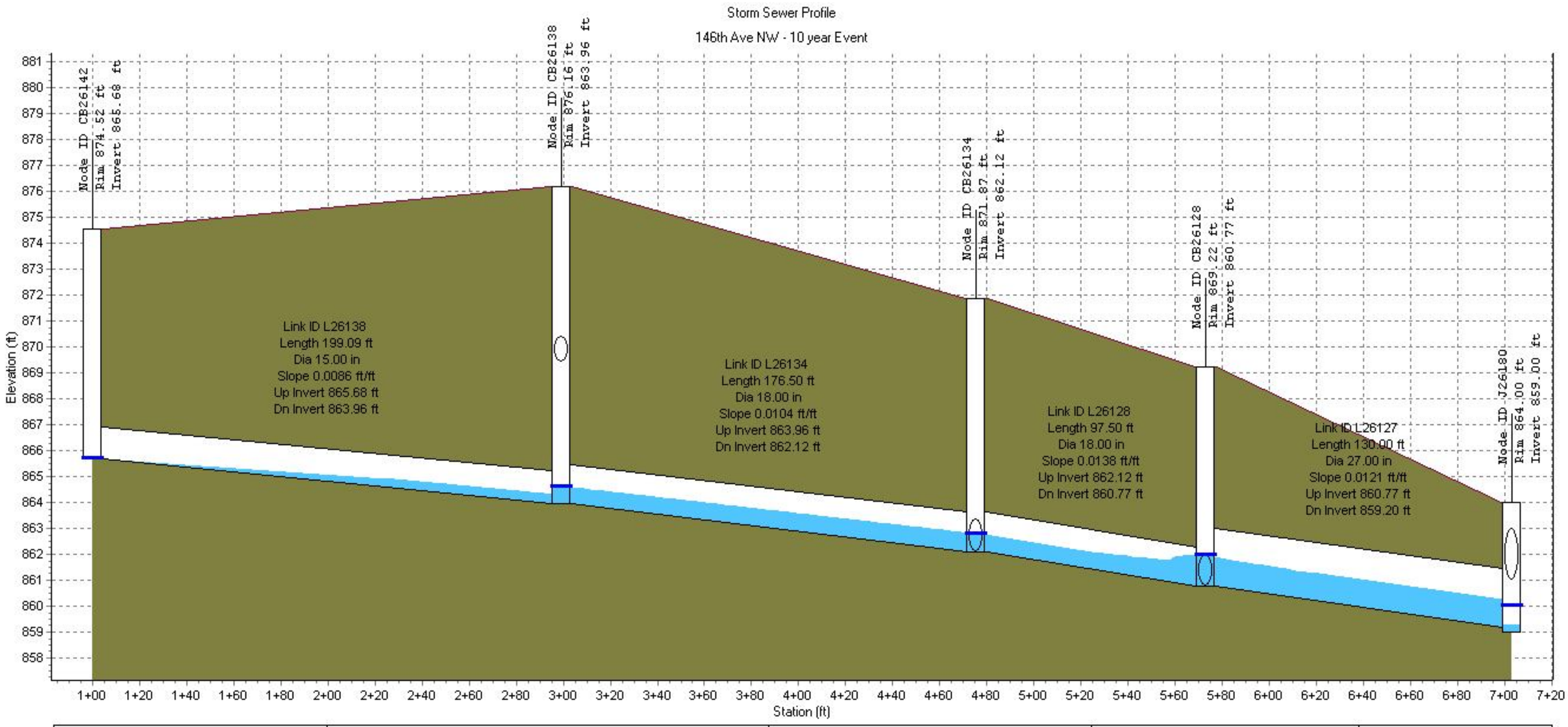
FIGURE NO. 28
OCTOBER, 2015

Legend

- Pond
- Pipe
- Junc
- Outfall
- Subbasin
- City Limits

N

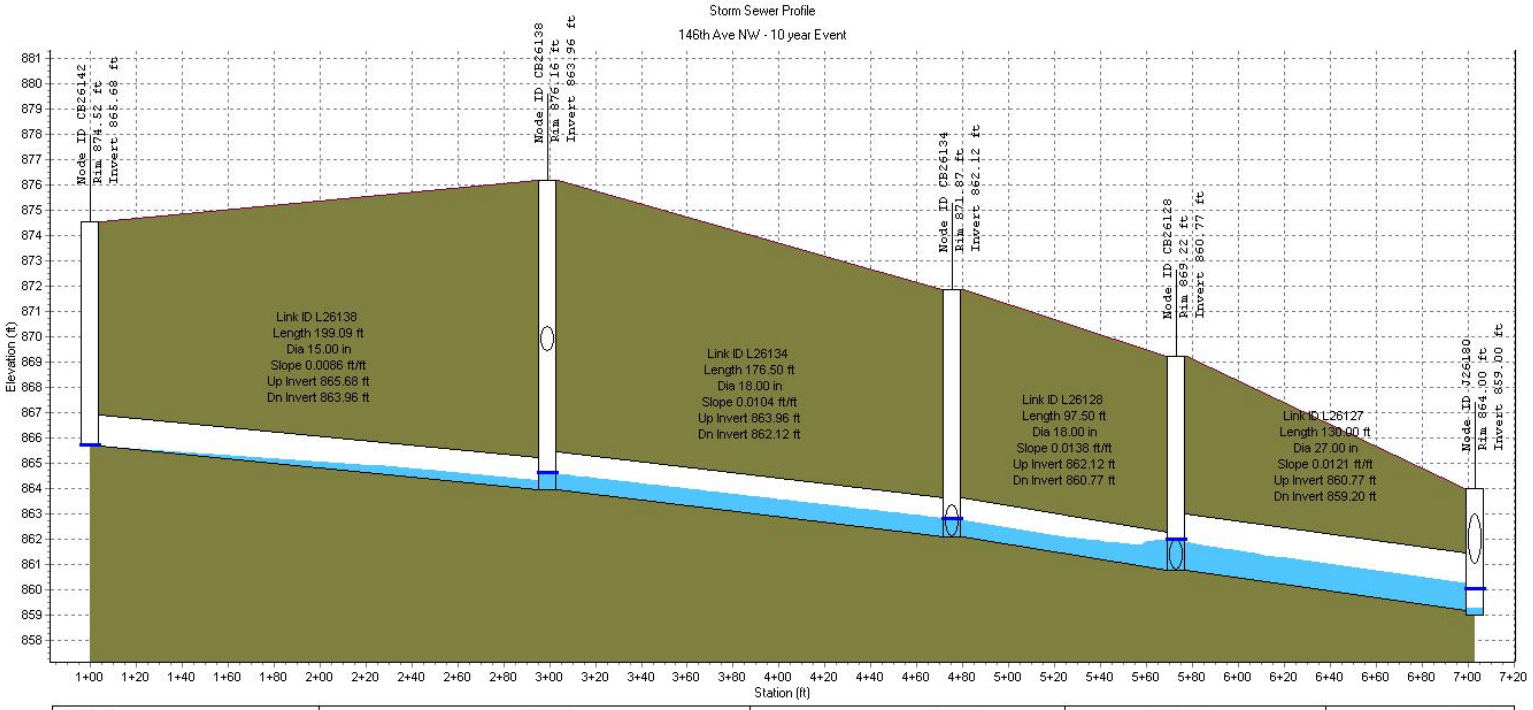
0 50 100 200 Feet



Node ID:	CB26142	CB26138	CB26134	CB26128	J26180
Rim (ft):	874.52	876.16	871.87	869.22	864.00
Invert (ft):	865.68	863.96	862.12	860.77	859.00
Min Pipe Cover (ft):	0.00	0.00	8.25	0.00	1.00
Max HGL (ft):	865.68	864.61	862.81	861.99	860.03

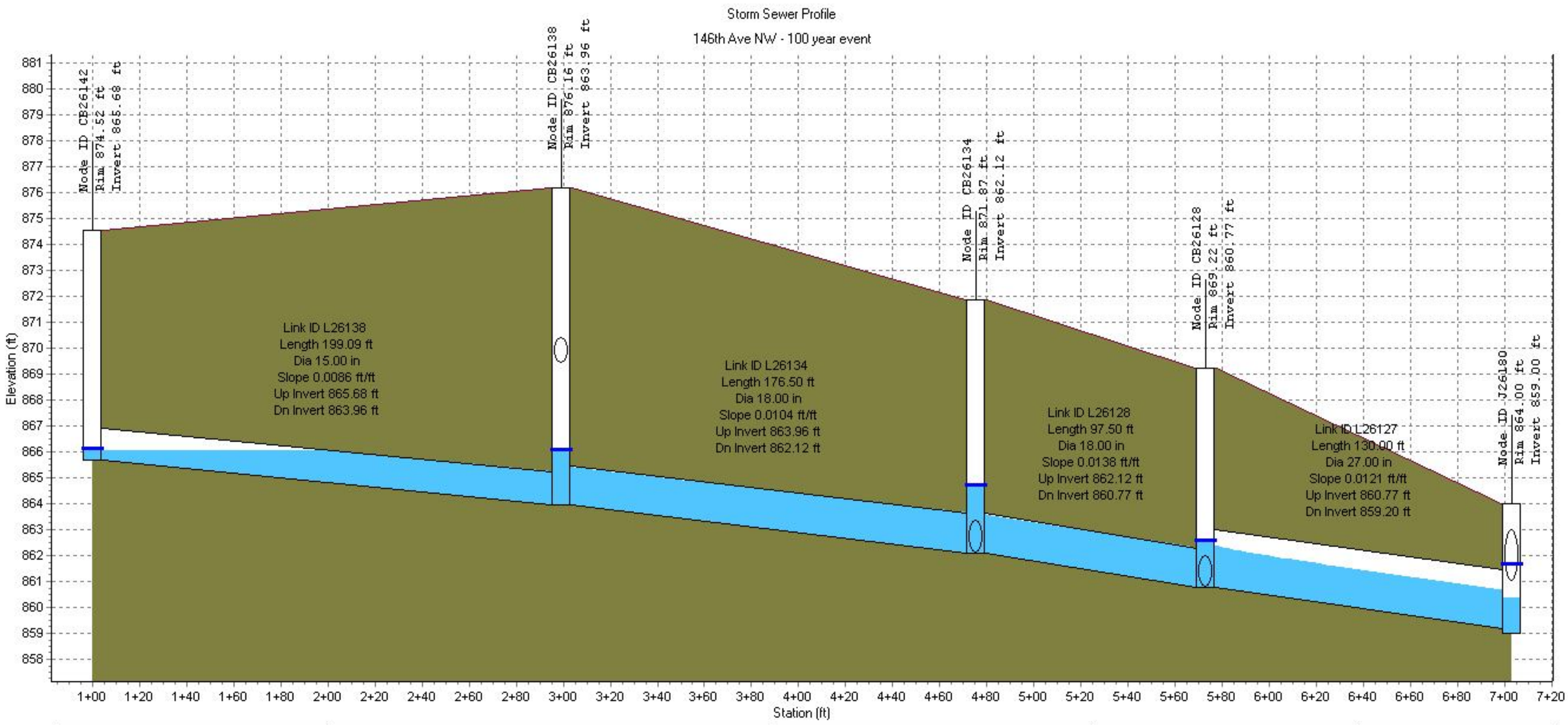
Link ID:	L26138	L26134	L26128	L26127
Length (ft):	199.09	176.50	97.50	130.00
Dia (in):	15.00	18.00	18.00	27.00
Slope (ft/ft):	0.0086	0.0104	0.0138	0.0121
Up Invert (ft):	865.68	863.96	862.12	860.77
Dn Invert (ft):	863.96	862.12	860.77	859.20
Max Q (cfs):	0.00	4.00	5.41	15.23
Max Vel (ft/s):	0.00	5.31	5.07	7.59
Max Depth (ft):	0.33	0.66	0.94	1.12

Figure 29



Node ID:	CB26142	CB26138	CB26134	CB26128	J26180
Rim (ft):	874.52	876.16	871.87	869.22	864.00
Invert (ft):	865.68	863.96	862.12	860.77	859.00
Min Pipe Cover (ft):	0.00	0.00	8.25	0.00	1.00
Max HGL (ft):	865.68	864.61	862.81	861.99	860.03

Link ID:	L26138	L26134	L26128	L26127
Length (ft):	199.09	176.50	97.50	130.00
Dia (in):	15.00	18.00	18.00	27.00
Slope (ft/ft):	0.0086	0.0104	0.0138	0.0121
Up Invert (ft):	865.68	863.96	862.12	860.77
Dn Invert (ft):	863.96	862.12	860.77	859.20
Max Q (cfs):	0.00	4.00	5.41	15.23
Max Vel (ft/s):	0.00	5.31	5.07	7.59
Max Depth (ft):	0.33	0.66	0.94	1.12



Node ID:	CB26142	CB26138	CB26134	CB26128	J26180
Rim (ft):	874.52	876.16	871.87	869.22	864.00
Invert (ft):	865.68	863.96	862.12	860.77	859.00
Min Pipe Cover (ft):	0.00	0.00	8.25	0.00	1.00
Max HGL (ft):	867.19	867.19	866.52	863.37	861.65

Link ID:	L26138	L26134	L26128	L26127
Length (ft):	199.09	176.50	97.50	130.00
Dia (in):	15.00	18.00	18.00	27.00
Slope (ft/ft):	0.0086	0.0104	0.0138	0.0121
Up Invert (ft):	865.68	863.96	862.12	860.77
Dn Invert (ft):	863.96	862.12	860.77	859.20
Max Q (cfs):	0.77	9.33	14.65	32.70
Max Vel (ft/s):	0.95	5.83	8.29	8.73
Max Depth (ft):	0.83	1.50	1.50	1.63

Figure 30

City of RAMSEY

STORM SEWER SYSTEM MAP

FIGURE NO. 31
OCTOBER, 2015

Legend

DIAMETER

- 12" - 21"
- 24" - 33"
- 36" - 42"
- 48"
- 54"
- 60
- 72
- 84
- Creeks
- Parcels

N

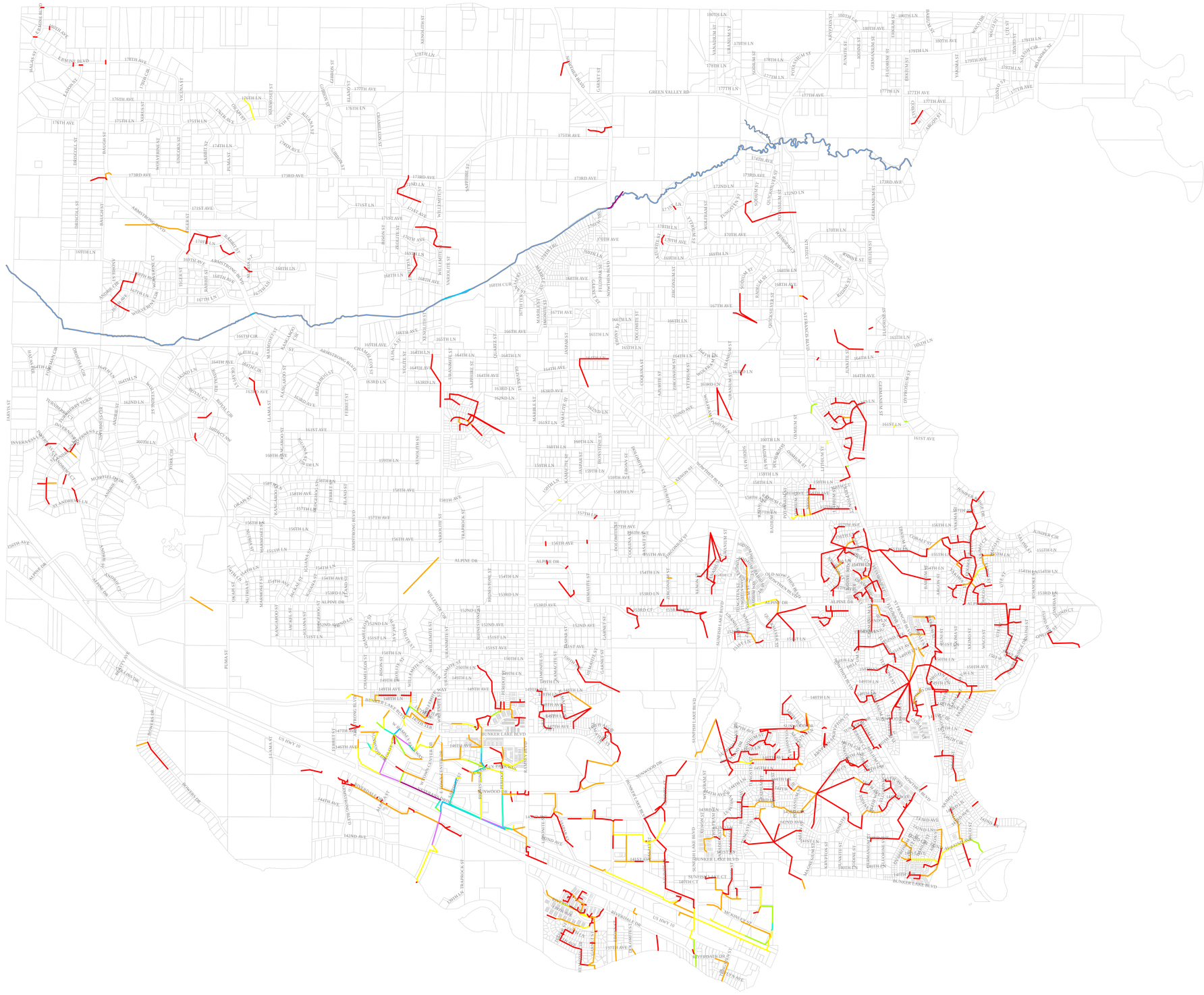
0 1,500 3,000 6,000 Feet

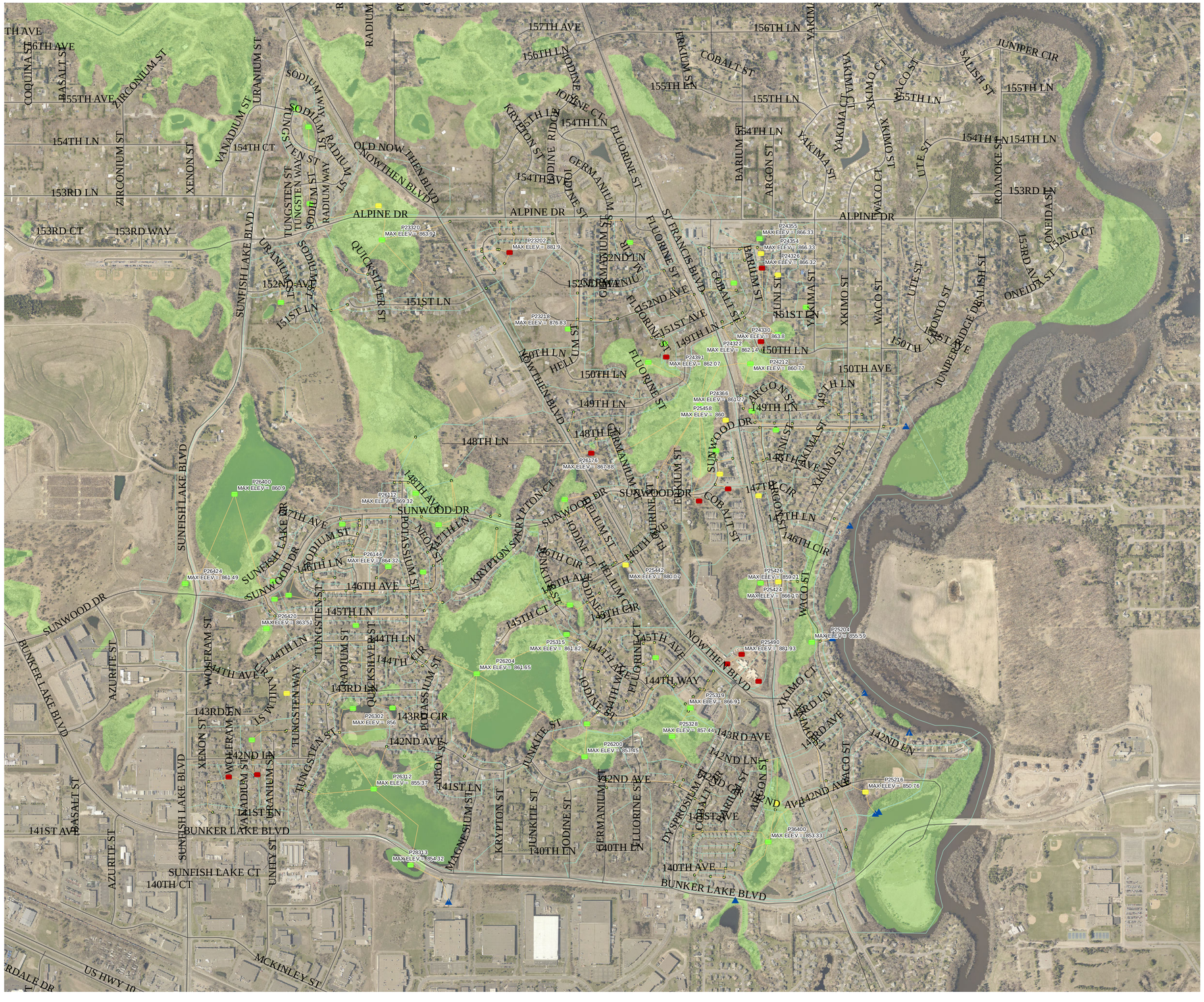
City of RAMSEY

2014 SURFACE WATER MANANGEMENT PLAN

STORM SEWER SYSTEM MAP

FIGURE NO. 31
OCTOBER, 2015





D43 POND SUMMARY 100 YEAR PEAK ELEVATION

FIGURE NO. 32
OCTOBER, 2015

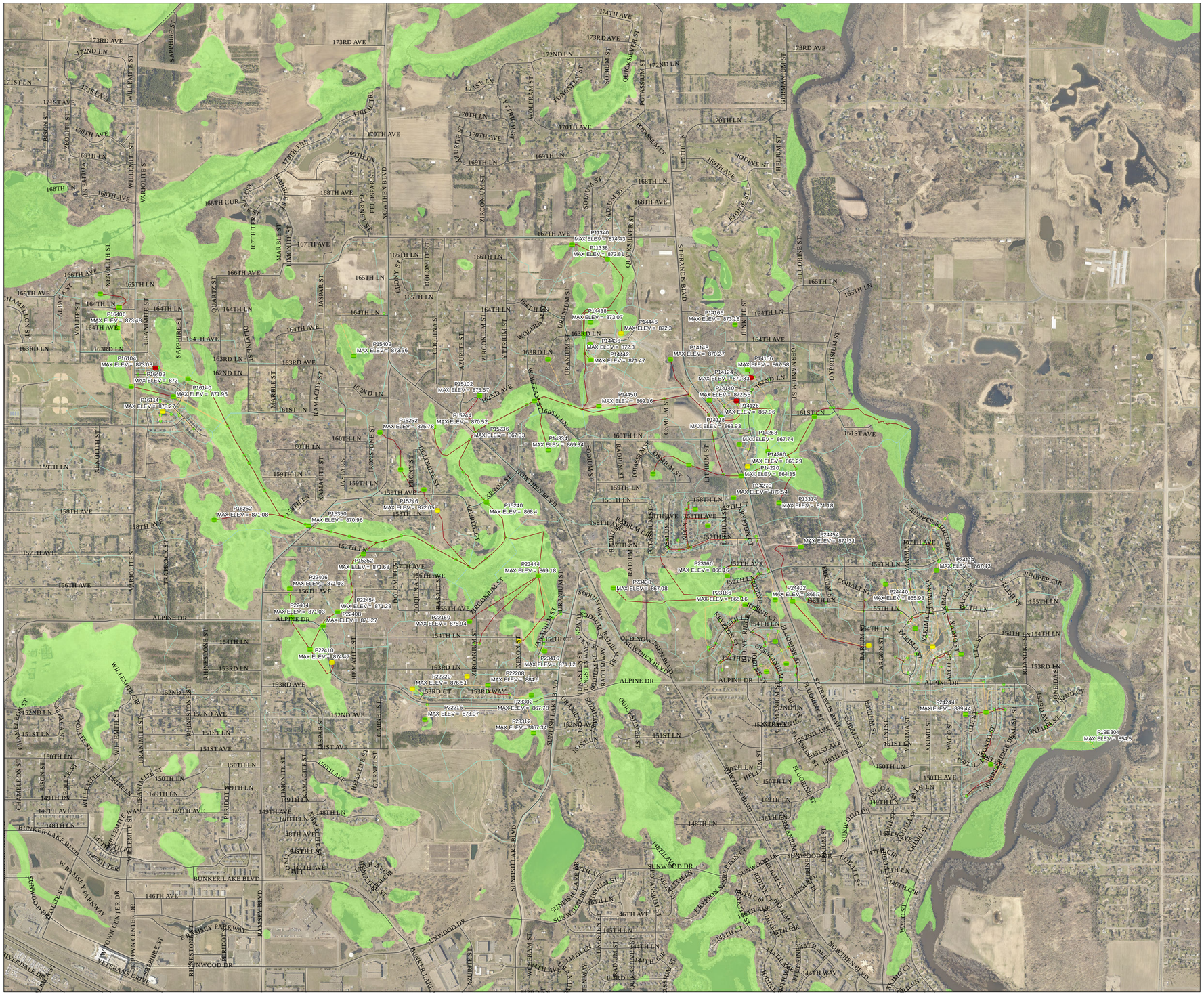
Legend

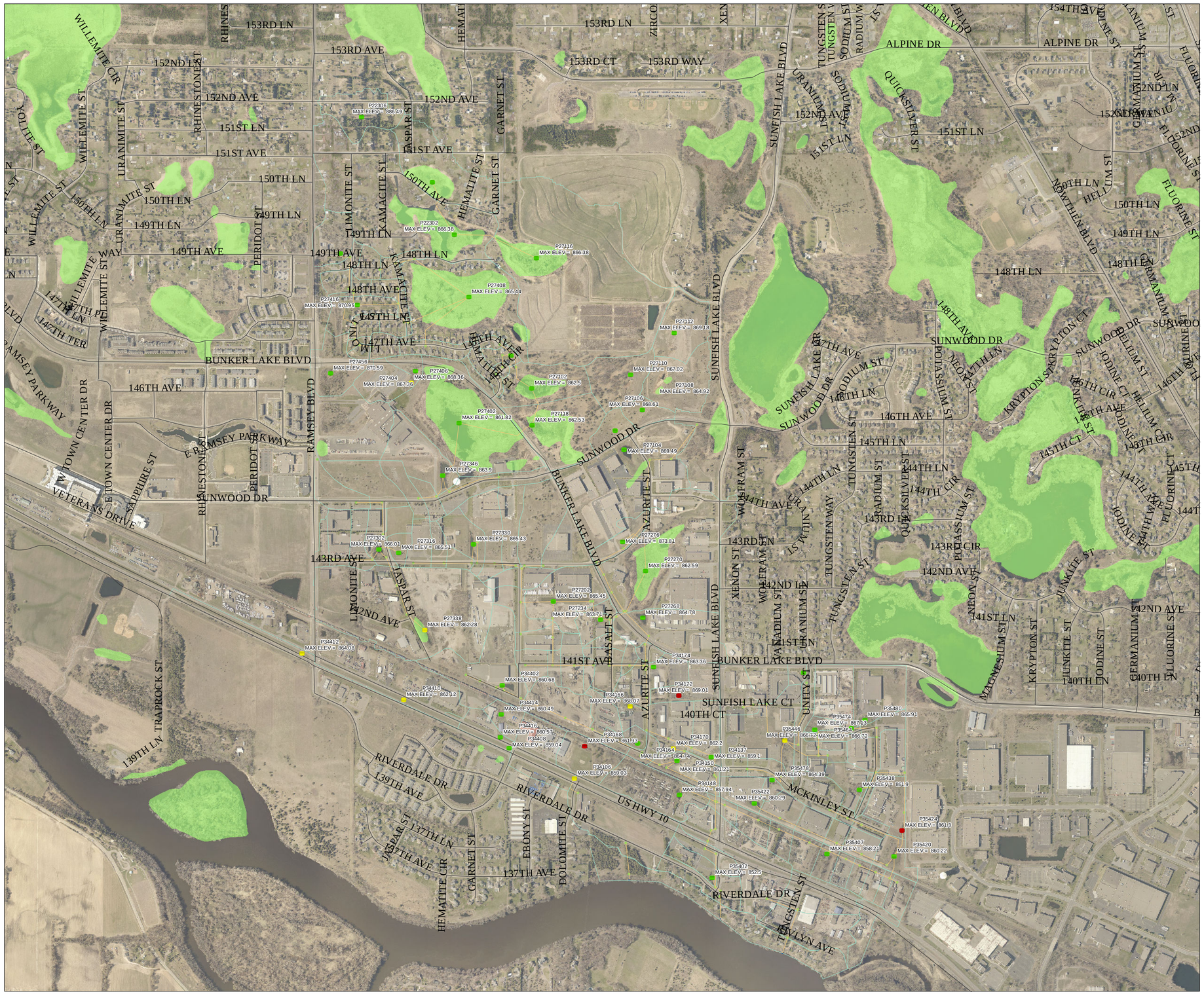
Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures
- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 1,000 2,000 4,000 Feet


P16406
MAX ELEV = 873.48
P16103
MAX ELEV = 873.09
P16402
MAX ELEV = 872
P16140
MAX ELEV = 871.95
P16134
MAX ELEV = 878.27
P16252
MAX ELEV = 871.08
P15350
MAX ELEV = 870.96
P15402
MAX ELEV = 873.56
P15102
MAX ELEV = 875.57
P15244
MAX ELEV = 870.52
P15252
MAX ELEV = 875.78
P15236
MAX ELEV = 867.33
P14334
MAX ELEV = 869.34
P15246
MAX ELEV = 872.05
P15240
MAX ELEV = 868.4
P15352
MAX ELEV = 871.68
P22406
MAX ELEV = 871.03
P22404
MAX ELEV = 871.03
P22454
MAX ELEV = 871.28
P22408
MAX ELEV = 871.27
P22419
MAX ELEV = 874.47
P23444
MAX ELEV = 869.18
P22150
MAX ELEV = 875.94
P23416
MAX ELEV = 871.12
P22220
MAX ELEV = 876.51
P22208
MAX ELEV = 884.6
P22216
MAX ELEV = 873.07
P23302
MAX ELEV = 867.78
P23312
MAX ELEV = 867.34
P14438
MAX ELEV = 873.07
P14446
MAX ELEV = 872.3
P14436
MAX ELEV = 872.3
P14442
MAX ELEV = 871.47
P14459
MAX ELEV = 869.16
P14334
MAX ELEV = 869.34
P14340
MAX ELEV = 874.43
P14338
MAX ELEV = 872.81
P14166
MAX ELEV = 873.16
P14140
MAX ELEV = 870.27
P14124
MAX ELEV = 870.33
P14140
MAX ELEV = 872.55
P14126
MAX ELEV = 867.96
P14118
MAX ELEV = 863.93
P14268
MAX ELEV = 867.74
P14156
MAX ELEV = 867.59
P12260
MAX ELEV = 865.29
P14220
MAX ELEV = 864.35
P14270
MAX ELEV = 879.54
P13314
MAX ELEV = 874.18
P23160
MAX ELEV = 866.16
P23438
MAX ELEV = 867.08
P23186
MAX ELEV = 866.16
P24454
MAX ELEV = 871.31
P24402
MAX ELEV = 865.7
P24440
MAX ELEV = 865.93
P24135
MAX ELEV = 867.43
P24244
MAX ELEV = 889.44
P19E304
MAX ELEV = 854.5
P23414
MAX ELEV = 871.16
P23436
MAX ELEV = 871.16
P23438
MAX ELEV = 871.16
P23440
MAX ELEV = 871.16
P23442
MAX ELEV = 871.16
P23444
MAX ELEV = 871.16
P23446
MAX ELEV = 871.16
P23448
MAX ELEV = 871.16
P23450
MAX ELEV = 871.16



EMISS POND SUMMARY
100 YEAR PEAK ELEVATION

FIGURE NO. 34
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

Pipe

Junc

Outfall

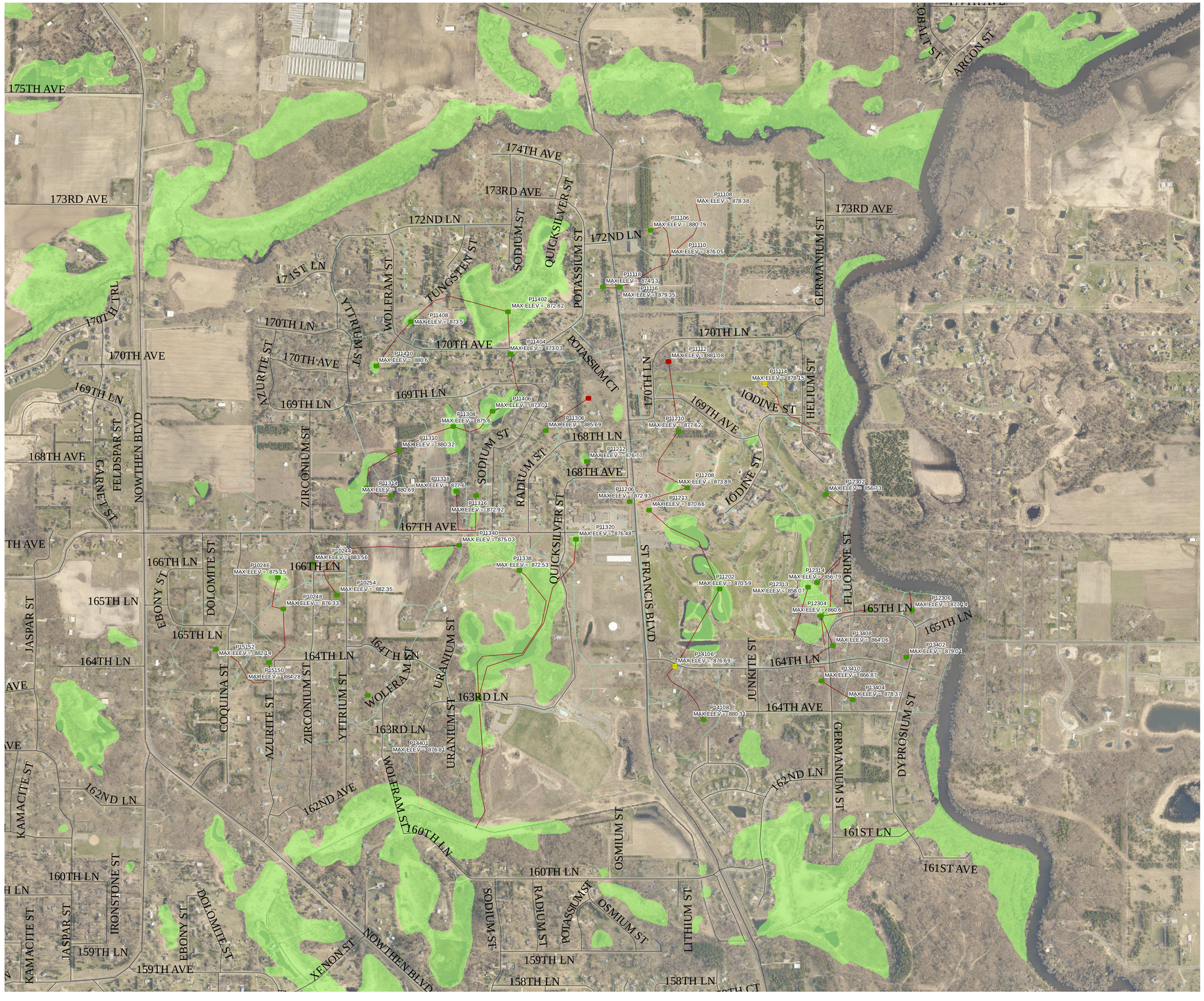
Subbasin

NWI

City Limits

N

0 1,000 2,000 4,000 Feet



GOLF POND SUMMARY
100 YEAR PEAK ELEVATION

FIGURE NO. 35
OCTOBER, 2015

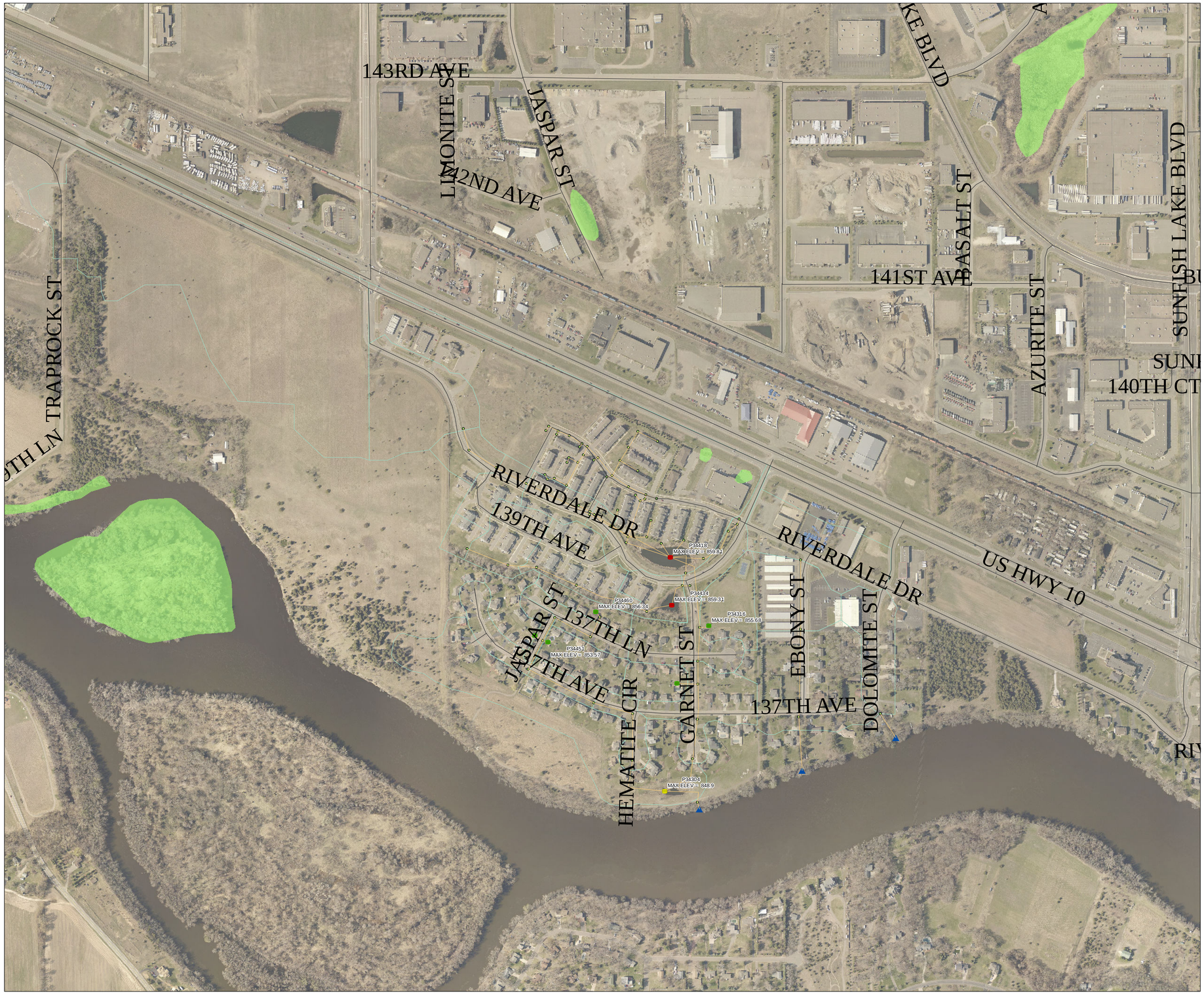
Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures
- Channel
- Pipe
- Junc
- Outfall
- Subbasin
- NWI
- City Limits

N

0 1,000 2,000 4,000 Feet



MMISS POND SUMMARY
100 YEAR PEAK ELEVATION

FIGURE NO. 36
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

Pipe

Junc

Outfall

Subbasin

NWI

City Limits

N

Feet
0 500 1,000 2,000

TROTT POND SUMMARY
100 YEAR PEAK ELEVATION

FIGURE NO. 37
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

Channel

Pipe

Junc

Outfall

Subbasin

NWI

City Limits

N

0 3,000 6,000 12,000 Feet

City of RAMSEY

WMISS POND SUMMARY
100 YEAR PEAK ELEVATION

FIGURE NO. 38
OCTOBER, 2015

Legend

Pond Flood Status

- Functioning Properly
- EOF Utilized
- Potential Threat to Structures

Streets2012

Pipe

Junc

Outfall

Subbasin

N

0 1,500 3,000 6,000 Feet

Appendix A

Ramsey City-wide

Storm Water Pollution Prevention Plan

City of Ramsey, Minnesota

2006 Stormwater Pollution Prevention Program



Prepared

~~**May 31, 2006**~~
Revised February 4, 2009

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2-Public Participation/ Involvement....26
3-Illicit Discharge Detection And Elimination....30
4-Construction Site Stormwater Runoff Control....36
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Executive Summary

The City of Ramsey is required to apply for coverage under the National Pollutant Discharge Elimination System Phase II/ State Disposal System program as administered by the US Environmental Protection Agency and the Minnesota Pollution Control Agency. This document outlines the steps Ramsey will take during the next permit cycle of 5 years to reduce stormwater pollution and is commonly referred to as a Stormwater Pollution Prevention Plan (SWPPP).

The SWPPP must address six (6) major areas:

Public Education and Outreach
Public Participation/ Involvement
Illicit Discharge Detection and Elimination
Construction Site Stormwater Runoff Control
Post-Construction Stormwater Management in New Development and Redevelopment
Pollution Prevention/ Good Housekeeping

Detailed sheets have been developed addressing sub-topics in each of these areas. Goals and timelines have been established for each sheet. The City will prepare an annual report summarizing the activities for the past year. The report will be available for review at the annual meeting held for review of the SWPPP. Comments received will be evaluated and incorporated into the SWPPP and annual report as appropriate.

The City of Ramsey currently has systems in place for reviewing new construction plans and requiring installation of erosion control measures prior to construction. This includes notifications and corrective measures for sites found to be out of compliance with the requirements. The City participates in the Environmental Expo held every spring. Information is distributed on methods to reduce stormwater pollution. The new resident packet contains useful information on recycling, lawn care and is distributed to all who purchase new homes in the city.

The City has inspected all known outfalls where stormwater leaves the boundaries of the city annually since 2003. These inspections were during dry weather and flows were not observed during the inspections. This is a good indicator that sanitary sewer lines are not connected to the storm sewer system. The inspection program has been expanded to include inspecting 20% of the ponds annually.

The city will be improving the website content and establishing a collection of educational materials for various audiences as part of this new permit.

The City of Ramsey has programs in place for reducing stormwater pollution and this SWPPP is a guide for additional measures that will be implemented over the next 5 years to further improve the stormwater quality in Ramsey. The City has adopted a stormwater pollution control ordinance to guide plan reviews for new development and construction of those new developments.
7

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Introduction

The City of Ramsey is bordered by two natural flowing rivers, the Mississippi River and the Rum River and is therefore committed to protecting the quality of water and limiting the impacts of new developments on our watershed. Ramsey is required to apply for a permit from the National Pollutant Discharge and Elimination System Phase II/ State Disposal System program as administered by the United States Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA). The permit requires preparation of a Stormwater Pollution Prevention Plan (SWPPP). This document is the SWPPP for Ramsey Minnesota. Portions of this document were prepared for the 2003 permit application. The 2003 permit were challenged in court and modifications were required as a result of the challenge.

Self-Assessment Description
Before beginning to select BMPs and Measurable Goals, city staff undertook a self-assessment of our city's stormwater system. This was an evaluation of our city's conditions, needs, and practices. The objective of this process was to provide a knowledge base upon which to structure our SWPPP in order to meet the Permit's Maximum Extent Practicable standard.

The self-assessment was guided by materials included in the League of Minnesota Cities NPDES Phase II MS4 Guide Plan. This self-assessment process had two major components:

- The first workshop session organized as part of the LMC Guide Plan project included a self-assessment component led by Pat Collins of AMEC Earth & Environmental. This included:
    - discussion of physical and socio-political watershed and organizational conditions and issues that should guide the selection of BMPs and Measurable Goals
    - review of two examples of cities with different characteristics to demonstrate how local conditions should shape the selection of BMPs and Measurable Goals
    - a series of exercises in which our city staff considered the local conditions for our community and how they should guide our selection of BMPs and Measurable Goals.
- After the workshop session, we worked with the NPDES Phase II Program Assessment Questionnaire that was included in the LMC Guide Plan notebook. This was a twelve-page document with a comprehensive list of questions that we used to guide us through a self-assessment activity, including consideration of a wide range of stormwater approaches.

The results of this process include:

- a set of understandings among city staff
- written notes of the self assessment meeting
- completed Program Assessment Questionnaires from key personnel

Together, these items represent our knowledge of our local stormwater system and the conditions that shape it. We have used the results of this self-assessment process to guide our selection of BMPs and Measurable Goals that make up the SWPPP for our Permit Application.

Based on this self-assessment process, our staff has considered the following factors in order to meet the Maximum Extent Practicable standard set forth in the Permit:

- sources of pollutants
- potentially polluting activities being conducted in the watershed
- sensitivity of receiving waters

- uses of receiving waters
- specific local concerns
- the size of our community
- climate
- implementation schedules
- current ability to finance stormwater programs
- hydrology
- geology
- capacity to perform operation & maintenance
- local land uses
- rate and type of development
- characteristics of our watershed
- organizational characteristics of our city.

In addition to the self-assessment process discussed above, our staff has also considered the following non-stormwater discharges to determine whether they should be identified as significant contributors of pollutants to our stormwater system:

- water line flushing
- landscape irrigation
- diverted stream flows
- rising ground waters
- uncontaminated ground water infiltration
- uncontaminated pumped ground water
- discharges from potable water sources
- foundation drains
- air conditioning condensation
- irrigation water
- springs
- water from crawl space pumps
- footing drains
- lawn watering
- individual residential car washing
- flows from riparian habitats and wetlands
- de-chlorinated swimming pool discharges
- street wash water
- discharge or flows from fire fighting activities.

During the self-assessment process, the City of Ramsey did not find any of the additional referenced non-stormwater discharges listed above to be significant contributors of pollutants to the stormwater system.

The Rum River and Mississippi River are classified as Outstanding Resource Value Waters and new discharges are prohibited or restricted. The rivers and Rogers Lake in the northeast corner of the City are classified as impaired waters, discharges will be required to meet Total Maximum Daily Load targets as they are established. An Impaired Waters BMP Summary sheet and a Protected Discharge Assessment BMP Summary Sheet have been added after the Minimum Control Measure 6 sheets.

Minimum Control Measure Summary

The Revised Permit requires developing goals in six (6) areas which are: Public Education and Outreach, Public Participation/ Involvement, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post Construction Stormwater Management in New Construction and Redevelopment and Pollution Prevention/ Good Housekeeping. This document contains the 34 Best Management Practice Summary Sheets (BMPs) required for a complete permit application. The Minimum control measures are as follows:

Public Education and Outreach

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
1a-1	Distribute Educational Materials	**V.G.1.a**
1b-1	Implement an Education Program	**V.G.1.b**
1c-1	Education Program: Public Education and Outreach	**V.G.1.c**
1c-2	Education Program: Public Participation	**V.G.1.c**
1c-3	Education Program: Illicit Discharge Detection and Elimination	**V.G.1.c**
1c-4	Education Program: Construction Site Run-off Control	**V.G.1.c**
1c-5	Education Program: Post-Construction Stormwater Management in New Development and Redevelopment	**V.G.1.c**
1c-6	Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations	**V.G.1.c**
1d-1	Coordination of Education Program	**V.G.1.d**
1e-1	Annual Public Meeting	**V.G.1.e**

Public Participation/ Involvement

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
2a-1	Comply with Public Notice Requirements	**V.G.2.a**
2b-1	Solicit Public Input and opinion on the Adequacy of the SWPPP	**V.G.2.b**
2c-1	Consider Public Input	**V.G.2.c**

Illicit Discharge Detection and Elimination

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
3a-1	Storm Sewer System Map	**V.G.3.a**
3b-1	Regulatory Control Program	**V.G.3.b**
3c-1	Illicit Discharge Detection and Elimination Plan	**V.G.3.c**
3d-1	Public and Employee Illicit Discharge Information Program	**V.G.3.d**
3e-1	Identification of Non Stormwater Discharges and Flows	**V.G.3.e**

Construction Site Stormwater Runoff Control

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
4a-1	Ordinance or other Regulatory Mechanism	**V.G.4.a**
4b-1	Construction Site Implementation of Erosion and Sediment Control BMPs	**V.G.4.b**
4c-1	Waste Controls for Construction Site Operators	**V.G.4.c**
4d-1	Procedure for Site Plan Review	**V.G.4.d**
4e-1	Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance	**V.G.4.e**
4f-1	Establishment of Procedures for Site Inspections and Enforcement	**V.G.4.f**

Post-Construction Stormwater Management In New Development And Redevelopment

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
5a-1	Development and Implementation of Structural and/or Non-structural BMPs	**V.G.5.a**
5b-1	Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment	**V.G.5.b**
5c-1	Long-term Operation and Maintenance of BMPs	**V.G.5.c**
5d-1	Maintenance of Surface Water Protection Area	**IX.H**

Pollution Prevention/Good Housekeeping

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
6a-1	Municipal Operations and Maintenance Program	**V.G.6.a**
6a-2	Street Sweeping**	
6b-2	Annual Inspection of All Structural Pollution Control Devices	**V.G.6.b.2**
6b-3	Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis	**V.G.6.b.3**
6b-4	Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas	**V.G.6.b.4**
6b-5	Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures	**V.G.6.b.5**
6b-6	Record Reporting and Retention of all Inspections and Responses to the Inspections	**V.G.6.b.6**
6b-7	Evaluation of Inspection Frequency	**V.G.6.b.7**

Summary of Ramsey Program

The City of Ramsey reviews all new subdivision plans at least 3 times prior to authorizing construction. The plan reviews look at stormwater ponding, rate control and erosion control. The plans for all developments over 1 acre are also reviewed by the Lower Rum River Water Management Organization (LRRWMO). The City has aligned its requirements with those of the LRRWMO to provide consistent guidelines for developers.

The City of Ramsey currently has a system in-place for issuing notices to contractors that do not properly maintain erosion control measures. The City adopted a Stormwater Pollution Control Ordinance which went into effect January 2007. It incorporated the conditions spelled out in the model ordinance provided by the MPCA. The city sweeps all streets in the spring to collect sand and prevent it from washing into the storm sewer system. The city also sweeps all streets in the fall to collect leaves. All outfalls where water leaves the MS4 boundaries have been inspected annually since 2003. These inspections were all during dry weather and discharges have not been detected during these inspections. The database of stormwater structures has been created listing the outfalls, ponds and structural water quality treatment structures. This list is used for scheduling inspections and tracking of repairs performed on the system.

The city will be improving the website content and establishing a collection of educational materials for various audiences as part of this new permit.

The City of Ramsey has programs in place for reducing stormwater pollution and this SWPPP is a guide for additional measures that will be implemented over the next 5 years to further improve the stormwater quality in Ramsey.

Ramsey is bounded by the Rum and Mississippi Rivers which are classified as restricted discharge waters. The area adjacent to the Rum River is mostly developed; redevelopment is not anticipated in the near future. The majority of the development is large lot single family residences with wells and septic systems. The bank area between the houses and the water's edge is natural vegetation; pipes have been pushed from the top to the bottom of the bank to provide an outlet for stormwater. Most of the pipes connect to vegetated ditches that provide drainage for the roadway areas. There is one development with urban lots served by municipal sewer, water and storm sewer. One development was approved within the last the 16 years; the remainder were constructed previous to that time. There are ponding areas immediately adjacent to the Rum River Outfalls. They are inspected when the outfalls are inspected each year. A water quality treatment structure was added to upstream of an outfall to the Rum River when drainage improvements were required in the area. This is the proposed course of action for adding additional water quality treatment structures along the Rum River.

The Mississippi River is also bounded by a combination of large lot single family residences and urban lots. The recent urban lots were developed with ponds to provide water quality treatment. The older developments may be retrofitted with water quality treatment structures when other work is required in the area. A county park occupies a significant portion of the undeveloped area along the Mississippi River, minimal development is proposed for this park. There are several large tracts under consideration by developers at this time. The schedule for development has not been established; however, these new developments will be within 2000 feet of the river and will require additional storm water measures under the Construction Permit Program prior to being approved.

The storm drainage for the City ultimately reaches the Rum or Mississippi Rivers except for some land locked basins. The land locked basins are connected to areas that drain to the rivers when feasibility studies indicate a benefit will be provided by the improvement. The rivers are the only available

outlets from stormwater discharge from the City of Ramsey and are listed as restricted discharges. The City will be incorporating volume reduction strategies into the Post Construction Stormwater Ordinance.

The 2008 Comprehensive report summarizes the land uses and projected changes through 2030. The data is tabulated below:

Land Use Classification	% City Land Area 2008	% City Land Area 2030	% Change
Agricultural/ Vacant	17		-*
Rural Developing		35	-*
Commercial/ Industrial/ Multifamily	6	10	4
Single Family Residential	38	15	-*
Park/ Quasi Public	7	9	2
Right-of-Way (State, County, Railroad, City)	11	11	0
Water/ Wetland	21	21	0

-* Classifications changed

The 2030 projections show a combination and re-division of the present Agricultural/ Vacant and Single Family Residential categories into Rural Developing and Single Family Residential categories. A slight increase is projected for the Commercial/ Industrial/ Multifamily The Parks and Right-of-Way will also increase as a result of the projected development.

All new developments are reviewed by the City and the LRRWMO prior to construction and must limit the rate of discharge from the site to pre-development rates and provide water quality treatment. Developments within the corridors adjacent to the rivers must meet density and open space standards along with preserving natural vegetation. The City adopted an updated Surface Water Management Plan in 2008 which will require all future developments to limit the rate of stormwater discharge to 75% of the existing discharge. This will be combined with the new Post Construction Discharge ordinance to address new or expanded discharges to the Rum and Mississippi rivers. Prohibiting all new stormwater discharges will deprive landowners of full use of their property and is contrary to the goals of the Metropolitan Council and the City of Ramsey Comprehensive Plan. The City of is Ramsey included in the 2030 Guide Plan for the Metropolitan Council which is looking at managing growth for the region. The new ordinance will be drafted to accommodate the required growth and limit discharges.

The City has modified construction plans to protect endangered species. The state list of endangered and threatened species is reviewed when developments are proposed near potential habitat. The City has a wetland buffer ordinance which also requires evaluation of potential impacts to endangered species habitat. Projects adjacent to potential habitat will be reviewed by the LRRWMO and with other agencies as appropriate.

The City is not aware of any properties eligible for listing in the National Register of Historic Places or Archeological sites. Environmental Assessment Worksheets have been completed for numerous projects in the city. These reports have not identified Historic or Archaeological sites within the boundaries of the city. We will continue to review all proposals for development and will require additional protection measures be implemented if sites of significance are identified in or adjacent to proposed developments.

The Drinking Water Supply Management Area has been mapped by the Minnesota Department of Health. The map is included in Appendix 2. The mapped area includes existing developments and the Ramsey Town Center Project. The Ramsey Town Center project utilizes regional ponds for stormwater rate control with additional water quality treatment practices required on each site in the development. Several of the regional ponds will have liners to maintain water levels for aesthetic purposes. The liners will prevent stormwater from entering the groundwater in the Drinking Water Supply Management Area.

Appendix 1

Best Management Practice Summary Sheets

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: **1-Public Education And Outreach**

Unique BMP Identification Number: 1a-1

***BMP Title:** Distribute Educational Materials

***BMP Description:**

The City of Ramsey will distribute educational materials to the general public including City residents, homeowners, business owners and school children.

Location(s) in SWPPP of detailed information relating to this BMP:

The specific materials and audiences are described in 1c-1 – 1c-6.

***Measurable Goals:**

The effectiveness of the BMP will be measured by :

- recording the number of calls received in response to the educational materials
- recording the number of stormwater management assistance requests
- conduct period surveys to assess the implementation of methods

***Timeline/Implementation Schedule:**

In the 2009 the City will compile an inventory of existing educational materials and identify distribution formats beyond the periodic City news letter.
On an ongoing basis the city shall publish materials a minimum of four times in the City periodic newsletter, The Ramsey Resident.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1b-1

***BMP Title:** Implement an Education Program

***BMP Description:**

The education program will consist of brochures, handouts, web page content, posters, displays and community interaction. The program will explore placing public service announcements with local media outlets.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Record the distributions outlets and materials distributed to the public.

***Timeline/Implementation Schedule:**

Annually - Prepare report on the locations and numbers of the educational materials distributed.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey
Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH
Unique BMP Identification Number: 1c-1

***BMP Title:** Education Program: Public Education and Outreach

***Audience(s) Involved:**

General public including city residents, homeowners, business owners and school students (K-12)

***Educational Goals for Each Audience:**

Increase public awareness and understanding of stormwater runoff and pollution potentials with in the community.
Demonstrate correlation between stormwater runoff and water quality.

***Activities Used to Reach Educational Goals:**

1. Stormwater Hotline
2. Website pages with stormwater information and links
3. Participate in annual Environmental Expo
4. Place articles in the Ramsey Resident regarding stormwater

***Activity Implementation Plan:**

Annually - prepare report on activities conducted.
Ongoing -Stormwater Hotline
Semiannually Update -Website pages with stormwater information and links
Annually each spring - Participate in City sponsored Environmental Expo
Quarterly - Place articles in the Ramsey Resident regarding stormwater

***Performance Measures:**

Record hotline calls received and response to the calls.
Record website hits, number of participants at educational events, materials handed out and published articles.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-2

***BMP Title:** Education Program: Public Participation

***Audience(s) Involved:**

General Public including City Residents, homeowners and business owners.

***Educational Goals for Each Audience:**

Increase public awareness and understanding of stormwater issues within the community.
Inform and educate the public about the impacts of stormwater runoff on water quality and what they can do to actively protect local lakes and streams from polluted stormwater runoff.
Inform and educate the public about how the City manages stormwater runoff through its' Stormwater Pollution Prevention Program (SWPPP).

***Activities Used to Reach Educational Goals:**

The City will report in the Ramsey Resident on activities related to managing stormwater and implementing the SWPPP. Topics for the newsletter may include information about the water quality of our City lakes and streams; events and programs the public can participate in to raise awareness about stormwater impacts; specific stormwater management activities the City is implementing; and the stormwater budget/ fees.
Displays and handouts will be available at the annual Environmental Expo.

***Activity Implementation Plan:**

Annually – Publish articles on stormwater management and the SWPPP in the Ramsey Resident, update web content.
Annually in spring – Participate in the Environmental Expo.
Ongoing – provide pet waste bags in city parks

***Performance Measures:**

Survey citizens to determine if stormwater articles were read and if their knowledge of stormwater issues was increased.
Track number of persons participating in Environmental Expo.
City will evaluate effectiveness of Education program after 2 years and make adjustments as needed to make program more effective.
Pet waste bag dispensers have been placed in parks. The public is using the bags, reducing the amount of waste before it can wash into ponds and wetlands.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-3

***BMP Title:** Education Program: Illicit Discharge Detection and Elimination

***Audience(s) Involved:**

The City of Ramsey will distribute educational materials to the general public including City residents, homeowners, business owners and City Staff regarding Illicit Discharge Detection and Elimination.

***Educational Goals for Each Audience:**

Raise public awareness of illicit discharges within all groups.
Educate city staff on ways to detect potential illicit discharges.

***Activities Used to Reach Educational Goals:**

Insert brochures in new resident packet.
Provide information to business owners.
Educate Public Works staff during monthly meetings.
Provide display at environmental expo calling attention to potential for illicit discharge

***Activity Implementation Plan:**

Annually in December - Update brochures for new resident packet
Annually in Spring – Provide display at the environmental expo
Biannually in even numbered years - Send information to business owners
Biannually in even numbered years - review keys to recognition of illicit discharges with Public Works staff

***Performance Measures:**

Record training dates
Record contacts with business owners and training sessions
Prepare summary report of environmental expo

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey
Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH
Unique BMP Identification Number: 1c-4

***BMP Title:** Education Program: Construction Site Run-off Control

***Audience(s) Involved:**

Developers(including their Engineers and Contractors) and City Staff

***Educational Goals for Each Audience:**

Reinforce the need for use and maintenance of erosion control BMP's on construction sites.

***Activities Used to Reach Educational Goals:**

Publish Ramsey BMP construction activity guide
Comment on erosion control practices on site plan reviews
Review erosion control issues at preconstruction conferences with contractors

***Activity Implementation Plan:**

2009 - The codification of the BMPs will take place as noted in section 5 of City Code.
Ongoing as site plans, building permits and construction projects occur.

***Performance Measures:**

Record number of site plan, building permits and construction projects reviews.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-5

***BMP Title:** Education Program: Post-Construction Stormwater Management in New Development and Redevelopment

***Audience(s) Involved:**

The City of Ramsey will distribute educational materials to the general public including City residents, homeowners, business owners and City Staff regarding Post-Construction Stormwater Management in New Development and Redevelopment.

***Educational Goals for Each Audience:**

Increase public awareness and understanding of stormwater runoff and pollution potentials with in the community. Demonstrate correlation between stormwater runoff and water quality.

***Activities Used to Reach Educational Goals:**

The materials developed in 1c-1 will be used in this BMP also.

***Activity Implementation Plan:**

The schedule will be the same as 1c-1.

***Performance Measures:**

See section 1c-1.

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-6

***BMP Title:** Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations

***Audience(s) Involved:**

City Public Works Staff

***Educational Goals for Each Audience:**

Review need for an increased awareness of Good Housekeeping practices in municipal operations within the Public Works Department.

***Activities Used to Reach Educational Goals:**

Brochures, handouts and training sessions.

***Activity Implementation Plan:**

Annually – at one of the monthly public works all staff meetings.

***Performance Measures:**

Annually – report on training session conducted

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-1

***BMP Title:** Coordination of Education Program

***BMP Description:**

Annually review the content of programs and brochures being used within the program. Update materials were necessary and review related agency materials for consideration of new or improved materials.

Location(s) in SWPPP of detailed information relating to this BMP:

BMP 1

***Measurable Goals:**

Report on program content and material changes.

***Timeline/Implementation Schedule:**

Annually - prepare report on material and program modifications

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1e-1

***BMP Title:** Annual Public Meeting

***BMP Description:**

Hold annual public meeting. Meeting will be scheduled to allow time for preparation of annual report for previous calendar year. Annual report will be available at the meeting for review. Comments received will be reviewed and incorporated in the annual report as appropriate.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Advertise and hold annual meeting.

***Timeline/Implementation Schedule:**

Annually – hold annual meeting.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: **2-Public Participation/ Involvement**

Unique BMP Identification Number: 2a-1

***BMP Title:** Comply with Public Notice Requirements

***BMP Description:**

The annual meeting will be advertised at least 30 days in advance. The paper used for all official notices of the city will be used. The meeting date will also be posted at City Hall and on the website.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Record notice of Publication of notice in annual report.

***Timeline/Implementation Schedule:**

Annually- publish meeting notice.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2b-1

***BMP Title:** Solicit Public Input and opinion on the Adequacy of the SWPPP

***BMP Description:**

The SWPPP will be available at City Hall in the Engineering Department and on the Website. Instructions for providing written comments will be available. Contact information is provided to accommodate written and oral comment.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Recording the number of responses and comments on the SWWPPP
Record attendance at the annual meeting

***Timeline/Implementation Schedule:**

Annually – Hold public meeting

Annually- Submit comments provided by the public in the annual report..

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey
Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT
Unique BMP Identification Number: 2c-1

***BMP Title:** Consider Public Input

***BMP Description:**

Public input will be gathered from review of the SWPPP and at the Annual meeting. The information gathered will be reviewed and a response shall address the concern or comment. A summary of proposed changes to the SWPPP will be addressed in the annual report.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Hold public meeting
Record comments and responses on the SWPPP into the annual report.

***Timeline/Implementation Schedule:**

Annually – Prepare report, hold meeting and submit report to MPCA

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: **3-Illicit Discharge Detection And Elimination**

Unique BMP Identification Number: 3a-1

***BMP Title:** Storm Sewer System Map

***BMP Description:**

The City of Ramsey will develop a Storm Sewer System Map that will assist us in determining the presence of Illicit Discharges. The map will also aid in inspection of the storm sewer system and to prioritize the annual maintenance required to optimize the use of the storm sewer system to reduce pollution in disharges to the waters of the State.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Completed Storm Sewer System Map
Identification of needed maintenance

***Timeline/Implementation Schedule:**

December 2006 – Compilation of As-built information
December 2007 – Completion of Storm Sewer System Map
June 30, 2008 Storm Sewer System Map Completed
Annually – Update map with new projects and reconstruction

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3b-1

***BMP Title:** Regulatory Control Program

***BMP Description:**

The State of Minnesota has regulations prohibiting the connection of non-stormwater discharges into the storm sewer system. The City has adopted an Individual Sewage Treatment System Ordinance. The city will adopt an Illicit Discharge Detection and Elimination Ordinance.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Completed review of existing regulations
Adopt new ordinance

***Timeline/Implementation Schedule:**

December 2006 - Completed draft ordinance
December 2007 - Completed ordinance

Specific Components and Notes:

The city has inspected all known outfalls from the MS4 to the Rum and Mississippi Rivers annually since 2003. These were all dry weather inspections and flow was not observed in the pipes during these inspections.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3c-1

***BMP Title:** Illicit Discharge Detection and Elimination Plan

***BMP Description:**

The City of Ramsey currently offers a recycling program to the residents. The program includes curbside pickups and a semi-annual recycling day for electronics and larger items not accepted in the curbside program. The City of Ramsey has been recognized by Anoka County for exceeding participation goals in the recycling program.

The City has had a mandatory septic tank pumping ordinance in place since 2005.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Completed Recycling days
Quantity of materials recovered from solid waste stream
Number of septic systems reported pumped

***Timeline/Implementation Schedule:**

Annually – report number of septic systems pumped
Annually – inspect outfalls and act on dry weather flows observed

Specific Components and Notes:

Curbside recycling
"Recycling Day"
Maintenance vehicle liquid recycling
The city has inspected all known outfalls from the MS4 to the Rum and Mississippi Rivers annually since 2003. These were all dry weather inspections and flow was not observed in the pipes during these inspections.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3d-1

***BMP Title:** Public and Employee Illicit Discharge Information Program

***BMP Description:**

Education of Employees and Public on Illicit Discharge Program

Ramsey will develop a strategy to inform City Employees, property owners, local businesses and the public about the hazards associated with illicit discharges and improper waste disposal.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

City staff trained in Illicit Discharge Recognition.
Distribution of educational materials on Illicit Discharge Detection and Elimination.
Summarize recycling volume in annual report
Include summary of disseminated educational material with annual report

***Timeline/Implementation Schedule:**

Annually review shop procedures regarding vehicle fluids
June 2009 compile resources for Illicit Discharge Recognition training Program
January 2010 Complete staff Illicit Discharge Recognition Training
Annually IDDE refresher training, disseminate literature

Specific Components and Notes:

Use "Rubber Ducky" or similar public service announcements via local cable
Review maintenance vehicle fluid procedures at Employee meetings
Distribute recycling information to residents through newsletter, website and Environmental Expo

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3e-1

***BMP Title:** Identification of Non Stormwater Discharges and Flows

***BMP Description:**

The City is in the process of indentifying drainage areas and has completed a comprehensive stormwater model for all drainage areas in the City. The model will be used in conjunction with the Storm Sewer Map and field observations to determine areas where illicit discharges may exist.

The City will develop a process to determine whether any of the following categories of non-stormwater discharges or flows are significant contributors of pollutants to our MS4:

Waterline flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated groundwater infiltration, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, de-chlorinated swimming pool discharges, street wash water, and discharges or flows from fire fighting activities.

For any non-stormwater discharges or flows which the City finds to be a significant contributor of pollutants to the MS4 the City will develop an action plan to evaluate and address the impact the discharge is having on stormwater quality.

Location(s) in SWPPP of detailed information relating to this BMP:

MCM 3.C

***Measurable Goals:**

Completion of the study
Develop a process to investigate and evaluate the potential for the non-stormwater discharges identified above to be significant contributors of pollutants to our MS4.
Conduct investigation and evaluation of non-stormwater discharges and flows.
Develop an action plan for flows identified as significant contributors of pollutants to our MS4.
Implement action plan for significant non-stormwater discharges and flows.

***Timeline/Implementation Schedule:**

May 2007 – Selected Consultant to prepare comprehensive stormwater study
October 2008 – City Council accepted comprehensive stormwater study
August 2009 Complete ordinance modifications required in comprehensive stormwater study.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: **4-Construction Site Stormwater Runoff Control**

Unique BMP Identification Number: 4a-1

***BMP Title:** Ordinance or other Regulatory Mechanism

***BMP Description:**

Construction Site Stormwater Runoff Control and Enforcement is addressed in section 9.27 of City Code and went into effect on January 2, 2007.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Adoption of Ordinance

***Timeline/Implementation Schedule:**

June 2006 Adopt Ordinance
Ongoing - Work with builders to raise awareness of ordinance and enforce provisions of ordinance.

Specific Components and Notes:

Required Components in ordinance:

- Submittal of Erosion and Sediment Control plans by site Operators to MS4
- Site Plan Review and Approval before construction
- Site operators maintain records on rainfall and inspections
- Regular inspections by site operators
- Specify requirements for dewatering or basin draining at site
- Specify requirements for BMP maintenance
- Specify controls for managing solid and hazardous wastes
- Specify requirements for permanent stormwater controls
- Specify requirements for perennial vegetative cover on exposed soils
- Compliance includes Verbal warnings, written warnings, stop-work orders, fines, forfeit of security bond money and/or withholding of certificate of occupancy.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4b-1

***BMP Title:** Construction Site Implementation of Erosion and Sediment Control BMPs

***BMP Description:**

Installation and maintenance of erosion control measures on construction sites.

The City of Ramsey will continue to utilize the MPCA "Protecting Water Quality in Urban Areas" manual, BWSR "MN Construction Site Erosion and Sediment Control" handbook, Met Council's "Small Site BMP" manual and the MPCA " Minnesota Stormwater Manual" for BMP selection. Developers are directed to these manuals for preparation of their plans. City review of all development plans requires incorporation of the BMPS presented in these manuals.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Ongoing – Review and comment on erosion control measures on construction plans in conjunction with Preliminary and Final Plat Approvals

***Timeline/Implementation Schedule:**

Ongoing - The city currently reviews and comments on erosion control measures and BMP's on all construction plans. The process continues in the field, our construction observers monitor all construction sites and issue repair notices to sites where BMP's are not controlling erosion.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4c-1

***BMP Title:** Waste Controls for Construction Site Operators

***BMP Description:**

City Code requires dumpsters or debris containment areas on all construction sites. Inspections can be withheld if debris is not picked up.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Minimize complaints from residents about construction debris.

***Timeline/Implementation Schedule:**

Ongoing – review construction site waste controls, enforce existing regulations.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4d-1

***BMP Title:** Procedure for Site Plan Review

***BMP Description:**

The City development approval process includes three (3) phases, Sketch Plan, Preliminary Plat and Final Plat for subdivision of land. Site plans have 2 phases Preliminary Site plan and Final Site Plan. Staff reviews the plans at each phase and provides a review letter to the development team. Sites over 1 acre also require a permit from the Lower Rum River Water Management Organization (LRRWMO). The reviews from both agencies address erosion control, temporary sedimentation basins and final stormwater ponding requirements. The city has established a system of notices for construction site erosion control problems. The notices are provided to the contractor specifying the work to be done and the timeframe to complete the work. The system includes means for the City to perform the work if the contractor fails to act.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Continue plan review; implement changes in process if necessary.

***Timeline/Implementation Schedule:**

Ongoing – review development plans, require implementation of appropriate Construction Site BMPs for controlling stormwater runoff.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4e-1

***BMP Title:** Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance

***BMP Description:**

The current system of erosion control notices addresses Stormwater Noncompliance. A Stormwater Hotline and website will be added to provide additional avenues for reporting stormwater violations. Currently, calls received on violations are routed to field staff for observation of the condition and preparation of a notice as necessary.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Record all calls received including corrective measures performed.
Record all notices issued for stormwater noncompliance.

***Timeline/Implementation Schedule:**

December 2006 – Implement Hotline and Website.
Ongoing - Observe construction sites and issue notices as needed; receive and follow-up on calls and web postings regarding stormwater noncompliance.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4f-1

***BMP Title:** Establishment of Procedures for Site Inspections and Enforcement

***BMP Description:**

Inspect construction sites for stormwater noncompliance. Issue notices for corrective actions, follow-up to ensure compliance. The City has established a system of notices that are issued for erosion control non-compliance as noted in 4d-1.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Log of completed inspections and notices issued.

***Timeline/Implementation Schedule:**

Ongoing – Continue site inspections, issuing notices and following up on notices.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: **5-Post-Construction Stormwater Management In New Development And Redevelopment**

Unique BMP Identification Number: 5a-1

***BMP Title:** Development and Implementation of Structural and/or Non-structural BMPs

***BMP Description:**

The City of Ramsey will evaluate and select the BMPs necessary to achieve the balance between water quality and water quantity to ensure that the waters of the community are clean and residents and property are not damaged.

The City of Ramsey has accepted innovative water quality treatment devices and will continue to evaluate new technologies for implementation in the City.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Selection of BMPs
Publication of accepted BMPs
Implementation of BMPs

***Timeline/Implementation Schedule:**

December 2007 – BMPs codified
December 2008 – BMPs published

Specific Components and Notes:

Construction erosion and sedimentation control ordinance
Evaluate and select BMPs

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5b-1

***BMP Title:** Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment

***BMP Description:**

Adoption of Post Construction Runoff Ordinance
The City of Ramsey will have a Post Construction Runoff Ordinance in place within 6 months of extension of permit coverage.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Evaluation of existing ordinance
Adoption of Ordinance

***Timeline/Implementation Schedule:**

December 2008 – Evaluation of Ordinance
December 2009 – Adoption of Ordinance

Specific Components and Notes:

The City of Ramsey currently operates under a Subdivision Ordinance. The City will evaluate the BMPs and existing ordinance to see that the provisions of the SWPPP are being accomplished and develop a Post Construction Ordinance in the 5th year of the permit cycle.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-1

***BMP Title:** Long-term Operation and Maintenance of BMPs

***BMP Description:**

The City of Ramsey will monitor and maintain BMPs installed in the City.

The City established a stormwater utility in 2000. The fund has been used to fund needed storm sewer improvements.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Update storm sewer system database with location of Structural BMPs.
Annual report on BMP maintenance.

***Timeline/Implementation Schedule:**

December 2007 – Update storm sewer system database with Structural BMPs
Annually – Prepare report on maintenance of structural BMPs

Specific Components and Notes:

The City has included a vacuum truck in the 5 year Capital Equipment Plan that can be used for maintenance of structural BMPs (oil/water separators, sump manholes, water quality treatment structures). Current needs are met by contracting for needed services.

The public works department monitors and repairs the current BMPs.

The City acquired a vacuum truck in December 2008 that will be used to maintain the structural BMP's.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

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BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5d-1

***BMP Title:** Maintain Source Water Protection Area

***BMP Description:**

The map of the Source Water Protection Area (SWPA) is included in Appendix 2. The SWPA covers the Ramsey Town Center Area which is bounded on the east by Ramsey Boulevard, on the west by Armstrong Boulevard, on the South by the Burlington Northern Santa Fe Railroad. The northern boundary is approximately at 149th Avenue which is not continuous in this area. The Ramsey Town Center development included regional ponds for rate control, individual developments are required to provide additional treatment on site such as water quality treatment manholes, infiltration basins or pervious pavement. Each proposed BMP is evaluated as part of the plan review process. Several of the regional ponds are lined to maintain water levels and provide water features. These ponds are nearest to most of the municipal water supply wells. The remaining regional ponds are south of the municipal wells. The surface water aquifer flow is from north to south in this area.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Maintain ponds and BMPs in this area. Record work done.
Continue requirement for additional on-site measures as Ramsey Town Center develops.
Coordinate development reviews for this area with Well Head protection requirements to ensure protection of the Drinking Water Source Area.

***Timeline/Implementation Schedule:**

Ongoing – Monitor and maintain ponds and BMPs

Specific Components and Notes:

The City will incorporate the MDH Stormwater Guidance manual into plan reviews for projects in proximity to the wellhead protection areas.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: **6-Pollution Prevention/ Good Housekeeping**

Unique BMP Identification Number: 6a-1

***BMP Title:** Municipal Operations and Maintenance Program

***BMP Description:**

The City of Ramsey will develop a collection of training materials that will be used to educate staff about pollution prevention and good housekeeping. These resources will come from applicable external sources, such as the EPA and may be supplemented with materials developed by our own organization.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Completed training materials
Employee training

***Timeline/Implementation Schedule:**

December – 2006 Evaluation of outside agency materials
December – 2007 Compilation of training resource reference folder
Annual updates

Specific Components and Notes:

Equipment and Hazardous Material Storage
Information Management System
Employee training

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-2

***BMP Title:** Street Sweeping**

***BMP Description:**

The City of Ramsey will semi-annually sweep the streets of the City to remove potential pollution materials before they can enter the storm sewer system.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Number of lane miles swept

***Timeline/Implementation Schedule:**

Annually

Specific Components and Notes:

Sweeping schedule
Sweeper maintenance schedule.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-1

***BMP Title:** Annual Inspection of All Structural Pollution Control Devices

***BMP Description:**

Inspection of Structural Pollution Control Devices – the locations of these devices are being compiled as part of the Storm Sewer Mapping program.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Prepare annual report on inspection results

***Timeline/Implementation Schedule:**

December 2007 – Completion of Storm Sewer mapping, database of devices and first round of inspections of Structural Pollution Control Devices.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-2

***BMP Title:** Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis

***BMP Description:**

Inspection of MS4 Outfalls, Sediment Basins and Ponds on a rotating basis, creating work orders for repairs as needed.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Inspection of 20 percent of the MS4 Outfalls, Sediment basins and Ponds Each Year
Preparation of annual inspection report

***Timeline/Implementation Schedule:**

December 2006 Complete Annual Inspection
Annually thereafter – Complete Inspection

Specific Components and Notes:

The city has identified all of the MS4 outfalls and is still adding ponds to the storm sewer map.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1440
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-3

***BMP Title:** Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas

***BMP Description:**

Inspect City owned Stockpile, Storage and Material Handling areas.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Completion of annual inspection report.

***Timeline/Implementation Schedule:**

December 2006 Complete Annual Inspection of exposed Stockpile, Storage and Material Handling Areas

Specific Components and Notes:

The City will be installing an enclosed Salt Storage building in 2006. The current Salt Storage covers the stockpile; however the loading operations are enclosed. This facility will provide room for loading inside. The other material stock piles are located away from storm inlets, ponds and ditches.

***Responsible Party for this BMP:**

Name: Leonard Linton

Department: Engineering

Phone: 763 421-1410

E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-4

***BMP Title:** Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures

***BMP Description:**

Review Inspection notes and schedule appropriate repair, replacement and maintenance measures noted in inspection reports.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Preparation of Inspection Follow-up Report

***Timeline/Implementation Schedule:**

December 2006 Prepare report
Annually thereafter prepare report

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey
Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING
Unique BMP Identification Number: 6b-5

***BMP Title:** Record Reporting and Retention of All Inspections and Responses to the Inspections

***BMP Description:**

Establish record retention system for all MS4 related Inspections.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Establish and utilize record retention system

***Timeline/Implementation Schedule:**

December 2006 Establish record retention system

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey
Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING
Unique BMP Identification Number: 6b-6

***BMP Title:** Evaluation of Inspection Frequency

***BMP Description:**

Evaluate Inspection Results and adjust frequency if needed.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Prepare report on evaluation of Inspection Results

***Timeline/Implementation Schedule:**

December 2008 Evaluate inspection results for first 3 years of program.
Annually incorporate latest inspections into evaluation

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: City of Ramsey
Permit Condition: IV.D Section 303(d) listings
Unique BMP Identification Number: IV.D – 1

BMP Title: Impaired Waters Review Process

BMP Description:

The City of Ramsey will review all discharges from our MS4 system to impaired waters, as defined by the current USEPA approved 303(d) list. Using the data from this review, we will determine if any changes to the existing stormwater system or BMPs are needed to minimize the impact of discharges from our MS4 to the impaired waters. If changes are needed the City of Ramsey will modify our SWPPP and submit these modifications to the MPCA with our current annual report.

Measurable Goals:

- The City of Ramsey has determined that discharges from our MS4 system enter the following impaired waters, as defined by the current USEPA approved 303(d) list: (Water Body, Impairment)
    - Mississippi River - Mercury in Fish Tissue, PCB in Fish Tissue
    - Rogers Lake - Aquatic Recreation
    - Rum River - Mercury in Fish Tissue
- This determination was made using the Storm Sewer Map and citywide stormwater model. The mercury TMDL is being addressed state wide and it is assumed the discharge from Ramsey is not a source of mercury. The PCB in fish tissue TMDL plan has not been approved as of June 2008. The TMDL for Rogers Lake is not scheduled to start until 2015.
- The Mississippi River and the Rum River are both classified as ORVW waters. A separate BMP Summary sheet has been prepared for Discharges to Waters with Prohibited or Restricted Discharges Assessment.
- The watersheds, hydrology and impacts will be developed simultaneously for the Impaired Waters and Prohibited Discharge Waters.

Timeline/Implementation Schedule:

December 2008	The City of Ramsey has identified the Rum River, Mississippi River and Rogers Lake as Impaired Waters receiving impacts from its MS4 discharges. A map has been prepared showing the Impaired Waters. A city wide stormwater model has been developed.
May 2009	The City will correlate the Impaired Waters watersheds with the stormwater model and will complete an evaluation of hydrology, land use and runoff. The City will evaluate changes to its storm sewer system to reduce the impacts to the Impaired Waters.
June 30 2009	The City of Ramsey will submit as an attachment to the Annual Report to the MPCA, the assessment, response to any public comments, plan for ongoing work elements and any proposed changes to the SWPPP that have been deemed necessary through this assessment process.
Ongoing	The City of Ramsey will review, evaluate and incorporate changes to the SWPPP as TMDL goals are established and published for these waters.

Specific Components and Notes:

This process is to be reassessed annually over the course of the permit cycle. As new 303(d) lists with additional impaired waters listed are published in the future, City of Ramsey will review changes to the list and conduct the necessary review of additional listed waters likely to be impacted by the MS4's stormwater discharges.

When an USEPA approved TMDL is finalized, the City of Ramsey intends to fully comply with all limits and requirements set forth in the TMDL in accordance with the schedule(s) outlined in the TMDL and the MS4 Permit.

Responsible Party for this BMP:

Name: Leonard Linton

Department: Engineering

Phone: 763 427-1410

E-mail: llinton@ci.ramsey.mn.us

BMP Summary Sheet

MS4 Name: City of Ramsey

Permit Condition: IX. Appendix C. Part A and/or Part B.

Unique BMP Identification Number: IX. A. and/or IX. B.

***BMP Title:** Discharges to Waters with Prohibited or Restricted Discharges Assessment

***BMP Description:** City of Ramsey Practices for discharges to ORVW waters

- This BMP includes establishment of a baseline of information– determine what processes are in place and what has already been accomplished that will help meet the permit conditions
- This BMP includes preparation of a written inventory of all stormwater discharges to the prohibited or restricted water(s) from within the jurisdictional boundaries of the MS4; compile necessary detail about the stormwater discharges to assess the impacts and alternatives
- Prepare a map that includes all the delineated sub-watershed(s) covering the MS4 that discharge to the ORVW, including the identified discharge points and routes to the ORVW waters that the MS4 discharge may impact.
- Evaluate past and future changes in the watersheds, projected out at least through the year 2020.
- Determine if a new or expanded discharge has or would occur and the magnitude of the potential changes.
- Evaluate alternatives to the discharge.
- Propose methods of eliminating the discharge.

Activity Implementation Plan

As an MS4 located within a watershed that discharges to ORVW waters, City of Ramsey will submit an assessment and other documentation required in Appendix C of permit MNR040000 of which the following are major components:

1. The City of Ramsey topography generally slopes from northwest to southeast. The eastern boundary is the Rum River and the southern boundary is the Mississippi River. Both Rivers are designated ORVW's. Many of the developments in the City, especially along the rivers, were in place prior to designation of the rivers as ORVW's. Development has continued since the designation and the level of storm water treatment has increased with time. Development is anticipated to continue in the future.

2. The City has prepared a stormwater model for the entire city based on the existing storm sewer system. The model has identified areas that are landlocked and do not discharge to the rivers, excluding these areas all runoff reaches either the Rum River or the Mississippi River.

3. The City has prepared a map showing when plats were approved for determination of where discharges have occurred since the ORVW was designated. It appears that new or expanded discharges have occurred since the ORVW was designated. The City has prepared a stormwater model for the entire city that will be used in conjunction with the plat date map to evaluate changes to the discharges.
4. The City adopted an updated Surface Water Management Plan in 2008. The plan calls for all new developments to incorporate infiltration practices and to limit discharge rates to 75% of the existing runoff rates. The city will evaluate Low Impact Development, infiltration and volume reduction strategies and will adopt ordinances requiring the practices that are best suited for the unique conditions in Ramsey.

***Timeline/Implementation Schedule:**

December 2008	The City of Ramsey has identified the Rum River and Mississippi River as ORVW waters receiving impacts from its MS4 discharges. A map has been prepared showing developments approved after the ORVWs were designated. A city wide stormwater model has been developed.
May 2009	The City will correlate the post ORVW development watersheds with the stormwater model and will complete an evaluation of hydrology, land use and runoff. The City will evaluate volume reduction strategies and will adopt an ordinance requiring the use of volume reduction strategies in future development/ redevelopment projects.
June 30 2009	The City of Ramsey will submit as an attachment to the Annual Report to the MPCA, the assessment, response to any public comments, plan for ongoing work elements and any proposed changes to the SWPPP that have been deemed necessary through this assessment process.

Specific Components and Notes: Provide any clarification or other work related to this action here.

***Responsible Party for this BMP:**

Name: Leonard Linton
Department: Engineering
Phone: 763 427-1410
E-mail: llinton@ci.ramsey.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness*

Appendix 2

MPCA/ DNR Exhibits

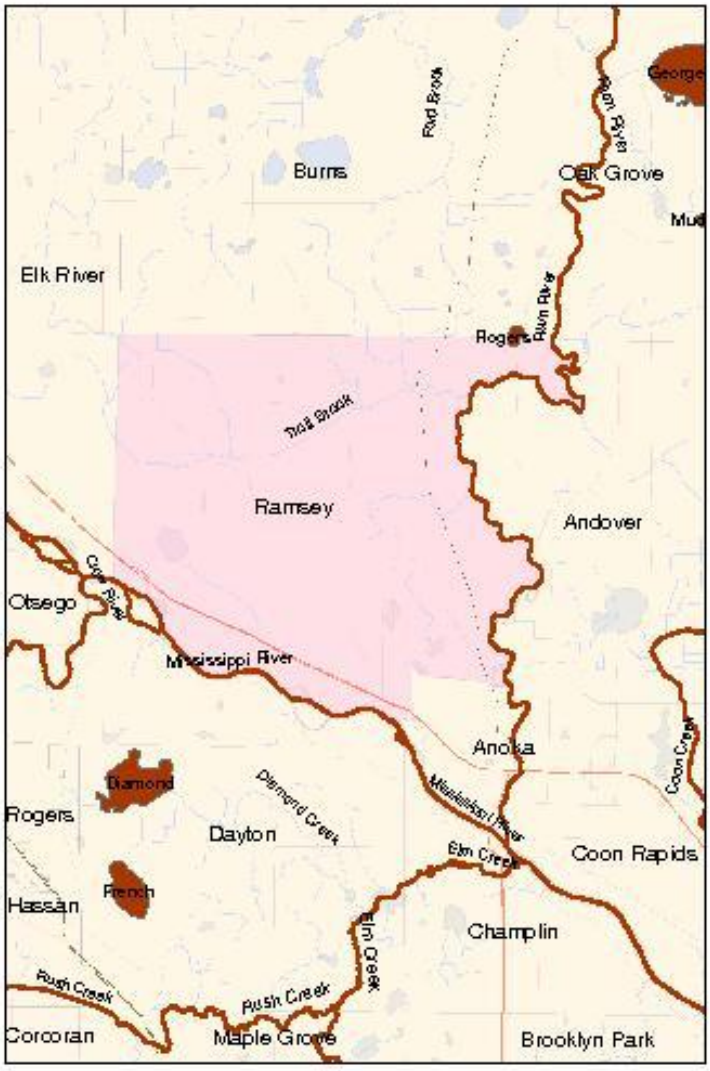
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ATTACHMENT
LIST OF SPECIAL WATERS
(MPCA)

Excerpt from MPCA Special Waters List

County	Waterbody	Designation	Location
…			
Anoka	Mississippi River	Scenic/ Rec River	State Aid Highway 7 bridge in St. Cloud to NW Anoka City Limits
Anoka	Rum River	Scenic/ Rec River	Highway 27 Bridge in Onamia to Rice and Madison Streets in Anoka
….			

Ramsey City MS4
Impaired Waters 8/1/2006



Legend

- Impaired Streams
- Impaired Lakes
- Your MS4
- Cities/Townships
- Lakes
- Rivers

Roads

- Interstate
- US Highway
- MN Highway
- CSAH
- County Road

0 1,600 3,200 6,400
Meters

Ramsey City MS4
Waters of Interest 8/1/2006



Legend

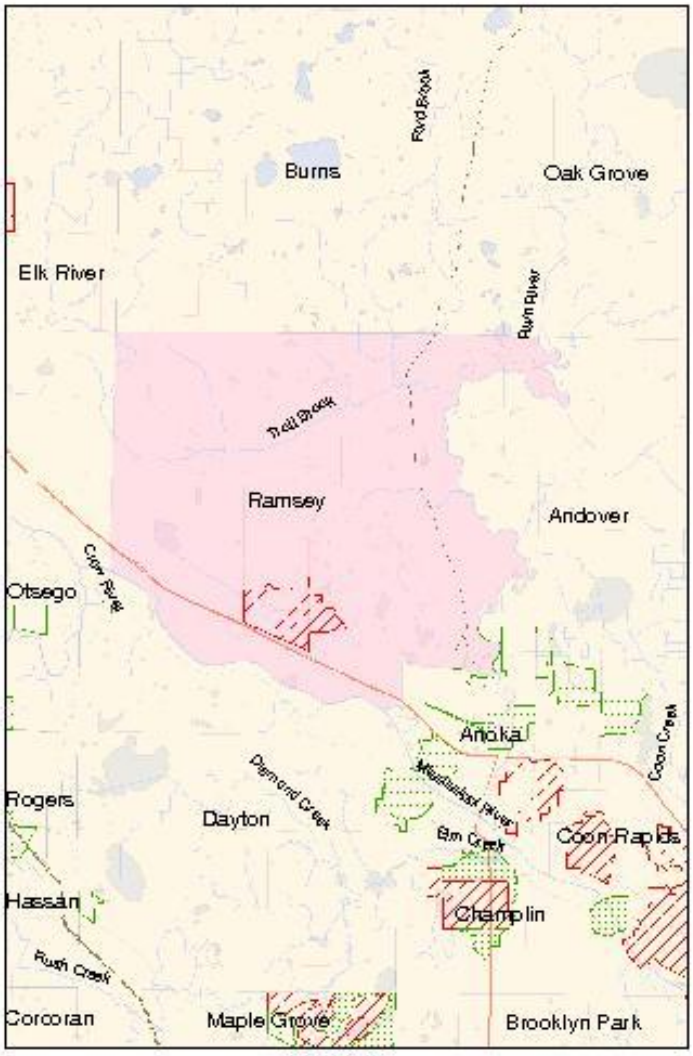
- ORVW Streams
- Your MS4
- Cities/Townships
- Lakes
- Rivers

Roads

- Interstate
- US Highway
- MN Highway
- CSAH
- County Road

0 1,600 3,200 6,400
Meters

Ramsey City MS4 DSW 8/1/2006



Legend

Drinking Source Waters
- Low Vulnerability
- Vulnerable

Roads
- Interstate
- US Highway
- MN Highway
- CSAH
- County Road

- Your MS4
- Cities/Townships
- Lakes
- Rivers

0 1,650 3,300 6,600 Meters

Appendix B

Comment Letters

June 22, 2015

Mr. Bruce Westby
City Engineer
City of Ramsey
7550 Sunwood Drive NW
Ramsey, MN 55303

RE: City of Ramsey Surface Water Management Plan (plan)
Metropolitan Council Review File No. 21414-1

Dear Mr. Westby:

The Metropolitan Council (Council) has completed its review of the above plan, dated May 12, 2015. The plan is consistent with Council policies and the Council's *Water Resources Policy Plan*. The Council finds the plan fulfills the requirements for a local water management plan, and provides an excellent framework for managing storm water in the city.

We do have several minor comments on the plan:

- Page 1 of the plan refers to the Council's 2030 Water Resources Management Policy Plan; the Metropolitan Council adopted its *2040 Water Resources Policy Plan* on May 20, 2015.
- In *Section X, C. Recommendations* and in some of the policies, actions are referred to as things that "should" be done. The plan needs to have specific language as to what will be done and by whom.
- In *Section X, E. Model Results*, the text refers to figures in the plan, however the figure numbers given appear to be incorrect. For example, the text heading says, "*Figures 15 &16 EMISS Watershed.*" However Figure 16 is actually the Golf watershed 100 year pond summary.

Thank you for considering our comments on the city's plan. Again, the Council believes Ramsey's Surface Water Management Plan provides an excellent framework for managing storm water in the city and protecting water quality and quantity. If you have any questions regarding these comments, please contact Joe Mulcahy, at 651-602-1104.

Sincerely,

Leisa Thompson
General Manager, Environmental Services Division

cc: Todd Hass, Chair, Lower Rum River Watershed Management Organization
Edward Reynolds, Metropolitan Council District 9
Sam Paske, Assistant General Manager, Environmental Quality Assurance Department
Annalee Garletz, Metropolitan Council Sector Representative
Reya Ismacili, Metropolitan Council Referrals Coordinator
Joe Mulcahy, Water Resources Assessment Section

390 Robert Street North Saint Paul, MN 55101-1805
651.602.1000 | TTY 651.291.0904 metrocouncil.org

METROPOLITAN COUNCIL

Anoka Conservation District
1318 McKay Drive NE, Suite 300
Ham Lake, Minnesota 55304
Ph: 763-434-2030 Fx: 763-434-2094
www.AnokaSWCD.org

July 2, 2015

Bruce Westby, City Engineer
City of Ramsey
7550 Sunwood Drive NW
Ramsey, MN 55303

Mr. Westby,

The Anoka Conservation District is reviewing the City of Ramsey's draft Local Surface Water Management Plan (received 5-12-2015) on behalf of the Lower Rum River Watershed Management Organization. City local water plans (LWP) must be consistent with the WMO plan. Please consider the comments on the following pages.

Barr Engineering is also conducting a review of regulatory elements of the plan on behalf of the WMO which you will receive under separate cover. I have reviewed those comments and agree with them, however they are generally not re-stated in this letter.

After revision of this plan, please resubmit it to the LRRWMO. A letter summarizing actions taken to address our concerns would be appreciated to expedite our review.

The City is reminded that local controls and ordinances must be amended to be in conformance with state and WMO standards within 180 days after LWP approval. (MN Statutes 103B.235 subd. 4).

Respectfully,

Jamie Schurbon

Water Resource Specialist

LRRWMO Plan Requirement	WMO Page	Comments/Suggested Actions
Education		
Local plans must include education. An education program must be part of local plan development.	53	Reference the SWPPP where a more detailed education plan is already in place for the City.
Wetlands		
"Wetland excavation for the enhancement of wildlife habitat will only be allowed if the project proposer applies for a LRRWMO approval and the excavation is in conformance with the WCA as well as guidance from the BWSR, DNR, and USACOE"	57	The city must develop wetland buffer standards consistent with LRRWMO standards. Please see Barr Engineering's review.
City must have wetland standards consistent with the LRRWMO standards.	Appendix G	DOES IT APPLY TO CONST. OF IND. HOME
Stormwater		
"New or expanded stormwater discharges to the Rum River are not allowed" because it is classified as an Outstanding Resource Value Water by the DNR.	46	Add corresponding language.
City must have stormwater standards consistent with the LRRWMO standards.	Appendix E	Add a summary of LRRWMO standards.
WMO encourages stormwater pond design to include habitat enhancement and aesthetic features.	54	Add a similar policy, perhaps under goal 3.
Anoka Dam		
An ownership /responsibility plan for the Anoka Dam will be developed with the member cities.	61	Add discussion of Anoka Dam management planning, including any collaborative work with Anoka and Andover.
Water Quality		
The LRRWMO will "work cooperatively with other agencies and communities on TMDLs…" Cities should recognize impaired waters in their local plan and provide plan for addressing.	43, 55	The MPCA is in the process of announcing new impaired waters designations. Trott Brook is being listed as impaired for macroinvertebrates, fish, dissolved oxygen and E. coli. Update the plan with this information.
Other		
"Municipalities will apply for grants through the LRRWMO with the municipalities providing match funds required"	49	The city is strongly encouraged to use their stormwater utility fund in partnership with LRRWMO. State grants can be pursued if local matching dollars are provided; this will make local dollars go much farther.
		Consider mentioning new state buffer laws.

resourceful. naturally.
engineering and environmental consultants

BARR

June 19, 2015

Mr. Bruce Westby
City Engineer
City of Ramsey
7550 Sunwood Drive NW
Ramsey, MN 55303

Re: Local Surface Water Management Plan: City of Ramsey

Dear Mr. Westby:

The Lower Rum River Watershed Management Organization's (LRRWMO) *Third Generation Watershed Management Plan* (LRRWMO WMP) was approved by the Board of Water and Soil Resources (BWSR) on December 11, 2011. MN Rules 8410.016 requires that local municipal storm water plans shall be adopted within 2 years of the BWSR board's approval of the last organization plan (Watershed District or Water Management Organization) that affects local units of government. The city of Ramsey, lying totally within the LRRWMO, has submitted their *Local Surface Water Management Plan* (Ramsey Plan) to the LRRWMO on May 12, 2015. The Plan must, at a minimum, meet the requirements for local plans as outlined in Minnesota Statutes 103B.235, except as provided by the LRRWMO WMP under Minnesota Rule 8410.0110, subpart 3.

Barr Engineering Co. (Barr) and the Anoka Conservation District (ACD) are reviewing the Ramsey Plan and are submitting comments to the LRRWMO on compliance and conformance with the LRRWMO WMP. Barr's review and comments are primarily on the storm water management component of the Ramsey Plan. The ACD's comments, submitted under separate cover, are on the goals and policies component of the Ramsey Plan. State Statute requires the LRRWMO complete its review and provide comments by July 11, 2015, 60 days of the submittal of the Ramsey Plan. E-mail correspondence from the City has stated that the review period can be extended to July 16, 2015, the next regularly scheduled meeting of the LRRWMO.

Review Comments of the Storm Water Management Plan

1. The storm water requirements (Appendix E of the LRRWMO WMP) of the LRRWMO need to be stated in the Ramsey Plan and at a minimum adopted by the City. This includes rate control, volume retention, water quality management, and flood control/management. The LRRWMO criteria are stated frequently throughout the text of the Ramsey Plan. However in addition, if in one statement in one location within the Ramsey Plan it is stated that the City adopts/references the requirements of Appendix E, this would provide greater clarity to the Ramsey Plan user of the applicable storm water requirements.

2. Page 6, Item 7 of the Ramsey Plan states; *The wetland buffers recommended in the Wetland Function assessment were approved by City Council when the 2008 SWMP was approved. Further review of the buffers by the City Council resulted in a policy to delay the implementation of the wetland buffer recommendations.*

   - This statement is also mentioned in several places throughout the Ramsey Plan. Wetland Protection Standards for the LRRWMO are outlined in Appendix G of the LRRWMO WMP. The Ramsey Plan must specifically identify these standards, how the City will be implementing these standards and any wetland requirements, such as buffers, that the City will be implementing through ordinance.

3. Page 14, Item B of the Ramsey Plan states; *Figure 4 shows the 10-year capture zone (Well Head protection Area, WHPA) as well as the Drinking Water Supply Management Area (DWSMA) for the seven municipal drinking water wells in Ramsey. Storm water infiltration will not be allowed inside these zones.*

   Page 34, Item D of the Ramsey Plan states (last sentence); *City Policy adopted in conjunction with infiltration requirements of the LRRWMO Third Generation Plan permits infiltration in areas within the Drinking Water Supply Area (DWSMA), so long as it is not also within the 10-year capture zone.*

   - These two statement appear to somewhat be in conflict with each other.
   - The Ramsey Plan needs to address how volume retention requirement is to be complied with in areas such as the DWSMA or in areas that are non-conducive for infiltration.

4. Page 16, Item #2 of the Ramsey Plan states; *The bounce from the normal water level to the high water level does not exceed two feet.*

   - It is recommended that this comment be replaced with, The impacts of storm water from new development discharging into a wetland will be determined through a Minnesota Routine Assessment Methodology (MnRAM) assessment of the wetland.

     A MnRAM provides a quantitative and qualitative assessment of the impacts that storm water has and will have on a wetland.

5. Page 18, Table 16; of the Ramsey Plan. It is recommended that the Design Infiltration Rates in the Minnesota Storm Water Manual, as amended, be used and referenced rather than the information from Urban Hydrology for Small Watersheds, (SCS, 1986).

6. Page 19, Item #11 of the Ramsey Plan - Unique Features and Scenic Areas; The City Codes referenced, Chapter/Section 177, must comply with the revised MDNR's Wild and Scenic River Management requirements.

7. Page 20 of the Ramsey Plan: The highlighted text states NEED TO ADD WEB PAGE, the web page needs to be provided.

8. Page 31 of the Ramsey Plan, last paragraph states; *Elevation of **the lowest opening** of a structure shall be a minimum of 1 foot above the Emergency Overflow, or 2 feet above the HWL of the nearby pond or waterbody, whichever is higher.*

   - The LRRWMO WMP criteria states; The **low floor** elevation of all development, including basements, must be at least 3 feet above the highest anticipated groundwater table, 2 feet above the designated or designed 100-year flood elevation, or 1 foot above the emergency overflow, whichever is higher. The statement in the Ramsey Plan must be corrected.

9. Page 35, Item 4 of the Ramsey Plan – Pond and Pipe Design Criteria: The Peak Flow Rate Control criteria described on page E-5 of the LRRWMO WMP should be included in the discussion.

10. Page 37 of the Ramsey Plan, Group C states; *Includes soils that are low in organic content and made-up of clay loams and soils high in clay.*

    - The Minnesota Storm Water Manual identifies a Hydrologic Soil Group C as a sandy-loam, ML, silts, very fine sand, silty or clayey fine sands. Please verify the description in the SWMP or consider using the description in the Minnesota Storm Water Manual.

11. Page 41, Policy 2.1 of the Ramsey Plan: The policy should be modified to read, *The City will adopt best management practices for development that will result in an annual removal efficiency of 60% total phosphorus and 90% total suspended solids.*

12. Page 41, Policy 3 of the Ramsey Plan should be Policy 3.4. See previous comments regarding wetland protection standards, Item 2. Also, it appears that the last sentence of this policy statement beginning with Policy 3.5 should either be modified or be a standalone Policy.

13. Page 42, Goal 4 of the Ramsey Plan; A policy needs to be added that the City's newsletter or web site will provide information regarding water resource management and a summary of the on-going activities of the LRRWMO (page 53, Policy 1, Education of the LRRWMO WMP).

14. Page 42, Policy 6.3 of the Ramsey Plan; Hydraulic Soil Types A and B are most conducive to infiltration but infiltration is/should not be limited to these two soil types.

15. Page 43, Policy 6.5 of the Ramsey Plan states; *The use of grassed waterways shall be encouraged to maximize infiltration. Proper grades shall be maintained or underdrain systems installed as part of an overall site plan to insure positive drainage.*

    - The use of an underdrain system does not provide for infiltration but rather filtration of storm water.

16. Page 43, Goal 7 – Wetlands of the Ramsey Plan; A policy should be provided that the LRRWMO is the Local Governmental Unit (LGU) administering the requirements of the Wetland Conservation Act (WCA) in Ramsey.

17. Page 43, Policy 7.1 of the Ramsey Plan states; *Use and Function of all wetlands greater than ¼ acre in size has been determined as part of the 2008 SWMP preparation.*

    - In other Sections of the Ramsey Plan it has been stated that the Use and Function of the wetland has been prepared but will not be used at this time. This needs to be clarified and describe how the requirements of Appendix G – Wetland Protection Standards in the LRRWMO WMP are to be complied with.

18. Page 46, Policy 12.7 of the Ramsey Plan states; *The City will perform regular wet storage volume surveys of its storm water quality ponds on a 10-year rotating basis.*

    - Is this consistent with the requirements of the City MS4 permit requirements?

General Comments

1. The figures for the various Study Areas show "Potential Threat to Structures" designation. A table or some form of reference to the structure location (address), low floor elevation and flood elevation would be useful information in the Ramsey Plan.
2. The flood elevations and discharges shown in the tables are listed to the hundredth (0.01) of a foot and hundredth (0.01) of a cubic foot per second (c.f.s.), respectively. Because of the numerous assumptions and variables used in these calculations, it is recommended that flood elevations be shown to the whole foot (no less than a tenth of a foot – 0.1) and discharges be shown to the whole c.f.s (no less than a tenth of a c.f.s. – 0.1).

Thank-you for the opportunity of providing our review comments regarding the *Local Surface Water Management Plan* for the city of Ramsey submitted to the LRRWMO in accordance with MN Rule 8410.016.

If you have any questions or request further clarification of our comments, please contact Todd Haas, LRRWMO Board Chairman or me at 952-832-2857, bobermeyer@barr.com.

Sincerely,

Robert C. Obermeyer P.E.
Lower Rum River Watershed Management Organization Engineer

C: Lower Rum River Watershed Management Organization Members
Jamie Schurbon; ACD
Leonard Linton; city of Ramsey

BCO/ymh

COMPREHENSIVE WATER SYSTEM STUDY UPDATE

IN COORDINATION WITH 2040 COMPREHENSIVE PLAN UPDATE

CITY OF RAMSEY, MN

SEPTEMBER 2017

Submitted by:
Bolton & Menk, Inc.
7533 Sunwood Drive NW
Suite 206
Ramsey, MN 55303
P: 763-433-2851
F: 763-427-0833

COMPREHENSIVE WATER PLAN UPDATE
IN COORDINATION WITH
2040 COMPREHENSIVE PLAN UPDATE

CITY OF RAMSEY, MINNESOTA

A. PURPOSE

The purpose for this report is to update the City's 2012 Comprehensive Water Plan based on current (2017) population and land use projections. The 2012 Comprehensive Water Plan included a plan for meeting the City's needs based on development projected within the City's 2030 Comprehensive Plan. The 2012 Comprehensive Water Plan outlined infrastructure needs and included an implementation schedule based on the anticipated development.

City staff has identified development which has occurred since the 2012 study was completed and has provided projections for development which is likely to occur in the next 23 years (Year 2040). This report evaluates the impact of the recent and projected development on the proposed schedule for water infrastructure implementation.

Typically water system improvements are funded through a combination of Water Availability Charges, trunk charges, and water usage fees. We have prepared one option for funding the water system which should be reviewed and discussed with the City's financial advisor prior to setting or adjusting any charges or fees.

B. SUMMARY OF INFRASTRUCTURE REVISIONS TO 2012 COMPREHENSIVE PLAN

Infrastructure expenditures were based on the City's Capital Improvement Plan for the years 2017 to 2020. We also identified several capital improvement projects which will need to be implemented between 2021 and 2040.

1. Water Distribution System

The water distribution system is depicted on Figure 1. Water wells, towers and existing and proposed water mains are shown on the graphic. A summary of revisions (when compared to the 2012 map) is as follows:

1. Removed both alternative Water Treatment Facility locations and related surface water pipes.
2. Updated the existing water main locations to match the current City water map.
3. Loop #1
    a. Revised to reflect the Bowers Drive water main as a lateral main rather than a trunk facility.
    b. Added a loop along Puma Street and Alpine Drive.
    c. Added a water main on Riverdale Drive, west of Armstrong Boulevard to complete the loop in that area.
    d. Removed the small loop east of Armstrong Boulevard on 142nd Avenue.
    e. Revised the segment east of Armstrong Boulevard, on Riverdale Drive, from proposed to existing.
4. Loop #4 was revised to connect from one existing 12" main to another. The southern existing 12" pipe appears to have been installed since the 2012 report.

5. Loop #6 was added to the map. This is proposed work to be completed next summer.

We have included a table depicting the costs of the improvements in the areas described at the back of this report.

2. Water Supply Wells and Storage

Development projections from 2012 indicated a new water supply capacity would be required by 2019. With the updated development data, new water supply is now projected to be required by 2022.

Construction of new wells in 2023 and 2028 will provide adequate capacity to the year 2040 based upon projected growth rates.

In order to determine a viable location for a new well, and potential for additional water supply options utilizing groundwater sources, a well location study should be undertaken beginning in 2017.

The following capital costs, presented in 2017 dollars, should be expected for the water system:

- A new water supply well and pumphouse in 2023 at $1,500,000,
- A new water supply well and pumphouse in 2028 at $1,500,000, and
- Water tower rehabilitation in 2030 at $2,000,000.

Additionally, $100,000 per year for the years 2021 through 2028 should be allocated for well service and pump maintenance.

Water tower 3 is anticipated to need rehabilitation in approximately 2030. Approximately $2,000,000 will be required for this work.

3. Water Treatment Facility

In the 2012 report, a water treatment facility was identified as a means of water supply. This was intended to be a surface water treatment facility that drew raw water from the Mississippi River. Based on current discussions with regulatory agencies, there is the potential to provide more water to the system through the addition of wells. In the 2017 report, the treatment facility was removed.

A new treatment facility was added to the 2017 report to provide greater water quality than exists from the untreated well water current used in the City. The construction of the facility will depend on several factors, including: needs of business and industrial users, and acceptability of the water by residents of the community. The water treatment facility is depicted as being constructed in 2027 and 2028 at a cost of $24,000,000. The actual timing of the construction of the facility is undetermined at this time.

C. TRUNK WATER MAIN COSTS

Attached are updated cost estimates related to the water distribution system improvements, totaling $6,574,097. These costs include 25% indirect costs such as administration, engineering, legal and financing. Additionally, we have included a 20% contingency for unforeseen improvements which may be required during the study period, for a total cost of $7,888,916 in 2017 dollars.

The City's current Capital Improvement Plan was used to determine expenditures for the years 2017 to 2020. For the years 2021 to 2040, the above costs were spread evenly over the 20 year period, while being inflated at a rate of 3% per year.

D. DEVELOPMENTAL IMPACT ON COMPREHENSIVE WATER PLAN

Population and Growth

Actual and projected development within the City of Ramsey since the 2012 Comprehensive Water Plan was developed are summarized as follows:

- Connections from 2012-2015 are as follows:
  - 2012: 295
  - 2013: 164
  - 2014: 66
  - 2015: 258
  - Avg: 196
- Projected development is as follows:
  - 160 Residential Units/Year, (50% High Density)
  - 10 Commercial/Industrial Acres/Year
  - 567 Residential Units in NE Expansion Area

The development projections above are projected to occur from 2016 to 2040. The total projected number of new units to be served by the water system, after a high density unit adjustment of 0.7 per high density unit, is 3831 units. This represents an average of 160 units per year will be developed. The attached Table 1 provides a summary of both the 2012 comprehensive Water Plan population and water demand projected, and the updated projections based on new development information.

E. ANALYSIS

Our detailed analysis (depicted on a spreadsheet at the back of this report) provides an evaluation of the impact of development and proposed improvements on the current rate structure. The following assumptions were made for the analysis:

- Capital expenditures for 2017 to 2020 were taken from the City's current Capital Improvement Plan.
- Capital expenditures for the years 2021 to 2040 were based on assumptions described in Sections B and C above.
- Operating expenses of $836,662 were used for 2017 and then inflated at a rate of 4% per year for the duration of the analysis period.
- Treatment facility operating expenses were assumed to begin in 2029 at an annual rate of $1,000,000 per year and then inflated at 3% per year each year after 2029.
- Water usage rates of $2.57/1,000 gallons for 2017 were used and then inflated at a rate of 2% per year after 2017.
- Water Availability Charges of $1,236 were used for 2017 and then inflated at a rate of 2.5% per year after 2017.
- Trunk charges of $1,720 were used for 2017 and then inflated at a rate of 2.5% per year after 2017.

Table 1
Population and Water Demand Projections
Ramsey, Minnesota
9/15/2017

2012 Comprehensive Water Plan

Year	2012	2016	2020	2025	2030	2035	2040
Service Area Population	11,434	14,961	18,669	22,519	26,029		
New Residential Customer Accounts	260	323	323	260	260		
People/Household	2.87	2.87	2.7	2.7	2.7		
Added Population	746	927	872	702	702		
End of Year Service Area Population	12,180	15,888	19,541	23,221	26,731		
Average Daily Water Demand (gpd)	1,827,030	2,383,236	2,931,206	3,483,221	4,009,721		
Maximum Day Water Demand (gpd)	5,481,090	7,149,708	8,793,617	10,449,662	12,029,162		

Update

Year	2012	2016	2020	2025	2030	2035	2040
Service Area Population	11,434	13,681	15,409	17,569	19,729	21,889	24,049
New Residential Customer Accounts	295	160	160	160	160	160	160
People/Household	2.87	2.70	2.70	2.70	2.70	2.70	2.70
Added Population	847	432	432	432	432	432	432
End of Year Service Area Population	12,281	14,113	15,841	18,001	20,161	22,321	24,481
Average Daily Water Demand	1,842,098	2,116,982	2,376,182	2,700,182	3,024,182	3,348,182	3,672,182
Maximum Day Water Demand	5,526,293	6,350,945	7,128,545	8,100,545	9,072,545	10,044,545	11,016,545

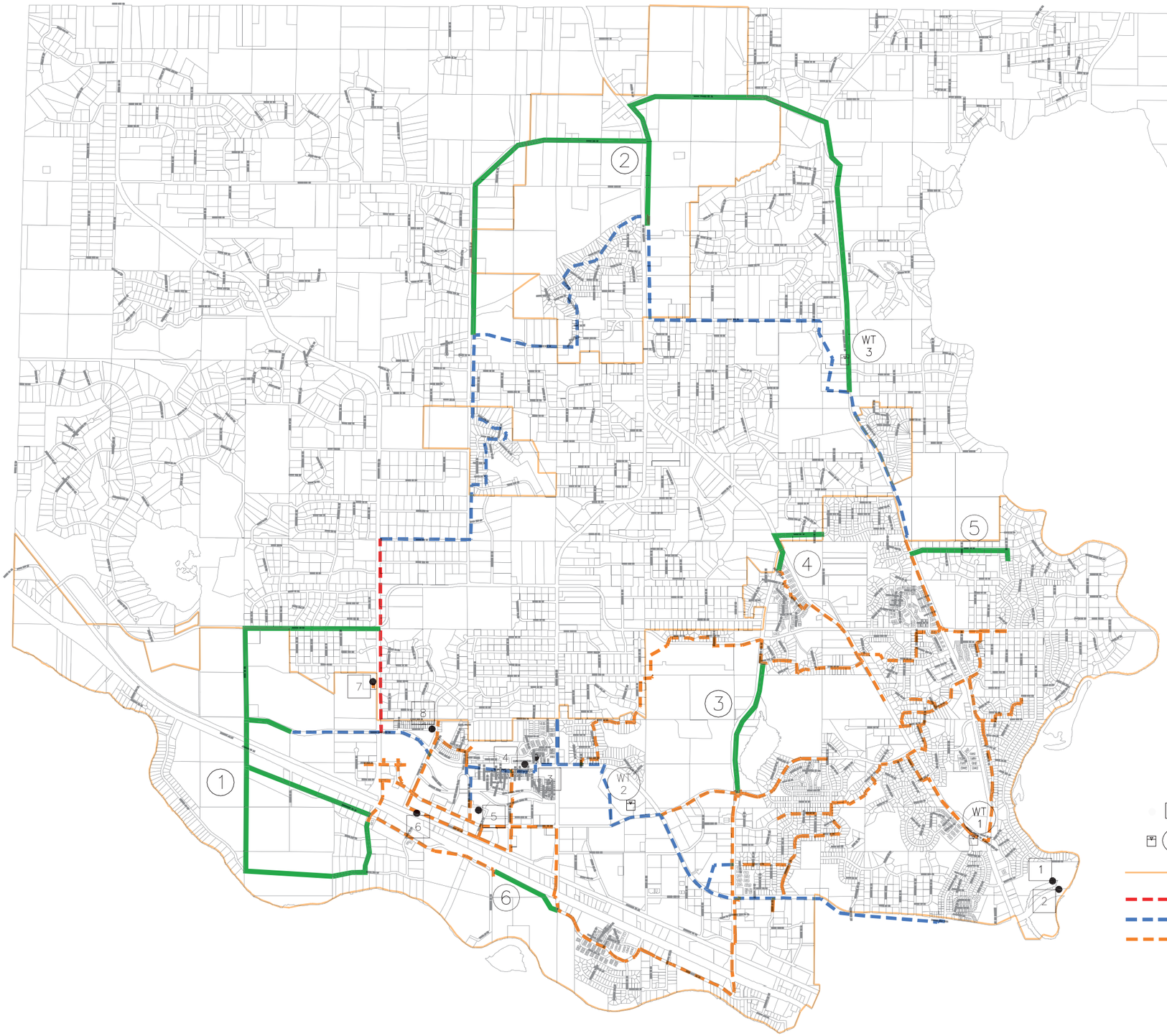
2040 MUSA - Water System Loop Improvements (2021-2040)

Loop	LOCATION	SIZE (IN.)	LENGTH (FT.)	COST PER FOOT*	COST
1	Southwest Loop	12"	19,000	$124	$2,352,313
		3,000 LF Constructed in 2017			
				TOTAL LOOP 1	**$2,352,313**
2	North Central Loop	12"	28,000	$124	$3,466,567
				TOTAL LOOP 2	**$3,466,567**
3	County Road 57	12"	4,100	**INCLUDED IN YEAR 2020 OF CIP**	
4	CSAH 5/157TH AVE NW	12"	2,700	$124	$334,276
				TOTAL LOOP 4	**$334,276**
5	158TH LANE NW	12"	3,400	$124	$420,940
				TOTAL LOOP 5	**$420,940**
6	RIVERDALE BOULEVARD	12"	2,300	**INCLUDED IN YEAR 2017 OF CIP**	
				SUB-TOTAL	**$6,574,097**
				20% CONTINGENCIES FOR UNFORSEEN IMPROVEMENTS	**$1,314,819**
				TOTAL IMPROVEMENT COSTS	**$7,888,916**
				AVERAGE YEAR FOR 20 YEARS (2017 DOLLARS)	**$394,446**
				INFLATED AT 3% PER YEAR TO YEAR 2021	**$443,952**

* INCLUDES 25% INDIRECT COST

Table 2
Water Utility Rate Impact Summary
City of Ramsey, Minnesota
9/15/2017

	Actual 2016	Projected / Actual 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023	Projected 2024	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030	Projected 2035	Projected 2040
Beginning Balance		**$ 18,440,114**	**$ 18,249,021**	**$ 17,702,048**	**$ 19,553,332**	**$ 20,635,777**	**$ 22,190,135**	**$ 23,779,713**	**$ 23,704,661**	**$ 25,339,597**	**$ 27,009,720**	**$ 28,876,172**	**$ 18,784,291**	**$ 6,426,591**	**$ 7,126,392**	**$ 7,072,941**	**$ 9,587,285**
Water System Revenue																	
New Customers		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Annual Water Sales (gallons/year)		994,500,000	1,006,500,000	1,018,500,000	1,030,500,000	1,042,500,000	1,054,500,000	1,066,500,000	1,078,500,000	1,090,500,000	1,102,500,000	1,114,500,000	1,126,500,000	1,138,500,000	1,150,500,000	1,210,500,000	1,270,500,000
Water Rates ($/1000 gallons) (Inflated at 2% per year)		**$ 2.57**	2.62	2.67	2.73	2.78	2.84	2.89	2.95	3.01	3.07	3.13	3.20	3.26	3.32	3.67	4.05
Water Availability Charge (WAC) ($/connection) (Inflated at 2.5% per year)		**$ 1,236**	$ 1,267	$ 1,299	$ 1,331	$ 1,364	$ 1,398	$ 1,433	$ 1,469	$ 1,506	$ 1,544	$ 1,582	$ 1,622	$ 1,662	$ 1,704	$ 1,928	$ 2,181
Connection/Trunk Charge ($/connection) (Inflated at 2.5% per year)		**$ 1,720**	$ 1,763	$ 1,807	$ 1,852	$ 1,899	$ 1,946	$ 1,995	$ 2,045	$ 2,096	$ 2,148	$ 2,202	$ 2,257	$ 2,313	$ 2,371	$ 2,683	$ 3,035
Water Rate Revenue (Inflated at 2.5% per year)		$ 2,087,443	$ 2,139,629	$ 2,193,120	$ 2,247,948	$ 2,304,146	$ 2,361,750	$ 2,420,794	$ 2,481,314	$ 2,543,347	$ 2,606,930	$ 2,672,104	$ 2,738,906	$ 2,807,379	$ 2,877,563	$ 3,255,699	$ 3,683,524
WAC Revenue		$ 197,760	$ 202,704	$ 207,772	$ 212,966	$ 218,290	$ 223,747	$ 229,341	$ 235,074	$ 240,951	$ 246,975	$ 253,150	$ 259,478	$ 265,965	$ 272,614	$ 308,438	$ 348,969
Trunk Revenue		$ 290,575	$ 294,230	$ 297,976	$ 301,816	$ 305,752	$ 309,787	$ 313,922	$ 318,161	$ 322,506	$ 343,687	$ 352,279	$ 361,086	$ 370,113	$ 379,366	$ 429,218	$ 485,621
Interest Earnings		$ 184,401	$ 273,735	$ 265,531	$ 293,300	$ 309,537	$ 332,852	$ 356,696	$ 355,570	$ 380,094	$ 405,146	$ 433,143	$ 281,764	$ 96,399	$ 106,896	$ 106,094	$ 143,809
Total Water System Revenue		$ 2,760,179	$ 2,910,298	$ 2,964,398	$ 3,056,030	$ 3,137,726	$ 3,228,136	$ 3,320,753	$ 3,390,119	$ 3,486,897	$ 3,602,738	$ 3,710,675	$ 3,641,235	$ 3,539,856	$ 3,636,440	$ 4,099,449	$ 4,661,924
Water Utility Expenses - Capital Improvement Projects																	
Miscellaneous Projects																	
Fire Station #1 Extension of Water					$ 55,000												
County Radio Station (3 -Year Funding)		$ 1,700															
Public Works Campus			$ 1,715,750														
3/4 Ton Truck				$ 43,000													
Utility Truck		$ 25,000	$ 23,500														
Water Supply & Treatment Improvements																	
Renovate Pump House #3			$ 60,000														
Construct Well & Pumphouse #9					$ 75,000			$ 1,700,000									
Well #1 Rehabilitation		$ 38,000	$ 41,000	$ 44,000	$ 47,000												
Emergency Supply for Well #3		$ 115,000															
Well Location Study		$ 75,000															
Water Treatment Facility - 10 MGD Groundwater												$ 12,000,000	$ 12,000,000				
Water Storage Improvements																	
Refurbish Water Tower #1		$ 1,300,000															
Refurbish Water Tower #2			$ 700,000														
Maintain Water Tower #3				$ 75,000													
Distribution System Improvements																	
River Pines Lift Station Water Connection					$ 20,000												
Distribution System Maintenance Improvements																	
Watermain Looping Bunker Lake Blvd.					$ 340,000												
Watermain Looping Sunfish Lake Blvd.					$ 450,000												
Watermain Looping Ramsey Blvd to Traprock		$ 129,250															
Watermain Bunker Lake Boulevard - Business Park		$ 162,842															
Watermain Puma Street - Business Park		$ 220,226															
2021 through 2040 Projected Improvements																	
Distribution System						$ 443,952	$ 457,271	$ 470,989	$ 485,118	$ 499,672	$ 514,662	$ 530,102	$ 546,005	$ 562,385	$ 579,257	$ 671,517	$ 778,473
Construct Well & Pumphouse #10													$ 2,138,641				
Storage Tower 3 Rehabilitation															$ 3,025,179		
Well Service and Pump Maintenance (8 wells)						$ 115,927	$ 119,405	$ 122,987	$ 126,677	$ 130,477	$ 134,391	$ 138,423	$ 142,576				
Subtotal- Capital Expenses		**$ 2,067,018**	**$ 2,540,250**	**$ 162,000**	**$ 987,000**	**$ 559,879**	**$ 576,675**	**$ 2,293,976**	**$ 611,795**	**$ 630,149**	**$ 649,053**	**$ 12,668,525**	**$ 14,827,222**	**$ 562,385**	**$ 3,604,436**	**$ 671,517**	**$ 778,473**
Operational Expenses																	
Operating Expense- Distribution and Administration (Inflated at 4% per year)		$ 836,662	$ 870,128	$ 904,934	$ 941,131	$ 978,776	$ 1,017,927	$ 1,058,644	$ 1,100,990	$ 1,145,030	$ 1,190,831	$ 1,238,464	$ 1,288,003	$ 1,339,523	$ 1,393,104	$ 1,694,924	$ 2,062,134
Operating Expense- Treatment (Inflated at 3% per year)														$ 1,000,000	$ 1,030,000	$ 1,194,052	$ 1,384,234
Subtotal- Operating Expense		$ 836,662	$ 870,128	$ 904,934	$ 941,131	$ 978,776	$ 1,017,927	$ 1,058,644	$ 1,100,990	$ 1,145,030	$ 1,190,831	$ 1,238,464	$ 1,288,003	$ 2,339,523	$ 2,423,104	$ 2,888,976	$ 3,446,368
Total Annual Expenses		**$ 2,903,680**	**$ 3,410,378**	**$ 1,066,934**	**$ 1,928,131**	**$ 1,538,655**	**$ 1,594,603**	**$ 3,352,620**	**$ 1,712,785**	**$ 1,775,178**	**$ 1,839,884**	**$ 13,906,989**	**$ 16,115,224**	**$ 2,901,908**	**$ 6,027,539**	**$ 3,560,493**	**$ 4,224,840**
Finance Adjustments																	
Trunk Charges Returend per John Peterson's agreement (thru 2025)		$ (144,375)	$ (144,375)	$ (144,375)	$ (144,375)	$ (144,375)	$ (144,375)	$ (144,375)	$ (144,375)	$ (144,375)							
PW Land/Building - Internal Loan 2009-2028 @2%		$ 34,930	$ 35,629	$ 36,341	$ 37,068	$ 37,810	$ 38,566	$ 39,337	$ 40,124	$ 40,926	$ 41,745	$ 42,580	$ 54,436				
Internal Loan to offset Muni Center Debt beginning year 2011-2030@2%		$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853	$ 61,853		
Internal Loan for RTC Land Purchase- 10 yr@2% when land sold																	
Net Finance Adjustments		$ (47,592)	$ (46,893)	$ (46,181)	$ (45,454)	$ (44,712)	$ (43,956)	$ (43,185)	$ (42,398)	$ (41,596)	$ 103,598	$ 104,433	$ 116,289	$ 61,853	$ 61,853		
Water System Working Capital Balance																	
Total Annual Expenses		$ 2,903,680	$ 3,410,378	$ 1,066,934	$ 1,928,131	$ 1,538,655	$ 1,594,603	$ 3,352,620	$ 1,712,785	$ 1,775,178	$ 1,839,884	$ 13,906,989	$ 16,115,224	$ 2,901,908	$ 6,027,539	$ 3,560,493	$ 4,224,840
Total System revenue		$ 2,712,587	$ 2,863,405	$ 2,918,217	$ 3,010,576	$ 3,093,014	$ 3,184,180	$ 3,277,568	$ 3,347,721	$ 3,445,301	$ 3,706,336	$ 3,815,108	$ 3,757,524	$ 3,601,709	$ 3,698,293	$ 4,099,449	$ 4,661,924
Net Income (loss)		$ (191,093)	$ (546,973)	$ 1,851,284	$ 1,082,445	$ 1,554,358	$ 1,589,578	$ (75,052)	$ 1,634,936	$ 1,670,123	$ 1,866,452	$ (10,091,881)	$ (12,357,700)	$ 699,801	$ (2,329,247)	$ 538,956	$ 437,084
Beginning Water Working Capital Balance		$ 18,440,114	$ 18,249,021	$ 17,702,048	$ 19,553,332	$ 20,635,777	$ 22,190,135	$ 23,779,713	$ 23,704,661	$ 25,339,597	$ 27,009,720	$ 28,876,172	$ 18,784,291	$ 6,426,591	$ 7,126,392	$ 7,072,941	$ 9,587,285
Remaining Working Capital Balance	**$ 18,440,114**	**$ 18,249,021**	**$ 17,702,048**	**$ 19,553,332**	**$ 20,635,777**	**$ 22,190,135**	**$ 23,779,713**	**$ 23,704,661**	**$ 25,339,597**	**$ 27,009,720**	**$ 28,876,172**	**$ 18,784,291**	**$ 6,426,591**	**$ 7,126,392**	**$ 4,797,145**	**$ 7,611,896**	**$ 10,024,369**





CITY OF RAMSEY
MINNESOTA

FIGURE 1

PROPOSED WATER SYSTEM IMPROVEMENTS
COMPREHENSIVE WATER PLAN
SEPTEMBER 2017

LEGEND

- # — EXISTING WELL
- WT 2 — WATER TOWER
- SERVICE AREA BOUNDARIES
- EXISTING 24" TRUNK MAIN
- EXISTING 16" TRUNK MAIN
- EXISTING 12" TRUNK MAIN
- 12" PROPOSED WATERMAIN

LOOP	LOCATION
1	SOUTHWEST LOOP
2	NORTH CENTRAL LOOP
3	COUNTY ROAD 57
4	CSAH 5/157th AVE NW
5	158th LANE NW
6	RIVERDALE BOULEVARD

NOTE:
The information for this map was obtained from various sources of existing maps, construction plans, and City records, some of which were prepared by others. While this information is believed to be reliable Bolton & Menk, Inc. is not respon- sible for its accuracy nor for errors or omissions which may have been incorporated into this document as a result.

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H:\RAMS\R16110056\CAD\2040 Proposed Water Treatment - 2016 Update.dwg 10/19/16 12:19 pm

Regular Planning Commission **9. 1.**

Meeting Date: 04/05/2018

By: JoAnn Shaw, Community Development

Information

Title:

Zoning Bulletins

Purpose/Background:

Enclosed are zoning bulletins for your review.

Notification:

Observations/Alternatives:

Funding Source:

Recommendation:

Action:

Attachments

Zoning Bulletins

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	JoAnn Shaw	03/30/2018 11:56 AM
Form Started By: JoAnn Shaw		Started On: 03/23/2018 12:02 PM
Final Approval Date: 03/30/2018		

QUINLAN™ February 10, 2018 | Volume 12 | Issue 3

Zoning Bulletin

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Mat #42078485

Proceedings/Jurisdiction—State court finds challenge to constitutionality of zoning ordinance is time barred under state law

Property owner then brings same challenge to federal court

Contributors

Corey E. Burnham-Howard

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POSTMASTER: Send address changes to Zoning Bulletin, 610 Opperman Drive, P.O. Box 64526, St. Paul, MN 55164-0526.



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P.O. Box 64526
St. Paul, MN 55164-0526
1-800-229-2084
email: west.customerservice@thomsonreuters.com
ISSN 0514-7905
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Citation: *May v. Morgan County Georgia, 2017 WL 6521296 (11th Cir. 2017)*

The Eleventh Circuit has jurisdiction over Alabama, Florida, and Georgia.

ELEVENTH CIRCUIT (GEORGIA) (12/21/17)—This case addressed the issue of whether the constitutionality of a zoning ordinance that is challenged in state court can later be challenged in federal court.

The Background/Facts: Christine May ("May") purchased lakefront property in Morgan County, Georgia (the "County") on which she constructed a vacation home. In order to allay the cost of construction, May planned to (and did) use the home for short-term vacation rentals. At the time, the County's zoning ordinance only allowed uses that were listed as "permitted" or "conditional." Short-term rental of single family dwellings (such as May's) were not listed as "permitted" or "conditional."

In 2010, the County adopted Regulation 15.35. That regulation explicitly banned rentals of single family dwellings for less than 30 consecutive days in the zoning district in which May's property was located.

May continued to rent her property on a short-term basis. In August 2011, the County issued to May a criminal citation for violating Regulation 15.35.

In April 2012, May filed a lawsuit in Georgia state court. In her lawsuit, she argued that she had a "grandfathered" right under the County zoning ordinances to continue offering short-term rentals on her property. She also argued that application of Regulation 15.35 to her property was unconstitutional under the due process and equal protection clauses of the United States and Georgia Constitutions, and the privileges and immunities clause of the Fourteenth Amendment of the United States Constitution.

Ultimately, the state trial court concluded that May's action was barred because: (1) she had failed to exhaust her administrative remedies by not seeking a rezoning and conditional use permit from the County before filing suit; and (2) Georgia Code § 5-3-20(a) barred May's claims because she failed to challenge the adoption of Regulation 15.35 (on its face, or as applied to her property) within 30 days of its passage.

May appealed. The Georgia Court of Appeals denied her application for a discretionary appeal. May again appealed, and the Supreme Court of Georgia also denied review.

May then attempted an administrative remedy. She filed an application for rezoning with the County, which would allow her property to be rezoned for short-term rentals. She also asked the County to amend the zoning ordinance to allow short-term rentals by property owners who rented before enactment of Regulation 15.35. She also requested that the County declare her right to continue offering short-term rentals on her property. The County denied her request and her applications.

In May 2015, May filed a lawsuit against the County in federal district court. In that action, she again argued that she had a grandfathered right to

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offer short-term rentals on her property. She brought a claim against the County under federal statute (42 U.S.C.A. § 1983), contending that Regulation 15.35 violated her "grandfathered constitutional rights." She also challenged the County's denial of her applications for rezoning or amendment and her request for a declaration of rights.

Finding there were no material issues of fact in dispute, and deciding the matter on the law alone, the district court granted summary judgment in favor of the County on May's request for a declaration that she had a grandfathered right to rent her property. The district court found that issue had already been litigated and decided in May's August 2011 criminal citation case. The district court also declined to exercise supplemental jurisdiction over May's claims related to the County's denial of her application for rezoning and amendment and her request for a declaration (leaving those only to be challenged in state court). Finally, as to May's § 1983 claims that the County's Regulation 15.35 violated her "grandfathered constitutional rights," the district court determined that the *Rooker-Feldman* doctrine barred its review of May's § 1983 claims.

The *Rooker-Feldman* doctrine provides that federal district courts and courts of appeal do not have jurisdiction to review state court decisions. The doctrine "applies both to federal claims raised in the state court and to those 'inextricably intertwined' with the state court's judgment." It applies as long as the party bringing the claims had a "reasonable opportunity" to raise the federal claims in state proceedings.

May appealed. She argued that the *Rooker-Feldman* doctrine did not apply here because her state court case was an "as applied" challenge to Regulation 15.35, while the federal challenge she was making differed in that in federal court she was now claiming that the enactment of Regulation 15.35 could not limit her "constitutional grandfathered right."

DECISION: Judgment of District Court for the Middle District of Georgia affirmed.

The United States Court of Appeals, Eleventh Circuit, held that the *Rooker-Feldman* doctrine barred May's § 1983 claim and her declaratory judgment request "because the crux of [her claim] was addressed in the first [state] civil case." The court noted that "[e]ven if her § 1983 claim that she ha[d] a 'vested constitutional right to continue renting [her property] on a short-term basis,' [was] somehow distinct from an as applied challenge to the constitutionality of the Regulation 15.35 bar against her enjoyment of that right, that claim [was] inextricably intertwined with her claims from her first civil case. And so [was] her request for a declaratory judgment." The court explained that both her § 1983 claim and her claim for declaratory relief were "based on her assertion that she ha[d] a 'grandfathered right' to rent her property on a short[-]term basis." Thus, both claims would require finding that her claim of a "vested constitutional right" was not time barred under Georgia law for her failure to challenge Regulation 15.35 within 30 days of its passage. In other words, it would require a finding in federal district court "on the same claims that she

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brought, and lost, in state court." "So she [was] complaining of the same injury in both cases, and [was] implicitly seeking a rejection of the state court's judgment that [Georgia Code § 5-3-20(a)] barred her request for relief." Thus, although not "bill[ed]" as an "appeal of the state court judgment," her federal court claims were "in substance just that," found the court. The court concluded that *Rooker-Feldman* therefore barred federal review of May's claims because all of her claims here were "inextricably intertwined" with those from the first state civil case.

See also: *District of Columbia Court of Appeals v. Feldman, 460 U.S. 462, 103 S. Ct. 1303, 75 L. Ed. 2d 206 (1983).*

See also: *Nicholson v. Shafe, 558 F.3d 1266, 89 U.S.P.Q.2d 1911 (11th Cir. 2009).*

See also: *Casale v. Tillman, 558 F.3d 1258 (11th Cir. 2009).*

Case Note:

May had alternatively argued that the court should adopt an exception to ***Rooker-Feldman****, and find that it did not apply because the state court in the first civil case lacked subject matter jurisdiction (i.e., the authority to hear the specific subject matter of May's case). The court concluded that even if it were to adopt such an exception, it would not apply here because the court in May's first civil case had subject matter jurisdiction to determine that the 30-day state law time bar (Georgia Code § 5-3-20(a)) applied to May's claims.*

Use/Interpretation of Zoning Regulations—County Planning Director authorizes mining operation under construction permit

County Board reverses, maintaining that a mining permit is instead required

Citation: *Croell Redi-Mix, Inc. v. Pennington County Board of Commissioners, 2017 SD 87, 2017 WL 6381344 (S.D. 2017)*

SOUTH DAKOTA (12/13/17)—This case addressed the issue of whether, under a county ordinance, a mining operation was properly permitted under a construction permit. The case also addressed the issue of whether the mining operation was exempt from permit requirements as a legal nonconforming use.

The Background/Facts: Since the 1970s, Perli Quarry (the "Quarry") had been in operation in Pennington County (the "County"). The Quarry was a mining operation that extracted sand, gravel, and construction aggregate. At the time the Quarry began operating, the County had not yet adopted zoning ordinances. Zoning ordinances were eventually adopted and amended and updated, including in 2001 and 2010. Under those ordinances, the Quarry was designed an "A-1 General Agriculture District," which allowed, among others, the following relevant uses: "[t]emporary quarries"; "the extraction of sand, gravel, or minerals," provided that a Construction Permit is obtained in accordance with [the zoning ordinances]; and "[m]ining provided a Construction Permit is obtained in accordance with [the zoning ordinances]." The provision of a construction permit was governed by § 507(A) of the County zoning ordinance. Section 507(B) also permitted mining as authorized by a mining permit.

In 2015, Croell Redi-Mix Inc. ("Croell") acquired the Quarry. Croell sought to "continue and expand mining operations" at the Quarry. The County Planning Department advised Croell to obtain a construction permit pursuant to § 507(A) of the County zoning ordinance. Croell applied for a construction permit to continue and expand its mining operation. The County Planning Commission approved the application and the Planning Director issued the construction permit.

Subsequently, area residents appealed the approval of the construction permit to the County Board of Commissioners (the "Board"). The County Board of Commissioners (the "Board") reversed the approval of the construction permit.

Croell then appealed the Board's reversal to circuit court. The circuit court found that the Board's decision to reverse the issuance of the construction permit was "arbitrary" because it was based on "unfounded" assertions of area residents.

The Board appealed. On appeal, the Board argued that Croell's proposed use of the Quarry in the A-1 General Agriculture District could not be authorized under a construction permit. The Board argued that, under the plain language of the zoning ordinance, a construction permit could not be issued for a quarry of the scope and duration intended by Croell. The Board argued that the mining of such a scope as proposed could only be permitted if a mining permit was obtained.

Again, § 507(A) of the County zoning ordinance allowed mining under a construction permit, subject to "any other" "more restrictive" provision that took precedent. Section 507(B) was a more restrictive provision, requiring a mining permit for extraction of any mineral or substance exceeding 100 cubic yards. Croell extracted more than 100 cubic yards.

Croell responded by noting the "historical interpretation, application, and implementation of the [County zoning ordinance] by staff and legal counsel," which "historically and consistently" interpreted the zoning ordinance to allow mining such as Croell's with only a construction permit and without obtaining a mining permit. Croell argued that historical inter-

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pretation was entitled to deference here. Croell also contended that the mining-permit requirement of the zoning ordinance did not apply to the Quarry since it had been in operation prior to adoption of the zoning ordinance and was thus a legal nonconforming use.

DECISION: Judgment of circuit court reversed.

The Supreme Court of South Dakota rejected Croell's arguments and agreed with the Board. The court found that under the plain language of the zoning ordinance (§ 507(B)), Croell's intended use of the land required a mining permit. Thus, the court concluded that the Board had properly reversed the Planning Director's issuance of the construction permit for Croell's mining operation use at the Quarry.

In so concluding, the court explained that since Croell extracted more than 100 cubic yards, "[u]nder the clear language of § 507(B), Croell's intended use could not be authorized under a construction permit; a mining permit was required." Therefore, the court held that the Board "properly declined to issue a construction permit for the purpose of doing that which [was] prohibited under § 507(B), and the circuit court erred by reversing the Board's decision."

Rejecting Croell's argument that the Planning Commission and Planning Director's "historical interpretation" of the zoning ordinance—allowing mining with a construction permit—should be given deference, the court said that when the meaning of an ordinance is "unambiguous"—as the court found it was here—"the contrary interpretation of those administering the ordinance is not entitled to deference."

Regarding Croell's legal nonconforming use argument, the appellate court concluded that it was "not relevant." Croell's construction permit application did not simply seek to continue a nonconforming use, but sought to expand its operation to convert additional acres of land to use as a quarry that had not previously been used as a quarry. Thus, a mining permit was required, concluded the court.

See also: *Wegner Auto Co., Inc. v. Ballard, 353 N.W.2d 57 (S.D. 1984).*

Case Note:

On appeal, Croell had also challenged the standing (i.e., legal right to appeal) of the area residents to appeal the issuance of the construction permit. The court found that, under the zoning ordinance, anyone "affected" by "any action taken by the Planning Director in administering . . . Section 507(A) [of the County zoning ordinance, which governs construction permits,]" had standing to appeal to the Board. Here, the court found that the residents that had appealed to the Board were "affected" by the Planning Director's decision as they had claimed the mining operations affected them in the following ways: negatively impacted their enjoyment of their properties; contaminated local wells; ejected large amounts of dust onto their properties; decreased traffic safety; and reduced local tourism.

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Accessory Use—Nursery operators are cited for illegal "industrial manufacturing" of compost in violation of zoning ordinance

Nursery operators claim composting was not "manufactured," and, in any case, was an authorized accessory use of their property

Citation: *State ex rel. Town of Tiverton v. Pelletier, 2017 WL 6395807 (R.I. 2017)*

RHODE ISLAND (12/15/17)—This case addressed the issue of whether composting activities on residential property amounted to "manufacturing" of compost on residential property, which was prohibited under the local zoning ordinance. The case also addressed the issue of whether the manufacture of compost on residential property was permitted as an "accessory use," despite the local ordinance prohibiting such manufacturing activities in a residential zoning district.

The Background/Facts: James and Melissa Pelletier (the "Pelletiers") owned a 30-acre property (the "Property") in a residential zoning district in the Town of Tiverton (the "Town"). In their R-80 zoning district, raising crops commercially, including an associated greenhouse or nursery, was a permitted use. The Pelletiers operated a nursery on their Property.

In March 2009, the Pelletiers were served with a summons and complaint charging them with violating the Town's zoning ordinance by manufacturing compost on the Property. Under the Town's zoning ordinance, "industrial manufacturing, storing, processing, and fabricating activities" were prohibited uses in an R-80 zone. After a trial, the Pelletiers were found liable for manufacturing compost in an R-80 zone in violation of the zoning ordinance.

The Pelletiers appealed. They argued that the evidence did not establish that they "manufactured" compost on their Property. The Pelletiers admitted that materials (such as grass clippings, yard waste, and horse manure) were shipped from off-site to the Property for the purpose of composting. Witnesses for the Town had testified to, among other things, observing large piles of compost and the mixing of material with industrial equipment. However, the Pelletiers contended that their composting actions could not be categorized as "industrially manufacturing" because "once the material [was] mixed together, 'nature takes over' and compost develops naturally." They also argued that the composting activities did

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not amount to "industrial manufacturing" because the compost was not being packaged and sold as a product off-site. Alternatively, the Pelletiers contended that the processing of compost on their Property was a permitted accessory use because compost was used in the operation of a nursery, which was a permitted use in the R-80 zone.

DECISION: Judgment of superior court affirmed.

The Supreme Court of Rhode Island held that the Pelletiers' conviction of violating the Town zoning ordinance by manufacturing compost on residential property was supported by sufficient evidence. Although the zoning ordinance did not define "manufacturing," the court noted that it has been defined as "the production of articles for use from raw or prepared materials by giving the materials new forms, qualities, properties or combination whether by hand labor or machines." The court found that the evidence established that the Pelletiers: procured truckloads of waste materials from off-site to be transported to their Property; actively combined those waste materials with heavy industrial equipment; and produced large quantities of finished compost that was ultimately used off-site through the Pelletiers' landscaping business. The court emphasized that it found that the use of "heavy, noise-emitting industrial equipment coupled with delivery of truckloads of organic material . . . on a daily basis," established the elements of "manufacturing" and "processing" that set the Pelletiers composting activities apart from the "average homeowner who engages in composting."

In so holding, the court rejected the Pelletiers' arguments that their composting activities could not be categorized as "industrial manufacturing." The court said that, whether or not the Pelletiers were selling their compost for profit was "immaterial." The court noted that the Town zoning ordinance entitled "Industrial uses" was devoid of any requirement that manufactured products be "packaged, shipped, and sold for profit." Moreover, the court found that the plain meanings of "manufacturing" and "industrial" did "not necessarily involve retail activity."

The court also rejected the Pelletiers' argument that the processing of compost on their Property was a permitted accessory use because compost was used in the nursery, which was a permitted use in the R-80 zone. The Town zoning ordinance defined accessory use as a use of land or building "customarily incidental and subordinate to the principal use of the land or building . . . ." The court acknowledged that the use of compost in connection with a nursery use was allowed as an accessory use. However, the court distinguished such an accessory use of compost from "the [industrial] manufacturing, storing, and processing of compost" performed on a "large scale" by the Pelletiers. The "industrial manufacturing" of compost by the Pelletiers, found the court, was not allowed even as an accessory use since the zoning ordinance expressly prohibited "manufacturing, storing, processing, and fabricating activities" in an R-80 zone. Accordingly, the court held that manufacturing compost on the Pelletiers' Property was not a permitted accessory use.

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Standing—Nonprofit organization challenges rezoning of developers' parcels in city

Developer and city argue that nonprofit failed to prove it would suffer special damages from rezoning and therefore lacks standing to bring the challenge

Citation: *Cherry Community Organization v. City of Charlotte, 2017 WL 5580339 (N.C. Ct. App. 2017)*

NORTH CAROLINA (11/21/17)—This case addressed the issue of whether a nonprofit organization showed that it would suffer special damages from a proposed rezoning such that it had standing (i.e., the legal right) to seek declaratory judgment against the city and a developer challenging the rezoning.

The Background/Facts: Midtown Area Partners II, LLC ("MAP") owned four parcels in and around the Cherry Community ("Cherry") in the City of Charlotte (the "City"). Cherry was an historically African American neighborhood located in the Midtown Morehead Cherry District of the City. In August 2014, MAP submitted an application to the City to rezone the four parcels from general-use districts to mixed development-districts in furtherance of its plans to construct a mixed-use development.

The Cherry Community Organization ("CCO") was a nonprofit organization that sought to "protect the residential character, safety, and stability of, as well as the affordable housing within [Cherry]." CCO opposed MAP's rezoning application. CCO owned real property immediately adjacent to and/or in close proximity to MAP's parcels. CCO complained that it would suffer from "special damages" from the rezoning "in the form of increased noise, traffic and parking, decreased visibility due to the height of the proposed project, diminution in the peaceful residen[tial] character of the Cherry neighborhood, and a reduction in the value of [CCO's] real property."

The City Council ultimately approved MAP's rezoning applications. CCO petitioned the superior court, seeking declaratory judgment against the City and MAP. Finding there were no material issues of fact in dispute, and deciding the matter on the law alone, the trial court granted summary judgment in favor of the City and MAP, and dismissed the case with prejudice.

CCO appealed. As a threshold matter, the City and MAP asserted that CCO lacked standing (i.e., the legal right) to bring the declaratory judgment action.

DECISION: Judgment of superior court affirmed as modified.

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The Court of Appeals of North Carolina agreed with the City and MAP, concluding that CCO lacked standing to bring the declaratory judgment action against the City and MAP.

In so concluding, the court explained that a party only has standing to challenge a zoning ordinance in an action for declaratory judgment when it "has a specific personal and legal interest in the subject matter affected by the zoning ordinance and . . . is directly and adversely affected thereby." The court noted that although owning property immediately adjacent to or within close proximity to the subject property (as CCO did here with regard to the parcels MAP sought to rezone) did "bear some weight on the issue of whether the complaining party ha[d] suffered or [would] suffer special damages distinct from those damages to the public at large," that was not "in and of itself sufficient to plead special damages."

Here, examining the evidence submitted by CCO, the court found it was "insufficient to show that CCO ha[d] or [would] suffer any individual harm as a result of the rezoning such that CCO" could prove standing and survive the motion for summary judgment that had been brought by the City and MAP. Although CCO had alleged special damages, the court found that there was no "actual proof" of special damages. The court found that "CCO's forecast of evidence of special damages consist[ed] of nothing more than conclusory, unsupported allegations that certain damages [would] ensue . . . ."

Having found that CCO failed to meet its burden of production of evidence that it would suffer special damages distinct from the rest of the community because of MAP's rezoning, the court concluded that CCO failed to establish that it had standing to maintain its action for declaratory judgment. Accordingly, the court did not reach CCO's remaining contentions and the merits of CCO's appeal.

See also: *Cherry v. Wiesner, 781 S.E.2d 871 (N.C. Ct. App. 2016), review denied, 369 N.C. 33, 792 S.E.2d 779 (2016).*

Zoning News from Around the Nation

MASSACHUSETTS

The Woburn City Council recently voted to modify local regulations to extend to 12-months the immunity period that shields builders from having to modify construction plans to reflect recently adopted zoning ordinances. Previously, the exception was for a six-month period of time, which conflicted with a superseding state law.

Source: *Daily Times Chronicle; http://homenewshere.com*

OHIO

The Newark City Council has passed a zoning ordinance allowing for

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medical marijuana businesses in the city. The new ordinance applies to medical marijuana cultivators, processors, and dispensaries. Under the ordinance, any dispensary must be approved by the Newark Board of Zoning Appeals. The ordinance also limits the location of dispensaries by restricting them to "medium intensity business districts" and from within 1,000 feet of a school, church, public library, public playground or public park. A variance from the Board of Zoning Appeals could reduce that distance to 750 feet away from the restricted areas. The location of medical marijuana cultivators and processors would be limited to industrial districts. The businesses are also required to obtain a license from the City and pay an annual $500 fee.

Source: *Newark Advocate; www.newarkadvocate.com*

WISCONSIN

In late November, Governor Scott Walker signed into law the "Homeowners' Bill of Rights." The new legislation, consists of two bills: One bill "allows property owners to build on and sell lots of 'substandard' size if they were legal when created." That bill also "prohibits local governments from merging adjacent lots that share the same owner without the owner's permission and makes it easier for property owners to get conditional-use permits and variances, maintain nonconforming structures, and dredge private ponds." The second bill "allows homeowners to appeal assessments when a homeowner refuses to let the assessor inside the house, and to hang the American flag even if condominium or homeowner association rules would prohibit it."

Source: *The Heartland Institute; www.heartland.org*

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QUINLAN™ February 25, 2018 | Volume 12 | Issue 4

Zoning Bulletin

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Preemption/Aviation—Town says use of private heliport is prohibited under town zoning laws

Heliport owner contends state aeronautics code preempts zoning laws

Citation: *Roma, III, Ltd. v. Board of Appeals of Rockport, 478 Mass. 580, 88 N.E.3d 269 (2018)*

MASSACHUSETTS (01/08/17)—This case addressed the issue of "whether cities and towns may exercise their zoning authority to determine

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POSTMASTER: Send address changes to Zoning Bulletin, 610 Opperman Drive, P.O. Box 64526, St. Paul, MN 55164-0526.



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P.O. Box 64526
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email: west.customerservice@thomsonreuters.com
ISSN 0514-7905
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whether land in their communities may be used as a noncommercial private restricted landing area, here a heliport, or whether they may do so only with the approval of the [Division of Aeronautics of the Massachusetts Department of Transportation] because the exercise of such zoning authority is preempted by the [Massachusetts's] aeronautics statutes, G. L. c. 90, §§ 35-52 (aeronautics code)."

The Background/Facts: Ron Roma ("Ron") was a licensed helicopter pilot who regularly used his helicopter to travel to his "various family homes, business engagements, and other activities," but did not use the helicopter for any commercial purposes. One of those family homes, owned by Roma, III, Ltd. ("Roma"), was located on 1.62 acres of property (the "Property") in a residential zoning district in the Town of Rockport (the "Town"). Roma requested and received from the Federal Aviation Administration, a "determination of airspace suitability," recognizing the Property as a licensed private use heliport. Following an airspace review, Roma also received approval from the Division of Aeronautics of the Massachusetts Department of Transportation (the "Division").

In November 2014, Ron flew his helicopter to the Property. Soon thereafter, the Town's building inspector issued an enforcement order to Roma. That order stated that a heliport was "not allowed, either as a principal use of the property or an accessory use, in any zoning district in the [t]own," and that the use of Roma's Property for the landing of a helicopter was in violation of the Town's bylaw. The Town building inspector ordered "that the landing of helicopters on the property be stopped immediately" and that the "[f]ailure to comply with this order may result in fines of up to $300 per day."

Roma appealed the enforcement order to the Town's Board of Appeals ("Board"). The Board ultimately denied the appeal. The Board explained that, under the Town's zoning bylaw, uses that were "not expressly permitted" were "deemed prohibited." Since the bylaws did not expressly authorize the use of land for a heliport, the Board concluded that Roma's use of the Property for a heliport was not permitted. The Board also concluded that the use of a heliport was not allowed as a " 'customarily incidental' accessory use" or as an "accessory use normally associated with a one-family detached dwelling that is not detrimental to a residential neighborhood." Consequently, the Board determined that a heliport would need "some form of approval, variance and/or special permit."

Roma appealed the Board's decision to the Land Court. The Land Court judge determined that he was "constrained to apply" prior caselaw (*Hanlon v. Town of Sheffield, 89 Mass. App. Ct. 392, 50 N.E.3d 443 (2016) (abrogated by, Roma, III, Ltd. v. Board of Appeals of Rockport, 478 Mass. 580, 88 N.E.3d 269 (2018)*)), which interpreted the Massachusetts aeronautics code—G. L. c. 90, § 39B—"to indicate that a town may not enforce a zoning bylaw that would prohibit a private landowner from creating a noncommercial private restricted landing area on his or her property, unless the relevant bylaw had been approved by the [D]ivision." Here, the Town zoning bylaw had not been approved by the Division. Accordingly, finding there were no material issues of fact in dispute and deciding the matter on the law alone, the judge granted summary judgment to Roma.

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The Board applied to the Supreme Judicial Court of Massachusetts for direct appellate review, which was granted.

DECISION: Judgment of Land Court vacated and matter remanded.

Abrogating (i.e., repealing) *Hanlon v. Town of Sheffield, 89 Mass. App. Ct. 392, 50 N.E.3d 443 (2016) (abrogated by, Roma, III, Ltd. v. Board of Appeals of Rockport, 478 Mass. 580, 88 N.E.3d 269 (2018))*, the Supreme Judicial Court of Massachusetts held that cities and towns in Massachusetts may exercise their zoning authority to determine whether land in their communities may be used as a noncommercial private restricted landing area. In other words, the court held that the state aeronautics code—G. L. c. 90, § 39B—did not preempt local zoning regarding noncommercial private restricted landing areas.

In reaching that conclusion, the court analyzed the statute. The court found that the first three paragraphs of § 39B required municipalities to apply to the Division for a certificate of approval before acquiring any property for "an airport or restricted landing area." Paragraph four provided that § 39B did "not apply to restricted landing areas for non-commercial private use," among other exceptions. The court found that to mean that "a private landowner who wishes to establish a noncommercial private restricted landing area does not need prior [D]ivision approval; the landowner simply needs to inform the [D]ivision in writing of its establishment, and ensure that it is not built or maintained in a manner that would endanger the public safety." The court found that paragraph five allowed municipalities to enact rules and regulations governing "the use and operation of an aircraft at an airport or restricted landing area," but such rules and regulations were only effective if approved by the Division.

Here, the Board had argued that since the fourth paragraph declared that § 39B did not apply to restricted landing areas designed for noncommercial private use, the fifth paragraph requiring Division approval of municipal rules and regulations on restricted areas did not apply to noncommercial private restricted landing areas.

The Supreme Judicial Court agreed with the Board. In agreeing, the court acknowledged that the "use and operation of aircraft" was governed by § 39B, but emphasized that the use of land, on the other hand, was traditionally regulated by municipalities under their zoning authority. Accordingly, concluded the court, "regardless of whether § 39B is the sole source of a city or town's authority to regulate the 'use and operation of aircraft,' it plainly is not the source of a city or town's authority to regulate the use of land."

Roma had contended that, nevertheless, unless approved in advance by the Division, the Town's zoning bylaw that prohibited the use of land to establish a noncommercial private restricted landing area was preempted by the state aeronautics code. Roma argued that a clear intent to preempt such local zoning enactments should be inferred "to prevent frustration of the legislative purpose of the aeronautics code."

The court disagreed with Roma. The court explained both federal and state preemption analysis. Focusing on state law preemption, the court said that "a local regulation will not be invalidated unless the court finds a 'sharp conflict'

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between the local and State provisions." Here, the court found that the legislative purpose of the aeronautics code of "foster[ing] . . . private flying" did not suggest a legislative intent to encourage the development of private heliports and landing areas on private property. Contrary, found the court, since land use regulation has long been recognized by the Legislature to be a prerogative of local government, the court concluded that it would "not infer that the enactment of the aeronautics code reflects a clear legislative intent to preempt all local zoning bylaws that might affect noncommercial private restricted landing areas based on the risk of frustrating the legislative purpose of fostering private flying." Nor was the court "persuaded that the Legislature, by granting the [D]ivision 'general supervision and control over aeronautics,' [under] G. L. c. 90, § 39, intended to preempt all local land use regulation that might affect the use of land for private heliports."

Accordingly, the court concluded that "there [was] no clear legislative intent to preempt local zoning enactments with respect to noncommercial private restricted landing areas, and that a city or town does not need the prior approval of the [D]ivision to enforce a zoning bylaw that requires some form of approval, variance, or special permit for land to be used as a private heliport."

Thus, the enforcement order against Roma was upheld.

See also: *Town of Harvard v. Maxant, 360 Mass. 432, 440, 275 N.E.2d 347 (1971).*

See also: *Town of Wendell v. Attorney General, 394 Mass. 518, 476 N.E.2d 585 (1985).*

Historic District—Property owners raze and reconstruct house located in historic district but not individually listed on state or national historic registers

Abutting neighbors sue, arguing new house violates state historic-district regulations, and seeking injunction for modifications to new house

Citation: *McDowell v. Sapienza, 2018 SD 1, 2018 WL 285839 (S.D. 2018)*

SOUTH DAKOTA (01/03/18)—This case addressed the issue of whether historic-district regulations applied to a property owner's new home constructed in an historic district, despite the fact that the home was not listed on state or national historic registers.

The Background/Facts: The McKennan Park Historic District of Sioux Falls ("McKennan Park") is a historic property listed on the national register of historic places. In 2014, Joseph and Dr. Sarah Sapienza (the "Sapienzas")

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purchased a house in McKennan Park. The house they purchased was designated an "intrusion" and "noncontributing property," and it was not listed on the state or national registers of historic places. The Sapienzas originally planned to renovate the house, but ultimately decided to raze it and construct a new home on the property.

In furtherance of their plans, the Sapienzas submitted architectural renderings to the Board of Historic Preservation (the "Board") of the City of Sioux Falls (the "City"). The Sapienzas disclosed to the Board that some changes may be made to the plans submitted. The Sapienzas also notified the Board that their home would be larger than the previous structure. Based on the information provided, the Board approved the Sapienzas' proposal, and the City issued a building permit for the proposed construction.

In October 2014, the Sapienzas began constructing their new home. Construction of the home was complete in January 2016.

In the interim, in May 2015, owners of the property adjacent to the Sapienzas' property—Pierce and Barbara McDowell (the "McDowells")—sued the Sapienzas. The McDowells' suit against the Sapienzas was based on theories of negligence and nuisance. Among other things, the McDowells alleged that construction of the Sapienzas' home violated a state regulations governing new construction in historic districts—ARSD 24:52:07:04. ARSD 24:52:07:04 establishes standards for "[n]ew construction or additions within a historic district." It covers numerous standards including, among others, the design, height, width, and proportion of such new construction.

The circuit court agreed that the Sapienzas home violated state historic-district regulations. The court entered judgment in favor of the McDowells. The court issued a mandatory injunction requiring the Sapienzas to modify their home to comply with the state regulation for historic districts.

The Sapienzas appealed. On appeal, the Sapienzas argued that ARSD 24:52:07:04 did not apply to their property because their home was not listed on the state or national registers. They relied on ARSD 24:52:07:01, which provides that the regulations in ARSD chapter 24:52:07 "apply to historic properties listed on the state register or the national register, or both." They interpreted ARSD 24:52:07:01 to limit ARSD 24:52:07:04's application to new construction on individual properties already listed on the state or national registers. They also argued that the court abused its discretion in granting an injunction requiring modification of their home (as opposed to requiring them to pay monetary damages).

DECISION: Judgment of circuit court affirmed in relevant part.

The Supreme Court of South Dakota held that the State historic-district regulations applied to the Sapienzas' new home constructed in the McKennan Park Historic District.

In so holding, the court disagreed with the Sapienzas' interpretation of the historic-district regulations. The court explained that "although ARSD 24:52:07:01 indicates that the rules in ARSD chapter 24:52:07 apply to historic properties listed on the state or national registers, the McKennan Park Historic District itself is a 'historic property' that is 'listed' on the state and national registers." The court said this was because the enabling statutes for ARSD

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24:52:07:01 and ARSD 24:52:07:04 included historic districts within the statutory definition of "historic property." (See SDCL 1-19A-2(3).) Therefore, explained the court, "ARSD 24:52:07:01's reference to listed 'historic properties' cannot be read as language limiting the applicability of the chapter's substantive regulations to individually owned historic properties." Since McKennan Park itself was a listed historic property, and the Sapienzas' individually owned property was within McKennan Park, the court concluded that even through the Sapienzas' home was not individually listed on state or national registers, the State historic-district regulations still applied to the Sapienzas' property. In other words, because the McKennan Park historic district was itself a "historic property" that was listed on state and national registers, the requirements of the State historic-district regulations (i.e., ARSD 24:52:07:04) applied to any new construction or additions within McKennan Park, including the Sapienzas' new home construction.

The court also concluded that the issuance of the injunction requiring the Sapienzas to modify their newly-constructed home to comply with the historic-district regulations was warranted. In so concluding, the court explained that in determining whether an injunction requiring modification of the Sapienzas' home was warranted, it had to look at: (1) whether an injunction was statutorily authorized under state law (SDCL 21-8-14); and, if so, (2) whether the circuit court's decision to grant the injunction was an abuse of discretion.

The court found that an injunction was statutorily authorized in this case. The court noted that under SDCL 21-8-14(1), an injunction could be granted to prevent the breach of an obligation (i.e., here, the historic-district regulations), where "pecuniary compensation would not afford adequate relief." Here, the court determined that pecuniary compensation would not provide adequate relief as the failure of the Sapienzas to construct their home in accordance with historic standards: (1) impaired the historical integrity of the McKennan Park historic district; (2) decreased the market value of the McDowells' home; and (3) interfered with the McDowell's use and enjoyment of their home. These "intangible harms" said the court, "are often not rectified by pecuniary compensation."

Next, the court concluded that the circuit court had not abused its discretion in issuing the injunction. The court said this was because: (1) the Sapienzas caused the harm, which (2) was irreparable without the injunction because the undermining of the historic district could not be remedied by a payment of money to the McDowells; and (3) the Sapienzas' acts "were not innocent mistakes," as they chose to use a construction company unfamiliar with standards for historic districts, and submitted to the Board renderings that did not accurately reflect what they later built; and (4) the hardship to be suffered by the Sapienzas in modifying their newly-constructed home was not "disproportionate" to the benefit to be gained by the McDowells, whose privacy and use and enjoyment of their home was impacted by the Sapienzas' home.

See also: *Vieux Carre Property Owners & Associates, Inc. v. City of New Orleans, 246 La. 788, 167 So. 2d 367 (1964).*

See also: *Faulkner v. Town of Chestertown, 290 Md. 214, 428 A.2d 879 (1981).*

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See also: *A-S-P Associates v. City of Raleigh, 298 N.C. 207, 258 S.E.2d 444 (1979).*

See also: *Hoffman v. Bob Law, Inc., 2016 SD 94, 888 N.W.2d 569 (S.D. 2016).*

Case Note:

The McDowells had also alleged that construction of the Sapienzas' home violated the City's chimney ordinance. The proximity of the Sapienzas' new home had caused the McDowells' home to fall out of compliance with the chimney ordinance's chimney height requirements (based on distance and height of adjacent structures), leaving the McDowells unable to use their fireplace. The circuit court agreed with the McDowells and ordered the Sapienzas to modify their home so that McDowells could use their fireplace. On appeal, however, the Supreme Court of South Dakota concluded that the chimney ordinance was a set back requirement, which regulated the height of chimneys on a structure and not the siting of structures on other properties. Although the Sapienzas' new home caused the McDowells' home to fall out of compliance with the chimney ordinance, the Sapienzas' home was not sited in violation of the chimney ordinance, found the court. As such, the court reversed the circuit court's contrary legal conclusion.

Case Note:

The Sapienzas had asserted defenses of laches and assumption of risk. However, both the circuit court and the appellate court rejected those defenses.

Case Note:

The McDowells had also sued the City for negligence. They had alleged that the City was negligent in issuing the building permit and permitting the Sapienzas to build a home that violated building regulations. The circuit court had agreed, concluding that the City owed a duty to the McDowells to properly enforce the historic-district regulation. But, the Supreme Court of North Dakota disagreed. It concluded that the duty to ensure compliance with permits—which allegedly was breached here—rested with the "individuals responsible for construction," and not the local government. Moreover, the court found that the McDowells failed to establish the requirements for establishing a special duty owed by the City to the McDowells (i.e., that the City had actual knowledge that the Sapienzas' home would violate ARSD 24:52:07:04; that the McDowells relied on representations of the City to protect them; or that ARSD 24:52:07:04 set forth mandatory acts that the City undertook to protect the individual property owners in the historic district.) Thus, the court concluded that the circuit court erred in holding that the City owed a duty to the McDowells to ensure compliance with applicable building codes and regulations.

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Jurisdiction/School District—Town says school district's electronic sign violates town zoning ordinances

School district contends that it is immune from town's zoning ordinances

Citation: *Ravena-Coeymans-Selkirk Central School District v. Town of Bethlehem, 156 A.D.3d 179, 66 N.Y.S.3d 534 (3d Dep't 2017)*

NEW YORK (11/30/17)—This case addressed the issue of whether a school district was immune from a town's zoning ordinances.

The Background/Facts: In January 2015, the Ravena-Coeymans-Selkirk Central School District (the "School District") asked the Town of Bethlehem (the "Town") whether any local law would prohibit the School District from replacing an existing traditional sign at one of its elementary school located in the Town with an electronic message board sign. The Town informed the School District that the Town's zoning laws expressly prohibited electronic signs in the Town. The School District then applied to the Town for a variance in order to install the electronic sign (which had already been donated to the school). The Town denied the School District's variance application. However, the School District, nevertheless, installed the electronic sign. Consequently, the Town informed the School District that it was in violation of various provisions of the Town's zoning laws, and ordered the School District to remove the sign. The School District responded that, as a public school, it was not subject to local zoning requirements. Still, "[a]s a precaution," the School District appealed the Town's variance denial to the Town's Zoning Board of Appeals (the "ZBA"). The ZBA also denied the variance request, citing, among other things, traffic safety concerns.

Following the ZBA's denial of its requested variance, the School District filed an action for declaratory judgment with the county Supreme Court. The School District asked the court to declare that, as a public school, the School District was immune and exempt from compliance with the Town's zoning laws as they apply to the use of real property for school purposes.

The Town and the ZBA counterclaimed. They asked the court for an order directing the School District to remove the sign.

The Supreme Court rejected the School District's immunity argument, dismissed the School District's action, and directed that the School District to remove the electronic sign.

The School District appealed.

DECISION: Judgment of Supreme Court affirmed as modified.

The Supreme Court, Appellate Division, Third Department, New York, held that the School District was not immune from the Town's zoning ordinances.

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In so holding, the court acknowledged that schools do enjoy some immunity from zoning regulations. The court said this was the case where New York's Education Law explicitly requires Education Department oversight of local school boards, such as with: the selection of building sites and erection or demolition of buildings on those sites (see Education Law §§ 401, 407, 408); the sale or acquisition of property (see Education Law §§ 402-405); health or safety conditions within the school (see Education Law §§ 409-409-l); or any use of a school building (see Education Law § 414). However, the court explained that the immunity School Districts have from local zoning regulations is "not so broad and absolute as [the School District] contend[ed]." Where local zoning regulations do not encroach on a state agency's authority, they are authorized and applicable to School Districts, held the court.

Here, the court found that the Education Department did not require review of sign placement, and the School District had not requested any Education Department review of its electronic sign placement. Hence, the court concluded that there was "no duplication of review—nor the possibility of conflicting determinations—by state and local entities," and there was no "encroachment by the Town or the ZBA on a state agency's authority."

Having concluded that the School District was not immune from the Town's zoning ordinances, the court next looked at whether the ZBA had properly denied the School District's request for a variance. The court concluded that the ZBA had properly denied the variance given that: the Town and the ZBA had not refused the School District the opportunity to install any sign, but just an electronic message center sign, which was prohibited in the Town and which also failed to comply with at least three additional size and location requirements of the signage provisions of the Town's zoning ordinance; and the ZBA had "provided rational reasons for its determination, including a concern for traffic safety due to the sign's brightness and potential to be more distracting and hazardous to passing motorists than an ordinary sign."

See also: *Cornell University v. Bagnardi, 68 N.Y.2d 583, 510 N.Y.S.2d 861, 503 N.E.2d 509, 37 Ed. Law Rep. 292 (1986).*

Case Note:

The School District had argued that, alternatively, it was entitled to immunity from local zoning laws in light of the " 'balancing of public interests' test." The court rejected that argument, stating that the balancing of public interests tests was generally applied in the case of competing localities and was "not necessary in relation to schools." Rather, with regard to schools, the court said that "the controlling consideration must always be the over-all impact on the public's welfare."

Case Note:

Because the county Supreme Court had not made a declaration, the appellate court modified the judgment by declaring that the School District had not shown itself to be immune and exempt from the Town's zoning law in these circumstances.

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Case Note:

In its decision, the appellate court pointed to a state Court of Appeals case, which had held that schools are not fully exempt from zoning rules, particularly where the educational use "may actually detract from the public's health, safety, welfare or morals . . . ." (See Cornell University v. Bagnardi, 68 N.Y.2d 583, 510 N.Y.S.2d 861, 503 N.E.2d 509, 37 Ed. Law Rep. 292 (1986).) The School District had argued that the Court of Appeals' holding applied to only private schools. But, the appellate court disagreed.

Zoning News from Around the Nation

CALIFORNIA

A gun rights group has reportedly filed a petition with the United States Supreme Court, asking the court to consider a Ninth Circuit Court of Appeals decision, which upheld an Alameda County zoning ordinance that prohibited gun stores from being located within 500 feet of certain areas, including residential zoning districts. In the appeal, the gun rights group maintains that the county zoning law is a violation of Second Amendment rights. The Ninth Circuit had rejected that argument, noting that there were locations in the county where guns could be purchased, and finding there is no constitutional right to sell guns.

Source: *Fox News; www.foxnews.com*

PENNSYLVANIA

Millcreek Township has reportedly "agreed to pay a resident $23,396 to settle a federal lawsuit challenging township political sign regulations." The Township also had earlier settled a separate, similar case for $15,000. The residents had challenged an ordinance that capped the number of temporary signs allowed on property, including political signs. Under the terms of the recent settlement, the township zoning ordinance will be amended to eliminate the cap on temporary signs.

Source: *GoErie.com; www.goerie.com*

MAINE

In June, Town of Kennebunk residents will vote on a proposed ban on all retail marijuana sales and operations in Town. The proposed zoning ordinance was approved by the Town's Planning Board and Board of Selectmen. Last year, recreational marijuana became legal in Maine, and the state legislature is currently considering a proposal to extend a statewide ban on retail sales of marijuana until May 1 to give the state more time to craft regulations related to recreational marijuana. Previously, Governor Paul LePage vetoed a bill created by a bipartisan task force that would have addressed such regulation of recreational marijuana.

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Source: *Bangor Daily News; https://bangordailynews.com*

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QUINLAN™

March 10, 2018 | Volume 12 | Issue 5

Zoning Bulletin

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Use—Landowner contends the hosting of commercial events on farmland is permitted as of right under Rhode Island's Right to Farm Act

Township maintains that while statute identifies commercial events as valuable to the preservation of agriculture, it does not make them an as-of-right

Contributors

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POSTMASTER: Send address changes to Zoning Bulletin, 610 Opperman Drive, P.O. Box 64526, St. Paul, MN 55164-0526.

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P.O. Box 64526
St. Paul, MN 55164-0526
1-800-229-2084
email: west.customerservice@thomsonreuters.com
ISSN 0514-7905
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"agricultural operation"

Citation: *Gerald P. Zarrella Trust v. Town of Exeter, 2018 WL 444298 (R.I. 2018)*

RHODE ISLAND (01/16/18)—This case addressed the issue of whether, by enacting the 2014 amendment to a Rhode Island statute—subsection 4(a) of Rhode Island's Right to Farm Act, G.L. 1956 chapter 23 of title 2—the Rhode Island General Assembly expanded the definition of "agricultural operations" to include the hosting of commercial events, such that such use was not subject to a municipality's zoning control.

The Background/Facts: Gerald Zarrella ("Zarrella") owned land in the Town of Exeter (the "Town"). Zarrella sought to use his farmland to host commercial events, including weddings for a fee. In 2011, the Town sued Zarrella to prevent him from using his farmland for such events. As a result of that legal action, the Town and Zarrella entered into an amended consent judgment that permanently enjoined Zarrella from "using and/or renting [his property] . . . for weddings for a fee or other commercial events." The injunction ran with the land "until such time" that its terms were "superseded by statute."

According to Zarrella that time came, and the injunction was superseded, when, in 2014, the Rhode Island General Assembly amended the second sentence of subsection 4(a) of Rhode Island's Right to Farm Act, G.L. 1956 chapter 23 of title 2 (§ 2-23-4(a)). Prior to 2014, the second sentence of the statute provided that "the mixed-use of farms and farmlands for other forms of enterprise" were "recognized as a valuable and viable means of contributing to the preservation of agriculture." The 2014 amendment added a list of such mixed uses for other forms of enterprise to include, among other things, "festivals and other special events." Zarrella asserted that hosting commercial events—including hosting weddings for a fee—was the sort of "other special event[ ]" that the General Assembly recognized as "a valuable and viable means of contributing to the preservation of agriculture" with its 2014 statutory amendment. He argued that the 2014 amendment therefore rendered the 2011 permanent injunction that prohibited his hosting weddings for a fee on his property "a nullity, green-lighting his ability to host weddings for a fee on his farmland."

With that argument, Zarrella attempted to obtain from the Town a zoning certificate that would allow him to host a "commercial fundraising event" on his farmland. The Town rejected Zarrella's request for a zoning certificate. The Town maintained that the 2014 amendments to the second sentence of § 2-23-4(a) were simply a statement of policy, and not an expansion of the definition of "agricultural operations" permitted as of right under the statute. As such, the Town maintained that Zarrella's use of his farmland to host weddings or "commercial fundraising event[s]" was a nonagricultural operation that remained under the Town's control.

Zarrella sued the Town, asking the court to make a declaration in his favor. The court denied Zarrella's request for declaratory relief, instead ruling that the 2014 amendment to § 2-23-4(a) "merely set forth a list of encouraged uses of farms and farmland, which did not preempt the town's authority to restrict nonagricultural operations such as hosting commercial events, including weddings for a fee."

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Zarrella appealed.

DECISION: Judgment of superior court affirmed.

The Supreme Court of Rhode Island also agreed with the Town, holding that the 2014 General Assembly amendments to the second sentence of § 2-23-4(a) was a statement of policy—setting forth a list of encouraged activities deemed "valuable and viable" with respect to "contributing to the preservation of agriculture"—and "would not and could not expand the definition of [as-of-right] agricultural operations."

In so holding, the court analyzed the statutory language, finding it "clear and unambiguous," and thus ascribing the "plain and ordinary meaning of the words of the statute." The first sentence of § 2-23-4(a) defined "agricultural operations" to include "any commercial enterprise that has as its primary purpose horticulture, viticulture, viniculture, floriculture, forestry, stabling of horses, dairy farming, or aquaculture, or the raising of livestock, including for the production of fiber, furbearing animals, poultry, or bees . . . ." And, again, with the 2014 amendments, the second sentence, of § 2-23-4(a) listed examples of mixed uses of farmland recognized as "valuable and viable means of contributing to the preservation of agriculture."

The court concluded that there was "no dispute" that the hosting of a wedding for a fee was a "commercial activity" that did not fall under the "agricultural operations" enterprises set forth in the first sentence of § 2-23-4(a). The court also concluded that the hosting of a wedding for a fee was not an "agricultural operation" by virtue of the language contained in the second sentence of § 2-23-4(a). The court explained that even if hosting weddings for a fee fell within the ambit of the second sentence of the statute, that sentence was only "aspirational"—"a statement of policy preference"—and not "definitional." Such a statement of policy preference did not, concluded the court, transform the nonagricultural use of a wedding for a fee into an "agricultural operation" allowed by right under the statute. Finding that hosting weddings for a fee was an activity that fell outside the statutory definition of "agricultural operations," the court concluded that it was a "nonagricultural" activity that was subject to the town's control. Thus, the court found that Zarrella remained bound by the 2011 injunction that enjoined him from using his farmland "for weddings for a fee or other commercial events."

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Special Exception/Burden of Proof/ Preemption—Zoning board finds applicant need not prove "subjective and vague" special exception requirement

Objectors argue requirement is "specific and objective" and therefore had to be satisfied by applicant

Citation: *Berner v. Montour Township Zoning Hearing Board, 2018 WL 280464 (Pa. Commw. Ct. 2018)*

PENNSYLVANIA (01/04/18)—This case addressed the issue of whether zoning ordinance requirements were "specific and objective" such that a special exception applicant had the burden of showing the requirements were met, or were "subjective and vague" such that the applicant did not bear the burden of proving compliance with the requirement. The case also addressed the issue of whether a state statute—Pennsylvania's Nutrient Management Act—preempted zoning ordinance requirements related to special exceptions for intensive agriculture uses so as to excuse a landowner's compliance with the local zoning ordinance.

The Background/Facts: Scott Sponenberg (the "Applicant") owned property in an agricultural zoning district in Montour Township (the "Township"). In April 2013, the Applicant filed an application for a special exception with the Township's Zoning Hearing Board ("ZHB") for a proposed intensive agricultural use. Specifically, the Applicant sought to construct a swine nursery barn with an under building for manure storage.

Under the Township's zoning ordinance, "intensive agriculture," including "hog raising," was permitted by special exception, subject to specific requirements. One such requirement, under § 402(1)(E) of the Township zoning ordinance, was that such intensive agriculture uses "shall submit facility designs and legally binding assurances with performance guarantees which demonstrate that all facilities necessary for manure and wastewater management . . . will be conducted without adverse impact upon adjacent properties." "Adverse impacts" were defined to include: "groundwater and surface water contamination, ground water supply diminution, noise, dust, odor, heavy truck traffic, and migration of chemicals offsite."

Ultimately, the ZHB granted Applicant's special exception request. The grant of the special exception was based, in part, on the ZHB's determination that § 402(1)(E)'s special exception requirement was "subjective and vague" and therefore not a specific requirement that Applicant was required to satisfy to obtain special exception approval.

The ZHB additionally concluded that Pennsylvania's Nutrient Management Act ("NMA"), 3 Pa. C.S. §§ 501-522, preempted § 402(1)(E)'s special excep-

tion requirement. A provision of the NMA provides that a municipal zoning ordinance may not prohibit or regulate the storage or handling of animal manure or nutrients "if the municipal ordinance or regulation is in conflict with [the NMA] and the regulations or guidelines promulgated under it." Here, the ZHB concluded that § 402(1)(E) was in conflict with an NMA regulation that provided minimum standards for the "design, construction, location, operation, maintenance and removal from service of manure storage facilities." (See 25 Pa. Code § 85.351.)

Russell and Donna Berner, Kendall Dobbins, Robert D. Clark, and Robert W. Webber (the "Objectors") appealed the ZHB's grant of the special exception to Applicant. The Objectors expressed concerns about the Applicant's proposed use regarding odor, manure application, potential contamination of groundwater, disease, traffic, and diminution in property value. The Objector's argued that the ZHB erred in granting the special exception based on its determinations that: (1) § 402(1)(E)'s special exception requirement was "subjective and vague" and therefore not a specific requirement that Applicant was required to satisfy to obtain special exception approval; and (2) the NMA's regulations preempted § 402(1)(E)'s special exception requirement so as to excuse Applicant's non-compliance with that provision.

The trial court upheld the ZHB's decision.

The Objectors again appealed.

DECISION: Judgment of Court of Common Pleas reversed.

The Commonwealth Court of Pennsylvania agreed with the Objectors' arguments. The court held that the special exception requirement of § 402(1)(E) of the Township's zoning ordinance—requiring applicants submit facility designs and legally binding assurances with performance guarantees that demonstrate that all facilities necessary for manure management will be conducted without adverse impact on adjacent properties—was "specific and objective," and therefore had to be satisfied by the Applicant (and was not so satisfied here). The court also held that the NMA regulation cited by the ZHB did not apply here, and therefore did not preempt or excuse Applicant's compliance with § 402(1)(E)'s special exception requirements.

In so holding, the court explained that "a special exception is neither special nor an exception, but rather a use expressly contemplated that evidences a legislative decision that the particular type of use is consistent with the zoning plan and presumptively consistent with the health, safety and welfare of the community." With regard to burden of proof, the court explained that an applicant for a special exception "has both the duty of presenting evidence and the burden of persuading the ZHB that his [or her] proposed use satisfies the objective requirements of the zoning ordinance for the grant of a special exception." Once that burden is satisfied, it shifts to any objectors to the application, explained the court.

Here, the court found that Applicant "bore the burden of showing" he made the required submissions under § 402(1)(E). Contrary to the ZHB's determinations, the court determined that § 402(1)(E)'s requirement that an applicant "submit facility designs and legally binding assurances with performance guarantees that demonstrate that all facilities necessary for, among other

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things, manure and wastewater management and water supply will be conducted without adverse impact on adjacent properties" was "not subjective or vague." Rather, the court found that the requirement was "a specific, objective one" that Applicant bore the burden of meeting.

The court explained that it's determination that the language in § 402(1)(E) constituted a specific requirement rather than a subjective, general one, was "bolstered by the facts that":

> (1) the provision require[d] an applicant to make certain clearly identified submissions; (2) the requirement for [those] submissions, by its own terms, applie[d] only to certain, identified intensive agriculture uses such as Applicant's proposed swine nursery rather than all intensive agriculture uses generally; and, (3) the provision expressly enumerate[d] the categories of adverse impacts that it is aimed at avoiding.

Since Applicant failed to prove he made the submissions identified in and required by § 402(1)(E), the court concluded that the ZHB erred in granting Applicant's special exception application in part on that basis.

Moreover, in holding that the NMA regulation cited by the ZHB did not apply here, and therefore did not preempt or excuse Applicant's compliance with § 402(1)(E)'s special exception requirements, the court noted that the NMA regulations identified by the ZHB as being in conflict with § 402(1)(E) applied only to "new manure storage facilities and the expansion of existing manure storage facilities, as part of a plan developed for a nutrient management plan [("NMP")] operation." (See 25 Pa. Cod § 83.351(a).) Here, Applicant's proposed use did not require the development of an NMP. Thus, the NMA regulation cited by the ZHB as preempting § 402(1)(E) did not, in fact, apply here, concluded the court. Because the cited regulation did not apply here, the court further concluded that the ZHB erred in determining that the regulation excused Applicant's non-compliance with § 402(1)(E).

Thus, the court concluded that because Township zoning ordinance § 402(1)(E) was not preempted by the NMA or its regulations, and because Applicant bore the burden of proving he complied with § 402(1)(E) and did not do so, the ZHB erred in granting Applicant's special exception regulations.

See also: *Bray v. Zoning Bd. of Adjustment, 48 Pa. Commw. 523, 410 A.2d 909 (1980).*

Preemption—City ordinance prohibits the loading of crude oil onto tankers in city harbor

Oil pipeline operator contends ordinance is preempted by numerous federal and state laws

Citation: *Portland Pipe Line Corporation v. City of South Portland, 2017 WL 6757556 (D. Me. 2017)*

MAINE (12/29/17)—This case addressed the issue of whether a city zon-

ing ordinance prohibiting the loading of crude oil onto tankers in the city harbor and the building of new structures for that purpose was preempted by federal and state laws including: the federal Pipeline Safety Act, the federal Port and Waterways Safety Act, federal foreign affairs power, federal maritime law, and the Maine Oil Discharge Prevention and Pollution Control Law.

The Background/Facts: Since 1941, Portland Pipe Line Corporation (the "Operator") has operated crude oil pipelines that stretch from the harbor in South Portland, Maine (the "City"), through New Hampshire and Vermont, and into Quebec, Canada, terminating at oil refineries in Montreal East. In 2007-2008, the Operator began proposing a "flow reversal project," marketing its ability to transport oil from Canada to South Portland. Due to economic conditions, the proposed project was put on hold, but then revived again in 2012-2013.

In 2014, the City Council passed the "Clear Skies Ordinance" (the "Ordinance" or the "City Ordinance")). Among other things, the City Ordinance made the "storing and handling of petroleum and/or petroleum products" for the "bulk loading of crude oil onto any marine tank vessel" a prohibited use in the Commercial "C" and Shipyard "S" zoning districts in the City. The Ordinance further prohibited the construction, reconstruction, or alteration of facilities, structures, or equipment "for the purpose of bulk loading of crude oil onto any marine tank vessel" in the Commercial "C" zoning district, Shipyard "S" and Shoreland Area Overlay zoning districts in the City, as well as in the Industrial "I" and Non-Residential Industrial "INR" zoning districts in the City.

The Ordinance effectively stood as "as an obstacle to [the Operator's] efforts to obtain permits and credibly market its services to transport crude oil from north to south." Accordingly, the Operator challenged the validity of the Ordinance. (Joining the Operator in this challenge was the American Waterways Operators ("AWO")—a nationwide trade organization that advocates for the interests of United States tugboat, towboat, and barge owners and operators.) Among other things, the Operator maintained that the Ordinance was preempted by various federal and state laws, including: the federal Pipeline Safety Act; the federal Port and Waterways Safety Act; federal foreign affairs power; federal maritime law; and the Maine Oil Discharge Prevention and Pollution Control Law.

Specifically, the Operator argued that Congress preempted the entire field of interstate pipeline safety through the Pipeline Safety Act ("PSA") and its regulations. (See 49 U.S.C.A. §§ 60101 et seq., and 49 C.F.R. Part 195.) The Operator claimed that the Ordinance was preempted by the PSA "because the purpose of the Ordinance is regulating pipeline safety, which is a field covered by the PSA." Alternatively, the Operator claimed that, at the least, the Ordinance was preempted by the PSA because the Ordinance effectively impacted "pipeline operations and related safety measures" because it directly regulated "how oil should be transported through the pipeline system."

The Operator argued that the Ordinance was also preempted by the Port and Waterways Safety Act because that Act "occupies the entire field of 'the operation of marine tanker vessels in U.S. harbors, including the loading and unloading of their cargo.' " (See Title II of the PWSA, 46 U.S.C.A. Ch. 37,

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and the regulations thereunder, volumes 33 and 46 of the Code of Federal Regulations.)

The Operator also asserted that the Ordinance was preempted by the exclusive federal authority over foreign affairs because the Ordinance "profoundly interferes" with the federal policy around tanker operations, which "seeks to facilitate trade among nations and reach international solutions." Similarly, the Operator asserted that the Ordinance was "preempted more broadly under Art. III, Section 2 of the [United States] Constitution and the Constitution's embedded principal of federal maritime governance" under which "there is exclusive federal control over maritime activities."

Finally, the Operator argued that the Maine Oil Discharge Prevention Law, also referred to as the Coastal Conveyance Act, preempts local ordinances "in direct conflict with this subchapter or any rule or order of the board or commissioner adopted under authority of this subchapter." The Operator argued that since its license was issued via "[Maine] Department [of Environmental Protection] Order," it therefore qualified as a "rule or order of the board or commissioner" that directly conflicted with the Ordinance.

Claiming there were no material issues of fact in dispute, and asking the court to decide the matter on the law alone, the City and the Operator each asked the court to issue summary judgment in their favor on the City's preemption claims.

DECISION: Summary judgment granted to the City with regard to the Operator's preemption claims.

The United States District Court for the District of Maine held that the City Ordinance—which prohibited loading crude oil onto tankers in the City harbor and building new structures for that purpose—was not preempted by the federal Pipeline Safety Act, the federal Port and Waterways Safety Act, federal foreign affairs power, federal maritime law, or the Maine Oil Discharge Prevention and Pollution Control Law.

More specifically, the court concluded that the City Ordinance was not a "safety standard" preempted by the federal PSA. The court explained that the Ordinance's prohibition was not a "standard," and that therefore it was possible to comply with both the PSA and the Ordinance. The court noted that no provision of the PSA or its regulations required pipeline operators to load crude oil. And, the Ordinance did not set competing levels, quantities, or specifications that made complying with both the PSA and the Ordinance more difficult. Furthermore, the court concluded that "Congress did not intend the PSA to preempt state and local authority to prescribe the location or routing of a pipeline facility." (See 49 U.S.C.A. §§ 60104(c), 60104(e).)

In holding that the City Ordinance was not preempted by provisions of the federal PWSA and related regulations concerning tankers, the court noted that the Ordinance did not provide any duties or restrictions related to vessel navigation or traffic in ports. Further, the court found that the PWSA's goals of protecting the environment and minimizing accidents was consistent with the Ordinance. While the PWSA preempted a field of regulation with respect to tanker safety standards and operations, the court found that the Ordinance had "at most an indirect effect on tankers and did not conflict with specific provi-

sions of PWSA such that preemption could be implied." (See 33 U.S.C.A. § 1221 et seq.; 46 U.S.C.A. § 3701 et seq.) Moreover, the court found that even if the Ordinance was a "stricter safety regulation on transfer facilities than provided for in the PWSA, Congress expressly indicated that states and localities retained their power to enact such restrictions, and no provision of the PWSA suggested an intent to remove local control over the siting of transfer facilities." (See 33 U.S.C.A. § 1221 et seq.; 46 U.S.C.A. § 3701 et seq.)

The court also held that, although the City Ordinance allegedly had the practical effect of preventing the Operator from importing oil from Canada, the Ordinance was not preempted by the federal foreign affairs power since: the Ordinance "did not explicitly target any particular foreign country"; "federal policy around tanker loading facilities explicitly contemplated stricter local regulations"; "federal policy on cross border pipelines was inconsistent"; "federal policy embodied in the Transit Pipeline Agreement between Canada and United States was one of anti-discrimination that did not implicate [the] [O]rdinance"; and the "State Department permit requirement for cross border pipelines did not indicate an intent to displace state and local authority over ports and oil transfer facilities." (See 42 U.S.C.A. § 7511b(f)(4); 28 U.S.T. 7449.)

The Court further concluded that the City Ordinance was not preempted under federal maritime law since the Ordinance "only restricted on-shore facilities and conduct and did not regulate activity of tankers or sailors at sea." (See U.S. Const. art. 3, § 2, cl. 1.) Moreover, the court found that the Ordinance "did not impermissibly ban federally licensed coastwise trade," or "ban or wholly exclude licensed vessels from using its waterway." Rather, the court found that the Ordinance "imposed the same restrictions on all vessels that might carry crude oil," and thus "could not discriminate against federal licensees in favor of local vessels." (See 46 U.S.C.A. § 9101; 46 C.F.R. Part 154, Subpart E.)

Finally, in finding that the City Ordinance was not preempted by the Maine Oil Discharge Prevention and Pollution Control Law, the court explained that the state statute "expressly contemplate[d] local restrictions consistent with the purposes of coastal protection unless there is a 'direct conflict' with the statute, regulation, or 'order.' " While the Operator received a license from Maine's Department of Environmental Protection ("DEP"), that license did not constitute a DEP "order" within the meaning of the preemption provision of the statute, found the court. If such a license did have a preemptive effect, noted the court, there would be "virtually no room for local regulation," which would contradict the state statute's savings clause, which contemplates local restrictions in addition to state conditions imposed through licenses. Moreover, the court concluded that its conclusion was "bolstered by the fact it [was] not impossible to comply with both the Ordinance and the License." While the License certified that the Operator's transfer equipment complied with the state requirements on transfer operations, either to unload or load oil products, the Ordinance only permitted loading or unloading of refined oil, and the unloading of crude oil. (See 38 Me. Rev. Stat. § 541 et seq.)

See also: *Philip Morris Inc. v. Harshbarger, 122 F.3d 58 (1st Cir. 1997).*

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See also: *U.S. v. Massachusetts, 493 F.3d 1, 2007 A.M.C. 1705 (1st Cir. 2007).*

See also: *American Ins. Ass'n v. Garamendi, 539 U.S. 396, 123 S. Ct. 2374, 156 L. Ed. 2d 376 (2003).*

See also: *Southern Pac. Co. v. Jensen, 244 U.S. 205, 37 S. Ct. 524, 61 L. Ed. 1086, 1996 A.M.C. 2076 (1917).*

See also: *Sawyer Environmental Recovery Facilities, Inc. v. Town of Hampden, 2000 ME 179, 760 A.2d 257 (Me. 2000).*

Case Note:

The Operator also contended that the City Ordinance: was void for vagueness; was inconsistent with the City's comprehensive plan; violated the Operator's equal protection rights; and violated the Commerce Clause of the United States Constitution. The court held that the Ordinance: was not void for vagueness; was not inconsistent with the City's comprehensive plan; and did not violate the Operator's equal protection rights. As to the Commerce Clause claim, the court held that fact issues precluded summary judgment on that claim. Specifically, the court could not determine whether the Ordinance discriminated against interstate commerce in violation of the Commerce Clause because it found genuine issues of material fact existed as to the "primary effect and primary purpose" of the Ordinance.

Zoning News from Around the Nation

CALIFORNIA

Recently introduced Senate Bill 827 would exempt housing projects within a 1/2 mile radius of a major transit stop or a 1/4 mile radius of a high-quality transit corridor from various municipal zoning requirements, "including maximum controls on residential density or floor area ratio, minimum automobile parking requirements, design standards that restrict the applicant's ability to construct the maximum number of units consistent with any applicable building code, and maximum height limitations, as provided."

Source: *California Legislative Information; https://leginfo.legislature.ca.gov*

MASSACHUSETTS

With a goal of closing the gap between housing supply and housing demand, Governor Baker has proposed a bill that would allow municipal zoning ordinances that would "foster the creation of housing" to pass with a simple majority vote rather than the currently required two-thirds supermajority vote.

Source: *South Coast Today; www.southcoasttoday.com*

VIRGINIA

Pending in the State Legislature, House Bill 1258 and Senate Bill 405 would require municipalities to automatically approve cell phone towers that meet certain parameters. Reportedly, the bills would require automatic approval of cell phone towers under 50 feet tall, and of communications equipment within 500 feet of an existing utility pole. The bills would also prohibit localities from requiring cell phone companies to collocate their equipment on existing towers.

Source: *Martinsville Bulletin*; *www.martinsvillebulletin.com*

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ZONING PRACTICE FEBRUARY 2018

AMERICAN PLANNING ASSOCIATION

ISSUE NUMBER 2

PRACTICE ADAPTIVE REUSE



Repurposing Single-Family Homes and Neighborhoods

By Jeffrey Beiswenger, AICP, and Zachary Tusinger

A wave of change is coming to single-family neighborhoods. Is your community ready?

This edition of *Zoning Practice* will outline strategies for addressing the changes that are likely to come to single-family neighborhoods nationwide, including the demographic changes that will drive housing booms in some communities and widespread vacancies in others, code enforcement tools for addressing vacant properties, strategies for reusing vacant parcels where demand for single-family homes has declined, and accommodating housing in those neighborhoods that are in demand.

THE PAST AND FUTURE OF AMERICAN SUBURBS

Dramatic demographic changes are unfolding in the United States. This will continue to have a significant impact on the nation's existing and future housing supply. According to professor and demographer Arthur C. Nelson, FAICP, nearly half of all buildings that will be standing in 2030 do not exist today (Nelson 2013). The economic fortunes of cities will shape (and be shaped by) both the form and location of these new buildings. Employment opportunities are also changing—rapidly. From a peak in 1979, more than seven million manufacturing jobs have been lost, according to the Bureau of Labor Statistics, while 53 million jobs were gained in other sectors—including 33 million service-sector jobs (Worstall 2016). In the coming decades, the rise of widespread automation is expected to bring economic upheaval. Will jobs lost to automation be replaced? And where will these jobs be located?

Given this backdrop of seismic economic shifts, home-buying preferences are changing as well. Millennials are more likely to live with their parents, yet are also required to be more mobile than previous generations, given rapidly changing employment prospects. Millennials are also more burdened by debt than previous generations, and are delaying their first forays into the housing market (Lerner 2017). The combination of these macroeconomic and social factors will serve to create a housing-supply mismatch in the single-family home market that may result in a surplus of single-family homes by 2030 and beyond.

The historical context for these changes is vital to our understanding of how communities are likely to evolve into the near future. In the postwar area, the demand for large neighborhoods of single-family homes was driven by the family formation that occurred from the silent generation (born from 1925 to 1945) as WWII ended and in the population boom that occurred afterward. Federal action in the form of large-scale highway building and the desire of this generation (and baby boomers) to own single-family homes in the suburbs fueled the expansion of suburban (and exurban) communities throughout the U.S.

According to a study by Arthur Nelson, the U.S. will have a surplus of approximately 28 million conventional (medium- to large-lot) single-family homes by 2030. This is primarily due to changing preferences for more small-lot and attached housing units (Nelson 2013). According to Nelson, the 2030 demand will wane for conventional, large-lot homes with a demand for only 32.6 million new units. In 2011, the supply of units was already more than 60.5 million—creating a supply-demand mismatch. Meanwhile, developers may need to catch up on the construction of attached and small-lot units. Additionally, multigenerational and multihousehold occupancies of single-family homes are becoming increasingly common. Few alternatives exist for those who cannot afford, or do not want, a large single-family home in the suburbs. The repurposing of single-family homes into multifamily dwellings, care homes, mixed use buildings, offices, and other uses is more common than ever, both with and without the appropriate zoning in place.

Beyond Infill: Changing Neighborhoods and Density

As the housing market continues to heat up following the Great Recession, cities are facing new challenges. Increased housing costs, a shortage of available homes in high-demand areas, and entire generations dealing with the effects of lost income and savings are leading to new pressures on the single-family neighborhoods that once formed the backbone of the American Dream. A half-century slide in the number of people living under one roof has ended and is beginning to reverse, with average household sizes inching up in many states. Increased densities challenge the placid character of suburban single-family neighborhoods. Since federal and state laws limit how much cities can regulate the number of individuals living under one roof, the solution must be multipronged.

Not only do challenges exist in rapidly depopulating communities, but also in hot coastal regions facing housing shortages. In the near term, many cities, particularly in the coastal regions, are dealing with high demand for housing of all types, including single-family homes. Consequently, costs are through the roof, and the rate of creation of new housing units in many markets is frustratingly slow.

Missing Middle Housing

Part of the pressure on existing neighborhoods stems from the fact that in the U.S., housing is largely constructed in two forms: large, suburban style single-family homes, and large, mid-rise apartment complexes. This gap in housing types is what is often called the "missing middle:" duplexes, fourplexes, small multiplexes, live-work units, and bungalows. Missing middle housing, if properly designed, can bridge the gap between dense mid-rise residential neighborhoods and lower-density, auto-oriented neighborhoods. Missing middle housing has a small footprint and medium density (but is perceived as lower), and can be walkable. This type of housing preserves many of the community and neighborhood aspects of single-family homes, but allows for the added densities that are needed to reduce sprawl and retrofit American neighborhoods.

Vancouver, British Columbia, which is currently dealing with explosive housing

costs, recently released a 10-year housing strategy that has the potential to radically transform a city that is predominately made up of single-family houses, even though it is perhaps better known for its high rises. The strategy relies to a large degree on the creation of more missing middle housing. Of the 72,000 homes the city hopes will be created over the next decade, 4,000 are intended to be "laneway homes," or accessory dwelling units. Another 10,000 of those are anticipated to be ground-level town houses, row houses, and other forms of medium-density infill grafted strategically into the city's existing single-family neighborhoods (City of Vancouver 2017)

DEALING WITH VACANT HOMES

Due to shifting demographics and changing economic conditions, certain neighborhoods could see widespread vacancies of surplus single-family homes. Fortunately, tools are available for addressing these vacancies. During the foreclosure crisis of the late 2000s, effective tools were developed as entire neighborhoods were emptying. In the case of widespread foreclosures, the vacancies were often temporary. In the future, vacancies may be more permanent as demand for single-family homes dissipates in certain areas. The following tools can help keep vacant homes from falling into disrepair, or help find alternative uses for them.



Ed Kohler, Flickr (CC by 2.0)

VPOs are one tool that municipalities can use to minimize the impacts of vacant and abandoned homes.

Code Enforcement Tools—VPOs and Receivership

An effective tool to address vacant homes in your community is the vacant property ordinance (VPO). The tool can be easily incorporated into your municipal code, but also requires some enforcement capacity. Fees can be established to help offset some of the enforcements costs.

During the foreclosure crisis of the late 2000s, the VPO was developed and utilized by towns and cities nationwide to address the abandonment of homes and prevalence of bank-owned homes. Many communities adopted VPOs and code enforcement protocols to help minimize the impact of vacant properties. Doug Leeper, the code enforcement division manager in Chula Vista, California, shepherded a vacant property registry and fee program through the approval process in 2007 (§15.60). Leeper estimated that there were more than 9,000 foreclosed homes in Chula Vista during the housing crisis; the vacant property program registered more than 2,600 homes by 2007.

By 2009, more than 400 communities had adopted similar ordinances. Central to the ordinance is a requirement that vacant properties are registered by the city or in a national database accessible by the city. A small annual registration fee is required and properties are required to be maintained. Security must also be provided, with a contact number prominently displayed. If the worst-case scenario materializes in your community, and single-family homes become vacant faster than they can be absorbed by the market, a VPO is a good stop-gap measure.

A more aggressive approach is through a vacant building receivership ordinance. Referred to as "fix it or lose it" by the city of Baltimore, it provides a building official with the authority to petition the court for the appointment of a receiver to help raze, rehabilitate, or sell a vacant building. The city also has a "Vacant to Value" program that allows for property under city ownership to be transferred to a developer for improvements and eventual sale. Receivership has the potential to quickly address and remedy nuisance properties (City of Baltimore).

A key benefit to a more aggressive approach is that it prevents property speculators from sitting on dilapidated properties over an extended period. It also allows for the receiver to pass property to an organization or developer quickly, to put the property back to productive use. The ordinance also provides a mechanism whereby the jurisdiction can collect liens and penalties from delinquent property owners (Jacobsen 2015).

The Agrihood

The local food movement is alive and well in the U.S. In Detroit, a collection of forward-thinking advocates from the city's urban agricultural community have turned vacant single-family homes and lots into community resources for urban agriculture. Detroit's hard-hit north side has created a neighborhood where agriculture is the centerpiece of a mixed use urban community. A formerly dense urban neighborhood now has a successful working farm at the center.

In 2004, Detroit had only 100 urban farms. By 2013 urban agriculture was recognized as a legal use in the city's zoning ordinance. This reduced uncertainty and allowed existing urban farms to remain in place and expand. In 2016, there were approximately 1,400 urban farms in Detroit.

The Detroit ordinance establishes legal definitions for many urban agriculture uses, including aquaculture, aquaponics, farm stands, farmers markets, greenhouses, rainwater catchment systems, hoop houses, orchards, tree farms, urban farms, and urban gardens. The ordinance operates as an overlay to the city's existing zoning ordinance. The code includes standards for setbacks, lighting, maintenance, drainage, nuisance issues, noise, and hours of operation. Importantly, the ordinance grants legal nonconforming use status to all agricultural operations that predate the ordinance.

Portland, Oregon, has incorporated urban agriculture into the zoning ordinance with the express intent of connecting local food production to the community at a

neighborhood level. The zoning updates include clear definitions of several land-use types, including:

- market gardens (or orchards) where food is grown to be sold
- community gardens, where several individuals collaborate to grow food
- food membership distribution sites, farmers markets

The focus of amendments to the Portland zoning code was to legalize these activities in all zoning districts, while adding performance standards to address possible impacts.

Urban agriculture can be applied to suburban areas, as well. Sacramento County, a mixed urban/suburban county in California, adopted a new urban farm ordinance in 2017. The ordinance permits market gardens, small farms on vacant property, and urban ag stands to sell produce, eggs, honey, and other goods on the site of an urban farm or garden. The ordinance also allows egg-laying hens and ducks on parcels as small as 10,000 square feet, and permits beehives.

Urban agricultural concepts can breathe new life into urban and suburban neighborhoods. These concepts have applicability all over the U.S. as changing demographics and socioeconomic conditions reduce the demand for inner city and large suburban lots. (For more information, see "Urban Agriculture as an Emergent Land Use," *Zoning Practice*, August 2014: planning.org/media/document/9006887.)



Jason Meredith, Wikimedia, (CC by 2.0)

Some municipalities explicitly encourage larger, more expensive homes with minimum dwelling unit requirements.

GENTLE INFILL

Thus far, we have focused on strategies for unwanted homes and lots in single-family neighborhoods, and how to use code enforcement and site acquisition tools to help address impacts, encourage reuse of structures, or provide alternative uses for the structure or land. What about areas where new housing supply is needed, but the existing homogenous single-family neighborhood is not meeting the market or social demand for new housing, particularly workforce housing? One concept that is gaining traction is "gentle infill," where infill development is compatible with its surroundings to achieve urban design goals and produce more housing.

Zoning codes are typically full of provisions that prohibit housing through scale and density constraints. Some jurisdictions even have minimum dwelling unit sizes with the express intent of encouraging larger, more expensive homes. Market solutions, in the form of smaller units, can be facilitated with zoning changes and respond to demand for missing middle housing.

In 2009, the town of Mammoth Lakes, California, recognized that infill could be a way to bring more development and vitality to town, particularly with respect to workforce housing. It adopted a Community Benefit/Incentive Zoning Policy (CB/IZ). The idea behind the CB/IZ was to provide development incentives (zoning flexibility, impact fee reductions, etc.) in exchange for community benefits such as workforce housing.

A draft *Downtown Revitalization Action Plan* was presented to the town council in September 2017. This plan includes an "incremental development overlay ordinance" and includes concepts such as:

- expedited planning and permit processing
- allowing shared parking, off-site parking, and other creative parking solutions
- code flexibility for smaller projects, particularly with regard to existing nonconformities
- preapproved building prototypes (e.g., mixed uses, housing types, etc.) to shorten the review process

Microunits that can be built off-site and brought in on wheels can also play a role in a gentle-infill strategy, particularly as temporary or permanent workforce housing. Microunits can be used as accessory dwelling units, part of multiunit clusters, or as freestanding "skinny" homes on small leftover parcels. Consultant Darin Dinsmore helped Truckee, California, implement this incremental infill process to transform an auto-oriented corridor into a mixed use community by allowing opportunity sites to develop with street-fronting uses such as offices, retail buildings, mixed use buildings, and town houses. In addition to zoning flexibility, a key component of this approach is cost containment—allowing fee reductions or waivers to allow these projects to be built with less cost.

Dinsmore and others argue for permit streamlining, permit fee reductions, parking reductions, and other "breaks" to incentivize infill development. Riverside, California,

has embraced this approach by creating a Residential Infill Incentive Program. It targets underutilized parcels in suburban and rural residential zones that are 21,780 square feet or larger. Properties that qualify are eligible for fee reductions to make additional residential development less expensive in areas where existing infrastructure is in place (City of Riverside).

Davis, California, has taken a much different approach to help facilitate infill development. Instead of providing financial or processing incentives, the city prepared a helpful guide to infill development, including principles and expectations. This document is still in draft form, but is publicly available (see References). This guide recognizes the complexity of infill development and seeks to help developers navigate the process to ensure that high-quality infill is ultimately built (City of Davis).

Accessory Dwelling Units

For years, accessory dwelling units (ADUs) have been a cost-effective way to increase the housing supply. These smaller housing units, either within the existing footprint of a home or in a small accessory structure, were traditionally created with the purpose of housing extended family members nearby. They are generally a good way to increase the density in low-density neighborhoods, while at the same time providing supplementary income for home owners. While some cities have embraced accessory dwelling units, others have put up roadblocks and tried to ban them all together.

Recognizing their potential to limit sprawl and provide additional affordable housing, many states and jurisdictions have taken steps to ease the path for home owners to build accessory dwelling units. At the end of 2016, California enacted a sweeping law streamlining the process whereby cities should approve them, as well as reducing the fees associated with them.

Given the high cost of housing in California, the number of applications for ADUs has exploded in many jurisdictions, including Santa Barbara. ADUs may become one of the key fixtures for a "post-suburban city" where the modern household is not just the traditional nuclear family, but full of many generations, multiple unrelated adults living together, college students moving back home for longer periods of time, and home owners looking for additional cash flow to keep up with housing and living costs (Loudenback 2017).

Cities outside of California are making significant progress, as well. Arlington, Virginia, recently rewrote its regulations to allow for an easier process for home owners to construct and license ADUs after only 20 eligible home owners successfully obtained licenses over an eight-year period (Sullivan 2017). Perhaps no city has seen as much success in promoting or building ADUs as Portland, Oregon. In 2016, the number of ADUs approved (615) was tantalizingly close to the number of single-family homes approved (867) (Law 2017).

This is in stark contrast to just a decade ago, when Portland approved 30 times more single-family home permits than permits for ADUs. As the number of lots available for single-family homes decreases, and as demand for housing remains strong, the economics of maximizing the buildout of a single-family lot by adding an ADU become more profound. With administrative and fee changes that the city has made for processing ADU permits, it becomes even cheaper than it otherwise might have been. Portland exempted ADUs from impact fees for roads, parks, and utilities in 2010 and has since renewed that exemption twice. Even with the recent boom, there is considerable development potential remaining throughout the city as well. Portland State University recently calculated that there are approximately 70,000 single-family lots in the city that could add an ADU. (Law 2017)

Additions and Garage Conversions

One of the biggest limiting factors to how many people can live in a single-family home is the number of bedrooms it is permitted to have. Adding additional bedrooms has traditionally been relatively easy. In some cases, it's a matter of adding a wall or subdividing a room. In other cases, the additional bedroom(s) can take the form of an addition to the home. In still other circumstances, there may be underused or uninhabitable space that can be claimed, like a garage, attic, or basement. In the past, this has been a straightforward process: As long as you obeyed setbacks and floor area ratio requirements, all you needed was a building permit.

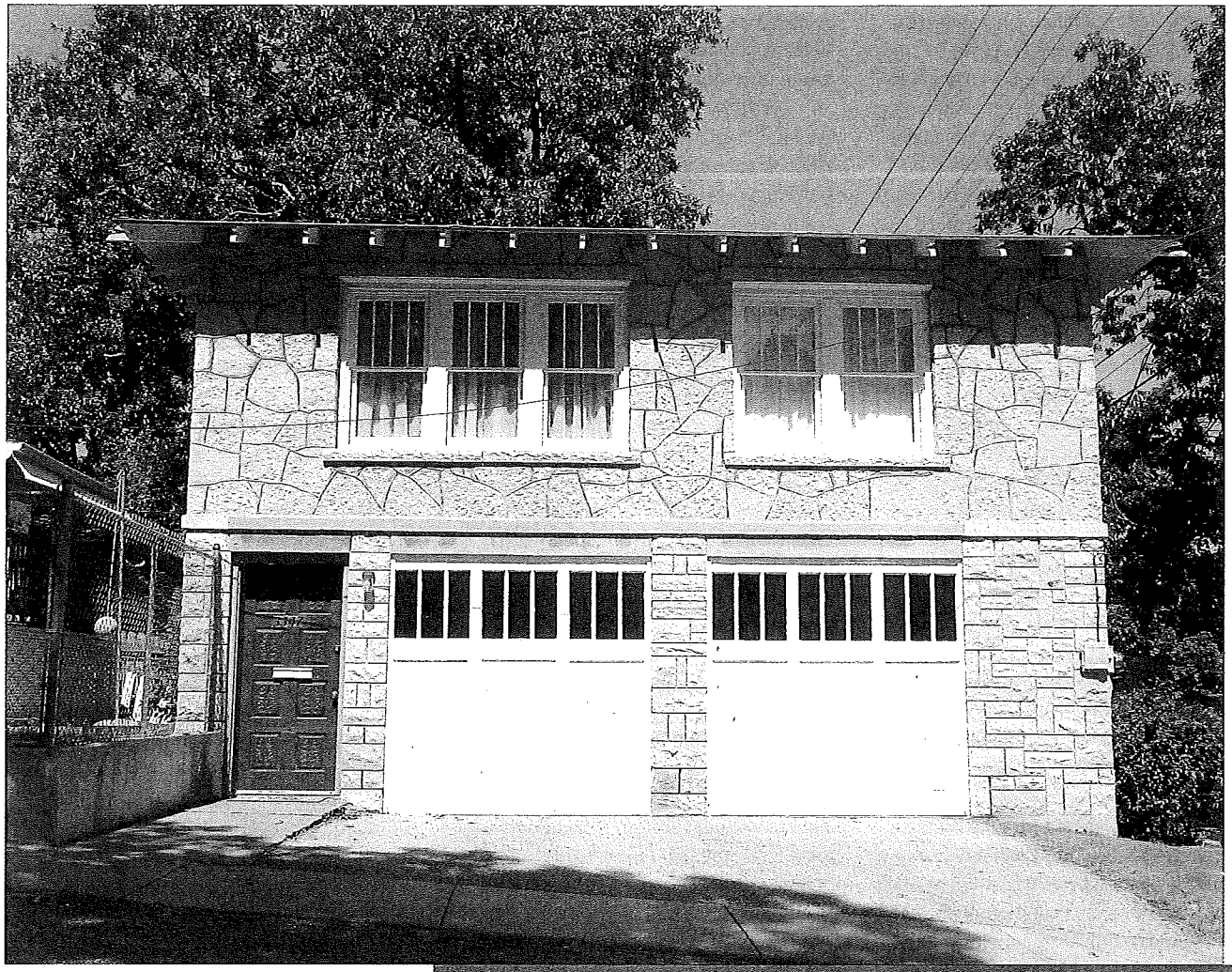
Some cities concerned about overcrowding and its effect on on-street parking in neighborhoods have instituted limits and greater oversight. Berkeley, California, has instituted new restrictions on additional bedrooms that would require reviews and permits before increasing the number of bedrooms on a residential parcel beyond four. Davis, California, similarly requires additional off-street parking for homes with five or more bedrooms. It is probably no coincidence that both cities are college towns with burgeoning student populations. San Luis Obispo, another California college town, regulates high-occupancy residential uses where there are more than six adults living together in one housing unit. This includes greater oversight and higher off-street parking standards.

Another method for increasing the living space in a home is to convert all or part of a garage, either into additional rooms for the main unit or as part of an ADU. The new California state laws for streamlining ADU approval contemplate existing garages as one option for home owners. Finishing garages (or in some parts of the country attics or basements) may often be a more affordable option for adding living space than an expensive addition or freestanding ADU. As driving habits and car ownership levels change, and as (some) cities relax off-street parking requirements, garage conversions may increasingly be part of the reimagining of single-family neighborhoods.

Short-Term Rentals

A pressure on single-family neighborhoods is the rise of the sharing economy and short-term rentals. In popular tourist areas, a well-run Airbnb can generate more money for a home owner than might otherwise be generated through a long-term residential lease. Some recent data has shown that spikes in Airbnb listings can be linked to increases in the monthly cost of rent. This encourages property owners to withdraw their properties from the housing market and rent them out as short-term rentals.

The impact of short-term rentals is more profound than just shrinking the home supply and increasing the cost of rent. Airbnbs and other short-term rentals have the potential to drastically change the character of existing single-family neighborhoods. Imagine—suddenly the



Abe Ezekowitz/Wikimedia (CC SA-3.0)

Converting garages into accessory dwelling units is a popular and effective way to adapt to increased demand in single-family neighborhoods.

home next door has a different someone living there two, three, or four nights a week. Different cars come and go. There's the constant shuffle of luggage and people in and out of the home. People unfamiliar with the neighborhood or sound ordinances host parties. Now imagine that the neighborhood has multiple short-term rentals (maybe it's a popular vacation area and has a view). Now it's not just one house on the block that has become transient in nature, but three. Suddenly the neighborhood begins to lose its cohesion.

Unlike ADUs, short-term rentals have only recently been a regulatory concern. Some cities have prohibited them completely, with Healdsburg, California, a popular wine country destination concerned about the cost of housing and proliferation of vacation homes, being a prime example. Cities like Sonoma, California, have limited how many short-term rental permits can be issued, while others, like New York City, have significantly increased their regulation and oversight.

Regulations for short-term rentals can be tailored to fit the unique needs of the community. So far, there is no one set of best practices. Rohnert Park, California, wanted to maintain the character of its suburban-style residential neighborhoods that were beginning to experience pressure from the proliferation of nearby wine country short-term rentals. The city crafted an ordinance in 2017 that banned whole-house rentals, yet still allowed single-room rentals subject to certain conditions. The city felt this compromise still allowed residents to supplement their incomes through short-term rentals, but helped to maintain the housing supply and preserve neighborhood character.

Multigenerational Housing

The American Planning Association estimates that by 2040, more than 20 percent of the population will be over the age of 65 and over 28 percent of the population will be under the age of 18. Combined, this is nearly half of the total population (Hodgson 2011). It is expected that more and more of these persons will live in multigenerational households. Younger adults are also living at home for longer periods than in the past.

Zoning codes need to be adjusted to accommodate multigenerational households. In 2013, AARP calculated that 51 million American live in multigenerational homes (Abrahms 2013). This is 16.7 percent of the U.S. population. Some builders have begun to recognize this, and are building

dwelling unit typologies that can accommodate more than one household. Others offer two master suites, or dens that can be converted into a bedroom. By making sure that a bedroom and a bathroom are on the first floor, these developments appeal to multigenerational households with elderly parents who may not want or be able to climb the stairs. In response to demographic changes and the related housing demand, a developer in Huntington Beach, California, scrapped plans for a 23-acre, single-family neighborhood and instead designed a multigenerational neighborhood with a mix of small homes, town houses, and carriage houses with dwelling units designed to accommodate home-based businesses. The neighborhood was intentionally designed to allow for young families, downsizing baby boomers, their aging parents, and their boomerang adult children to all live together nearby.

CONCLUSION

Where do single-family neighborhoods go from here? Riding the waves of change, both demographic and economic, will be key for the survival and evolution of these neighborhoods over the coming decades. In areas where population and financial trajectories might otherwise point toward disinvestment, the full toolbox should be available to practitioners to guide the next stage of development: code enforcement, receivership, and urban agriculture are all possibilities. At the other end of the spectrum, where there is pressure for greater densities, municipalities should be prepared to see increasing numbers of short-term rentals, home additions, and accessory dwelling units. In some cases, practitioners should be prepared to guide single-family neighborhoods toward more complete transformations—walkable neighborhoods with a mix of single-family and multifamily development. Regardless, today's single-family neighborhoods will look very different in the coming years.

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VOL. 35, NO. 2

Zoning Practice (ISSN 1548–0135) is a monthly publication of the American Planning Association. James M. Drinan, JD, Chief Executive Officer; David Rouse, FAICP, Managing Director of Research and Advisory Services; Joseph DeAngelis and David Morley, AICP, Editors.

Subscriptions are available for $95 (U.S.) and $120 (foreign). Missing and damaged print issues: Contact APA Customer Service (312-431-9100 or subscriptions@planning.org) within 90 days of the publication date.

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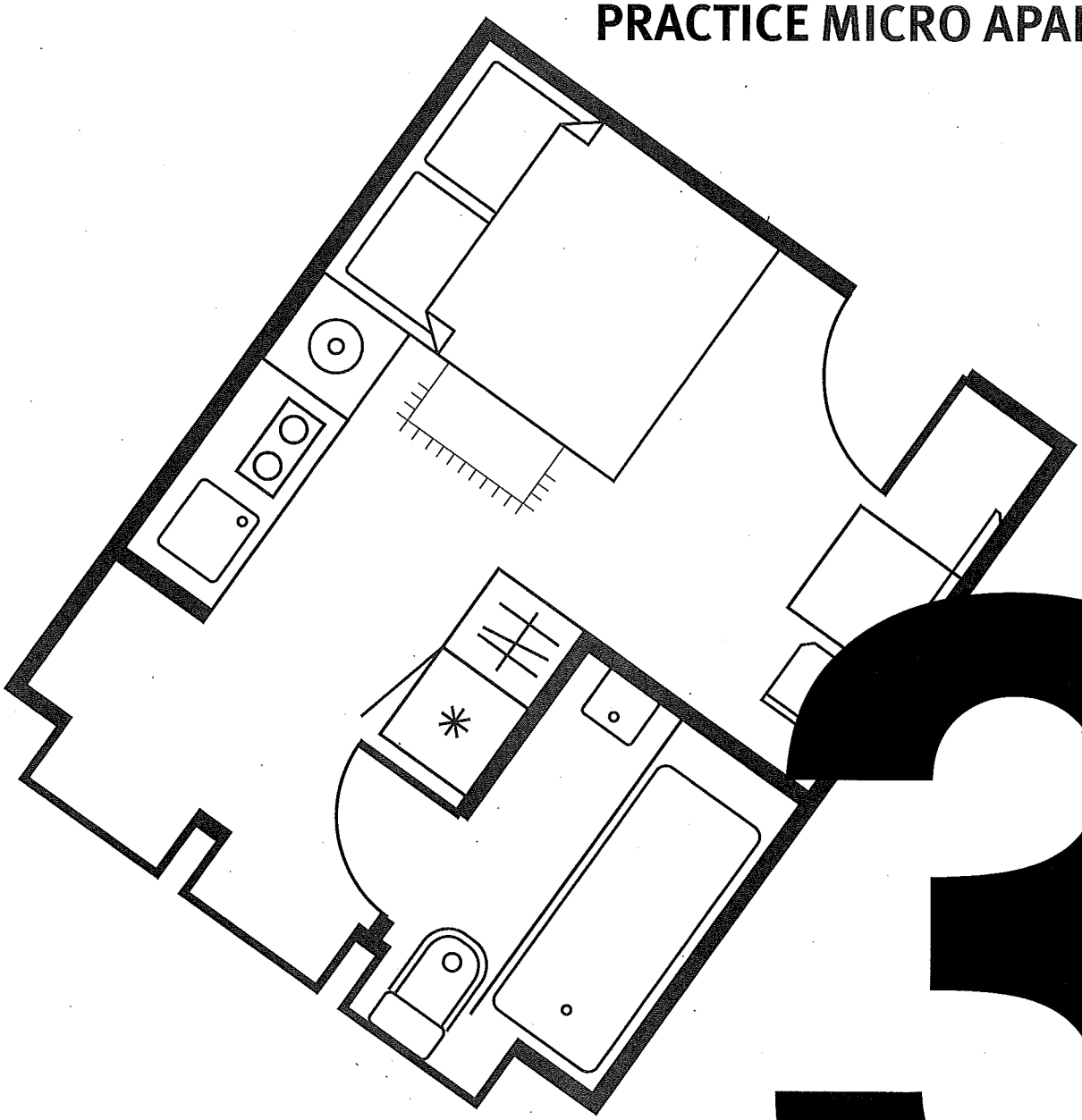
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ZONING PRACTICE MARCH 2018

AMERICAN PLANNING ASSOCIATION

ISSUE NUMBER 3

PRACTICE MICRO APARTMENTS



3

Zoning for Micro Apartments

By David Morley, AICP

There are few symbols of consumption as conspicuous as a giant new home. But "living large" isn't for everyone. Over the past several years, interest in small living spaces has inspired widespread media coverage of tiny houses (see the November 2015 edition of *Zoning Practice*) and micro apartments.

While there is no authoritative definition of micro apartment, most commentators reserve this label for new multifamily residences with less than 400 square feet of living space. Typically, these are efficiency dwelling units (also known as "studio" apartments) with a single combined living, dining, and sleeping room. Even though 400 square feet is smaller than most two-car garages, this is considered spacious in some markets. Consequently, the more relevant concept is size relative to market norms. The term "micro apartment" is probably saved for efficiency units that are at least 20 percent smaller than the average size in the area (i.e., a specific neighborhood, district, or city).

Few communities address micro apartments (or an analogous term) explicitly in their zoning codes. However, many zoning codes make it physically impossible or financially infeasible to build very small efficiency dwelling units. The purposes of this article are to highlight why rising demand for micro apartments may merit zoning changes, and to summarize how a small number of cities have amended their codes to add definitions, use permissions, and additional standards to sanction smaller dwelling units than would otherwise be permissible.

THE MARKET FOR MICRO APARTMENTS

The primary forces driving demand for very small apartments in cities are demographic changes and real estate market dynamics. The maturation of millennials (those born between about 1982 and 2004) and the retirement of the baby boomers (born between 1946 and 1964) has changed demand for housing in many urban neighborhoods. These large generations are driving population growth in many cities, and so far, housing markets have been slow to respond to pent-up demand.

Demographic Change

In 1957—at the height of the postwar baby boom—the average household size in the U.S. was 3.33 persons. By 2017, this number had fallen to 2.54 persons (U.S. Census Bureau 2017a). The reasons are clear: An increasing percentage of women are choosing to delay or forgo marriage and childbirth in favor of educational attainment and career advancement.

However, smaller families haven't typically led to smaller homes. In fact, the average size of a newly constructed single-family home in the U.S. increased from 1,660 square feet in 1973 to a peak of 2,687 square feet in 2015, a more than 60 percent gain (U.S. Census Bureau 2017b). This doesn't tell the whole story, though.

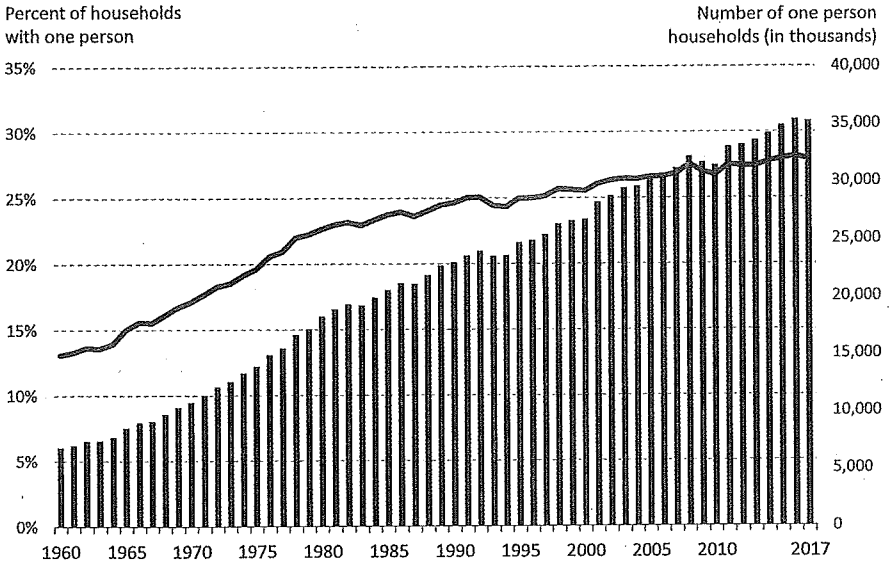
Between 1960 and 2017, the percentage of single-person households increased from 13 to 28 percent (U.S. Census Bureau 2017a). The trend is more dramatic in large cities. According to the most recent estimates, people living alone account for 33 percent of all households in the 25 most populous cities (U.S. Census Bureau 2017c). Generally, these individuals are not the target market for new detached single-family residences. In these cities, 57 percent of single-person householders are renters, and this figure jumps to 87 percent for householders under the age of 35.

Market Dynamics

As the percentage of single-person households increases, we need significantly more dwelling units to house the same number of people. In cities with growing populations, this means more multifamily residences. For built-out cities, the math only works if you can fit more units in the same building footprint. And that's exactly what's happening.

Across the country, the average unit size for large multifamily developments is dropping, and efficiency apartments have shrunk the most (Otet 2016). In 2006, the average size of an efficiency apartment in a building or complex with more than 50 units was 614 square feet. By 2016, this had fallen to 504 square feet, an 18 percent decrease.

According to an Urban Land Institute survey of current micro-apartment residents, 82



Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements, 1960 to 2017.

Living alone used to be relatively uncommon in the U.S.



Joe Mabel, Wikimedia (CC BY-SA 3.0)

This micro-apartment building in Seattle's Capitol Hill neighborhood has 60 units with private bathrooms and kitchenettes.

percent did not start out looking for a micro apartment (Carey et al. 2015). Rather, they chose their residences as a trade-off for lower rents; proximity to work or school, neighborhood amenities, and transit; the ability to live alone; internet service; and unit finishes.

The target market for micro apartments are single men and women under the age of 34, currently living with roommates, and earning less than $40,000 per year (Carey et al. 2015). Market research indicates that most of these individuals rent micro apartments when they are new to a career or city, and that they graduate to larger units after a year or two. These units seem especially attractive to entry-level technology and new media industry workers (Carey et al. 2015).

Micro apartments versus single-room occupancy units

While there are no formal distinctions among different types of very small multifamily residences, real estate professionals routinely draw distinctions between single-room occupancy (SRO) units geared toward very-low-income residents, and micro apartments aimed at young professionals. SRO units typically rent by the day, week, or month, and do not have kitchens. Meanwhile, contemporary micro apartments generally lease by the year (or school semester) and have in-unit kitchens or kitchenettes (i.e., refrigerator, microwave, and sink). However, in some cases the built form and internal space configuration can be very similar for both.

Individual micro-apartment projects can vary considerably in terms of unit features and communal amenities. Some projects incorporate a range of design solutions to make units seem larger, including built-in furniture and storage areas, high ceilings, large windows, and movable walls and kitchen islands. Others place the emphasis on communal facilities, such as shared kitchens, dining areas, and gathering spaces. At the top of the market, some buildings offer both.

New SRO projects haven't gained as much media attention as market-rate micro-apartment projects; however, in some cities, public housing authorities and nonprofit developers have shown renewed interest in SROs as "housing-first" for individuals experiencing homelessness. Contemporary SROs may provide in-unit kitchenettes, and often incorporate communal spaces for cooking, eating, or socializing. In these cases, the key physical distinction between micro apartments and SRO units are the quality of the finishes.

PLANNING FOR MICRO APARTMENTS

The reasons for supporting micro-apartment projects go beyond satisfying existing market demand. However, careful planning is necessary to assess the likely effects of regulatory changes and to address community concerns.

The Benefits of Micro Apartments

All other factors equal, per-unit housing costs decrease as unit size decreases and project density increases. Consequently, micro-apartment projects can increase housing choice and affordability in tight housing markets. Beyond the benefits to individual residents, micro apartments in pedestrian- and transit-friendly locations make more efficient use of existing infrastructure and public services, consume less energy, and have a lower carbon footprint than larger residences.

Micro apartments can also be part of a local economic development strategy to attract and retain young professionals. Expanding opportunities for people to live near downtown jobs and amenities can be attractive to current and prospective employers who need access to an educated workforce.

Assessing Market Conditions

Not every housing market is ripe for micro-apartment development. Furthermore, what qualifies as a micro apartment in one market may seem roomy in another. Before considering regulatory changes to facilitate micro-apartment development, it makes sense to assess the local housing market, to determine the likely effects of permitting dramatically higher density residential development on housing costs in the community, and to gauge how much smaller apartments would need to be to make a micro-apartment project "pencil out" for developers.

For communities with low housing demand, regulatory changes will likely have little to no effect on development outcomes or housing costs. On the other hand, making micro apartments legal in communities with very high housing demand relative to existing development opportunities may have the unintended consequence of raising housing costs across the board as property owners and developers see the potential of higher rents per square foot.

This same relationship between housing demand and existing development opportunities will also partly determine the



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The luxury Channel apartment building in Washington, D.C., includes more than 150 micro apartments with sizes ranging from 337 to 358 square feet.

size threshold for micro-apartment development. However, there are other important factors to consider, such as the difference in development costs between wood-frame and concrete- or steel-framed buildings. Many local building codes only permit wood-frame construction for buildings up to 75 feet tall. Taller buildings also typically require additional fire safety features. To finance the leap to concrete- or steel-framed construction, developers may need to squeeze more units per floor.

Addressing Community Concerns

Sometimes existing residents will express concerns about any new project or policy proposal that will increase residential density. The most common concerns are related to traffic, parking, and community character.

Because micro apartments are most attractive to young professionals with lower-than-average rates of car ownership, conventional traffic and parking concerns may be unfounded. However, the popularity of on-demand ride services among young professionals can lead to traffic problems associated with curbside pickups and drop-offs. Here, and in areas where the existing infrastructure is over capacity, it is important to evaluate site design, infrastructure improvement, and transportation demand-management alternatives before encouraging or allowing micro-apartment projects.

Often the most productive strategy for addressing fears about community character is to keep discussions focused on the objective physical characteristics of projects, rather than the demographic characteristics of potential residents. This can help planners and local officials identify site and exterior building design priorities to mitigate aesthetic impacts.

If micro apartments are dramatically smaller than existing multifamily units, some community members may also worry about how they may affect potential occupants. While there is research supporting the idea that overcrowding negatively affects psychological well-being, these studies, generally, focus either on public housing residents or housing-instable families sharing tight quarters. If this research bears any relevance for contemporary micro-apartment projects, it is likely limited to highlighting the importance of ensuring access to adequate natural light and guarding against overoccupancy of individual units.

REGULATORY BARRIERS TO MICRO APARTMENTS

Fundamentally, state and local building codes determine the absolute lower limit on dwelling unit size through minimum habitable space standards. Most state and local building codes in the U.S. are rooted in the International Code Council's International Building Code (IBC). The most recent version of the IBC stipulates that efficiency dwelling units in new multifamily buildings must contain a living room with at least 220 square feet of floor area (which does not include space devoted to closets or bathrooms) (§1208.4). Very few state and local building codes permit dwelling units smaller than this.

One notable exception is California's Health and Safety Code, which explicitly authorizes cities and counties to adopt ordinances permitting efficiency dwelling units as small as 150 square feet (§17958.1). Additionally, the International Property Maintenance Code (IPMC) requires existing single-occupancy efficiency units to have only 120 square feet of clear floor area of habitable space (§404.6). At least one locality, Grand Rapids, Michigan, uses this standard to set an absolute minimum size for new micro apartments (§5.6.08.B.3.f).

Beyond a building code's habitable space requirements, many local zoning codes include provisions that establish an explicit minimum floor area for dwelling units of different types. The minimum dwelling unit size is virtually always more restrictive



Rhododendrites, Wikimedia (CC BY-SA 4.0)

Westminster Arcade in Providence, Rhode Island, is the oldest indoor shopping center in the U.S. In 2013, developers converted the top two floors to 48 residences, most of which are sized between 225 and 450 square feet.

SELECT DEMOGRAPHICS OF CITIES WITH ZONING STANDARDS FOR MICRO APARTMENTS

City	State	2016 Est. Population	2010 Population	2010 Density (pop. / square mile)	2016 Percentage of Single-Person Households	2016 Percentage of Crowded Housing Units[1]	2016 Percentage of Highly Rent-Burdened Households[2]
Grand Rapids	MI	196,445	188,040	4,236	30.3	1.1	47.3
Hartford	CT	123,243	124,775	7,179	38.8	3.7	41.4
Miami	FL	453,579	399,457	11,136	38.1	3.0	54.6
Oakland	CA	420,005	390,724	7,004	32.4	4.7	42.1
Seattle	WA	704,352	608,660	7,251	38.6	2.0	34.5
Springfield	MO	167,319	159,498	1,952	37.6	1.0	39.5
West Palm Beach	FL	108,161	99,919	1,807	39.0	2.5	49.3

1. Housing units with an average of at least 1.51 occupants per room.
2. Households paying 35 percent or more of income for gross rent.

EXAMPLES OF USE DEFINITIONS FOR MICRO APARTMENTS

City	State	Use Definition
Grand Rapids	MI	*Micro-Unit*: A dwelling unit, included as part of a multiunit development and located in a Mixed-Use Commercial zone district, with a total gross floor area of no more than 475 square feet.
Hartford	CT	*Efficiency/Micro-Unit*: A dwelling unit with at least 300 square feet and no more than 500 square feet of usable floor area, and only one combined living and sleeping room. The unit may also have separate rooms containing only kitchen facilities or bathroom facilities.
Miami	FL	*Micro Dwelling Unit*: A small Multifamily Residential Dwelling Unit type that shall include sanitary facilities and kitchen facilities.
Oakland	CA	*Micro Living Quarters*: [O]ne or more rooms located in a multiple-tenant building having an average net floor area of 175 square feet, but a minimum size of 150 square feet of net floor area, and occupied by a permanent residential activity. Bathroom facilities, which include toilet and sink, as well as shower and/or bathtub, are required to be located within each individual Micro Living Quarter. Cooking facilities are not allowed to be located within each individual Micro Living Quarter, and shared kitchen facilities are required within close proximity on the same building floor.
Seattle	WA	*Small Efficiency Dwelling Unit*: [A] dwelling unit with an amount of square footage less than the minimum amounts specified for Efficiency Dwelling Units in the Seattle Building Code, and that meet the standards prescribed in §23.42.048.
Springfield	MO	*Micro-Efficiency Multifamily Dwelling Unit*: A dwelling unit with a total floor area of 400 square feet or less.
West Palm Beach	FL	*Micro-Unit*: [A] small residential unit with a total square footage between 300 square feet and 549 square feet, with a fully functioning kitchen and bathroom.

than what would otherwise be allowed by the local building code (otherwise, the standard would be pointless).

Additionally, many zoning codes require a minimum lot area per dwelling unit for each zoning district. These minimum lot area requirements combine with required setbacks and maximum heights to create a minimum dwelling unit size that may vary lot by lot but is, again, virtually always more restrictive than habitable space requirements in the local building code.

Other zoning standards present indirect barriers to micro-apartment development. Minimum off-street parking requirements increase per-unit development costs and set a practical limit on the amount of space developers can devote to dwelling units, as do minimum open space or common area requirements. And multifamily development standards that stipulate a maximum percentage of efficiency units or a minimum average unit size make micro-apartment-only buildings impossible.

ZONING STANDARDS FOR MICRO APARTMENTS

The author has identified seven cities in the U.S. that define and regulate a use analogous to micro apartments in their zoning codes (see table above). While these jurisdictions are all principal cities of metropolitan statistical areas, they are not similarly populous or dense. Based on the most recent American Community Survey estimates, all seven have a higher percentage of single-person households than the national average (28.1 percent). Five of the cities are growing at a rate faster than the national average (4.7 percent), have a higher percentage of crowded housing units than the national average (1.1 percent), or have a higher percentage of highly rent-burdened households than the national average (40.7 percent).

Use Definitions

Defining micro apartments as a distinct use can be helpful if the community wants to single out these units for special zoning treatment. However, if micro apartments are subject to the same use permissions and development standards as other multifamily dwelling units (or other efficiency units), there is no clear benefit to adding a new definition to the zoning code.

While numerous popular press articles have spotlighted existing or planned micro-apartment projects in New York; Chicago; San Francisco; Seattle; Denver; Boston; Washington, D.C.; Portland, Oregon; Providence, Rhode Island; and Chattanooga, Tennessee, only one currently defines micro apartments as a distinct land use. Seattle added a definition and use-specific standards for "small efficiency dwelling units" in 2014 after developers had already built several small-scale micro-apartment projects with shared kitchens (taking advantage of existing standards for congregate residences) in relatively low-density residential areas. In this case, the city moved to check an existing development trend. For other cities, the motivation seems to be to facilitate a type of development that was previously either explicitly prohibited or extremely impractical due to district-specific development standards.

None of these cities use the term "micro apartment" in their codes, and there is no clear consensus alternative analogous term (see table below). Four define analogous terms—in part—based on a maximum size, and four define them—in part—based on a minimum size. Five require in-unit kitchens, and one prohibits in-unit kitchens. Three define analogous terms—in part—based on their location within specific zoning districts.

Communities that want to define micro apartments as a distinct use should consider adding a simple modifier to an existing defined term in its zoning code (e.g., "dwelling unit, micro") and placing the new definition near the modified term in a section of generally applicable definitions or a section explaining use classification. This will help project applicants find the definition quickly. Clarify the distinguishing characteristics of the new use, but do not incorporate use permissions or use-specific standards into the definition.

Use Permissions

Defining micro apartments as a distinct use makes it easy for the community to single out these units for special treatment in tables or lists of use permissions by zoning district. For some cities, the goal may be to permit micro apartments in zoning districts that do not otherwise allow multifamily development. For others, the goal may be to limit micro apartments to a small number of transit- or pedestrian-oriented districts. There are three basic types of use permissions in zoning: by right (or as-of-right), ministerial, and discretionary.

Permitting micro apartments by right sends a clear signal to potential developers that these units are desirable in a certain zoning district. This approach presents applicants with the fewest hoops to jump through before obtaining zoning approval.

Requiring a ministerial approval for micro apartments communicates that the community is generally supportive of these units in a certain zoning district, but this support is conditional upon compliance with objective standards intended to minimize negative impacts on proximate uses. This approach gives planning staff an opportunity to review an application before the planning director or zoning administrator issues an "over-the-counter" permit. Often, communities use ministerial approval processes to confirm that a particular application conforms to use-specific standards (see additional standards discussion below).

Permitting micro apartments subject to a discretionary use permit (often referred to as a conditional, special, or special exception use permit) indicates that the community is potentially supportive of these units in a certain zoning district, provided the specific spatial and operational characteristics of the use do not pose compatibility problems. Discretionary approval processes typically involve one or more public hearings before the local legislative body, planning commission, or zoning board renders a final decision on an application. Because the longer approval time frame and a greater degree of uncertainty can discourage some applicants, discretionary use permissions work best for locations or circumstances where objective standards are likely to be insufficient to ensure compatibility.

Interestingly, only four of the seven cities noted that define a term analogous to micro apartments in their zoning codes include these terms in their enumerations of use permissions (see table below), although in one of the three remaining examples, the city's use definition specifies permissible zoning districts. Six cities permit micro apartments in at least one district by right or ministerial approval. The other requires all micro-apartment projects to apply for a discretionary use permit. However, if the project is sited on less than one acre and does not require an environmental impact report, the planning director can render a decision, and a public hearing is not mandatory.

Communities that want to include district-based use permissions for micro apartments in their zoning codes should consider permitting these units either by right or with a ministerial approval in all pedestrian-oriented districts that allow multifamily residences. While these projects have significantly higher unit densities than conventional multifamily buildings, the number of residents per acre does not, typically, increase proportionally. Furthermore, based on the demographics discussed above, micro-apartment households are less likely to own cars or enroll students in local schools.

Additional Standards for Micro Apartments

Many contemporary zoning codes limit use permissions with use-specific development or operational standards. By codifying objective additional standards for specific uses, the community can permit a wider range of uses without relying on discretionary use permits to ensure compatibility. In some cases, use-specific standards apply only in certain zoning districts, while in other cases the standards apply community-wide.

The most common use-specific standards in contemporary zoning are off-street parking requirements. Typically, communities require every land use to provide a minimum amount of off-street parking on-site. However, a growing number of communities stipulate the maximum amount of off-street parking for various uses (with or without also specifying a minimum).

All seven cities noted that define a use analogous to micro apartments in their zoning codes have adopted use-specific, off-street parking standards (see table on page 7). Four of the cities require a minimum amount of off-street parking; the other three cap the amount of off-street parking.

Beyond off-street parking standards, there is little consistency from place to place regarding other use-specific zoning standards. Six cities include an explicit minimum unit size. Five require on-site bicycle parking. Three include site-specific locational restrictions, such as transit proximity or inclusion within an overlay district. One stipulates

USE PERMISSIONS FOR MICRO APARTMENTS

			Permitted in One or More Districts	
City	State	Defined Use	By Right or Ministerial Approval	Subject to Discretionary Use Permit
Grand Rapids	MI	Micro-Unit	X[1]	
Hartford	CT	Efficiency / Micro-Unit	X	
Miami	FL	Micro Dwelling Unit	X	
Oakland	CA	Micro Living Quarters		X
Seattle	WA	Small Efficiency Dwelling Unit	X[2]	X[2]
Springfield	MO	Micro-Efficiency Multifamily Dwelling Unit	X[1]	X[1]
West Palm Beach	FL	Micro-Unit	X	

1. Use permissions do not distinguish between the defined use and other multifamily dwelling units.
2. Use permissions do not distinguish between the defined use and other dwelling units.

USE-SPECIFIC STANDARDS FOR MICRO APARTMENTS

City	State	Defined Use	Minimum Size	Off-Street Parking Standards	Additional Standards
Grand Rapids	MI	Micro-Unit	120 square feet clear floor area (2015 IPMC)	Min.: 0.5 space/unit	§5.6.08.B.3.f
Hartford	CT	Efficiency/Micro-Unit	300 square feet	Max.: 2 spaces/unit	§3.3.1.A(5)(a)
Miami	FL	Micro Dwelling Unit	275 square feet	Max.: 1.1 spaces/unit	§6 Table 13
Oakland	CA	Micro Living Quarters	150 square feet	Min.: 0.25 space/unit	§17.101C.055
Seattle	WA	Small Efficiency Dwelling Unit	220 square feet	Min.: 0.5 space unit	§23.42.048.B
Springfield	MO	Micro-Efficiency Multifamily Dwelling Unit	220 square feet habitable space (2012 IBC)[1]	Min.: 1 space/unit	None
West Palm Beach	FL	Micro-Unit	300 square feet	Max.: 0.55 space/unit	§94-106(a)(8.a)

1. Not addressed in zoning code.

minimum sleeping area space and kitchen and bathroom facilities requirements. One stipulates common area space and management requirements. And one requires on-site car- and bicycle-sharing stations and a monthly per-unit contribution to the city's trolley fund.

Communities wondering if they should include use-specific standards for micro apartments in their zoning codes should consider whether local building code requirements are sufficient to protect the health, safety, and welfare of occupants. Think about how district- or building-form-specific development standards are likely to affect the physical possibility and financial feasibility of micro-apartment projects. Identify any locations within permissible zoning districts that would be inappropriate for micro-apartment projects. If full in-unit kitchens are not required by definition, specify how much space developers must devote to shared kitchens and the location of those kitchens. Either let the market determine how much parking is needed on-site or base minimum off-street parking requirements on the likely demographics of micro-apartment households. Finally, consider whether increasing usage of on-demand ride services merits dedicated space for pickups and drop-offs.

CONCLUSIONS

Despite widespread media coverage in the past five years, micro-apartment development in the U.S. is rare. Currently, demand for very small units seems to be concentrated in the urban cores of large cities with a shortage of affordable rental housing for young, single professionals. In highly stressed housing markets, zoning reforms targeted at making micro-apartment projects legally permissible, physically possible, and financially feasible may lead to dramatic increases in housing supply. However, these reforms may not require singling out micro-apartment development for special zoning treatment. In some cases, the only necessary reform may be eliminating minimum unit size requirements or off-street parking standards.

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VOL. 35, NO. 3

Zoning Practice (ISSN 1548–0135) is a monthly publication of the American Planning Association. James M. Drinan, JD, Chief Executive Officer; David Rouse, FAICP, Managing Director of Research and Advisory Services; Joseph DeAngelis and David Morley, AICP, Editors.

Subscriptions are available for $95 (U.S.) and $120 (foreign). Missing and damaged print issues: Contact APA Customer Service (312-431-9100 or subscriptions@planning.org) within 90 days of the publication date.

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