Alternative Urban Areawide Review – ***Revised***

for

City of Montrose

Montrose, MN
September 2017
(Previously published October 2008.)

Prepared by: Bolton & Menk, Inc. – W13.111316

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Alternative Urban Areawide Review

1. PROJECT TITLE

Montrose Alternative Urban Areawide Review - ***Revised***

2. PROPOSER

Item No. 2 is not required for an AUAR.

3. RESPONSIBLE GOVERNMENT UNIT (RGU)

RGU	City of Montrose
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4. REASON FOR EAW PREPARATION

Item No. 4 is not applicable to an AUAR.

5. PROJECT LOCATION

Figure 1, Regional Location Map, illustrates the environmental study area location in relation to other nearby features. Table 5-1 provides specific project location details.

Table 5-1. Project Location			
County	Wright		
City/Township	City of Montrose; Marysville, Woodland and Franklin Townships		
Township	**Range**	**Section**	**Quarter or Half Section**
T 118 N	R 25 W	6	N 1/2
T 119 N	R 25 W	31	S 1/2
T 119 N	R 26 W	25, 26, 35 and 36	Entire Sections
T 119 N	R 26 W	27 and 34	E 1/2
T 118 N	R 26 W	1, 2, 11 and 12	Entire Sections
T 118 N	R 26 W	3 and 10	E 1/2

6. PROJECT DESCRIPTION

A. 2017 AUAR Revised Context

Background. In 2008, the City of Montrose first completed this Alternative Urban Areawide Review (AUAR) to plan for projected population growth and development. The 2008 AUAR development scenario was based on two stages, an Interim Build and a Full Build, to provide context and identify priorities to guide growth. The 2008 AUAR, with the related Comprehensive Plan and impact studies, established substantial growth plans for as soon as 2030, with the Full Build stage providing a long-term community vision. Therefore, the growth of population, households, and employment anticipated in the 2008 AUAR formally established the intent for a large development expansion (5,300 acres of new development within a 7,100-acre area). This area and capacity for development still remains consistent with long-term annexation and land use plans. The population, household, and employment assumptions for each stage in the 2008 AUAR are provided in Table 6-1.

Table 6-1. 2008 AUAR Development Scenario Stages				
2008 AUAR Stages	**Population**	**Households**	**Employment**	
			Retail	**Non–Retail**
No Build (unplanned to 2030)	8,092	3,312	141	262
Interim Build (2020-2030)	21,030	8,585	3,358	4,094
Full Build (2030 & beyond)	35,558	14,043	4,212	6,992

Now (in 2017), the City of Montrose understands that it has not experienced sustained growth at the pace implied in 2008. Between 2000 and 2010, the City's population grew from 1,143 to 2,847 people (US Census), which is far below the 2008 AUAR "No Build" target of 8,092 (that figure in 2008 effectively represented "unplanned" growth and expansion). In addition, Montrose has now updated its Comprehensive Plan, as approved by the City Council on April 10, 2017. While current observations and planning confirms the City is growing, the recent updates to City plans and the observed and anticipated slower growth warranted this AUAR Revision. The 2017 Comprehensive Plan Update reevaluated land use designations and anticipated growth through 2040, presenting conservative, moderate, and fast growth projections for 2040. The range of projections is far below the population capacities reflected in the 2008 Interim and Full Build scenarios. The 2017

Comprehensive Plan used the moderate growth projection of 6,055 in 2040 to plan for housing units and land use, reflected in Table 6-2. This moderate growth anticipates a population increase of 3,208 persons from 2010 to 2040, which is in the middle of the projection range and is less than 20 percent of the 2030 levels assumed in the 2008 AUAR.

Table 6-2. 2017 Comprehensive Plan Population Projections		
Year	**Projected City Population**	**Population Growth** (2010 base)
2015	3,079	232
2020	3,500	421
2025	4,000	500
2030	4,600	600
2035	5,300	700
2040	6,055	755
Projection Range		
2040 - Conservative	*4,465*	*1,618*
2040 - Fast	*7,500*	*4,653*

Additionally, community surveys conducted with the 2017 comprehensive planning process showed a desire to promote infill development. This approach, which anticipates contiguous infill development, should also influence a slower rate of change and fewer impacts by 2040 than expected in 2008.

The 2017 Comprehensive Plan update for the City of Montrose also led to slight changes in planned land use for the AUAR study area. Specifically, a stretch of commercial land use in the north central portion of the AUAR area is now marked as public and park space, and a medium density residential parcel near the west central border of the study area is now marked as high density residential. These changes are reflected in Figures 4-6 and are considered to be the most updated planned or future land use. These slight adjustments in land use do not change the overall potential impacts described in this document.

Purpose of Revision. This 2017 AUAR Revision primarily serves to report the above-noted reduced rates of growth. It also re-publishes the entire AUAR to confirm the City's plan to retain a large reserve capacity for expansion – essentially the same capacity reflected in the 2008 AUAR and in the 2017 Comprehensive Plan Update. The main difference in the planning context are time horizons, with the AUAR Interim Build Stage area now planned as the 20-year focus for development – the area intended to meet the needs of the City to the year 2040 or beyond. The Full Build Stage is maintained to provide land use guidance beyond 2040 and flexibility in development, should the need of the City outgrow the Interim Build Stage.

Releasing this complete document as an AUAR Revision discloses the key planning context updates from the original 2008 AUAR to 2017, ensuring details are not omitted as might have been the case with a simpler 5-year update. Accordingly, this 2017 AUAR Revision maintains much of the 2008 AUAR content, which keeps the capacity for City expansion and development unchanged for the Interim Build and Full Build stages. The location of the AUAR study area, its acreage, and the potential impacts, are mostly the same as in 2008, and the information on potential impacts is considered accurate. The main revisions are extended timeframes, with the Interim Stage providing guidance to 2040 and the Full Build Stage providing longer-term guidance. Except for where specifically highlighted with ***bold-italic text***, there are minimal changes from the 2008 AUAR in this 2017 AUAR Revision.

Because this AUAR is a revision, the formatting and numbering of sections is the same as in 2008. Current Minnesota Environmental Assessment Worksheet (EAW) guidance is also reconciled into this AUAR Revision.

B. Project Summary

The Montrose AUAR area consists of approximately 5,300 developable acres of future development surrounding the City of Montrose. It is proposed to include low, medium and high density residential, industrial and commercial development. The project includes construction of roads, homes, businesses, trails, parks, ponds, and utilities such as storm water, wastewater, and water supply piping. This AUAR also analyzes the impacts of approximately 1,700 acres of development that exists or is in a various stage of approval and 100 acres of railroad right-of-way, for a total analysis area of approximately 7,100 acres.

C. Complete Project Description

Introduction

The City of Montrose is located in Wright County, northwest of the Twin Cities 7–County Metropolitan Area as illustrated in Figure 1. Figure 2 shows the AUAR boundary and City limits on a USGS map. The AUAR study area surrounds the City of Montrose, but does not include the existing developed area of the City, or "exception" properties that are already developed or in the process of being developed. Figure 3 shows the AUAR boundary and study area on an aerial photo. The shaded blue area on Figure 3 is within the AUAR study area. Even though the AUAR study area does not include the existing developed areas and areas in the process of being developed, the cumulative impact analyses were completed for the entire AUAR area, including the existing developed areas. The Mitigation Plan was also written with the existing developed and developing areas in mind.

The AUAR area does not lie entirely within the City of Montrose. Marysville, Woodland and Franklin Townships, and the Wright County Board have given RGU authority for the AUAR area to the City of Montrose. The City of Montrose has orderly annexation agreements with Marysville and Woodland Townships. The area included in the annexation agreement with these townships coincides with the study area boundary. The majority of the existing land use in the AUAR area is agricultural related, including farmsteads, assorted agricultural accessory buildings, and agriculture production fields.

The City of Montrose has experienced a population growth averaging approximately ***11****%* ***per year,*** between the year 2000 at 1,143 and the ***2015 population estimate of 3,079. Most of this growth occurred between 2000 and 2010***. The land use vision identified in the Full Build Scenario in this AUAR is projected to yield an estimated population of 35,558, including approximately 14,043 households, and 11,204 employees. ***The 2017 Comprehensive Plan acknowledges this Full Build capacity potential, but focuses on a projected 2040 population of 6,055 and the Interim Build capacity of a population of 21,000 with 8,585 households and approximately 7,452 employees to guide development for the next 20+ years.***

The AUAR will be evaluated every 5 years or as required by Minnesota Rule 4410.3610 sub. 7. The re-evaluation process will allow the AUAR to be a working document that will change as development trends, environmental requirements and needs, and local, state, and federal requirements change.

It is recognized that all communities in this area have and will continue to grow. The City of Montrose is taking a proactive approach to deal with the associated impacts of growth by completing this AUAR.

<u>Development Planning Summary</u>

The City of Montrose's Comprehensive Plan ***was updated and approved by City Council in 2017*** and includes a land use plan, staging plan, a public facilities plan (water system plan, wastewater system plan, storm water management plan and transportation plan) and an implementation program. The Comprehensive Plan complies with the requirements of the Environmental Quality Board. Land uses have been determined for the entire AUAR area. The AUAR area will consist of Low, Medium and High Density Residential, Commercial, Industrial, Mixed Use, and Agricultural, as well as public and semi-public land uses, and state Wildlife Management Areas (WMAs).

<u>Staging</u>

Only one development scenario is being evaluated in this AUAR. The scenario evaluated in this AUAR is consistent with the City's Comprehensive Plan and with the known development plans of the property owners in the area. This scenario was broken into two stages: Interim Build and Full Build. Land uses for the Interim Build are shown on Figure 4 and land uses for the Full Build are shown on Figure 5. The ultimate land use plan, along with shoreland and floodplain overlay districts and wetlands, is shown on Figure 6. This staging plan was developed to direct growth to infill areas of the City to promote an efficient use of existing infrastructure and to work towards the completion of parallel roadways to TH 12 to reduce local travel demand on the highway.

The scenario under evaluation includes construction of roads, ponds, and utilities such as storm water, wastewater, and water supply piping. Utilities such as water, sanitary sewer and storm sewer will be constructed simultaneously with the streets.

<u>Infrastructure</u>

<u>Stormwater Management</u>— The AUAR study area is located within the North Fork of the Crow River watershed, which is under the management authority of Wright County. The City has developed a Surface Water Management Plan (SWMP) that describes how water resources will be managed in the City, including portions of the AUAR area, and provides a plan for regional storm water ponds. Subwatersheds to cover the entire AUAR area have been delineated and are described in the City's Comprehensive Plan, which includes the ***Stormwater Management Plan.*** Existing storm water drainage areas will be modified slightly under the proposed storm water drainage areas. This is discussed in detail in Item 17.

<u>Municipal Water</u>**—** Public water service is not presently available to the entire AUAR area. Development within the AUAR area will require that additional public water facilities be constructed to serve projected water demand from future development. A series of 12-inch, 10-inch and 8-inch water supply pipes will be constructed to provide water supply to the area. ***Four additional water towers totaling 2.75 million gallons*** will provide adequate water storage to serve the AUAR area. Additional wells will be constructed to provide water supply for the area. All areas are discussed in detail in Item 13.

<u>Sanitary Sewer</u>— Similar to municipal water, sanitary sewer service is not currently available to the entire AUAR area. Existing sanitary sewer lines will need extension to serve properties in the AUAR area. Eight additional lift stations will be required to serve the AUAR area as well as expansions and upgrades to two other lift stations. Multiple trunk lines and force mains will be required as well. Expansions and process changes will be required to the existing Montrose Regional Wastewater Treatment Facility to treat the additional sanitary sewer flows. Each of these items are discussed in detail in Item 18.

<u>Roadways</u>— A detailed traffic impact analysis was completed for the AUAR area, evaluating the effects of traffic on the area roadway system. The traffic analysis for proposed development in the

AUAR area includes an analysis of the cumulative impacts of other existing developments near the study area in Montrose (including area within Waverly, MN). The analysis evaluates the traffic impacts of the "exception" properties as the No-Build Scenario, as well as the Interim Build and Full Build scenarios.

The mitigation needed to assure acceptable operations at each intersection was determined through the traffic analysis summarized in Item 21. The final proposed lanes and traffic control measures recommended for the roadways studied are included in Appendix A. These lane and traffic control recommendations assure Level of Service D or better for all intersections, except where traffic volumes are extremely low or where delay and volume would not be expected to meet signal warrant requirements. Note that the roadway improvements recommended should be built concurrent with any development of the area. This is discussed in detail in Item 21 and the detailed traffic analysis is in Appendix A.

<u>Parks, Trails and Natural Resources/Open Space Preservation</u>— The City and developer negotiate the type of park, open space and trail dedication at the time of development review. It is anticipated that the City will obtain neighborhood park property and trail segments within the AUAR area through parkland dedication at the time of subdivision approvals. This is discussed in Item 9.

<u>Schools</u>— Currently, there is one elementary school in the City of Montrose. The Buffalo/Montrose/Hanover School District bought 32 acres of land west of CSAH 12 south of CR 107 for a future junior high school. Based on the previous AUAR future Full Build Scenario population of approximately 35,000, it is anticipated that there would be 3 additional elementary schools built on approximately 20 acres each within the City. The proposed junior high and additional elementary schools have been considered in the traffic analysis in Appendix A.

D. Project Purpose

The purpose of this project is to evaluate and mitigate the potential impacts of build–out of the AUAR area and plan for the long–term roadway and utility needs. Montrose has an active real estate market and there is an increasing demand for residential and non–residential land uses. The City of Montrose is the AUAR proposer, however, build–out of the AUAR area is expected to occur primarily by non–governmental entities, and some public and semi–public development is expected to occur.

E. Are future stages of this development, including development on any outlots, planned or likely to happen? If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

☒ No

☐ Yes

F. Is this project a subsequent stage of previous project? If yes, briefly describe the past development, timeline and any past environmental review.

☒ No

☐ Yes

7. PROJECT MAGNITUDE DATA

Table 7-1. Project Magnitude Data						
Total Project Acreage:		5,300 developable acres in a total of approximately 7,100 aces (complete AUAR buildout)				
No. of Residential Units:	Low Density	10,315	Medium Density	3,368	High Density	360
Commercial, industrial or institutional building area (gross floor space)					6.63M ft^2	
Indicate areas of specific uses (in square feet)[1]						
Commercial Office	868,161	Commercial – Retail	2,015,834	Industrial – Business Office Park	731,808	
Industrial – Light	1,293,680	Industrial – Heavy	1,463,616	Manufacturing	NA	
Institutional	NA	Agricultural	NA			
Other commercial (specify)		None				
Building height (If over 2 stories, compare to heights of nearby buildings)		2-3 (Most nearby buildings are 1-2 stories.)				

[1]Areas given in each category are estimates based on land use assumptions and are subject to change

Figure 6 shows the Ultimate Land Use Plan for the AUAR study area. Figure 7 shows the areas that are not developable, due to several reasons. Information to determine whether land was developable was gathered from the National Wetlands Inventory, the Protected Waters Inventory, FEMA, Organic Deposits, and Wildlife Management Areas. The maximum densities for commercial and industrial floor space and residential units were calculated by multiplying the usable upland area by the assumed development densities. The AUAR area encompasses about 7,100 acres, of which about 5,300 acres are usable upland and approximately 1,700 acres were identified as undevelopable, and another 100 acres is within undevelopable railroad right-of-way. All development densities have been applied to usable acres rather than total acres. Table 7-1 summarizes the approximate usable area calculations for each land use designation, and excludes the “exception” properties that are already developed or in the process of being developed.

For cumulative impact analysis purposes, Tables 7–2, 7–3, and 7–4 identify the residential and non–residential development assumptions for Full Build Scenario of the AUAR boundary. Residential land uses would be the majority land use in the AUAR area, with approximately 4,400 of the 4,900 residential land use acres being low density residential. Non-residential land uses total approximately 1,900 acres. The largest acreage of non–residential land uses are Public/Semipublic land uses due to the extent of the Woodland and Malardi WMAs comprising nearly 1,000 acres.

Table 7-2. Residential Development Assumptions						
Land Use	**Total Acres**	**Undevelopable Acres**	**Developable Acres**	**Households Per Acre**	**Total Households**	**Population**
Low Density Residential	***4,386***	***955***	***3,431***	3	10,315	26,118
Medium Density Residential	***417***	77	***340***	8	***2,720***	8,528
High Density Residential	***114***	***17***	***97***	12	***1,164***	912
Total Residential	***4,924***	***1,049***	***3,875***	**NA**	***14,199***	**35,558**

Table 7-3. Non–Residential Development Assumptions – Land Use			
Non–Residential Land Use Acreages	**Total Acres**	**Undevelopable Acres**	**Developable Acres**
Commercial	***357***	28	***329***
Industrial	513	93	420
Mixed Use	90	5	85
Public/Semi–Public	***1,103***	***882***	***161***
Railroad Right-of-Way	100	100	0
Total Non-Residential	***2,163***	***1,108***	**995**

Table 7-4. Non–Residential Development Assumptions – Intensity							
Non–Residential Land Use Yields	**Allocation of Developable Acres**	**Acres Per Land Use Type**	**Net Sq. Ft. of Building**	**Building Sq. Ft. Per Employee**	**Total Employees**	**Retail Employees**	**Non–Retail Employees**
Commercial-Retail	70%	239.4	2,085,653	495	4,212	4,212	NA
Commercial-Office	30%	102.6	893,851	265	3,375	NA	3,375
Industrial-Light	40%	168	1,463,616	1,030	1,421	NA	1,421
Industrial-Heavy	40%	168	1,463,616	1,500	976	NA	976
Industrial-Business Park	20%	84	731,808	600	1,220	NA	1,220
Total Non–Residential	**NA**	**NA**	**6,638,544**	**NA**	**11,204**	**4,212**	**6,992**

The one development scenario in this AUAR was broken into two stages: Interim Build and Full Build. This was done to direct growth to infill areas of the City to promote an efficient use of existing infrastructure and to work towards the completion of parallel roadways to TH 12 to reduce local travel demand on TH 12. As outlined in the Comprehensive Plan, growth will be directed to Interim Build properties identified in Figure 4, which also includes land identified as "exceptions" in Figure 3. When there is less than a 10-year supply of a specific land use available for development within the Interim Build area, property within the Full Build area identified in Figure 5 would be made eligible for development. It is also anticipated that as the AUAR is reported on every 5 years that the Comprehensive Plan may be updated to confirm its guidance or to accommodate anticipated development needs. If the Comprehensive Plan is updated, the AUAR will be evaluated to determine whether revisions are required to maintain consistency, ***which is the case for this 2017 AUAR Revision***.

Table 7–5 Staging Scenarios identifies the population, households, and employment for ***2014***, and forecasts based on the Ultimate Land Use Plan identified in the City of Montrose's Comprehensive Plan for the "exception" properties (also identified as the No Build scenario for traffic analysis purposes), the Interim Build, and Full Build stages. The population is the total, including the existing developed parts of the City.

Table 7-5. Staging Scenarios

Staging Scenario	Population	Households	Employment	
			Retail	Non–Retail
2014 (Comprehensive Plan Conditions)	***3,079***	***1,140***	***568***	
No Build	8,092	3,312	141	262
Interim Build	21,030	8,585	3,358	4,094
Full Build	35,558	14,043	4,212	6,992
2040 Forecast	***6,055***	***2,422***	***7,452***	

COVER TYPES

Table 7-6 provides approximate cover type acreage for current conditions in the AUAR area, after the Interim Build, and after the Full Build. These values are approximations based on desired future and uses in Figure 6. As parcel and park development occurs, actual land cover acreage will change. "Developed" land cover includes impervious surfaces and pervious surfaces, such as lawns, landscaping, and parks.

Table 7-6. Cover Type Acreage Estimations for AUAR Area

Cover Type	Before (Current Conditions)	Interim Build	Full Build
Wetlands	1,023	1,023	1,023
Deep water/streams	849	849	849
Wooded/forest	221	137	100
Brush/Grassland	1,361	700	150
Cropland	2,748	1,366	0
Developed	890	3,017	4,970
TOTAL	**7,092**	**7,092**	**7,092**

8. PERMITS AND APPROVALS REQUIRED

List all known local, state and federal permits, approvals, and financial assistance for the

project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.

Table 8-1. Permits and Approvals Required		
Unit of Government	**Type of Application**	**Status**
City of Montrose	Preliminary and Final Plat Approval/PUD	To be applied for.
City of Montrose	Street and Utility Plan Approval	To be applied for.
City of Montrose	Grading Permit	To be applied for.
City of Montrose	Building Permits	To be applied for.
City of Montrose	Municipal Water Connection Permit	To be applied for.
City of Montrose	Municipal Sewer Connection Permit	To be applied for.
City of Montrose	Zoning Amendment	To be applied for.
City of Montrose	Certificate of Wetland Replacement	To be applied for.
City of Montrose	Tree Survey/Preservation Plan	To be applied for.
City of Montrose	Tree Reforestation/Replacement Plan	To be applied for.
City of Montrose	Conditional Use Permit	To be applied for.
Wright County	Storm Water Management Plan Approval	To be applied for.
Wright County Highway Dept.	Access Permit	To be applied for.
Wright County Highway Dept.	Utility Work in Right of Way	To be applied for.
MN Department of Transportation	Access Permit	To be applied for.
MN Department of Transportation	Drainage Permit	To be applied for.
MN Department of Transportation	Utility Crossing	To be applied for.
MN Department of Transportation	Work in Right of Way	To be applied for.
MN Department of Health	Watermain Extension Approval	To be applied for.
MN DNR Division of Waters	General Permit 97-0005 for Temporary Water Appropriations	To be applied for, if needed.
MN DNR Division of Waters	Water Appropriations Permit	Existing Permit – To be Modified
MN Pollution Control Agency	NPDES/SDS General Permit	Existing Permit – To be Modified
MN Pollution Control Agency	Sanitary Sewer Extension Permit	To be applied for.
MN Pollution Control Agency	NPDES General Stormwater Permit for Construction Activity	To be applied for.
MN Pollution Control Agency	Section 401 Water Quality Certification/Waiver	To be applied for.
US Army Corps of Engineers	Section 404 Permit	To be applied for.

While there are no specific development proposals at this time, it is anticipated that the City could provide public financial assistance including bond guarantees, Tax Increment Financing and/or infrastructure to facilitate a specific development or redevelopment proposal.

The City will utilize funding mechanisms similar to Trunk Area Fees, Sanitary Sewer and Water Access Charges, Transportation Improvement Districts and Park Dedication Fees to fund necessary infrastructure upgrades and improvements due to development within the City. Fees will be charged to developers at the time of development. The City requires developers to pay Trunk Area fees for Sanitary Sewer, Watermain and Storm Sewer. The City also requires developers to dedicate either land or cash for development and expansion of City park facilities. The City has recently begun requiring Developers to pay fees to assist in funding of transportation improvement projects. The continued development and implementation of Transportation Improvement Districts or other similar programs ***will provide a funding mechanism to assist in funding*** the City's portion of necessary Transportation improvements and expansions. Sewer and Water Access Charges are paid

by individual property owners at the time of hookup to City utilities. The City will review fee structures on an ongoing basis to ensure that funding is adequate for construction of the necessary infrastructure upgrades to support continued development.
The City may utilize Public Facilities Authority funding programs to assist in paying for upgrades to public infrastructure. The City has a five-year capital improvement plan in which they assess and budget for necessary capital improvements. The plan is re-evaluated on ***a regular*** basis and updated as needs are filled and new needs arise.

9. LAND USE

Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

The majority of the existing land use in the AUAR area is agricultural related, including farmsteads, assorted agricultural accessory buildings, and agriculture production fields. The land uses in the "exception" area of Figure 3 are primarily single family detached housing, with some commercial, industrial, institutional, single family detached housing, and multi–family housing. The Ultimate Land Use Plan identified within the City of Montrose's Comprehensive Plan is shown on Figure 6.

Due to similarity in land use, the proposed development is compatible with existing residential developments on adjacent lands surrounding the City. The majority of adjoining agricultural land exists to the south, east and north edges of the AUAR boundary. Occasional dust, noise and runoff from farming activities are somewhat incompatible with the proposed residential uses. The lots most likely to be affected are those that will abut agricultural land along the AUAR boundary. Potential land use conflicts with environmental resources such as wetlands and WMAs are not anticipated, because future development would be required to comply with local ordinances related to shoreland regulations, impervious surface coverage, and stormwater management. Where appropriate, the City may encourage specific design strategies to minimize impervious surface, utilize native landscaping, and/or accommodate wildlife (e.g., rollover curb and elliptical culverts to accommodate turtles).

The potential for soil contamination was researched using Environmental Data Resources, Inc. (EDR). In order to break the area down into more manageable pieces, the site was broken into three areas for which the EDR reports were done. Because the EDR reports cover a radius around a point, central points in each of the three areas (north, south and east) were chosen. The reports were compared to ensure that sites weren't counted more than once because they were listed in more than one report. In addition, because of the radius, some sites outside of the AUAR area were listed in the EDR reports, and these were excluded in the summary, below.

The sites with adequate address information were mapped in each report. There is one Leaking Underground Storage Tank (LUST) site, but it has been closed. There are two Minnesota Ag Spills, involving agricultural chemicals. There is one site listed as both a MN LS site (Minnesota List of Sites) and MN VIC site (Minnesota Voluntary Investigation and Cleanup). There is one Resource Conservation and Recovery Act – Small Quantity Generators (RCRA-SQG) site in the area. There are also two Facility Index System (FINDS) sites. FINDS is an index of several databases, including: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System). In general, these sites were on the eastern side of the AUAR area. No oil or gas pipelines were mapped by the EDR reports in the AUAR area.

Due to poor or inadequate address information, there were sites listed in the EDR reports, but were not mapped. It is likely that these sites are in AUAR study area exclusions. There is one Brownfields (Petroleum Brownfields Program Sites) site. There are four Resource Conservation and Recovery Act – Small Quantity Generators (RCRA-SQG) in the area (three of these were also FINDS sites). There are eight Facility Index System (FINDS) sites (two of these are also RCRA-SQG sites). There are 17 Leaking Underground Storage Tank (LUST) sites, and one of these sites is also listed as an Underground Storage Tank (UST) site. There are three AST (Aboveground Storage Tank) sites. There is one Leaking Aboveground Storage Tank (LAST) site. There are four other Underground Storage Tank (UST) sites. There is one Minnesota Spills site. There are two MN LS (Minnesota List of Sites) and MN VIC (Minnesota Voluntary Investigation and Cleanup) sites, and one site that is listed as both. There are two Tier 2 Facility sites. There is one CERC-NFRAP (Comprehensive Environmental Response, Compensation, and Liability Information – No Further Remedial Action Planned) site.

Listing a site on an environmental database does not automatically mean that the site is a contamination hazard; it simply means that there is some activity or other indication that the site needs to be tracked. Because these sites are listed on state and national environmental databases, the current land owners are assumed to be aware of the conditions of their property. As the AUAR area develops, people purchasing property will be encouraged to conduct Phase 1 Environmental Assessments to help make new owners aware of the existing conditions on the property they are considering buying. If any new contamination is discovered, any contaminated soil will be disposed of according to applicable Minnesota Pollution Control Agency (MPCA) regulations. Storage tanks are discussed under Item 20 of this AUAR.

There are two State operated Wildlife Management Areas in the AUAR study area. Malardi Lake WMA is located in the northeast portion of the AUAR area. The Interim Build Scenario borders the western side of the WMA, and the Full Build Scenario would fully encompass the WMA. Woodland WMA is in the southeast portion of the AUAR area. The Interim Build Scenario borders the WMA in the west, and the Full Build Scenario would fully encompass the WMA. Both WMAs are planned to be maintained as state wildlife management areas in Interim and Future Build Scenarios. Adjacent land uses to these sites are additional park space and/or low density residential development.

According to the City of Montrose's Comprehensive Plan (2017) and the Wright County Parks website, (http://www.co.wright.mn.us/Facilities?clear=True), there are no existing City, Township, or County parks, open spaces or recreational facilities in the AUAR study area. A primary way for the City and County to acquire park and trail property is through land dedication at the time of subdivision. The City of Montrose and Wright County ordinances require that developers of subdivisions dedicate land or pay a fee in lieu of land, in accordance with state law. The City and developer negotiate the type of park, open space and trail dedication at the time of development review. It is anticipated that the City will obtain neighborhood park property and trail segments within the AUAR area through park dedication at the time of subdivision approvals. "Park Search Areas" are potential park sites and are shown on Figure 6.

***Zoning Codes and Overlay Districts:* The following land use descriptions are new to this AUAR revision, reflecting updates made to City Code as part of the 2017 Comprehensive Plan update.**

- **Urban Reserve District:** The purpose of the Urban Reserve District is to preserve areas where urban public utilities are not presently available. These lands are to be retained in a natural state or in agricultural uses pending the proper timing for the economical provision of sewer and water, streets, parks, storm drainage and other public utilities and services so that orderly development can occur. Permitted uses include farms and farmsteads, hobby farms, nurseries and greenhouses, public parks, wildlife areas, game refuges, residential care facilities serving six for fewer persons and single family, detached dwelling at a density of 1 dwelling unit per 40 acres.

- **Shoreland Overlay District:** The purpose of the Shoreland Overlay District is to provide for the wise utilization of shoreland areas in order to preserve the quality and natural character of these protected waters of the City. Shorelands include Mud Lake, Malardi Lake, Fountain Lake, the unnamed lake, and the unnamed tributary of to the North Fork Crow River within the City's boundaries. Overlay districts are noted in Figure 6. All permitted uses allowed and regulated in applicable zoning districts underlying the Shoreland Overlay District are permitted within the Overlay District.
- **Floodplain Overlay District:** The FP, Floodplain Overlay District shall be applied to and superimposed upon all districts as existing or amended by the text and map of Ordinance 1095. The FP, Floodplain Overlay District regulations shall not be construed to allow any use or structure otherwise not allowed in the underlying zoning district where the property is located. The regulations and requirements imposed by the FP Floodplain Overlay District shall be in addition to those established by all other districts in Ordinance 1095. The FP Floodplain Overlay District shall be established based upon the specific information contained in the Flood Insurance Rate Map and the Flood Insurance Study for the City as adopted in Section 1095-4.B.
- **Single Family Residential:** The purpose of the R-1, Single Family Residential District is to allow for low density single family residential neighborhoods as guided by the Comprehensive Plan, as well as directly, related complementary uses. A full range of public services and facilities shall be available to R-1 District areas. Permitted uses include public parks, residential care facilities serving six for fewer persons and single family, detached dwellings.
- **Single Family Manufactured Home Park:** The purpose of the R-2, Single Family Manufactured Home Park District is to provide a separate district for manufactured home parks, distinct from other residential uses in areas guided for low density residential land uses by the comprehensive plan. Permitted uses include public parks, residential care facilities serving six for fewer persons and single family, detached dwellings.
- **Medium Density Residential:** The purpose of the R-3, Medium-Density Residential District is to establish low to moderate density residential housing in multiple family structures ranging up to and including eight (8) units, as guided by the Comprehensive Plan and that satisfies the following planning objectives:
    - Creation of a cohesive medium-density neighborhood that provides attractive living environments and contributes to the City's identity.
    - Provide attractive and durable medium-density housing options as a means of addressing the City's life cycle housing needs.
    - Preservation of natural land forms, open spaces, greenways for scenic enjoyment and recreational use through the regulation of medium-density residential land use.
    - Allows for the subdivision of twinhome, quadraminium and townhome base lots to permit individual private ownership of a single dwelling within such a structure.
- **High Density Residential:** The purpose of the R-4, High Density Residential District is to provide for high density housing in multiple family structures and directly related complementary uses as guided by the Comprehensive Plan. Permitted uses include dwelling structures containing more than eight dwelling units, residential care facilities serving 16 or fewer persons, and public parks.
- **Residential Business:** The purpose of the R-B, Residential Business District is to provide for a transition in land use from residential to low intensity businesses and allow for the mixing of these uses. The establishment of this district is to be limited to those areas

specifically guided for mixed use development by the Comprehensive Plan and only when a full range of public services and facilities are available. Permitted uses include historic sites and structures, multiple family dwelling structures containing not more than six units, residential care facilities serving 16 or fewer persons, single family detached dwellings, two family residential dwellings, and public parks.

- **Central Business District:** The purpose of the B-1, Central Business District is to provide specifically for the regulations of high intensity commercial uses located within the downtown area defined in the Comprehensive Plan. Permitted uses include adult uses, governmental or public regulated utilities, buildings or structures necessary for the health, safety, and general welfare of the City, clinic and general office businesses, personal services, retail businesses without drive-through service facilities, and service businesses on-site and without drive-through facilities.
- **Highway Business District:** The purpose of the B-2, Highway Business District is to provide for and limit the establishment of motor vehicle oriented or dependent high intensity commercial and service activities. Permitted uses include adult uses, governmental or public regulated utilities, buildings or structures necessary for the health, safety, and general welfare of the City, greenhouses and nurseries, hospitality businesses, liquor stores on and off sale, clinic and general office businesses, recreational businesses contained entirely within the principal building, restaurants without drive-through facilities and without outdoor dining, retail businesses without drive-through service facilities, service businesses on-site and without drive-through facilities, off-site service businesses, specialty schools, and theaters.
- **Light Industrial: T**he purpose of the I-1, Light Industrial District is to provide for less intensive types of industrial uses which, because of their proximity to residential areas or other sensitive uses, are less likely to impose objectionable influences, such as noise, vibrations, dust, heat, smoke, odor, etc. Permitted uses include adult uses, auto repair, bottling, building material sales, greenhouses, laundry, machine shops, manufacturing, mass transit terminals, professional offices, radio, and television stations, shops for contractors, warehouse and distribution facilities, and wholesale.
- **General Industrial:** The purpose of the I-2, General Industrial District is to provide for the establishment of industrial uses of a more intense nature development in areas guided for industrial land use by the Comprehensive Plan. Permitted uses include adult uses, auto repair, bottling, building material sales, greenhouses, laundry, machine shops, manufacturing, mass transit and truck terminals, professional offices, radio, and television stations, shops for contractors, warehouse and distribution facilities, and wholesale.
- **Institutional:** The INS District is intended to provide a specific zoning district for facilities devoted to serving the public. It is unique in that the primary objective of uses within this district is the provision of services, frequently on a non-profit basis, rather than the sale of goods or services. It is intended that uses within such a district will be compatible with adjoining development, and they normally will be located on an arterial street or thoroughfare. Permitted uses include governmental or public regulated utilities, buildings or structures necessary for the health, safety, and general welfare of the City, preschool, elementary, junior or senior high schools having regular course of study accredited by the State of Minnesota, publicly owned civic or cultural buildings, such as libraries, city offices, auditoriums, public administration buildings and historical developments, and religious institutions such as churches, chapels, temples and synagogues.
- **Planned Unit Development:** The purpose of the PUD, Planned Unit Development District is to provide for the integration and coordination of land parcels as well as the combination of varying types of residential, commercial and industrial uses.

10. COVER TYPES

A. Cover Type Map, at least at the scale of a USGS topographic map, depicting:

- **Wetlands - identified by type (Cowardin)**
- **Watercourses - rivers, streams, creeks, ditches**

- **Lakes - identify protected water status and shoreland management classification**
- **Woodlands – breakdown by classes where possible**
- **Grassland - identify native and old field**
- **Cropland**
- **Current development**

The Minnesota Land Cover Classification System mapping has not been done for Wright County. Bolton and Menk used aerial photographs, National Wetland Inventory mapping, and other mapping to delineate the boundaries between plant communities (Figure 8). Farmsteads were included in the "cropland" coverage. The National Wetlands Inventory was used to map wetlands, and wetlands are discussed in further detail in Item 12 and shown in Figure 11. Protected waters are discussed in Item 12 and shown in Figure 10, and shorelands in Item 14.

Vegetation within the AUAR boundary is predominantly agricultural (cropland), with some areas of grasslands and woodlands. Areas categorized as grassland within the AUAR boundary are primarily composed of non-native vegetation. Wetland types are discussed in Item 12. Oak forests and maple-basswood forests are an important natural community, being a remnant of the Big Woods that once stretched across 1.3 million acres of Minnesota. There are no areas of oak or maple-basswood forests that are listed as known occurrences of rare species or native plant communities (according to the Natural Heritage Database) within the AUAR area, but there are some occurrences in the land adjacent to the AUAR area. Maple-basswood forests have become rare throughout their former range, particularly within the Seven County Metropolitan Area. The Minnesota DNR views this community type as one of the most threatened in Minnesota and encourages preservation and restoration where possible. The City of Montrose also encourages tree preservation with its Tree Preservation Plan ordinance.

The City has now identified a privately owned patch of woodlands, for habitat preservation and a potential park, just outside city limits at the southwest corner of Clementa Avenue and 55th Street. The City intends to work with property owners to maintain current woodland land cover as development occurs to provide habitat for area species as noted in the Mitigation Plan (See Appendix B).

As described in Item 9, most current or recent development is limited to low-density homesteads.

B. Overlay Map showing anticipated development in relation to the cover types. This map should also depict any "protection areas," existing or proposed, that will preserve sensitive cover types. Separate maps for each major development scenario should generally be provided.

Development within the AUAR area is expected to convert all of the agricultural land and some of the woodland and grassland to residential, commercial, and light industrial land uses. Proposed land use is shown on Figure 9.

Existing tracts of forest will be preserved to the extent practicable. The City currently has a Tree Preservation ordinance (1020-6). Prior to the issuance of building permits for all new and/or expanded single or multiple-family residential, commercial, industrial and institutional uses, a tree preservation plan shall be submitted to the City Engineer and Zoning Administrator. The plan shall be in accordance with requirements outlined in Subdivision Ordinances, including the size, species, tag numbers, and location of all significant trees proposed to be saved and removed on the area of development, and the measures to protect the significant trees to be saved.

No other sensitive cover types have been identified outside of the wetlands, and impacts to these are discussed under Item 12.

11. FISH, WILDLIFE AND ECOLOGICALLY SENSITIVE RESOURCES

A. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

Fish and wildlife resources on and near the AUAR area are directly related to the composition, quality, size, and connectivity of natural communities including grasslands, woodlands, and wetlands. Because a majority of the site is currently under agricultural use, and has been over the past several decades, land clearing and agricultural practices have likely displaced many of the wildlife species that historically occurred within this portion of Wright County. Wildlife resources that exist throughout the site include species that have adapted to cropland and fragmented woodlands such as pheasant, meadowlark, field sparrow, cottontail, red fox, coyote, turkey, raccoon, squirrel and white-tailed deer. The open fields provide seasonal food and cover for these species. The AUAR area includes both the Malardi Wildlife Management Area (WMA) and the Woodland WMA. Neither of these areas will be negatively impacted by the development within the AUAR. The wetlands and woodlands provide habitat and cover for many species commonly found in the upper Midwest such as woodcock, thrushes, woodpeckers, amphibians, and birds of prey.

The City currently has a Tree Preservation ordinance (1020-6). Prior to the issuance of building permits for all new and/or expanded single or multiple-family residential, commercial, industrial and institutional uses, a tree preservation plan shall be submitted to the City Engineer and Zoning Administrator. The plan shall be in accordance with requirements outlined in Subdivision Ordinances, including the size, species, tag numbers, and location of all significant trees proposed to be saved and removed on the area of development, and the measures to protect the significant trees to be saved. Subdividers are encouraged to preserve all healthy trees of significant value even if the trees are less than six inches in diameter. Developers and/or home builders shall be required to replace significant trees which were indicated on the tree preservation plan to be saved but ultimately were destroyed or damaged. Each significant tree destroyed or damaged shall be replaced with trees totaling two (2) caliper inches for every one (1) caliper inch of tree loss. The ordinance requires that a minimum of 50% of trees be preserved. In addition the City requires that a minimum of two trees be planted in every front yard of every home. The combination of these two requirements allows forested tracts to be preserved and replaces trees that are lost through development.

The City currently has two greenway/habitat corridors included in the Park and Trail Plan. The first corridor follows a drainage way designated by the DNR as a tributary to the North Fork of the Crow River. The corridor will connect a 20 acre hardwood forest located southwest of Clementa Avenue and 55th Street N. to several large wetland complexes in the northern portion of the AUAR area. The second corridor connects Malardi State Wildlife Management Area and Woodland State Wildlife Management Area. The corridor follows a series of existing wetlands between the two management areas. The DNR was consulted in the location of this corridor to select the best possible corridor for movement of wildlife between the two management areas. The City will consider additional “greenway/habitat corridors” and the best use of park areas and regional stormwater ponding locations to assist in the creation of these corridors.

Some local decline in wildlife abundance is expected to result from these changes. Populations of species that depend on cropland are the most likely to be impacted by development, and other animals may succumb to mortality during project construction.

The industrial development proposed would be a mixture of light and general industrial. Specifically, according to the Montrose Zoning Ordinance, the purpose of the light industrial area would be to provide for less intensive types of industrial uses and the City would require that uses to be accommodated include those which generate a minimum of noise, vibration, dust, heat, smoke, and odor. Examples of light industrial permitted uses include warehouses, professional offices, contractor shops and offices, and processing or distribution facilities. General industrial uses would include machine shops, metal products manufacturing, and other manufacturing and assembly processes which do not create noise, vibration, smoke, odors, heat, or glare, etc. disturbing to adjacent property occupants. Other general industrial uses would be considered in accordance with the Montrose Zoning Ordinance. Under these proposed land uses, the City would encourage developers to minimize impervious surface and utilize native landscaping where practicable. While residential areas can provide more opportunity for incorporation of wildlife habitat into project design, the value of such habitat is in part a function of the residential area's density, and there is potential to incorporate habitat of comparable value into the design of non-residential land uses.

Aquatic wildlife resources occur in the various lakes, wetlands and creeks scattered throughout the AUAR area (Item 12), with the potential for fish concentrated in the Malardi and Woodland WMAs and Fountain Lake.

Woodland WMA consists of a 500-acre open water cattail-dominated wetland surrounded by upland cool season grasses with some brushy components. This area is of high importance as a spring and fall waterfowl use area. Malardi WMA is 127 acres, composed mostly of an open water wetland with surrounding lowland shoreline vegetation. Spring and fall diver (duck) migrations can be exceptional on the marsh. In the spring there are a large number of birds on the marsh. Trumpeter swans have routinely nested on the marsh (DNR WMA website: http://www.dnr.state.mn.us/wmas/index.html). Neither of these WMAs will be negatively impacted by the development within the AUAR area.

The increase in population and the associated activity due to development within the AUAR area is not anticipated to affect the fish community of Malardi or Woodland WMA or Fountain Lake.

There is a need to prevent the further spread of aquatic invasive species, especially Eurasian watermilfoil (Myriophyllum spicatum), Curly-leaf pondweed (Potamogeton crispus) and the zebra mussel (Dreissena polymorpha). No lake in the AUAR area is known to currently be infested with Eurasian watermilfoil, Curly-leaf pondweed or zebra mussels, but the potential for their introduction increases with boats entering the lakes. All boaters need to increase their efforts to prevent the introduction of Eurasian watermilfoil, Curly-leaf pondweed, zebra mussels and other invasive aquatic species into these lakes and other uninfested lakes in Minnesota; therefore, highly visible signs describing the threat from Eurasian watermilfoil, Curly-leaf pondweed and zebra mussels will be appropriately placed and information about Eurasian watermilfoil, Curly-leaf pondweed and zebra mussels will be made available to boaters through DNR educational resources.

B. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources such as native prairie habitat, colonial waterbird nesting colonies or regionally rare plant communities on or near the site?

If yes, describe the resource and how it would be affected by the project. Indicate if a site survey of the resources has been conducted and describe the results. If the DNR Natural Heritage and Non-game Research Program has been contacted give the correspondence reference number. Describe measures to minimize or avoid adverse impacts.

☐ No

☒ Yes

DNR Natural Heritage and Non-game Research Program Correspondence Reference No. **ERDB 20180092,** ***dated August 24, 2017.***

A Minnesota Natural Heritage database search reported five known occurrences of rare species or native plant communities within a one-mile radius of (but not within) the AUAR area. ***American ginseng (panax quinquefolius), a species of special concern, has been identified within a mile of the eastern edge of the AUAR boundary. Bald eagles (haliaeetus leucocephalus), which no longer have protected status but are included on Minnesota watchlists, have been sited within a mile of the northern edge of the AUAR boundary.*** The Trumpeter Swan (cygnus buccinators), a species of special concern, has nested on Malardi Lake WMA marshes occasionally in the past. ***Minnesota Natural Historic Information System data report Trumpeter Swan sitings north and east/southeast of the AUAR boundaries. The native plant communities identified are Oak Forest and Maple Basswood Forest. These plant communities have been identified east and south of the AUAR boundaries. As all species and plant communities are not within the AUAR boundaries, there are few to no adverse impacts anticipated.***

The AUAR area also includes both the Malardi WMA and the Woodland WMA. Neither of these areas will be negatively impacted by the development within the AUAR.

12. PHYSICAL IMPACTS ON WATER RESOURCES

Will the project involve the physical or hydrologic alteration, such as dredging, filling, stream diversion, outfall structure, diking, and impoundment, of any surface waters such as a lake, pond, wetland, stream or drainage ditch?

If yes, identify water resource affected and give the DNR Protected Waters Inventory number(s) if the water resources affected are on the PWI. Describe alternatives considered and proposed mitigation measures to minimize impacts.

☐ No

☒ Yes

DNR Public Waters

The digital DNR Public Waters Inventory (PWI) for Wright County indicates the AUAR area includes Mud Lake (aka Woodland WMA) (86-585P) along the eastern AUAR boundary, Malardi Lake (86-112P), a portion of Fountain Lake (86-86P), a portion of an unnamed DNR Public Water (wetland) (86-372W) in the eastern portion of the AUAR area, a portion of unnamed DNR Public Water (lake) (86-105P) in the western portion of the AUAR area and a portion of an unnamed DNR Public Water (wetland) (86-446W) at the southern end of the AUAR area (Figure 10). There are also four unnamed creeks that flow through the AUAR area. The creeks are labeled on Figure 10. Although the North Fork of the Crow River is not within the AUAR boundaries, the AUAR area ultimately drains to the River, which is northeast of the AUAR area.

Woodland Wildlife Management Area (from DNR website: http://www.dnr.state.mn.us/wmas/index.html)
Area: 701 acres
Location: 1 mile southeast of Montrose within Sections 1 and 12, T118N, R26W.
Description: This WMA consists of a 500-acre open water cattail dominated wetland (Mud Lake) surrounded by upland cool season grasses with some brushy components. Water control capabilities allow for water level management of the wetland. Water access is limited to a northeast parking lot

and an east parking lot.

Malardi Wildlife Management Area
Area: 127 acres
Location: 1.5 miles northeast of Montrose within Sections 25 and 36, T119N, R26W.
Description: This 127-acre WMA is composed mostly of an open water wetland (Malardi Lake) with surrounding lowland shoreline vegetation. A trail on the east side of the WMA leading to a water access/parking lot is the principal entry point to the unit.

Wetlands
National Wetland Inventory wetlands within the AUAR area total 1849.13 acres or 26 percent of the AUAR area (Figure 11). Table 12-1 lists the number of wetlands and areas of different wetland types within the AUAR study area based on the Cowardin system.

Table 12-1. Wetland Characteristics		
Wetland Type (Cowardin)[1]	**Area (Acres)**	**Count[2]**
L1UBH	12.73	1
L2UBG	97.01	1
PEM/SS1Bd	7.87	2
PEM/SS1Cd	1.51	1
PEM/UBFd	408.68	1
PEMA	25.25	12
PEMAd	106.78	18
PEMB	35.96	13
PEMBd	9.98	6
PEMC	188.95	110
PEMCd	714.08	100
PEMF	74.66	23
PEMFd	23.74	13
PFO1/EMB	1.54	1
PFO1/EMC	2.03	1
PFO1A	2.88	1
PFO1B	14.53	5
PFO1Bd	4.13	2
PFO1C	33.24	9
PFO1Cd	13.92	6
PSS1B	4.04	4
PSS1Bd	3.22	2
PSS1C	2.38	4
PSS1Cd	25.81	9
PUB/EMF	1.20	3
PUBF	10.62	15
PUBFd	14.81	5
PUBFx	2.74	16
PUBKx	4.84	2
Total	**1849.13**	386

[1] *Wetland type based on Cowardin et al. (1979).*

[2]This is the number of NWI wetlands within the AUAR area that are this wetland type.

Wetland Impacts

Impacts to the majority of the wetland acreage in the AUAR area will be avoided. Development of the area will impact some wetlands, particularly those adjacent to or nearby existing or proposed roadways and higher density development areas. Detailed wetland impact and replacement plans are not yet available for developments within the AUAR area. The impacts are likely to occur in the form of fill and excavation. The City of Montrose recognizes the value of wetlands of all sizes and is committed to avoidance of wetland impacts where practicable. The City's ordinances list methods of protection for wetlands, including a minimum 30-ft vegetated buffer for wetlands. This further protects the integrity of the wetland and provides further treatment of sheet flow storm water runoff prior to entering the wetland. Regional storm water ponds will not be constructed in wetlands.

Individual developers within the AUAR area that propose alterations to jurisdictional wetlands will be required to follow the sequencing process of wetland avoidance, minimization, rectification, and mitigation as outlined in the Minnesota Wetland Conservation Act (WCA). Wetlands will need to be delineated and permit applications will need to be prepared and submitted to the City of Montrose and the U.S. Army Corps of Engineers to obtain authorization for wetland alterations under the WCA and Section 404 of the Federal Clean Water Act prior to project construction. Wetland applications and designs will undergo additional review and comment by the Minnesota DNR, the Minnesota Board of Water and Soil Resources, the Wright Soil and Water Conservation District and the Minnesota Pollution Control Agency.

Wetland impacts will be replaced in compliance with the Minnesota WCA and the Federal Clean Water Act. Under the WCA, a minimum of 2 to 1 wetland replacement is required to compensate for wetland alteration including filling and drainage. At least the first 1 to 1 wetland replacement must be in the form of New Wetland Credit to satisfy WCA requirements. Detailed wetland alteration and replacement plans have not been completed for developments within the AUAR area, therefore, the extent of mitigation is not known at this time. Wetland replacement will either be designed to expand upon existing on-site wetlands, created in conjunction with storm water ponding, or credits will be purchased from a local wetland bank. On-site wetland replacement will be explored as the first alternative for compensatory mitigation.

The City of Montrose will study the feasibility of creating a wetland bank within the AUAR area. If the feasibility study reveals that the creation of a wetland bank within the AUAR area is feasible and necessary, the City will employ necessary measures to develop a wetland bank.

13. WATER USE

Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)?

If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

☐ No

☒ Yes

There are a total of 109 wells within the AUAR boundary listed on the County Well Index Online from the Minnesota Department of Health (MDH). As properties that have wells are developed, these wells will be sealed and properly abandoned in accordance with MDH regulations. Other unregistered wells encountered during construction will be sealed and properly abandoned in compliance with MDH regulations prior to site development. The existing farmsteads will be connected to City water mains when development reaches them.

Public water service is not presently available to the entire AUAR area. The City has four existing wells: unique well numbers 00235853 (Well #2), 00149692 (Well #3), 00700302 (Well #4), and 0700301 (Well #5). The wells have a total pumping capacity of 1,100 gpm. The Full Build area is anticipated to have a water demand of approximately 7,300 gpm. Additional wells will be required to meet these demands. Based upon an assumed average pumping capacity of 400 gpm for each well, it is anticipated that an additional 17 wells will need to be constructed to meet the demands of the Full Build area. Additional wells will be constructed as development within the areas progress and additional pumping capacity is warranted. The Minnesota Department of Natural Resources (DNR) Water Appropriations Permit will need to be amended to provide for this water usage.

The groundwater aquifer is considered “non-vulnerable” in the Montrose area, due to a thick clay layer that separates the water table that feeds the surface water from the drinking water aquifer. Therefore, additional pumping of the drinking water aquifer should not affect the surface waters, such as wetlands.

Due to the unknown layout of plats within the AUAR area, a proposed well configuration layout would only be conceptual at this time and therefore is not included. Also, since watermains will be installed as development progresses and the location of future wells is dependent upon the proximity of adjacent watermains it would be difficult to determine the location of future wells at this time. As the AUAR is updated every five years, maps could be developed showing the location of more immediate proposed wells.

Monitoring wells to monitor effects of the increase in appropriation will be drilled at each proposed well location prior to the construction of the well. Test pumping and aquifer data at the proposed well location will be gathered and submitted to the DNR for approval prior to the new well construction. Also, the City will be installing a continuous aquifer monitoring system in their primary two wells. The system will allow the aquifer to be monitored at existing well locations for aquifer levels including drawdowns, static water level, and provide a history of aquifer level data useful in analyzing aquifer sustainability.

The City’s existing water supply meets all National Primary Drinking Water Regulations. The existing water supply does contain levels of manganese around 0.8 mg/L to 1.4 mg/L. These levels exceed the recommended secondary drinking water standard of 0.05 mg/L. Polyphosphate is added into the distribution system to help combat the higher levels of manganese by keeping the manganese particles in suspension. Iron and manganese levels will continue to be monitored as new wells are constructed.

Development within the AUAR area will require that the City of Montrose trunk water distribution system be extended to serve future development. The trunk water distribution system will be installed as development occurs, and will be funded by development charges. The proposed trunk water main layout is shown in Figures 12 through 16. Figure 17 shows the existing conditions water pressure. Figure 18 shows existing conditions fire flow. Figure 19 shows the proposed Interim Build water pressure. Figure 20 shows proposed Interim Build fire flow. Figure 21 shows the proposed Full Build water pressure. Figure 22 shows proposed Full Build fire flow.

Currently, the City of Montrose has one 250,000-gallon elevated water tower ***and one 50,000-gallon elevated water tower. The City's 5 year capital improvement plan includes plans to construct a new 100,000-gallon water tower to replace the existing 50,000 gallon water tower. This will bring the total storage capacity to 350,000 gallons.*** One additional 750,000-gallon water tower will be constructed within the Interim Build area towards the north boundary line ***and one 500,000 gallon tower would be constructed towards the south boundary line*** as shown in Figure 12. Another 500,000-gallon and 1,000,000-gallon water tower will be constructed as part of the full build area. All towers will be constructed as development progresses and storage needs warrant an additional water tower. Water flow and pressure will be adequate for service to the entire AUAR area with the proposed water towers and trunk line distribution system.

One or more temporary Minnesota DNR Water Appropriation Permits may be necessary to conduct construction dewatering. Dewatering may be necessary during construction to install sanitary sewer, municipal water, and storm sewer in some areas. Construction dewatering is usually conducted less than 15 feet under the ground. Contractors will carry out these activities on a case-by-case basis at the minimum duration and quantity necessary to construct utility service for the affected sites. A temporary DNR Water Appropriation Permit will be required if construction dewatering and pumping from development exceeds 10,000 gallons per day or 1,000,000 gallons per year. The DNR General Permit 97-0005 for Temporary Water Appropriations will apply if construction dewatering does not exceed 50 million gallons in total and duration of one year from the start of pumping. The quantity and duration of construction dewatering is not known at this time, but dewatering activities will be temporary. It is not anticipated that construction dewatering or pumping will be extensive or continue long enough to impact domestic or municipal wells. Groundwater appropriated for construction dewatering purposes will be discharged into temporary or permanent ponds located within the AUAR area.

Summary:

1. No new private wells are anticipated in the environmental study area. ***New public wells will need to be built as development occurs.*** Municipal water will be provided to new development parcels by extending the City distribution system to these areas.
2. Existing functioning wells will remain in place until City water is available within an annexed area, at which time the existing well owner will typically be required to connect to the City system.
3. Unused or failing existing wells will be sealed in accordance with state law.

14. WATER-RELATED LAND USE MANAGEMENT DISTRICT

Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district?

If yes, identify the district and discuss project compatibility with district land use restrictions.

☐ No

☒ Yes

The AUAR area does contain areas within the FEMA-delineated 100-year flood plain near Mud Lake in the Woodland WMA and Fountain Lake. See Figure 23. The City of Montrose's Floodplain Overlay District ordinance is provided in Chapter 1095 of the Zoning Ordinance. No parts of the site are within a state or federally designated wild, scenic or recreational river land use district.

The City of Montrose's Shoreland Overlay District ordinance is provided in Chapter 1096 of the Zoning Ordinance. Mud Lake and Malardi Lake are classified as Natural Environment Lakes. Malardi Lake is also in a Special Protection Shoreland District (S-1).

The AUAR area does include the shoreland overlay district of Mud Lake (aka Woodland WMA) (DNR Public Water 86-85P), Malardi Lake (PW 86-112P), Fountain Lake (PW 86-86P), an unnamed DNR Public Water (wetland) (86-372W), an unnamed DNR Public Water (wetland) (86-446W), and an unnamed tributary to the North Fork Crow River (Figure 10). The shoreland overlay districts extend 1,000 feet from the ordinary high water levels (OHWL) of these waterbodies. The OHWL of both Mud Lake and Fountain Lake is 932 feet. The OHWL of Malardi Lake is 935.1 feet. The OHWL of the unnamed wetlands will be determined by the DNR as development reaches these wetlands. The current Shoreland Overlay District Ordinance already includes Mud Lake, Malardi Lake, Fountain Lake, an unnamed DNR Public Water (wetland) (86-105P), and an unnamed tributary to the North Fork Crow River. Upon annexation, the City will revise their Shoreland Overlay District ordinance to include the three unnamed creeks (86025a, 86035a, 86032a, and 86032b) (see Item 6 and Figures 9 and 10). The revised ordinance will be submitted to the Minnesota DNR for review at that time.

Under the current shoreland ordinance, the required suitable lot area per single home with City sewer service for non-riparian residential units within the shoreland of natural environment lakes is 20,000 square feet. This corresponds to the required area per unit for the underlying Low Density Residential zoning district. The required suitable lot area per single home for riparian residential units within the shoreland of natural environment lakes is 40,000 square feet. The required areas for riparian residential lots correspond to the larger lot area requirements set forth in the Minnesota DNR model shoreland ordinance. The higher development density allowed for non-riparian residential lots provides an added incentive for developers to dedicate the land adjacent to the OHWL for public use and natural vegetation.

Development within the Shoreland Overlay Districts will be compatible with the land use restrictions set forth in the City of Montrose Shoreland Overlay District ordinance. As concept plans for development are submitted, the City will ensure plans are consistent with the ordinance and evaluate whether certain areas such as steep slopes, wetlands, and woodlands, could be considered for preservation through means that may include planned unit design negotiations, park land dedication, public acquisition, or other means.

15. WATER SURFACE USE

Will the project change the number or type of watercraft on any water body?

If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

☐ No

☒ Yes

It is anticipated that an increase in population will increase watercraft on nearby water bodies. There is limited watercraft accessibility due to low water levels on Mud Lake. Higher levels of fishing activity may decrease numbers of fish in the lakes. Otherwise, the increase in population and the associated activity due to development within the AUAR area is not anticipated to affect the fish community of Malardi or Woodland WMA or Fountain Lake.

16. EROSION AND SEDIMENTATION

Give the acreage to be graded or excavated and the cubic yards of soil to be moved. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

The City is very concerned and watchful of construction erosion and sedimentation. The City has strict requirements in place that all builders and developers must meet regarding the prevention of construction erosion and sedimentation. The City performs ***routine*** checks on construction sites and will terminate building inspections if contractors do not comply with the erosion and sedimentation control requirements.

Soil types are shown on Figure 24. Steep slopes are defined in the Environmental Quality Board's guidance as slopes of 12 percent or greater. According to the digital Soil Survey of Wright County, Minnesota (USDA NRCS, 2006), 4 of the 38 soil map units within the AUAR boundary have slopes of at least 12 percent and are indicated in the table below. These steeply sloped areas cover approximately 191 acres, or 3 percent, of the AUAR area. Four highly erodible soil (HEL) map units are identified on the site (totaling 191 acres or 3 percent of the AUAR area), along with three potentially highly erodible soils (PHEL) (totaling 1,045 acres or 15 percent of the AUAR area) (Figure 25), according to the digital Soil Survey of Wright County, Minnesota (USDA NRCS, 2006). The remaining 31 soil types are considered not highly erodible (NHEL). A field visit is required to determine the slope length and accurately classify potentially highly erodible lands. Soil unit slopes, water erosion potential, and erodibility for site soils, as described in the soil survey, are outlined in Table 16-1 below. Figure 26 shows hydric soils.

Table 16-1. Soil Characteristics

Map Unit	Soil Type	Slope (%)	Area (acres)	K Factor[1]	Erodibility[2]	Hydric Soil
1016	Udorthents, Loamy (Cut and Fill Land)	3	33.65	NR[3]	NR[3]	No
1023 D	Lester-Malardi Complex, Eroded	12-18	14.34	0.28	HEL	No
1027	Udorthents, Wet Substratum (Fill Land)	1	9.98	NR[3]	NR[3]	No
1030	Pits, Gravel-Udipsamments Complex	NR[3]	4.25	NR[3]	NR[3]	No
1035 B	Crowfork Loamy Sand	1-6	340.02	0.17	NHEL	No
1035 C	Crowfork Loamy Sand	6-12	46.54	0.17	NHEL	No
1066 C	Malardi-Hawick Complex	6-12	7.81	0.20	PHEL	No
106C 2	Lester Loam, Eroded	6-12	957.39	0.28	PHEL	No
106D 2	Lester Loam, Eroded	12-18	118.83	0.28	HEL	No
106E	Lester Loam	18-25	18.07	0.28	HEL	No
1080	Klossner, Okoboji, and Glencoe Soils, Ponded	0-1	91.69	0.28	NHEL	Yes
1087 B	Angus-Malardi Complex	2-6	18.31	0.28	NHEL	No
109	Cordova Clay Loam	0-2	633.19	0.28	NHEL	Yes

Table 16-1. cont. Soil Characteristics						
Map Unit	**Soil Type**	**Slope (%)**	**Area (acres)**	**K Factor[1]**	**Erodibility[2]**	**Hydric Soil**
1094 B	Angus-Cordova Complex	0-5	15.37	0.28	NHEL	Yes
114	Glencoe Clay Loam, Depressional	0-1	77.02	0.28	NHEL	Yes
1163	Suckercreek Loam, Frequently Flooded	0-2	31.06	0.28	NHEL	Yes
1173	Muskego and Klossner Soils, Frequently Flooded	0-1	45.17	NR[3]	NHEL	Yes
1197	Suckercreek Fine Sandy Loam, Occasionally Flooded	0-2	56.36	0.24	NHEL	Yes
1203	Muskego, Blue Earth, and Houghton Soils, Ponded	0-1	387.63	NR[3]	NHEL	Yes
1356	Water, Miscellaneous	NR[3]	31.52	NR[3]	NR[3]	No
W	Water	NR[3]	130.78	NR[3]	NR[3]	No
1362 B	Angus Loam	2-5	461.05	0.28	NHEL	No
1388 B	Terril Loam, Moderately Wet	2-6	6.84	0.24	NHEL	Yes
1443	Belleville Sandy Loam	0-2	54.05	0.20	NHEL	Yes
181	Litchfield Loamy Fine Sand	0-2	27.48	0.17	NHEL	No
1901 B	Angus-Le Sueur Complex	1-5	1717.89	0.28	NHEL	No
239	Le Sueur Clay Loam	1-3	141.56	0.24	NHEL	No
255	Mayer Loam	0-2	2.53	0.24	NHEL	Yes
392	Biscay Loam	0-2	87.14	0.28	NHEL	Yes
414	Hamel Loam	1-3	331.96	0.28	NHEL	Yes
523	Houghton Muck, Depressional	0-1	62.48	NR[3]	NHEL	Yes
539	Klossner Muck, Depressional	0-1	550.71	NR[3]	NHEL	Yes
548	Medo Muck, Depressional	0-1	70.64	NR[3]	NHEL	Yes
740	Hamel-Glencoe, Depressional, Complex	0-3	108.20	0.28	NHEL	Yes
74B	Dickinson Fine Sandy Loam	1-6	0.76	0.20	NHEL	No
86	Canisteo Clay Loam, Moderately Fine Substratum	0-2	88.79	0.24	NHEL	Yes
945C 2	Lester-Storden Complex, Eroded	6-12	79.68	0.28	PHEL	No
945D 2	Lester-Storden Complex, Eroded	12-18	40.10	0.28	HEL	No
956	Canisteo-Glencoe, Depressional, Complex	0-2	191.74	0.24	NHEL	Yes
	Total		**7092.58**			

1 *Erosion Factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.00 to 0.28; the higher the value, the more susceptible the soil is to such erosion.*
2 *HEL = Highly Erodible Land, NHEL = Not Highly Erodible Land, PHEL = Potentially Highly Erodible Land.*
3 *NR=Not reported in Highly Erodible Soil Map Unit List for Wright County, Minnesota*

Total areas for each hydrologic group for site soils are outlined in Table 16-2 below. There are approximately 210 acres within the AUAR area that are either water or hydrologically unclassified soils, thus the area in Table 16-1 and 16-2 are not the same. Figure 27 shows the soil hydrologic groups.

Table 16-2. Soil Hydrologic Groups	
Hydrologic Group[1]	**Area (acres)**
A	386.56
B	3,625.49
C	0.00
D	132.59
A/D	1,163.16
B/D	1,574.61
Total	**6,882.41**

1 Hydrologic soil groups are used to estimate runoff from precipitation: A – high infiltration rate, low runoff potential; B – moderate infiltration rate; C – slow infiltration rate, D – very slow infiltration rate, high runoff potential. There are approximately 210 acres within the AUAR area that are either water or unclassified soils, thus the area in Table 16-1 and 16-2 are not the same.

Grading will be conducted in phases in the AUAR area. Earthmoving for development will include grading for streets, utilities, buildings, residential lots, and other urban amenities throughout the developable portions of the site.

Before initiating construction, proposers of projects disturbing at least one acre of land must obtain coverage under the NPDES (National Pollutant Discharge Elimination System)/SDS (State Disposal System) Phase II Storm Water Program. The General Permit for construction activities requires: (1) management of storm water discharge during construction; (2) use of Best Management Practices (BMPs) to prevent erosion and control sediment; and (3) inspection of all erosion controls at least once every seven days during active construction and within 24 hours after a rainfall event greater than 0.5 inch in 24 hours. Requirements for storm water discharge design and construction activity under the General Storm Water Permit include:

1. Design and implementation of a Storm Water Pollution Prevention Plan (SWPPP). BMPs identified in the SWPPP, and as outlined below, must be installed in an appropriate and functional manner.

2. Provision of temporary sediment basins wherever ten or more acres drain to a common location. Basins should be sized to capture runoff from a 2-year, 24-hour storm.

3. Construction of permanent storm water management systems, such as sedimentation or infiltration basins, where one or more acres of cumulative impervious surface are created.

4. Erosion Prevention Practices:

   A. The Permittee must implement appropriate construction phasing, vegetative buffer strips, horizontal slope grading, and other construction practices that minimize erosion.

   B. All exposed soils and stockpiles with significant silt, clay, or organic components must be stabilized with temporary erosion protection or permanent cover in accordance with the following table, which shows the maximum time that an area can remain open when it is not actively being worked:

Type	Maximum Time to Remain Open
By surface, special, or impaired waters	7 days
All other exposed soils	14 days

C. The normal wetted perimeter of any drainage ditch that carries water from or around a construction site must be stabilized within 200 feet from the property edge or point of discharge to surface water. Stabilization must be completed within 24 hours of connecting to a surface water.

D. Pipe outlets must have energy dissipation within 24 hours of connection to a surface water.

5. Sediment Control Practices:

   A. Sediment control practices must minimize sediment entering surface waters, including curb and gutter systems and storm sewer inlets.

      i. Temporary or permanent drainage ditches and sediment basins must include sediment control practices appropriate for site conditions.

      ii. Additional upgradient sediment control practices must be installed if the downgradient treatment system is overloaded.

   B. Sediment control practices must be established on all down-gradient perimeters before any upgradient land disturbing activities begin. These practices must remain until final stabilization has been established.

   C. Sediment control practices may be adjusted to accommodate short-term activities such as clearing, grubbing, or vehicle passage. Any short-term activity must be completed as quickly as possible and the sediment control practices must be installed immediately after the activity is completed.

   D. All storm drain inlets must be protected by appropriate BMPs during construction until all sources with potential for discharging to the inlet have been stabilized.

   E. Temporary soil stockpiles must have silt fence or other effective sediment controls, and cannot be placed in surface waters or storm water conveyances such as curb and gutter systems or ditches.

   F. Vehicle tracking of sediment from the construction site must be minimized by BMPs such as stone pads, wash racks, or equivalent systems. Street sweeping must be used if such BMPs are not adequate to prevent sediment from being tracked onto the street.

   G. The Permittee must install temporary sedimentation basins as required in Part III.C. of the Permit.

6. Final Stabilization of the site must be achieved by establishing perennial vegetative cover, or other equivalent means, to prevent soil failure under erosive conditions. For residential construction, final stabilization is achieved when the residence is transferred to the homeowner.

The NPDES Phase II Storm Water Program also regulates municipal separate storm sewer systems (MS4s). A proposed General Permit for storm water discharged by specified MS4s became effective September, 2005. Although Montrose is not included in the List of Mandatory

MS4s, which is based on a municipality's location within a federally designated urbanized area, the City is subject to ongoing revisions to state rules. Under the proposed rules, MS4s that serve a population of at least 10,000, and MS4s with a population of at least 5,000 that discharge to valuable or polluted waters, may be regulated as well. When Montrose's population reaches 10,000, it is anticipated that the City will need to apply for permit coverage. Operators of regulated MS4s are required to design programs that reduce the discharge of pollutants to the maximum extent practicable, which will involve the development and implementation of BMPs. Achievement of six minimum control measures, including public education and participation, illicit discharge detection and elimination, runoff control during and after construction, and pollution prevention, will also be required.

17. WATER QUALITY: SURFACE WATER RUNOFF

A. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

This section identifies the selected technique for long-term treatment of storm water runoff, as well as rate and volume mitigation measures meeting State, County and City requirements. Storm water runoff from construction sites was addressed in Item 16. The City's *Surface Water Management Plan* (SWMP) and the City's Comprehensive Plan indicate the desire for a regional approach to storm water treatment and management. The goals ***of surface water management*** include the following:

- Identification of waters receiving runoff from the site.
- Limitation of post-development discharges to pre-development discharges for the 2-, 10-, and 100-year rainfall events using regional retention basins.
- Provision of permanent-pool volume for water quality treatment in accordance with NURP guidelines.
- Emphasis on importance of reducing runoff volumes typically seen with new development.
- Maintenance or improvement of existing wetland value.
- ***Reduction of public expenditures necessary to control excessive volumes and rates of runoff***
- ***Flood reduction***
- ***Identification of current and future drainage patterns***
- ***Protection and enhancement of the area's natural habitat***
- ***Promotion of ground water recharge***
- ***Protection of water quantity and quality in wetlands***
- ***Reduction in erosion from surface flows***

Since there were areas of the AUAR area that were not covered by the SWMP, those areas were also modeled in the same method and are discussed below. Storm water runoff from the AUAR area travels in three general directions: north, south and east. The entire area is within the North Fork of the Crow River watershed, so it eventually drains to the North Fork of the Crow River, which lies northeast of the AUAR area.

The volume and rate of runoff water generated by the AUAR area will increase with the higher concentration of impervious area associated with development. The primary technique for mitigation of these effects will be through the construction of "wet" regional retention ponds, which will be designed to treat the runoff and maintain existing discharge rates for the design storms. Wet sedimentation ponds shall be designed to Walker design standards (above and beyond MPCA sizing requirements), which reduce phosphorus loading at the downgradient site boundary by 40-70 percent on an annual average removal basis. The ponds will be located within outlots with the City of Montrose having ownership and being responsible for long-term maintenance. The regional ponds will not be built in wetlands. Wetlands are discussed in Item 12. Based on the specific features of the site, low impact development (LID) techniques may be considered during the concept plan review process and strategies could include, but not be limited to: impervious area minimization, natural vegetation retention, infiltration or filtration techniques (when soils permit) to aid in the reduction of discharge volumes, and storm sewer reduction (i.e. more overland flow through grass/vegetated swales to increase infiltration). This will help reduce impervious surfaces and encourage treatment and infiltration of storm water near where it falls.

The storm water runoff was modeled using the SCS TR-20 methodology within the HydroCAD storm water modeling software. Pre- and post-development conditions were analyzed for the 2-, 10-, and 100-year rainfall events. The analysis included existing land cover conditions, as well as potential future conditions.

The existing watershed boundaries, drainage patterns and node identifications as used in the modeling are indicated in Figure 28. The majority of the soils within the central and southern areas of the study boundary are of HSG Type B, HSG Type B/D (Type D, but acts like Type B if drained) and Type A/D (Type D, but acts like Type A if drained), with isolated areas in HSG Type D. In the northeastern and eastern portions of the AUAR area, there are more HSG Type A, HSG Type A/D and HSG Type B/D soils. See Figure 27 for Hydrologic Classifications of soils in the AUAR area. The Type A soils allow for rapid infiltration, Type B soils allow for moderate infiltration, while the D soils have much slower infiltration rates and are often found in low, wet areas.

The potential for a junior high school to be constructed in the near future and more elementary schools to be constructed in the more distant future would involve replacement of a portion of low-density residential land use with a school site. The percentage of impervious surfaces would likely be higher for a school around the building and parking lot area, but there would also be playing fields associated with the school that would have a lower percentage of impervious surfaces. It is expected that the land area occupied by the school would average out to have a similar percentage of impervious as the residential land area. Accordingly, a separate analysis of school impacts on storm water was not undertaken.

The pond sizes and locations shown in Figure 28 are conceptual and based on land use assumptions, and will be finalized when specific development is proposed for each pond’s watershed. Because the regional ponds’ locations are flexible to some degree, they could be placed in parks. For that reason, proposed ponds and park search areas are included for reference. The pond outlet structures may vary somewhat from those modeled, but all outlet structures will contain skimming devices of some sort. 1.5-inch spaced trash rack rods are recommended to prevent discharge of floatable trash and litter to public waters. The storm sewer conveyance system will depend on detailed site layout and has not been included as part of this study.

The regional ponds were sized with permanent “dead-pool” storage volumes as calculated based on the criteria recommended by William Walker, Jr. in *Design Calculations for Wet Detention Ponds* (1987) (i.e., the volume equivalent to the runoff produced from a 2.5-inch rainfall event under a fully developed condition, plus additional volume based on the percentage of future impervious area). This design provides for 85-95 percent removal of suspended solids and 40-70 percent removal of total phosphorus. The required volumes and surface areas for proposed ponds (Figure 28) are summarized in Table 17-1. In addition to the runoff treatment and rate control, filtration measures may be incorporated as further development planning occurs. Localized methods, such as raingardens, may be implemented to achieve this goal; however, should smaller scale methods prove impractical, then a more regional filtration “shelf” may be desired for the regional ponds mentioned in this document.

Table 17-1. Regional Pond Design			
Pond I.D.	**Drainage Area (Acre)**	**Required Volume (Acre-Ft)**	**Pond Surface Area (Acre)**
A1-PD	160.7	17.59	4.15
A2-PD	113.8	27.80	6.56
A3-PD	46.4	1.17	0.28
A4a-PD	40.9	3.4	0.80
A4b-PD	59.7	12.44	2.94
A5a-PD	106.7	11.40	2.69
A5b-PD	16.7	1.69	0.40
A6a-PD	108.8	15.46	3.65
A7-PD	58.10	7.00	1.65
A8-PD	163.7	26.45	6.24
A9-PD	41.1	3.66	0.86
A10a-PD	52.4	4.81	1.13
A10b-PD	38.1	2.93	0.69
A10c-PD	92.1	8.51	2.01
A10d-PD	61.1	4.46	1.05
A11a-PD	59.1	4.98	1.18
A11b-PD	16.2	1.49	0.35
A13b-PD	57.2	4.93	1.16
A13c-PD	56.2	5.16	1.22
A15b-PD	32.4	2.50	0.59
A15c-PD	63.1	5.29	1.25
A15d-PD	26.5	1.68	0.40
A17a-PD	125.9	11.55	2.73
A17b-PD	136.6	15.46	3.65
A17c-PD	309.0	28.55	6.74
A18a-PD	161.1	15.72	3.71
A20a-PD	41.7	3.91	0.92
A20b-PD	104.8	10.41	2.46
A22b-PD	136.8	12.36	2.92

Table 17-1. cont. Regional Pond Design			
Pond I.D.	**Drainage Area (Acre)**	**Required Volume (Acre-Ft)**	**Pond Surface Area (Acre)**
A23b-PD	146.3	14.24	3.36
A23c-PD	224.8	18.69	4.41
A23d-PD	58.1	5.58	1.32
A23e-PD	89.7	8.15	1.92
A23f-PD	12.2	1.04	0.25
A23g-PD	56.3	5.67	1.34
A25c-PD	20.2	2.04	0.48
A26a-PD	72.3	6.58	1.55
A29a-PD	16.8	1.54	0.36
A29b-PD	23.5	1.84	0.43
A27b-PD	55.6	5.01	1.18
A27c-PD	35.7	3.59	0.85
A27d-PD	96.6	9.50	2.24
A28a-PD	98.3	7.64	1.80
A28c-PD	75.2	7.38	1.74
A30a-PD	66.4	6.48	1.53
A30b-PD	101.7	7.70	1.82
A30d-PD	53.6	5.41	1.28
A30e-PD	43.8	3.76	0.89
A30f-PD	38.8	3.91	0.92
A30g-PD	30.1	2.77	0.65

Tables 17-2 and 17-3 indicate the pre- and post-development flow rates for the design storms.

Table 17-2. Stormwater Model Results – Existing Conditions					
Sub-Catchment	**Drainage Area (Acre)**	**Composite CN**	**Q_2 (Cubic ft per sec) (P=2.7")[1]**	**Q_{10} (Cubic ft per sec) (P=4.1")[1]**	**Q_{100} (Cubic ft per sec) (P=5.9")[1]**
A1	160.70	78	13.32	41.11	104.10
A2	113.80	78	70.40	159.51	286.82
A3	46.40	63	6.32	29.34	71.84
A4a	40.90	73	14.53	38.48	75.04
A4b	104.10	70	18.28	53.91	111.49
A5	349.50	77	25.09	82.48	206.78

Table 17-2. cont. Stormwater Model Results – Existing Conditions					
Sub-Catchment	Drainage Area (Acre)	Composite CN	Q_2 (Cubic ft per sec) (P=2.7")[1]	Q_{10} (Cubic ft per sec) (P=4.1")[1]	Q_{100} (Cubic ft per sec) (P=5.9")[1]
A5a	106.70	78	13.93	45.61	118.32
A5b	16.70	78	7.14	16.26	29.34
A5c	114.00	71	20.14	57.65	117.28
A6	329.90	76	26.95	87.38	217.51
A6a	108.80	73	10.67	33.07	86.52
A7	58.10	73	4.62	11.75	22.83
A8	163.70	77	13.08	42.20	106.21
A9	42.30	69	15.57	48.75	101.40
A10a	52.40	72	20.96	57.92	114.51
A10b	59.10	69	20.96	39.64	83.34
A10c	92.10	78	8.70	28.56	71.18
A10d	61.10	74	7.77	24.96	63.88
A11a	32.70	79	22.44	49.48	87.79
A11b	16.20	72	6.66	18.27	36.20
A11c	104.60	79	11.98	38.06	100.71
A13a	52.60	78	33.70	76.26	137.24
A13b	57.20	76	27.71	66.48	123.03
A13c	56.20	75	21.57	53.49	100.62
A14b	53.00	71	10.69	30.49	61.54
A15a	65.60	71	21.89	62.88	126.57
A15b	32.40	76	19.20	45.89	84.76
A15c	63.10	78	31.53	71.21	128.41
A15d	25.80	60	1.84	11.22	30.36
A16	64.10	59	2.15	11.41	30.86
A17a	125.90	74	12.33	41.64	103.63
A17b	136.60	77	14.32	46.97	117.78
A17c	187.10	75	18.94	61.68	159.22
A18a	161.10	77	12.45	39.42	98.37
A18b	80.50	77	11.59	39.75	99.43
A19	169.60	73	6.97	18.50	45.91
A20a	41.70	78	31.33	70.55	126.61
A20b	104.80	75	5.95	18.15	46.56

Table 17-2. cont. Stormwater Model Results – Existing Conditions					
Sub-Catchment	Drainage Area (Acre)	Composite CN	Q_2 (Cubic ft per sec) (P=2.7")[1]	Q_{10} (Cubic ft per sec) (P=4.1")[1]	Q_{100} (Cubic ft per sec) (P=5.9")[1]
A21	248.00	77	9.63	31.70	76.10
A22a	355.50	78	11.50	34.79	84.88
A22b	136.80	76	5.60	16.17	38.81
A23a	76.00	76	4.02	11.79	29.51
A23b	146.30	70	6.42	20.97	50.23
A23c	224.80	78	7.92	22.00	54.05
A23d	58.10	78	33.78	76.72	138.12
A23e	89.70	75	4.51	13.30	33.51
A23f	12.20	75	8.06	19.77	37.00
A23g	56.30	78	25.19	57.28	103.21
A24	58.50	79	86.85	184.86	320.56
A25a	178.30	75	121.78	297.61	555.80
A25b	20.70	78	17.63	39.46	70.49
A25c	20.20	78	11.91	26.93	48.33
A26a	72.30	77	5.59	18.55	45.45
A26b	21.40	85	27.85	53.11	86.63
A27a	12.30	82	13.63	27.70	46.99
A27b	55.60	74	32.31	82.17	156.28
A27c	35.70	78	27.55	61.97	111.01
A27d	96.60	79	8.49	28.61	71.73
A28a	98.30	78	9.37	31.74	78.34
A28b	29.60	78	24.51	54.89	97.99
A28c	75.20	74	20.75	52.97	101.65
A29a	16.80	75	11.87	28.88	53.85
A29b	23.50	69	5.54	17.43	36.76
A29c	16.40	82	22.24	44.86	75.65
A30a	66.40	78	27.71	62.94	113.66
A30b	101.70	73	6.86	20.50	49.30
A30c	44.50	82	60.35	121.71	205.27
A30d	53.60	73	18.02	47.70	92.97
A30e	43.80	75	18.82	46.47	87.55

Table 17-2. cont. Stormwater Model Results – Existing Conditions					
Sub-Catchment	Drainage Area (Acre)	Composite CN	Q_2 (Cubic ft per sec) (P=2.7")[1]	Q_{10} (Cubic ft per sec) (P=4.1")[1]	Q_{100} (Cubic ft per sec) (P=5.9")[1]
A30f	38.80	78	18.58	42.18	76.02
A30g	30.10	76	24.97	58.84	108.07

[1]P = Precipitation (inches of rain in 24 hours).

Table 17-3. Stormwater Model Results –Proposed Full Build Conditions					
Sub-Catchment	Drainage Area (Acre)	Composite CN	Q_2 (Cubic ft per sec) (P=2.7")[1]	Q_{10} (Cubic ft per sec) (P=4.1")[1]	Q_{100} (Cubic ft per sec) (P=5.9")[1]
A1	160.70	78	7.88	37.25	69.24
A2	113.80	79	0.89	4.07	7.04
A3	46.40	54	0.75	2.51	19.38
A4a	40.90	78	6.95	24.91	70.57
A4b	59.70	80	2.46	10.62	34.43
A5	349.50	77	25.09	82.48	206.78
A5a	106.70	80	9.66	43.48	109.96
A5b	16.70	79	0.87	12.50	24.27
A5c	114.00	71	20.14	57.65	117.28
A6	329.90	76	26.95	87.38	217.51
A6a	108.80	88	8.36	29.18	83.92
A7	58.10	82	4.35	9.44	22.59
A8	163.70	90	10.35	33.52	88.62
A9	42.30	77	5.21	19.90	48.88
A10a	52.40	75	4.87	19.40	62.66
A10b	59.10	74	4.73	19.64	69.90
A10c	92.10	78	5.39	23.92	64.75
A10d	61.10	75	6.67	24.21	62.61
A11a	32.70	79	6.47	20.04	55.12
A11b	16.20	75	2.64	5.29	17.99
A11c	104.60	79	11.98	38.06	100.71
A13a	52.60	78	33.70	76.26	137.24
A13b	57.20	77	7.25	22.01	92.24
A13c	56.20	75	4.77	19.36	64.02
A14b	53.00	71	10.69	30.49	61.54
A15a	65.60	71	21.89	62.88	126.57

Table 17-3. cont. Stormwater Model Results –Proposed Full Build Conditions					
Sub-Catchment	Drainage Area (Acre)	Composite CN	Q_2 (Cubic ft per sec) (P=2.7")[1]	Q_{10} (Cubic ft per sec) (P=4.1")[1]	Q_{100} (Cubic ft per sec) (P=5.9")[1]
A15b	32.40	73	3.40	16.69	32.41
A15c	63.10	79	8.27	13.86	114.67
A15d	25.80	68	1.12	5.24	26.25
A16	64.10	59	2.15	11.41	30.86
A17a	125.90	77	6.63	32.42	85.08
A17b	136.60	82	8.88	37.31	100.17
A17c	323.70	78	10.15	40.53	143.82
A18a	161.10	78	7.60	35.35	96.16
A18b	80.50	77	11.59	39.75	99.43
A19	169.60	73	6.97	18.50	45.91
A20a	41.70	79	7.07	21.13	54.71
A20b	104.80	79	3.91	16.58	44.14
A21	248.00	77	9.63	31.70	76.10
A22a	355.50	78	11.50	34.79	84.88
A22b	175.30	78	3.99	16.81	36.95
A23a	76.00	76	4.02	11.79	29.51
A23b	146.30	78	4.66	19.89	49.25
A23c	224.80	78	5.19	17.65	50.45
A23d	58.10	81	10.37	34.21	111.34
A23e	89.70	77	4.05	12.07	33.26
A23f	12.20	75	0.04	1.16	8.60
A23g	56.30	79	7.42	21.53	62.26
A24	58.50	79	86.85	184.86	320.56
A25a	178.30	75	121.78	297.61	555.80
A25b	20.70	78	17.63	39.46	70.49
A25c	20.20	79	5.35	11.14	24.27
A26a	72.30	79	3.95	17.69	43.98
A26b	21.40	85	27.85	53.11	86.63
A27a	12.30	82	13.63	27.70	46.99
A27b	55.60	76	2.18	10.32	64.03
A27c	35.70	79	2.15	9.60	46.46
A27d	96.60	79	4.30	18.53	63.40

Table 17-3. cont. Stormwater Model Results –Proposed Full Build Conditions					
Sub-Catchment	Drainage Area (Acre)	Composite CN	Q_2 (Cubic ft per sec) (P=2.7")[1]	Q_{10} (Cubic ft per sec) (P=4.1")[1]	Q_{100} (Cubic ft per sec) (P=5.9")[1]
A28a	98.30	79	4.25	15.92	74.76
A28b	29.60	78	24.51	54.89	97.99
A28c	75.20	79	5.78	26.46	86.09
A29a	16.80	75	1.07	5.53	21.86
A29b	23.50	72	2.55	7.04	18.65
A29c	16.40	82	22.24	44.86	75.65
A30a	66.40	79	9.95	26.28	75.19
A30b	101.70	73	2.09	8.82	39.99
A30c	44.50	82	60.35	121.71	205.27
A30d	53.60	78	4.45	19.45	41.54
A30e	43.80	77	8.10	20.06	46.69
A30f	38.80	79	4.45	19.97	42.19
A30g	30.10	77	1.78	8.53	53.71

[1]P = Precipitation (inches of rain in 24 hours).

As shown in the tables above, the regional ponding would reduce existing runoff discharge rates from the site and, as expected, the volume of water discharging from the site would increase after development. However, these numbers do not reflect pond infiltration or evaporation, nor any infiltration or LID techniques implemented within the study area.

The ponds have been designed and sized to the standards of the City's SWMP, which meet the NPDES requirements (e.g., dead-pool storage, 10 ft bench, etc.). As additional information becomes available (e.g., more detailed topographic information) it may become evident that local treatment ponds are necessary for treatment of isolated runoff. Any localized development ponds that are sized for the site will be required to meet the standards of the City's SWMP. The City of Montrose will require a long-term maintenance plan for storm water retention ponds to be in place before giving final plan approval to developers. The City charges each resident a storm water utility fee each month, and these funds are used to operate and maintain the storm water retention ponds. The City of Montrose will be developing a process to fund, acquire, and develop regional ponds.

B. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

Storm water runoff from the AUAR area travels in three general directions: north, south and east. Major receiving waters include Malardi Lake, Mud Lake, Fountain Lake, and many unnamed wetlands. The entire area is within the North Fork of the Crow River watershed, so the runoff from the area eventually drains to the North Fork of the Crow River.

Pre-development land use within the AUAR area is predominantly cultivated row cropland, which contributes higher amounts of phosphorus when compared to urban or undisturbed land uses. According to previous studies, agricultural runoff is usually considered a more important cause of phosphorus loading and lake eutrophication than is urban runoff.1

Because a large portion of the soils in the AUAR area have rapid to moderate infiltration rates, infiltration will be encouraged (where appropriate) to reduce stormwater volumes and recharge groundwater. Infiltration may be implemented in the form of raingardens and infiltration “shelves” in regional wet sedimentation ponds. This means that, above the normal water level of the ponds, the soil will be permeable so that any water above the normal water level will be infiltrated. Further reduction of phosphorus loading will be accomplished through construction of wet sedimentation ponds, as described in Item 17A. Wet sedimentation ponds shall be designed to Walker design standards, which reduce phosphorus loading at the downgradient site boundary by 40-70 percent on an annual average removal basis.

According to the MPCA, an Unnamed Creek/Unnamed Ditch (Assessment Unit ID 07010204-667), which runs from Mud Lake (Woodland WMA) to the North Fork Crow River on the eastern side of the AUAR area, is listed as impaired and a Total Maximum Daily Load (TMDL) limit is needed for dissolved oxygen and nutrients. This channel also has an approved TMDL for E. coli. The North Fork of the Crow River (Assessment Unit ID 07010204-503) to the northeast but not inside of the AUAR area, was delisted in 2016 for a previous dissolved oxygen impairment.

Activities to develop a TMDL typically result in Waste Load Allocations (WLA) or limitations that are imparted onto current MPCA permitted authorities, including Wastewater Treatment Plant permits, Industrial permits, Construction Stormwater Permits and Municipally Separate Storm Sewer System (MS4) permits. The City of Montrose can be indirectly affected by current and future waste load allocations through construction storm water permits and its share in the waste water treatment plant. In addition, industries within the City of Montrose that are required to submit Industry specific permits, may also be included in potential future waste load allocations. These will all be addressed as they are implemented.

The current population in Montrose is insufficient for MPCA to require a city-wide Municipally Separate Storm Sewer System (MS4) permit. If an MS4 permit is required of Montrose in the future, the City will most likely need to implement appropriate ordinances and other controls to meet TMDL and waste load allocations. If or when this occurs, the City will comply with future requirements as set forth by the DNR, MPCA, and any other state and federal agencies resulting from impairments and associated TMDL studies of the downstream receiving waters.

18. WATER QUALITY: WASTEWATER

A. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

A comprehensive sanitary sewer study was completed for the City of Montrose by Bolton & Menk, Inc., and is a part of the City’s Comprehensive Plan. The comprehensive sanitary sewer study was based upon the land use plan as shown in Figure 6. The plan was developed with the two-phase approach of Interim and Full Build areas as described in Item 7. Figure 29 shows the proposed lift station service areas. Figures 30 and 31 show the existing sewer conditions. Figures 32 through 35 show the proposed sanitary sewer collection system improvements for the interim area and Figures 36 through 39 show the same for the full build area.

Design Criteria:
Calculation of wastewater flows from development of the AUAR area were based upon residential densities as outlined in Item 7. The design criteria used were based on the Recommended Standards for Wastewater Facilities (2004 Edition) prepared by the Great Lakes –

Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten States Standards) and as adopted by the State of Minnesota. Projected sewer flow rates were calculated using the criteria shown below:

Per capita flow rate	100 gallons/day
Residents per household	2.5
Peaking Factor Residential	3.0 (Population based)
Low Density Residential	3 units /acre
Medium Density Residential	8 units/acre
Peaking Factor Commercial/Industrial	3.0
Commercial	1500 gal/acre/day
Industrial	2500 gal/acre/day

Table 18-1. Summary of Total Wastewater Flows within AUAR Study Boundary (Includes Flows from Existing Developed Areas and AUAR Study Exclusion Areas)

Land Use	Developable Acres	Households Per Acre	Total Households	Population	Flow Calculation	Total Avg. Daily Flow (MGD)
Low Density Residential	3,438	3	10,314	25,785	100 gal/person/day	2.58
Medium Density Residenti	421	8	3,368	8,420	100 gal/person/day	0.84
High Density Residential	30	12	360	900	100 gal/person/day	0.09
Commercial	342	-	-	-	1500 gal/acre/day	0.51
Industrial	420	-	-	-	2500 gal/acre/day	1.05

Total Avg. Daily Flow from AUAR Full Build Area = 5.07

The collection system has been sized to accommodate development from both the Interim and Full Build areas. Layout of the collection system has been designed such that construction of any portion of the system outside of the Interim Build area will not be necessary to serve the Interim Build area. Based upon the design criteria listed above, total anticipated wastewater flows from the Full Build AUAR area are a total average daily flow of 5.07 MGD and a peak flow of 15.22 MGD (3.0 Peaking Factor) resulting from the Full Build scenario. The total flow includes existing and future flows from the study area exceptions within the AUAR study boundary as shown in Figure No. 3.

The majority of the recommended collection system improvements will be implemented as development occurs. In other words, it is intended to construct the necessary trunk sewer lines and lift stations as part of each individual development. There is a possibility that specific cases will require service before a trunk main is in place to serve the area. Each of those cases will be evaluated at that time.

B. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies, and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Wastewater from Montrose and Waverly are treated at the Montrose Regional Wastewater

Treatment Facility. The receiving water for the discharge from Montrose's wastewater treatment facility is to an unnamed wetland (Woodland WMA) and then to an unnamed creek. The treatment facility operates under a NPDES permit and can treat an average wet weather flow of 0.781 mgd, a peak hourly wet weather flow of 1.380 mgd, 740 lbs/day of carbonaceous biological oxygen demand (CBOD5) and 822 lb/day of total suspended solids (TSS). The monthly average NPDES treatment limits are: 25 mg/l CBOD5, 45 mg/l TSS, 200 organisms per 100/ml fecal coliform, pH range of 6.0 to 9.0 standard units and 1 mg/l phosphorous. The treatment facility is meeting all current permit limits.

The City of Montrose is currently operating under the NPDES/SDS Permit issued on June 4, 2007. The permit had an original expiration date of May 31, 2012 but has been extended by the MPCA until the MPCA issues an updated permit. Due to expected growth in the cities of Montrose and Waverly, as well as more stringent limits on receiving waters, discharge limits for the Montrose Wastewater Treatment Facility might become more stringent. The BOD limit might change from 25 mg/L to 15 mg/L and the TSS limit might change from 45 mg/L to 30 mg/L for the monthly average. The phosphorus limit might change from a monthly average of 1 mg/L to a mass-loading limit based on the current NPDES permit. Based on the current treatment facility AWW flow of 0.781 mgd, the phosphorous monthly mass limit is 6.51 lbs/day. The Minnesota Pollution Control Agency (MPCA) must yet determine the final NPDES permit limits for future upgrades to the wastewater treatment facility.

The farmsteads in the AUAR area have septic systems. The farmsteads will be connected to City sanitary sewer as the development reaches them and they are annexed into the City. At that time their septic systems will be properly abandoned. This will improve the quality of groundwater in areas that currently have septic systems.

Since the Montrose Regional Wastewater Treatment Facility expansion in 2002 ***until 2012*** the NPDES SDS permit has required that the City monitor the effects of increased wastewater discharge rates to the Woodland WMA. Specific items included in the monitoring ***were*** Chlorophyll, Dissolved Oxygen, pH, Phosphorus, specific conductance, temperature, and transparency. The permit also required a plant community integrity study be completed to monitor any effects of the WWTP discharge on the plant community. ***Monitoring during that period showed no impacts on Woodland WMA. The MPCA is planning to remove the monitoring requirements on Woodland WMA during the next permit update.***

C. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

The sanitary wastewater will discharge to the publicly owned, Montrose Regional Wastewater Treatment Facility. The existing facility has an average wet weather treatment capacity of 0.781 mgd and will require expansion to handle the proposed wastewater flows and loadings. ***The City will complete a wastewater treatment facility plan to address the future demanded increase in flows and loadings as development occurs.***

The estimated future flow to the Montrose Regional Wastewater Treatment Facility is 5.86 MGD average daily flow, shown in Table 18-2. Flows from the mobile home park are included in the Montrose subtotal flows.

Table 18-2. Summary of Total Wastewater Flows to Montrose Regional Wastewater Facility				
Location	**Number of Connections**	**Population**	**Flow Calculation**	**Total Avg. Daily Flow (MGD)**
Existing Waverly Flow Total	520	1,300	80 gal/person/day	0.104
Future Flows from Waverly LS #1 (TH 12)	551	1,378	100 gal/person/day	0.138
Future Flows from Waverly LS #2 (Carrigan Meadows)	953	2,383	100 gal/person/day	0.238
Future Flows from Waverly Future LS (NE Waverly)	1,248	3,120	100 gal/person/day	0.312
SUBTOTAL WAVERLY FLOWS	3,272	8,180		0.792
SUBTOTAL MONTROSE FLOWS				5.07
TOTAL FLOW TO MONTROSE REGIONAL WWTF				**5.862**

An estimated timeline for treatment plant expansion has been created using population milestones. Since the timeline for treatment plant expansions will rely solely on how quickly development occurs, accurate dates for treatment plant expansions cannot be estimated. In Table 18-3 below an estimate of 100 gallons/person/day has been used. At the present time, flows from commercial and industrial land uses within Montrose and Waverly are minimal. The area's trends have shown that residents in Montrose and Waverly typically use less than 80 gallons/person/day. Therefore, the 100 gallons/person/day would allow for some flow from commercial and industrial uses. If large industrial wastewater developments occur, the below table would need to be adjusted accordingly.

Table 18-3. Estimated Timeline for Expansion of Montrose Regional Wastewater Facility		
Facility Expansion	**WWTP Capacity**	**Estimated Maximum Population WWTP Will Service (Combined Montrose & Waverly)**
Current	0.78	7,800
Expansion #1	1.5	15,000
Expansion #2	3.0	30,000
Expansion #3	6.0	60,000

Alternatives for expansion of the treatment facility will include expanding to an activated sludge treatment process. The activated sludge process, particularly extended aeration facilities, has commonly been designed for cities, which must provide both industrial and municipal wastewater treatment. Activated sludge systems have the ability to treat shock or inconsistent loadings, the flexibility and reliability to produce an effluent to meet the discharge limits, and to provide low operation and maintenance costs.

The following is a description of the proposed individual treatment components:

Screenings

A mechanical bar screen would provide removal of sticks, rags and the other large materials. These are removed to protect subsequent process equipment. The existing screen will be used at the new facility and the existing manual screen will be replaced with a new mechanical screen identical to the existing mechanical screen. The dewatered screenings would be loaded into trash containers and hauled away.

Grit Removal

Following screening, flow would pass through the grit removal facilities, which removes sand, grit and other materials from the influent wastewater. Removing grit minimizes deposition of grit in downstream processes and premature wear of downstream process equipment. A vortex grit removal system is proposed for removing grit and would be housed in a new building and sized for future flows. In addition, a grit pump and grit classifier would be included as part of the grit removal process.

Activated Sludge Process (Extended Aeration)

Extended aeration plants are characterized by the following: introduction of raw wastewater directly to the aeration basin; long-term aeration; high mixed liquor suspended solids concentration (MLSS); high return activated sludge (RAS) rate; and low sludge wastage. The particular advantage of using a long retention time (usually 18 to 24 hours in the aeration basin) is that the design permits the plant to operate effectively even though flow and strength vary widely and allow biological organisms to consume the organic matter and nitrify the ammonia.

Since activated sludge undergoes aerobic digestion in the aeration basin, more oxygen is required in the basin than is required in conventional single stage systems. To avoid excessively high MLSS and effluent solid losses, periodic solids wasting is required. The accumulation of inert solids actually controls the rate of sludge wasting. The extended aeration basin will be designed with a maximum solids retention time (SRT) of 25 days, organic loading of 15 lb/day/1000 cubic feet of basin volume, a food to mass (F/M) ration between 0.08-0.1 lbs CBOD5/lbs MLVSS/D, MLSS between 2,500-3,500 mg/l and 1.5 lbs O2/lbs of peak hourly CBOD5.

An anoxic and anaerobic basin for biological phosphorous removal would be provided prior to the aeration basin and allow for partial removal of influent phosphorous. A chemical feed system will continue to be utilized to ensure effluent phosphorous limits are met.

Final Clarifier

Activated sludge final clarifier must be designed to meet thickening as well as solid separation requirements. Since the rate of recirculation of return sludge from the final clarifier to the aeration basin is quite high, the surface settling rate and weir overflow rates should not exceed 900 gallons per day per square foot (gpd/ft^2) and 30,000 gallons per day per lineal foot, respectively. Using these surface settling rates and weir overflow rates, problems with sludge loading density currents, inlet hydraulic turbulence and occasional poor sludge settleability will be minimized. Solid loading rates are also maintained at a 35 lb/day/ft^2 maximum. Scum collection and removal facility will be provided as well as sludge suction withdrawal in order to minimize effects of nitrification in the final clarifier. Two new final clarifiers, similar to the existing clarifiers, will be provided to augment the existing clarifiers. Due to heat loss in an extended aeration system, covers for the final clarifiers are provided in order to avoid freeze-up of the scum collection mechanism. As previously discussed, chemical feed facilities will also be provided for additional phosphorous removal if the biological process is not sufficient.

Tertiary Treatment

As previously discussed, tertiary treatment is required to meet the stringent effluent phosphorous requirements. Tertiary treatment processes consist of filtering the wastewater prior to discharging into the receiving stream. Tertiary filters are used to remove biological particulate, suspended solids, and residual insolubilized phosphorous that may be carried through a secondary treatment process. Tertiary treatment systems can be classified as granular media filtration systems and membrane filtration systems. Due to the stringent requirements and the growth potential, membrane filters are the recommended treatment alternative.

Membrane filters consist of microfiltration (0.1 microns) and ultrafiltration (< 0.1 microns) and are pressure driven to remove very fine particles from the wastewater. Membrane filters contain hollow fibers and the filtration takes place from the outer surface of the fiber to the hollow inner core. Feed liquid passes through the porous wall of the fibers while the solids in the feed stream are retained on the outside fiber wall. The difference in pressure between the outside and the inside of the fibers is known as the transmembrane pressure (TMP). The TMP is the pressure that drives the liquid through the porous walls of the membrane, filtering the liquid in the process. Feed and filtrate pressures are measured by pressure transmitters and the TMP is calculated. As particles build up on the membrane surface during filtration, an increase in TMP is required to maintain a constant flow rate. To restore performance, these particles must be removed periodically by backwashing. Backwashing typically consists of air scouring, chemical scouring and liquid backwashing. Backwash is sent to a backwash tank and eventually pumped to the head of the facility for treatment. Since membrane filters have very small pore sizes, a 1mm punch screen is recommended in front of the filters to provide protection of the filters.

Benefits of membrane technology are the modular nature of membrane filters allows for increasing filter capacity by adding additional modules and the newer technology results in better effluent quality than conventional media filtration.

Disinfection

Ultraviolet (UV) light is a physical rather than a chemical disinfecting agent as compared to chlorine. UV radiations penetrate the cell wall of the microorganisms and are absorbed by nucleic acids, which either prevent replication or cause the death of the cell. The effectiveness of UV disinfection depends on UV intensity and exposure time. An open-channel single train disinfection system, using low-pressure high-intensity UV lamps, would be provided for disinfection of the water before discharging. The existing UV disinfection system will be expanded to disinfect the increased flows. Additional banks of lamps will be provided to increase the capacity of the existing system.

Biosolids Treatment & Storage

Wastewater biosolids, or sludge, consists of solids removed from raw wastewater and biosolids generated in the treatment process. The proper handling and disposal of biosolids is an important aspect of wastewater treatment. A method that is economical and acceptable from health, environmental and aesthetic points of view must be selected.

From 2004 to 2016, Montrose stored their biosolids in an on-site storage tank. In 2016, Montrose made a policy decision to not apply biosolids to the land but rather dispose of stored biosolids at the City of Buffalo's Biosolids Processing Plant. At this plant, biosolids are dried and incinerated. The City of Montrose recognized the many significant benefits to the environment by making this policy decision to not land apply biosolids. It is intended that biosolids will continue to be disposed of at the Buffalo Biosolids Facility moving forward as the AUAR area continues to be developed.

The treatment facility expansion will occur at the site of the exiting wastewater treatment facility and no additional land is required. The proposed treatment improvements will be located in one of the existing polishing ponds, and therefore no additional land is required to expand the wastewater treatment facility.

D. If the project requires disposal of liquid animal manure, describe disposal technique and location and discuss capacity to handle the volume and composition of manure. Identify any improvements necessary. Describe any required setbacks for land disposal systems.

No animal wastes, except domestic pet waste, will be produced on site.

19. GEOLOGIC HAZARDS AND SOIL CONDITIONS

A. Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

Minimum Depth (in feet)		Average Depth (in feet)	
Groundwater	2	Groundwater	37
Bedrock	180	Bedrock	216

The 109 wells located within the AUAR area showed a range in depth to groundwater of 2 to 80 feet, with an average depth of 37 feet (County Well Index, Minnesota Geologic Survey, 2007). Three of the wells did not have water levels reported for them. The shallowest groundwater is in two places: T118, 26W, Section 1 (northwest side of Mud Lake (Woodland WMA)) and T118, 25W, Section 6 (northeast of Mud Lake). The deepest groundwater is in T119, 26W, Section 36 (south of Malardi Lake and east of the existing city boundary). The same 109 wells showed a range in depth to bedrock of 180 to 245 feet, with an average depth of 216 feet (only three of these wells had depths to bedrock reported; the rest did not reach bedrock) (County Well Index, Minnesota Geologic Survey, 2007). The shallowest bedrock is in T118, 26W, Section 11(southwest side of Mud Lake). The deepest bedrock is in T119, 26W, Section 25 (in the northeast of the AUAR area, north of Malardi Lake). All three wells that did reach bedrock have shale as the bedrock.

According to the DNR's Aggregate Resources and Quarternary Geology, Wright County, Minnesota (J.D. Lehr, 1990), there are substantial potential aggregate deposits in the northeast corner and eastern side of the AUAR area (see Figure 40). These mapped areas are inferred, but not confirmed, to contain potentially significant aggregate deposits. Aggregate is in high demand, and the demand is expected to increase as development in the Twin Cities metro area continues. Some of the potential aggregate deposits area is already developed as low density residential, the railroad and TH 12. If this aggregate is to be accessed, it should be done before any more development reaches this area, because once buildings and infrastructure are built on top of the deposits, it will be much more costly to access them. Once the aggregate mining is finished, the area can be developed, for whichever land use it is zoned.

Also according to the DNR's Aggregate Resources and Quarternary Geology, Wright County, Minnesota (J.D. Lehr, 1990), there are organic deposits surrounding Malardi Lake and Mud Lake, and also smaller areas scattered through the AUAR area (see Figure 40). These are peat and organic-rich silt and clay, ranging from 3 to 20 feet thick. These areas are not developable, due to the soils being unsuitable to support structures.

There are no known sinkholes, shallow limestone formations or karst conditions at the site.

B. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil granularity and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

The digital *Soil Survey of Wright County* (USDA NRCS, 2007) identifies 38 soil map units within the AUAR area, as shown on Figure 24. The areas of each soil map unit are listed in Table 16-1. The most abundant soil type is Litchfield loamy fine sand with 0 to 2 percent slopes, occupying approximately 1,718 acres or 24 percent of the AUAR area. The Litchfield series consists of very deep, moderately well drained soils that formed in glaciofluvial deposits on outwash plains, terraces, or deltas. Permeability is moderately rapid or rapid. Surface runoff is low.

The second most frequent soil type is Lester loam, 6 to 12 percent slopes, eroded, for 957 acres or 13 percent. The Lester series consists of very deep, well drained soils that formed in calcareous loamy glacial till on till plains and moraines. These soils have moderate permeability. Runoff is medium to high.

The third most frequent soil type is Cordova clay loam, 0 to 2 percent slopes, for 633 acres or 9 percent. The Cordova series consists of very deep, poorly drained soils that formed mostly in loamy calcareous glacial till on ground moraines and till plains. The upper part of the profile in some of these soils formed in modified glacial till. These soils have moderately slow permeability. Surface runoff is low.

The majority of the soils within the central and southern areas of the study boundary are of HSG Type B, HSG Type B/D (Type D, but acts like Type B if drained) and Type A/D (Type D, but acts like Type A if drained), with isolated areas in HSG Type D. In the northeastern and eastern portions of the AUAR area, there are more HSG Type A, HSG Type A/D and HSG Type B/D soils. See Figure 27 for Hydrologic Classifications of soils in the AUAR area. The Type A soils allow for rapid infiltration, Type B soils allow for moderate infiltration, while the D soils have much slower infiltration rates and are often found in low, wet areas.

The potential for groundwater contamination is estimated to be moderate based on the permeability of the dominant soil types found on the site. The sensitivity of groundwater systems to pollution is indicated by the approximate time it takes water to infiltrate the land surface until it is discharged or pumped from an aquifer. Although shallow groundwater is highly susceptible to contamination, moderately permeable soils with finer textures will slow or restrict the movement of water, which extends the time needed for chemicals to break down before reaching the water table. Because development within the AUAR area will be typical of residential and commercial land uses, no unusual wastes or chemicals are anticipated to be spread or spilled onto the soils that would cause groundwater contamination.

One of the principle potential sources of contamination to the well water is other wells that reach or penetrate the aquifers that the City uses for its public water supply. In order to prevent contamination due to these other existing wells, all wells found during development of the AUAR area will be properly abandoned. Farmsteads will be connected to the City's watermains when the development reaches them and they are annexed into the City. No new private wells will be installed.

20. SOLID WASTES, HAZARDOUS WASTES, STORAGE TANKS

A. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

Construction activities for this development will generate waste on the site. The amount of waste will be typical of a construction project. The contractor will dispose of wastes generated at the site in an approved method or facility. The contractor will be encouraged to recycle construction waste that can be recycled. All brush and tree waste generated by construction will be chipped or otherwise recycled by the contractor and will not be burned on-site. The City has a brush, tree and yard waste compost site for homeowners' use.

After construction, typical residential and commercial/retail/office solid waste and hazardous wastes will be generated. All solid wastes will be handled by a City of Montrose licensed solid waste hauler. Household hazardous waste generated from individual homes in this development can be disposed of at the Household Hazardous Waste Facility in the City of Buffalo.

For residential properties, the majority of the solid waste generated will include paper, organics (food wastes, textiles/clothes, wood, and rubber products), yard wastes, and inert solids and household hazardous wastes. The remaining wastes will include plastics, metals, and glass, and very small percentages of specialized wastes such as oversized bulky wastes. The commercial/retail/office/light industrial solid wastes will be similar to the residential solid waste, but are likely to have more paper and cardboard.

The waste haulers in Montrose have municipal waste recycling programs. There is also a drop off in the City of Buffalo for Wright County residents' recycled materials and household hazardous waste. The residents and business owners will be encouraged to recycle all municipal solid wastes that can be recycled. The remainder of the municipal solid waste will be disposed of at an approved municipal waste landfill. Residential waste will be collected by a waste hauler hired by the City. Commercial businesses are responsible for properly disposing of the waste they generate.

B. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

Normal construction and household hazardous wastes are anticipated. Toxic or hazardous materials such as fuel for construction equipment and materials used in the construction of homes (paint, adhesives, stains, contaminated rags, acids, bases, herbicides, and pesticides) will likely be used during site preparation and building construction. Spills of these materials are not anticipated, but could require notification of the Minnesota Duty Officers if a large or dangerous spill occurs. Builders/contractors are responsible for proper management and disposal of any wastes generated during construction and homeowners are responsible for management and disposal thereafter. Any toxic or hazardous materials used on site will be properly used, properly stored in between uses, and properly disposed of when finished.

C. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

The potential for above and below ground storage tanks was researched using Environmental Data Resources, Inc. (EDR). Other potential environmental hazards or contamination are discussed under Item 9 of this AUAR. In order to break the area down into more manageable pieces, the site was broken into three areas for which the EDR reports were done. Because the EDR reports cover a radius around a point, central points in each of the three areas (north, south and east) were chosen. The reports were compared to ensure that sites weren't counted more than once because they were listed in more than one report. In addition, because of the radius, some sites outside of the AUAR area were listed in the EDR reports, and these were excluded in the summary, below.

The sites with adequate address information were mapped in each report. This site was on the eastern side of the AUAR area. Due to poor or inadequate address information, there were sites listed in the EDR reports, but were not mapped. It is likely that these sites are in AUAR study area exclusions. There is one Brownfields (Petroleum Brownfields Program Sites) site. There are 17 Leaking Underground Storage Tank (LUST) sites, and one of these sites is also listed as an Underground Storage Tank (UST) site. There are three AST (Aboveground Storage Tank) sites. There is one Leaking Aboveground Storage Tank (LAST) site. There are four other Underground Storage Tank (UST) sites.

A search of MPCA's Minnesota Aboveground/Underground Storage Tank Sites website for "City of Montrose, Wright County" revealed six known sites that do or did contain storage tanks in the AUAR area. Other sites were also listed in the search results, but based on their addresses, were determined not to be inside the AUAR area. Similar to the sites listed in the EDR reports, sometimes the address information was inadequate to determine if the site was in the AUAR area. When in doubt, the site was assumed to be in the AUAR area. Each site had between one and four tank records associated with it, for a total of twelve tanks (five active aboveground tanks and seven removed underground tanks). As development occurs on properties with existing unused storage tanks, and if any additional storage tanks are identified during the development process, unused tanks will be removed and properly disposed of or recycled in accordance with MPCA regulations.

There will be no temporary tanks on site during construction. Refueling of construction equipment will take place from tanker trucks, and will occur in areas that are not environmentally sensitive. There is the potential for new underground storage tanks for petroleum products to be installed in areas designated for commercial or light industrial use. A gas station/convenience store will likely be built in the commercial area in the central-western portion of the AUAR area. In the event that storage tank installation is necessary for one or more of the anticipated commercial or industrial facilities, these tanks will be installed according to applicable local, state, and federal regulations.

21. TRAFFIC

Provide an estimate of the impact on traffic congestion on affected roads and describe any traffic improvements necessary. If the project is within the Twin Cities metropolitan area, discuss its impact on the regional transportation system.

Parking spaces added	N/A
Existing spaces (if project involves expansion)	N/A
Estimated total average daily traffic generated	152,569 (At Full Build)
Estimated maximum peak hour traffic generated (if known)	15,923 (At Full Build)
Time of occurrence	4:30-5:30 PM

A detailed traffic impact analysis was completed for the AUAR area that compares the effects of traffic on the area roadway system between the No-Build Scenario and the Interim and Full Build Scenarios. The traffic analysis for the proposed development in the AUAR area includes an analysis of the cumulative impacts of the AUAR developments in addition to other developments already in process near the study area in Montrose. Traffic operations were analyzed at 37 intersections located within and outside of the AUAR Boundary. The full traffic impact study is included in Appendix A.

The proposed developments are estimated to consist of residential, industrial, and commercial uses. The current roadway system in Montrose would not facilitate traffic effectively and would not maintain acceptable service levels with the level of development that the City is planning. The majority of traffic would filter through the intersections with TH 12, as it would be the primary east-west highway corridor for the City to access the Twin Cities Metropolitan Area. TH 12 is very close to being congested with existing traffic. ***MnDOT is planning an overlay project for the portion of TH 12 that passes through Montrose, but this overlay will not expand the road.*** The nearest additional east-west highways include CSAH 30, approximately 1.5 miles to the south, and CSAH 32 to TH 55, which could be accessed from TH 25. These other routes are not congested and could handle an increase in traffic, but TH 12 is the most direct route to the Twin Cities area from Montrose and cities further west including Waverly, Howard Lake, and Cokato. Additionally, TH 55 north of Montrose is congested and some traffic that would prefer to utilize TH 55 is being diverted to TH 12 from the north. As TH 12 becomes more congested, these other parallel routes become more important but would not be able to alleviate all traffic concerns from TH 12 with the future growth presented in the AUAR.

The projected trips for the area are determined through the use of a Travel Demand Model. This model relies on real-world data to estimate future trips. A Year 2000 Travel Demand Model was completed for the Minnesota Department of Transportation. This Collar County Model includes all of the state highways within the entire seven-county metropolitan area and their collar counties. The Model takes into account personal vehicular traffic and transit traffic using both state highways and/or exclusive right-of-way. The entire Model area is split into Traffic Analysis Zones (TAZs), which help to split traffic onto the correct roadways. The primary purpose of the Model is to project traffic on the state highway system and provide estimates of transit ridership. For the AUAR, the Year 2000 Collar County Model was adjusted to include additional Traffic Analysis Zones (TAZs) and additional roadways near the City of Montrose. The Model was then calibrated to reflect Year 2000 traffic volumes in the area.

The trips generated by each Transportation Analysis Zone (TAZ) in the study are based on the Model parameters set up by the Mn/DOT and the Metropolitan Council. These trips are based on the Year 2000 Census and Travel Behavior Inventory. This is different than other smaller studies in which trips are based on the Institute of Transportation Engineers (ITE) Trip Generation Manual. The generated trips are distributed to the local and regional roadway network in the Model.

The total trips for each scenario in each TAZ was recorded to ensure that the trips into and out of each TAZ are reasonable, based on the number of households or employees there are in each zone. It is assumed that all the “exception” developments within the AUAR Boundary (but not in the AUAR study area) already exist, are platted or are within the pre-platting stage and will be completely developed by Year 2030. Platted development within the City of Waverly is also anticipated to have an impact on the traffic through and in the City of Montrose and is included in the 2030 No-Build projections. These are analyzed as the No-Build Scenario. The total daily trips generated by each development are summarized in Table 21-1 below.

<table>
<tr><th colspan="7">Table 21-1. Trip Generation Data</th></tr>
<tr><th rowspan="2">Scenario</th><th rowspan="2">Zonal Area</th><th colspan="2">AM Peak</th><th colspan="2">PM Peak</th><th rowspan="2">Daily Total</th></tr>
<tr><th>Entering</th><th>Exiting</th><th>Entering</th><th>Exiting</th></tr>
<tr><td rowspan="2">2030 No-Build</td><td>AUAR</td><td>709</td><td>1,414</td><td>1,841</td><td>983</td><td>25,633</td></tr>
<tr><td>Total</td><td>1,253</td><td>2,149</td><td>2,830</td><td>1,774</td><td>41,734</td></tr>
<tr><td rowspan="2">2030 Interim Build</td><td>AUAR</td><td>3,749</td><td>4,212</td><td>6,352</td><td>5,611</td><td>116,355</td></tr>
<tr><td>Total</td><td>4,283</td><td>4,968</td><td>7,332</td><td>6,375</td><td>131,774</td></tr>
<tr><td rowspan="2">2030 Full Build</td><td>AUAR</td><td>5,923</td><td>6,975</td><td>10,109</td><td>8,638</td><td>178,202</td></tr>
<tr><td>Total</td><td>6,477</td><td>7,734</td><td>11,089</td><td>9,421</td><td>193,744</td></tr>
</table>

As the area continues to grow and more uses are developed within the City of Montrose, the percentage of local trips is expected to be a larger portion of the total traffic within and out of the City. This local trip increase will be due to more office work places being developed in the City as it grows and an increase in the variety of businesses that develop in a larger city. This in turn reduces the number of trips residents have to make to adjacent communities for work, for services, and for retail shopping, making the City of Montrose a more self-sufficient city. Additionally, as the community adds retail, commercial, and industrial space, the area is likely to become a small regional hub for surrounding communities.

With the additional traffic from the AUAR developments, TH 12 would be extremely congested from the City of Waverly extending to the east through Montrose, all the way to the freeway portion of TH 12. Additionally, TH 25 and CSAH 12 are also severely impacted by the additional traffic. All of these roadways would now experience unacceptable delay and congestion with the current roadway network.

Based on the traffic analysis provided, extensive roadway improvements, intersection improvements, and traffic control modifications would be recommended to accommodate the anticipated Full Build Scenario development within the City of Montrose. These transportation improvements would be necessary to accommodate the intensity of development as proposed in the AUAR, as well as provide capacity for external traffic growth caused by regional growth.

It is recommended that the roadways be widened and intersections be improved to provide additional capacity for the 2030 Full Build Scenario. This additional capacity should be constructed in phases to best provide improvements as needed by the community to maintain acceptable service levels.

Improving and expanding the local and regional roadways would improve the traffic on TH 12 through Montrose. This would include the addition of intersections with TH 12 and local roadways for local traffic to travel on, without using TH 12. The recommended roadway network connections are shown in Figure 26 in Appendix A. By improving and expanding the local roadway network, traffic would move more efficiently throughout the City. The local roadways shown in Figure 26 in Appendix A would provide additional east-west corridors for local traffic. This study assumed that the local roadway connections would be constructed as the areas are developed. Without these additional local area connections, the geometric improvements recommended for the studied intersections would not operate well or function as expected. The additional roadway corridors running parallel to TH 12 would allow the local traffic to travel across the City without traveling on TH 12, thus preserving TH 12 for traffic that needs to use it on a more regional basis.

All intersections and accesses must be consistent with the most current Minnesota Department of Transportation's Access Category System and Spacing Guidelines (currently March 20, 2002), and most current Wright County Access and Spacing Requirements, which are currently located within the Northeast Wright County Sub-Area Transportation Study, June 2004.

The mitigation needed to assure acceptable operations at each intersection was determined through the traffic analysis. The final proposed lanes and traffic control measures recommended for the roadways studied are included in Appendix A, Figures 19, 20, 24 and 25, and in Appendix A Sections 6.1.1 to 6.1.7. These lane and traffic control recommendations assure Level of Service D or better for all intersections, except where traffic volumes are extremely low or where delay and volume would not be expected to meet signal warrant requirements. The roadway improvements recommended should be built concurrent with any development of the area.

Specific improvements to the roadway network include:

- US TH 12: Roadway widening to a 4-Lane Divided Highway and intersection control improvements at major intersections.
- TH 25 (East Leg): Roadway widening to a 4-Lane Divided Highway to CSAH 32, 3-Lane section north to the City of Buffalo and intersection control improvements at CSAH 32.
- TH 25 (West Leg)/CSAH 12: Roadway widening to a 3-Lane section south of TH 12 and to a 4-Lane Divided Highway north of TH 12. Intersection control improvements at major intersections.
- CR 110/Clementa Ave: Roadway widening to a 4-Lane Divided roadway near TH 12 and intersection improvements at 7th St. S. and 1st St. N/55th St. SW.
- Seventh Street North and Seventh Street South: Expanded roadways with east-west continuity through the City of Montrose to help alleviate TH 12.
- Railroad Crossings: Upgraded railroad crossings to maintain north-south continuity and safety.

Additional studies are recommended as development is added to the City. These include studies that analyze the:

- US TH 12 Corridor
- TH 25/CSAH 12 Corridor
- Clementa Avenue Railroad Crossing
- Zephyr Avenue Railroad Crossing
- Intersection Traffic Control Improvements
- Gravel Roadways
- Development Studies; to ensure consistency with the AUAR
- Develop a Funding Strategy to have development pay its proportionate fair share of roadway, infrastructure, and traffic control improvements.

The full traffic impact study, conclusions, mitigation, and the full explanation of the additional recommended studies are included in Appendix A.

22. VEHICLE-RELATED AIR EMISSIONS

Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts. Note: If the project involves 500 or more parking spaces, consult EAW Guidelines about whether a detailed air quality analysis is needed.

The increase in traffic will generate a corresponding small increase in carbon monoxide levels and other vehicle-related air emissions. With implementation of the traffic mitigation measures (see Item 21), the regional transportation network is expected to operate with acceptable Levels of Service (LOS). The roadway improvements described in the AUAR will be performed prior to or concurrent with land development, such that only minor effects on air quality are anticipated.

MPCA eliminated the Indirect Source Permit program in 2001, and therefore there are no Indirect Source Permit (ISP) requirements for parking spaces. Baseline air quality monitoring and predictive air quality modeling have not been scheduled at this time. If it is determined that an analysis is needed for specific projects within the AUAR study area, the City will coordinate with the MPCA.

23. STATIONARY SOURCE AIR EMISSIONS

Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult EAW Guidelines for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

This item is not applicable to an AUAR.

24. ODORS, NOISE AND DUST

Will the project generate odors, noise or dust during construction or during operation?

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at Item 23 instead of here.)

☐ No

☒ Yes

Development of the AUAR area is not expected to generate odors, noise or dust in excess of levels typical of residential, commercial or light industrial development during construction and operation. Dust will be generated during grading and construction of the AUAR development. Upon completion of construction, disturbed areas will either be paved or vegetated in accordance with approved site and landscaping plans. The development is not expected to generate dusty conditions after construction. Therefore, it is not anticipated that fugitive dust will be generated in objectionable quantities, and it is not anticipated that construction or operation of the AUAR development will generate odors.

The increased traffic is expected to generate a corresponding increase in noise levels near primary roadways. Based on the projected traffic numbers provided under Item 21, the increased traffic noise is expected to be perceptible during the peak hours of traffic, but this short-term noise increase is not expected to be substantial or interfere with residential or outdoor activities. Highway traffic noise changes with the number, type, and speed of vehicles and is never constant. The short time period of perceptible traffic noise increase is expected to limit the potential for increased noise to affect outdoor activities.

Minnesota Rules Chapter 7030 provides the standards for noise. These standards, noted in Table 24-1, describe the limiting levels of sound established on the basis of present knowledge for the preservation of health and welfare. These standards are designed to be consistent with sleep, speech, annoyance, and hearing conservation requirements for receptors within areas grouped according to land use activities.

Table 24-1. Minnesota Noise Standards				
Land Use	Daytime 7:00 AM to 10:00 PM		Nighttime 10:00 PM to 7:00 AM	
	L_{10} (dBA)[1]	L_{50} (dBA)	L_{10} (dBA)	L_{50} (dBA)
Residential	65	60	55	50
Commercial	70	65	70	65
Industrial	80	75	80	75

[1]A dBA is a unit of sound level expressed in decibels and weighted for the purpose of determining the human response to sound. L_{10} means the sound level that is exceeded for 10 percent of the time for a one-hour period. L_{50} means the sound level that is exceeded 50 percent of the time for a one-hour period.

Minnesota Statutes, Section 116.07, Subd. 2a, exempts noise from local and county roads from the requirements of these noise rules unless full control of access to the road has been acquired. While the above statute exempts the noise from the roads near this site from the Minnesota rules, the daytime standard does provide a basis for judging whether an area is appropriate for outdoor residential activities.

Traffic noise that exceeds Minnesota daytime noise standards can interfere with outdoor activities along free-flowing sections of roadways. Noise levels are typically substantially less near controlled intersections due to the decreased traffic speed. Intervening structures (buildings or barriers) reduce noise levels and the corresponding width of the noise impact zone.

Minnesota nighttime standards are in effect from 10:00 pm to 7:00 am. The nighttime standards are based on interference with sleep in a bedroom with a partially open window. Normally, the peak nighttime noise impact occurs from 6:00 a.m. to 7:00 a.m. during the first part of rush hour. As with the daytime standards, most City and County roadways are exempt from these standards. For modern residential buildings with year-round climate control (i.e., typically no open windows), the nighttime standards are the same as the daytime standards.

The level of traffic noise depends on the: (1) volume of traffic, (2) speed of the traffic, and (3) number of trucks in the flow of traffic. It takes 2,000 vehicles per hour to create noise levels that sound twice as loud as 200 vehicles per hour, and traffic moving 65 mph (miles per hour) sounds twice as loud as traffic traveling 30 mph.

It is important to consider the human perception and response to noise when assessing effects of noise. Noise level changes of 3 dBA or less are generally considered imperceptible. An increase of 10 dBA is considered to be a doubling of the perceived loudness, and a “substantial” noise increase is often defined as an increase of more than 10 dBA (Highway Traffic Noise Analysis and Abatement Policy and Guidance, Federal Highway Administration, June 1995). Based on the projected increase in traffic volume, development of the AUAR area is not expected to result in substantial increases in traffic noise levels.

Traffic noise usually is not considered a serious problem for people who live more than 500 feet from heavily traveled freeways and more than 100 or 200 feet from lightly traveled roads (Federal Highway Administration, www.fhwa.dot.gov/environment/htnoise.htm). A noise of 1 to 2 dBA is not discernable. Noise level decreases by about six dBA each time the distance between the noise source and the receptor doubles.

It is anticipated that noise levels will increase locally during construction of the development. The noise levels on and adjacent to the site will vary considerably depending on the number of pieces of equipment operating simultaneously, the percent of time in operation, and the distance from the equipment to the receptors. It is anticipated that most construction activities will occur between 7:00 am and 7:00 pm and that a number of machines could potentially be operating simultaneously.

25. NEARBY RESOURCES

Are any of the following resources on or in proximity to the site?

If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

Archaeological, historical or architectural resources?

☐ No

☒ Yes

A search for historic properties and archaeological sites in the database of the Minnesota State Historic Preservation Office (SHPO) yielded 14 sites under the "History/Architecture" heading and 4 sites under the "Archaeological" heading. In general, the known historical sites are associated with old town Montrose and the TH 12 alignment. The known archaeological sites are generally scattered on the east and southeast portions of the AUAR area. These sites are known because professional surveys were conducted tied to construction projects. As new projects are conducted in the AUAR area, the potential for historical and archaeological resources will be further assessed in Cultural Resources Reviews done for individual projects as development occurs. The City will require developers to submit this information as part of the platting process. The preliminary assessments will include background research at the SHPO, review of historical maps and aerial photos, and a visual reconnaissance of the project area. The Phase I investigations will include using systematic pedestrian survey and shovel testing.

Prime or unique farmlands or land within an agricultural preserve?

☐ No

☒ Yes

Prime farmland, as defined in the Farmland Protection Policy Act of 1981, is "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber." According to the Prime and Other Important Farmlands of Wright County, Minnesota (USDA NRCS, 2006), the following soils ***within the AUAR study area*** are classified as "All areas are prime farmland:" Dickinson fine sandy loam; Le Sueur clay loam; Angus-Cordova complex; Angus loam; Terril loam, moderately wet; and Angus-Le Sueur complex. The following soils are classified as "Farmland of statewide importance:" Lester loam, eroded; Litchfield loamy fine sand; Lester-Storden complex, eroded; and Angus-Malardi complex. The following soils are classified as "Prime farmland if drained:" Canisteo clay loam, moderately fine substratum; Cordova clay loam; Glencoe clay loam, depressional; Mayer loam; Biscay loam; Hamel loam; Hamel-Glencoe complex, depressional; and Canisteo-Glencoe complex, depressional. The following soil is classified as "Prime farmland if protected from flooding:" Suckercreek fine sandy loam, occasionally flooded. The site contains 5,003.25 acres of land that are prime or other important farmlands. That amounts to 71 percent of the AUAR area. The soils in Table 25-1 are shown in Figure 41.

Table 25-1. Prime and Other Important Farmland Classification	
Soil Classification Group	**Area (acres)**
All areas are prime farmland	2,343.48
Farmland of statewide importance	1,082.85
Prime farmland if drained	1,520.56
Prime farmland if protected from flooding	56.36
Total	**5,003.25**

There are currently parcels within the AUAR area that are enrolled in the Agricultural Preserves Program (also known as the Farmland Preservation Property Tax Credit Program). These are shown on Figure 42. In the Agricultural Preserves Program, in return for a tax break landowners agree to not develop the enrolled land for seven years after filing papers for cancellation. Property owners in the Agricultural Preserves Program must also develop and implement a conservation compliance plan on land classified as highly erodible land.

A related topic is the "Green Acres" program. The Agricultural Property Tax Law is a Minnesota Statute that is commonly referred to as "Green Acres." With this law, bare farmland is valued for tax purposes on its agricultural value, rather than its future development potential or highest and best use value. These "Green Acres" are entitled to valuation and tax deferments. Otherwise, taxes on potential development land could get so high they would force farmers off the land prematurely.

Certain requirements must be met to qualify for Green Acres. First the property must qualify for agricultural classification for property tax purposes. If the agricultural classification is met, then:

- The real estate must consist of ten or more deeded acres.
- The real estate must have been in possession of the applicant or immediate family member for at least seven years prior to application for benefits OR the real estate must be the homestead of the owner, or a surviving family member of that homestead.
- The real estate must be actively and exclusively devoted to agricultural use and is within four townships or cities or combinations thereof from other qualifying real estate.
- Real property shall be considered to be in agricultural use provided that annually at least 1/3 of the total family income of the owner is derived from the farm, or the total production income including rental from the property is at least $300 plus $10 per tillable acre.

If the property is sold and will continue to be used for agricultural purposes, the new owner has 30 days from the date of sale to apply for continued green acres. If the property is sold and it is used for purposes other than agriculture, the green acres tax credit is stopped. Taxes are then calculated on the present (non-agricultural) valuation of the land for the previous 3 years. Taxes are due at this higher determined rate because the Green Acres exemption helped the farmer keep the land longer, thus benefiting from the increased value of the land.

Most agricultural land in the AUAR area is in Green Acres. Since Green Acres is a property tax incentive program renewed on a yearly basis, a property in Green Acres is not prevented from development for a certain number of years like land in the Agricultural Preserves Program. Therefore, the Green Acres program helps farmers continue to farm on their property, but does not affect their development timeline should they decide to sell or develop their land.

Designated parks, recreation areas or trails?

☒ No

☐ Yes

There are no City, County, Township or State Parks in the AUAR study area. More local parks and connecting trails will be added when the AUAR area is developed. The addition of connecting trails will impact the existing parks and trails within the existing developed areas of the City of Montrose by increasing accessibility and, therefore, the likelihood of use. No adverse impacts to the existing parks and trails due to AUAR area development are expected.

Scenic views and vistas?

☐ No

☒ Yes

The view from the overlook at the Woodland WMA may be considered a scenic view or vista. As previously stated, the development of the AUAR area will not negatively impact the WMAs. The viewshed will become more suburban and less agrarian upon development in the AUAR area.

Other unique resources?

☒ No

☐ Yes

26. VISUAL IMPACTS

Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks?

If yes, explain.

☒ No

☐ Yes

27. COMPATIBILITY WITH PLANS AND LAND USE REGULATIONS

Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency?

If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved.

If no, explain.

☐ No

☒ Yes

The AUAR area does not lie entirely within the City of Montrose. Marysville, Woodland and Franklin Townships, and the Wright County Board have given RGU authority for the AUAR area to the City of Montrose. The City of Montrose has orderly annexation agreements with Marysville and Woodland Townships. The area included in the annexation agreement with these townships coincides with the study area boundary. Wright County does not have a Countywide Comprehensive Plan. ***Montrose, Franklin Township, Marysville Township, and Woodland Township are included in the US Highway 12 Corridor Plan, adopted in 2011, along with other Wright County municipalities. This AUAR is compatible with the US Highway Corridor Plan outlined by Wright County.***

The City of Montrose's Comprehensive Plan ***was updated in 2017*** and provides an essential framework for addressing the cumulative effects of growth that the City is planning for within the AUAR. The scenario evaluated in this AUAR is consistent with the new Comprehensive Plan and with the known development plans of the property owners in the area. The City of Montrose's Comprehensive Plan complies with the requirements of Minnesota Rule 4410.3610, Subp. 1. Any potential development proposals that do not comply with the Comprehensive Plan will require revisions to the development plans to result in compliance. The applicant would by law have the right to submit an application for amendment to the relative ordinance or Comprehensive Plan, and the City would be required to evaluate its merits and compliance with the Final AUAR and Mitigation Plan.

28. IMPACT ON INFRASTRUCTURE AND PUBLIC SERVICE

Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project?

If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the AUAR; see AUAR Guidelines for details.)

☐ No

☒ Yes

A. General Description

The Interim and Full Build staging scenarios of the project are identified in Item 7 and include construction of roads, storm water ponds, and utilities such as storm water, wastewater, and water supply piping to accommodate the planned growth. Utilities will be oversized to accommodate both future growth and existing areas served by temporary lift stations. Small utilities (gas, electric, telephone, and cable television) will be provided in underground easements located adjacent to the right-of-way or along property lines according to the utility company. Utilities such as water, sanitary sewer and storm sewer will be constructed simultaneously with the streets.

B. Detailed Information

- Stormwater Management
  The City has developed a Surface Water Management Plan (SWMP) that describes how water resources will be managed in the City, and provides a plan for regional storm water ponds. Since there were areas of the AUAR area that were not covered by the SWMP, those areas were also modeled in the same method in the City's Comprehensive Plan and are discussed in Item 17 above. Storm water runoff from the AUAR area travels in three general directions: north, south and east. The entire area is within the North Fork of the Crow River watershed, so it eventually drains to the North Fork of the Crow River, which

lies northeast of the AUAR area.

- Municipal Water
  Public water service is not presently available to the entire AUAR area. Development within the AUAR area will require that additional public water facilities be constructed to serve projected water demand from future development. A series of 12-inch, 10-inch and 8-inch water supply pipes will be constructed to provide water supply to the area. ***A 100,000 gallon water tower is planned for the next 2-5 years to replace the existing 50,000 gallon tower, providing additional capacity for near-term growth.*** Additional wells will be constructed to provide water supply for the area ***as development occurs***. All areas are discussed in detail in Item 13.

- Sanitary Sewer
  Similar to municipal water, sanitary sewer service is not available to the entire AUAR area. Existing sanitary sewer lines will need extension to serve properties in the AUAR area. Eight additional lift stations will be required to serve the AUAR area as well as expansions and upgrades to two other lift stations. Multiple trunk lines and force mains will be required as well. Expansions and process changes will be required to the existing Montrose Regional Wastewater Treatment Facility to treat the additional sanitary sewer flows. Each of these items is discussed in detail in Item 18.

- Roadways
  A detailed traffic impact analysis was completed for the AUAR area, evaluating the effects of traffic on the area roadway system. The traffic analysis for proposed development in the AUAR area includes an analysis of the cumulative impacts of other existing developments near the study area in Montrose (including area within Waverly). The analysis evaluates the traffic impacts of the "exception" properties as the No-Build Scenario, as well as the Interim Build and Full Build scenarios.

  The mitigation needed to assure acceptable operations at each intersection was determined through the traffic analysis summarized in Item 21. The final proposed lanes and traffic control measures recommended for the roadways studied are included in Appendix A. These lane and traffic control recommendations assure Level of Service D or better for all intersections, except where traffic volumes are extremely low or where delay and volume would not be expected to meet signal warrant requirements. Note that the roadway improvements recommended should be built concurrent with any development of the area. This is discussed in detail in Item 21 and the detailed traffic analysis is in Appendix A.

- Schools
  Currently there is one elementary school in the City of Montrose. The Buffalo/Montrose/Hanover School District bought 32 acres north of town for a junior high school. Based on a future build out population of the AUAR Study Area of approximately 35,000, it is anticipated that there would be 3 additional elementary schools built on approximately 20 acres within the City. The proposed junior high and additional elementary schools have been included in the traffic analysis in Appendix A.

- Police and Fire Protection Services
  There are no new police or fire stations planned at this time. Additional facilities or expansion of existing facilities to serve the AUAR study area will be constructed as needs warrant. The City currently contracts with Wright County Sheriff for police service, and this is expected to continue.

- Garbage Collection
  All solid wastes will be handled by a City of Montrose licensed solid waste hauler.

Recycling will be encouraged.

29. CUMULATIVE IMPACTS

Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement. Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this AUAR in such a way as to cause cumulative impacts. Describe the nature of the cumulative impacts and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to cumulative impacts (or discuss each cumulative impact under appropriate item(s) elsewhere on this form).

According to *AUAR Guidelines* (***July 2013***), the AUAR process deals with the cumulative impacts from related developments within the AUAR area. The responses to all items in this AUAR are intended to address the impacts from all anticipated developments within the AUAR area. The questions imposed by Item 29 should be answered with respect to the cumulative impacts of development *within the* AUAR boundaries in comparison to past, present, and reasonably foreseeable future projects *outside* of the AUAR area, where such cumulative impacts may be potentially significant. The Draft Scoping Document of the *Generic Environmental Impact Statement (GEIS) on Urban Development in Minnesota* (Urban Development GEIS Steering Committee, September 2000) discussed some of the challenges involved in cumulative impact analysis, such as the difficulty involved in quantifying the influence of individual policies on urban development. The inherent uncertainty of predicting future projects also adds to the complexity of cumulative effects analysis (*Considering Cumulative Effects Under the National Environmental Policy Act*, Council on Environmental Quality, January 1997). The City of Montrose's *Comprehensive Plan* (***2017***) provides an essential framework for addressing the cumulative effects of growth that is forecasted for communities in this location in relation to ***Wright County as a whole***. These documents plan for land use, housing, transportation, sanitary sewer, water supply and distribution, parks and open space, surface water management, and community facilities. These comprehensive plans and the studies, infrastructure plans, and ordinances that implement these plans, are intended to understand the potential cumulative impacts from development within each community, and to prepare strategies and approaches to avoid and mitigate these potentially adverse effects. As such, the comprehensive planning process provides a general mechanism for addressing the uncertainty of cumulative effects through monitoring and adaptive management.

Cumulative impacts on water resources, prime farmland, and wildlife habitat have the potential to stem from development in the AUAR area. According to the Minnesota Board of Soil and Water Resources, there has been a statewide loss of 50 percent of wetlands over about the past 100 years, indicating that past activities have resulted in cumulative wetland impacts. Applicable laws and regulations, however, provide for wetland replacement, such that the rate of cumulative negative effects on wetlands has slowed substantially. Development in the AUAR area will result in a relatively low level of wetland impacts from dredging and filling (see Item 12), and these impacts will be mitigated in compliance with applicable regulations. Furthermore, as discussed in the Mitigation Plan (Appendix B), the potential for wetland restoration within the AUAR area provides the opportunity to enhance degraded wetlands and thereby mitigate past impacts. Impacts of potential future projects outside of the AUAR area would be expected to be proportionately similar.

Aside from direct impacts via dredging and filling, water resources within and adjacent to the AUAR area have the potential to be impacted indirectly by stormwater runoff. The analysis described in Item 17 concluded that, while the volume of runoff requiring management will increase upon development, the active stormwater management to be implemented during development is expected to improve water quality relative to the existing conditions. Current conditions are predominated by agriculture, with little active stormwater management taking place, resulting in negative effects on the quality of nearby water resources. ***The expansion of development and City boundaries would extend the reach of the Surface Water and Stormwater Management Plans, potentially setting stronger standards for site use and water treatment than current conditions.*** The wetland regulations and stormwater Best Management Practices typical of other development that can reasonably be expected to occur in the vicinity of the AUAR area will likely result in impacts to nearby water resources that are similar to the currently proposed development. Accordingly, overall cumulative impacts on water resources from development in and around the AUAR area are expected to be minimal.

Development in the AUAR area will result in the permanent loss of some prime farmland, as addressed in Item 25. Other reasonably foreseeable future projects occurring in the same area can also be expected to have negative effects on prime farmland. Prime farmland, as defined in the Farmland Protection Policy Act of 1981, is "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber." This definition suggests that, while the conversion of prime farmland in past developments and in the AUAR area has removed, and will remove, some highly productive land from agricultural production, other suitable and reasonably productive lands in the vicinity of the AUAR area will remain available for agricultural use. Cumulative impacts on farmland from development in and around the AUAR area are therefore not expected to be substantial.

Development in the AUAR area will result in loss of some wildlife habitat, as discussed in Item 11. The conversion of agricultural land and natural plant communities to urban land uses eliminates habitat for certain wildlife species. This land conversion, and the resulting degradation and fragmentation of wildlife habitat, has occurred for past developments and can be expected to occur as a result of other reasonably foreseeable future projects. While this cumulative loss of wildlife habitat could be large, the magnitude of the effect depends upon the value of the habitat being lost. Because over half of the AUAR area has been in agricultural production for many decades, land clearing and agricultural practices have likely resulted in the displacement of historically resident wildlife by those species that have adapted to open cropland and fragmented woodlands. Certain species that occupy the modified and fragmented landscape will continue to inhabit the AUAR area. The preservation of the majority of existing wetlands and woodlands (see Item 10), and the dedication of wetland buffers (see Mitigation Plan [Appendix B], Items 12 and 14), will help to minimize cumulative effects of development on wildlife habitat. It is expected that future developments occurring in the vicinity of the AUAR area would take similar measures to protect and preserve wildlife habitat to the extent practicable, in order to be in compliance with local and state regulations, as well as to provide natural amenities for residents of the developed areas. In this manner, cumulative impacts to wildlife habitat are expected to be minimized.

In conclusion, negative cumulative impacts of development on water resources are expected to be minimal. Negative cumulative impacts of development on loss of prime farmland and wildlife habitat are predicted to occur but be minimized. As a final note, the inclusion of medium-density and high-density residential areas in the AUAR area helps to keep urban sprawl in check when compared to uniformly low density residential development. Given the negative environmental consequences of land consumption in expanding urban areas, there is a benefit to the environment of keeping development contained to a smaller area. Cumulative impacts to agricultural, wildlife, and other resources can be minimized with planning efforts that emphasize development in low-impact areas and avoid potential high-impact areas.

30. OTHER POTENTIAL ENVIRONMENTAL IMPACTS

If the project may cause any adverse environmental impacts not addressed by Items 1 to 28, identify and discuss them here, along with any proposed mitigation.

This project is not anticipated to cause adverse environmental impacts that have not been addressed by this AUAR in previous sections.

31. SUMMARY OF ISSUES

List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

Potentially noteworthy impacts of developing the AUAR area are the effects of urbanization on a city surrounded by an agricultural area. Land use will change, which will affect the infrastructure, natural resources, wildlife habitat, surface and ground water quality, traffic, and use and access to existing parks and recreation. These impacts are both positive and negative. The development of the AUAR area will increase the need for water and wastewater services, but will also result in the septic systems and private wells being properly abandoned, thus improving the safety and quality of the water resources. The change in land use from agricultural to urban uses will affect some wildlife habitat, but will also help lessen erosion and nutrient loading on wetlands and streams in the area, thus improving the water quality. Trails will be built that will increase connectivity for pedestrians and bicyclists. Addition of commercial and/or industrial areas will increase jobs in the community and provide services that residents might otherwise have to drive to another city to find.

These impacts have been discussed in the AUAR above in detail. The proposed mitigation is discussed in the Mitigation Plan in Appendix B.

32. RESPONSIBLE GOVERNMENT UNIT (RGU) CERTIFICATION

The Environmental Quality Board will only accept SIGNED Alternative Urban Areawide Reviews for public notice in the EQB Monitor.

I hereby certify that:

The information contained in this document is accurate and complete to the best of my knowledge.

The final AUAR describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9b and 60, respectively.

Copies of this final AUAR are being sent to the entire EQB distribution list.

Signature ______________________

Name, Title Justin L. Kannas, City Engineer

Date September 22, 2017

FIGURES

AUAR REGIONAL LOCATION MAP

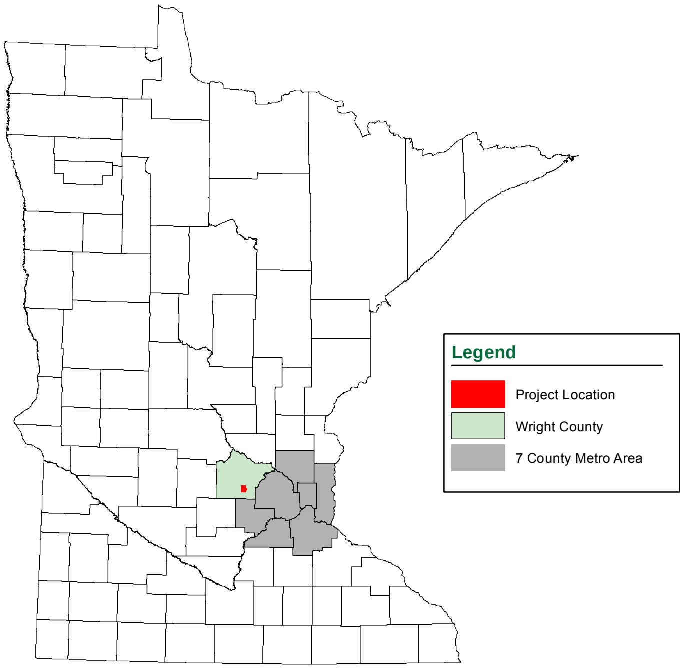
City of Montrose

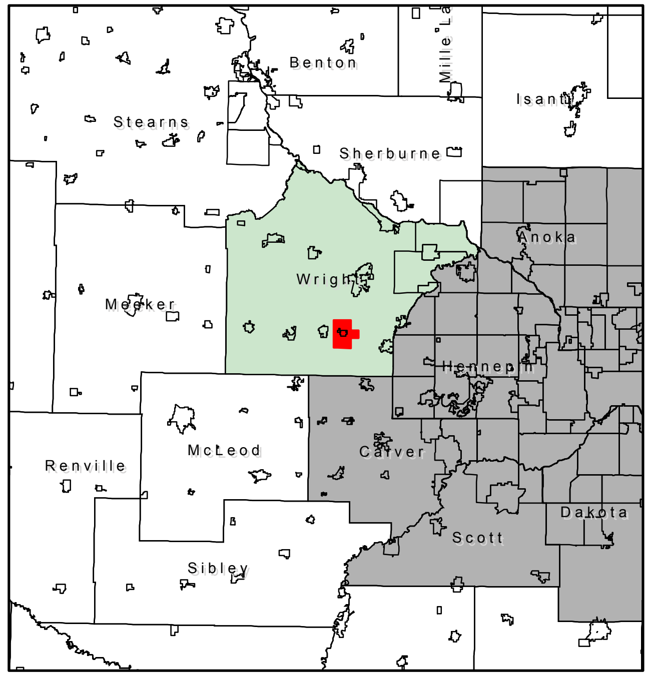
Figure 1

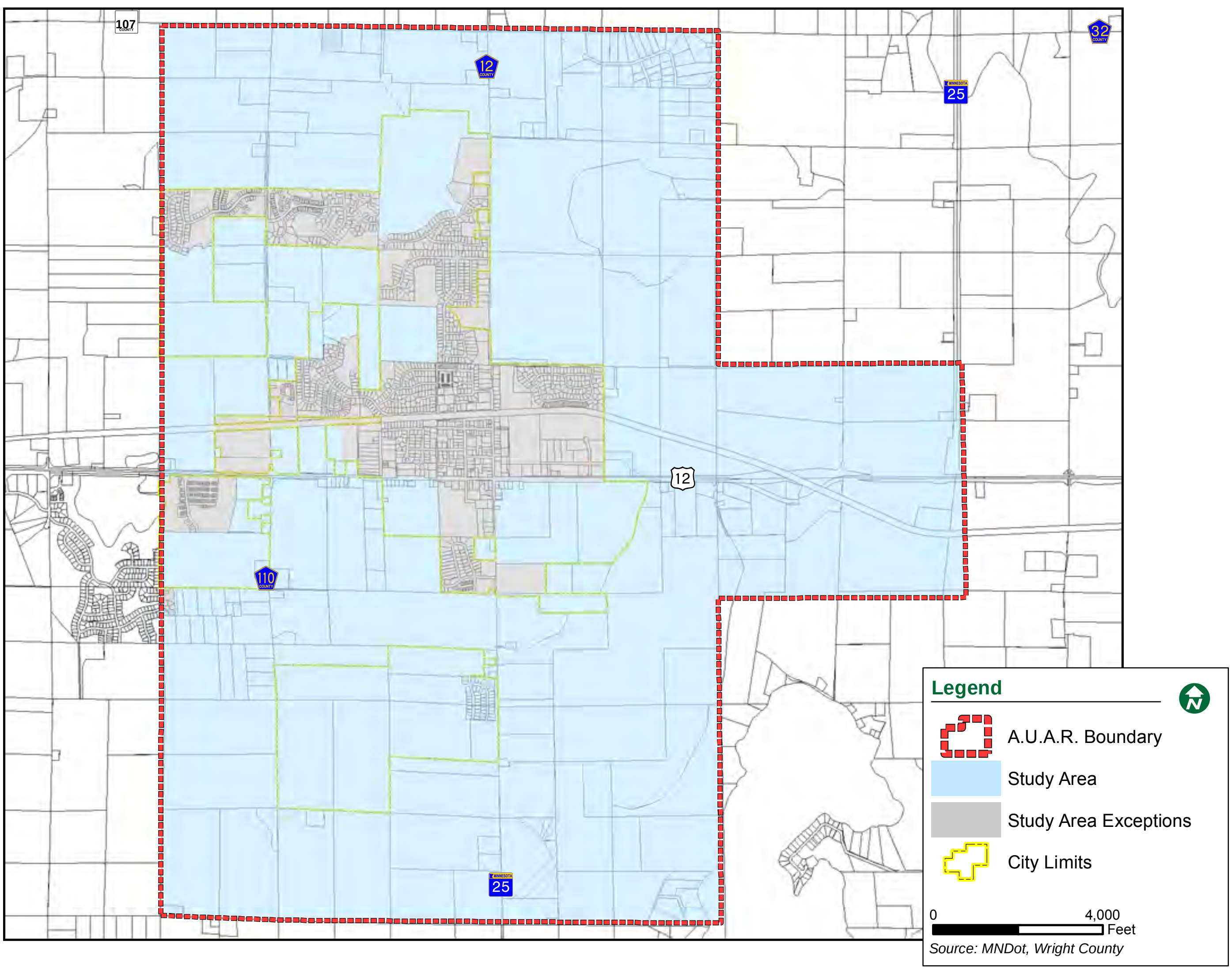
September, 2017

BOLTON & MENK

Real People. Real Solutions.







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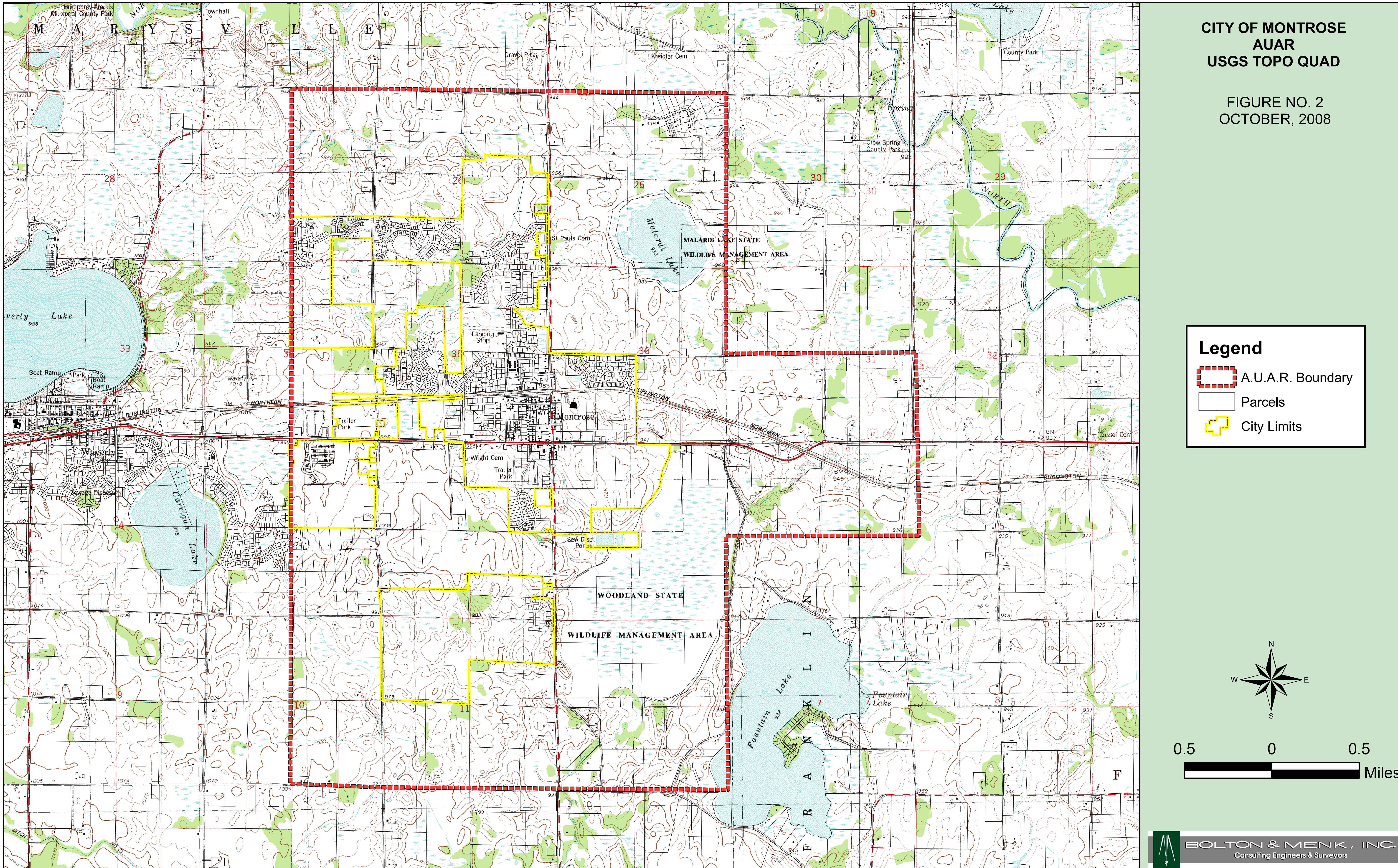
CITY OF MONTROSE
AUAR
USGS TOPO QUAD

FIGURE NO. 2
OCTOBER, 2008



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Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs USGS 11x17.mxd)
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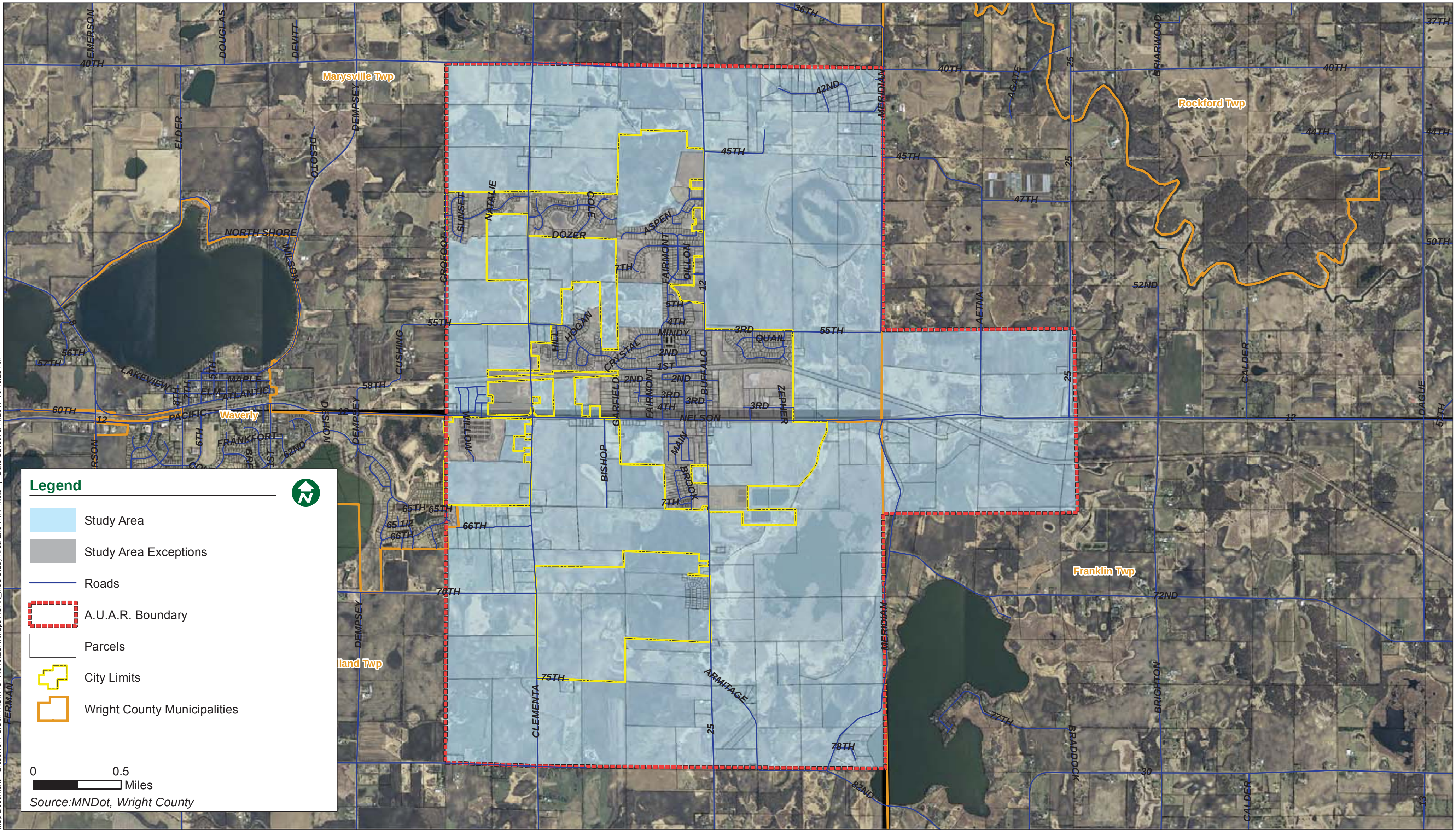
Study Area
City of Montrose

Figure 3
September 2017



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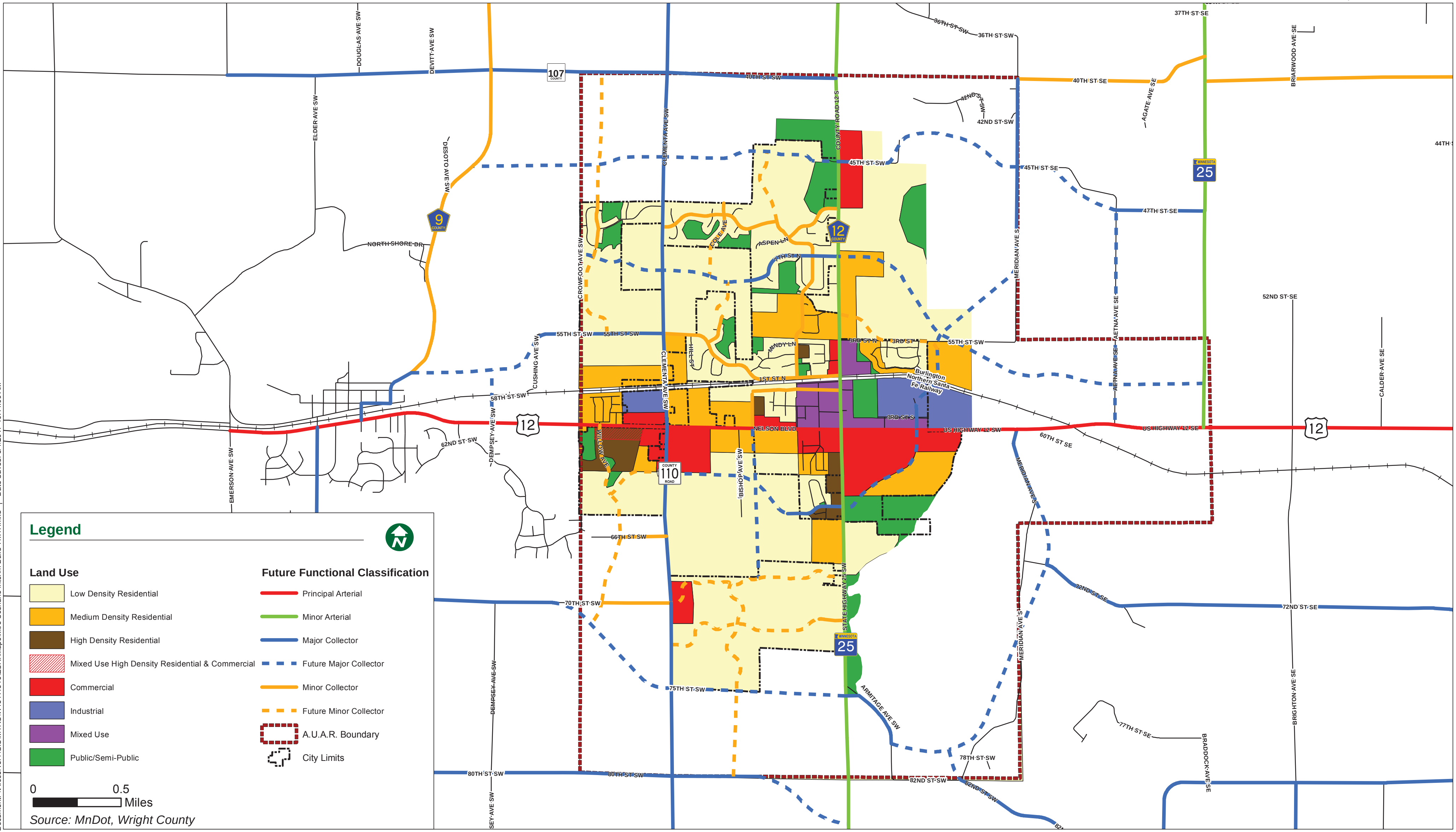
AUAR INTERIM BUILD SCENARIO

City Of Montrose, Minnesota

Figure 4

March 2017



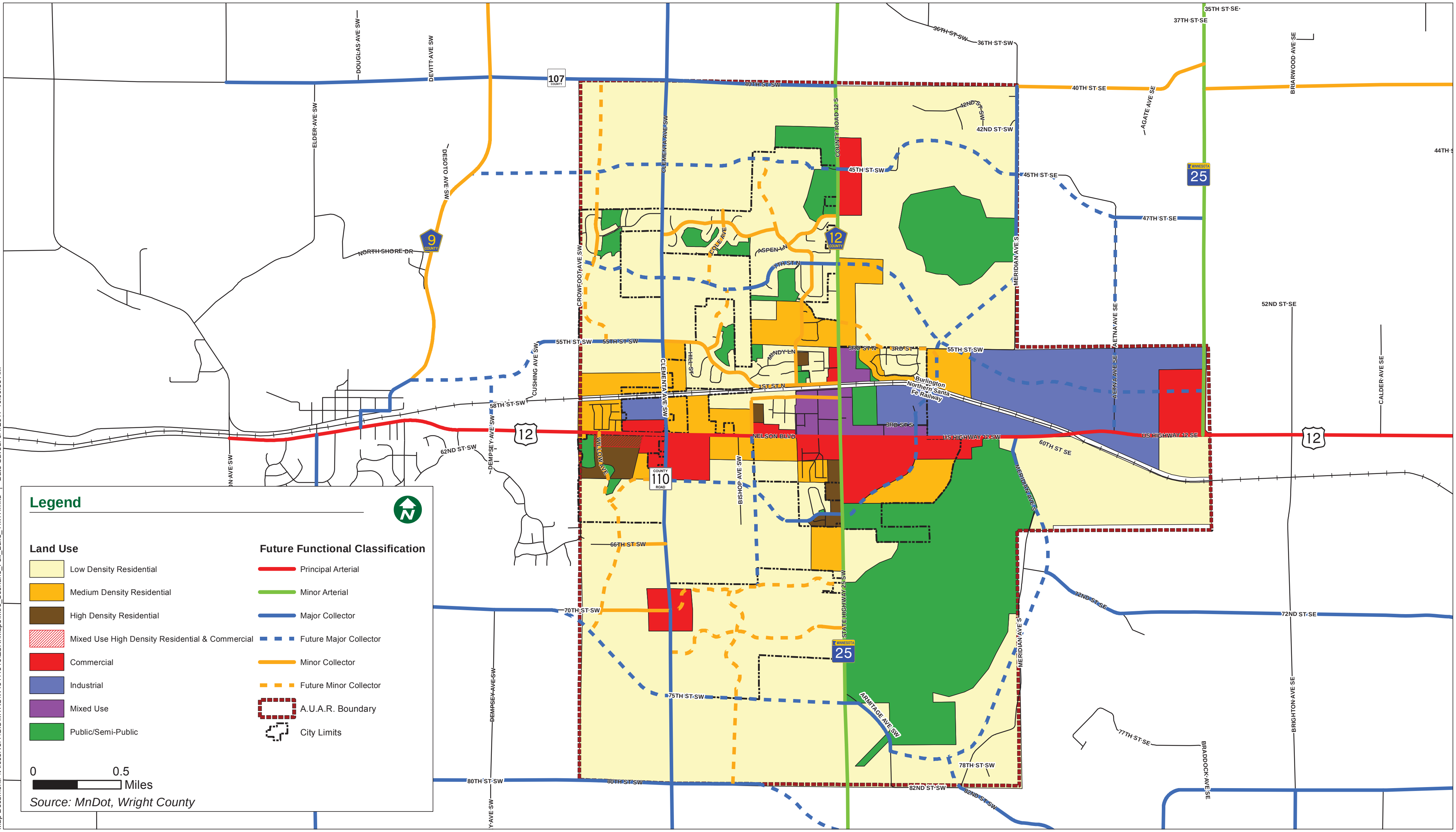
AUAR FULL BUILD SCENARIO

City of Montrose, Minnesota

Figure 5

March 2017

Real People. Real Solutions.



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MONTROSE
It's good to be home.

ULTIMATE LAND USE PLAN

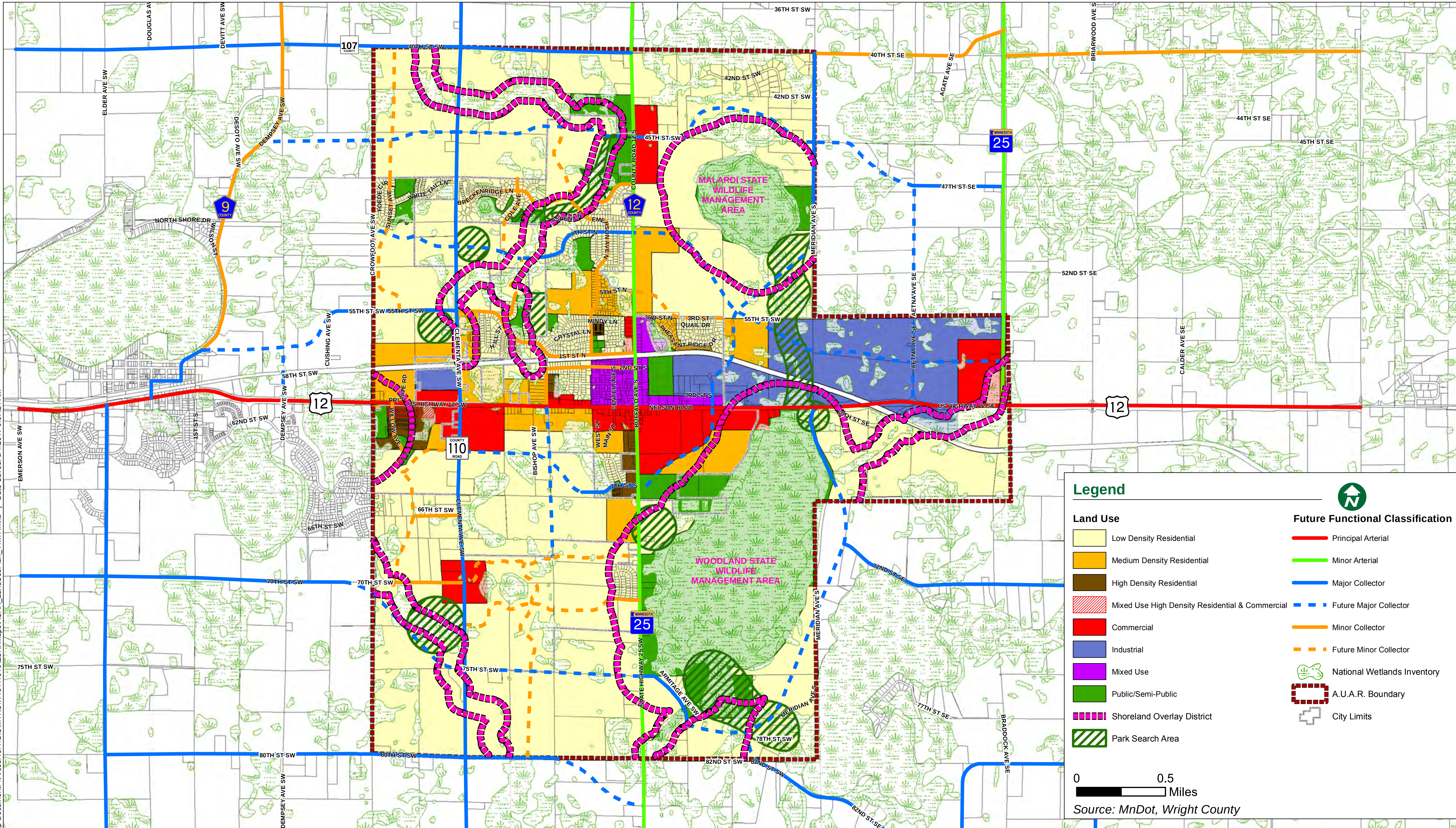
City Of Montrose, Minnesota

Figure 6

March 2017

BOLTON & MENK

Real People. Real Solutions.



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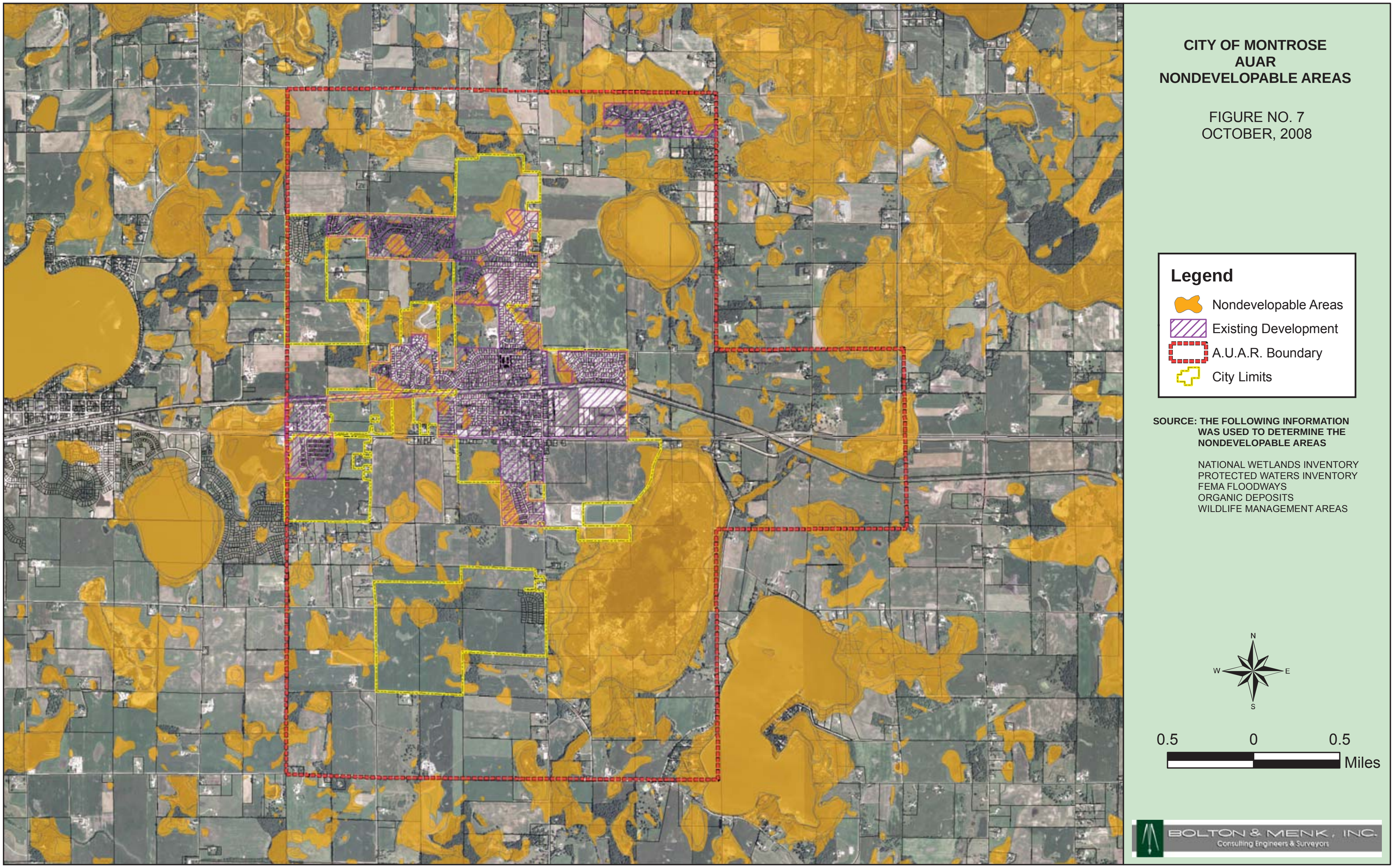

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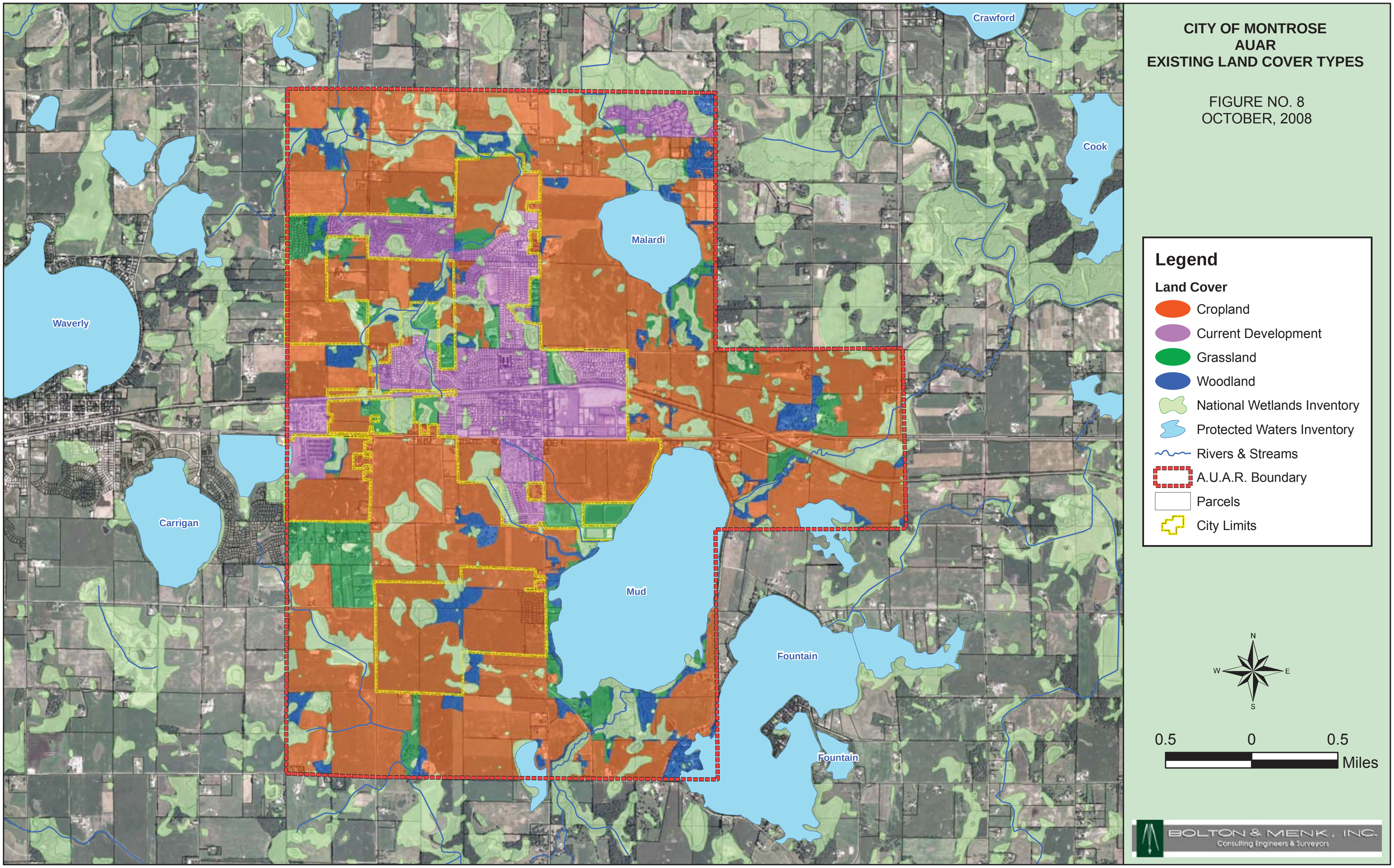

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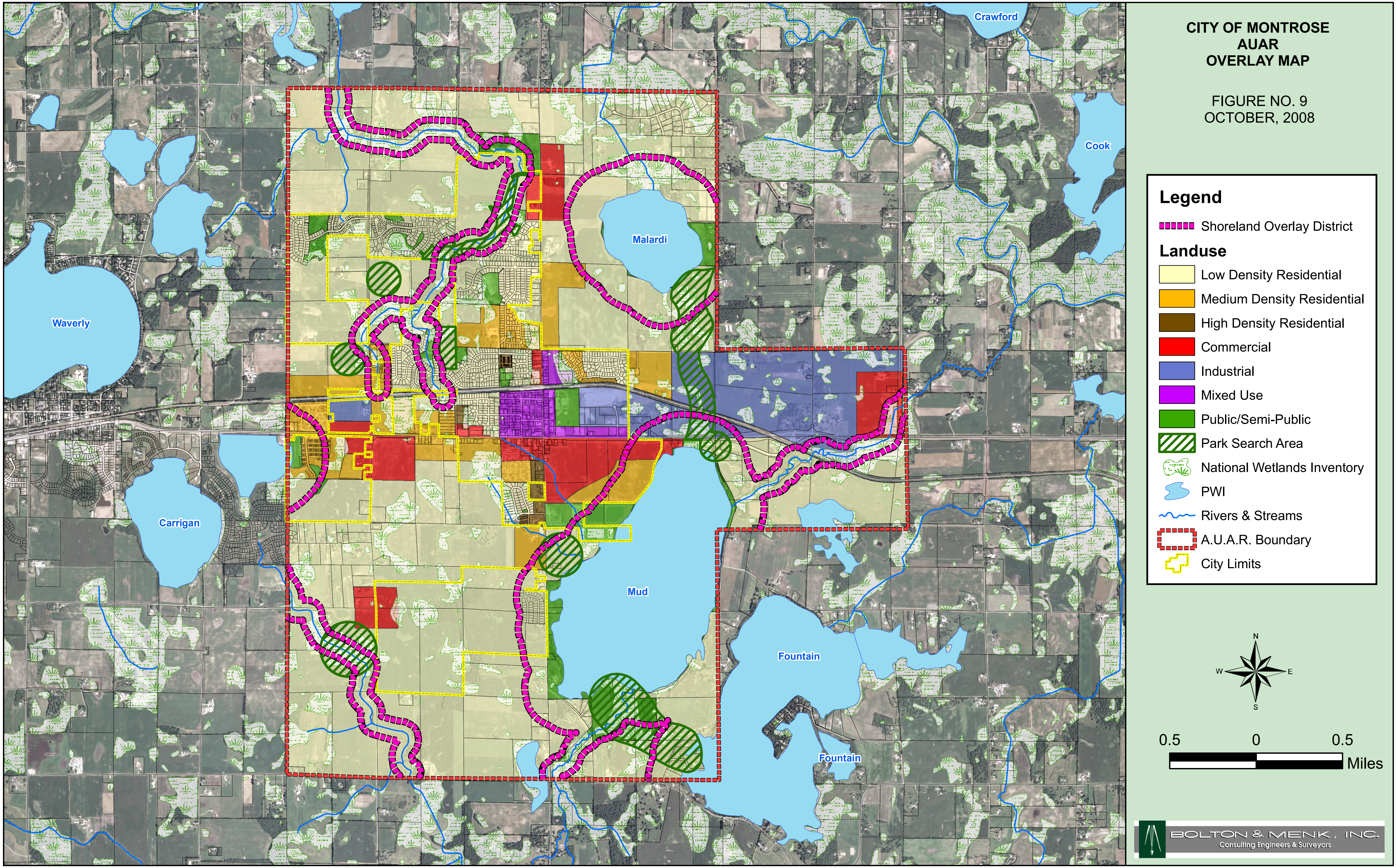

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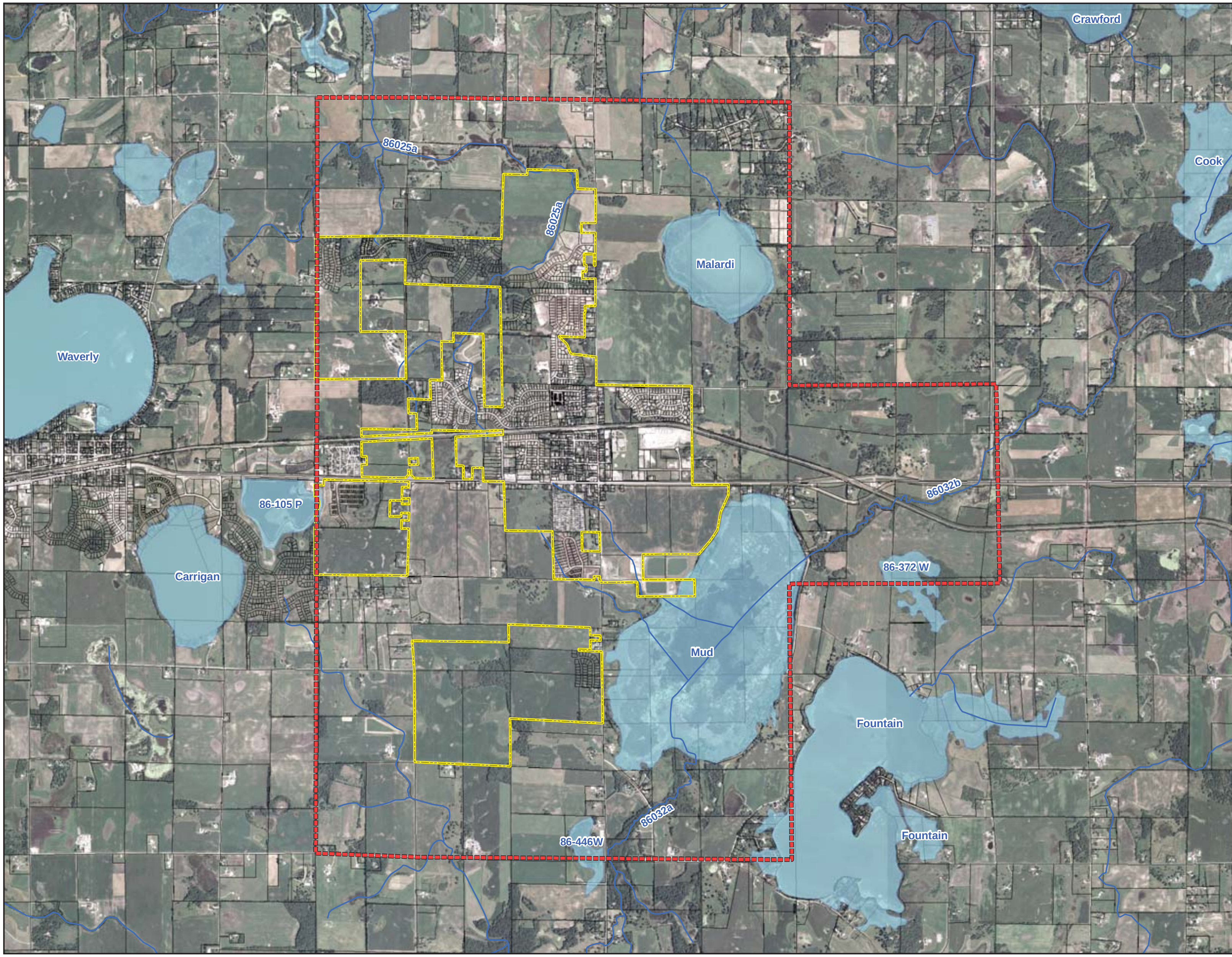

CITY OF MONTROSE
AUAR
PROTECTED WATERS

FIGURE NO. 10
OCTOBER, 2008

Legend

- Rivers & Streams
- PWI
- A.U.A.R. Boundary
- City Limits

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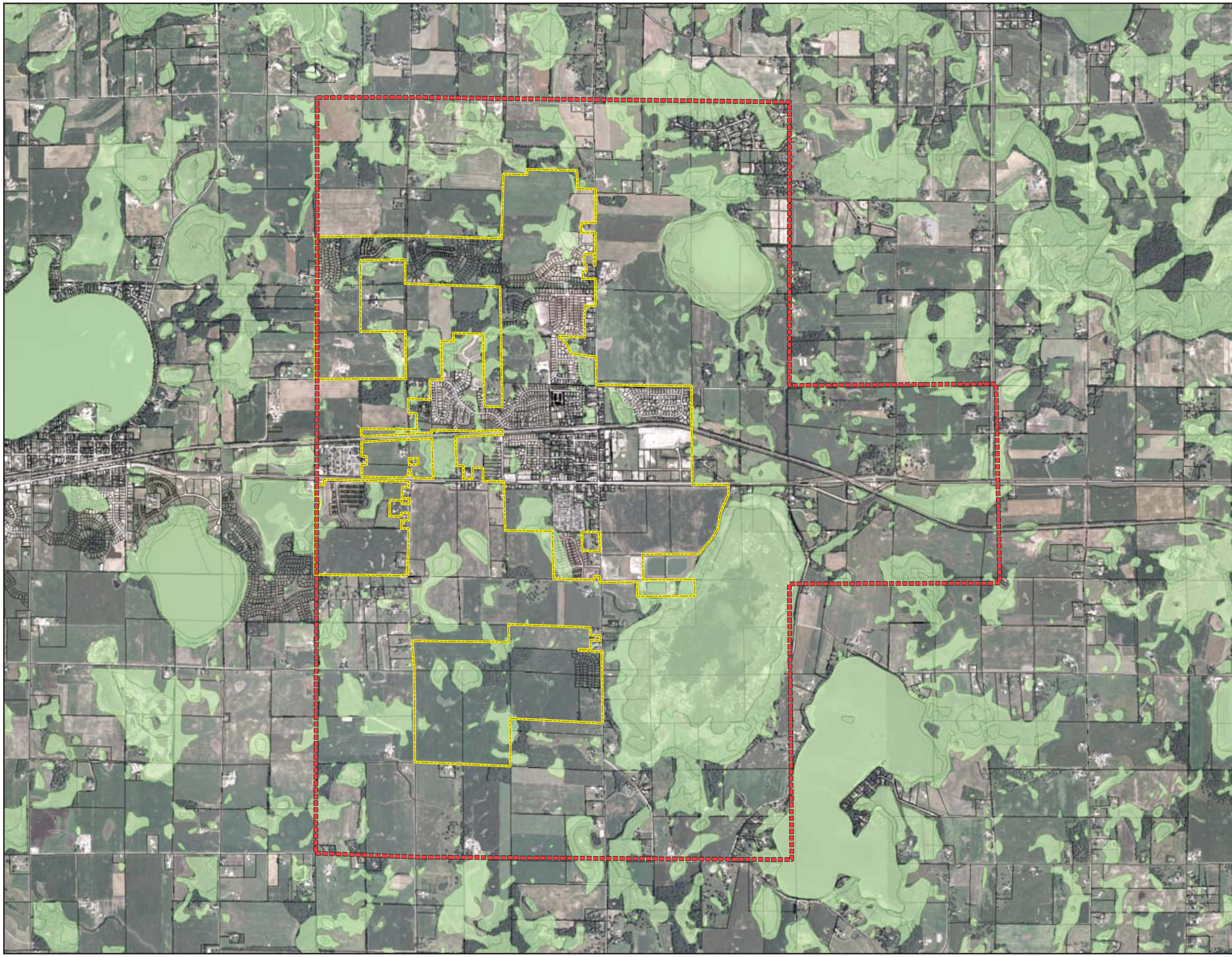
CITY OF MONTROSE
AUAR
NATIONAL WETLANDS INVENTORY

FIGURE NO. 11
OCTOBER, 2008



Legend

- NWI
- A.U.A.R. Boundary
- City Limits

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Miles

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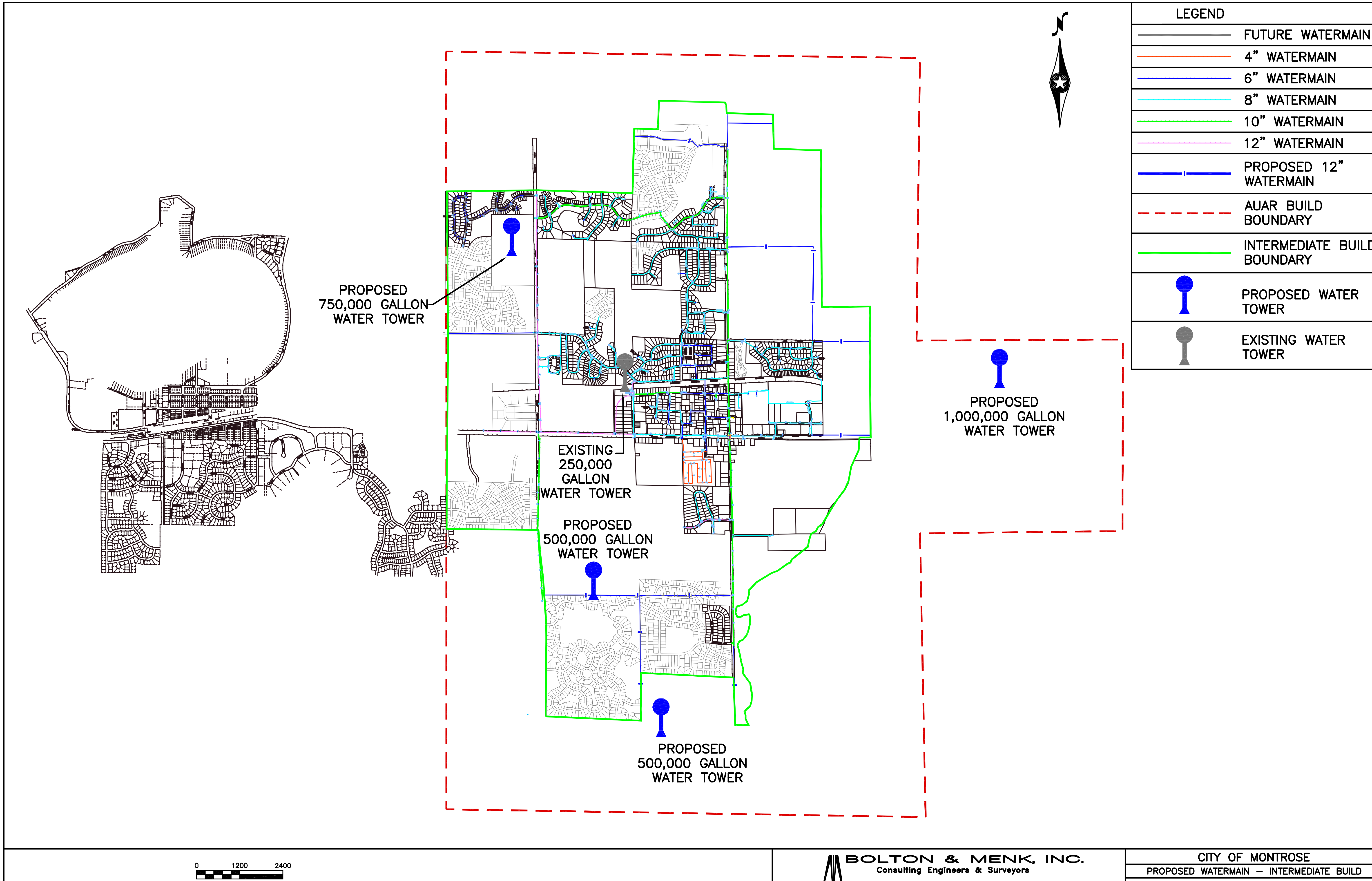

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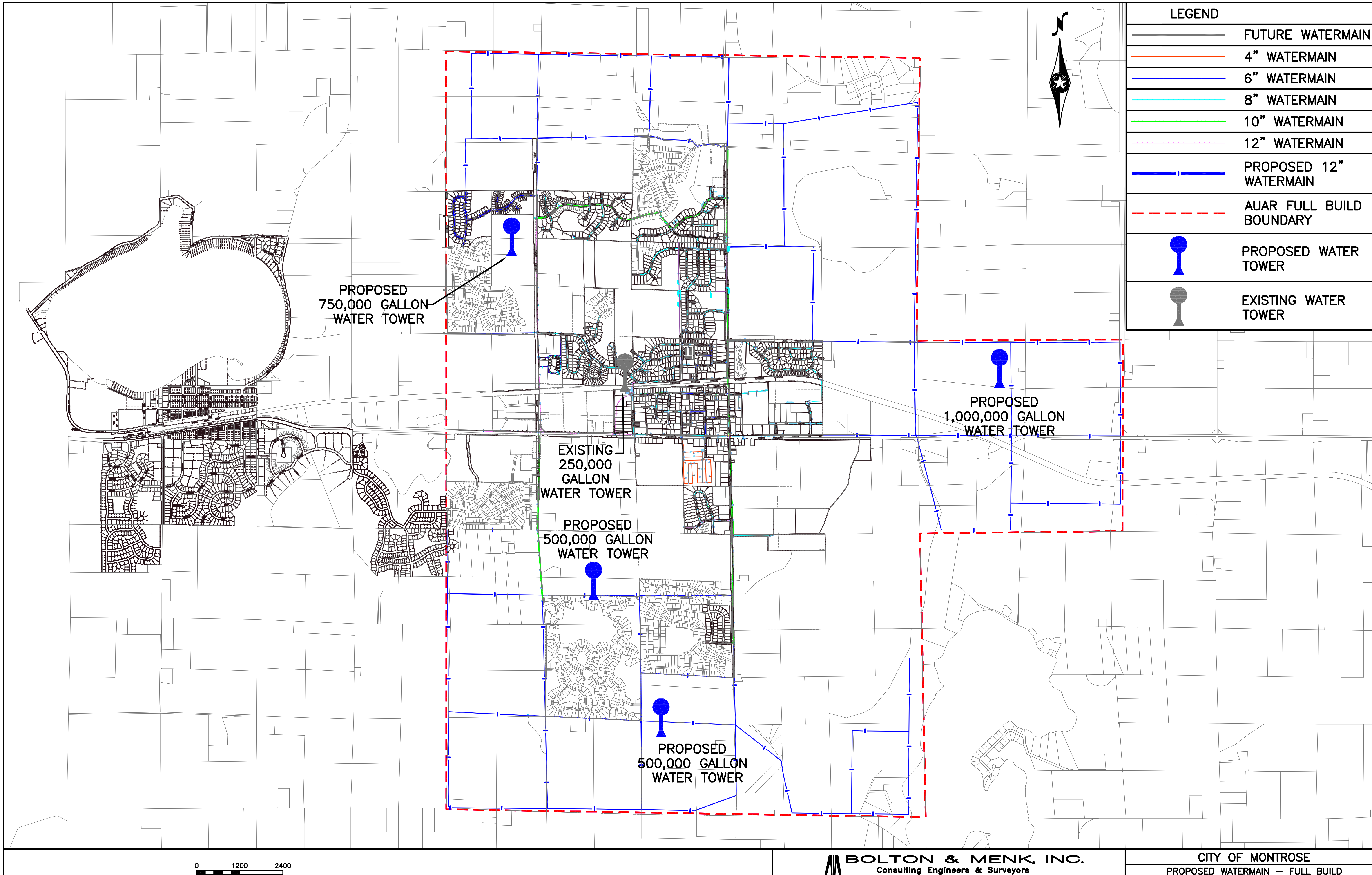
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
PROPOSED WATERMAIN – INTERMEDIATE BUILD
FIGURE NO. 12



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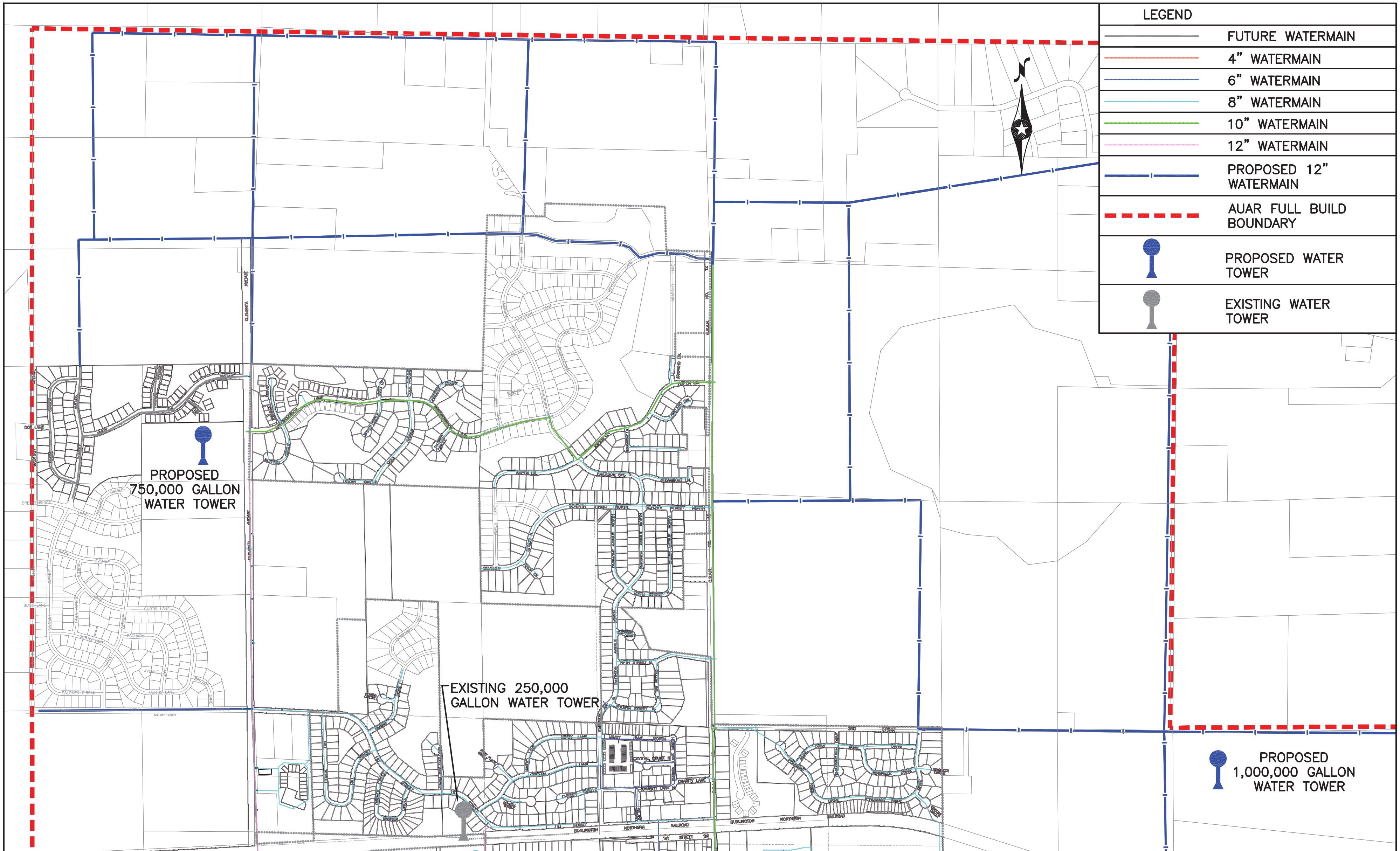
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
PROPOSED WATERMAIN – FULL BUILD
FIGURE NO. 13



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SCALE FEET

H:\Mtrs\W1337928\Cad\WMN STUDY\37928 FIG2-4 PROP PIPE TWR 2.dwg 10/10/08 8:17 am

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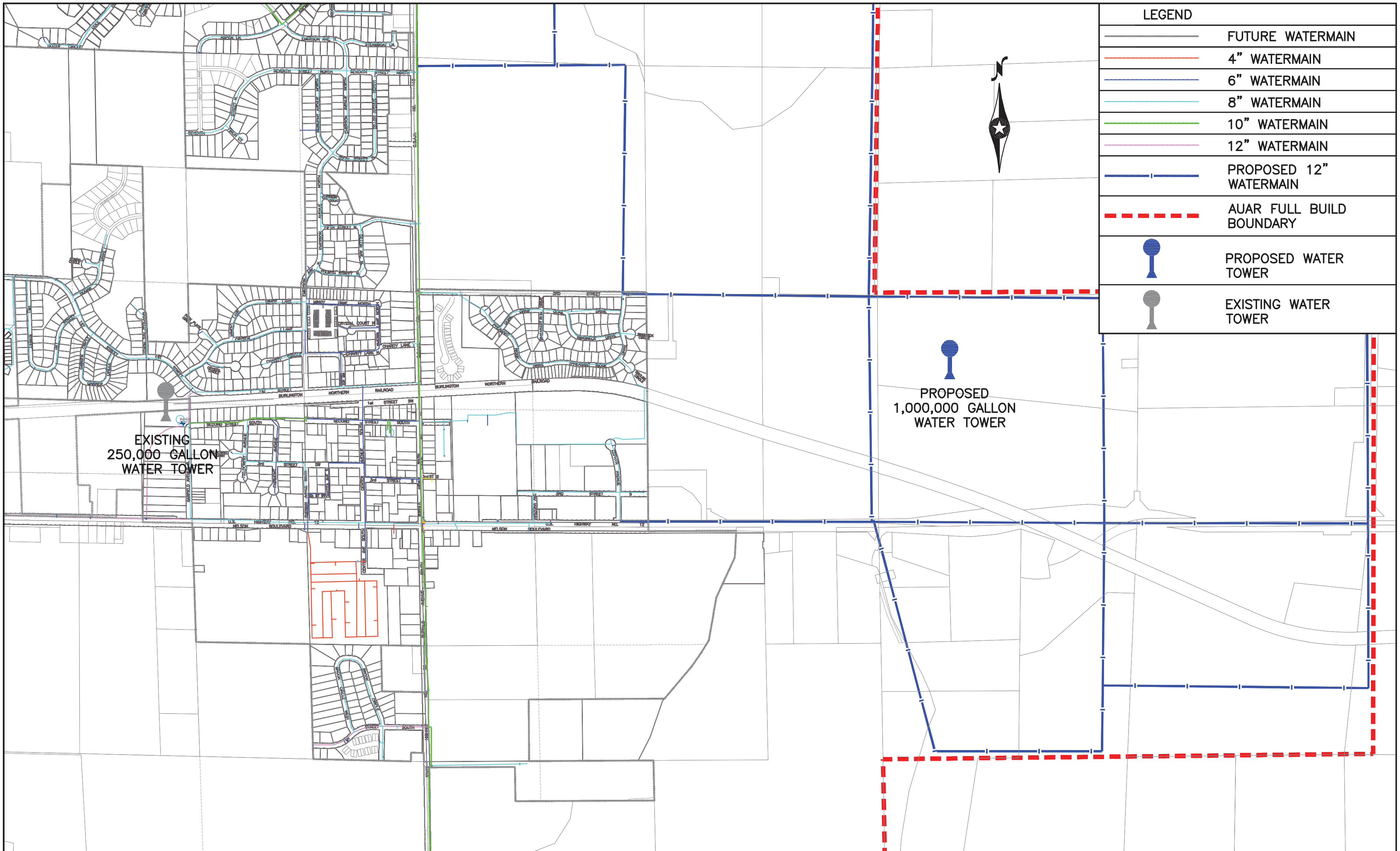
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
PROPOSED WATERMAIN FULL BUILD – NORTHERN
FIGURE NO. 14



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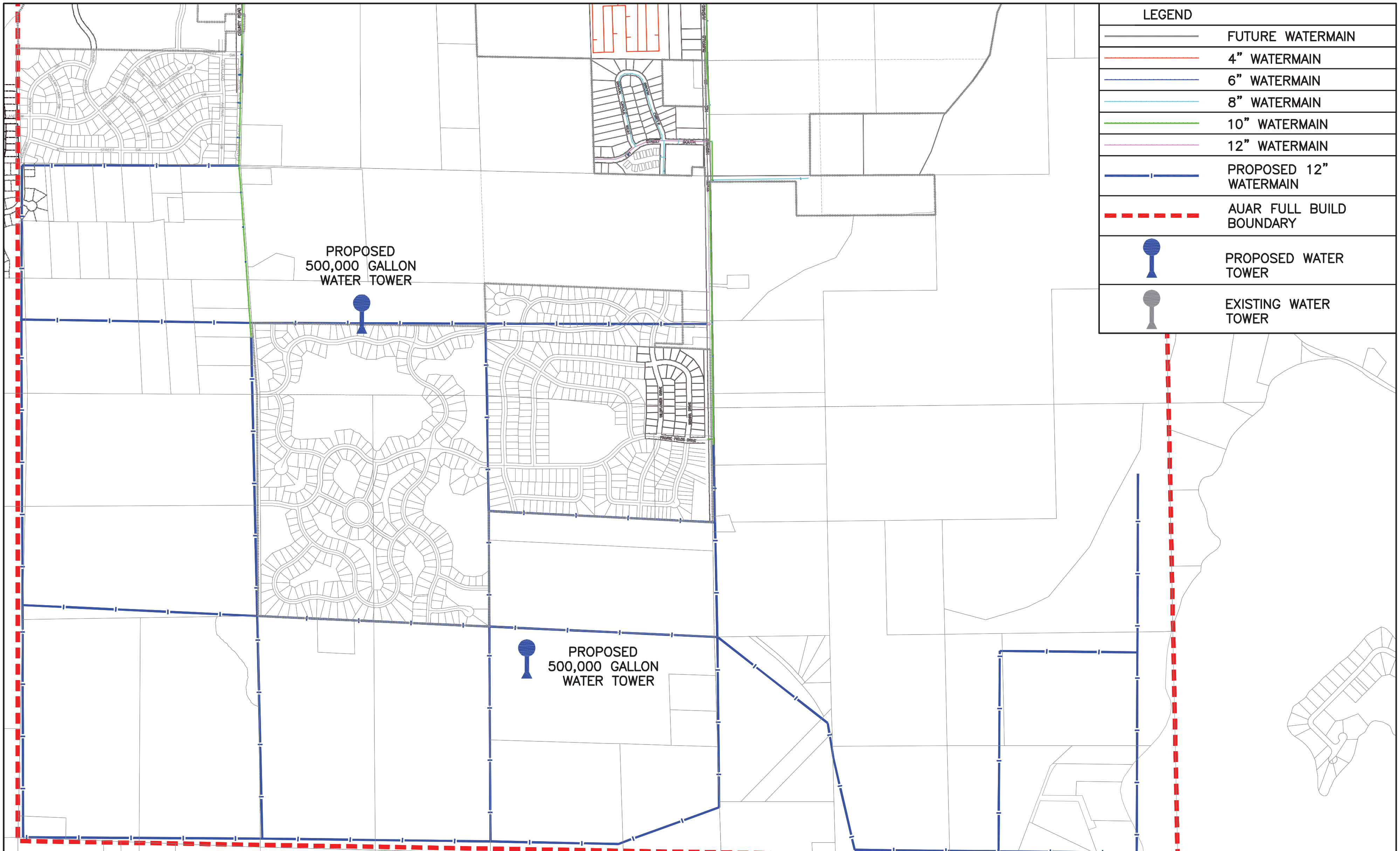
H:\Mtrs\W1337928\Cad\WMN STUDY\37928 FIG2-4 PROP PIPE TWR 2.dwg 10/10/08 8:17 am

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

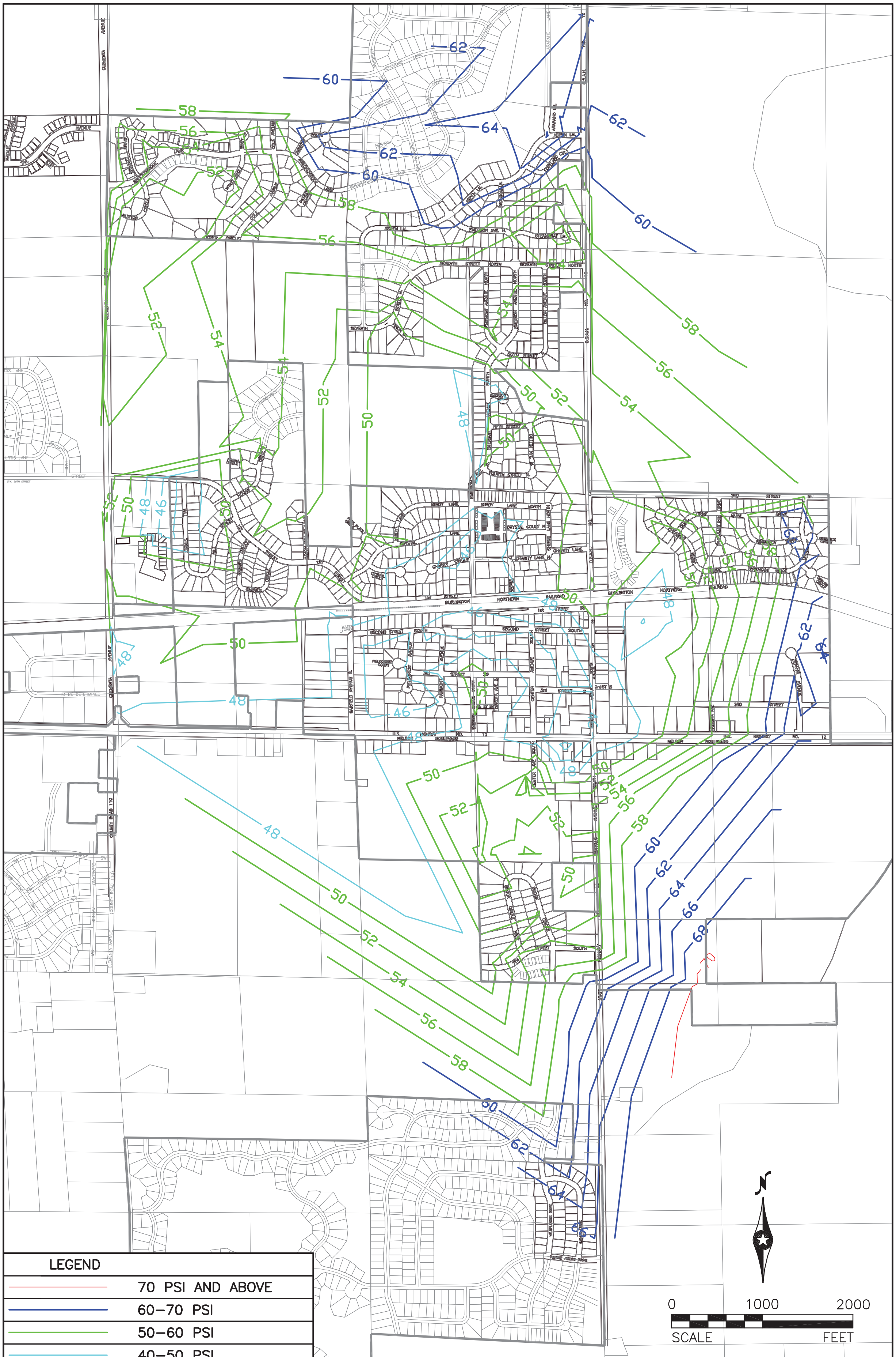
CITY OF MONTROSE
PROPOSED WATERMAIN FULL BUILD – EASTERN
FIGURE NO. 15



H:\Mtrs\W1337928\Cad\WMN STUDY\37928 FIG2-4 PROP PIPE TWR 2.dwg 10/10/08 8:17 am

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
PROPOSED WATERMAIN FULL BUILD – SOUTHERN
FIGURE NO. 16



BOLTON & MENK, INC.
Consulting Engineers & Surveyors

MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

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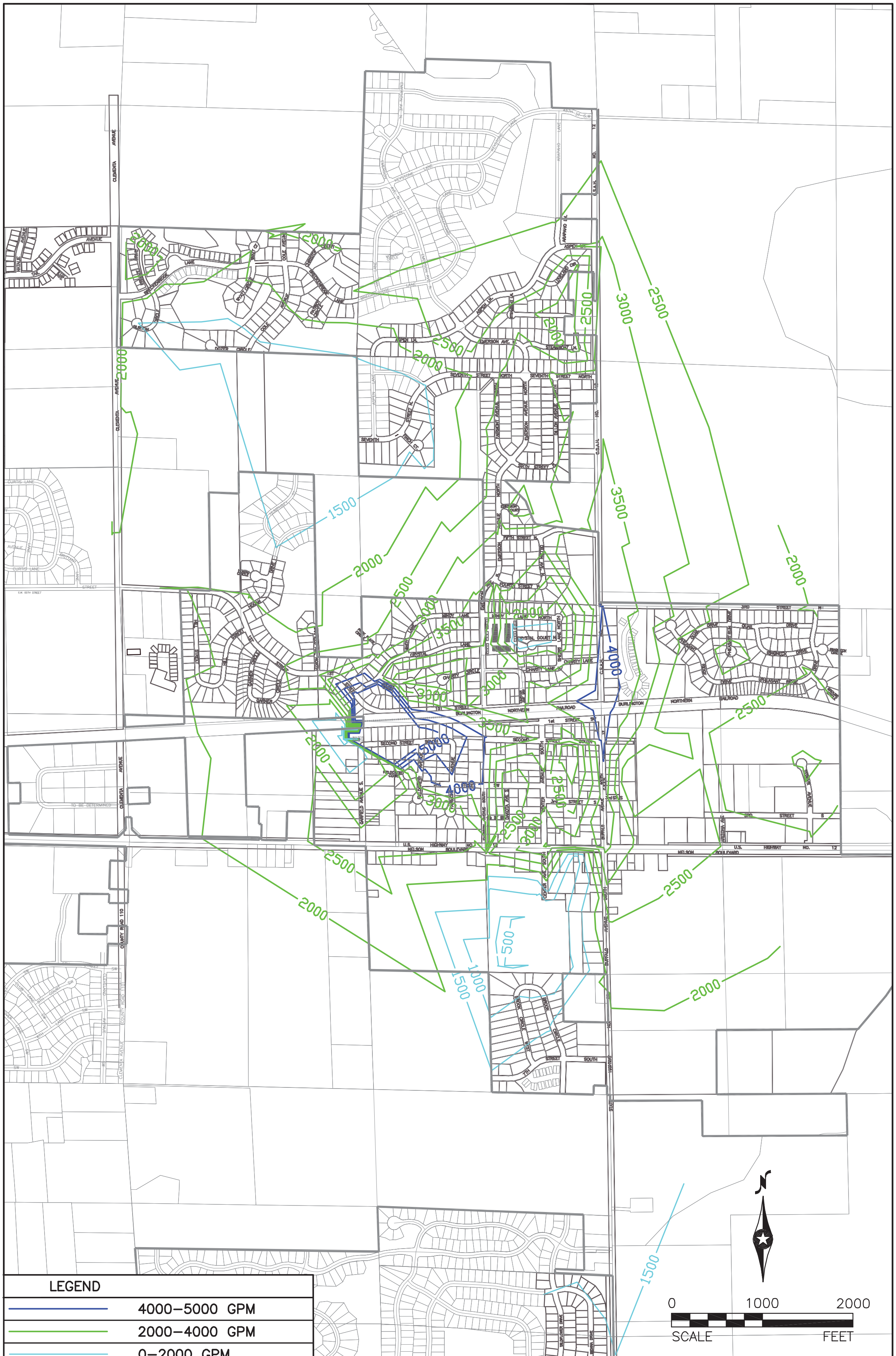
CITY OF MONTROSE
EXISTING CONDITIONS WATER PRESSURE

FIGURE NO. 17



BOLTON & MENK, INC.
Consulting Engineers & Surveyors

MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

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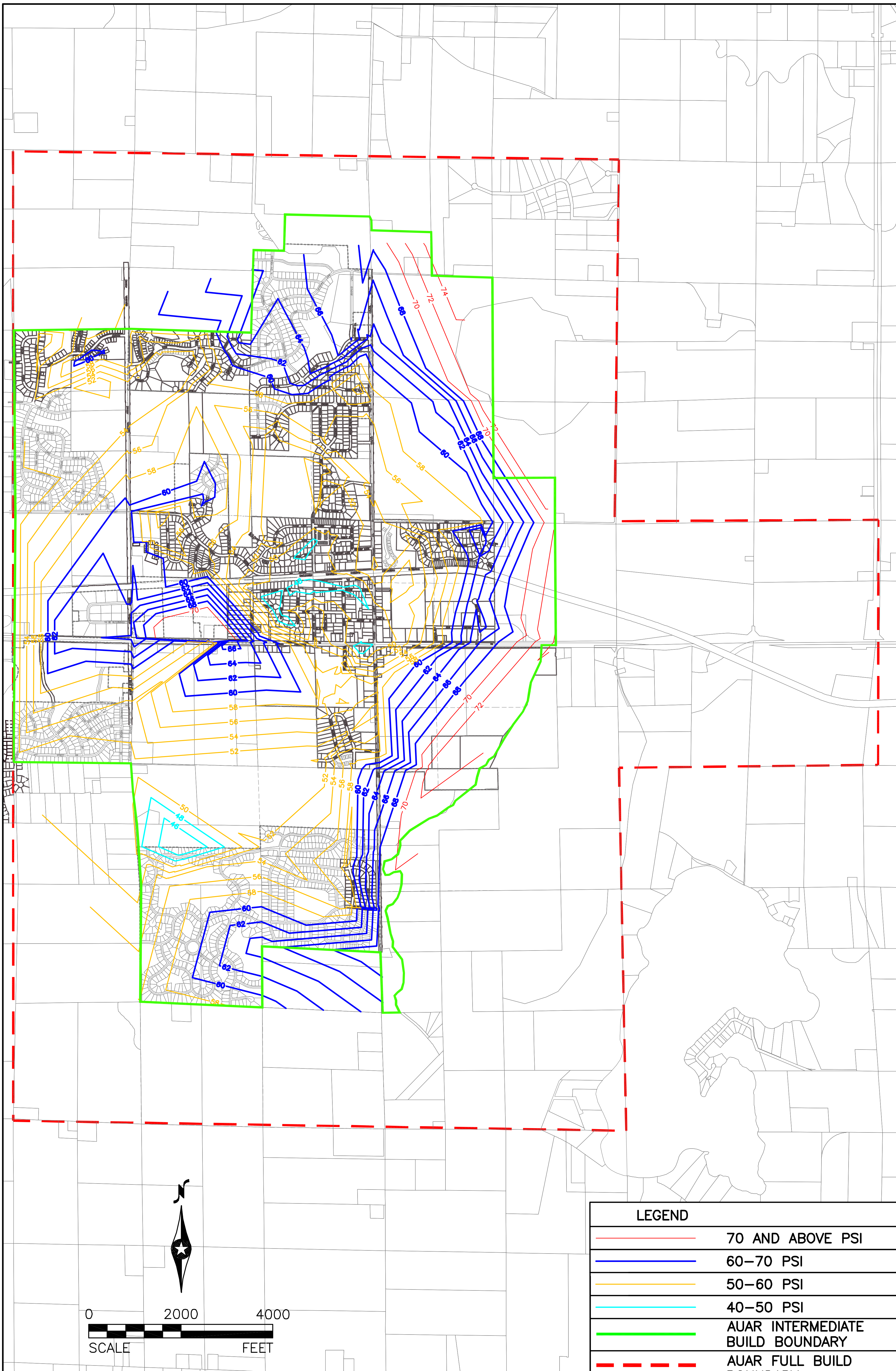
CITY OF MONTROSE
EXISTING CONDITIONS FIRE FLOW

FIGURE NO. 18



BOLTON & MENK, INC.
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

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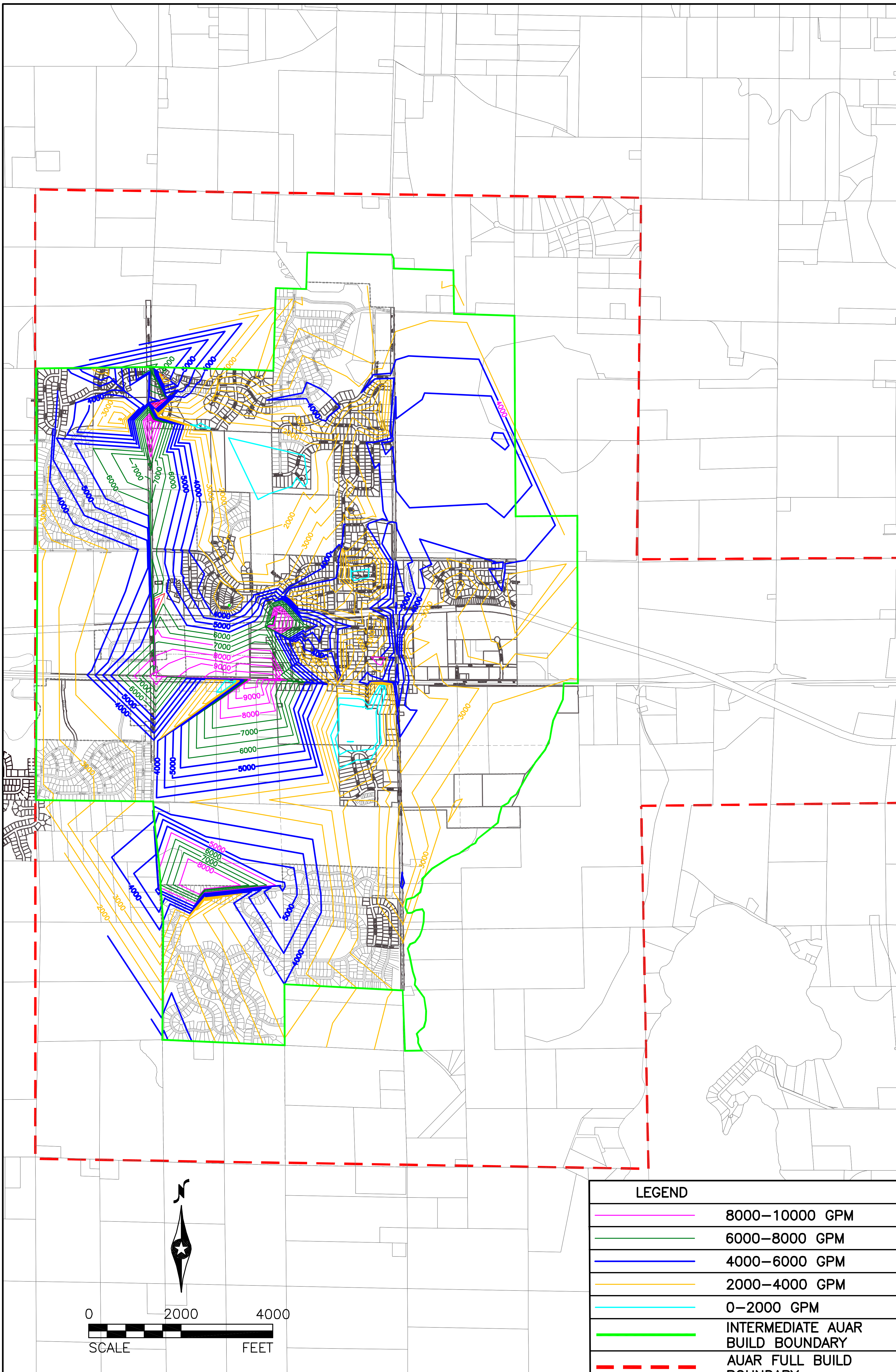
CITY OF MONTROSE, MINNESOTA
PROPOSED INTERMEDIATE BUILD WATER PRESSURE

FIGURE NO. 19



BOLTON & MENK, INC.
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

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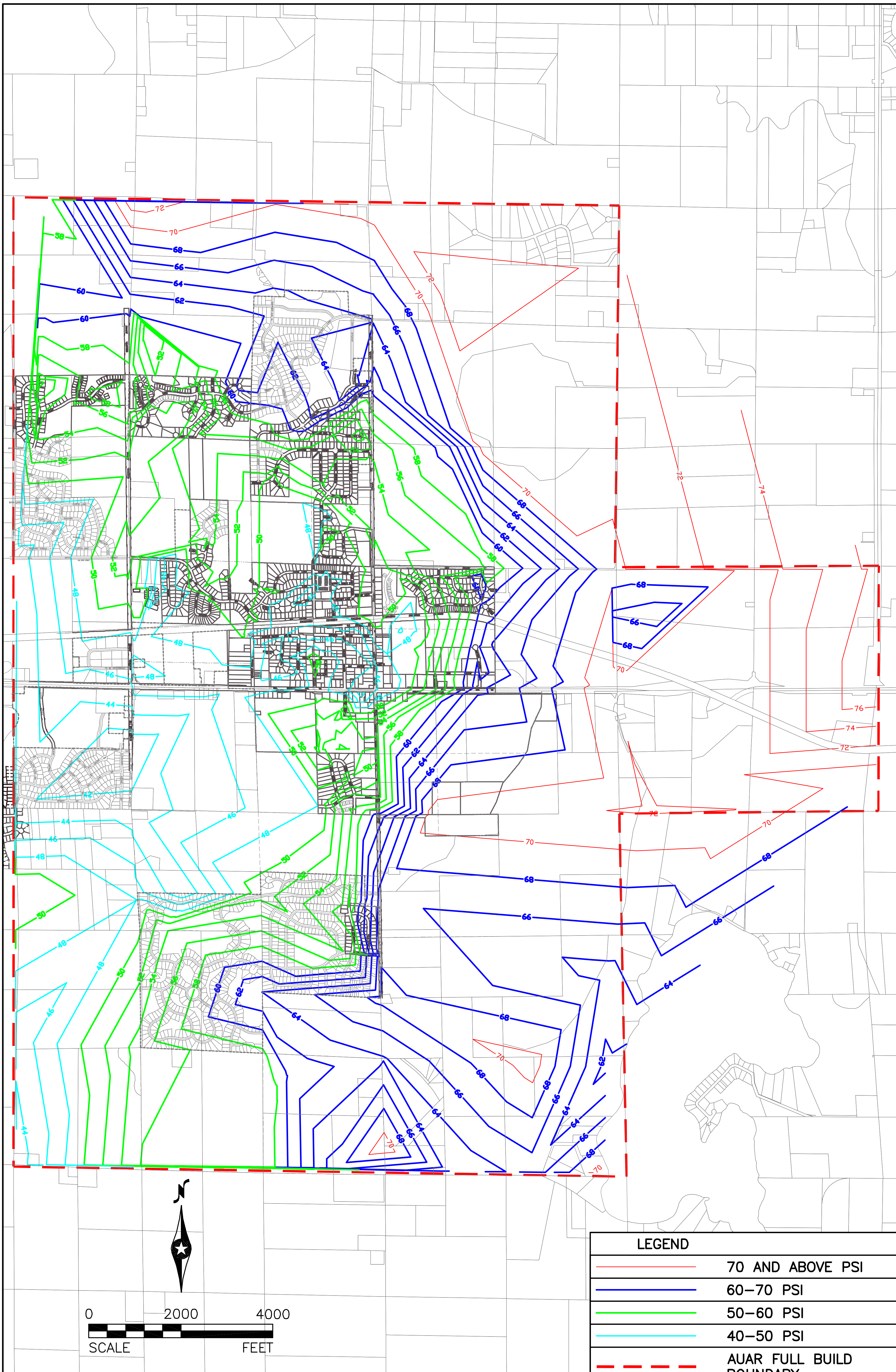
CITY OF MONTROSE, MINNESOTA
PROPOSED INTERMEDIATE BUILD FIRE FLOW

FIGURE NO. 20



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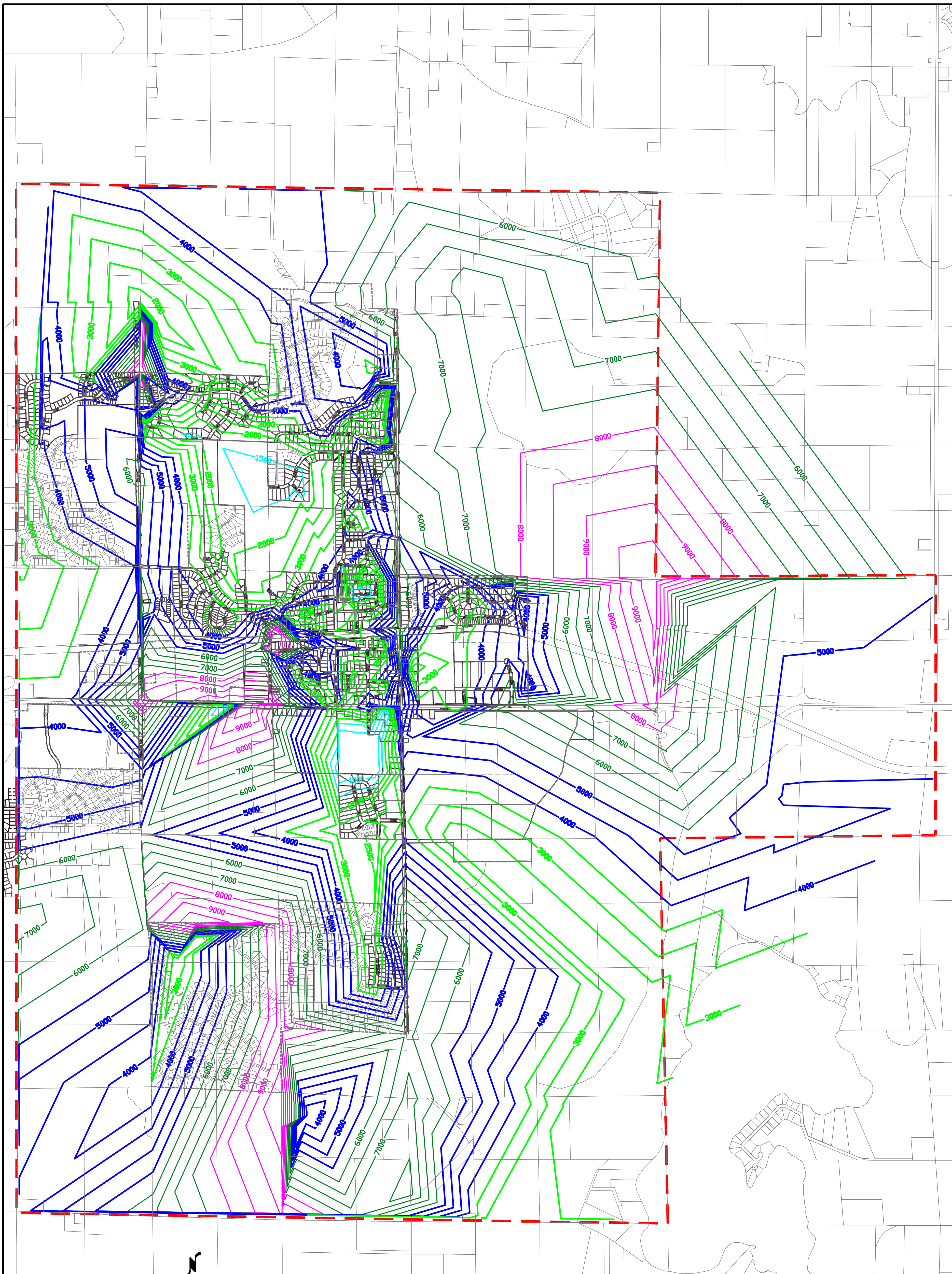
CITY OF MONTROSE, MINNESOTA
PROPOSED FULL BUILD WATER PRESSURE

FIGURE NO. 21



LEGEND

	8000–10000 GPM
	6000–8000 GPM
	4000–6000 GPM
	2000–4000 GPM
	0–2000 GPM
	AUAR FULL BUILD BOUNDARY

0 2000 4000
SCALE FEET

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CITY OF MONTROSE, MINNESOTA
PROPOSED FULL BUILD FIRE FLOW

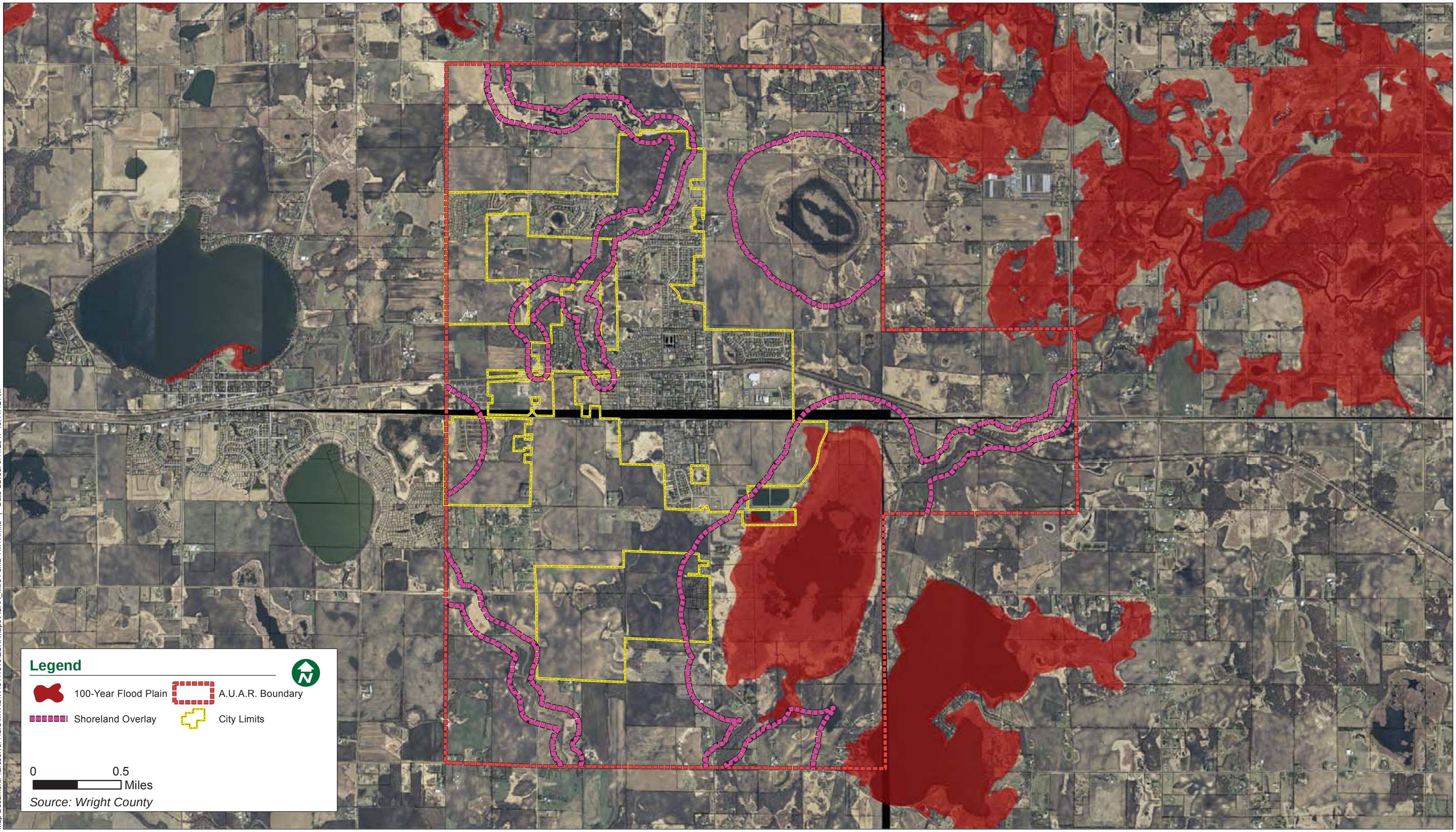
FIGURE NO. 22

AUAR FEMA 100-YEAR FLOOD PLAIN

City of Montrose

Figure 23

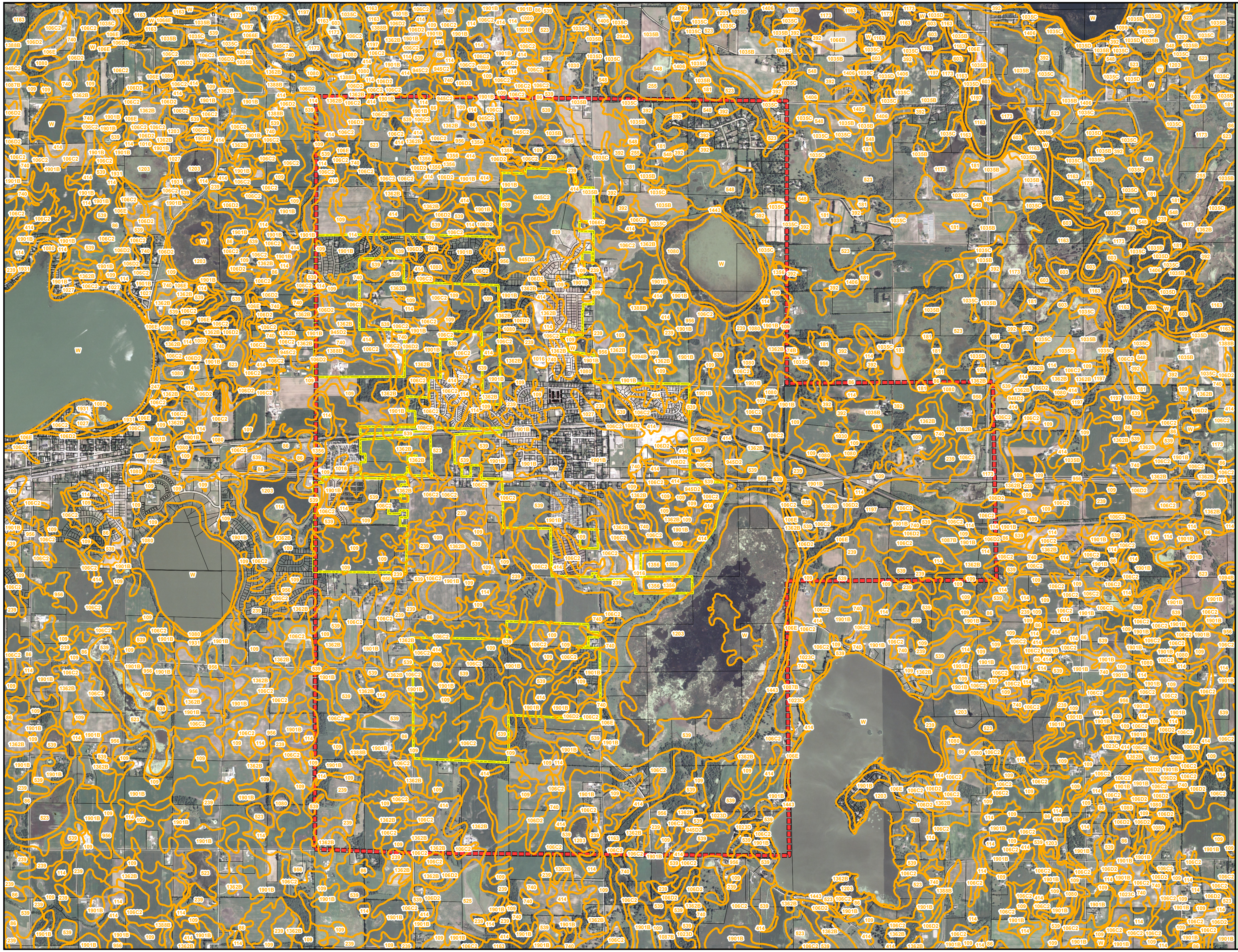
September 2017



Map Document: \\arcserver1\GIS\MTRS\W13111316\ESRI\Maps\AUAR_Mtrs Fema 11x17.mxd | Date Saved: 9/11/2017 10:41:12 AM

CITY OF MONTROSE AUAR SOILS MAP

FIGURE NO. 24
OCTOBER, 2008



Legend

- Soils
- A.U.A.R. Boundary
- City Limits

N
W
E
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0.5 0 0.5
Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Soil Types 11x17.mxd)
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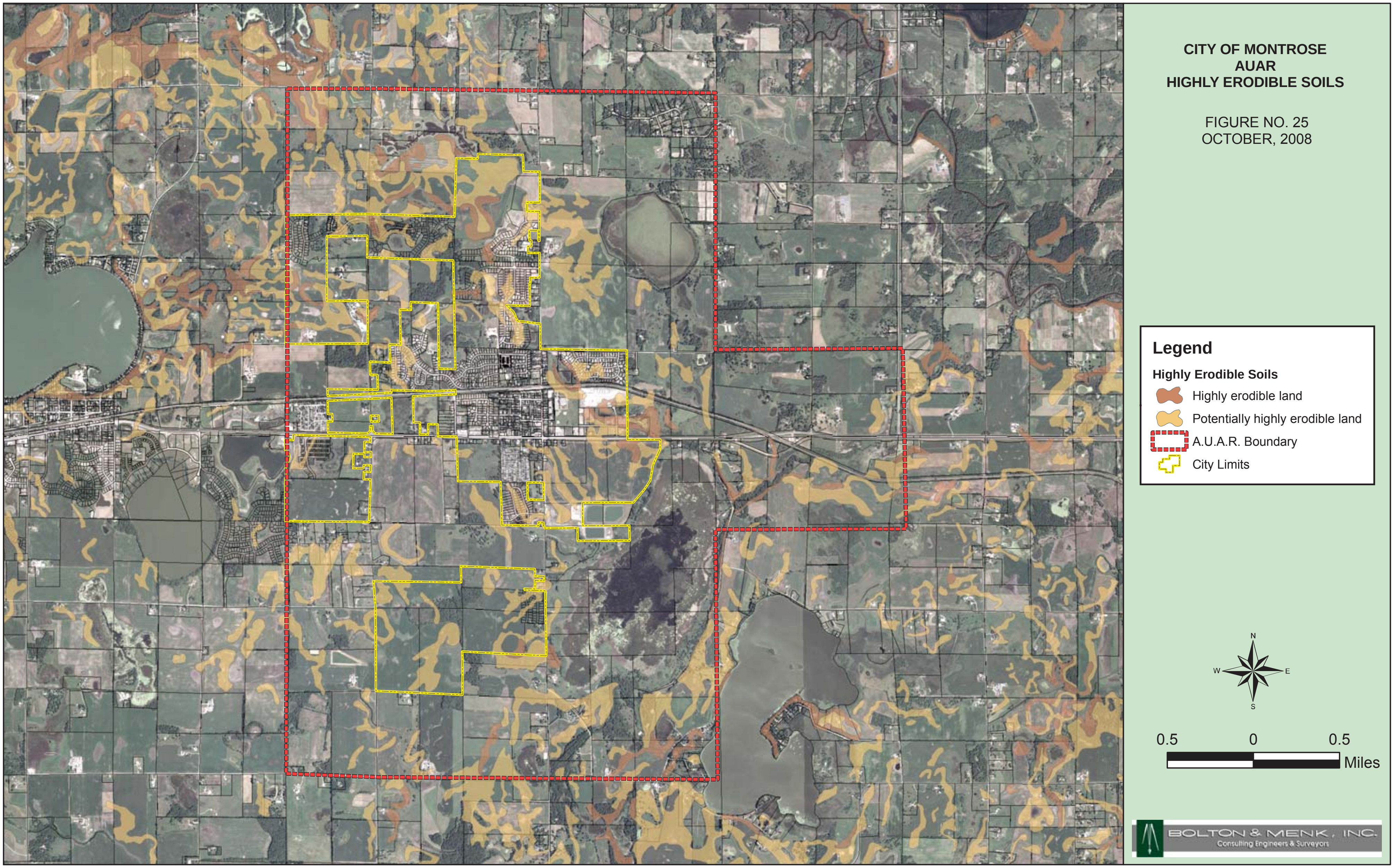

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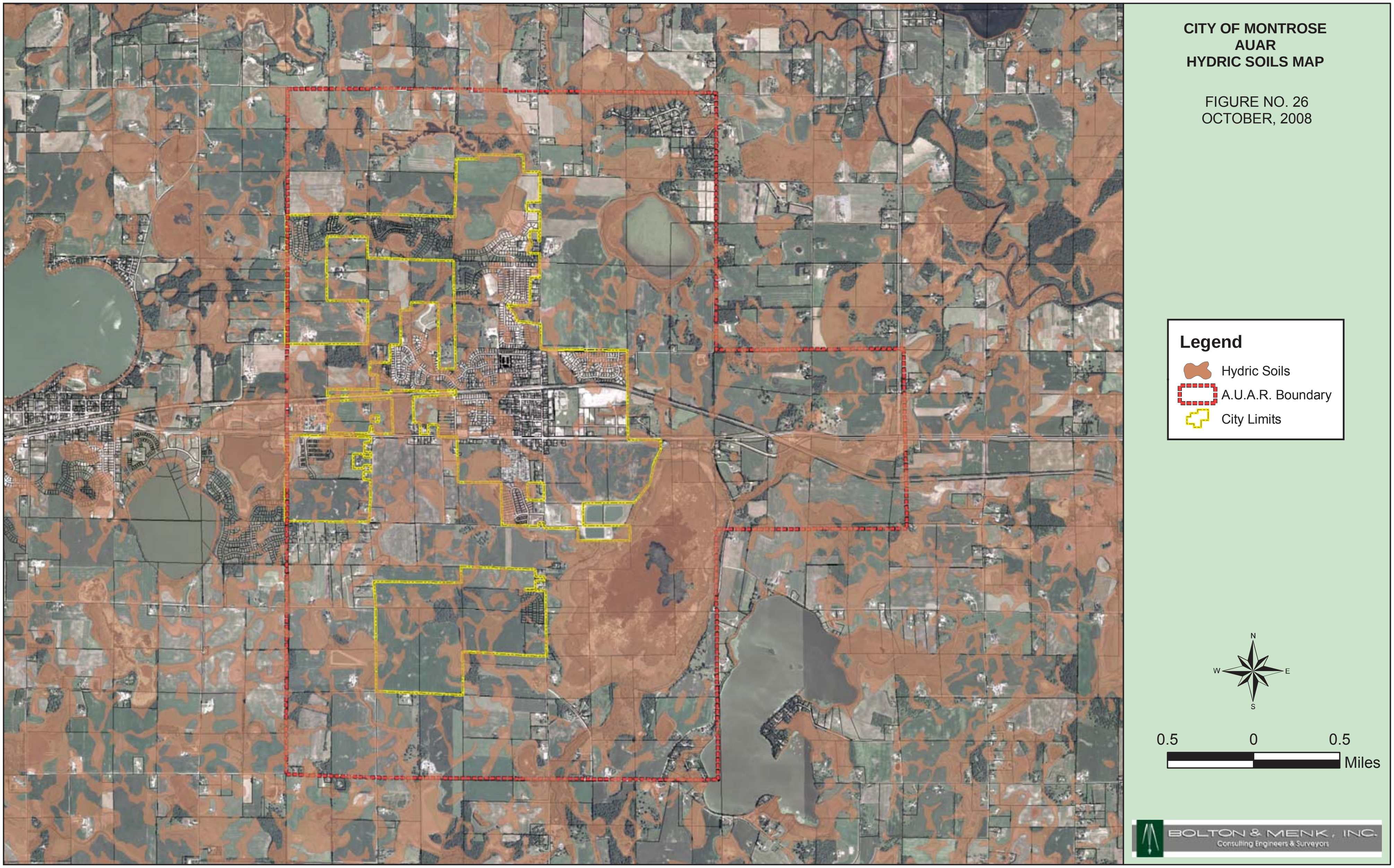
CITY OF MONTROSE
AUAR
HYDRIC SOILS MAP

FIGURE NO. 26
OCTOBER, 2008



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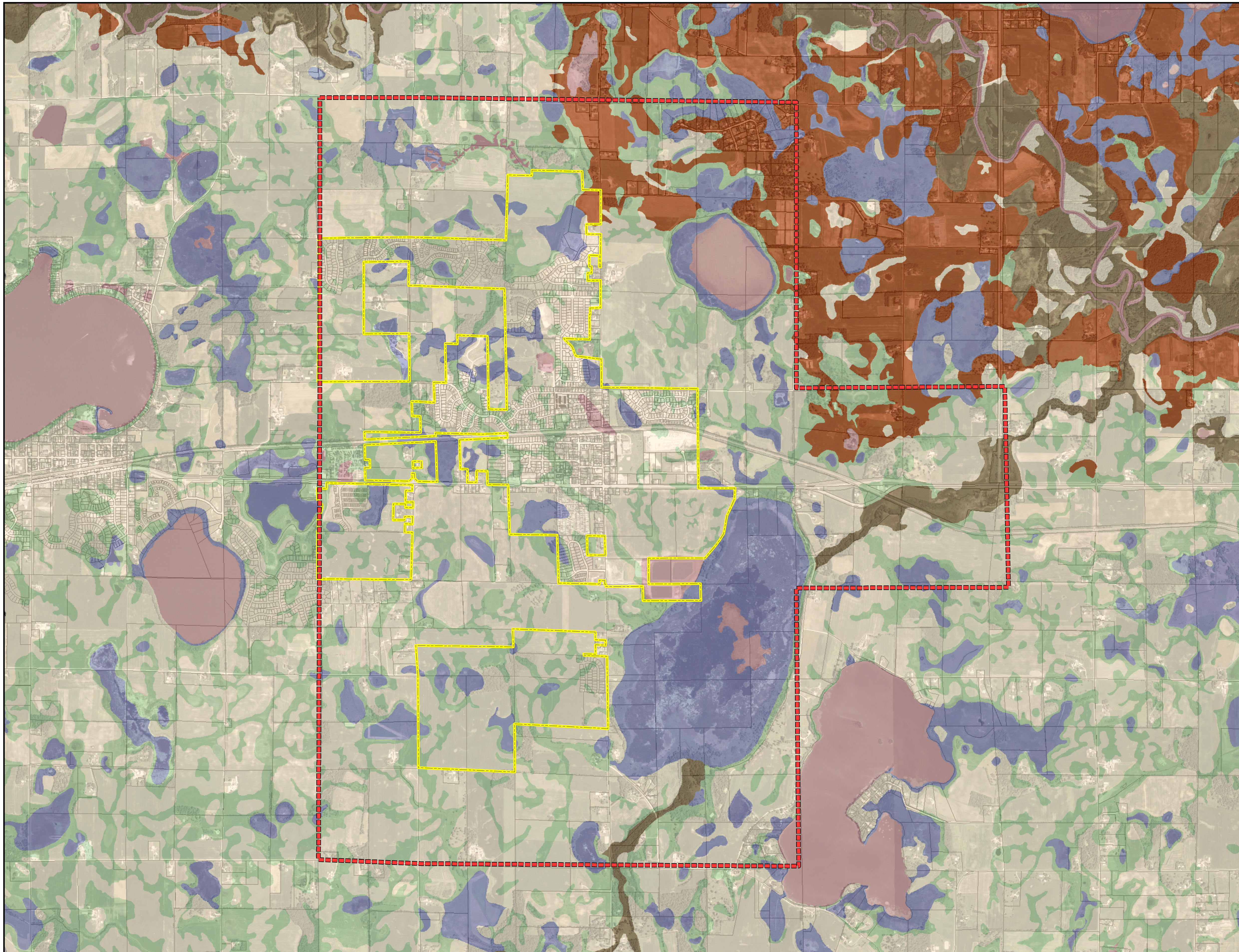

CITY OF MONTROSE
AUAR
SOIL HYDROLOGIC GROUPINGS

FIGURE NO. 27
OCTOBER, 2008

Legend

Hydrologic Groupings

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not Classified
- A.U.A.R. Boundary
- City Limits

N
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Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Soils Hydrologic 11x17.mxd)
10/9/2008 -- 9:48:27 AM

COMPREHENSIVE PLAN WATERSHEDS, PROPOSED DETENTION PONDS, AND PARK SEARCH AREAS

City Of Montrose

Figure 28

September 2017

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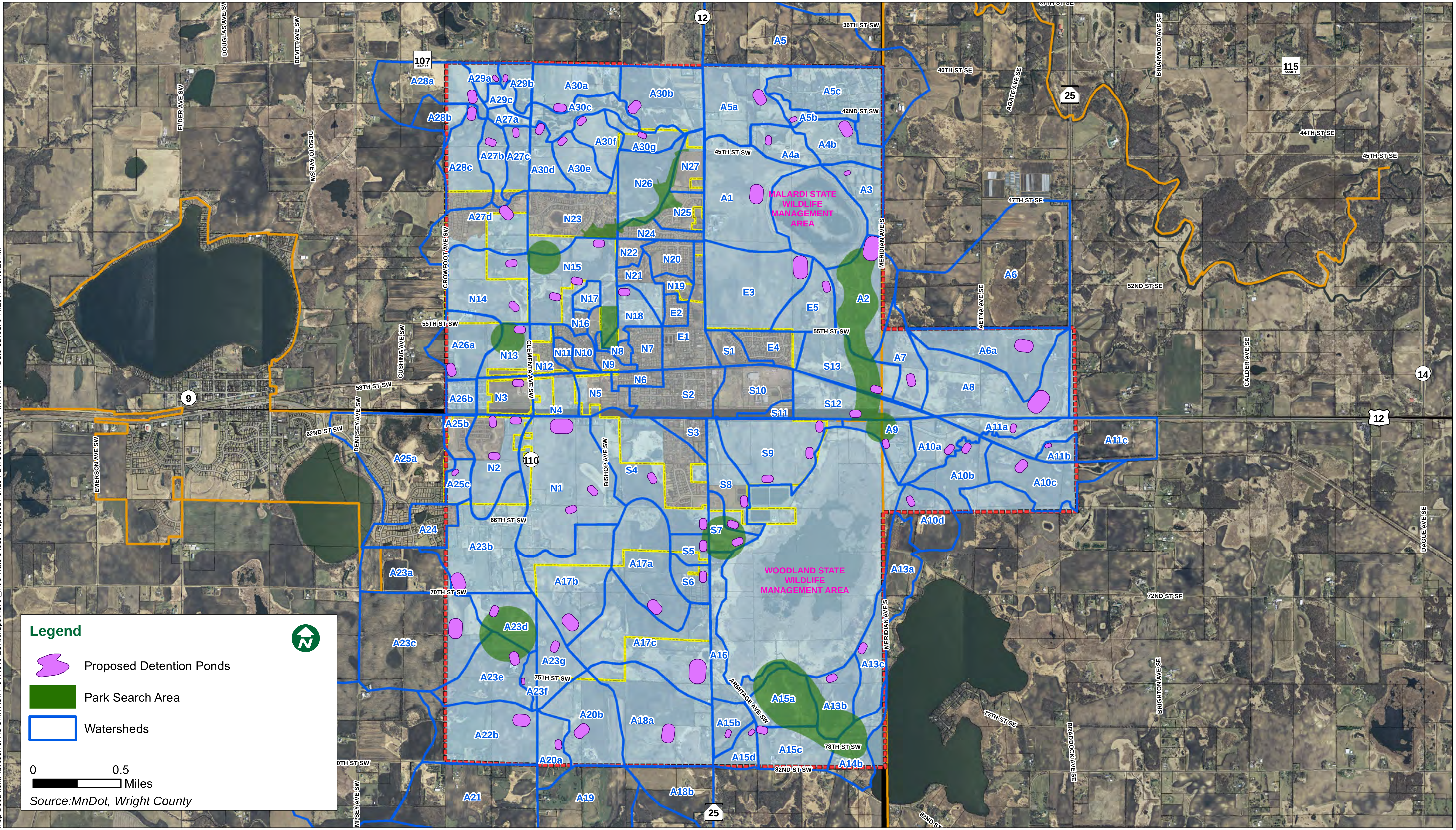
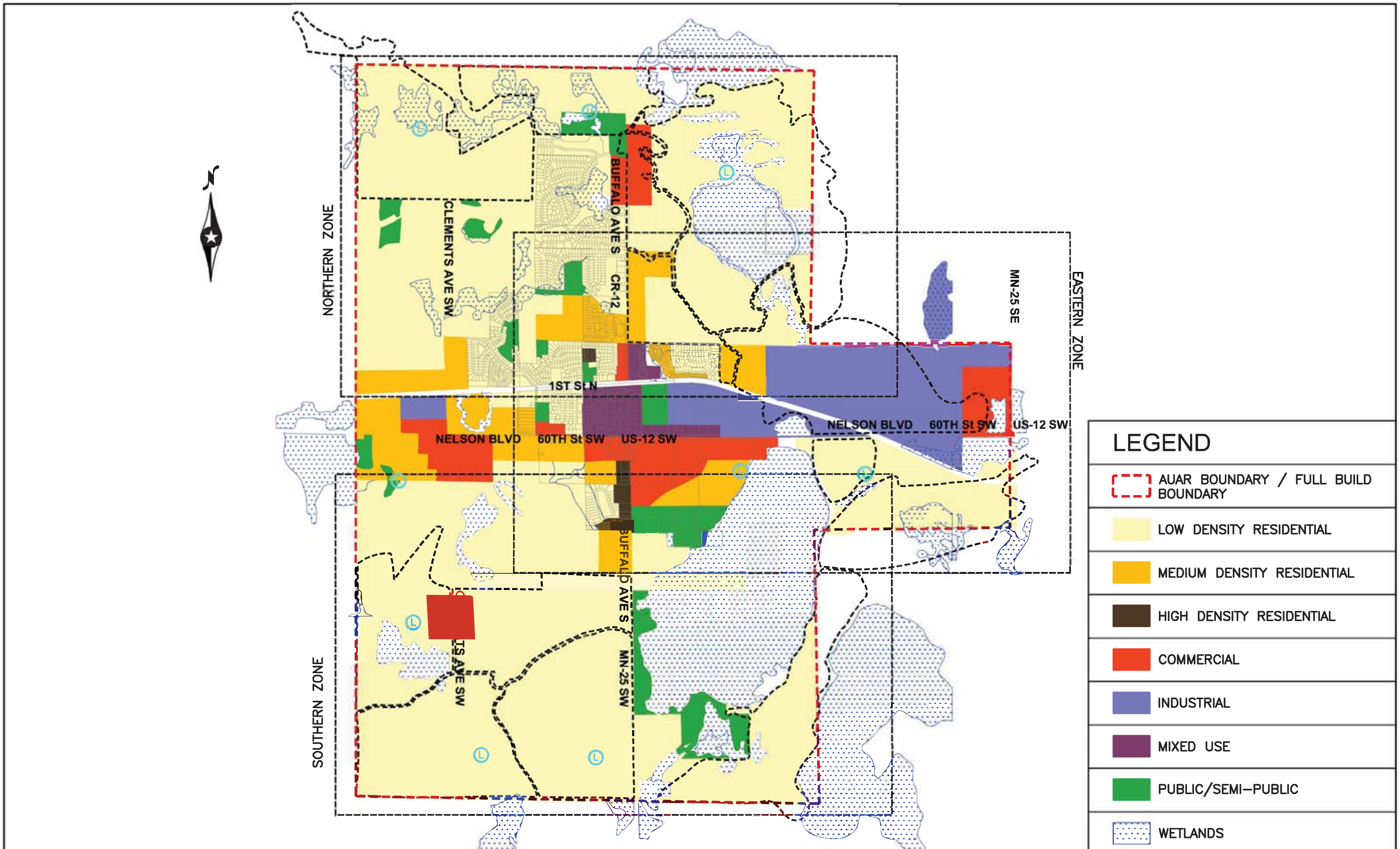
Real People. Real Solutions.



Map Document: \\arcserver1\GIS\MTRS\W13113116\ESRI\Maps\AUAR_Mtrs Watersheds-Proposed Ponds-Park Search Areas 11x17.mxd | Date Saved: 9/11/2017 10:46:26 AM



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CITY OF MONTROSE
PROPOSED LIFT STATION SERVICE AREAS
FIGURE 29

H:\Mtrs\W1337928\Cad\37928 Fig 3-4.dwg 10/10/08 8:28 am

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Consulting Engineers & Surveyors
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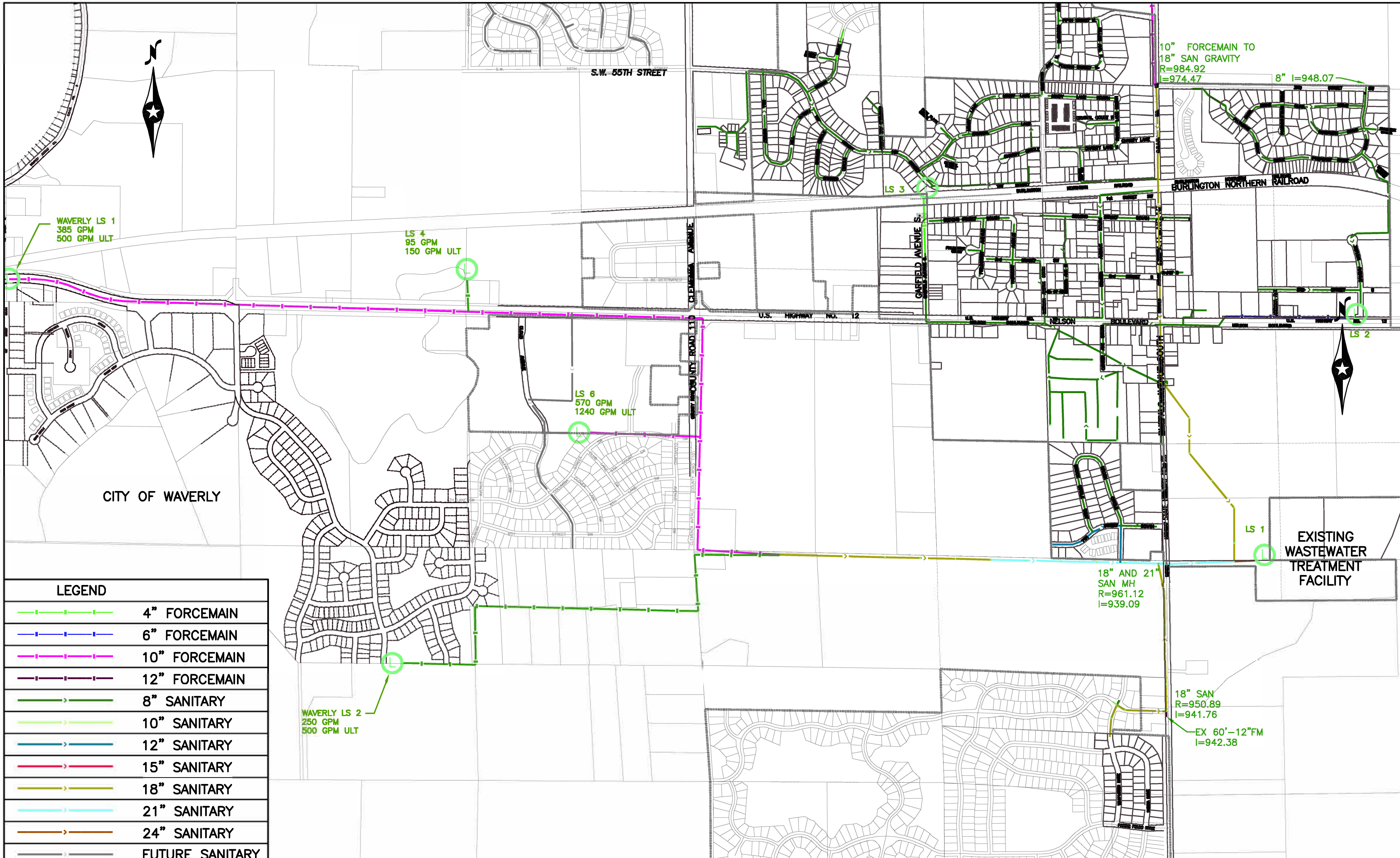
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
EXISTING SEWER CONDITIONS NORTH MONTROSE
FIGURE NO. 30



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BOLTON & MENK, INC.
Consulting Engineers & Surveyors
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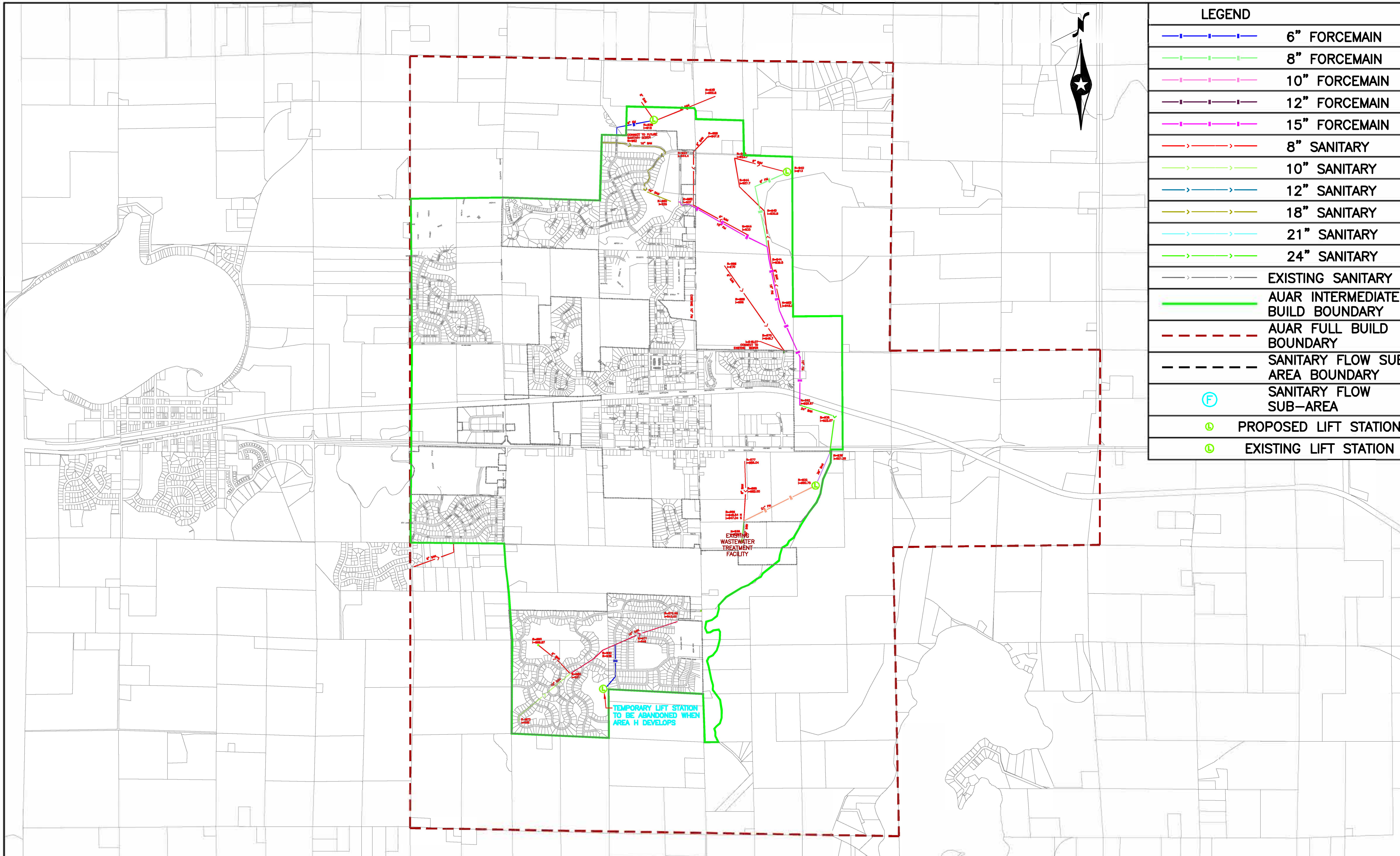
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
EXISTING SEWER CONDITIONS SOUTH MONTROSE
FIGURE NO. 31



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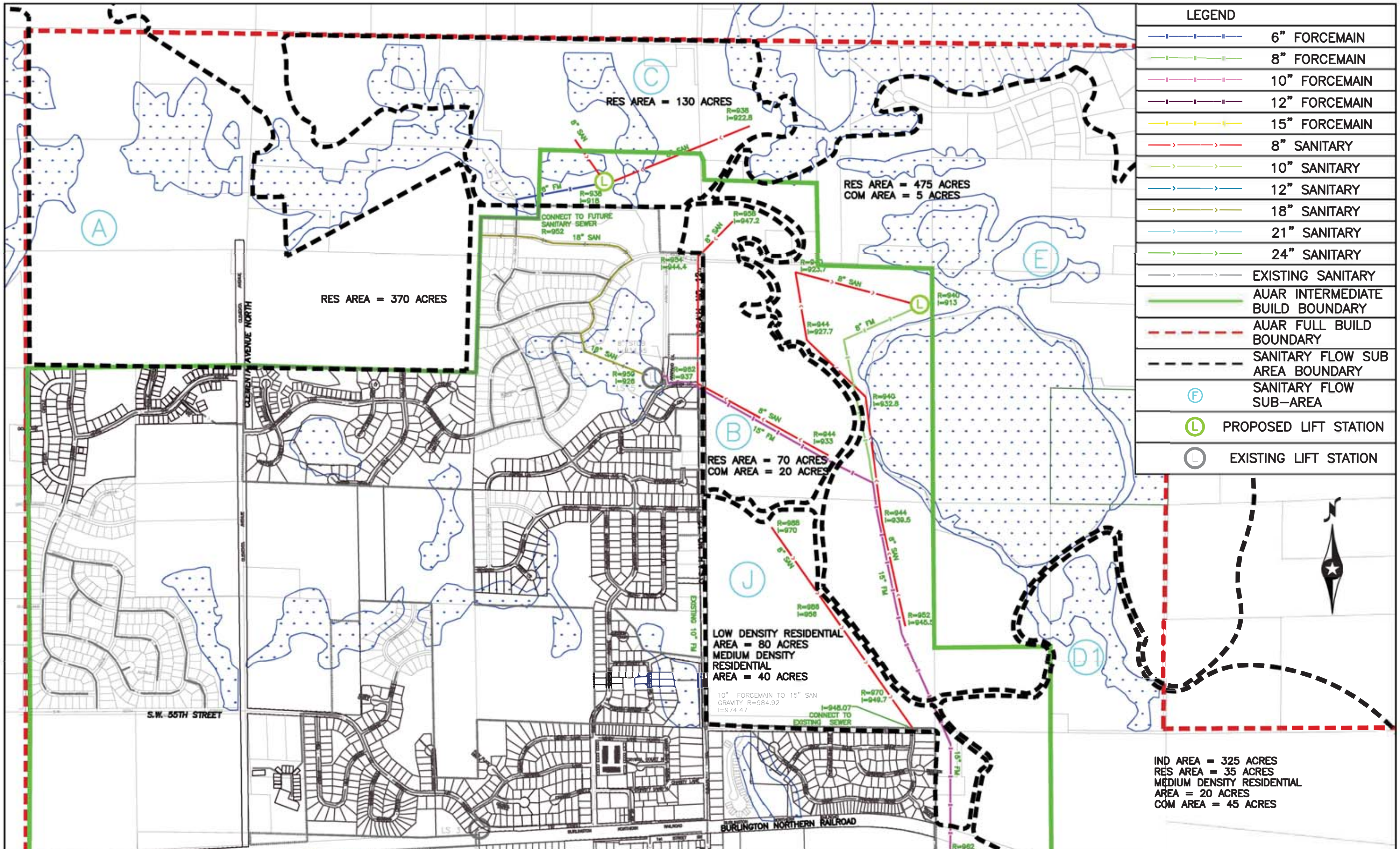
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
INTERMEDIATE BUILD SANITARY SEWER
FIGURE NO. 32



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SCALE FEET

NOTE: SEE APPENDIX FOR FLOW CALCULATIONS AND PIPE SLOPE INFORMATION

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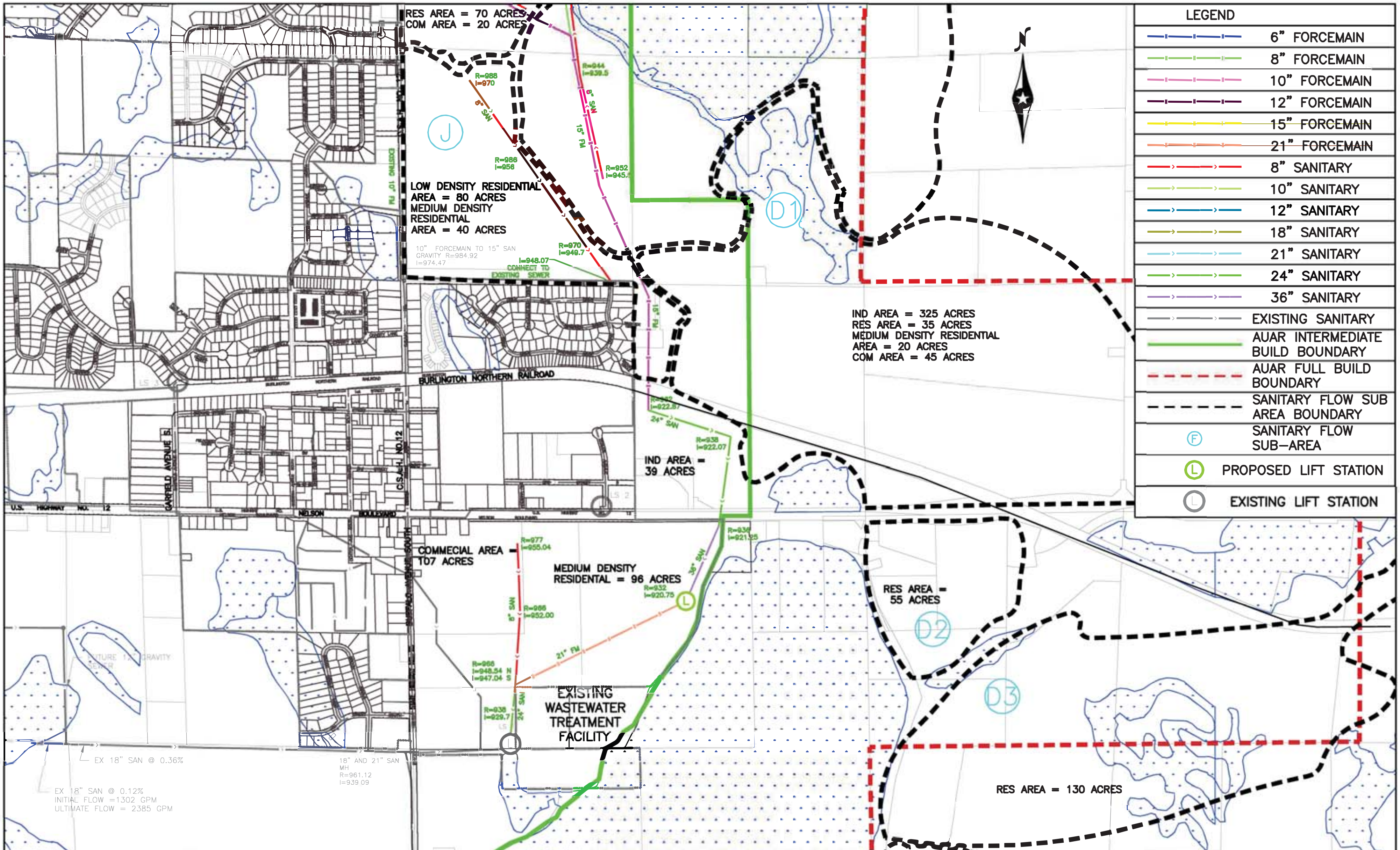
CITY OF MONTROSE
INTERMEDIATE BUILD SANITARY SEWER–NORTHERN ZONE

FIGURE NO. 33



NOTE: SEE APPENDIX FOR FLOW CALCULATIONS AND PIPE SLOPE INFORMATION

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Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
INTERMEDIATE BUILD SANITARY SEWER–EASTERN ZONE
FIGURE NO. 34

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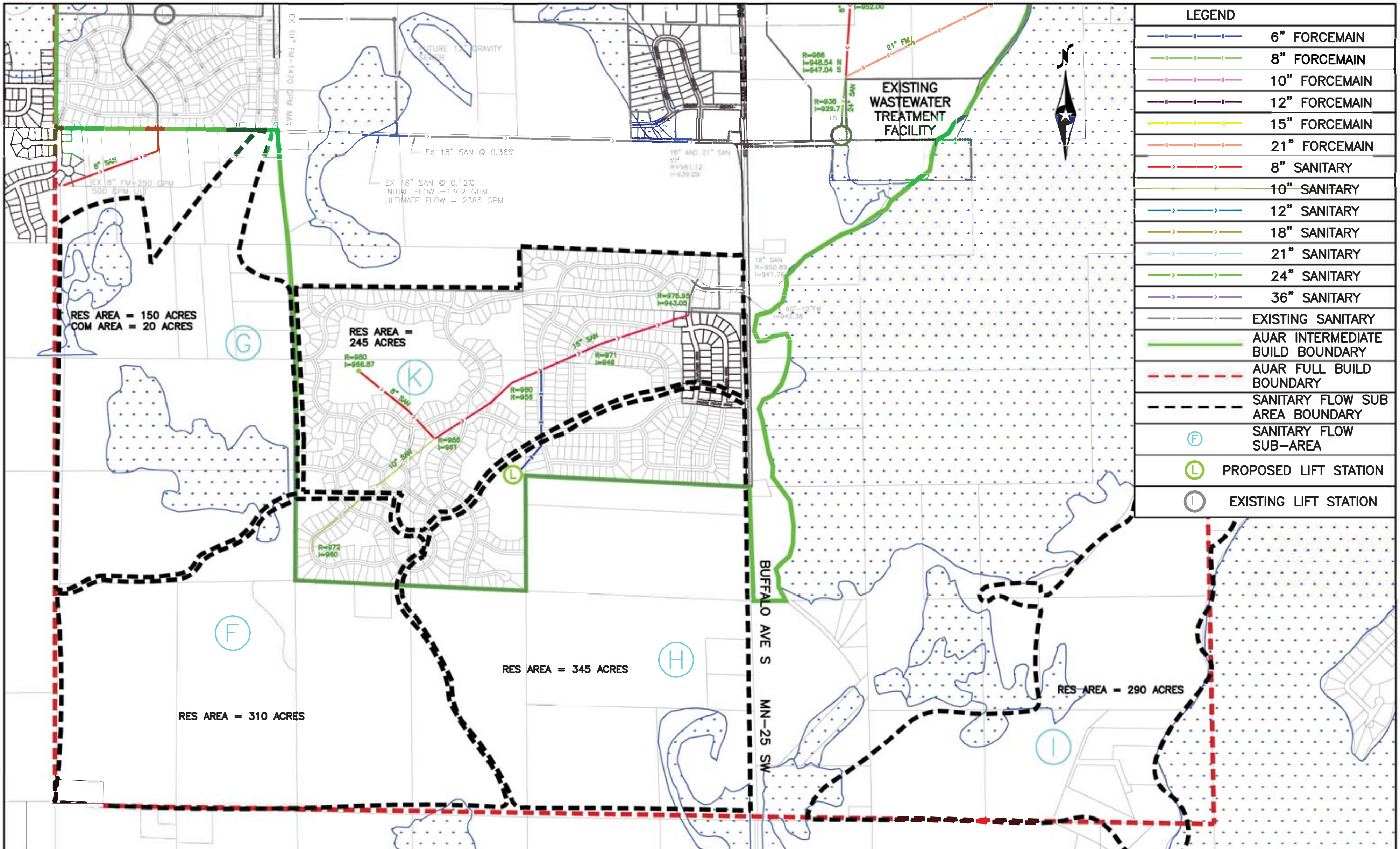

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NOTE: SEE APPENDIX FOR FLOW CALCULATIONS AND PIPE SLOPE INFORMATION

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Consulting Engineers & Surveyors
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CITY OF MONTROSE
INTERIM BUILD SANITARY SEWER-SOUTHERN ZONE
FIGURE NO. 35

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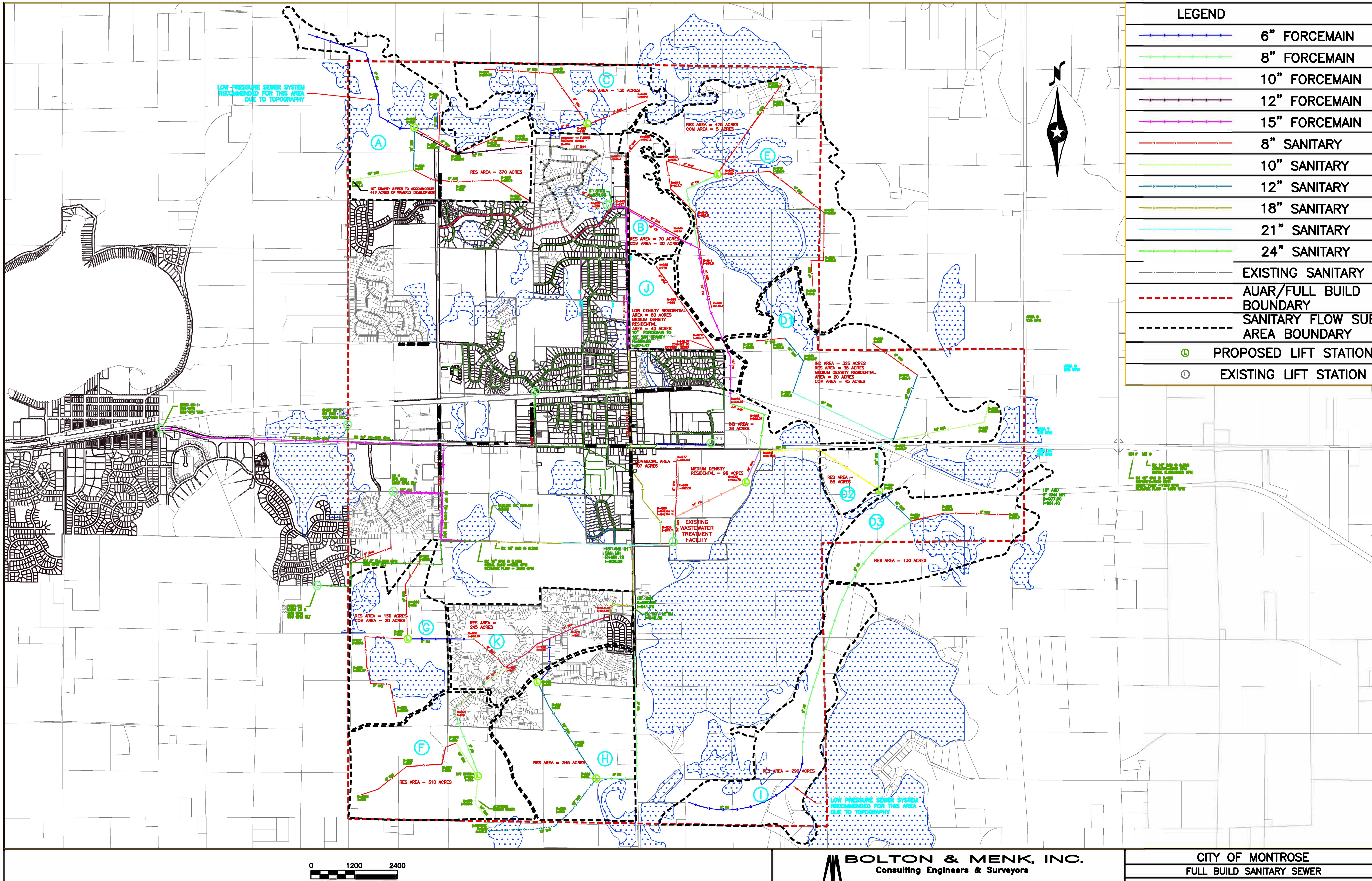

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CITY OF MONTROSE
FULL BUILD SANITARY SEWER
FIGURE NO. 36

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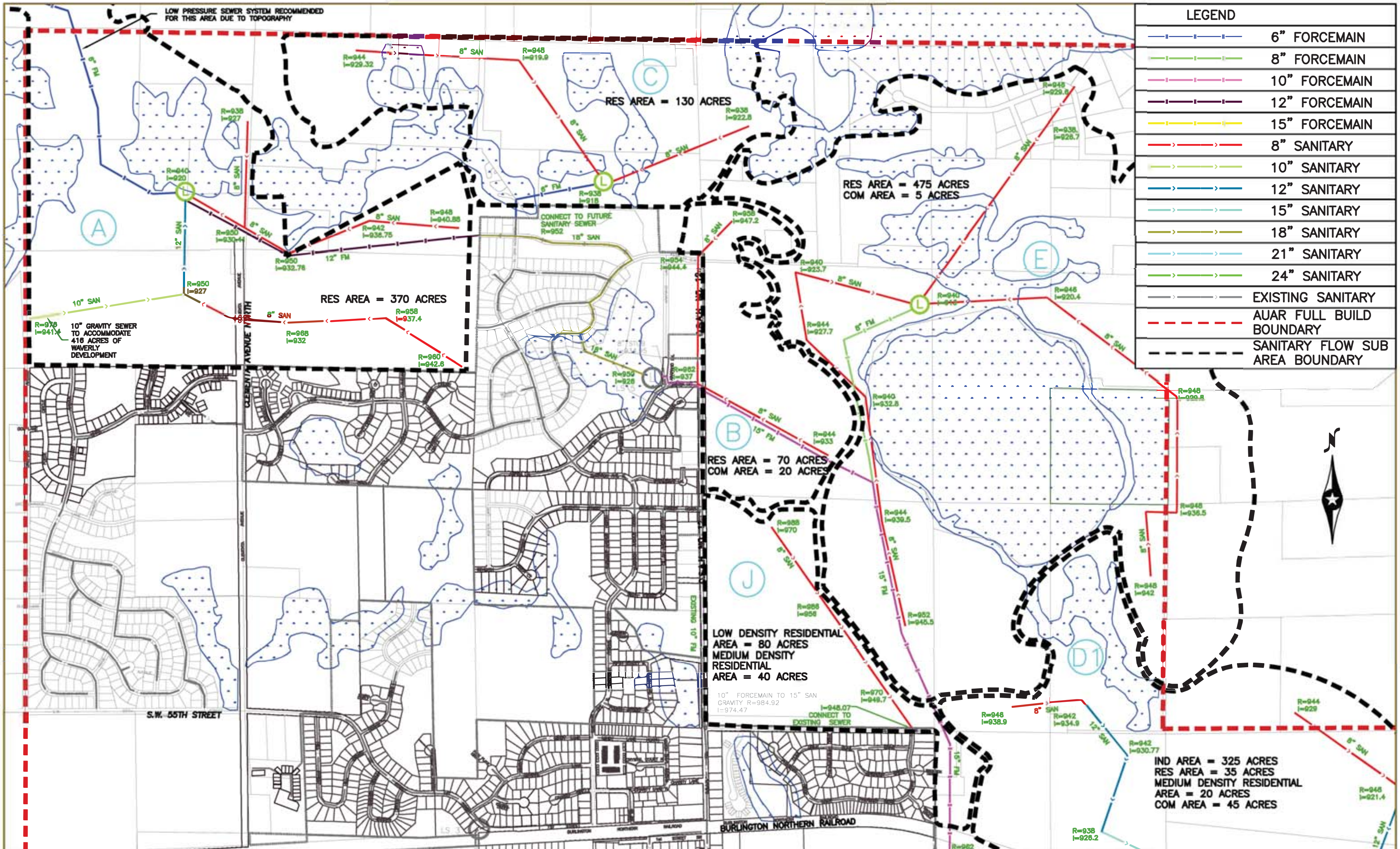

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SCALE FEET

NOTE: SEE APPENDIX FOR FLOW CALCULATIONS AND PIPE SLOPE INFORMATION

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Consulting Engineers & Surveyors
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BURNSVILLE, MN CHASKA, MN RAMSEY, MN AMES, IA

CITY OF MONTROSE
FULL BUILD SANITARY SEWER–NORTHERN ZONE
FIGURE NO. 37

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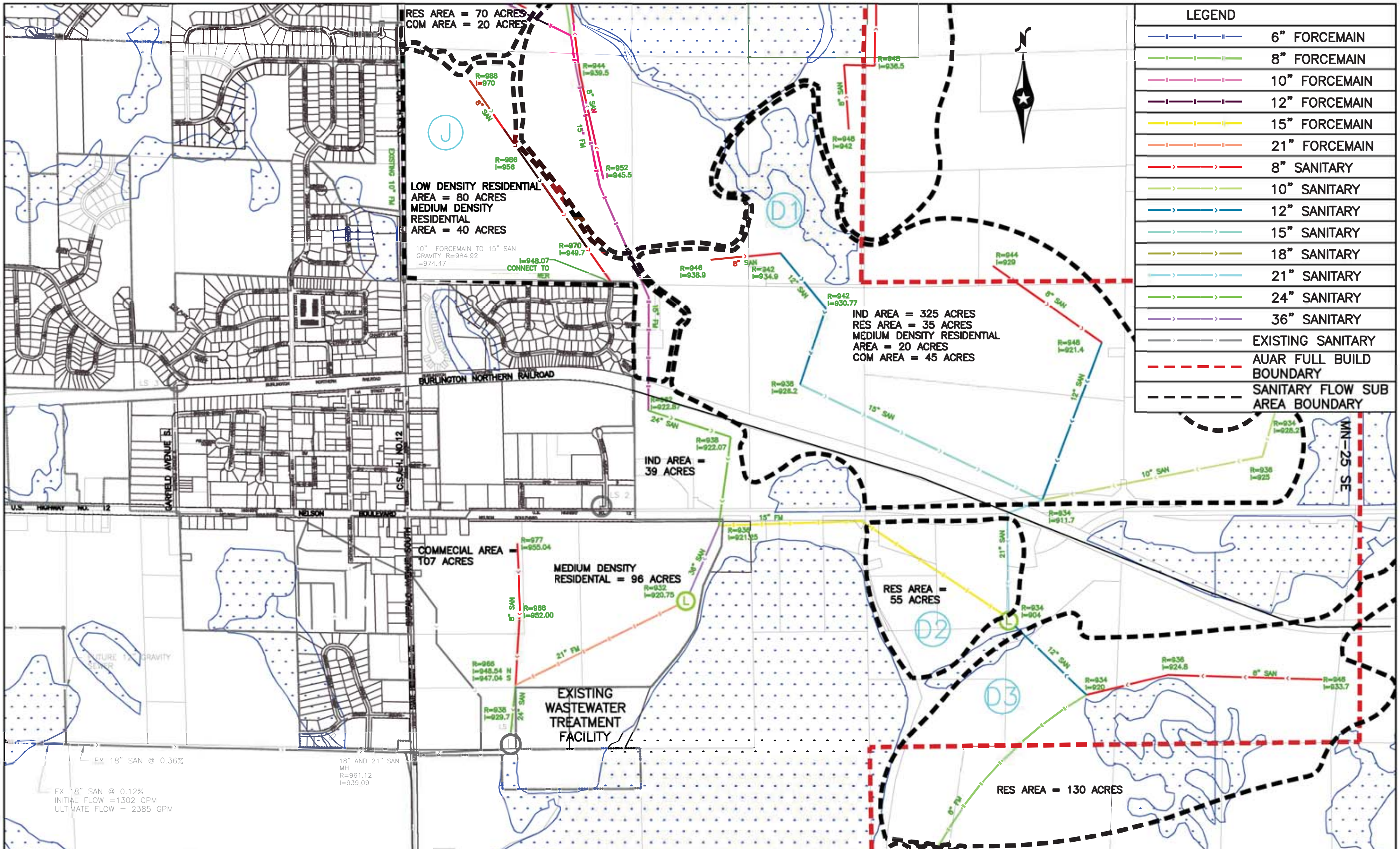

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NOTE: SEE APPENDIX FOR FLOW CALCULATIONS AND PIPE SLOPE INFORMATION

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CITY OF MONTROSE
FULL BUILD SANITARY SEWER—EASTERN ZONE
FIGURE NO. 38

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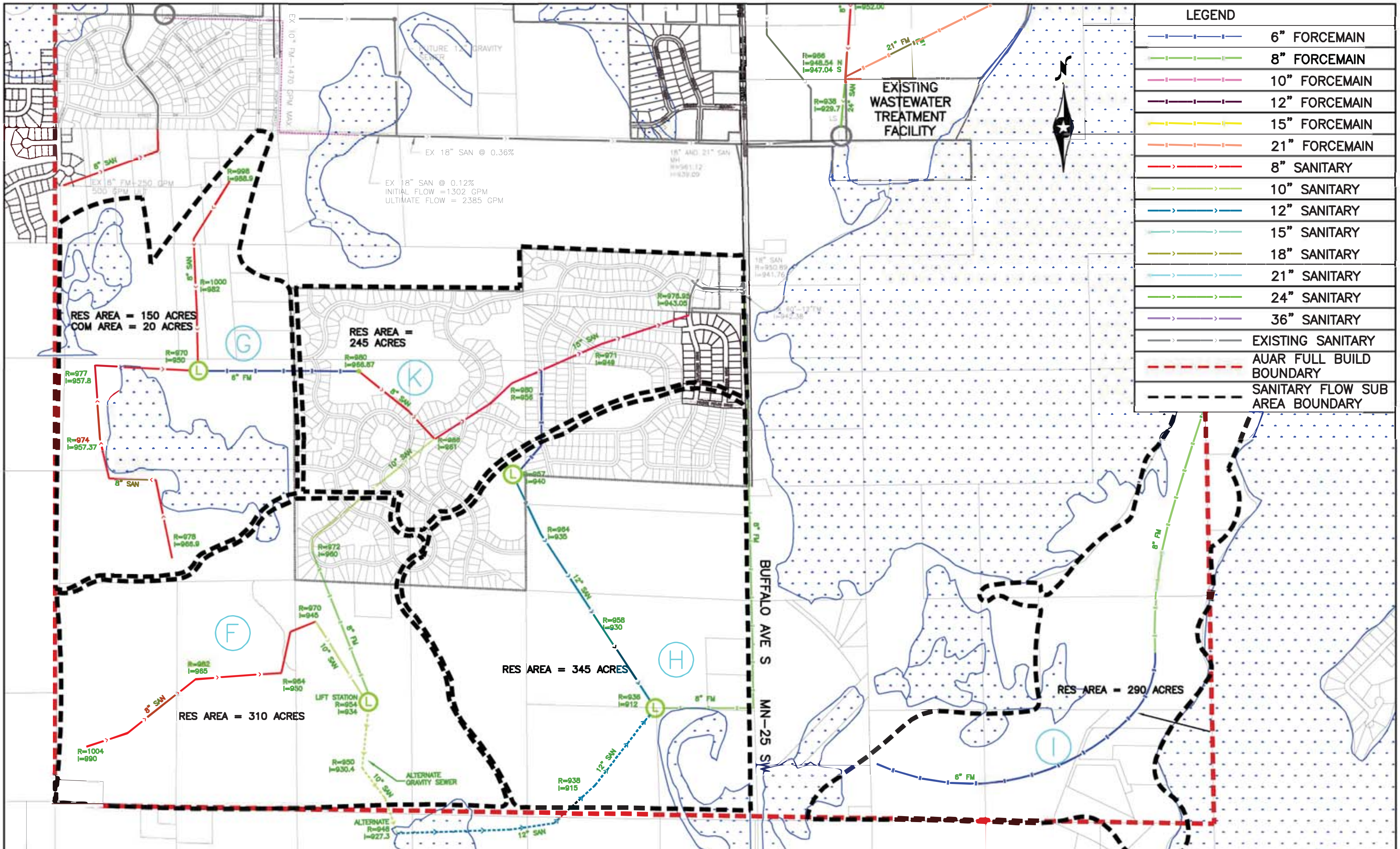

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NOTE: SEE APPENDIX FOR FLOW CALCULATIONS AND PIPE SLOPE INFORMATION

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Consulting Engineers & Surveyors
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CITY OF MONTROSE
FULL BUILD SANITARY SEWER—SOUTHERN ZONE
FIGURE NO. 39

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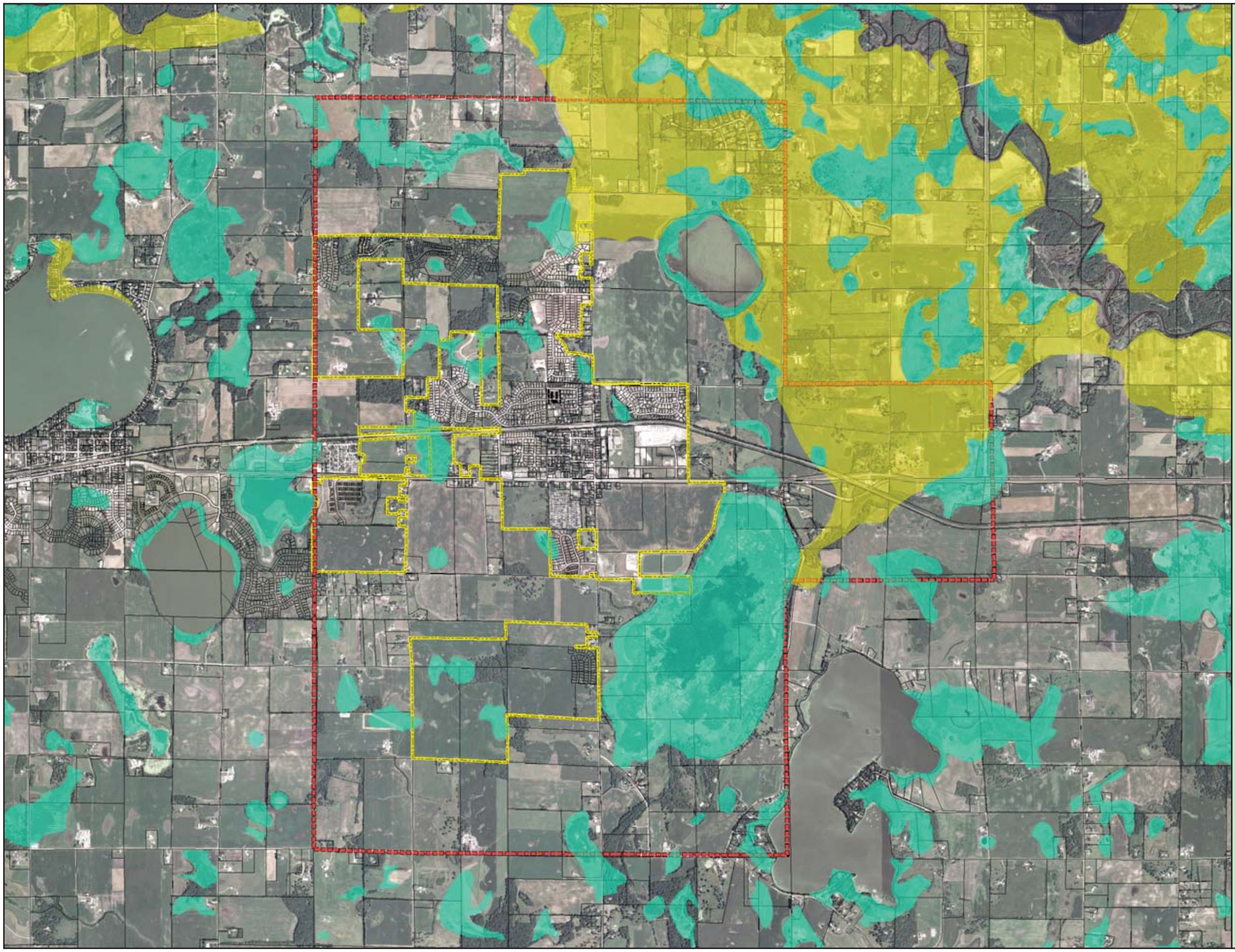

CITY OF MONTROSE
AUAR
POTENTIAL AGGREGATE DEPOSITS AND ORGANIC DEPOSITS

FIGURE NO. 40
OCTOBER, 2008

Legend

- Potential Aggregate Deposits
- Organic Deposits
- A.U.A.R. Boundary
- City Limits

N W E S

0.5 0 0.5 Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Aggregate Deposits 11x17.mxd)
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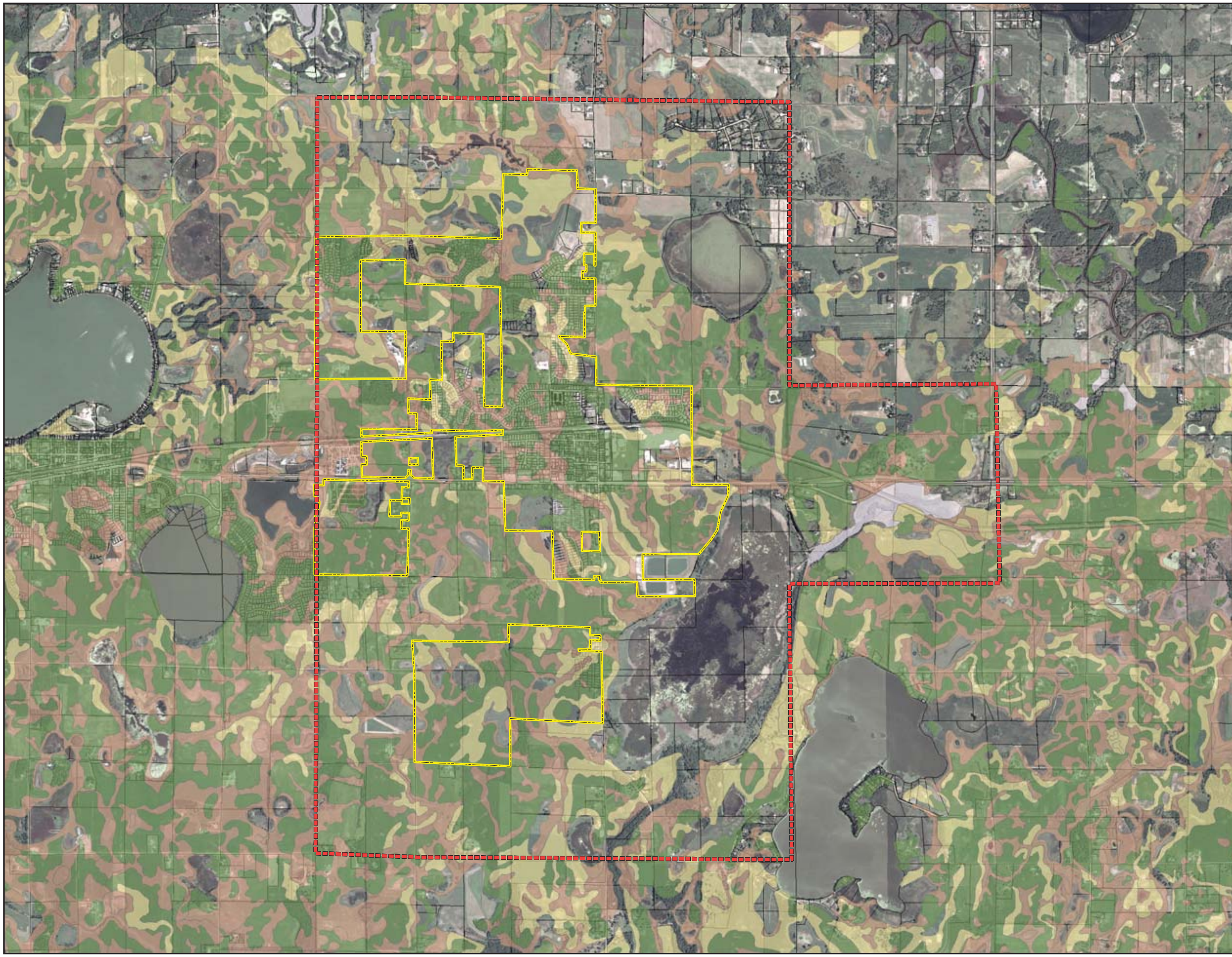

CITY OF MONTROSE
AUAR
PRIME AND OTHER
IMPORTANT
FARMLANDS

FIGURE NO. 41
OCTOBER, 2008

Legend

Prime and Other Important Farmland

- All areas are prime farmland
- Farmland of statewide importance
- Prime farmland if drained
- Prime farmland if protected from flooding
- A.U.A.R. Boundary
- City Limits

N
W E
S

0.5 0 0.5
Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Soils Prime Farmland 11x17.mxd)
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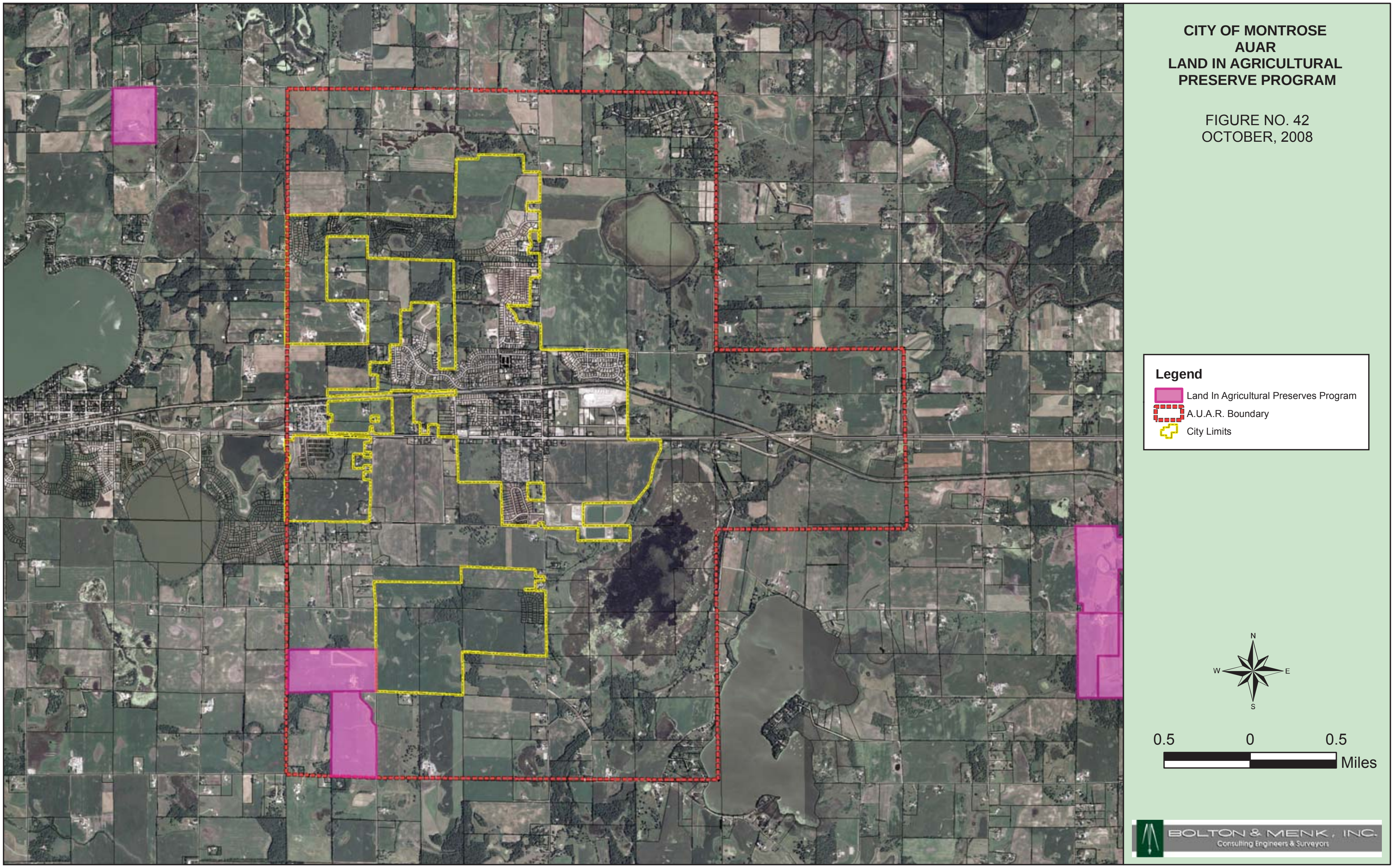

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APPENDIX A – TRAFFIC IMPACT STUDY

CITY OF MONTROSE AUAR
TRAFFIC IMPACT STUDY

CITY OF MONTROSE,
WRIGHT COUNTY, MN

2017 AUAR Revision Note: As stated in the body of the 2017 AUAR Revision, the City of Montrose has not experienced sustained growth at the pace implied in 2008. However, this appendix to the AUAR Revision is the same as prepared in 2007 and attached to the 2008 document. The 2017 revised growth forecasts indicate that traffic demands are significantly delayed and lower than assumed herein, with the forecast 2040 population of Montrose at less than 20 percent of the 2030 levels assumed in the 2008 AUAR. Therefore, the traffic levels anticipated in this analysis continue to provide a framework for general community transportation planning -- with anticipated long-term needs largely the same but delayed by decades. Few, if any, of the roadway capacity projects recommended in Section 6 of this Traffic Impact Study are needed today and have not yet moved forward.

Prepared by:

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

April 2007

Table of Contents

List of Traffic Appendices

Available on Request

Traffic Counts
Synchro Analysis Reports

List of Figures

1.0 Introduction/Background

The City of Montrose identified a need for a city-wide Alternative Urban Areawide Review (AUAR). As part of the AUAR document, a detailed traffic analysis is required to determine the traffic effects of the development area on the state, regional, and local roads. With the proposed land development and future plans for the City, there is a need to develop a traffic plan that will move traffic in a safe and efficient manner. Through the AUAR, the City will develop a long-range vision for the primary roadways and intersections within the City of Montrose. In addition, impacts to the regional roadway system beyond the City of Montrose will be analyzed to assure that they will be compatible to the local roadways.

1.1 Study Purpose

The City of Montrose is currently experiencing a population growth of about 21% per year, based on year 2000 population of 1,143 and 2006 population estimate of 3,505. With this rise in population, the traffic on the city's roadways has increased, and will continue to increase with further growth.

The land use vision identified in the City's Comprehensive Plan and in this AUAR yields a population of 35,558, a total of 14,043 households, and 11,204 employees. Averaging 200 building permits per year equates to a housing supply for 63 years.

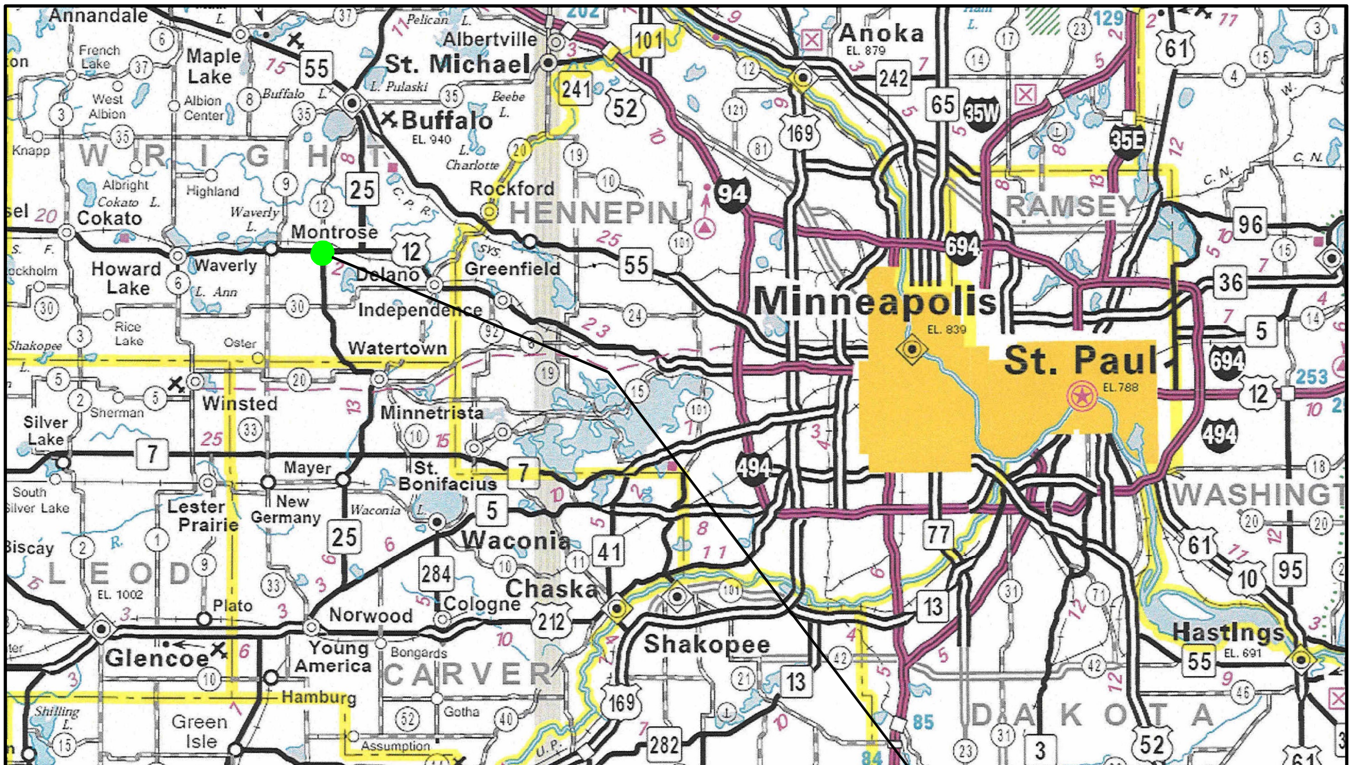
This projected growth will impact the local and regional traffic system. This traffic study will detail the projected traffic growth, its effects, and needed improvements to handle the expected traffic.

The Study objectives include:

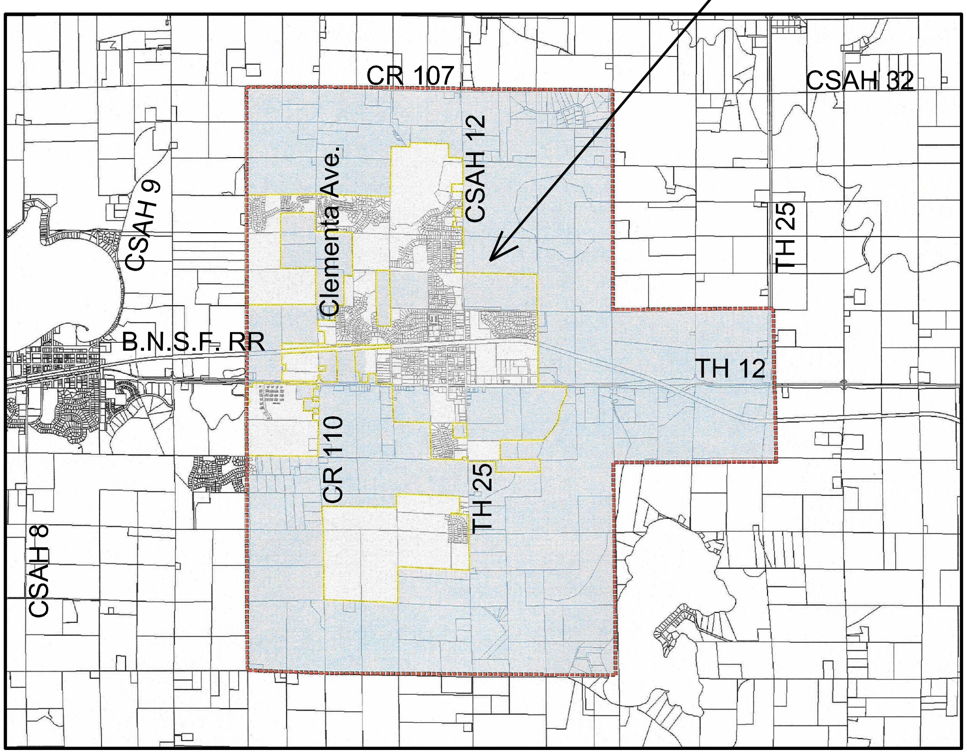
- Evaluating the Existing Intersection Geometry and Traffic Control
- Identifying the Projected Traffic Growth for all Scenarios
- Evaluating the Anticipated (No-Build) Traffic Volumes
- Evaluating the Proposed Interim Build Traffic Volumes
- Evaluating the Proposed Full Build Traffic Volumes
- Identifying the No-Build, Interim, and Full Build Roadway and Intersection Needs

1.2 Project Description

The AUAR area is located both north and south of TH 12, surrounding the currently developed portions of Montrose. The Study Area is shown in Figure 1. The planned development of the Montrose AUAR area includes an increase of 12,620 households and 10,801 employees. The employee increase is associated



Site Location



Legend

- A.U.A.R. Boundary
- Study Area
- Study Area Exceptions
- Parcels
- City Limits

N

No Scale

Figure 1 - Location Map

City of Montrose AUAR

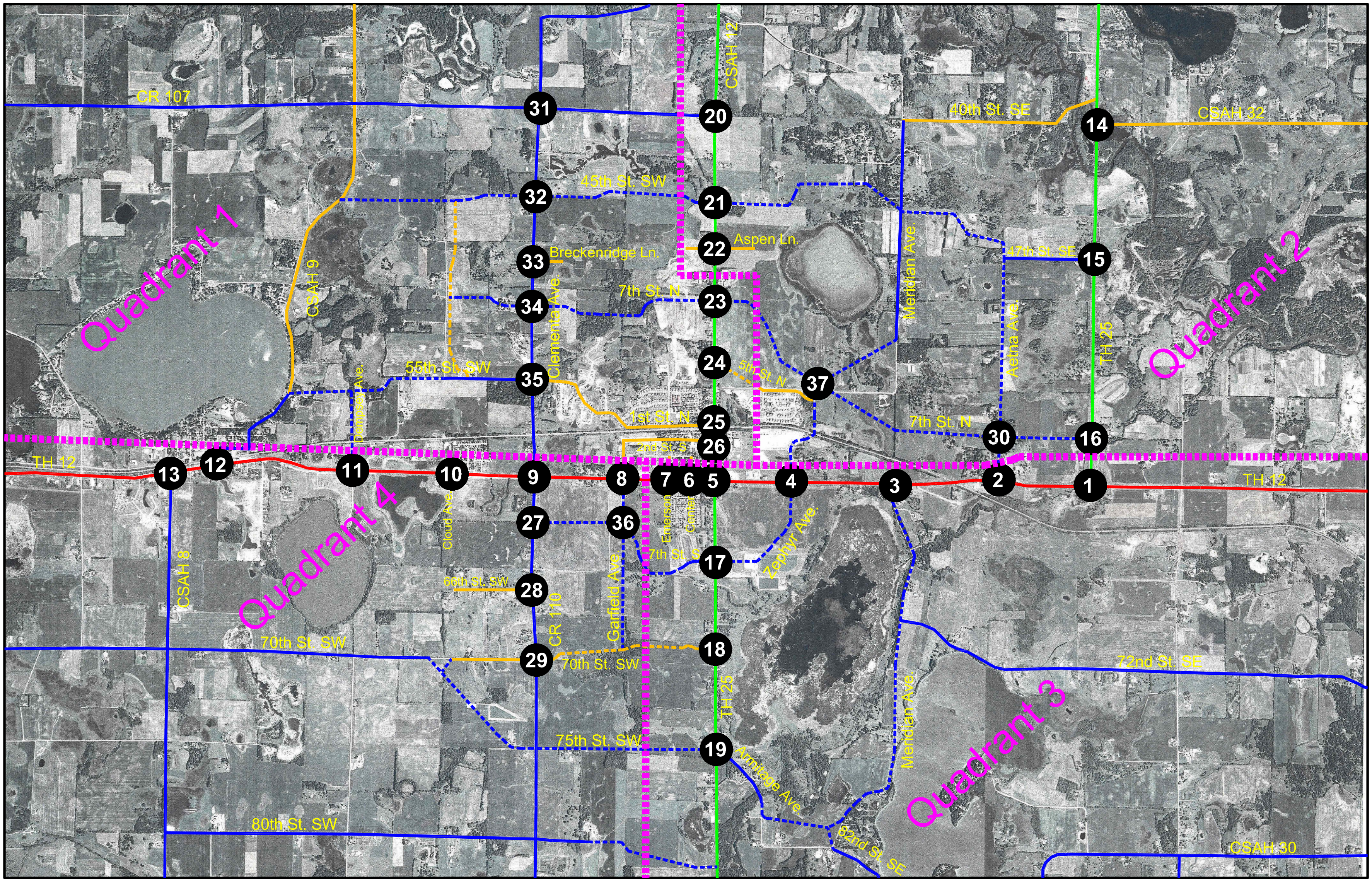
BOLTON & MENK, INC.
Consulting Engineers & Surveyors

H:\MTRS\W1337928\CAD\Location.dwg 04-09-2007 9:30 am with the commercial, retail, and non-retail development. These socio-economic increases are based on the proposed land use consistent with the City's Comprehensive Plan.

Traffic operations were analyzed at 21 existing intersections and at 16 proposed, or additional existing, intersections located within and outside of the AUAR study area. The intersections are shown in Figure 2 and are listed below:

Table 1-1: Study Intersections

Intersection #	Intersection Name
1	US TH 12 & TH 25
2	US TH 12 & Aetna Ave. SE
3	US TH 12 & Meridian Ave. S
4	US TH 12 & Zephyr Ave. S
5	US TH 12 & TH 25/CSAH 12/Buffalo Ave. S
6	US TH 12 & Center Ave. S
7	US TH 12 & Emerson Ave. S
8	US TH 12 & Garfield Ave. S
9	US TH 12 & CR 110/Clementa Ave. SW
10	US TH 12 & Cloud Ave. SW
11	US TH 12 & Dempsey Ave. SW
12	US TH 12 & CR 62/S 4th St.
13	US TH 12 & CSAH 8/CSAH 9/S 7th St.
14	TH 25 & CR 115/40th St. SE
15	TH 25 & 47th St. SE
16	TH 25 & Proposed 7th St. N/57th St. SE
17	TH 25 & 7th St. S
18	TH 25 & Proposed 70th St. SW
19	TH 25 & Armitage Ave. SW
20	CSAH 12 & CR 107/40th St. SW
21	CSAH 12 & 45th St. SW
22	CSAH 12 & Aspen Lane
23	CSAH 12 & 7th St. N
24	CSAH 12 & 5th St. N OR CSAH 12/3rd St. N
25	CSAH 12 & 1st St. N
26	CSAH 12 & 2nd St. S
27	CR 110 & Proposed 7th St. S
28	CR 110 & 66th St. SW
29	CR 110 & 70th St. SW
30	Aetna Ave. SE & Proposed 7th St. N
31	CR 107 & Clementa Ave. SW
32	Clementa Ave. SW & Proposed 45th St. SW
33	Clementa Ave. SW & Breckenridge Lane



Legend

Proposed Functional Classification

- **Principal Arterial**
- **Minor Arterial**
- **Major Collector**
- **Minor Collector**
- **Future Major Collector**
- **Future Minor Collector**

Figure 2 - Study Intersections

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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34	Clementa Ave. SW & Proposed 7th St. N
35	Clementa Ave. SW & 1st St. N/55th St. SW
36	Proposed Garfield Ave. S & Proposed 7th St. S
37	Proposed Zephyr Ave. S. & Proposed 7th St. N

1.3 Regional Highway System

The primary roadways for regional traffic through the area include: US TH 12, which runs east-west through the City of Montrose; TH 25, which runs north of TH 12 on the east side of the study area and south of TH 12 through the middle of the study area; and CSAH 12, which extends north of TH 12 through the City.

1.3.1 Functional Class

Roadways are functionally classified according to the character of service they provide. Since most travel involves movement through a network of roads, it becomes necessary to determine how vehicles can be channelized within the roadway network in a logical and efficient manner. This channelization is defined by a roadway's functional classification. The functional classification of a roadway determines what role a road or street should play in serving the flow of vehicle trips through the roadway network.

There are three general classes of roadways: arterial, collector, and local roads. Arterials provide the highest service levels and generally higher speeds. Arterials generally have higher levels of mobility and lower levels of access. Collectors provide a connection between arterials and local roads with a balance between mobility and access. Local roadways generally provide direct land access and limited mobility for through trips.

These classes have slightly different characteristics depending on the area type and subclassification. The City of Montrose is currently considered a rural community area but with the development expected throughout the area, it is likely to experience some urban area characteristics.

Table 1-2: Functional Classification Descriptions

Area Type	Classification	Sub-Class	Description
Rural	**Arterial**	**Principal**	Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.

		Minor	Link cities and larger towns and form an integrated network providing interstate and intercounty service. Spaced at intervals consistent with population density, so that all developed areas of the State are within a reasonable distance of an arterial highway. Provide service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems. Minor arterials constitute routes that should be expected to provide for relatively high overall travel speeds, with minimum interference to-through movement.
	Collector	**Major**	Provide service to any county seat not on an arterial route, to the larger towns not directly served by the higher systems, and to other traffic generators of equivalent intracounty importance. Link these places with nearby larger towns or cities, or with routes of higher classification; and serves the more important intracounty travel corridors.
		Minor	Spaced at intervals consistent with population density to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road. Provides service to the remaining smaller communities and links the locally important traffic generators with their rural hinterland.
	Local		Serve primarily to provide access to adjacent land and provide service to travel over relatively short distances as compared to collectors or other higher systems.

The current functional classification of roadways within the City of Montrose can be seen in Figure 3.

1.3.2 Highway System

Many of the state and federal roadways within the state of Minnesota are classified by not only their functional class but by their importance to national and state interests. The National Highway System (NHS) is intended to connect major population centers, meet national defense requirements, and service interstate and interregional travel. The Interregional Corridor (IRC) system is designed to link the major Regional Trade Centers (RTCs) around the state. The goal is to provide safe, timely, and efficient movement of goods and people.

US TH 12 is part of the National Highway System (NHS) and connects the City of Montrose to Interstate 394 and the Twin Cities Metropolitan Area approximately 25 miles to the east. It is classified as a Principal Arterial and is designated a Regional Corridor. The Highway connects western Minnesota to the Twin Cities Metropolitan Area. The Minnesota Department of Transportation recently constructed the section of TH 12 through this area as a "super-two" highway, which provides additional passing opportunities and improved geometrics as compared to a two-lane undivided highway. There are currently no plans to further increase capacity on TH 12 through Montrose within Mn/DOT's 20-year plan. A TH 12 bypass around several communities to the east is currently under construction. This bypass runs from Hennepin County Road 6 to Wayzata Boulevard and is expected to be operational by late 2008.

Both TH 25 and CSAH 12 are designated as Minor Arterials through the City of Montrose. TH 25 connects south to many county and state highways and to US TH 212 and ultimately to US TH 169. Both TH 25 and CSAH 12 connect north to the City of Buffalo, while TH 25 continues north to Interstate 94. As TH 25 extends north from Buffalo to I-94, it is designated as a Medium Priority Interregional Corridor.

1.4 Railroad

Rail is an important feature of commerce and trade and it does have an impact on the roadway system. The Burlington Northern Santa Fe Railroad has a rail line roughly following US TH 12 through the City of Montrose. The rail line is located on the south side of TH 12 east of the north leg of TH 25 and has a grade separated crossing over TH 12 between TH 25 and TH 25/CSAH 12.

Through and near the City of Montrose, the railroad has at-grade crossings at CSAH 12, Clementa Avenue, and Dempsey Avenue, north of US TH 12. The railroad crossings on CSAH 12 and Clementa Avenue are signalized, while the crossing at Dempsey Avenue is unsignalized. There are approximately 10 trains per day using this rail line.

2.0 Measures of Effectiveness

Measures of Effectiveness (MOEs) are quantitative measures that give some insight into how effectively something is performing. In traffic studies, MOEs display quantitative information about the performance of a roadway link, an intersection, or a network of intersections. The primary measures that are used in this study are Level of Service (LOS) and Volume-to-Capacity (v/c) Ratios.

The MOE analysis is performed using the methodology of the 2000 Highway Capacity Manual. Intersection MOEs are determined through SYNCHRO, a traffic analysis software program by Trafficware.

2.1 Level of Service

Service on roadway facilities are measured using Levels of Service (LOS). These letters describe a range of operating conditions used to describe capacity and service levels for different types of facilities.

Table 2-1: Level of Service Descriptions

LOS	Description
A	Free flow with minimal presence of other vehicles.
B	Stable flow with some presence and influence of other vehicles.
C	Restricted flow with interactions with other vehicles.
D	High-density flow with speed and maneuverability restricted.
E	Unstable flow at or near capacity.
F	Forced flow where traffic is severely constricted with poor travel times and long back-ups.

LOS C is generally considered acceptable on rural roadways to maintain mobility and safety. As an area urbanizes, LOS D is considered acceptable.

2.2 Intersection Level of Service

Intersection Levels of Service are calculated based on the 2000 Highway Capacity Manual, which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down for a signal or stop sign, the wait time at the signal or stop sign, and the time for the vehicle to speed up and get through the signal or enter into the traffic stream. Level of Service D is generally the acceptable design year LOS. The level of service and its associated intersection delay for a signalized and unsignalized intersection is presented below.

Table 2-2: Intersection Delay and Level of Service

LOS	Signalized Intersection Control Delay per Vehicle (sec.)	Unsignalized Intersection Control Delay per Vehicle (sec.)
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

For the unsignalized intersections, the first recommendation will be to operate the intersection under all-way stop control if the intersection does not operate with acceptable delay under two-way stop control. It is assumed that a signal will not be added unless a movement experiences delay over 4 vehicle-hours. This is consistent with the peak-hour delay signal warrant in the Minnesota Manual on Uniform Traffic Control Devices (MN-MUTCD). A roundabout is recommended under all cases as an alternative to an all-way stop or a signal.

2.3 Volume to Capacity Ratios

Volume to capacity ratio is the proportion of the actual traffic utilizing the facility to the facility's physical ability to carry a specific maximum volume. This is calculated by dividing the total traffic using the facility by the capacity of the facility. This can then determine if a facility is sufficient to handle the traffic that is expected to be traveling on it. A ratio greater than 1.00 predicts that the facility will be unable to discharge all of the demand arriving on it. Such a situation would result in long queues (a queue is a line of vehicles stacked together) and extensive delays, or diversion to alternate routes.

2.3.1 Roadway Segment Capacity

The peak hour roadway capacity is determined based on the type of roadway facility and geometric considerations including the following features: turn lanes, speeds, area type, access, number of lanes, passing opportunities, and roadway section type. The peak hour capacities used in this study are based off of the Highway Capacity Manual, Quality/Level of Service Handbook, and Metropolitan Council Forecast Modeling.

Table 2-3: Peak Hour Expressway and Principal Arterial Capacity

AreaType	Type of Roadway: Number of Lanes in Each Direction				
	Expressway		Principal Arterial		
	1	2	1	2	3
Rural	1100	2865	900	2415	3620
Developing	1100	2545	850	1735	2605
Developed	960	2285	755	1660	2490
Residential Core	960	2030	730	1605	2410
Business Core	960	2030	705	1555	2335

Table 2-4: Peak Hour Minor Arterial and Collector Capacity

AreaType	Type of Roadway: Number of Lanes in Each Direction					
	Minor Arterial		Major Collector		Minor Collector	
	1	2	1	2	1	2
Rural	900	2415	645	2080	600	2080

Developing	850	1735	645	1400	550	1400
Developed	755	1660	610	1340	495	1100
Residential Core	730	1605	605	1320	490	1085
Business Core	705	1555	580	1275	465	1035

In the capacity tables it is assumed that any two-lane facility is undivided with left turn lanes. Additionally, it is assumed that any four-lane facility is divided with left turn lanes. The following factors are adjustments for capacity due to roadway feature changes.

Table 2-5: Peak Hour Roadway Capacity Adjustment Factors

Lanes	1	1	2	2
Type	Divided	Undivided	Undivided	Undivided
Left Turn Lanes?	yes	no	yes	no
Factor	1.05	0.8	0.95	0.75

2.4 Roadway Segment Level of Service

Roadway sections between intersections are evaluated differently from intersections. The Highway Capacity Manual uses density to determine LOS. Density is the volume per lane divided by the speed. The congested speed is not evaluated in this study; so volume-to-capacity ratios are used to get a general LOS evaluation.

Table 2-6: Segment Level of Service

LOS	Max Density	Max v/c
A	11	0.30
B	18	0.50
C	26	0.70
D	35	0.90
E	40	1.00
F	>40	>1.00

2.4.1 Volume Determination

The volume in analyzing the volume-to-capacity ratios for roadway segments is the Directional Design-Hour Volume (DDHV) and is determined using the Average Annual Daily Traffic (AADT), the Directional Distribution Factor (D-Factor), and the Peak Hour Factor (K-Factor).

For analysis purposes, this study assumes that the projected ADT is equal to the AADT.

DDHV = AADT * K * D

The DDHV gives the volume of vehicles per hour traveling on the roadway segment. Since there is a peaking characteristic of traffic during the peak hour, this effect is added into the analysis. The Peak Hour Factor (PHF) for the area is known to be around 0.92 based on the recent traffic counts. The DDHV is divided by the PHF to determine the volume used for analysis.

V = DDHV / PHF

2.4.1.1 Directional Distribution

The directional distribution takes into account the observance that during any particular hour of the day; the traffic volume traveling in one direction may be greater than in the other direction.

The D-Factor is the proportion of traffic moving in the peak direction of travel during the peak hours.

2.4.1.2 Peak Hour Distribution

The peak hour distribution takes into account the observance that higher volumes of traffic are prevalent on the roadway during certain hours of the day.

The K-Factor is the proportion of total daily traffic that occurs in the peak hour.

2.4.1.3 Peak Hour Factor

The peak hour factor takes into account that within any peak hour, traffic flow peaks within that hour, which can be either a short or long-term fluctuation that impacts capacity needs.

PHF = Hourly Volume/ (4 * Peak 15-Minute Volume)

2.5 Gravel Road Considerations

The life of a road is affected by the number of vehicles using it. As the volumes increase, the faster a road will deteriorate. Gravel roads are particularly susceptible to volume increases and deteriorate more quickly than paved surfaces. As such, the decision to pave a gravel roadway becomes an important consideration when traffic volumes rise. Paving the road helps to seal the surface and protects the base and subgrade material, thus ensuring that the roadway doesn’t deteriorate as quickly.

When traffic volumes reach 400 vehicles per day (400 ADT) serious consideration should be given to some type of paving. This threshold has been determined through multiple studies and cost-benefit analyses.

3.0 Existing Conditions

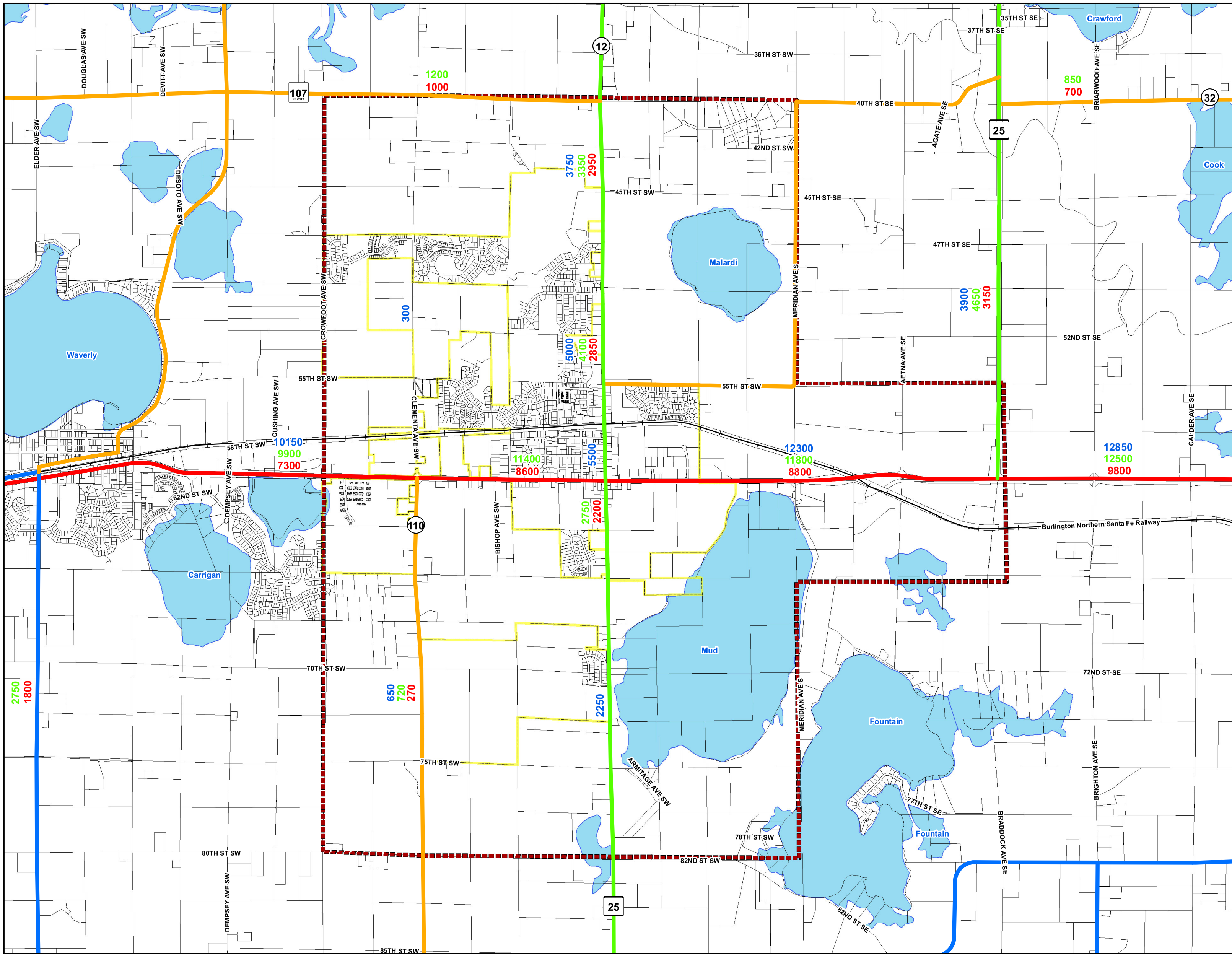
Various County and State Highways surround the City of Montrose, as shown in Figure 1. While US TH 12 is the primary east-west roadway through the City, there are multiple north-south roadways that carry significant traffic. These include TH 25, CSAH 12, CR 110, and Clementa Avenue.

US TH 12 is the major east-west thoroughfare for the region to the Twin Cities Metro Area and is classified as a Principal Arterial. TH 25 and CSAH 12 are the major north/south roadways that carry regional in addition to local traffic, and are classified as Minor Arterials. CSAH 9, CSAH 32 (formerly CR 115), CR 107, and CR 110 are additional county roadways in the area and are designated as Minor Collectors. The only Major Collector in the area is CSAH 8, located to the west through Waverly. Clementa Avenue is a local roadway, which has been recently partially paved and is an important north-south route on the west side of the City.

Year 2000 and 2004 Average Daily Traffic (ADT) volumes were obtained from the Minnesota Department of Transportation (Mn/DOT) and Wright County. These volumes are shown in Figure 3 along with collected 2006 ADT volumes. Current posted speed limits were recorded as available for the state and county roadways through the area.

Table 3-1: Existing Speed Limits

Roadway:	Speed Limit:
US TH 12, East of TH 25 to Arizona Avenue	55 mph
US TH 12, Arizona Avenue to Garfield Avenue	35 mph
US TH 12, Garfield Avenue to Clementa Avenue	45 mph
US TH 12, West of Clementa Avenue	55 mph
MN TH 25, South of 7th Street South	55 mph
MN TH 25, North of 7th Street South	45 mph
MN TH 25, South of TH 12	30 mph
MN TH 25, North of TH 12	55 mph
CSAH 8, South of TH 12	55 mph
CSAH 9, North of TH 12	30 mph
CSAH 12, North of TH 12	30 mph
CSAH 12, North of 3rd Street North	55 mph
CSAH 32, East of TH 25	55 mph
CR 107, West of CSAH 12	55 mph
CR 110, South of TH 12	55 mph



CITY OF MONTROSE
AUAR
EXISTING ADT VOLUMES

FIGURE NO. 3
APRIL, 2007

Legend

XXXX 2000 ADT Volumes
XXXX 2004 ADT Volumes
XXXX 2006 ADT Volumes

Existing Functional Classification

Principal Arterial
Minor Arterial
Major Collector
Minor Collector
A.U.A.R. Boundary
City Limits

N
W
E
S

0.5 0 0.5
Miles

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Existing ADT Volumes 11x17.mxd)
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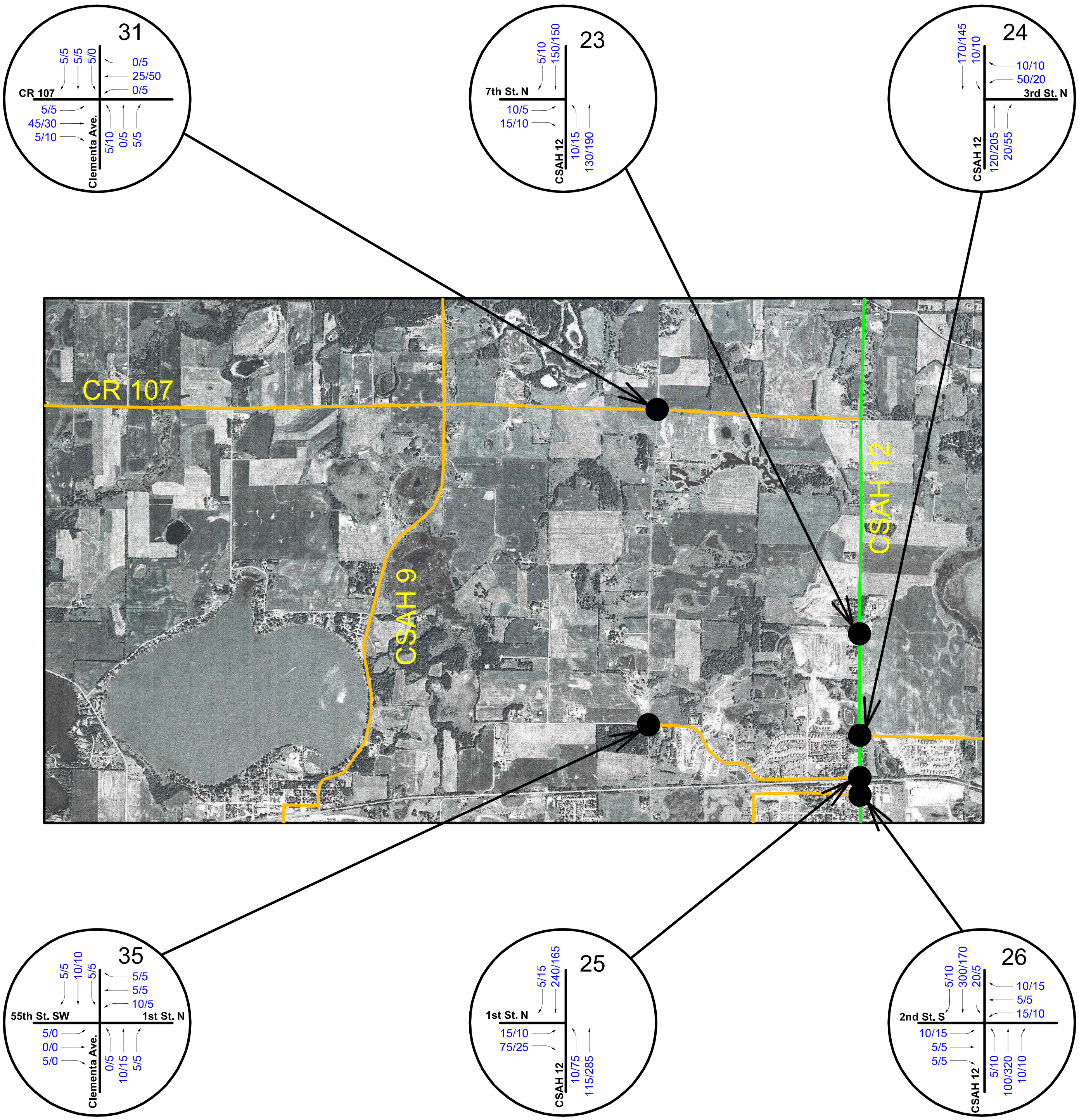
Intersection turning movement counts were taken at numerous intersections within the area to examine how the intersections are currently operating. These Peak Hour counts were taken from 6:00 to 9:00 am and 3:00 to 6:00 pm. From the counts, the peak hours were determined to be from 7:00 to 8:00 am and 4:30 to 5:30 pm. These peak hour turning movement volumes are shown in Figure 4.

The only signalized intersection within the City of Montrose is located at the intersection of TH 12 and TH 25/CSAH 12. All other intersections within the study area are unsignalized with two-way stop-sign control.

US TH 12 is a two-lane highway with a continuous Two-Way-Left-Turn-Lane (TWLTL) from Arizona Avenue west to Waverly, MN. Additionally, there are right turn lanes at all of the highway intersections. TH 25 is a two-lane highway through the City, both north and south of TH 12. CSAH 12 is a two-lane highway with left and right turn lanes at the intersections of 5th Street, 7th Street, Aspen Lane, and 45th Street. The intersection of CSAH 12 with CR 107 is a t-intersection and has left and right turn lanes. All other roadways are two-lane with minimal to no turn lanes. The lanes and intersection control are shown in Figure 5.



Legend

● Peak Hour Turning Movement

xx/yy

2006 AM Peak

2006 PM Peak

N

No Scale

Figure 4 (1 of 4) Existing Peak Hour Volumes (Quadrant 1)

City of Montrose AUAR

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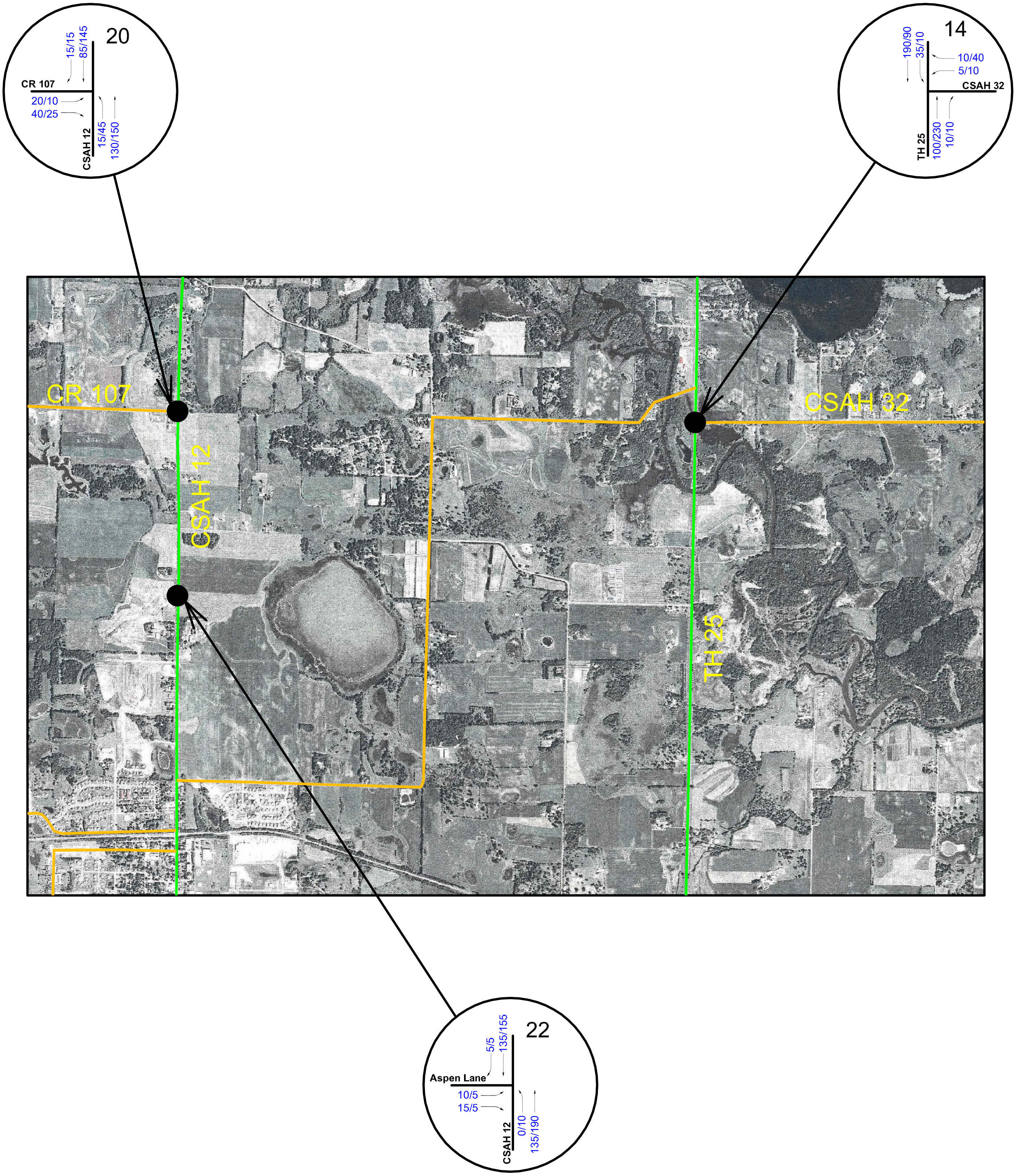

Figure 4 (2 of 4) Existing Peak Hour Volumes (Quadrant 2)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

2006 AM Peak
2006 PM Peak
xx/yy

N

No Scale

BOLTON & MENK, INC.
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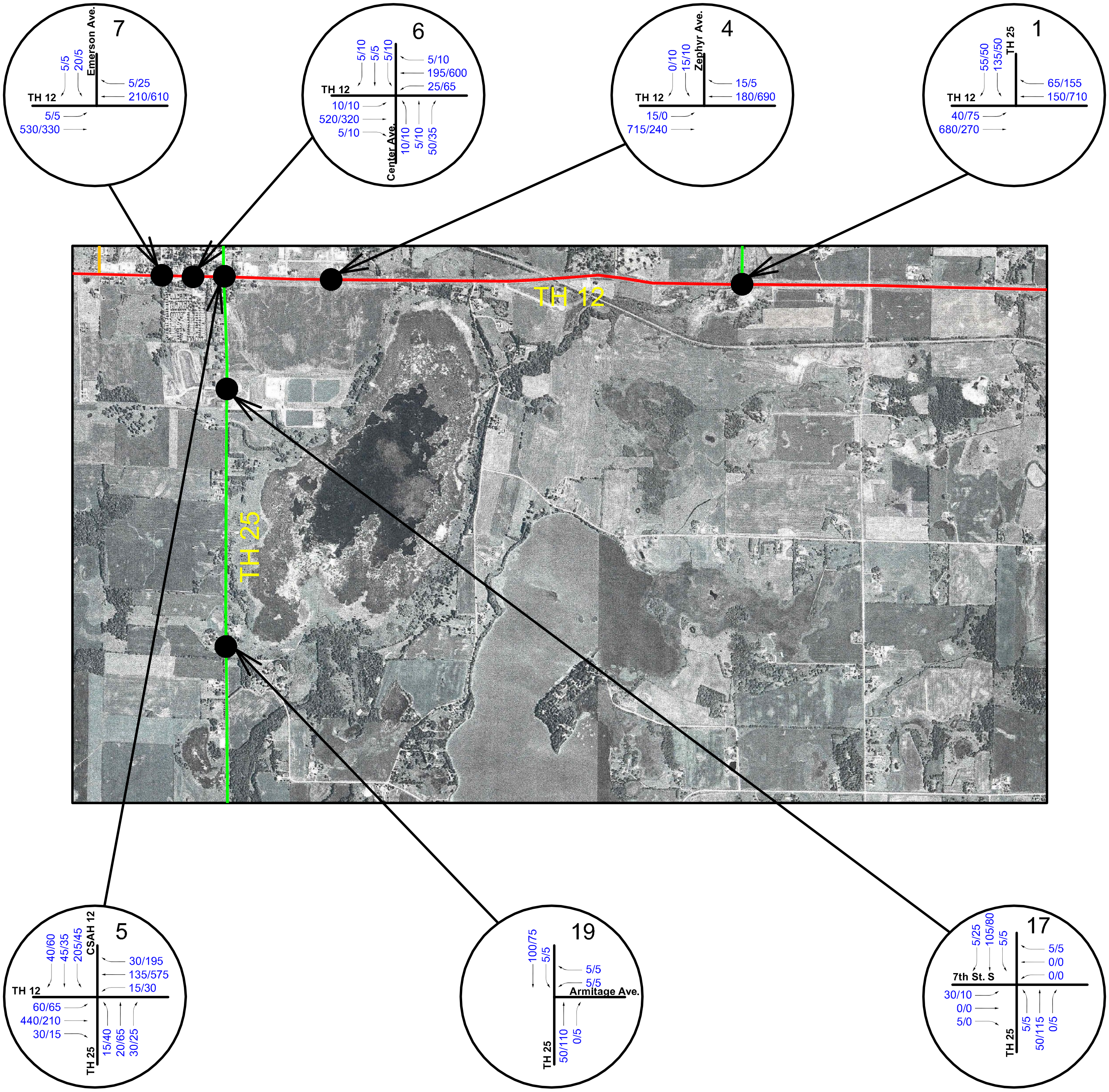

Figure 4 (3 of 4) Existing Peak Hour Volumes (Quadrant 3)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

xx/yy — **2006 AM Peak** / **2006 PM Peak**

N

No Scale

BOLTON & MENK, INC.
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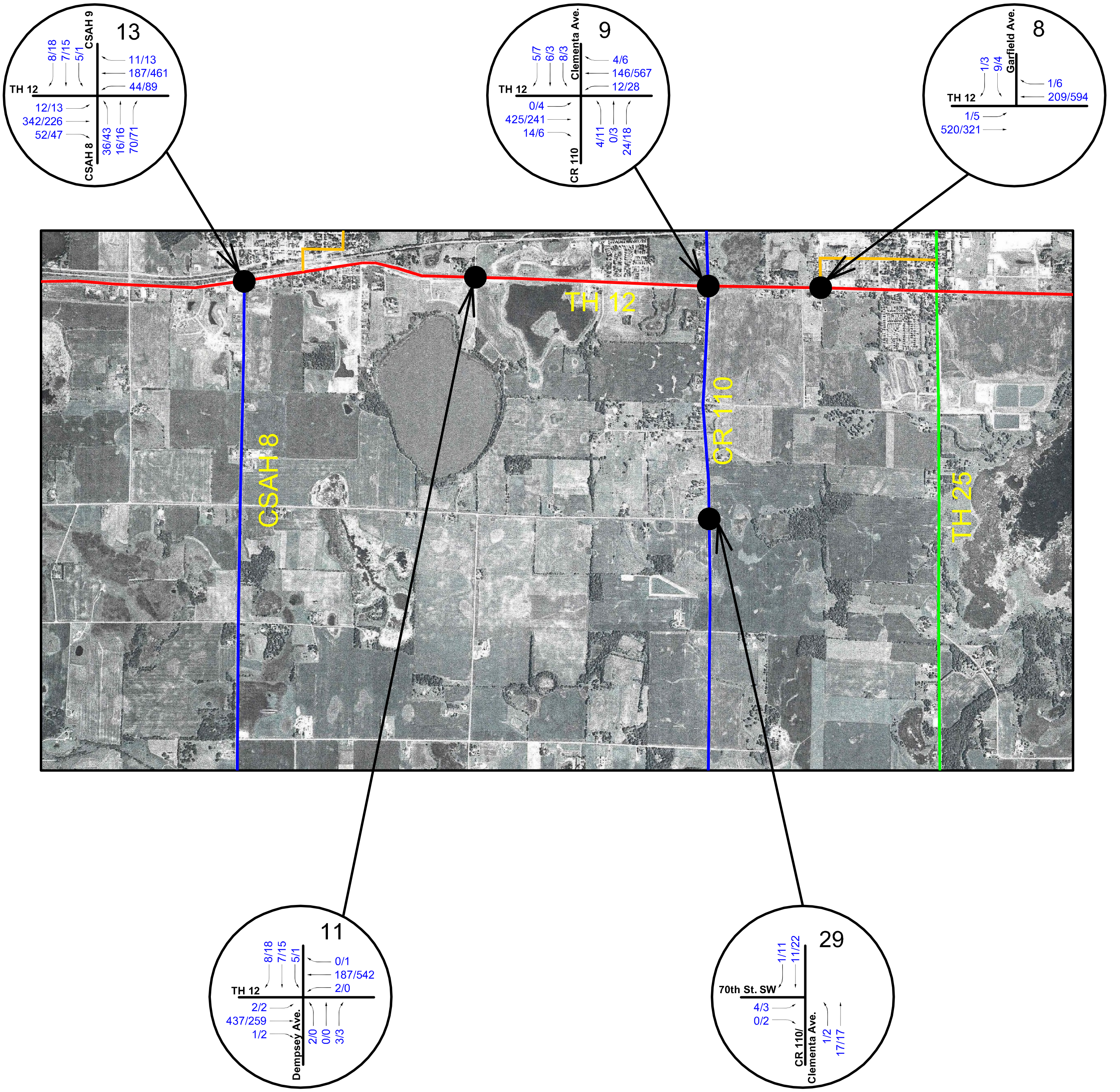

Figure 4 (4 of 4)
Existing Peak Hour Volumes (Quadrant 4)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

xx/yy — **2006 AM Peak** / **2006 PM Peak**

N

No Scale

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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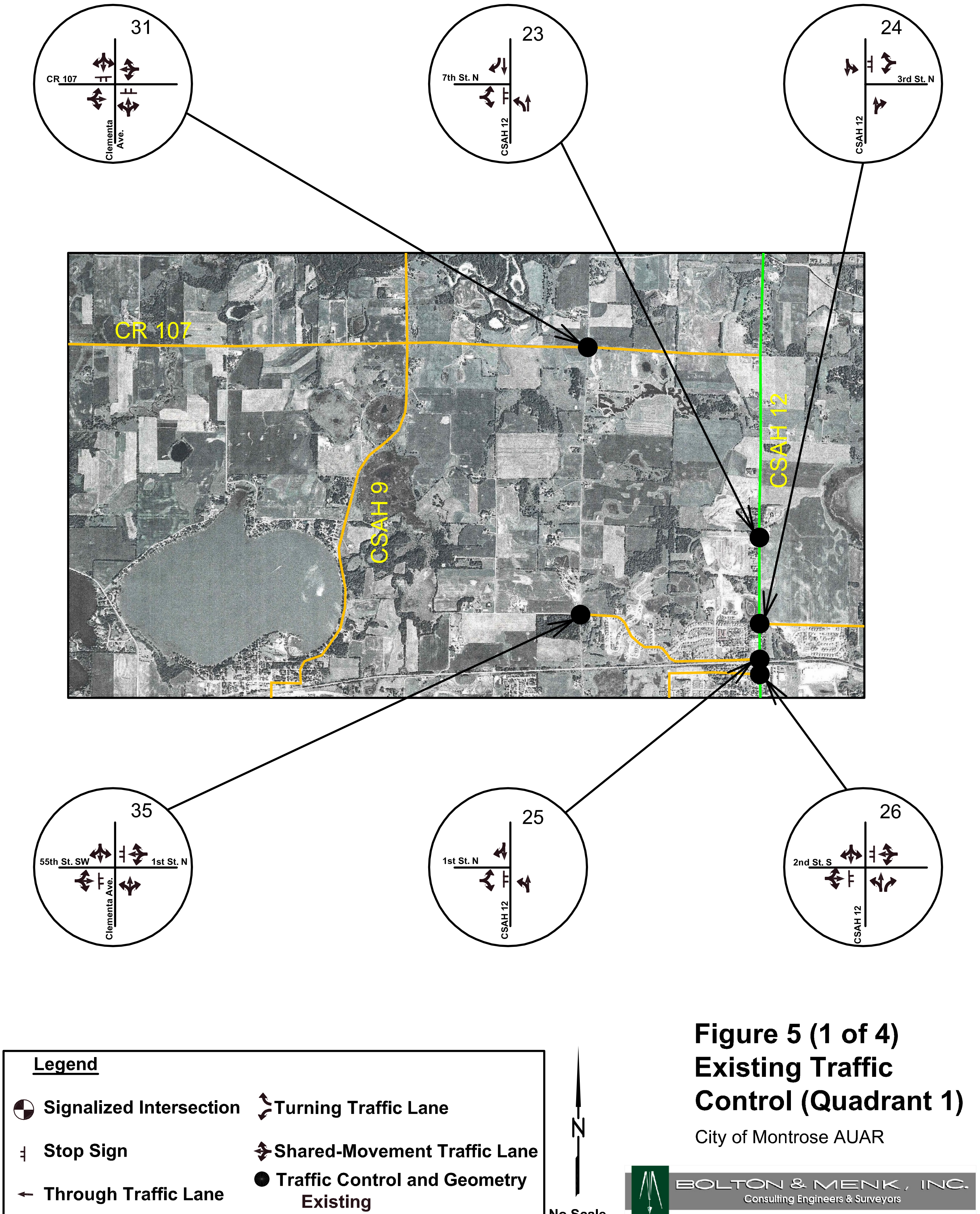

Figure 5 (1 of 4) Existing Traffic Control (Quadrant 1)

City of Montrose AUAR

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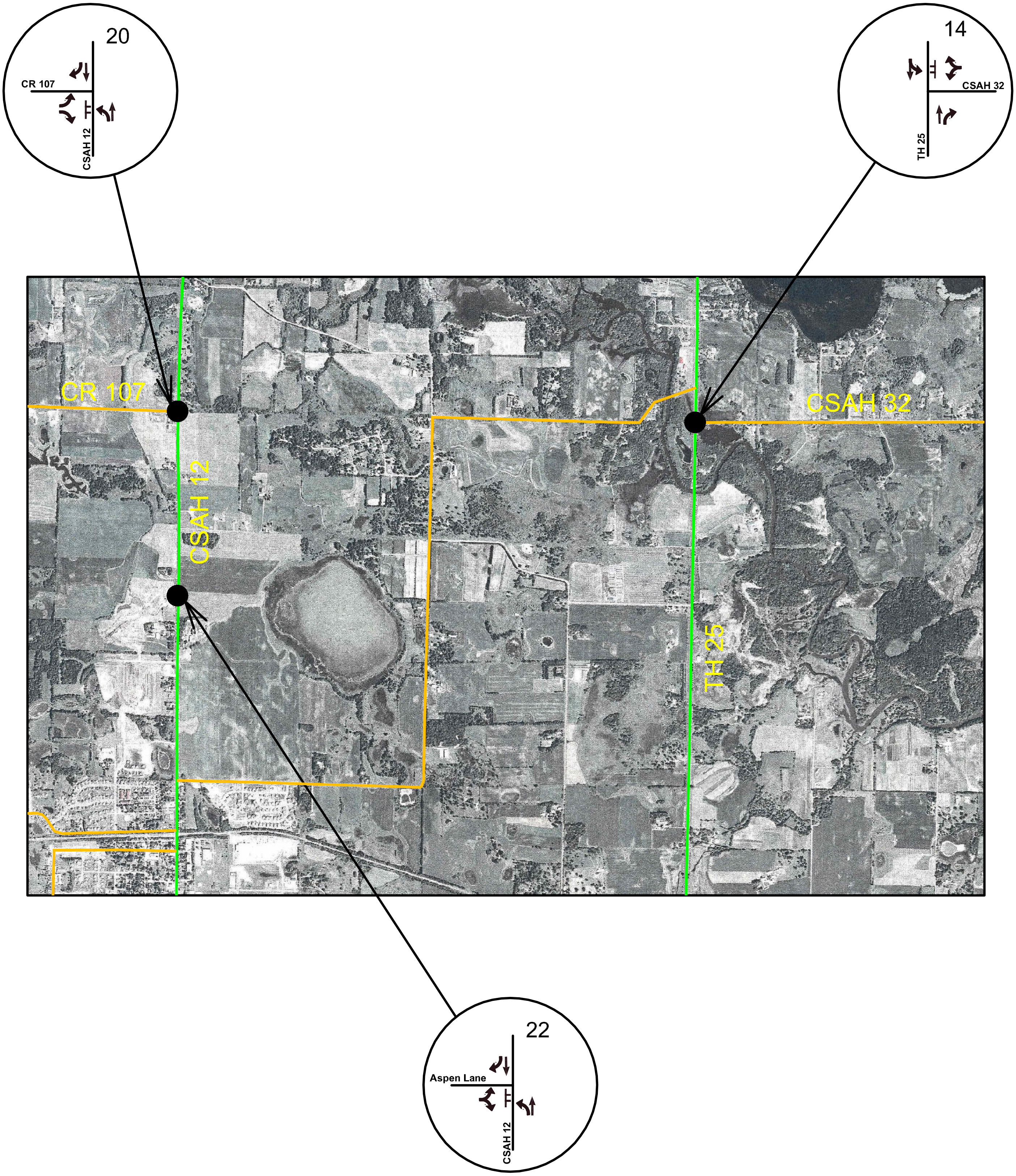

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry Existing

N

No Scale

Figure 5 (2 of 4) Existing Traffic Control (Quadrant 2)

City of Montrose AUAR

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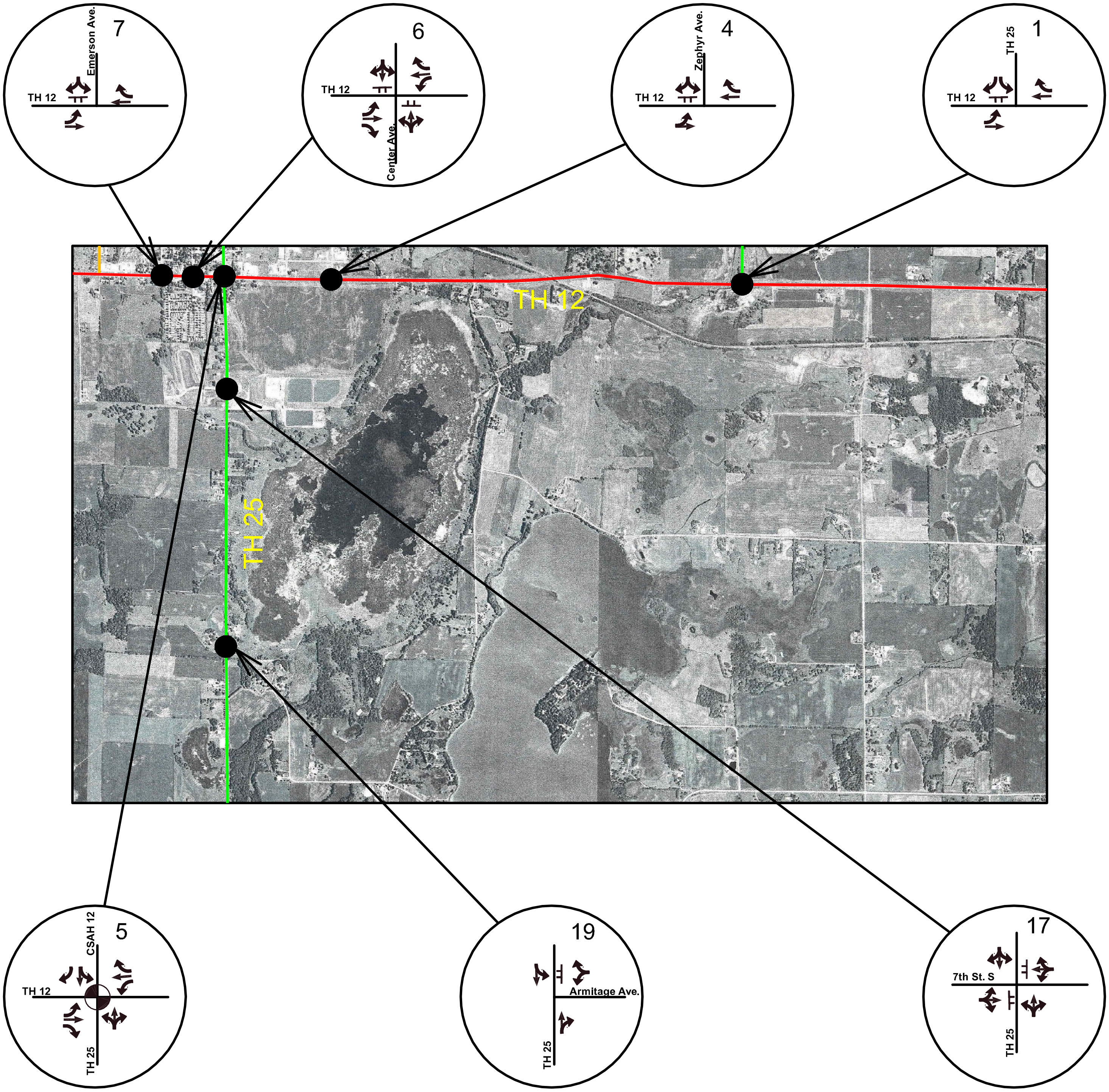

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry Existing

N

No Scale

Figure 5 (3 of 4) Existing Traffic Control (Quadrant 3)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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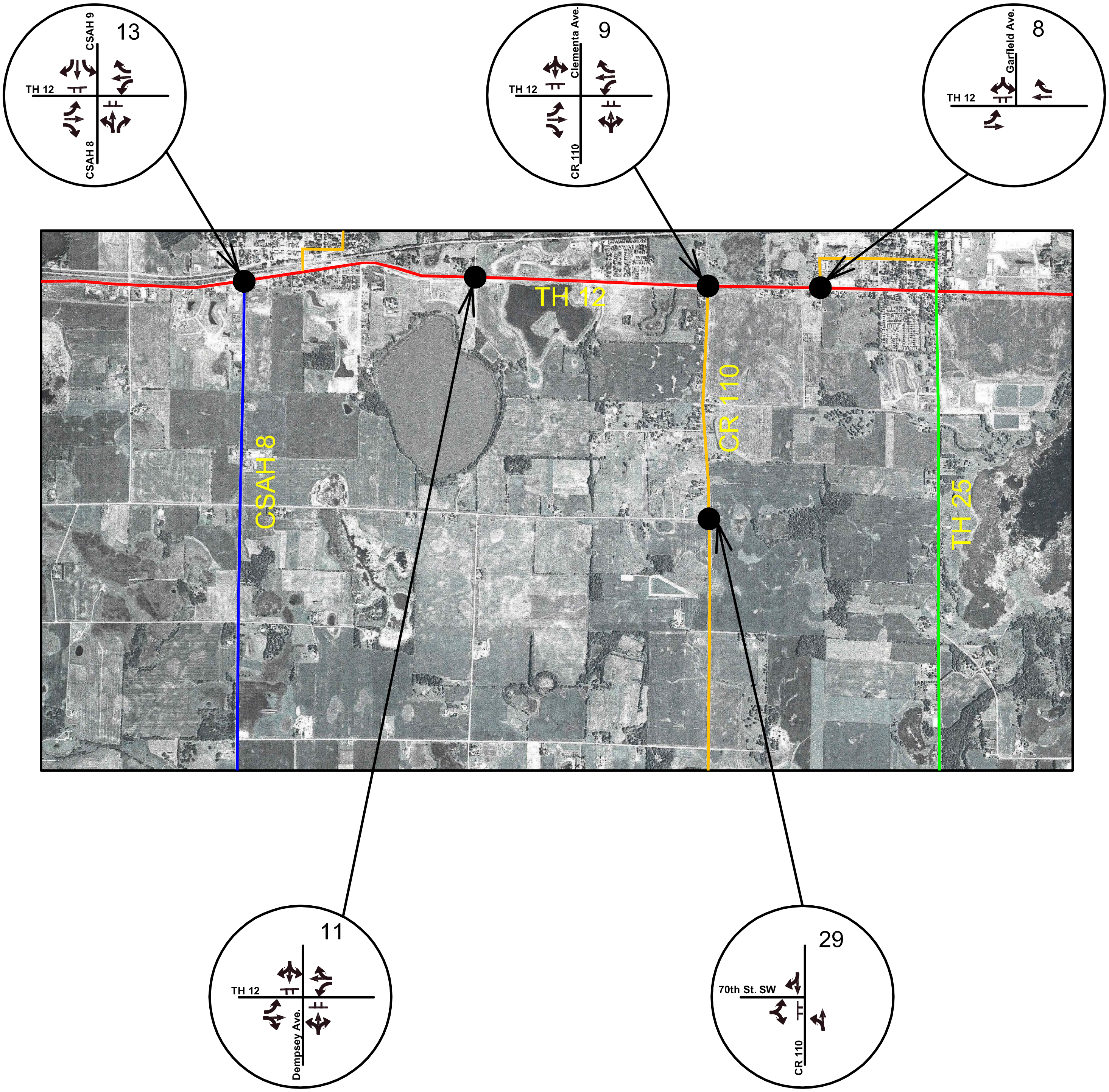

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry Existing

N

No Scale

Figure 5 (4 of 4) Existing Traffic Control (Quadrant 4)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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3.1 Capacity and Operations Analysis

All of the intersections within the study area operate under LOS D or better during the AM and PM peak hours. The LOS for each section of roadway is shown in Figure 6.

3.1.1 US TH 12

The traffic volumes currently on TH 12 are highly directional and much of the daily traffic is on the roadway during the peak hours. This characteristic is common in many of the outlying communities of the Twin Cities Metropolitan Area and is a result of much of the traffic traveling into the Twin Cities area in the AM and traveling out of the Twin Cities area in the PM. This is also indicative of a highly residential community, with little to no commercial, retail, or industrial jobs nearby.

TH 12 currently experiences some traffic back-ups through the City and there are little to no gaps between vehicles in the peak hour in the peak direction. These traffic issues are a result of inadequate capacity (volume to capacity ratio over 1.00) from the east leg of TH 25 to the intersection of TH 25/CSAH 12. The other segments of TH 12 have volume to capacity ratios over 0.70.

Existing operations were evaluated at multiple intersections along TH 12 including TH 25 (East Leg), TH 25/CSAH 12, CSAH 8/CSAH 9, and CR 110/Clementa Avenue. The current intersection control results in LOS C or better at all intersections except TH 25 (East Leg) and CSAH 8/CSAH 9, which have LOS D on the minor approach left turn movement during the peak hours.

The complete operational analysis results are included in the Traffic Appendix.

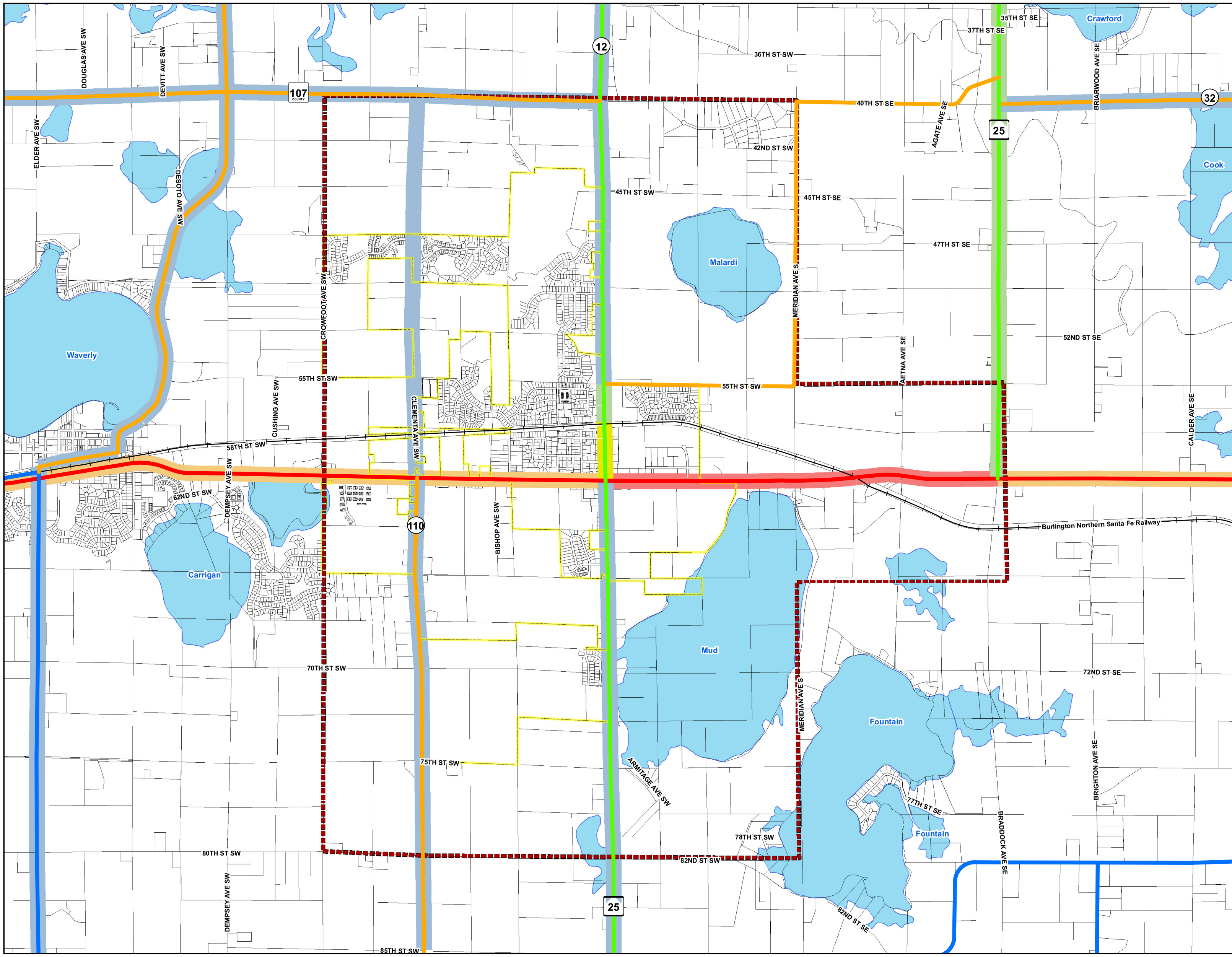
3.1.2 MN TH 25 (East Leg)

The east leg of TH 25 is a highly rural highway with minimal access. As such, the highway operates with excess capacity. The only highway intersection evaluated is with CSAH 32/40th Street SW (formerly CR 115). All movements operate at LOS C or better.

The complete operational analysis results are included in the Traffic Appendix.

3.1.3 MN TH 25 (West Leg)/CSAH 12

The roadway corridor of TH 25 and CSAH 12 is the main north-south roadway for traffic through Montrose. The only slightly congested section of the existing roadway is north of TH 12 through downtown Montrose where there are many



CITY OF MONTROSE
AUAR
EXISTING LEVEL OF SERVICE

FIGURE NO. 6
APRIL, 2007

Legend

Existing Functional Classification
- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- A.U.A.R. Boundary
- City Limits

Level of Service
- Los A, V/C < 0.30
- Los B, V/C < 0.50
- Los C, V/C < 0.70
- Los D, V/C < 0.90
- Los E, V/C < 1.00

N W E S

0.5 0 0.5 Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Existing LOS 11x17.mxd)
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local street and driveway accesses. North of the BNSF railroad, CSAH 12 has been widened and constructed with left and right turn lanes at each major intersection. Direct driveway access is limited to the west side of CSAH 12, south of 5th Street North. These features result in uncongested/free-flowing conditions.

TH 25 south of TH 12 only has direct driveway access for a few properties north of 7th Street South. The roadway is basically free-flowing. All of the intersections along TH 25 and CSAH 12 are stop sign controlled and all movements experience operations of LOS B or better.

The complete operational analysis results are included in the Traffic Appendix.

3.1.4 CR 110/Clementa Avenue

CR 110/Clementa Avenue is the major north-south roadway serving the west side of Montrose. As there is little development that accesses these roadways, traffic is very light and free flowing. All intersections are stop sign controlled and all movements experience operations of LOS A.

The complete operational analysis results are included in the Traffic Appendix.

3.2 Needed Improvements

The capacity of TH 12 between TH 25 (East Leg) and TH 25/CSAH 12 should be considered for widening to handle peak hour traffic more efficiently and safely. Although this is suggested, it is recognized that the railroad overpass of this section of roadway does limit the options for any immediate widening improvements.

4.0 Future Traffic

The Montrose AUAR study includes approximately 11 square miles of existing and proposed development. With this large area of study, future traffic is not easily projected using the conventional methods for a small-scale development. Traffic will use different intersections and roadways to travel within and out of the City of Montrose depending on their starting and final destination. Additionally, the interaction of traffic within an area this large must be taken into account to ensure that trips are not double-counted.

4.1 Traffic Model

The projected trips for the area are determined through the use of a Travel Demand Model. This model relies on real-world data to estimate future trips. This data includes census information and travel behavior including how many cars people have, how many drivers there are for those cars, how many trips each of those drivers take during a day, and where or how far drivers travel to get to their jobs or shopping areas.

A Year 2000 Travel Demand Model was completed for the Minnesota Department of Transportation. This Collar County Model includes all of the state highways within the entire seven-county metropolitan area and their collar counties. The Model takes into account personal vehicular traffic and transit traffic using both state highways and/or exclusive right-of-way. The entire Model area is split into Traffic Analysis Zones (TAZs), which help to split traffic onto the correct roadways. The primary purpose of the Model is to project traffic on the state highway system and provide estimates of transit ridership. For the AUAR, the Year 2000 Collar County Model was adjusted to include additional Traffic Analysis Zones (TAZs) and additional roadways near the City of Montrose. The Model was then calibrated to reflect Year 2000 traffic volumes in the area.

Year 2030 projected traffic data was selected as a basis for the AUAR traffic model. The 2030 forecast data is readily available from multiple public agencies. The Collar County Model was adjusted to reflect 2030 conditions by changing the socioeconomic data in the Model. The socioeconomic data includes households, employees, and population estimates for Year 2030, which was available from the Metropolitan Council. Traffic entering and exiting the Model was also adjusted to reflect expected 2030 traffic.

The socioeconomic data for the AUAR area was estimated based on the land use identified in the City's Comprehensive Plan.

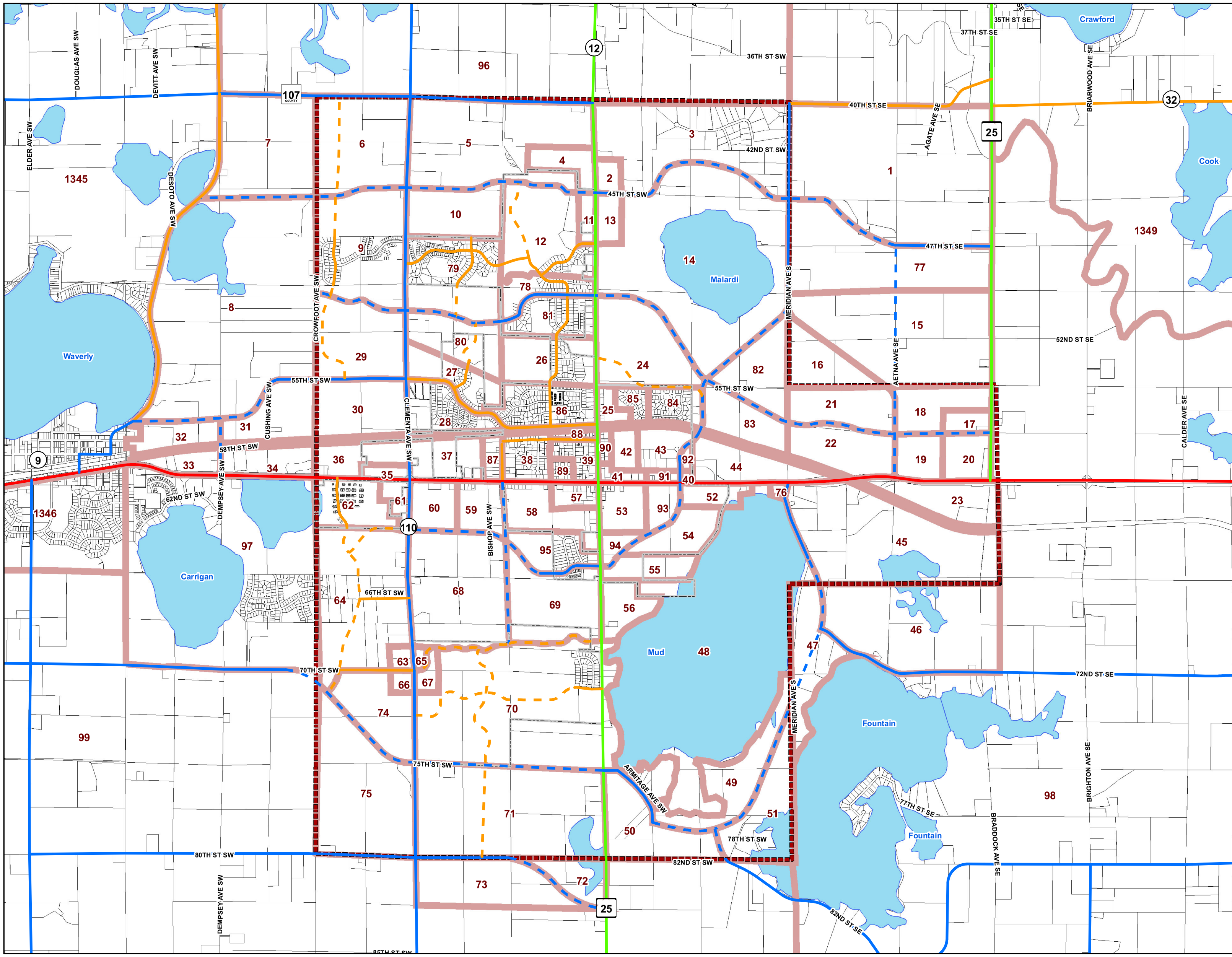
4.1.1 Traffic Analysis Zones

A traffic analysis zone is the unit of geography most commonly used in conventional transportation planning models. The Collar County Model Year 2000 Traffic Analysis Zones (TAZs) are defined by the Bureau of the Census. A TAZ is a statistical entity delineated by state and/or local transportation officials for tabulating traffic-related census data.

For this study, the City of Montrose was divided into multiple Traffic Analysis Zones (TAZs). These TAZs split the AUAR area into smaller zones than what was originally in the Collar County Model. These smaller zones help to spread traffic throughout the roadway network and emulate how drivers would be expected to travel within the AUAR area. The area was split into 99 smaller zones within the original 4 zones. These zones are shown in Figure 7.

CITY OF MONTROSE
AUAR
TRAFFIC ANALYSIS ZONES

FIGURE NO. 7
APRIL, 2007



Legend

- Traffic Analysis Zones

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- A.U.A.R. Boundary
- City Limits

N W E S

0.5 0 0.5 Miles

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Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Taz Model 11x17.mxd)
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4.1.2 Model Methodology

The general approach to forecasting the traffic volumes consisted of the following:

- Utilize the Collar County travel demand model and model parameters, developed for the Minnesota Department of Transportation and maintained by the Metropolitan Council, as the primary instrument for forecasting the volumes.
- Collect year 2000 and current year traffic count data and basic roadway attribute information in the study area for the purpose of validating the model, run for the base year (2000).
- Collect year 2000 census data from the U.S. Census Bureau as needed to validate the model inputs.
- Determine Traffic Analysis Zones based on roadways, land use data, and land features.
- Split model Traffic Analysis Zones into smaller zones for basis of projections.
- Add additional county and other major local roadways to the roadway network in the Collar County Model.
- Apply the model for the base year and validate its projections against the observed traffic count information; make appropriate adjustments as necessary to reach an acceptable validation.
- Apply the model for the forecast year (2030), taking into account anticipated regional network changes and the adjustments made to the 2000 model run, to generate the projected volumes.
- Analyze traffic patterns that ultimately comprise the elements themselves, through a series of special selected link analyses; use this information as a basis for adjusting the forecasted volumes if determined to be necessary.
- Prepare the final set of forecast volumes.

Additional details concerning the Model methodology are included in the Traffic Appendix.

4.2 Land Use Assumptions

The AUAR area identified by the City of Montrose is the preferred build out area for the entire City of Montrose. The City recognizes that although this is a very large area, some development has already expanded to limits of the area, and all of this area is likely to be developed in the future. Future plans for the City include the addition and expansion of commercial, retail, and industrial areas of the City to complement the recent and anticipated residential growth.

To understand the full impacts of the AUAR build out area to the roadways and intersections, two different sets of socioeconomic data have to be developed. The first set would be for a no-build of the AUAR area, while the second set would be for a full build of the entire AUAR area.

As analysis of the complete impacts of the AUAR area began, it was determined that a first stage of development would provide the City and other regional authorities a look into how improvements are staged from existing to a full build scenario. This first stage is defined as an interim scenario, which would bridge the no build and the full build of the AUAR area.

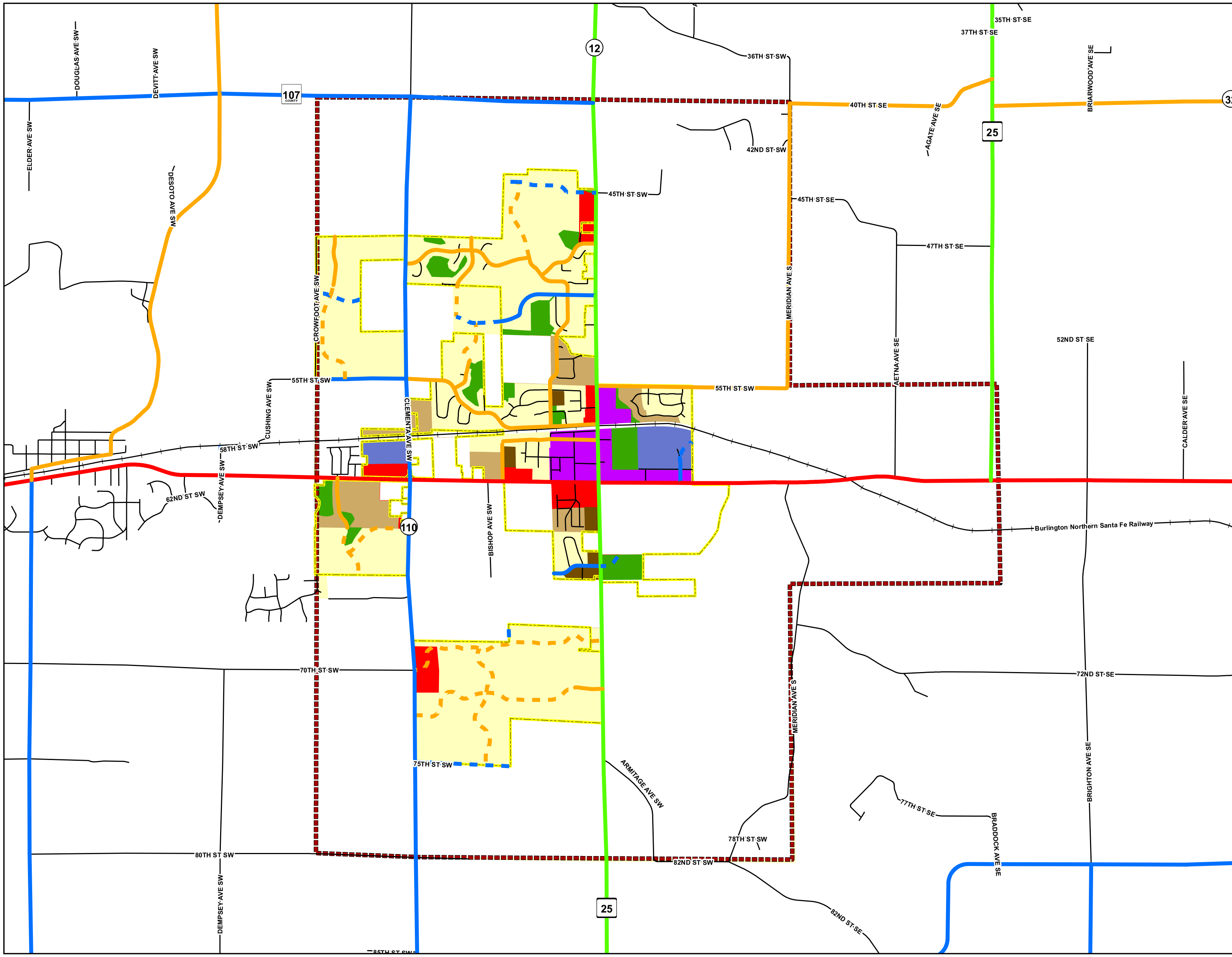
The Land Use Appendix provides a description of the assumptions and methods used to determine population, housing, and employment projections for the AUAR study area.

Socioeconomic data is developed for all analysis zones within the original four zones included in the Collar County Model. As a consequence, the total data for each scenario includes not only growth within the City of Montrose, but also within Waverly and other adjacent areas.

4.2.1 No-Build Scenario

The No-Build scenario identified is most consistent with the socioeconomic data obtained from the Metropolitan Council. It is assumed that all developments within the AUAR Boundary already exist, are platted or are within the pre-platting stage and will be completely developed by Year 2030. These developments are mostly residential in nature and are both north and south of TH 12. Limited commercial and industrial uses are anticipated within a development area north of TH 12, west of Clementa Avenue. The land use for the existing plus platted/pre-platted developments within the AUAR boundary is shown in Figure 8.

Platted development within the City of Waverly is also anticipated to have an impact on the traffic through and in the City of Montrose and is included in the 2030 No-Build projections. These residential developments are all located south of TH 12, between CSAH 8 and CR 110/Clementa Avenue.



CITY OF MONTROSE
AUAR
NO BUILD SCENARIO

FIGURE NO. 8
APRIL, 2007

Legend

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

Landuse

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Mixed Use
- Public/Semi-Public

N W E S

0.5 0 0.5 Miles

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Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario No Build 11x17.mxd)
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The socioeconomic data for the No-Build scenario was calculated and collected for the zones within the AUAR Boundary and the zones within the Collar County Model. The zones within the AUAR Boundary include both the existing development and the platted or pre-platted developments. The zones within the external area are the zones outside of the AUAR Boundary, within the Collar County Zones.

Table 4-1: No-Build Scenario Socioeconomic Data

Zonal Area	Population	Households	Retail Employees	Non-Retail Employees
AUAR Boundary	8,092	3,312	141	262
External to AUAR Area	3,661	1,428	183	1,094
Total	11,753	4,740	324	1,356

A table of the households, population, and employees by TAZ is included in the Traffic Appendix.

4.2.2 Interim Build Scenario

The interim stage of development is the area within the AUAR that is most likely to be built first. This area is based on the water/sewer service areas, wetland/water resources mitigation, future land uses, and likely needed roadway connections. The Interim Scenario generally fills in areas between the existing and the platted/pre-platted developments, while expanding commercial, retail, and industrial land use. The Interim Build Scenario land uses are shown in Figure 9.

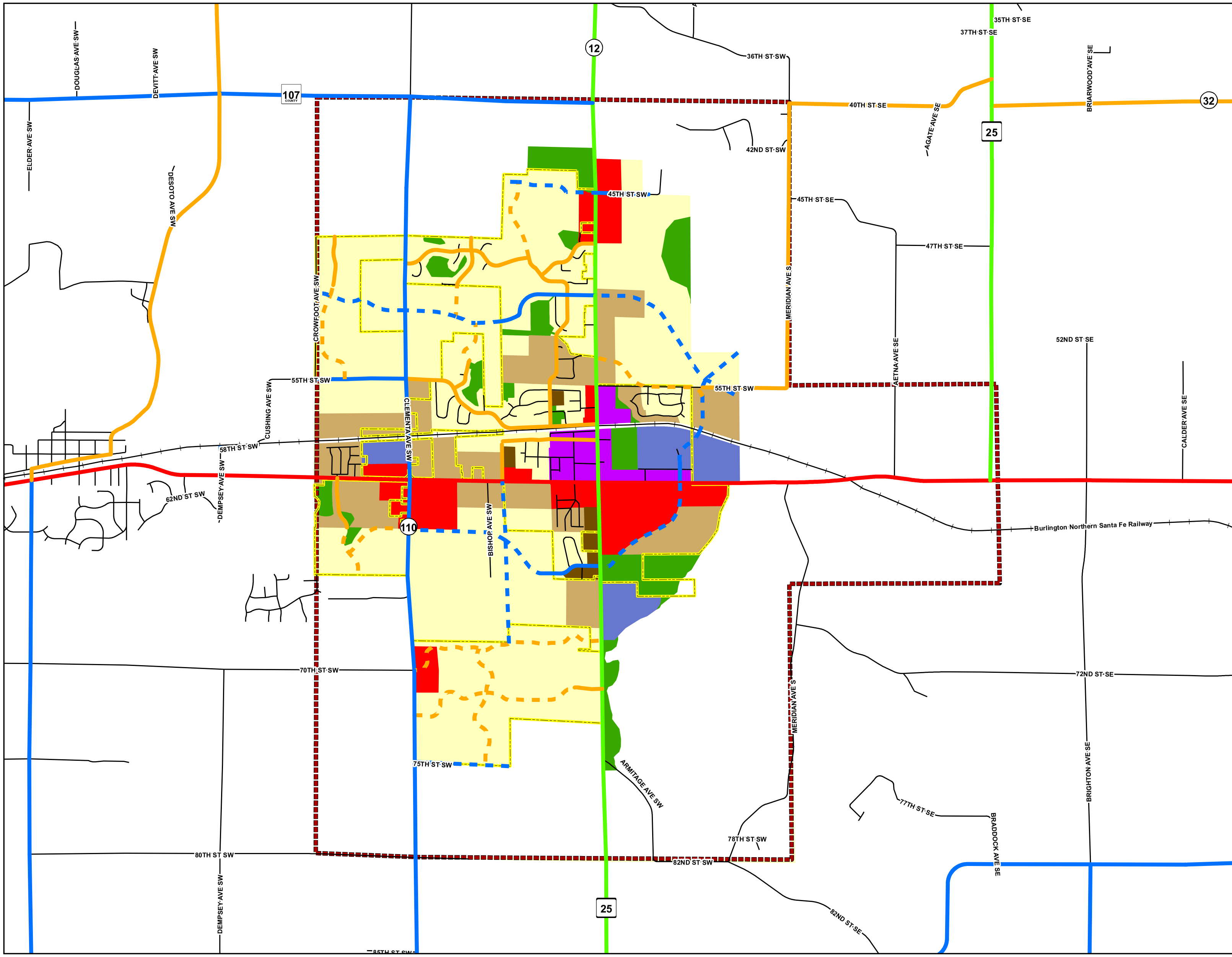
The socioeconomic data for the Interim Build scenario was calculated and collected for the zones within the AUAR Boundary and the zones within the Collar County Model. The zones within the AUAR Boundary include both the existing development and the platted or pre-platted developments in addition to the Interim AUAR Area. The zones within the external area are the zones outside of the AUAR Boundary, within the Collar County Zones.

Table 4-2: Interim Build Scenario Socioeconomic Data

Zonal Area	Population	Households	Retail Employees	Non-Retail Employees
AUAR Boundary	21,030	8,585	3,358	4,094
External to AUAR Area	3,661	1,428	183	1,094
Total	24,691	10,013	3,541	5,188

CITY OF MONTROSE
AUAR
INTERIM BUILD SCENARIO

FIGURE NO. 9
APRIL, 2007



Legend

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

Landuse

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Mixed Use
- Public/Semi-Public

N
W E
S

0.5 0 0.5 Miles

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Consulting Engineers & Surveyors

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A table of the households, population, and employees by TAZ is included in the Traffic Appendix.

4.2.3 Full Build Scenario

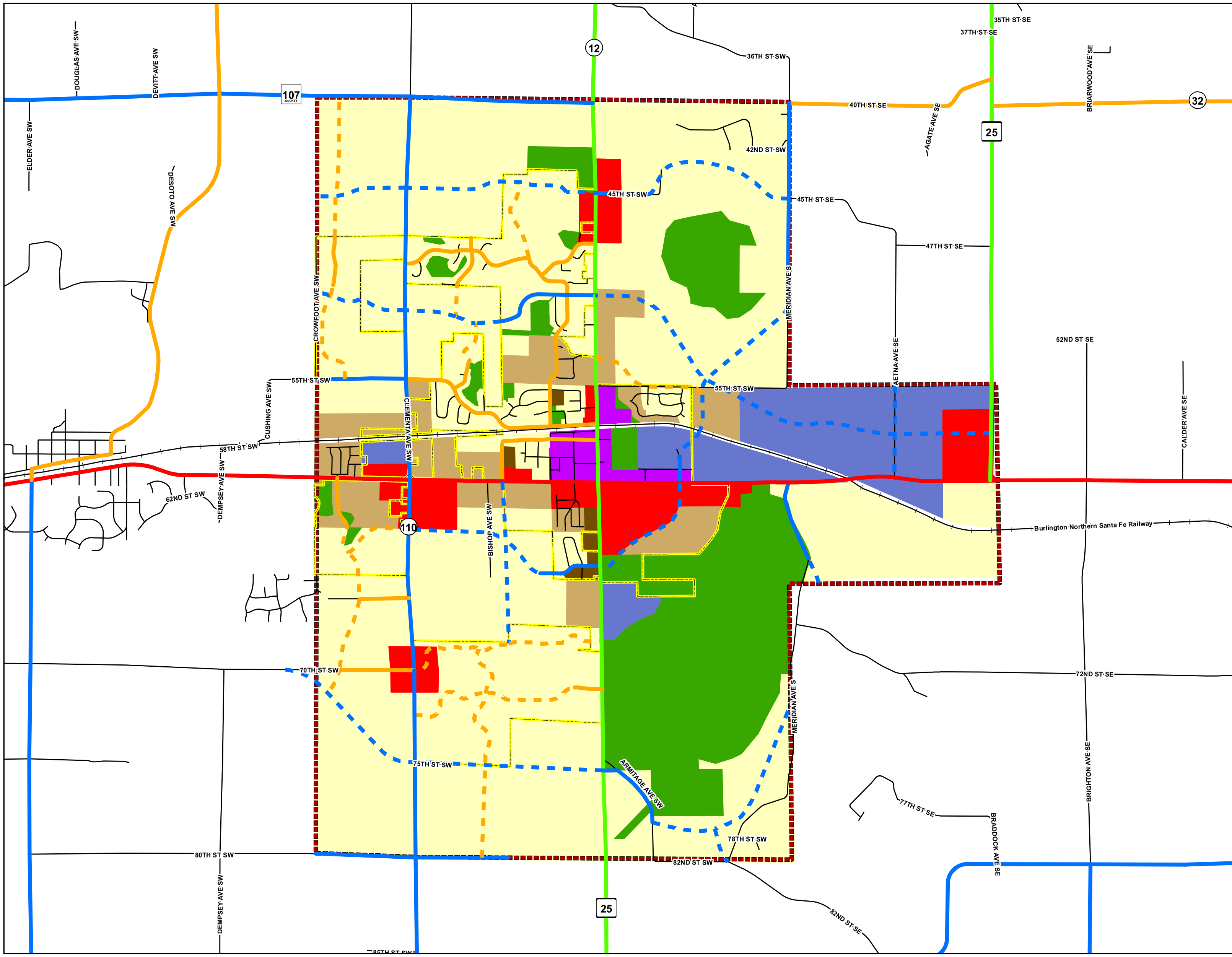
The final stage of development fills in the AUAR area. Although Full Build in this study is anticipated for 2030, this stage of development may happen after 2030, based on the housing supply provided in the AUAR. Full Build out of the AUAR area and its associated land use is shown in Figure 10.

The socioeconomic data for the Full Build scenario was calculated and collected for the zones within the AUAR Boundary and the zones within the Collar County Model. The zones within the AUAR Boundary include both the existing development and the platted or pre-platted developments in addition to the Full Build AUAR Area. The zones within the external area are the zones outside of the AUAR Boundary, within the Collar County Zones.

Table 4-3: Full Build Scenario Socioeconomic Data

Zonal Area	Population	Households	Retail Employees	Non-Retail Employees
AUAR Boundary	35,558	14,043	4,212	6,992
External to AUAR Area	3,661	1,428	183	1,094
Total	39,219	15,471	4,395	8,086

A table of the households, population, and employees by TAZ is included in the Traffic Appendix.



CITY OF MONTROSE
AUAR
FULL BUILD SCENARIO

FIGURE NO. 10
APRIL, 2007

Legend

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

Landuse

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Mixed Use
- Public/Semi-Public

N W E S

0.5 0 0.5 Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario Full Build 11x17.mxd)
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4.3 Trip Generation and Distribution

The trips generated by each TAZ in the study are based on the Model parameters set up by Mn/DOT and the Metropolitan Council. These trips are based on the Year 2000 Census and Travel Behavior Inventory. This is different than other smaller studies in which trips are based on the Institute of Transportation Engineers (ITE) Trip Generation Manual. The generated trips are distributed to the local and regional roadway network in the Model.

4.3.1 Total Trips

The total trips for each scenario in each TAZ was recorded to ensure that the trips into and out of each TAZ are reasonable, based on the number of households or employees there is in each zone.

Table 4-4: Trip Generation Data

Scenario	Zonal Area	AM Peak		PM Peak		Daily
		Entering	Exiting	Entering	Exiting	Total
2030 No-Build	AUAR	709	1,414	1,841	983	25,633
	Total	1,253	2,149	2,830	1,774	41,734
2030 Interim Build	AUAR	3,749	4,212	6,352	5,611	116,355
	Total	4,283	4,968	7,332	6,375	131,774
2030 Full Build	AUAR	5,923	6,975	10,109	8,638	178,202
	Total	6,477	7,734	11,089	9,421	193,744

4.3.2 ITE Trip Generation Comparison

The ITE Manual provides trip estimates based on land use and building sizes or number of lots. Using the ITE Trip Generation Manual and its trip rates is considered to be the de-facto procedure for estimating how much traffic an area of land will produce based on the type of buildings on the site. This comparison has been done to ensure that the Model output is reasonably close to the accepted standard.

The ITE rates and equations are based off of real-world data collected from multiple sites around the United States, so are consequently not specific to individual sites with what could have different characteristics compared to the national average.

The entire area trips from the Model output were compared to the entire area trips calculated using the ITE Manual. The ITE Trip Generation Manual, 7th Edition was used to get the ITE rates. For analysis purposes it was assumed that the housing units were Single-Family Detached Housing (ITE Code 210), each retail employee equaled 500 square feet of retail space and were Shopping Center (ITE

Code 820), and non-retail employees were 50% General Office Building (ITE Code 710) and 50% Industrial Park (ITE Code 130).

Using the straight trip generation rates yields the total trips going out of and into the area but does not take into consideration of vehicles going to multiple destinations. In addition, vehicles already on the road or from adjacent communities passing through the City of Montrose will stop in Montrose for some uses. These types of trips are considered pass-by trips. In the AM peak hour, retail trips were reduced by 15% and non-retail trips were reduced by 7.5% to account for pass-by and multi-use trips. In the PM peak hour, retail trips were reduced by 20% and non-retail trips were reduced by 10% to account for pass-by and multi-use trips. In the daily projections, retail trips were reduced by 30% and non-retail trips were reduced by 15% to account for pass-by and multi-use trips.

Table 4-5: ITE Trip Generation Comparison

	AM Peak		**PM Peak**		**Daily**	
Scenario	**Model**	**ITE**	**Model**	**ITE**	**Model**	**ITE**
2006 Existing	1,792	2,142	2,396	2,640	21,777	26,017
2030 No-Build	3,402	4,069	4,604	4,652	41,734	46,170
2030 Interim Build	9,251	9,540	13,707	11,770	131,774	113,226
2030 Full Build	14,211	14,283	20,510	16,347	193,744	157,895

The trips out of the Model are considered reasonably close to the trips determined using ITE. It is recognized that the City of Montrose does have lower than average trip rates for residential units, while higher than average trip rates for commercial, retail, and industrial uses. This is reasonable based on the highly residential nature of the City in 2006, where many of the trips out of the community are for more than one purpose.

As the area continues to grow and more uses are developed within the City of Montrose, the percentage of local trips is expected to be a larger portion of the total traffic within and out of the City. This local trip increase will be due to more office work places being developed in the city as it grows and an increase in the variety of businesses that develop in a larger city. This in turn reduces the number of trips residents have to make to adjacent communities for work, for services, and for retail shopping, making the City of Montrose a more self-sufficient city. Additionally, as the community adds retail, commercial, and industrial space, the area is likely to become a small regional hub for surrounding communities.

4.3.3 Trip Distribution

The land use within the City of Montrose and other surrounding cities has an impact to where people will travel, how far they will travel, and how they will get there. Additionally, the congestion anticipated on roadways will impact where and how people travel. The areas to which people are traveling to are based on trip length and regional pull. The regional pull takes into account that the larger a regional center is, the more people will travel to it, and the longer people are willing to travel to get there. This is especially important to note with the City of Montrose, in that the Twin Cities Metropolitan Area has a very large pull of trips from the City of Montrose, while the City of Buffalo has a smaller but important pull of trips to and from the City of Montrose. This is all taken into account in the Model.

The majority of traffic from the Montrose area is destined to the Twin Cities Metropolitan Area using US TH 12 to the east. There is also a reasonable percentage of traffic that is heading north to the City of Buffalo and Interstate 94 using TH 25 and CSAH 12. In addition, there is a large amount of traffic from the City of Buffalo bypassing TH 55 to head east by using TH 25 and US TH 12, or heading south on TH 25 to access TH 7 and areas to the south. All this traffic adds to the congestion within the City of Montrose.

5.0 2030 Capacity and Operations Analysis

Development of the AUAR study area would result in a significant change in roadway system performance due to the large volume of traffic being added to the roadway network. As all of the trips are moved through the community, the importance of routes that do not rely on the federal, state, or county roadway system would be important to maintain acceptable capacity levels and operations on those important regional roadways.

Analysis was completed for each of the 2030 scenarios for the Design Hour and the A.M. and P.M. peak hours. Additional signalized intersections are anticipated in the area to handle the additional traffic from the proposed development.

The individual intersection analyses for all intersections studied are included in the Traffic Appendix.

5.1 2030 No-Build Analysis

The Model was run with the socioeconomic data from the No-Build Scenario. Minimal additional roadways are anticipated, so much of the traffic from the area would utilize the regional roadway system.

The projected ADT for the No-Build scenario is shown in Figure 11. The peak hour volumes at each of the studied intersections are shown in Figure 12. The resulting Level of Service for the roadways is shown in Figure 13.

5.1.1 US TH 12

The traffic on TH 12 would increase by approximately 1% per year under the No-Build Scenario. Without any widening of TH 12, the entire roadway would be expected to operate over capacity by 2030. This would result in significant safety and delay concerns if no improvements are made. Through the City of Montrose, the anticipated maximum ADT volume is 16,100. This ADT is similar to the ADT currently on TH 12, west of Maple Plain.

In the No-Build Scenario, TH 12 would be used as an alternative roadway to access the Twin Cities Area for traffic originating in the City of Buffalo area that would like to use TH 55. TH 55 is currently in the preliminary stages of planning for expansion. It is assumed that by 2030, TH 55 would be expanded between the Cities of Plymouth and Rockford. This expansion would not include any expansion between the City of Rockford and the City of Buffalo. As traffic rises to 2030 levels, some of the traffic that would prefer to use TH 55 from the City of Buffalo and points further east would now use TH 12, since the congestion on TH 55 would be unacceptable. If TH 55 would be improved further by 2030 with additional capacity and improved access, than what is currently planned, the volumes on TH 12 would likely decrease. Even with this expansion, traffic levels would still be above capacity on TH 12.

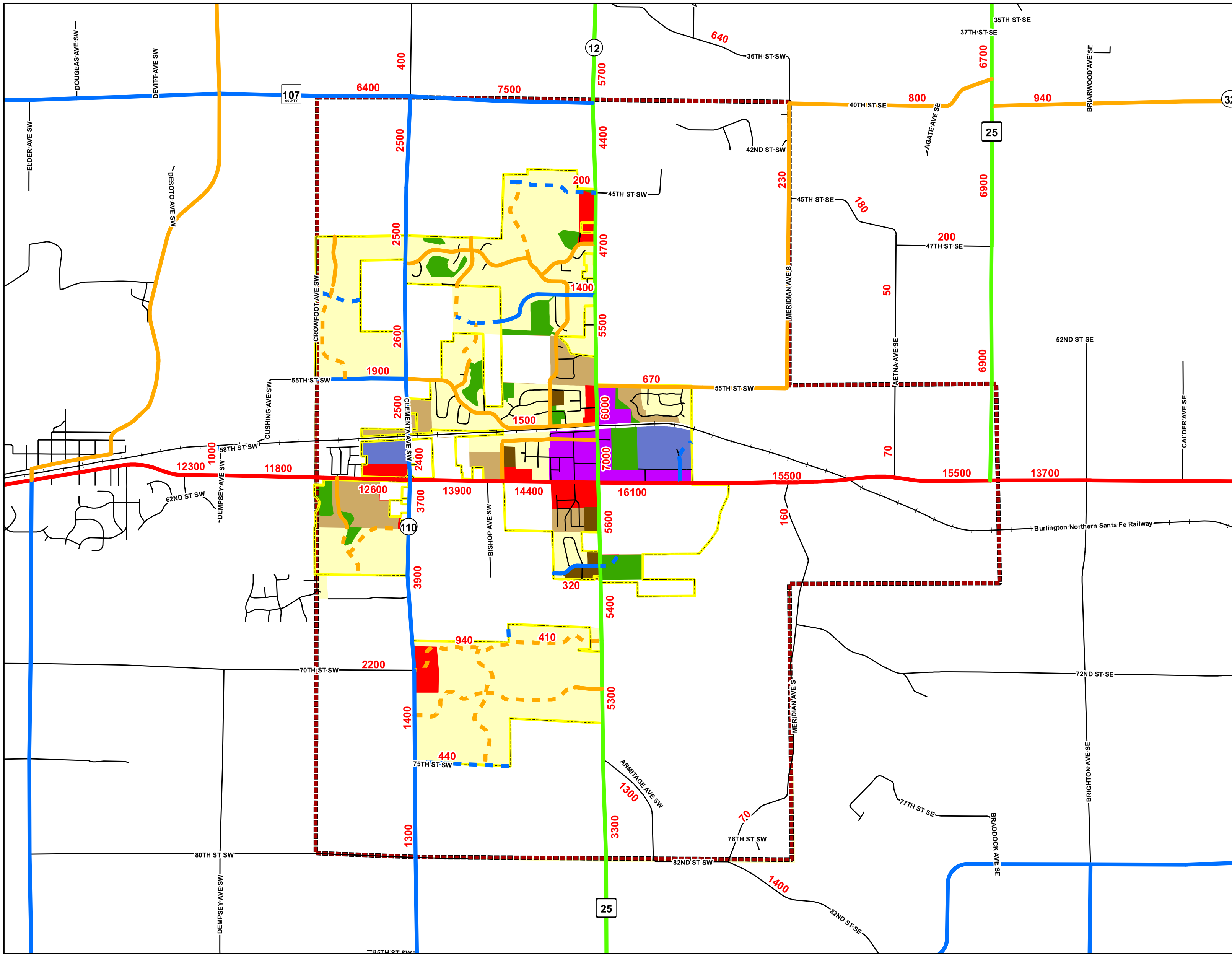
Traffic operations would be impacted at multiple intersections along TH 12 with the 2030 No-Build traffic.

Traffic from southbound TH 25 to eastbound TH 12 would experience over 16 vehicle-hours of delay during the PM peak hour. This delay equals an unacceptable average delay of approximately 4.5 minutes per vehicle to make the movement.

The operations of the signal at the intersection of TH 12 and TH 25/CSAH 12 would fail with the current lane configuration. There would be over 17 minutes of delay per vehicle with no improvements.

The growth of traffic on CR 110 and Clementa Avenue would result in unacceptable delay at the TH 12 intersection during the PM peak hour. This would be due to the high traffic volumes on TH 12 not allowing gaps for cross-street traffic to enter or cross the traffic stream.

The intersection of TH 12 with CSAH 8/CSAH 9 in Waverly would also experience unacceptable traffic delay.



CITY OF MONTROSE
AUAR
NO BUILD SCENARIO
2030 ADT VOLUMES

FIGURE NO. 11
APRIL, 2007

Legend

XXXX 2030 Projected ADT Volumes

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

Notes:
Traffic volumes rounded as follows:
<1000, Nearest 10
>1000, Nearest 100

Forecast numbers depicted have a confidence range of plus or minus 15%.

Forecasts follow procedures as documented in the Twin City Travel Demand Forecasts Prepared for Mn/DOT Metro: Model and Parameters for Adjustments to Model Inputs (Revised January 5, 2006).

N W E S

0.5 0 0.5 Miles

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Consulting Engineers & Surveyors

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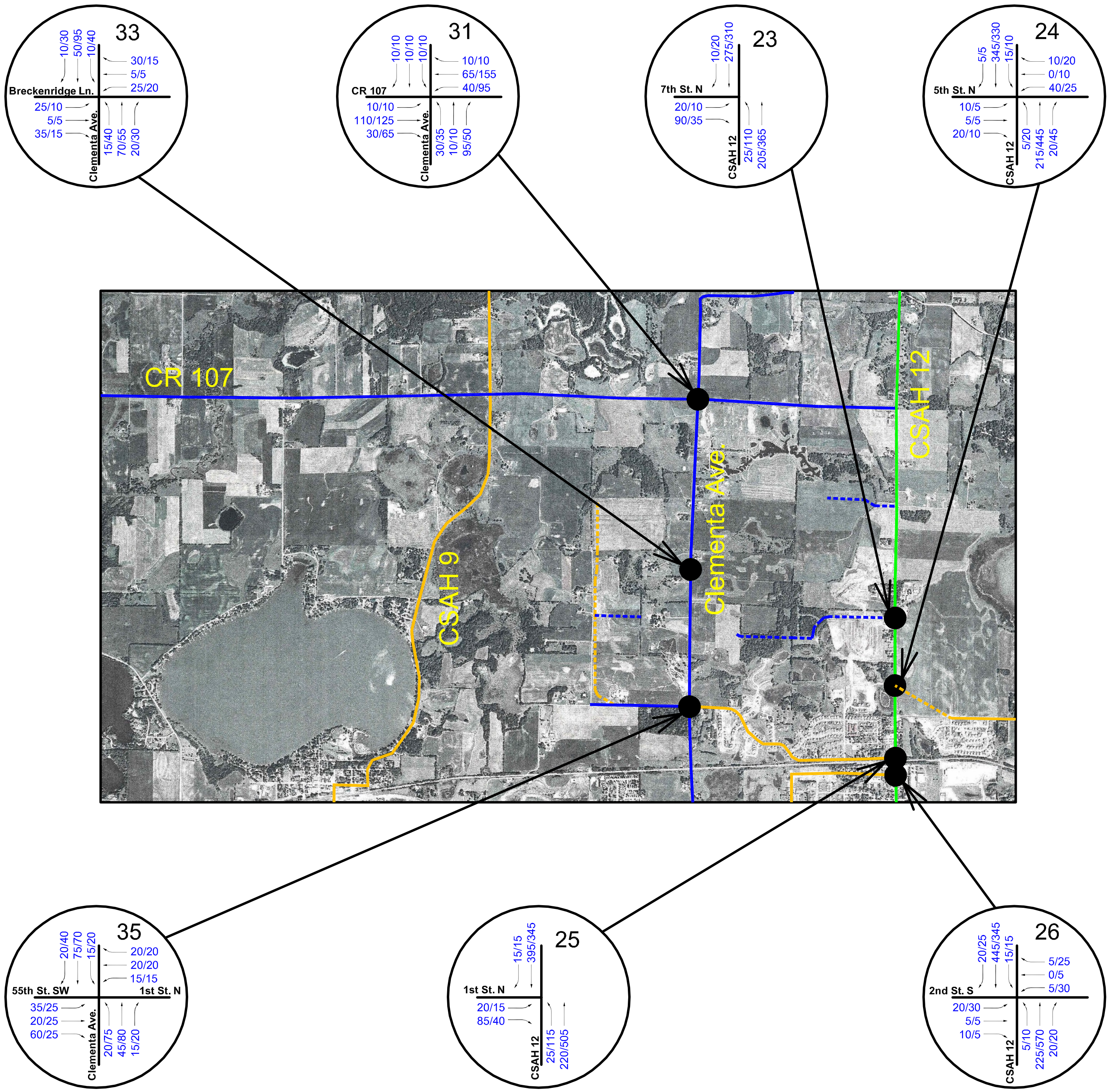

Figure 12 (1 of 4)
No-Build Peak Hour Volumes (Quadrant 1)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

2030 AM Peak
2030 PM Peak
xx/yy

N

No Scale

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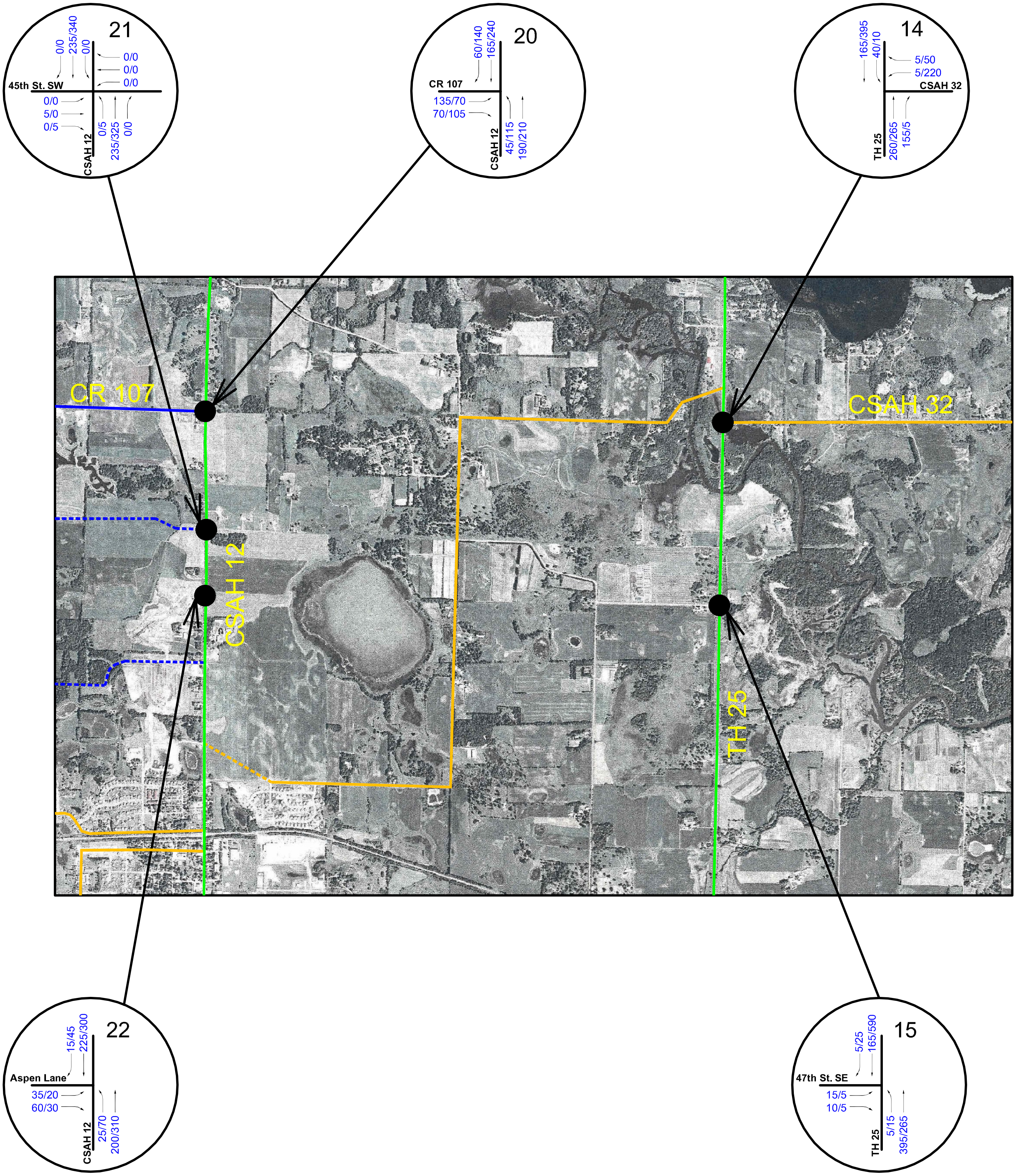

Figure 12 (2 of 4)
No-Build Peak Hour Volumes (Quadrant 2)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

xx/yy **2030 AM Peak** **2030 PM Peak**

N

No Scale

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Consulting Engineers & Surveyors

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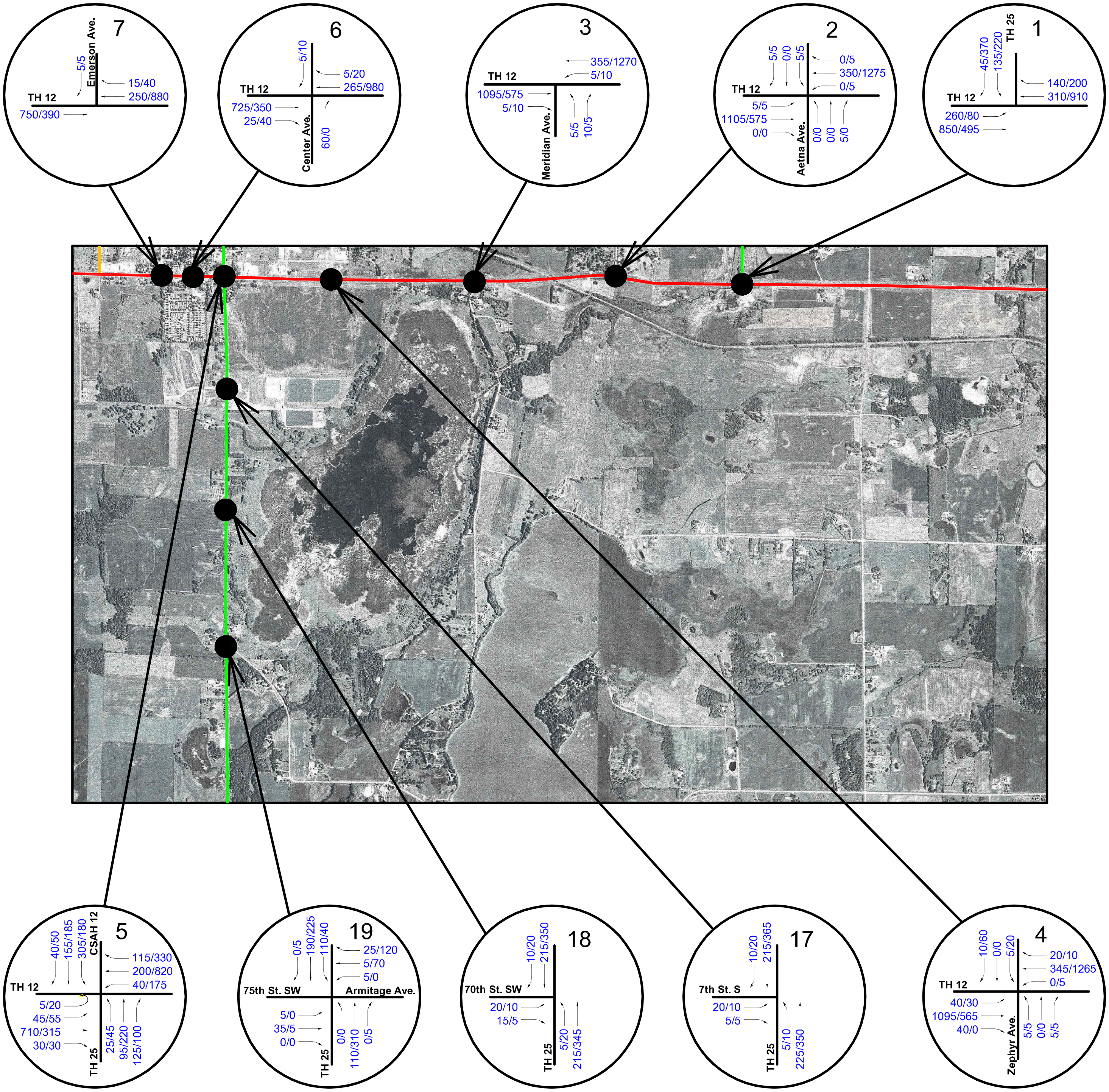

Figure 12 (3 of 4) No-Build Peak Hour Volumes (Quadrant 3)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

xx/yy — **2030 AM Peak** / **2030 PM Peak**

N

No Scale

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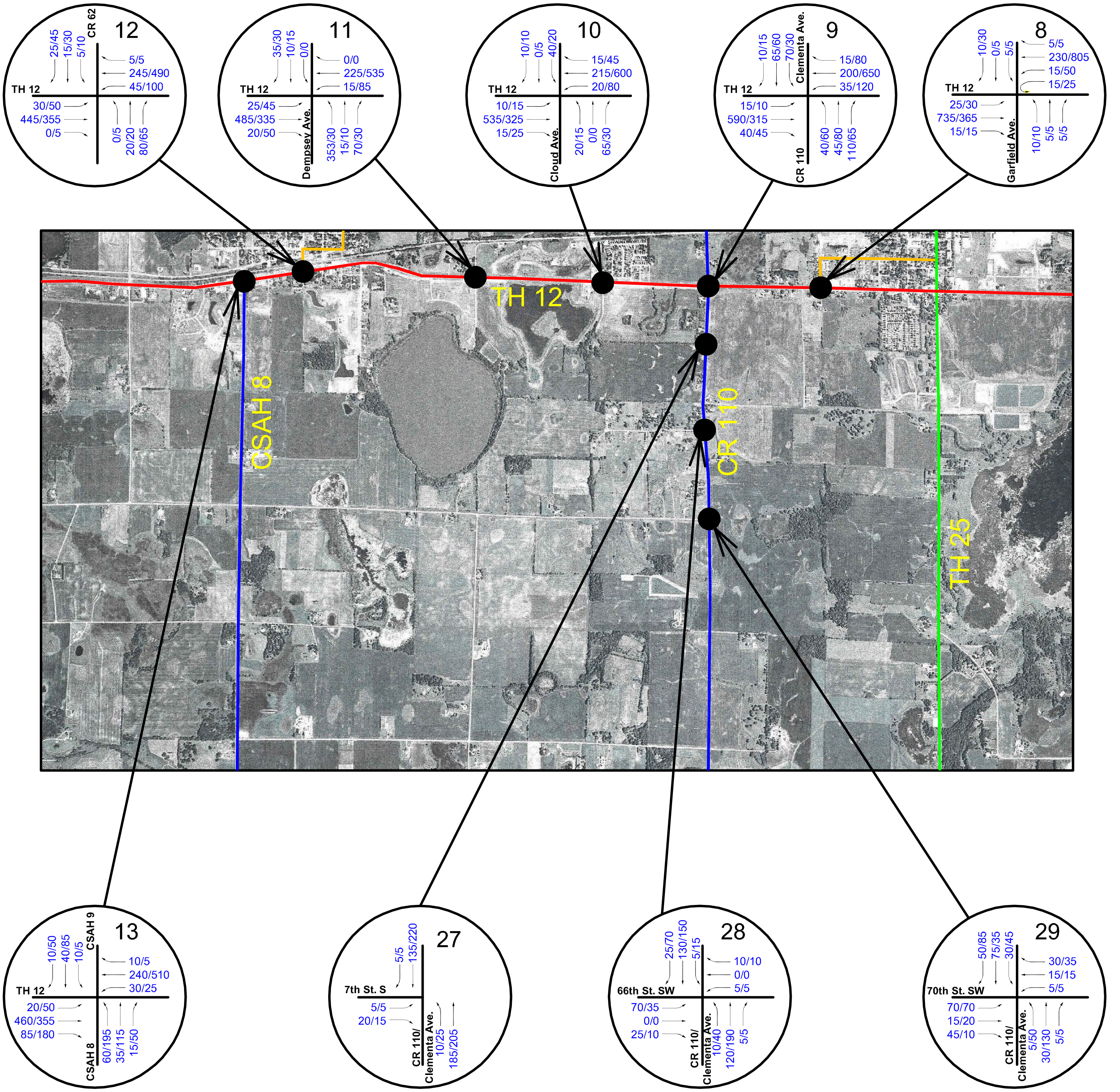

Legend

● Peak Hour Turning Movement

2030 AM Peak
2030 PM Peak
xx/yy

N
No Scale

Figure 12 (4 of 4) No-Build Peak Hour Volumes (Quadrant 4)

City of Montrose AUAR

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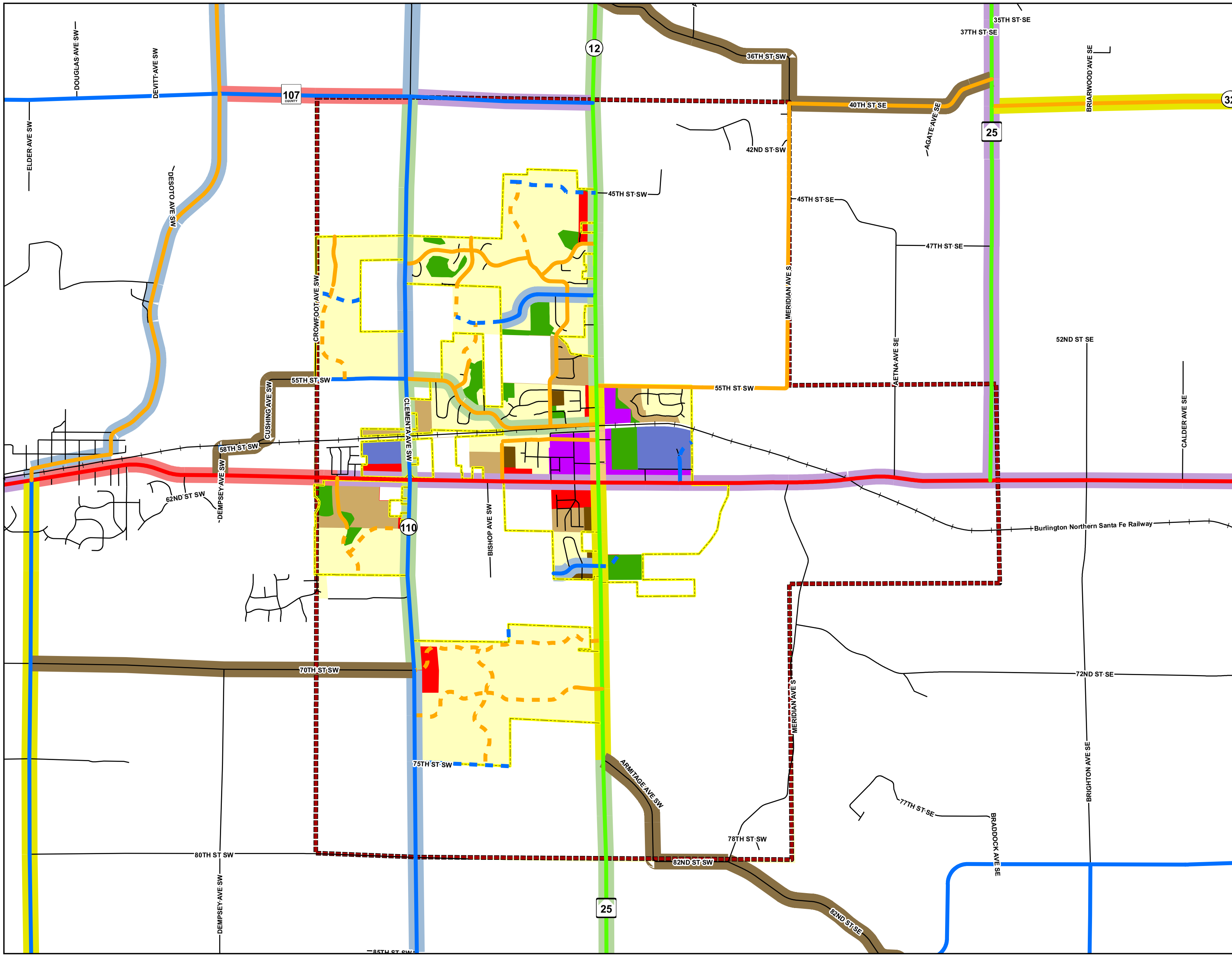
CITY OF MONTROSE
AUAR
NO BUILD SCENARIO
2030 LEVEL OF SERVICE

FIGURE NO. 13
APRIL, 2007



Legend

Level of Service

- Los A, V/C < 0.30
- Los B, V/C < 0.50
- Los C, V/C < 0.70
- Los D, V/C < 0.90
- Los E, V/C < 1.00
- Los F, V/C > 1.00
- Gravel Road, > 400 vpd

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

N W E S

0.5 0 0.5 Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario No Build LOS 11x17.mxd)
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5.1.2 MN TH 25 (East Leg)

TH 25 north of TH 12 would experience traffic growth of 1.5% per year under the No-Build Scenario. This would result in an increase to an ADT of 6,900 north of TH 12. This traffic growth would primarily be traffic originating from the City of Buffalo that would be using TH 12 as an alternative roadway to access the Twin Cities Area, instead of TH 55.

With the increase in volume, the roadway would operate at LOS F. This would be partially due to the high directionality and high peak hour factors. If TH 55 were improved with additional capacity and improved access, more than what is currently planned, the volumes on TH 25 would likely decrease. This decrease may bring operations to better than LOS F.

5.1.3 MN TH 25 (West Leg)/CSAH 12

With the current design of this corridor, operations are projected to be LOS D or better under the No-Build Scenario. The only section of the roadway with LOS D would be north of TH 12, south of the railroad, where the forecasted ADT is 7,000. The lower service level would be due to the limited design and minimal turn lanes available. North of the railroad, the LOS would be C or better. The three-lane design of CSAH 12 handles the traffic efficiently and effectively.

5.1.4 CR 110/Clementa Avenue

With the No-Build traffic, the volume on Clementa Avenue and CR 110 would be increased approximately 10 times than what is currently on the corridor, resulting in an ADT of 2,500 north of TH 12 and 3,900 south of TH 12. Since the roadway is currently below capacity, the additional capacity would be available for the increase in traffic.

5.1.5 Additional Roadways

As the City grows, the intersection of CSAH 12 with TH 12 would be extremely congested. With no improvements, some traffic would use the gravel roads of 36^{th} Street and 40^{th} Street between CSAH 12 and TH 25 as alternative routes in the No-Build Scenario. Additionally, Armitage Avenue and 82^{nd} Street would provide an alternative route to CSAH 30 from TH 25. The high volumes on the gravel roads would be a concern because the volume of traffic taking these routes would be over 400 vehicles per day (vpd), thus indicating that a paved roadway be considered.

5.1.6 Needed Improvements

Due to the increase in traffic under the No-Build Scenario, TH 12 and TH 25 would require improvement. TH 12 should be widened to a four-lane expressway east of TH 25 (East Leg) and a 4-lane divided highway from TH 25 (East Leg) to Dempsey Avenue to maintain acceptable operations. Additionally, dual left turn lanes or additional thru lanes would be needed at the TH 25 (West Leg)/CSAH 12 intersection.

Additionally, under the No-Build Scenario, TH 25 should be widened to a 4-lane divided highway from TH 12 to CSAH 32 to maintain acceptable operations. This additional capacity would be needed to carry traffic from areas north on TH 25 and from areas east on CSAH 32.

The only other roadway that would need capacity improvements under the No-Build Scenario is CR 107. It should be widened to include left turn lanes at Clementa Avenue to maintain acceptable operations.

Roadway segment improvements are shown in Figure 14 while intersection improvements are shown in Figure 15.

5.1.6.1 TH 12 at TH 25 (East Leg)

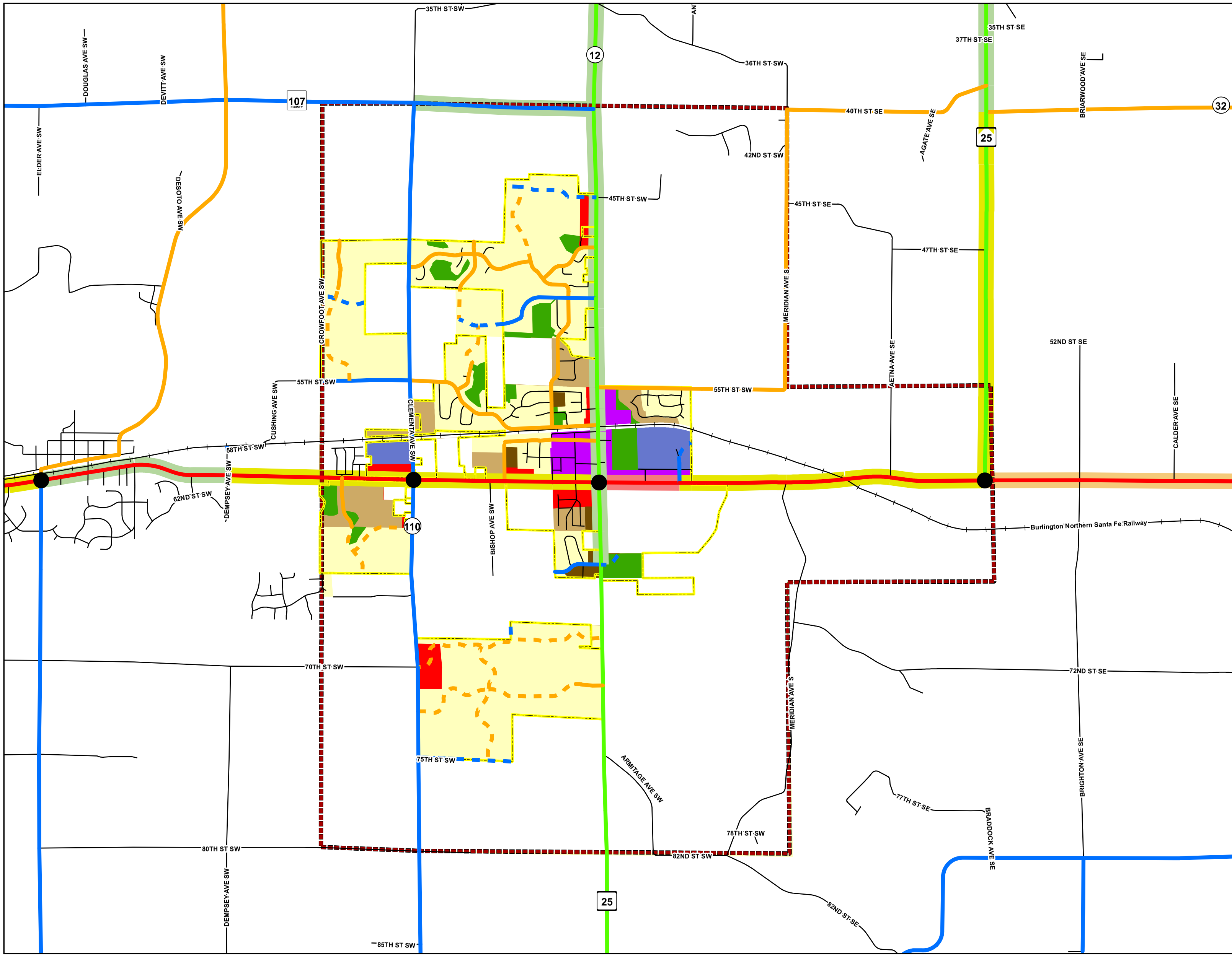
Due to the high delay and high volume of traffic moving through the intersection of TH 25 and TH 12, a signal or roundabout would be needed by 2030 under the No-Build Scenario to maintain acceptable operations. The improvement of the intersection with signalization would require protected only left turns and a channelized right turn for the westbound and southbound movements, in addition to the widening of TH 12 to a 4-lane facility. The roundabout would likely have to be a double-lane roundabout.

5.1.6.2 TH 12 at TH 25 (West Leg)/CSAH 12

The existing signal and intersection lane configuration would not operate effectively with the proposed volumes from the No-Build Scenario. TH 12 would need to be widened to a 4-lane facility to maintain acceptable operations. If the intersection were signalized, all approaches would need left turn lanes and channelized right turn lanes. If the signal was removed and a roundabout was constructed, a double-lane roundabout would likely be needed.

5.1.6.3 TH 12 at CR 110/Clementa Avenue

With the increase in traffic of all approaches under the No-Build Scenario, the intersection would need improvement to maintain acceptable operations. This intersection would likely warrant signalization within the next few years with the development assumptions provided in this AUAR. A 4-Lane highway through the intersection may be needed to handle peak hour traffic fluctuations. Under signalization, all left turns would be assumed to operate with protected only signal



CITY OF MONTROSE
AUAR
NO BUILD SCENARIO
2030 MITIGATED LANE NEEDS

FIGURE NO. 14
APRIL, 2007

Legend

Traffic Control Improvement
- 4 Way Stop or Roundabout
- Signal or Roundabout

2030 Roadway Needs
- 6-Lane Divided
- 4-Lane Expressway
- 4-Lane Divided
- 3-Lane Undivided

Future Functional Classification
- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

N E S W

0.5 0 0.5 Miles

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Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario No Build Lane Needs 11x17.mxd)
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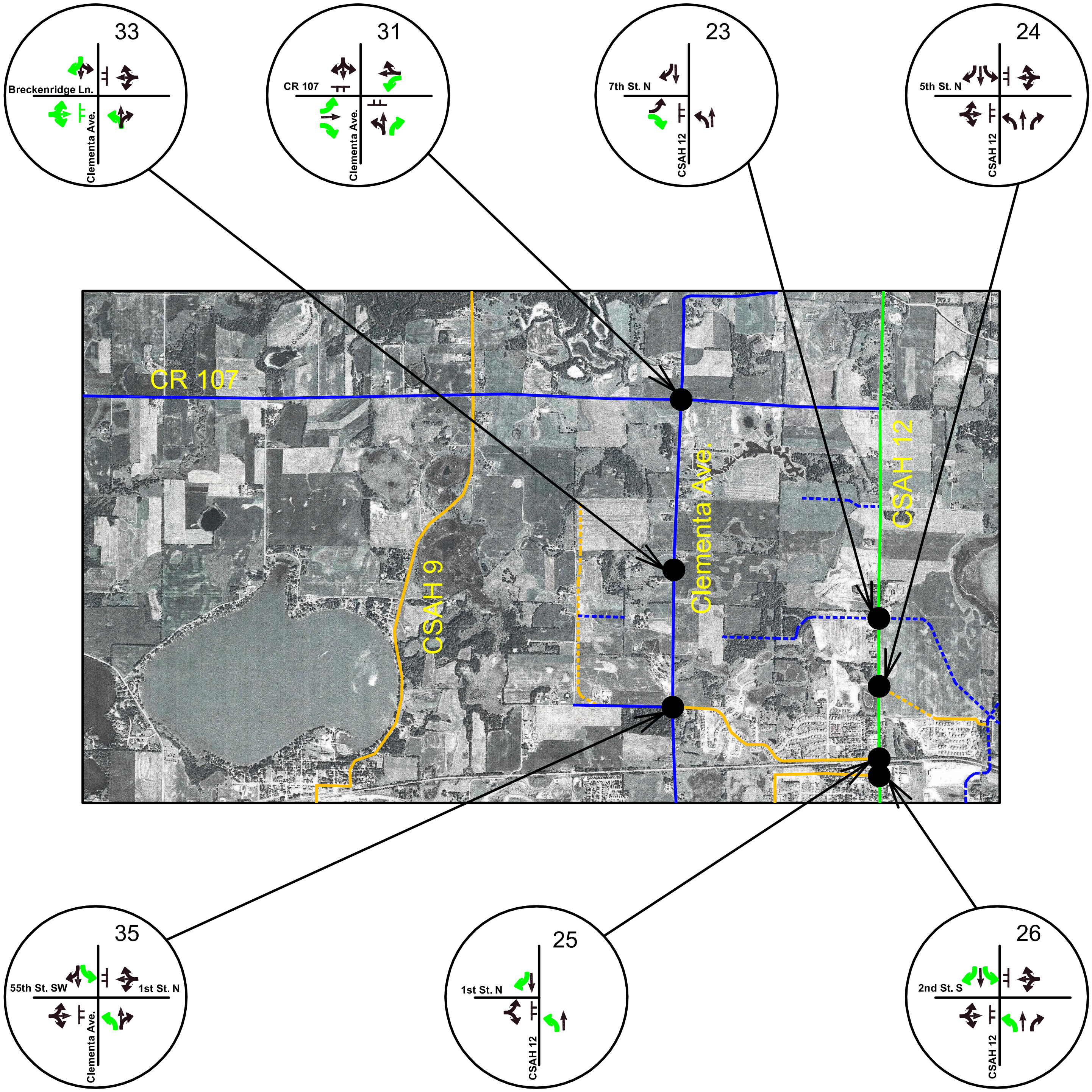

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry
  - Existing
  - 2030 No-Build Mitigated

Figure 15 (1 of 4)
No-Build Mitigated Traffic Control (Quadrant 1)

City of Montrose AUAR

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Consulting Engineers & Surveyors

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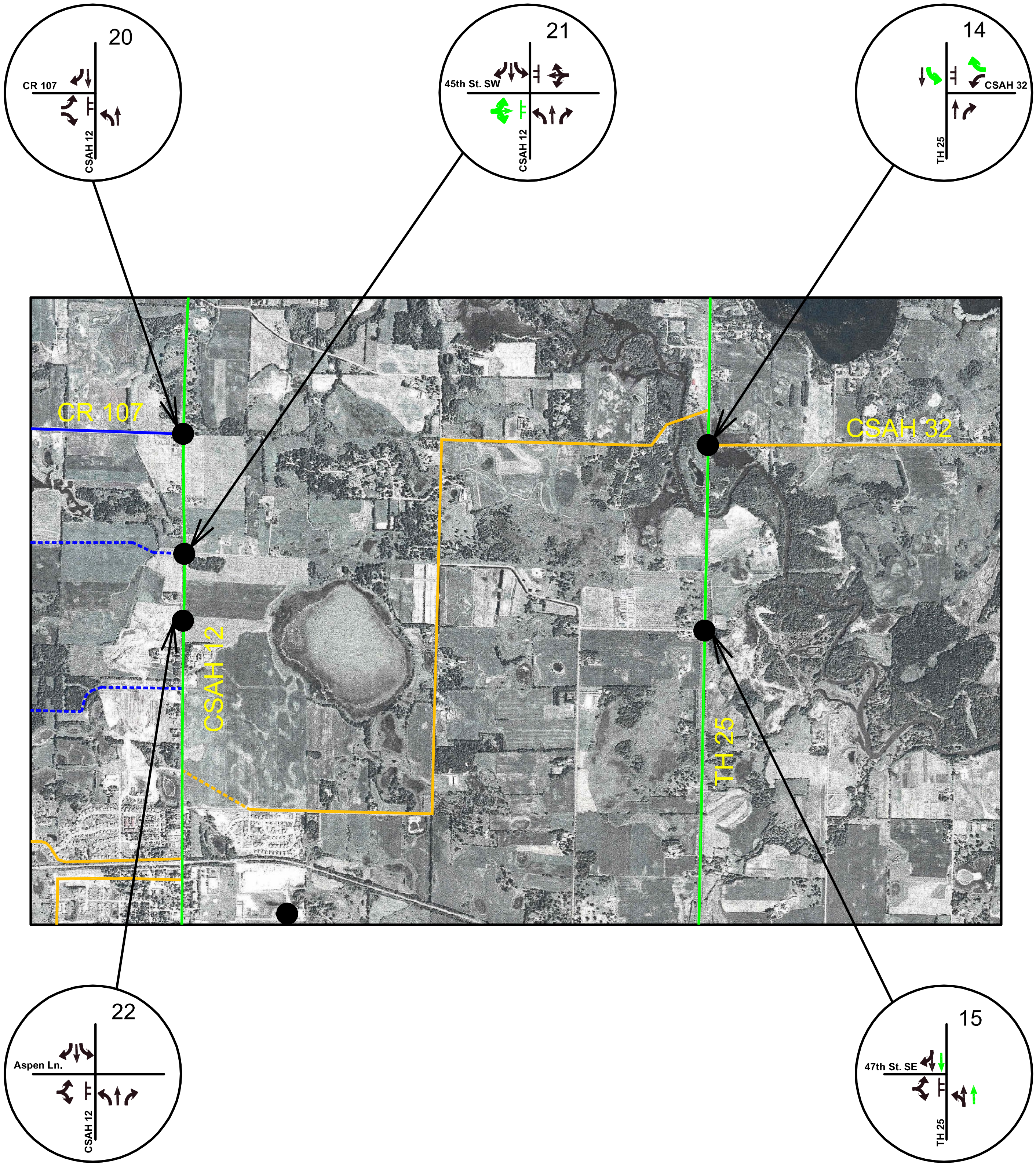

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry
  - Existing
  - 2030 No-Build Mitigated

N

No Scale

Figure 15 (2 of 4)
No-Build Mitigated Traffic Control (Quadrant 2)

City of Montrose AUAR

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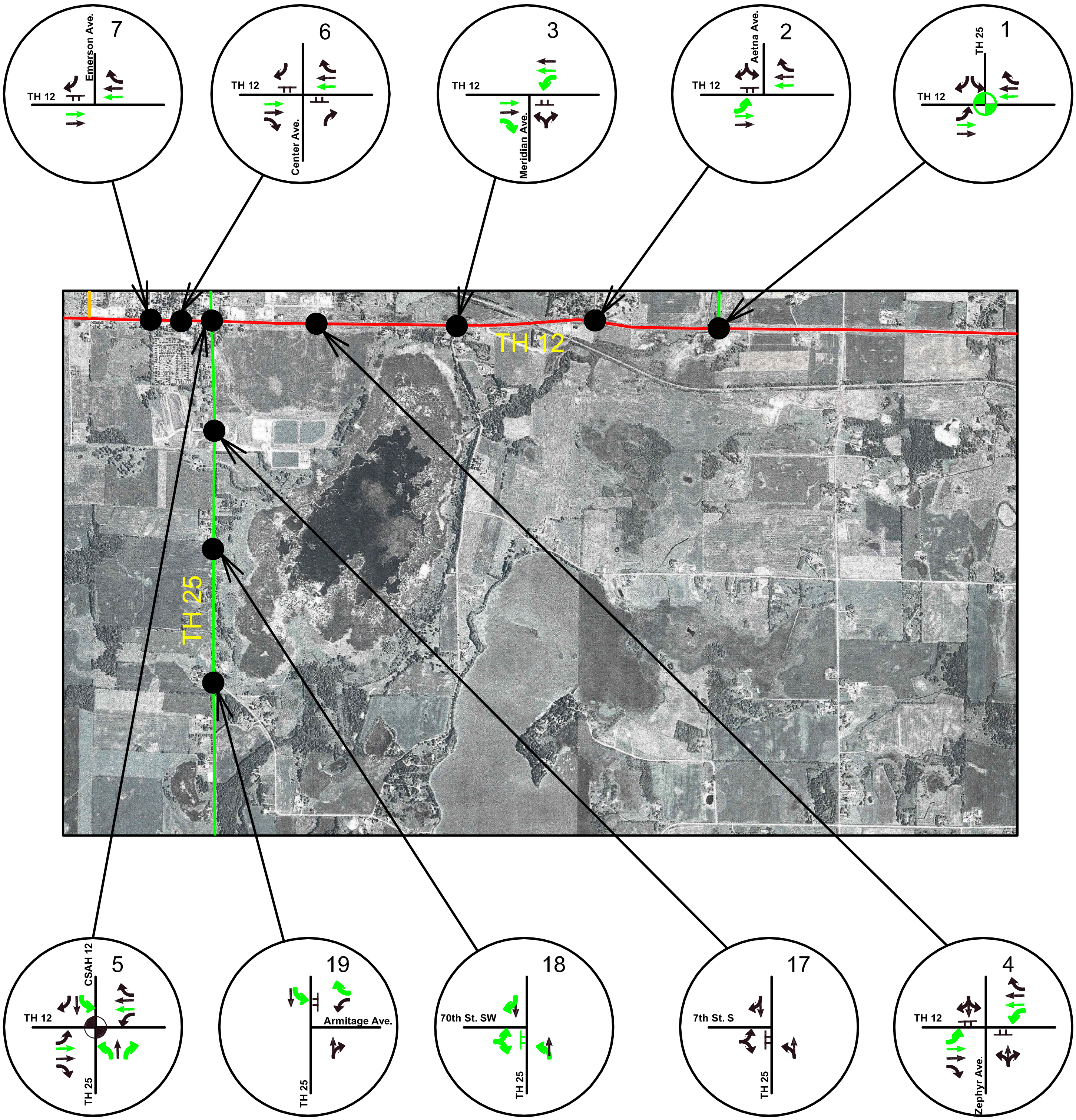

Legend

Signalized Intersection

Shared-Movement Traffic Lane

Stop Sign

Traffic Control and Geometry
Existing
2030 No-Build Mitigated

Through Traffic Lane

Turning Traffic Lane

N

No Scale

Figure 15 (3 of 4) No-Build Mitigated Traffic Control (Quadrant 3)

City of Montrose AUAR

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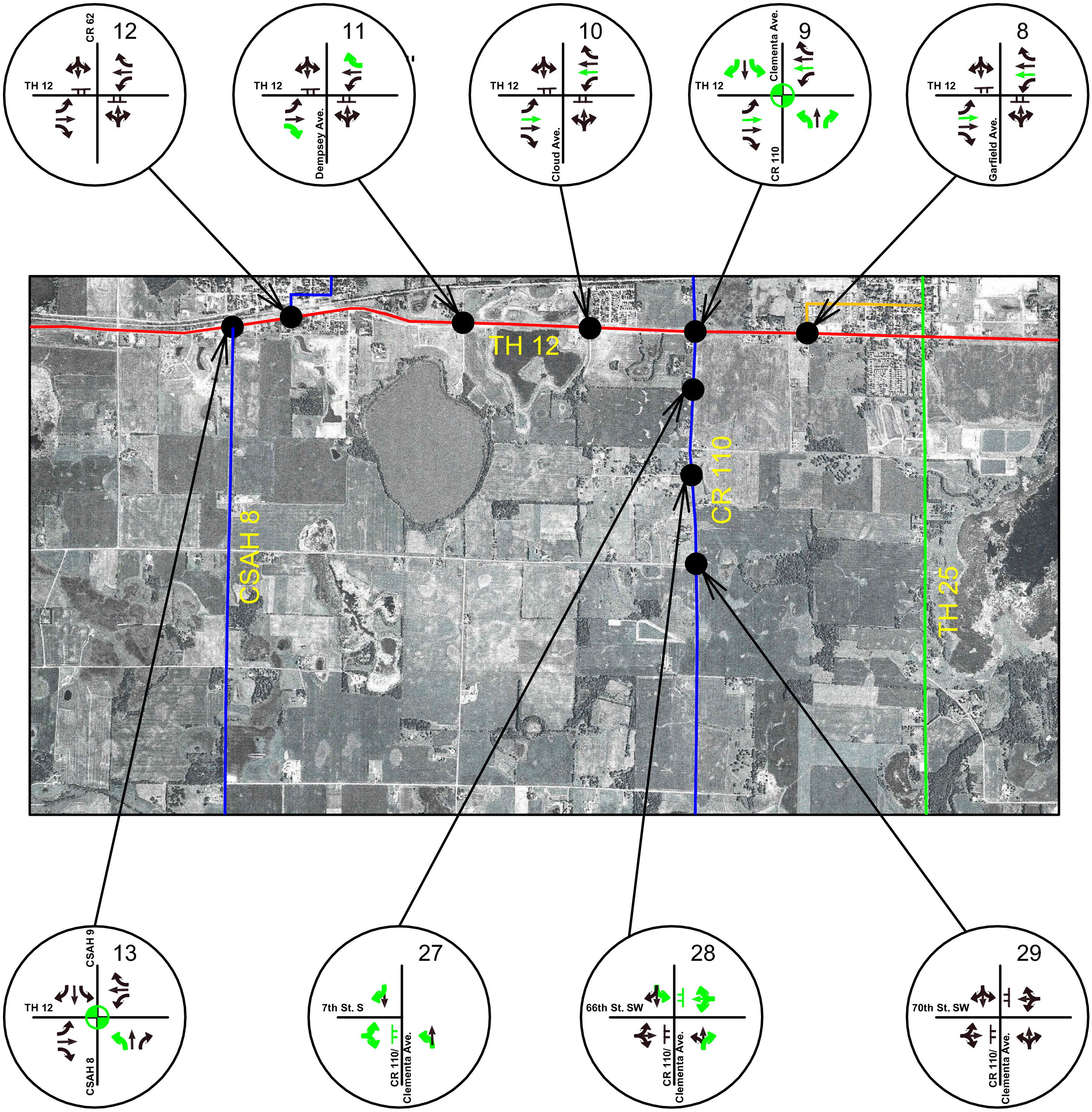

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry
  - Existing
  - 2030 No-Build Mitigated

N

No Scale

Figure 15 (4 of 4) No-Build Mitigated Traffic Control (Quadrant 4)

City of Montrose AUAR

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operations and there would need to be channelized right turns on the south and east legs of the intersection. A double-lane roundabout would also be an option.

5.1.6.4 TH 12 at CSAH 8/CSAH 9

This intersection would be impacted by the increase of traffic on TH 12 and would likely need both thru lane improvements on TH 12 and a signal or roundabout to maintain acceptable operations under the No-Build Scenario. This traffic increase through Waverly would be primarily from developments anticipated in Waverly and increases in traffic from points further west.

5.2 2030 Interim Build Analysis

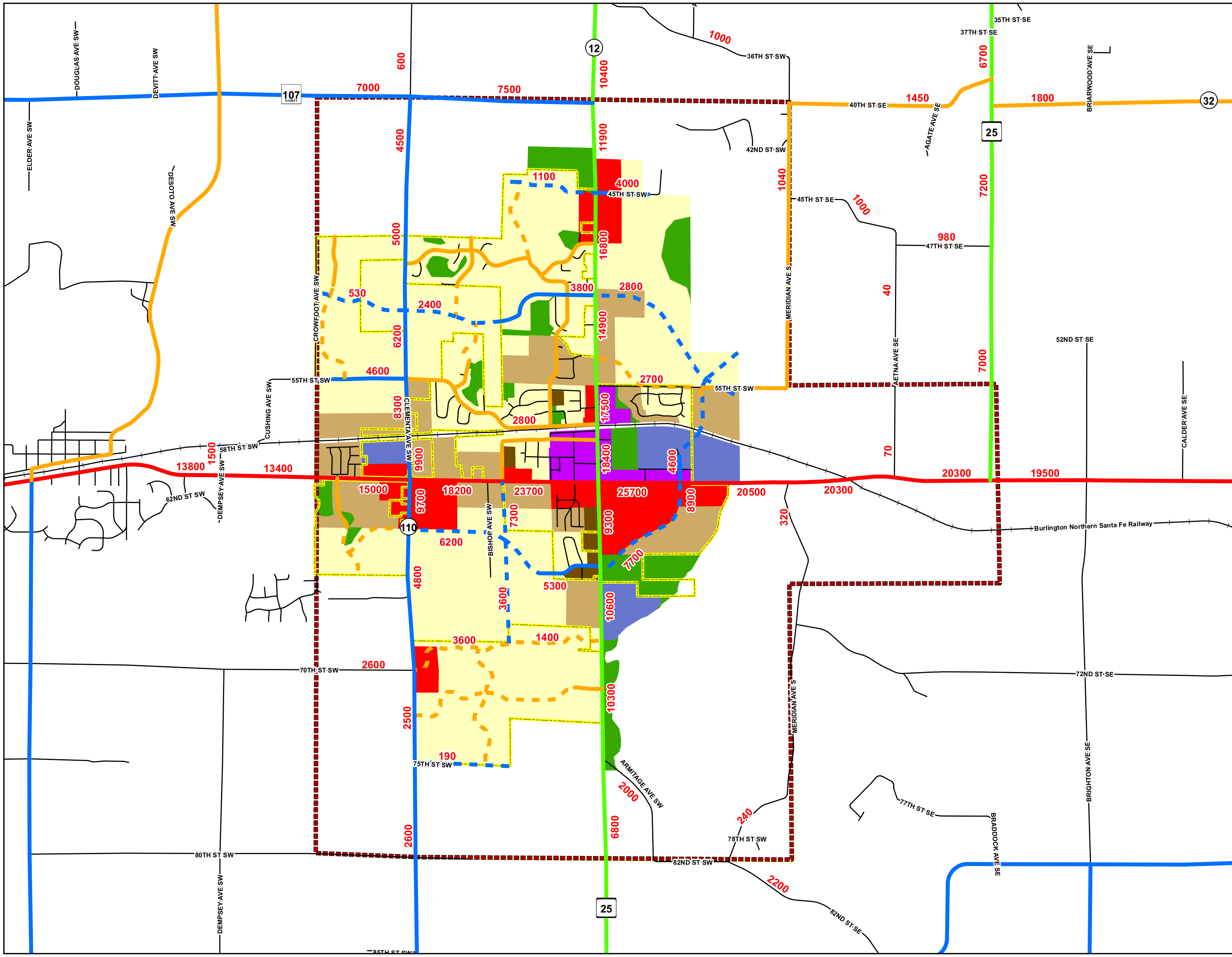
The Model was run with the socioeconomic data from the Interim Scenario. The additional roadways of Seventh Street North and Seventh Street South are anticipated between CR 110/Clementa Avenue and TH 25 (West Leg)/CSAH 12. These roadways would help to alleviate TH 12 by providing an alternative roadway for traffic heading east-west in the City. In addition, Zephyr Avenue would be an important roadway link for north-south traffic as an alternative to CSAH 12 or Clementa Avenue across the railroad tracks and TH 12. Zephyr Avenue and Seventh Street South with Seventh Street North and CR 110/Clementa Avenue provide a ring road for local traffic.

The projected ADT for the Interim Build scenario is shown in Figure 16. The peak hour volumes at each of the studied intersections are shown in Figure 17. The resulting Level of Service for the roadways is shown in Figure 18.

5.2.1 US TH 12

The traffic on TH 12 increases by approximately 2.5% per year under the Interim Build Scenario. This results in a maximum forecast ADT of 25,700 between TH 25/CSAH 12 and Zephyr Avenue. This ADT is similar to the ADT currently on TH 12 through Long Lake. This would be a 9,600 ADT increase over the No-Build Scenario and the difference would be due to the additional development within the City of Montrose. Backups over ⅓ of a mile would be prevalent on TH 12 with this level of traffic and no improvements.

East of TH 25, the ADT increase as compared to the No-Build would be around 5,800. The difference in ADT increases along TH 12 would be due to the increase in local trips where more of the new traffic from Montrose would now be destined within the City instead of points further east. As with the No-Build Scenario, without any widening of TH 12, the entire roadway would operate over capacity. This would result in significant safety and delay concerns if no improvements are made.



CITY OF MONTROSE
AUAR
INTERIM BUILD SCENARIO
2030 ADT VOLUMES

FIGURE NO. 16
APRIL, 2007

Legend

XXXX 2030 Projected ADT Volumes

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

Notes:
Traffic volumes rounded as follows:
<1000, Nearest 10
>1000, Nearest 100

Forecast numbers depicted have a confidence range of plus or minus 15%.

Forecasts follow procedures as documented in the Twin City Travel Demand Forecasts Prepared for Mn/DOT Metro: Model and Parameters for Adjustments to Model Inputs (Revised January 5, 2006).

N W E S

0.5 0 0.5 Miles

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Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario Interim Build Volumes 11x17.mxd)
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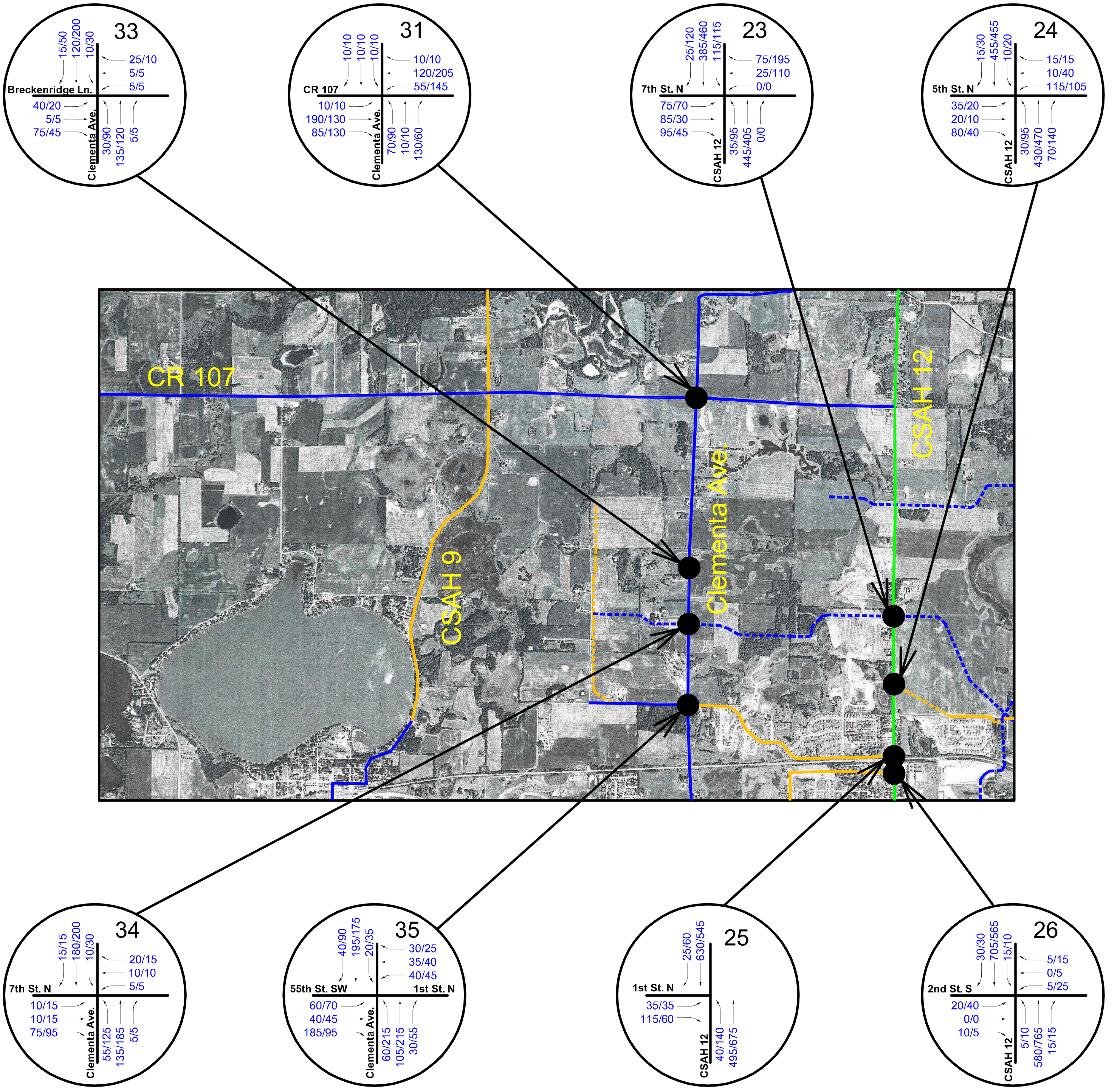

Figure 17 (1 of 4)
Interim Build Peak Hour Volumes (Quadrant 1)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

2030 AM Peak
2030 PM Peak
xx/yy

N

No Scale

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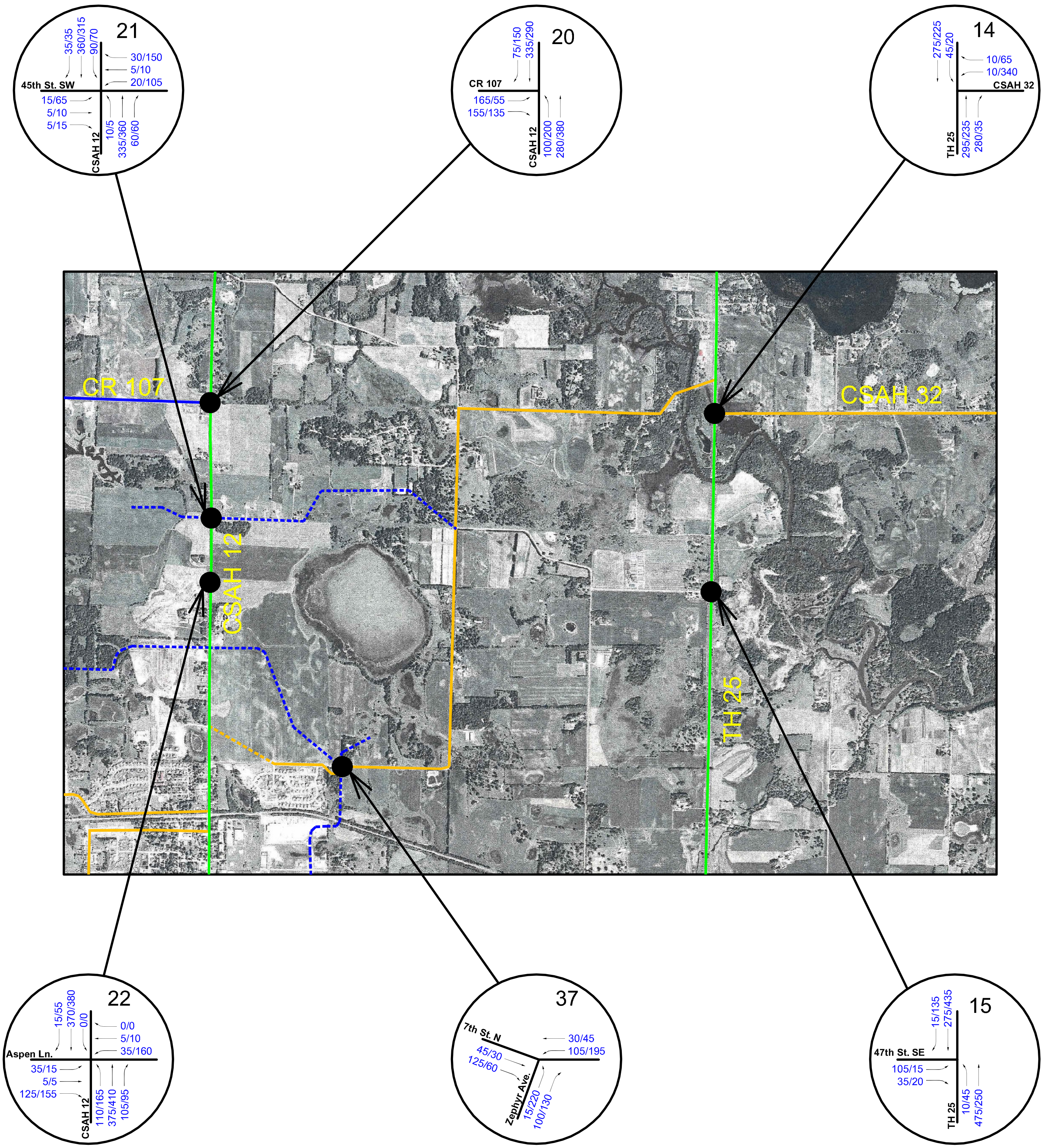

Figure 17 (2 of 4) Interim Build Peak Hour Volumes (Quadrant 2)

City of Montrose AUAR

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Legend

● **Peak Hour Turning Movement**

xx/yy — **2030 AM Peak** / **2030 PM Peak**

N

No Scale

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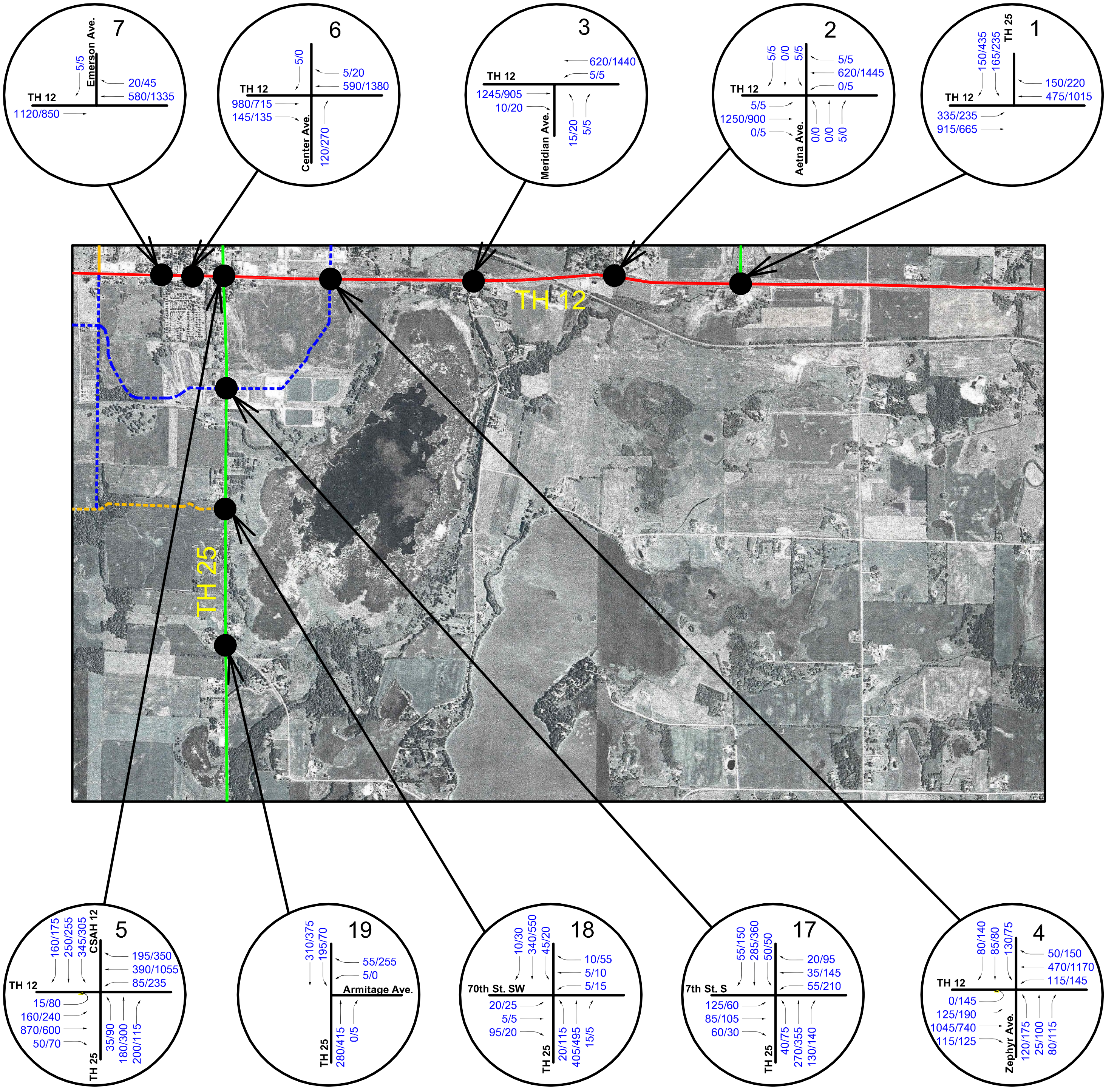

Legend

● Peak Hour Turning Movement

xx/yy
2030 AM Peak
2030 PM Peak

N

No Scale

Figure 17 (3 of 4)
Interim Build Peak Hour Volumes (Quadrant 3)

City of Montrose AUAR

BOLTON & MENK, INC.
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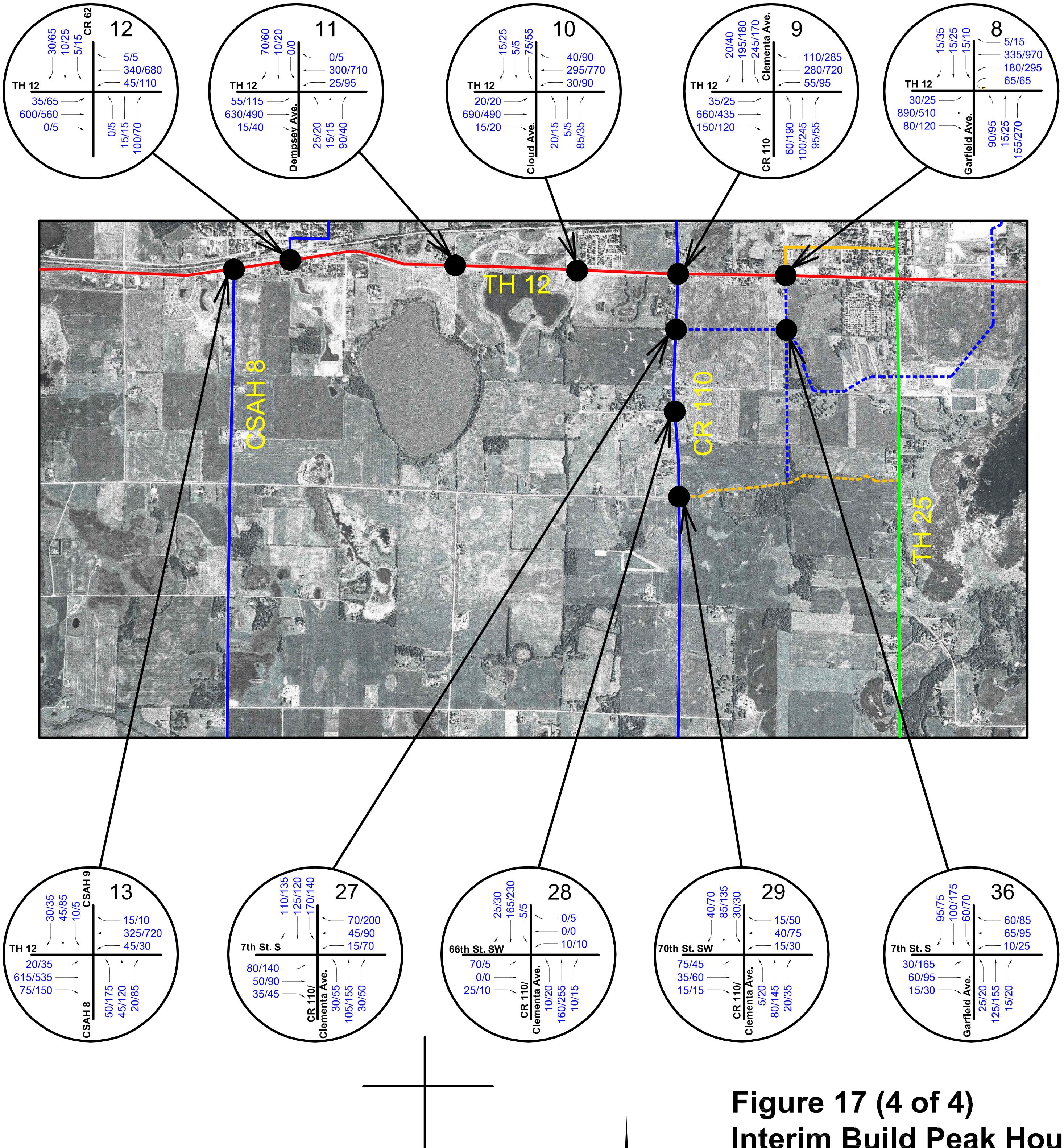

Legend

● **Peak Hour Turning Movement**

xx/yy — **2030 AM Peak** / **2030 PM Peak**

N

No Scale

Figure 17 (4 of 4) Interim Build Peak Hour Volumes (Quadrant 4)

City of Montrose AUAR

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Consulting Engineers & Surveyors

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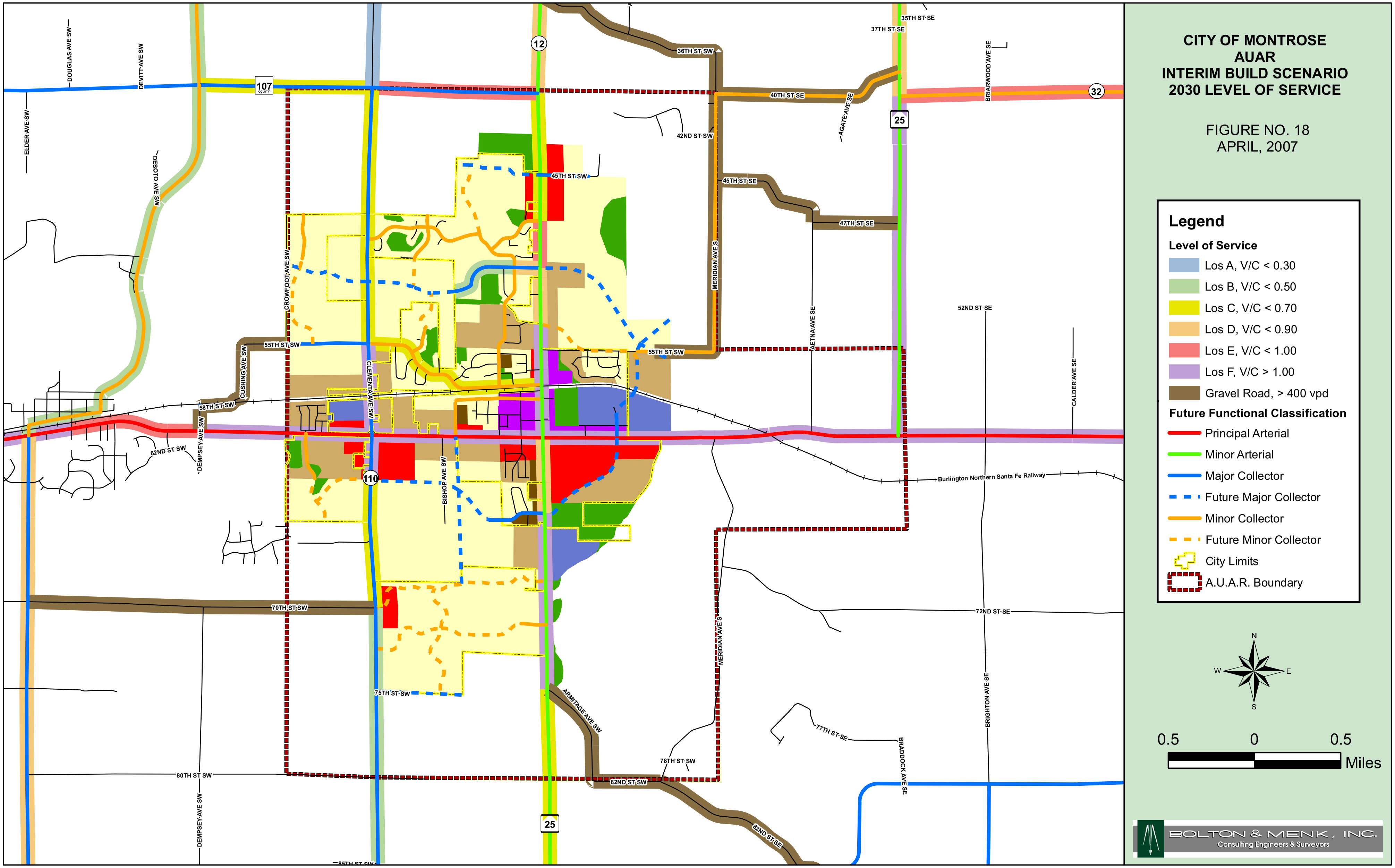

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario Interim Build LOS 11x17.mxd)
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The intersections along TH 12 would continue to experience poor operations with no improvements under the Interim Build Scenario. All streets that intersect with TH 12 would experience LOS F for the left turn movements. Some of the intersections with TH 12 would have very low volumes of traffic or would have alternate routes to access the roadway network, so are not a large concern. Other intersections would need major improvements to handle the anticipated Interim Build Scenario traffic and maintain acceptable operations.

5.2.2 MN TH 25 (East Leg)

Under the Interim Build Scenario, TH 25 north of TH 12 experiences traffic growth of 2% per year. This results in a forecasted ADT of 7,200 north of TH 12. This traffic growth would be for both traffic originating from the City of Buffalo and traffic originating within the City of Montrose that would be using both TH 12 and CSAH 32 as roadways to access the Twin Cities Area.

With the increase in volume, the roadway would operate at LOS F. As consistent with the No-Build Scenario, if TH 55 were improved with additional capacity and improved access than what is currently planned, the volumes on TH 25 would likely decrease. This decrease may result in operations to better than LOS F.

5.2.3 MN TH 25 (West Leg)/CSAH 12

Under the Interim Build Scenario, traffic north and south of TH 12 on this corridor would approximately be double of what was calculated under the No-Build Scenario. North of TH 12, the ADT is forecasted to be 18,400, while the ADT south of TH 12 is forecasted to be 10,600. With the increased traffic of the Interim Scenario, operations on this corridor would become severely impacted with no improvements. LOS E and F would be prevalent from Armitage Avenue, through TH 12, north to Aspen Lane. The current design of this corridor would be insufficient to handle the forecasted Interim Build Scenario traffic and maintain acceptable operations.

The intersections at Seventh Street South and Seventh Street North would experience unacceptable delay for the movements onto TH 25/CSAH 12.

5.2.4 CR 110/Clementa Avenue

The projected ADT north of TH 12 is 9,900, while the ADT south of TH 12 is 9,700 under the Interim Build Scenario. This results in a tripling of the ADT that was forecasted in the No-Build Scenario. The corridor between Seventh Street South and First Street North/55th Street SW would operate at LOS F with the current roadway section. This large increase in traffic ensures that the corridor would no longer operate effectively.

The intersections at Seventh Street South and First Street North would experience unacceptable delay for the movements onto CR 110/Clementa Avenue in the Interim Build Scenario.

5.2.5 Additional Roadways

As shown in the No-Build Scenario, the intersection of CSAH 12 with TH 12 would be extremely congested with the 2030 traffic forecasted under the Interim Build Scenario. With no improvements, traffic would now use more gravel roads between CSAH 12 and TH 25 as alternative routes. These would include 36th Street, 40th Street, 45th Street, 47th Street, 55th Street, and Meridian Avenue. Additionally, Armitage Avenue and 82nd Street would provide an alternative route to CSAH 30 from TH 25. All of these roadways experience volumes over 400 vehicles per day (vpd) and may need improvement.

The ADT on CR 107 is forecasted at 7,500. This increase in traffic from the Interim Build Scenario results in poor operations between Clementa Avenue and CSAH 12.

5.2.6 Needed Improvements

Due to the increase in traffic from the Interim Build Scenario, TH 12, TH 25, and CSAH 12 would need improvement to maintain acceptable operations. TH 12 would need to be widened to a four-lane expressway east of TH 25 (East Leg) and a 4-lane divided highway from TH 25 (East Leg) to Dempsey Avenue. Additionally, dual left turn lanes or additional thru lanes would be needed at each of the intersections between TH 25/CSAH 12 and Meridian Avenue to maintain acceptable operations.

TH 25 would need to be widened to a 4-lane divided highway from TH 12 to CSAH 32, a 3-lane undivided highway north of CSAH 32, and to a 3-lane undivided highway between Armitage Avenue and TH 12 to maintain acceptable operations under the Interim Build Scenario. Turn lanes would also be needed at all major intersections.

CSAH 12 would need to be widened to a 4-lane divided highway north of TH 12 to 5th Street North to maintain acceptable operations. The existing 3-lane undivided highway section north of 5th Street would be adequate to handle the projected traffic. CR 110 south of TH 12 and Clementa Avenue north of TH 12 would need to be widened to include left turn lanes at each intersection between Seventh Street South and First Street North to maintain acceptable operations.

The only other roadway that would need capacity improvements is CR 107, which should be widened to include left turn lanes at Clementa Avenue.

Roadway segment improvements are shown in Figure 19 while intersection improvements are shown in Figure 20.

5.2.6.1 TH 12 at TH 25 (East Leg)

Due to the high delay and high volume of traffic moving through the intersection of TH 25 and TH 12, a signal or roundabout would be needed by 2030 under the Interim Build Scenario to maintain acceptable operations. The improvement of the intersection with signalization would require protected only left turns and a channelized right turn for the westbound and southbound movements, in addition to the widening of TH 12 to a 4-lane facility. The roundabout would likely have to be a double-lane roundabout.

5.2.6.2 TH 12 at Zephyr Avenue & Arizona Avenue

This Zephyr Avenue intersection would likely warrant signalization with the development assumptions for the Interim Build Scenario. This roadway connects the areas north and south of TH 12 and connects the north side of Montrose to the commercial/retail area south of TH 12. Turn lane improvements would be needed to maintain acceptable operations. This would include dual left turn lanes for the eastbound leg. Additionally, there would be a channelized right turn on the south leg of the intersection. Under signalization all left turns are assumed to operate with protected only signal operations. A double-lane roundabout may also be an alternative.

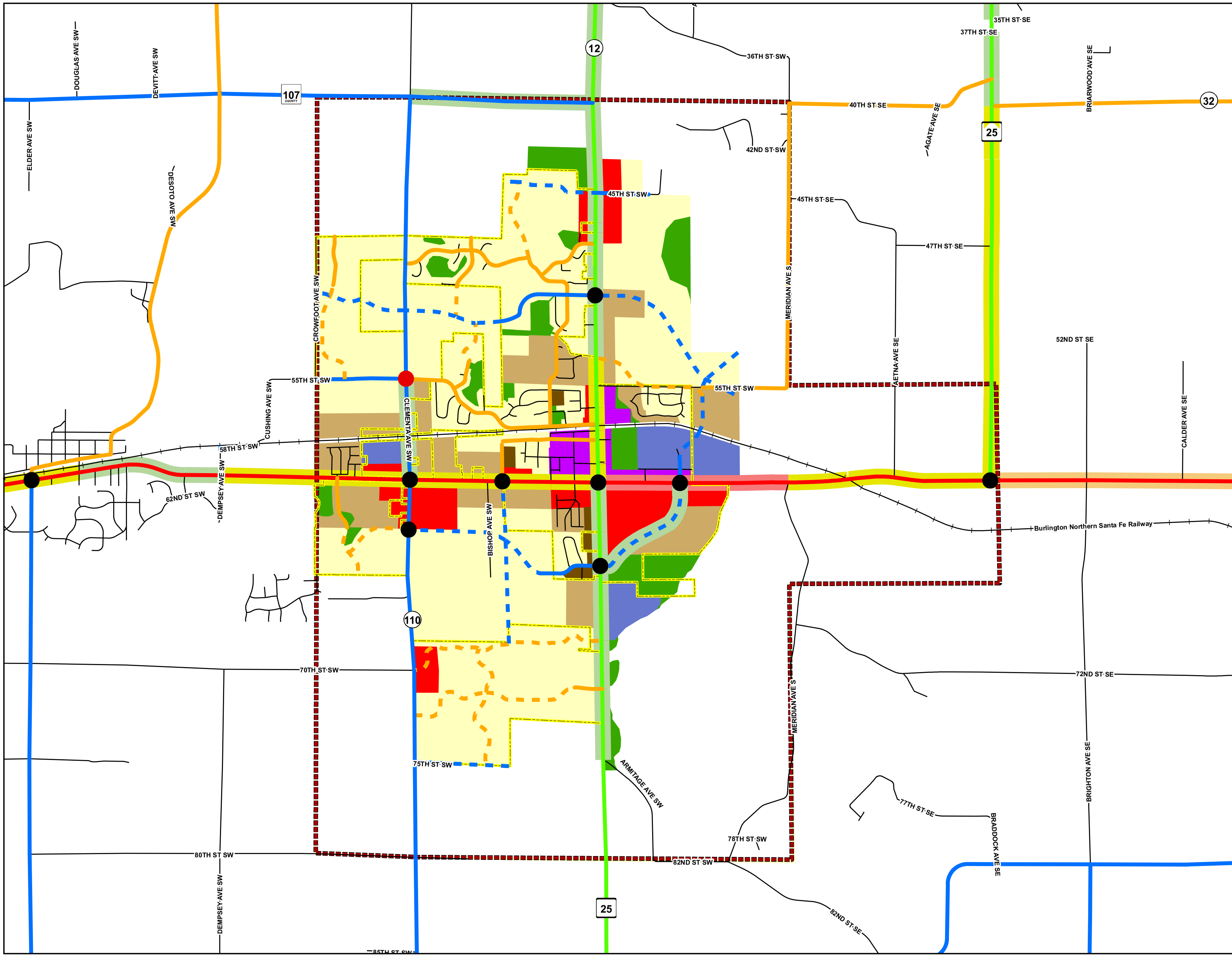
With the expansion of TH 12 to a divided highway facility, the intersection of Arizona Avenue would be a right-in/right-out access to ensure acceptable operations along TH 12 under the Interim Build Scenario. Traffic would be able to distribute to the alternate intersections of Zephyr Ave. or Seventh Street South and TH 25 to access TH 25/CSAH 12 and enable all movements.

5.2.6.3 TH 12 at TH 25 (West Leg)/CSAH 12

The existing signal and intersection lane configuration would not operate effectively with the proposed Interim Build Scenario volumes. TH 12 and TH 25/CSAH 12 would need to be widened to a 4-lane divided facility through the intersection to maintain acceptable operations. If the intersection were signalized, the north, west, and east legs would need dual left turn lanes and the south leg would need a single left turn lane to provide acceptable capacity. Channelized right turn lanes would also needed on all legs of the intersection. If the signal was removed and a roundabout was constructed, a double-lane or triple-lane roundabout may be needed to maintain acceptable service levels under the Interim Build Scenario.

CITY OF MONTROSE
AUAR
INTERIM BUILD SCENARIO
2030 MITIGATED LANE NEEDS

FIGURE NO. 19
APRIL, 2007



Legend

Traffic Control Improvements
- 4 Way Stop or Roundabout
- Signal or Roundabout

2030 Roadway Needs
- 6-Lane Divided
- 4-Lane Expressway
- 4-Lane Divided
- 3-Lane Undivided

Future Functional Classification
- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

N W E S

0.5 0 0.5 Miles

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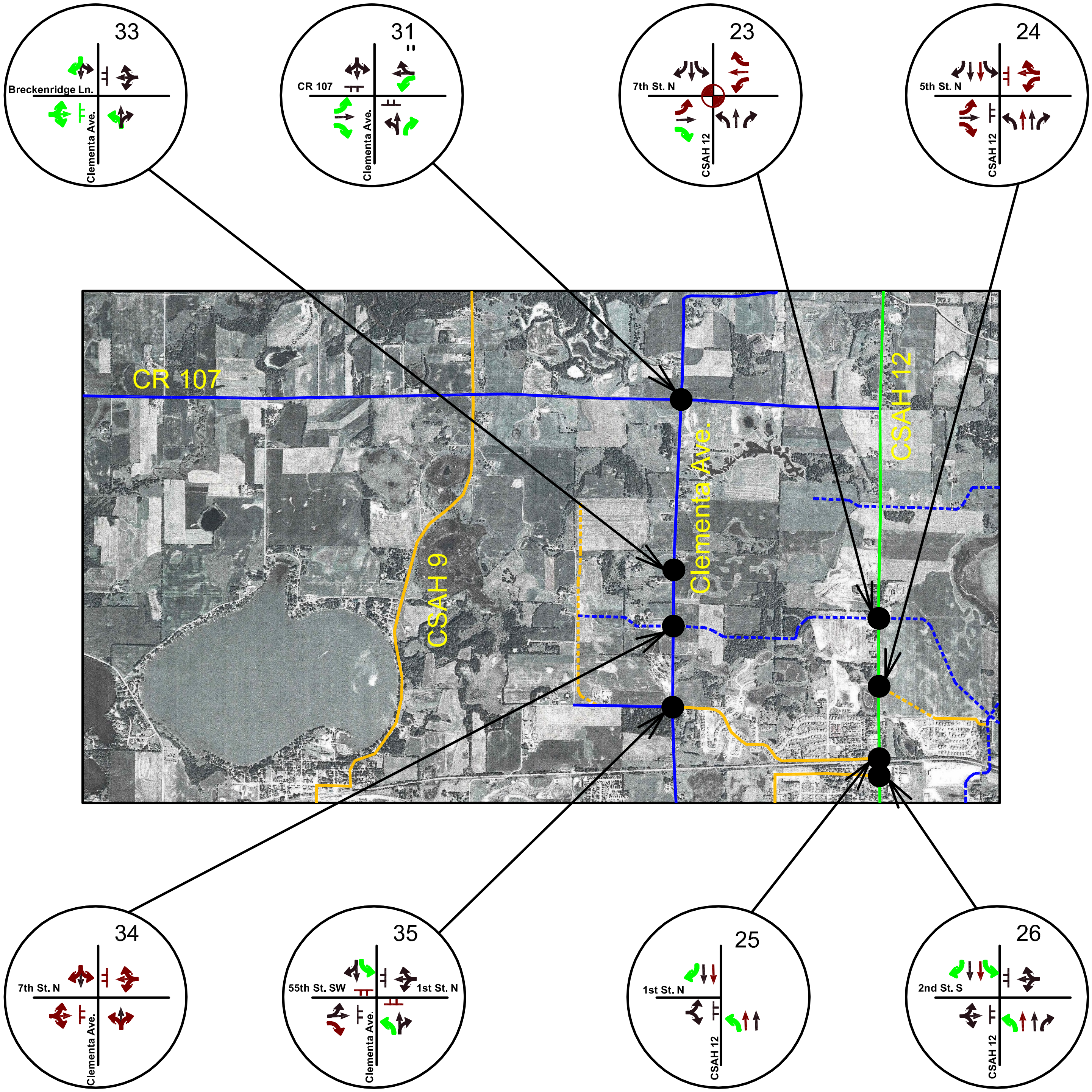

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry
  - Existing
  - 2030 No-Build Mitigated
  - 2030 Interim Build Mitigated

N

No Scale

Figure 20 (1 of 4)
Interim Build Mitigated Traffic Control (Quadrant 1)

City of Montrose AUAR

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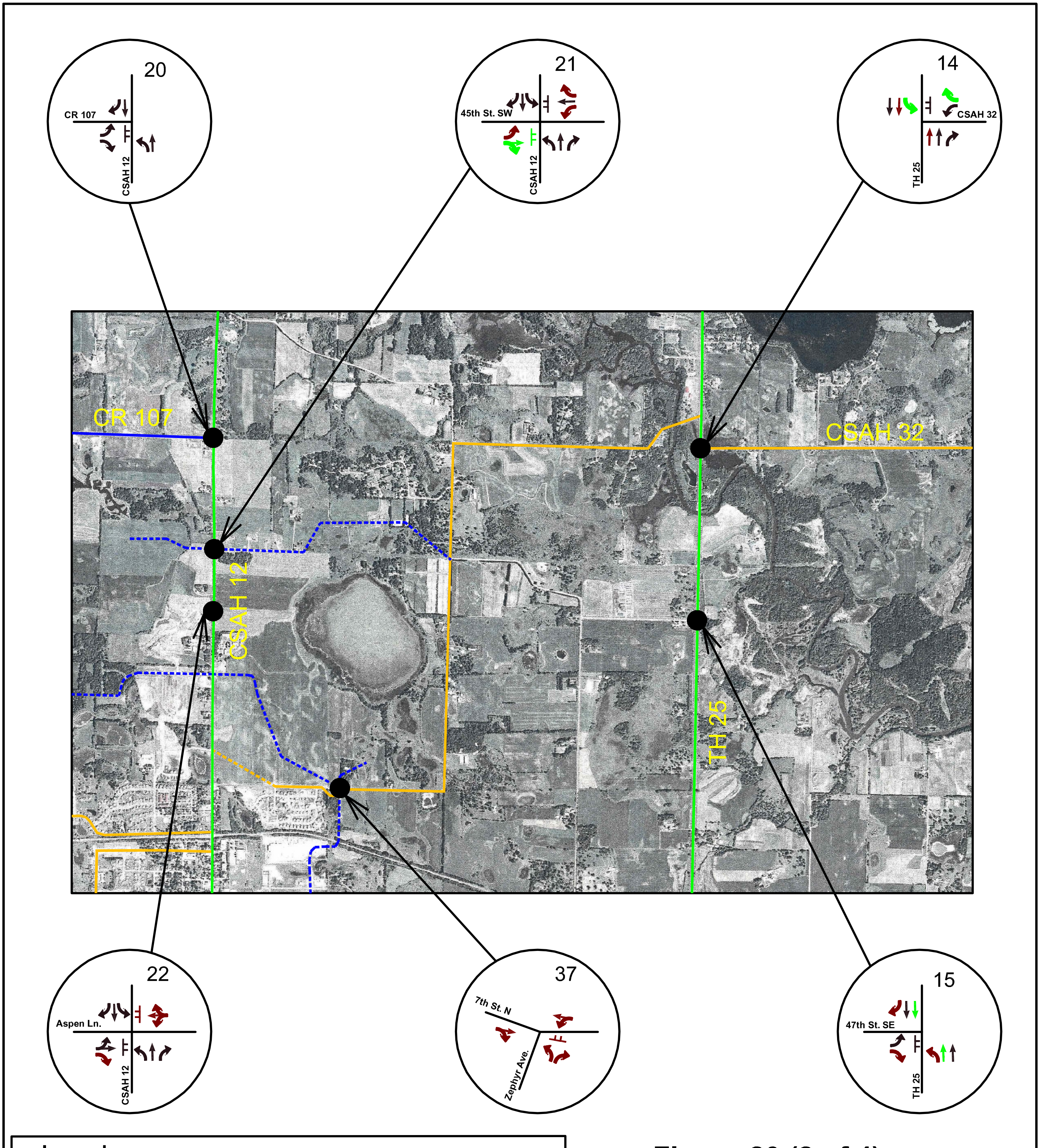

Figure 20 (2 of 4) Interim Build Mitigated Traffic Control (Quadrant 2)

City of Montrose AUAR

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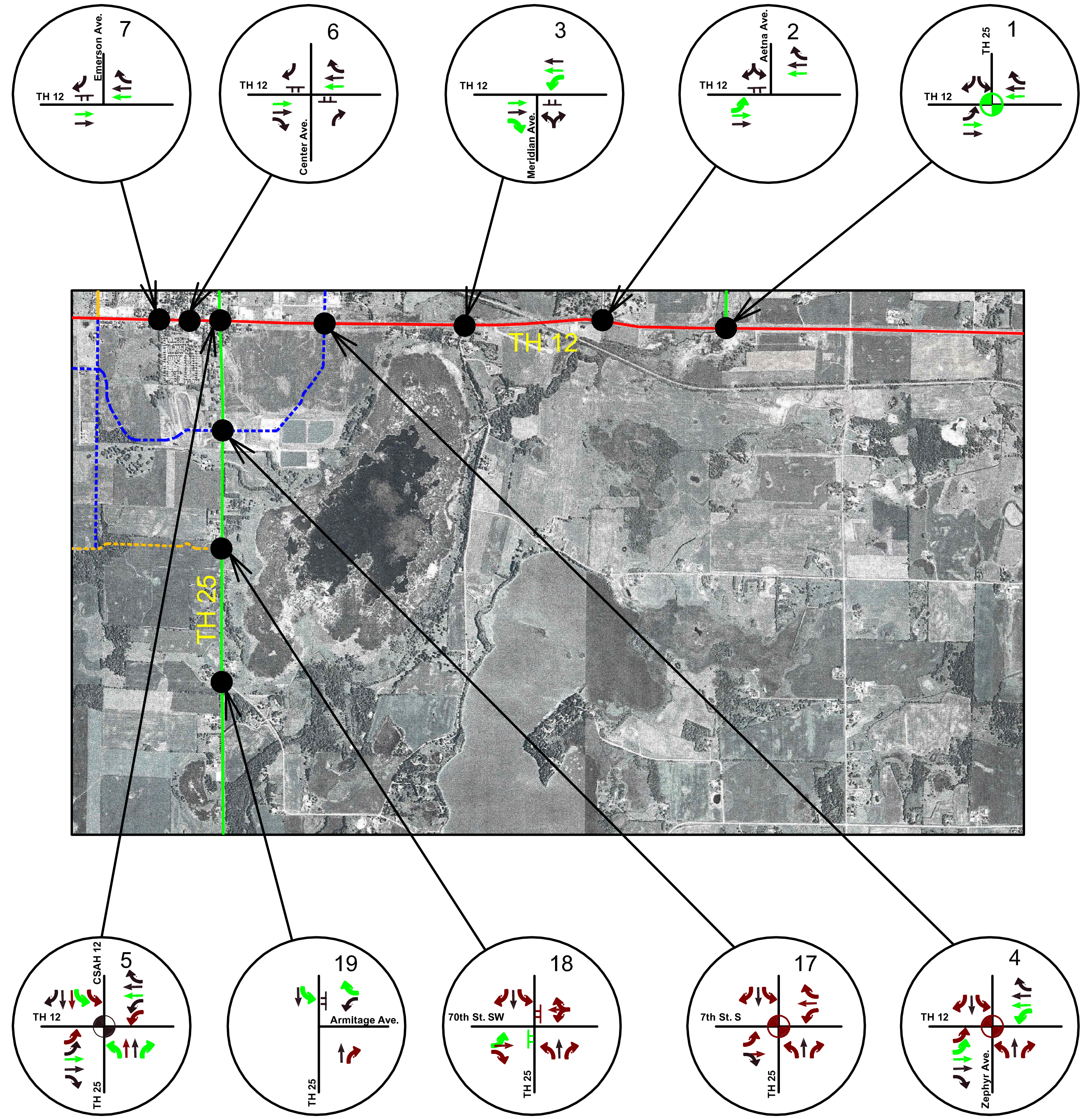

Legend

Signalized Intersection

Shared-Movement Traffic Lane

Stop Sign

Traffic Control and Geometry
Existing
2030 No-Build Mitigated
2030 Interim Build Mitigated

Through Traffic Lane

Turning Traffic Lane

N

No Scale

Figure 20 (3 of 4) Interim Build Mitigated Traffic Control (Quadrant 3)

City of Montrose AUAR

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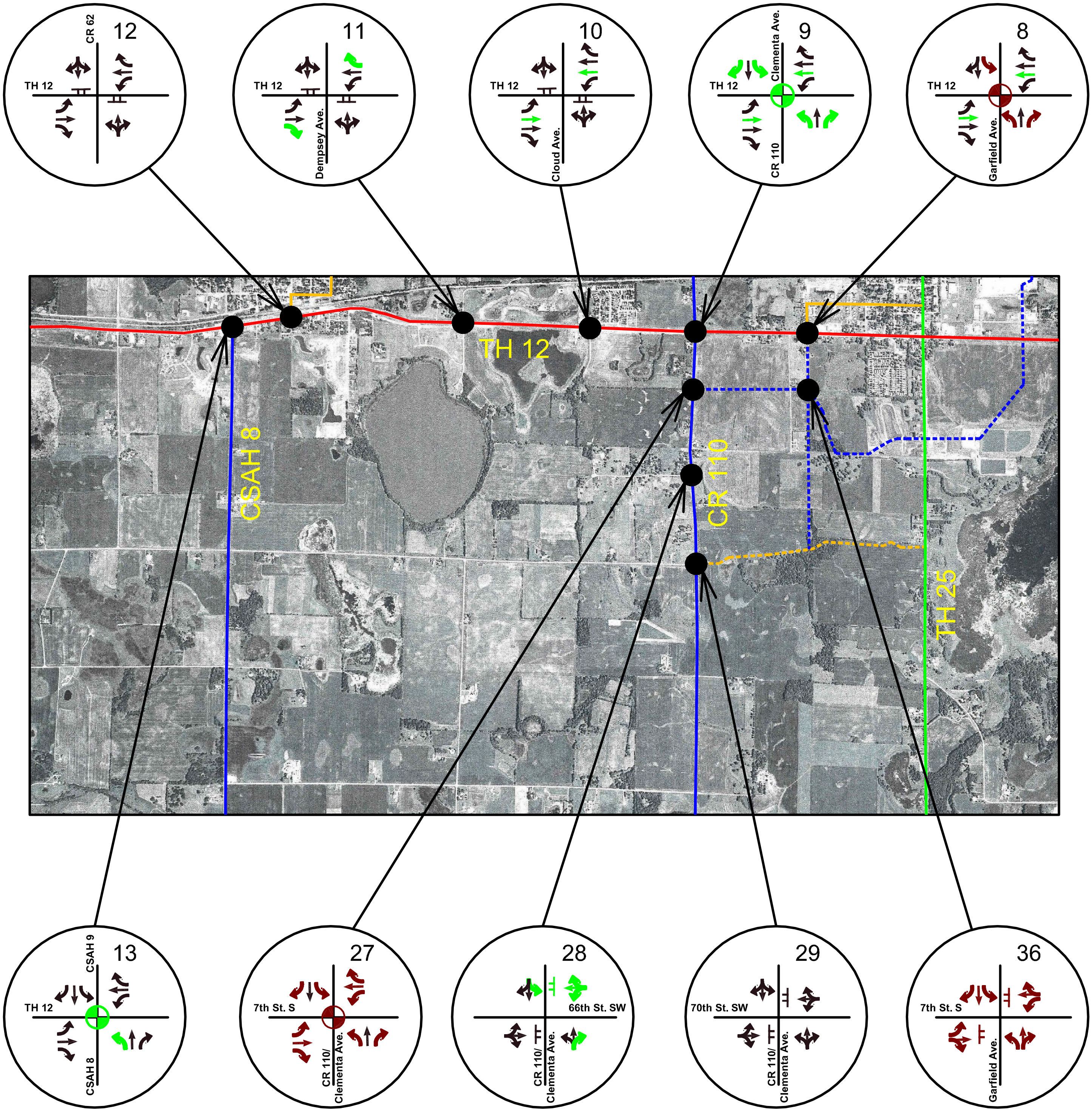

Legend

Signalized Intersection

Stop Sign

Through Traffic Lane

Turning Traffic Lane

Shared-Movement Traffic Lane

Traffic Control and Geometry
Existing
2030 No-Build Mitigated
2030 Interim Build Mitigated

N

No Scale

Figure 20 (4 of 4)
Interim Build Mitigated Traffic Control (Quadrant 4)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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5.2.6.4 TH 12 at Center Avenue, Emerson Avenue, & Garfield Avenue

The intersection at Garfield Avenue would provide an important city connection to the regional highway system under the Interim Build Scenario. It would connect the existing downtown north of TH 12 with the future commercial areas south of TH 12.

With the expansion of TH 12 to a divided highway facility, the intersections of Center and Emerson Avenue would be designed as right-in/right-out accesses to ensure effective traffic movement and acceptable service levels on TH 12. Traffic would distribute to the alternate intersections of Garfield Ave. or 1st/2nd/3rd Street South to TH 25/CSAH 12 to enable all movements.

5.2.6.5 TH 12 at CR 110/Clementa Avenue

This intersection would likely warrant signalization due to the increased traffic volumes under the Interim Build Scenario. A 4-Lane divided highway through the intersection would be needed to maintain acceptable operations under peak hour traffic. With signalization, left turn and right turn lanes would be needed for all approaches to ensure acceptable service levels. Additionally, channelized right turns on the south and east legs of the intersection would be needed. The left turns on TH 12 would operate with protected only signal operations. A double-lane roundabout would also an option under the Interim Build Scenario to maintain acceptable operations.

5.2.6.6 TH 12 at CSAH 8/CSAH 9

This intersection would be impacted by the increase of traffic on TH 12 and would likely need both thru lane improvements on TH 12 and a signal or roundabout to handle the anticipated 2030 Interim Build Scenario traffic. This traffic increase through Waverly would primarily be from developments anticipated in Waverly and increases in traffic from points further west.

5.2.6.7 TH 25 at Seventh Street South

Under the Interim Build Scenario, there would be a large retail/commercial area to the east of TH 25 on Seventh Street South. Due to the large volumes of traffic in and out of the area a change in traffic control would be needed to maintain acceptable service levels. Turn lanes would be required with the inclusion of a signal. A roundabout would also be an option to maintain acceptable operations.

5.2.6.8 CSAH 12 at First Street North & 1st/2nd/3rd Streets South

All of these intersections would be located within the area designated with a four-lane divided roadway under the Interim Build Scenario. Even though all of the intersections would not have enough volume to warrant any traffic control change, high delay for some movements would be likely. It would be recommended that all of the intersections except 2nd Street South be closed to left-out access if accident issues arise. With the consolidation of all left turns out to 2nd Street South, some change in traffic control may be needed under the Interim Build Scenario to maintain acceptable service levels and reduce the crash potential through the area.

5.2.6.9 CSAH 12 at Seventh Street North

Seventh Street North would serve as a primary route for traffic north of the railroad to distribute to Zephyr Avenue, TH 12, and the commercial area south of TH 12 under the Interim Build Scenario. The intersection of CSAH 12 at Seventh Street would need a roundabout design or turn lanes and signalization to handle the forecasted volumes and maintain acceptable operations.

5.2.6.10 CR 110 at Seventh Street South

Seventh Street South serves retail/commercial areas on both sides of CR 110 under the Interim Build Scenario. As such, the intersection would need a roundabout or turn lanes with a signal to handle the forecasted traffic and maintain acceptable service levels.

5.2.6.11 Clementa Avenue at First Street North

The intersection of Clementa Avenue at First Street North/55th Street SW serves primarily residential developments in the Interim Build Scenario. With the increased volume, the current traffic control would not function within acceptable service levels. A four-way stop controlled intersection operates within acceptable service levels and a roundabout would also work at this intersection. A detailed analysis should be conducted to ensure that any traffic control options would not interfere with the railroad.

5.3 2030 Full Build Analysis

The Model was run with the socioeconomic data from the Full Build Scenario. The additional roadway of Seventh Street South is anticipated between CR 110 and TH 25 (West Leg)/CSAH 12. Additionally, Seventh Street North is anticipated between Clementa Avenue and TH 25 (East Leg). As the area further grows at Full Build, 45th Street would become an important east-west route north of Seventh Street North while 75th Street would become an important east-west route south of Seventh Street South. All of these roadways would help to alleviate TH 12 by providing an alternative roadway for traffic heading east-west in the City.

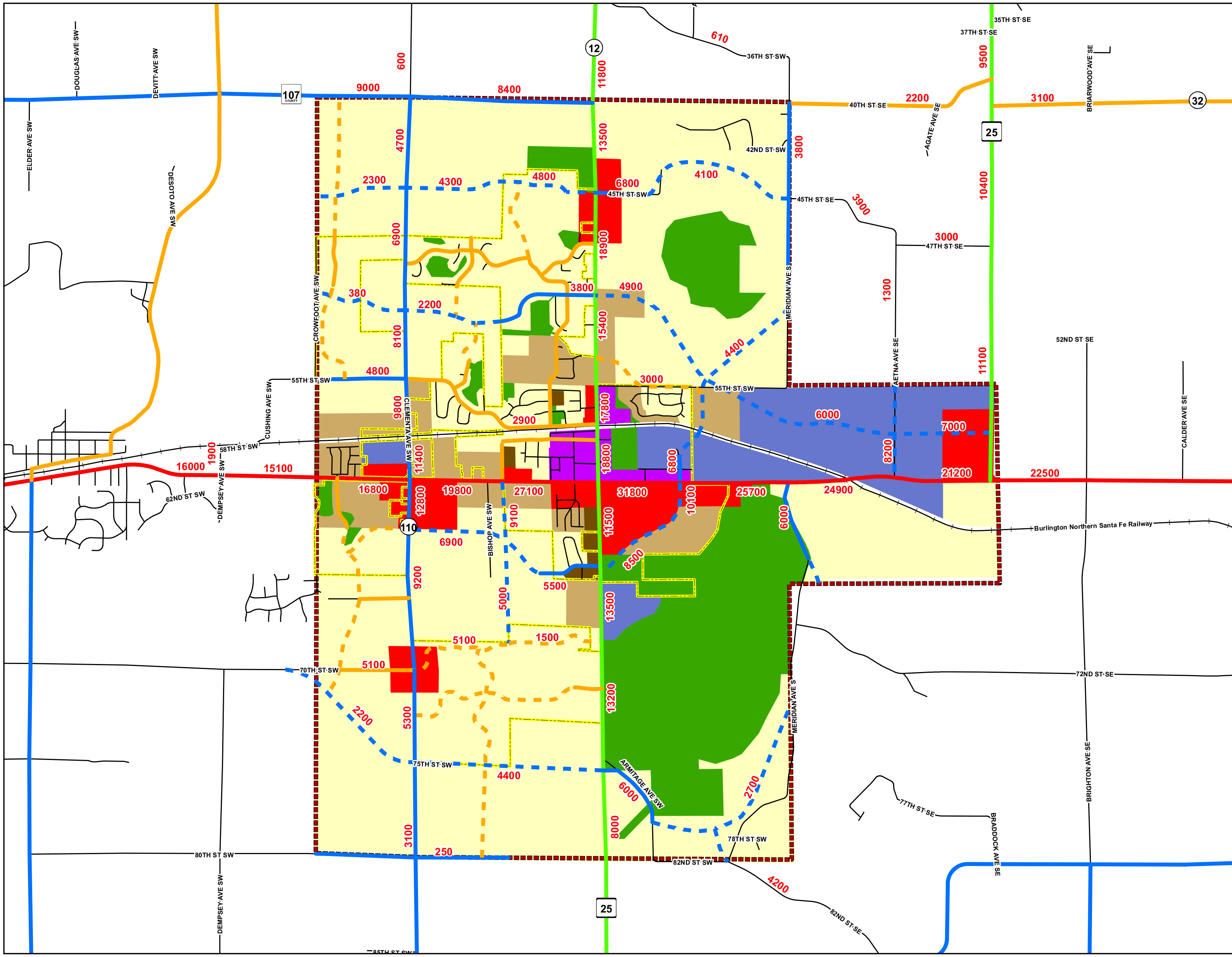
Meridian Avenue along with Armitage Avenue would now become a major route for north/south and east/west traffic on the southeast part of the City. Zephyr Avenue would continue to be an important roadway link for north-south traffic as an alternative to CSAH 12 and Clementa Avenue across the railroad tracks and TH 12, connecting the north and south parts of the City. Zephyr Avenue and Seventh Street South with Seventh Street North and CR 110/Clementa Avenue would provide a ring road for local traffic.

The projected ADT for the Full Build scenario is shown in Figure 21. The peak hour volumes at each of the studied intersections are shown in Figure 22. The resulting Level of Service for the roadways is shown in Figure 23.

5.3.1 US TH 12

The traffic on TH 12 increases by approximately 3.0% per year under the Full Build Scenario. This results in a maximum forecast ADT of 31,800 between TH 25/CSAH 12 and Zephyr Avenue. This ADT is similar to the ADT currently on TH 12 through Wayzata or TH 55 through Plymouth. This would be a 6,100 ADT increase over the Interim Build Scenario and the difference would be due to the additional development within the City of Montrose. Backups would continue to be over ⅓ of a mile on TH 12 with this level of traffic and no improvements.

East of TH 25, the ADT increase as compared to the Interim Build would be around 3,000. As mentioned in the Interim analysis, the difference in ADT increases along TH 12 would be due to the increase in local trips where more of the new traffic from Montrose would now be destined within the City instead of points further east. Additionally, the extension of Seventh Street North to TH 25would help to alleviate TH 12. Traffic would now use additional routes to go east due to the increased congestion on TH 12. These routes include CSAH 30 and CSAH 32. As with the Interim Scenario, without any widening of TH 12, the entire roadway would operate over capacity under the Full Build Scenario. This would result in significant safety and delay concerns if no improvements were made.



CITY OF MONTROSE AUAR FULL BUILD SCENARIO 2030 ADT VOLUMES

FIGURE NO. 21
APRIL, 2007

Legend

XXXX 2030 Projected ADT Volumes

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

Notes:
Traffic volumes rounded as follows:
<1000, Nearest 10
>1000, Nearest 100

Forecast numbers depicted have a confidence range of plus or minus 15%.

Forecasts follow procedures as documented in the Twin City Travel Demand Forecasts Prepared for Mn/DOT Metro: Model and Parameters for Adjustments to Model Inputs (Revised January 5, 2006).

N E S W

0.5 0 0.5 Miles

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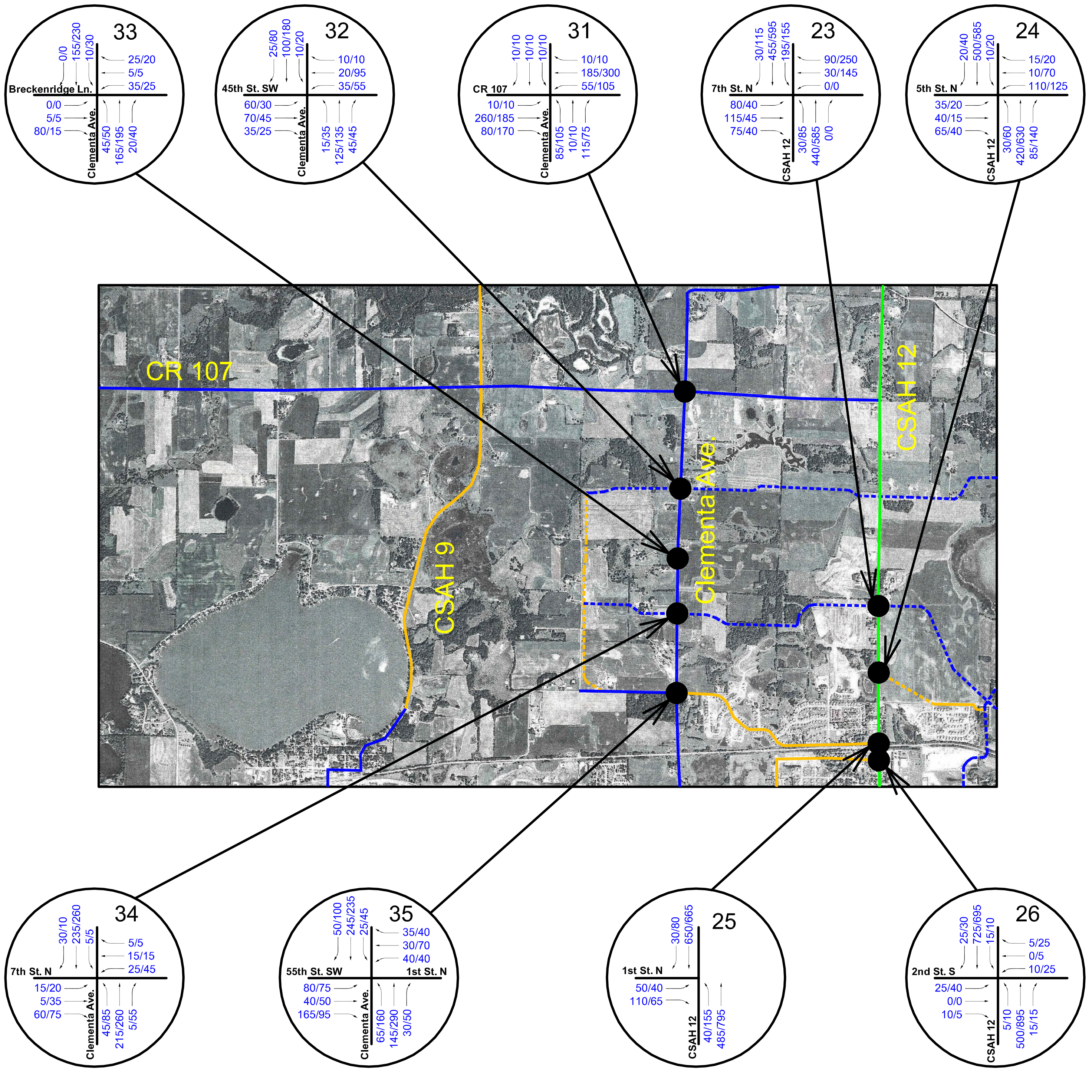

Legend

● Peak Hour Turning Movement

2030 AM Peak
2030 PM Peak
xx/yy

N

No Scale

Figure 22 (1 of 4) Full Build Peak Hour Volumes (Quadrant 1)

City of Montrose AUAR

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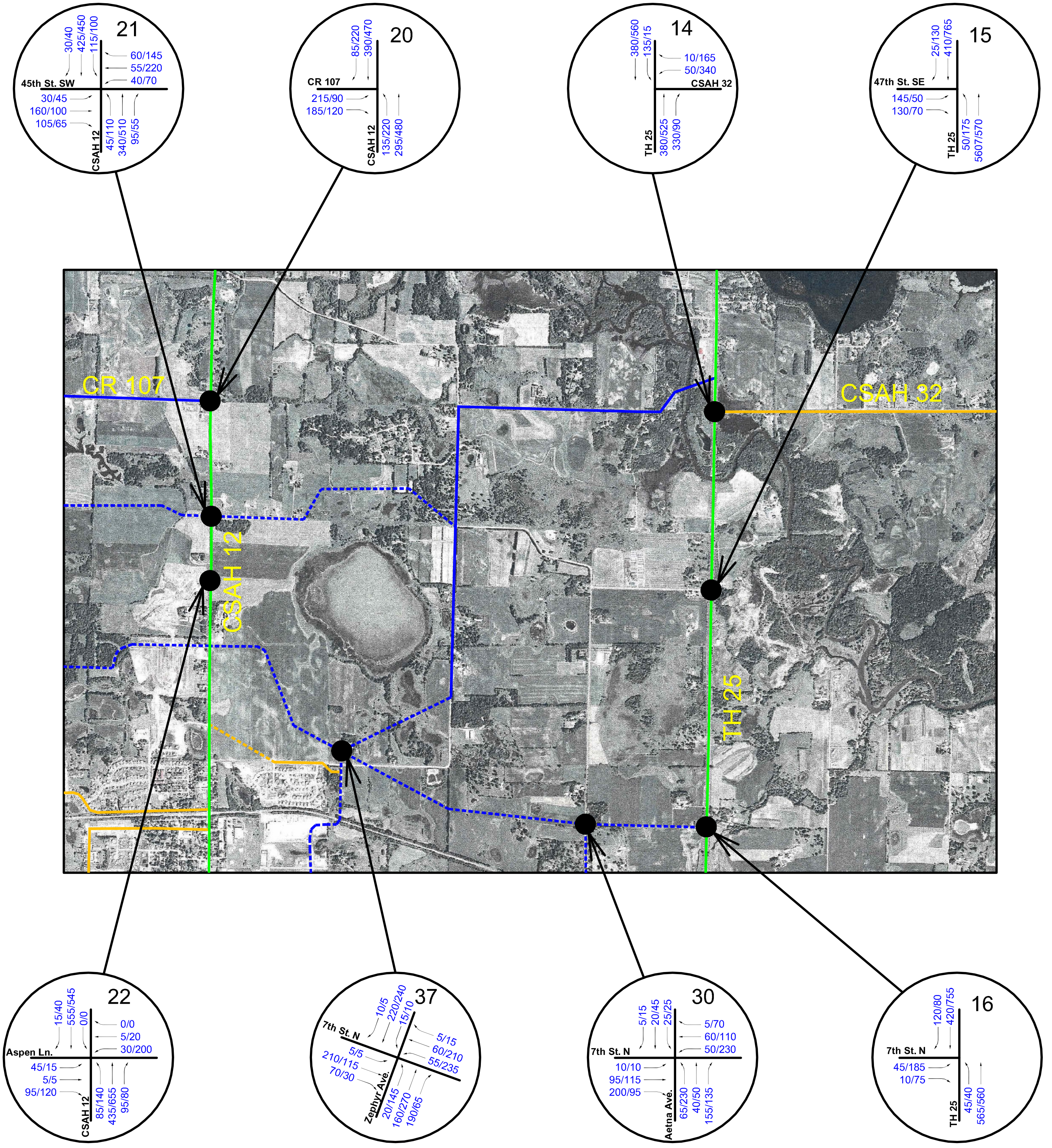

Legend

● Peak Hour Turning Movement

2030 AM Peak
2030 PM Peak
xx/yy

N

No Scale

Figure 22 (2 of 4) Full Build Peak Hour Volumes (Quadrant 2)

City of Montrose AUAR

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Consulting Engineers & Surveyors

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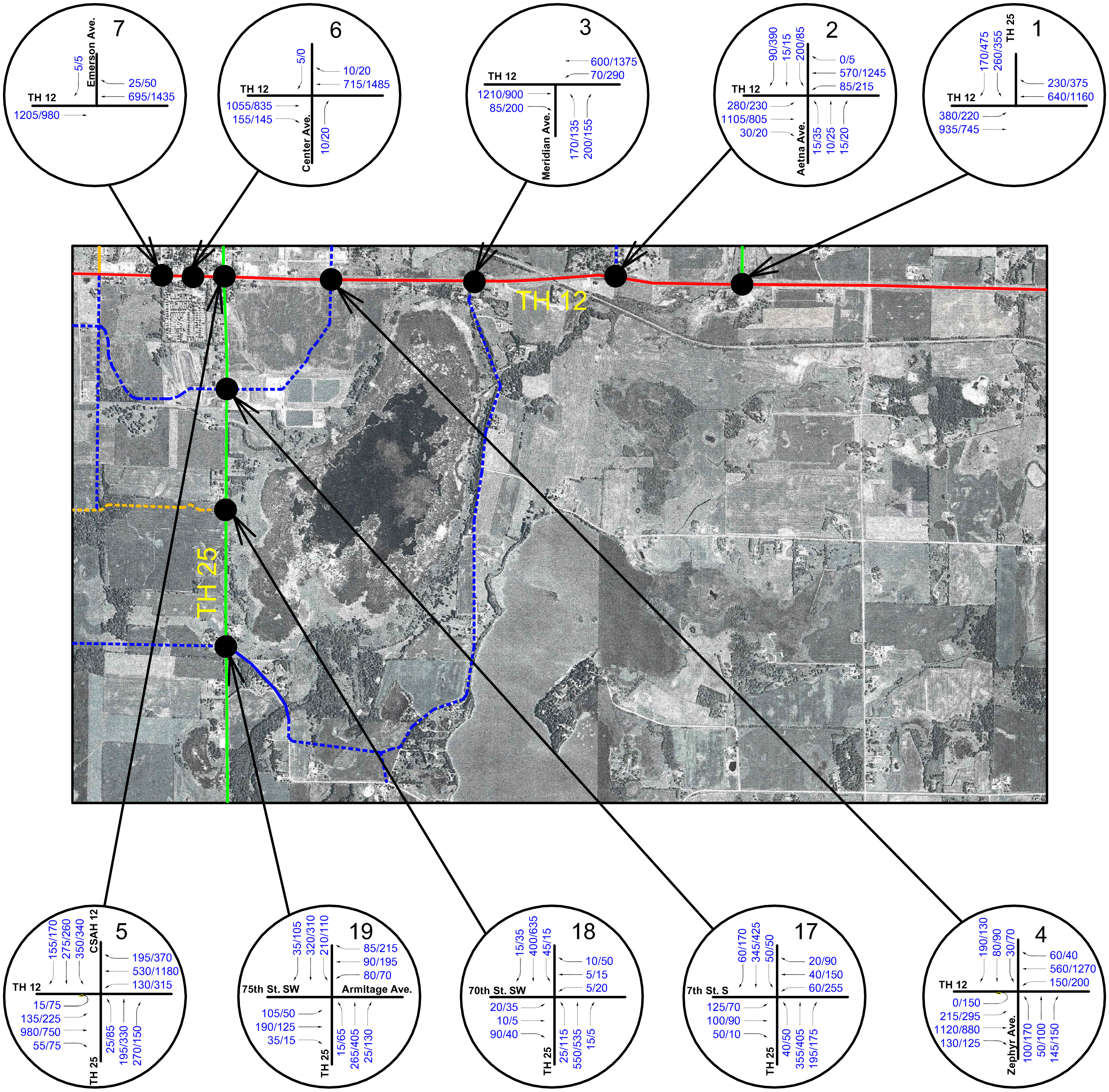

Legend

● Peak Hour Turning Movement

2030 AM Peak
2030 PM Peak
xx/yy

N

No Scale

Figure 22 (3 of 4) Full Build Peak Hour Volumes (Quadrant 3)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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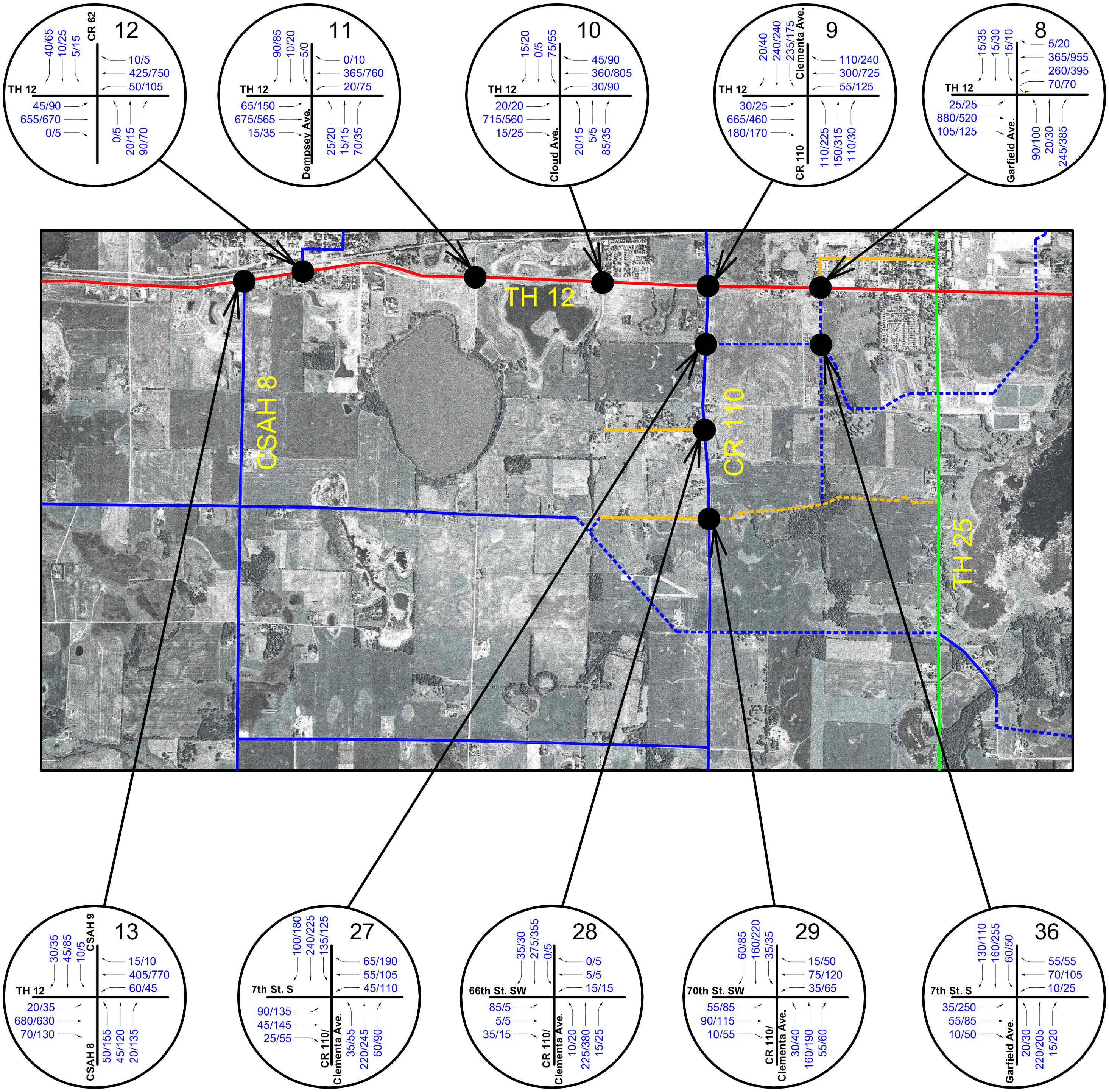

Figure 22 (4 of 4)
Full Build Peak Hour Volumes (Quadrant 4)

City of Montrose AUAR

Legend

● **Peak Hour Turning Movement**

xx/yy — **2030 AM Peak** / **2030 PM Peak**

N

No Scale

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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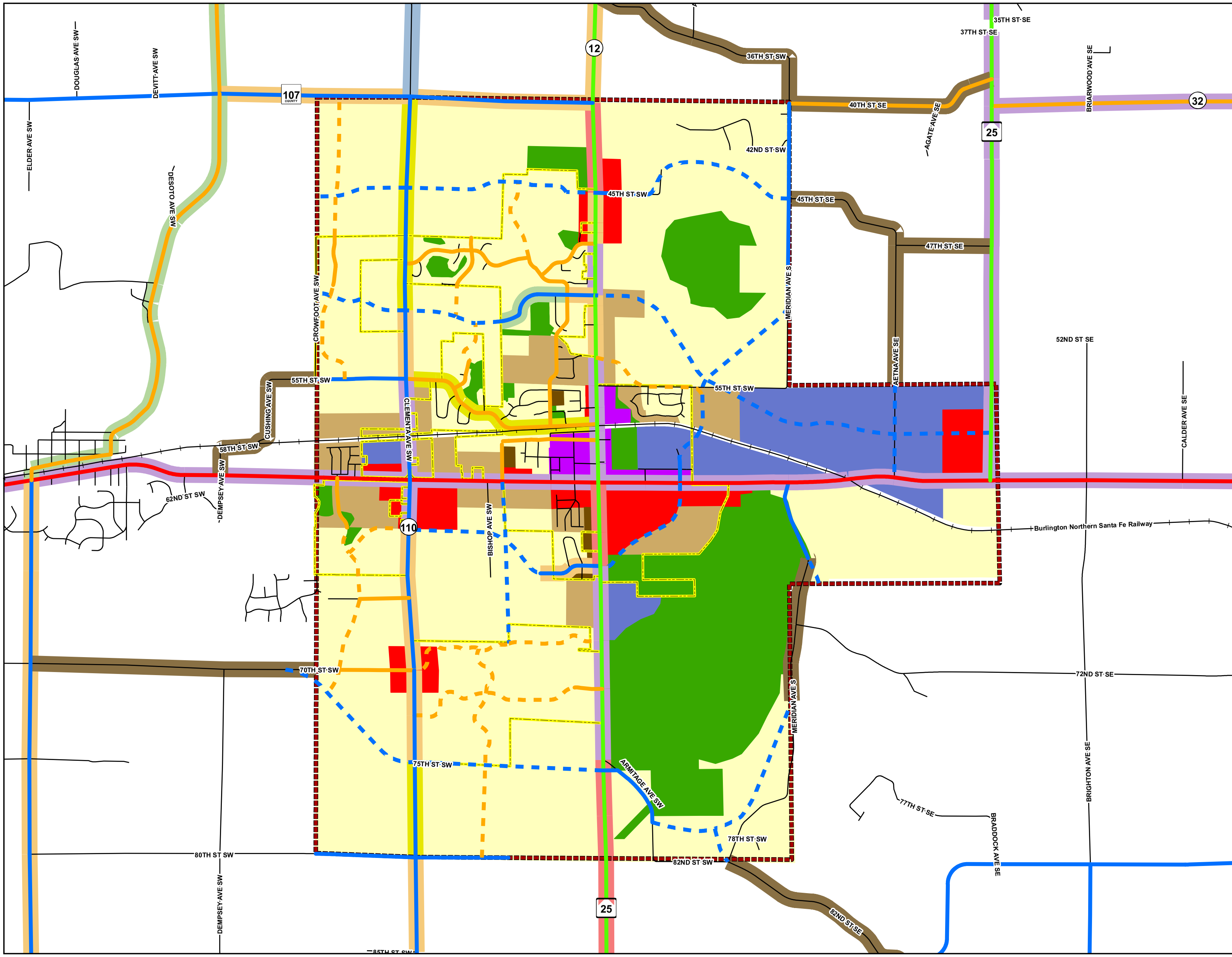

CITY OF MONTROSE
AUAR
FULL BUILD SCENARIO
2030 LEVEL OF SERVICE

FIGURE NO. 23
APRIL, 2007

Legend

Level of Service
- Los A, V/C < 0.30
- Los B, V/C < 0.50
- Los C, V/C < 0.70
- Los D, V/C < 0.90
- Los E, V/C < 1.00
- Los F, V/C > 1.00
- Gravel Road, > 400 vpd

Future Functional Classification
- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

N W E S

0.5 0 0.5 Miles

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario Full Build LOS 11x17.mxd)
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The intersections along TH 12 would continue to experience poor operations with no improvements. All streets that intersect with TH 12 would experience LOS F for the left turn movements. Some of the intersections with TH 12 would have very low volumes of traffic or would have alternate routes to access the roadway network, so are not a large concern. Other intersections would need major improvements to handle the anticipated Full Build Scenario traffic and maintain acceptable operations.

5.3.2 MN TH 25 (East Leg)

TH 25 north of TH 12 experiences traffic growth of 3% per year. This results in a forecasted ADT of 11,100 north of TH 12 under the Full Build Scenario. This traffic growth would be both traffic originating from the City of Buffalo and traffic originating within the City of Montrose. The industrial area north of TH 12, just west of TH 25 would be the major producer of the traffic increase, but the extension of Seventh Street North to TH 25 would also increase through traffic that may otherwise use TH 12.

With the increase in volume, the roadway would operate at LOS F. As consistent with the Interim Build, if TH 55 is improved with additional capacity and improved access more than what is currently planned, the volumes on TH 25 would likely decrease. However, with the increased traffic levels associated with the additional development in Montrose due to the Full Build Scenario, the decrease of traffic from Buffalo with the TH 55 improvements would likely not bring operations to acceptable levels.

5.3.3 MN TH 25 (West Leg)/CSAH 12

Traffic volumes with the Full Build are slightly higher than under the Interim Build both north and south of TH 12 on this corridor. North of TH 12, the ADT is forecasted to be 18,800, while the ADT south of TH 12 is forecasted to be 13,500. This minimal increase as compared to the Interim Build would be a result of the additional east-west routes through the City and the increased continuity of those routes. With the increased traffic of the Full Build Scenario, operations on this corridor would be severely impacted with no improvements. LOS E and F would be prevalent all of the way from CSAH 30, through TH 12, north to CR 107. The current design of this entire corridor would be insufficient to handle the forecasted traffic.

Under the Full Build Scenario, the intersections at Armitage Avenue, Seventh Street South, Fifth Street North, Seventh Street North, 45^{th} Street SW, and CR 107 would have unacceptable delay for the movements onto TH 25/CSAH 12.

5.3.4 CR 110/Clementa Avenue

With the increased development in Montrose under the Full Build Scenario, the ADT on the corridor near TH 12 is similar to the forecasted traffic on the TH 25/CSAH 12 corridors. The projected ADT north of TH 12 is 11,400, while the ADT south of TH 12 is 12,800. Even with this increase, only the corridor between Seventh Street South and First Street North/55th Street SW would operate at LOS F with the current roadway section.

The intersections at Seventh Street South and First Street North would have unacceptable delay for the movements onto CR 110/Clementa Avenue under the Full Build Scenario.

5.3.5 Additional Roadways

As in the No-Build Scenario, the intersection of CSAH 12 with TH 12 would be extremely congested with 2030 traffic from the Full Build Scenario. With no improvements, traffic would continue to use more gravel roads between CSAH 12 and TH 25 as alternative routes. These include 36th Street, 40th Street, 45th Street, 47th Street, 55th Street, and Aetna Avenue. Additionally, Meridian Avenue, and 82nd Street would provide an alternative route to CSAH 30 and TH 12 from TH 25. All of these roadways would experience volumes over 400 vehicles per day (vpd) and may require improvement.

Under the Full Build Scenario, the ADT on CR 107 is forecasted at 8,400. The gravel roads that may need major improvements have ADT anywhere from 1,300 on Aetna Avenue to an ADT of 4,200 on 82nd Street.

5.3.6 Needed Improvements

The Full Build analysis results are very similar to the Interim Build analysis results. As such, the improvements needed are very similar. Only intersections with capacity expansion over what was required in the Interim Scenario are highlighted for the Full Build analysis.

Due to the increase in traffic, TH 12, TH 25, and CSAH 12 require improvement under the Full Build Scenario. TH 12 would need to be widened to a four-lane expressway east of TH 25 (East Leg) and a 4-lane divided highway would be needed from TH 25 (East Leg) all the way through Waverly to maintain acceptable operations. Additionally, dual left turn lanes or additional thru lanes would be required at each of the intersections between TH 25/CSAH 12 and Aetna Avenue to provide acceptable service levels.

TH 25 would need to be widened to a 4-lane divided highway from TH 12 to CSAH 32, a 3-lane undivided highway north of CSAH 32, and to a 3-lane undivided highway between Armitage Avenue and TH 12 to maintain acceptable operations under the Full Build Scenario. Turn lanes would be provided at all major intersections.

CSAH 12 would need to be widened to a 4-lane divided highway north of TH 12 to Aspen Lane to maintain acceptable service levels under the Full Build Scenario. The existing 3-lane undivided highway section north of Aspen Lane would be adequate to handle the projected traffic. CR 110 south of TH 12 and Clementa Avenue north of TH 12 need to be widened to a four-lane divided roadway with turn lanes at each intersection between Seventh Street South and First Street North under the Full Build Scenario to maintain acceptable operations.

The only other existing roadway that would need capacity improvements is CR 107, which should be widened to include left turn lanes at Clementa Avenue and new development accesses to ensure acceptable operations under the Full Build Scenario.

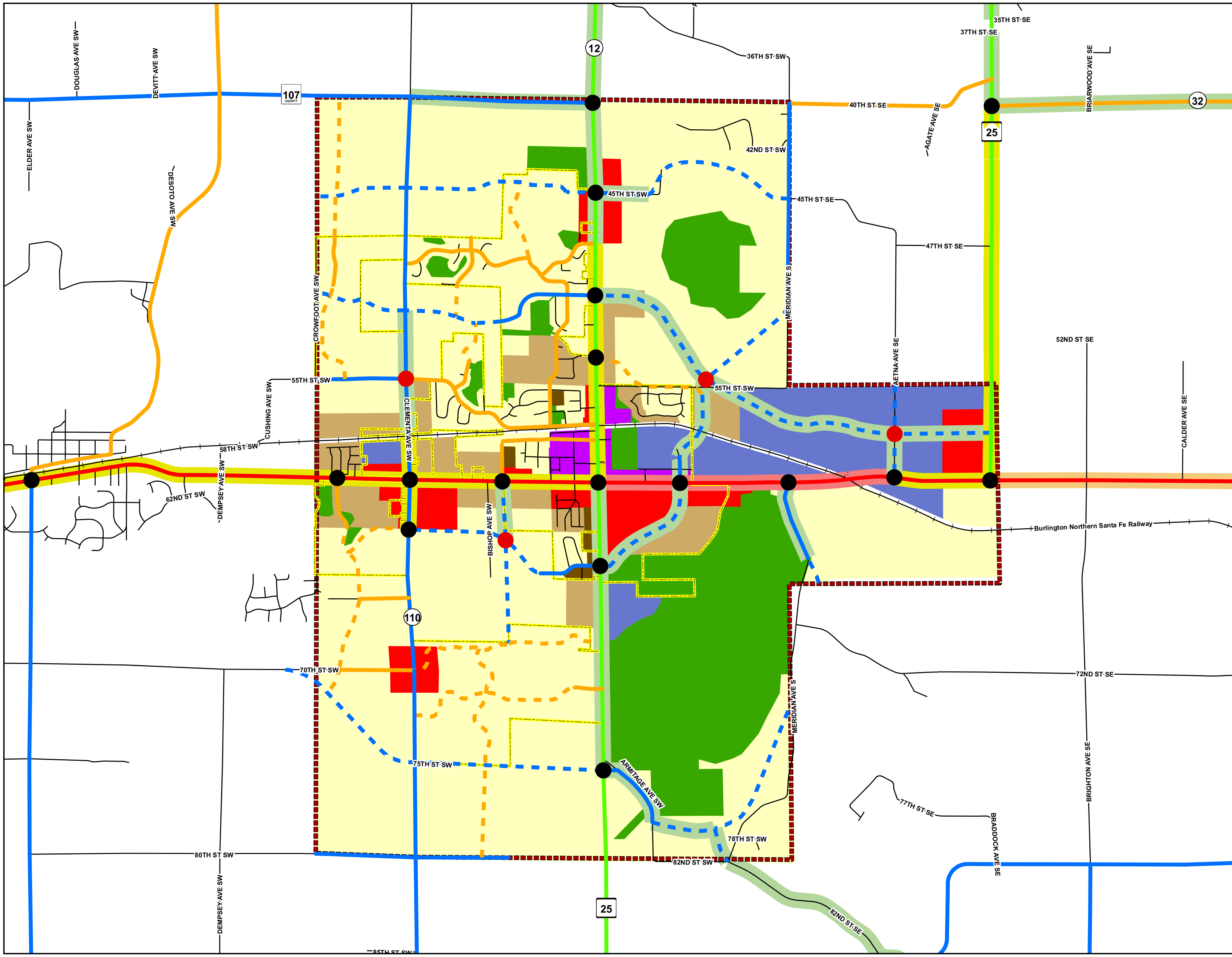
Roadway segment improvements are shown in Figure 24 while intersection improvements are shown in Figure 25.

5.3.6.1 TH 12 at Aetna Avenue & Meridian Avenue

The volume of traffic at these intersections would be light enough to not warrant signalization in the Interim Build Scenario. With the added development and traffic from the Full Build Scenario, the volumes would be high enough to warrant signalization. A signal or roundabout would be needed for both of these intersections to maintain acceptable service levels. The improvement of the intersections with signalization would require left and right turn lanes for each approach and protected only left turns on TH 12, in addition to the widening of TH 12 to a 4-lane facility. A roundabout would also be an option but may require a double-lane roundabout to meet acceptable delay standards under the Full Build Scenario.

5.3.6.2 TH 12 at Cloud Avenue

The traffic at Cloud Avenue under the Full Build Scenario would be high enough to warrant some intersection control change and to maintain acceptable service levels for minor street traffic. This change could either be a roundabout or a signal with left and right turn lanes on TH 12. Traffic could also distribute to the intersection of Seventh Street South at CR 110.



CITY OF MONTROSE
AUAR
FULL BUILD SCENARIO
2030 MITIGATED LANE NEEDS

FIGURE NO. 24
APRIL, 2007

Legend

Traffic Control Improvements
- 4 Way Stop or Roundabout
- Signal or Roundabout

2030 Roadway Needs
- 6-Lane Divided
- 4-Lane Expressway
- 4-Lane Divided
- 3-Lane Undivided

Future Functional Classification
- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- City Limits
- A.U.A.R. Boundary

N W E S

0.5 0 0.5 Miles

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Scenario Full Build Lane Needs 11x17.mxd)
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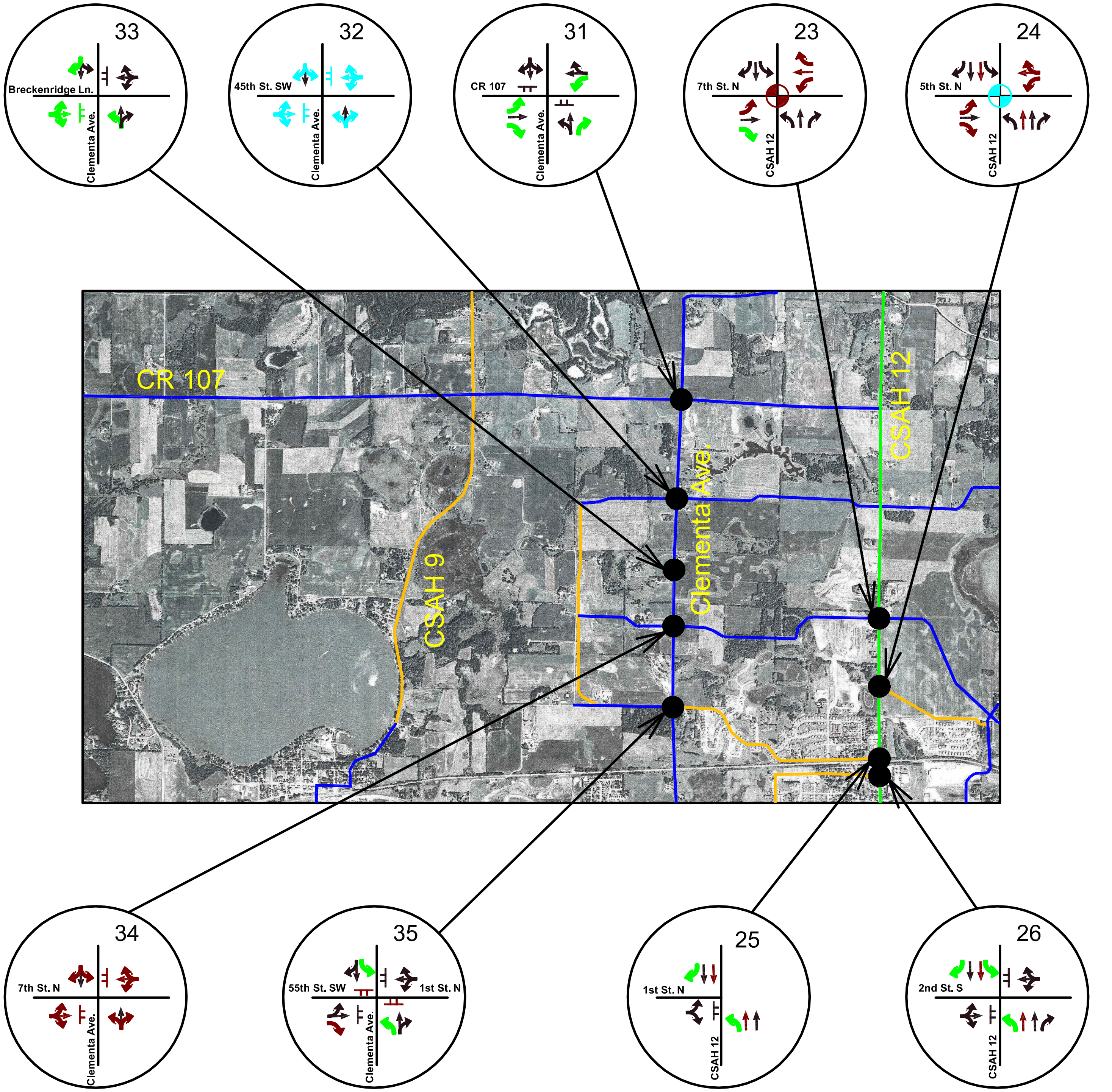

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry
  - Existing
  - 2030 No-Build Mitigated
  - 2030 Interim Build Mitigated
  - 2030 Full Build Mitigated

N

No Scale

Figure 25 (1 of 4)
Full Build Mitigated
Traffic Control (Quadrant 1)

City of Montrose AUAR

BOLTON & MENK, INC.
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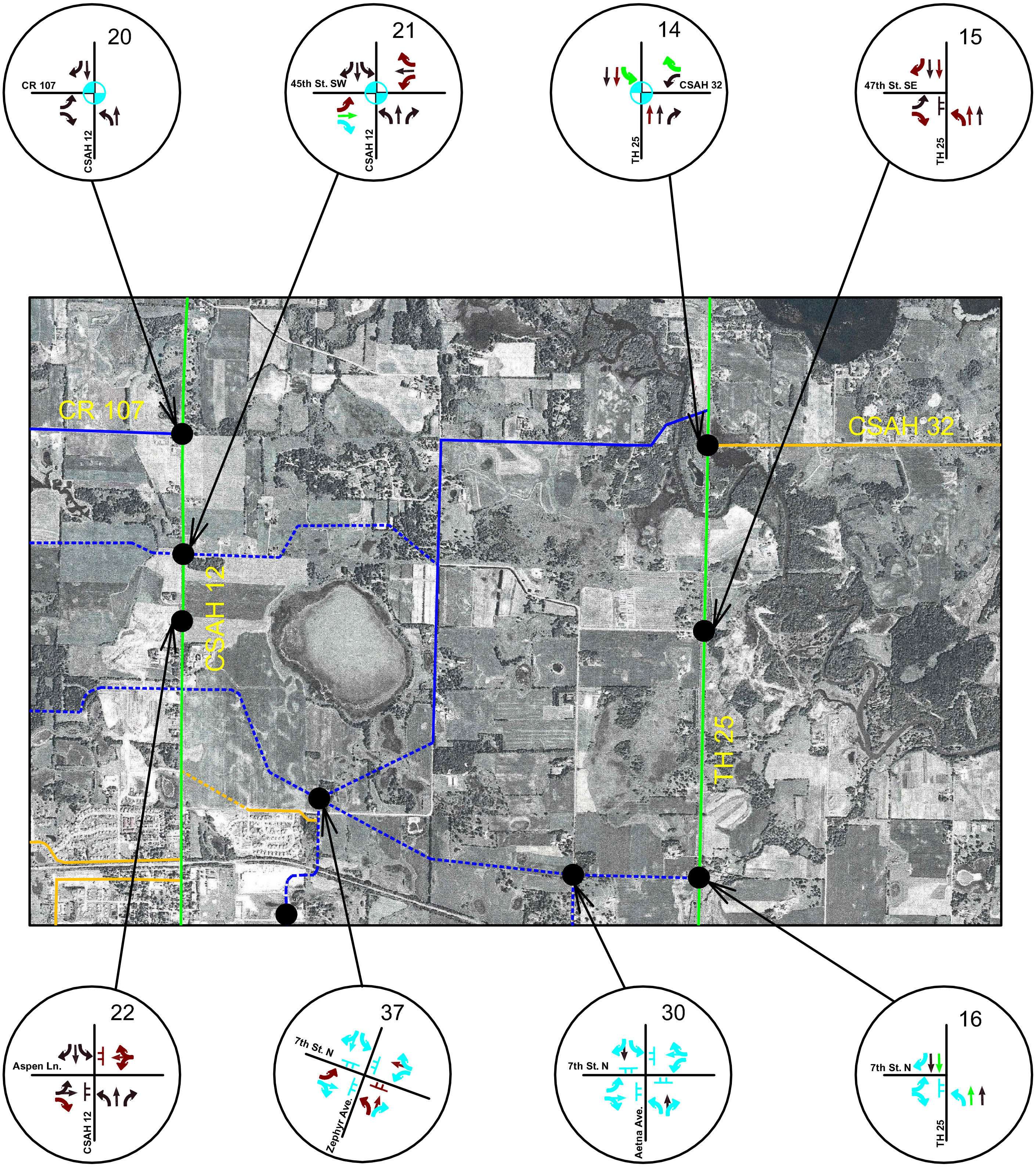

Legend

Signalized Intersection

Stop Sign

Through Traffic Lane

Turning Traffic Lane

Shared-Movement Traffic Lane

Traffic Control and Geometry
Existing
2030 No-Build Mitigated
2030 Interim Build Mitigated
2030 Full Build Mitigated

N

No Scale

Figure 25 (2 of 4)
Full Build Mitigated
Traffic Control (Quadrant 2)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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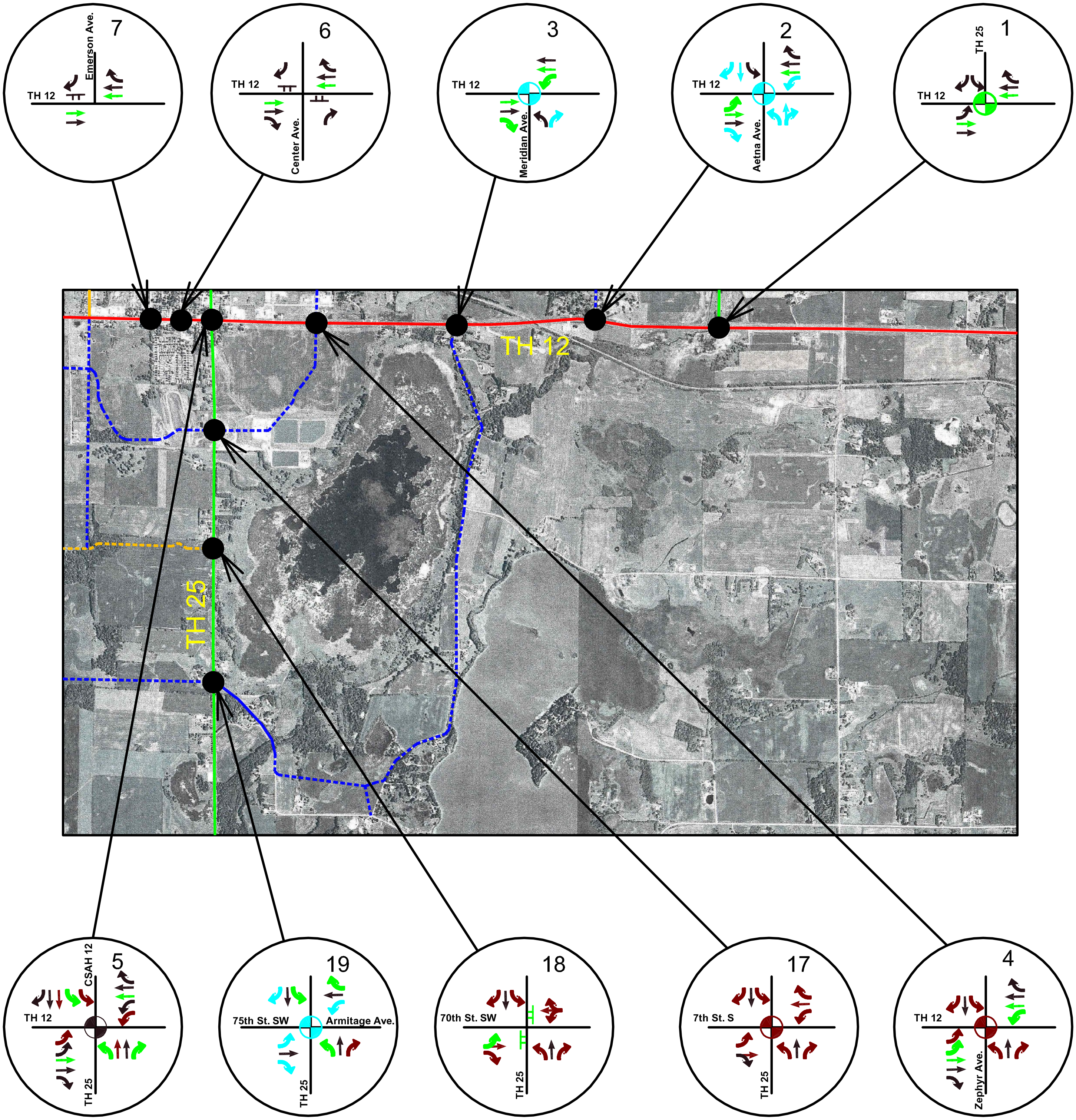

Legend

Signalized Intersection

Stop Sign

Through Traffic Lane

Turning Traffic Lane

Shared-Movement Traffic Lane

Traffic Control and Geometry
- Existing
- 2030 No-Build Mitigated
- 2030 Interim Build Mitigated
- 2030 Full Build Mitigated

N

No Scale

Figure 25 (3 of 4)
Full Build Mitigated
Traffic Control (Quadrant 3)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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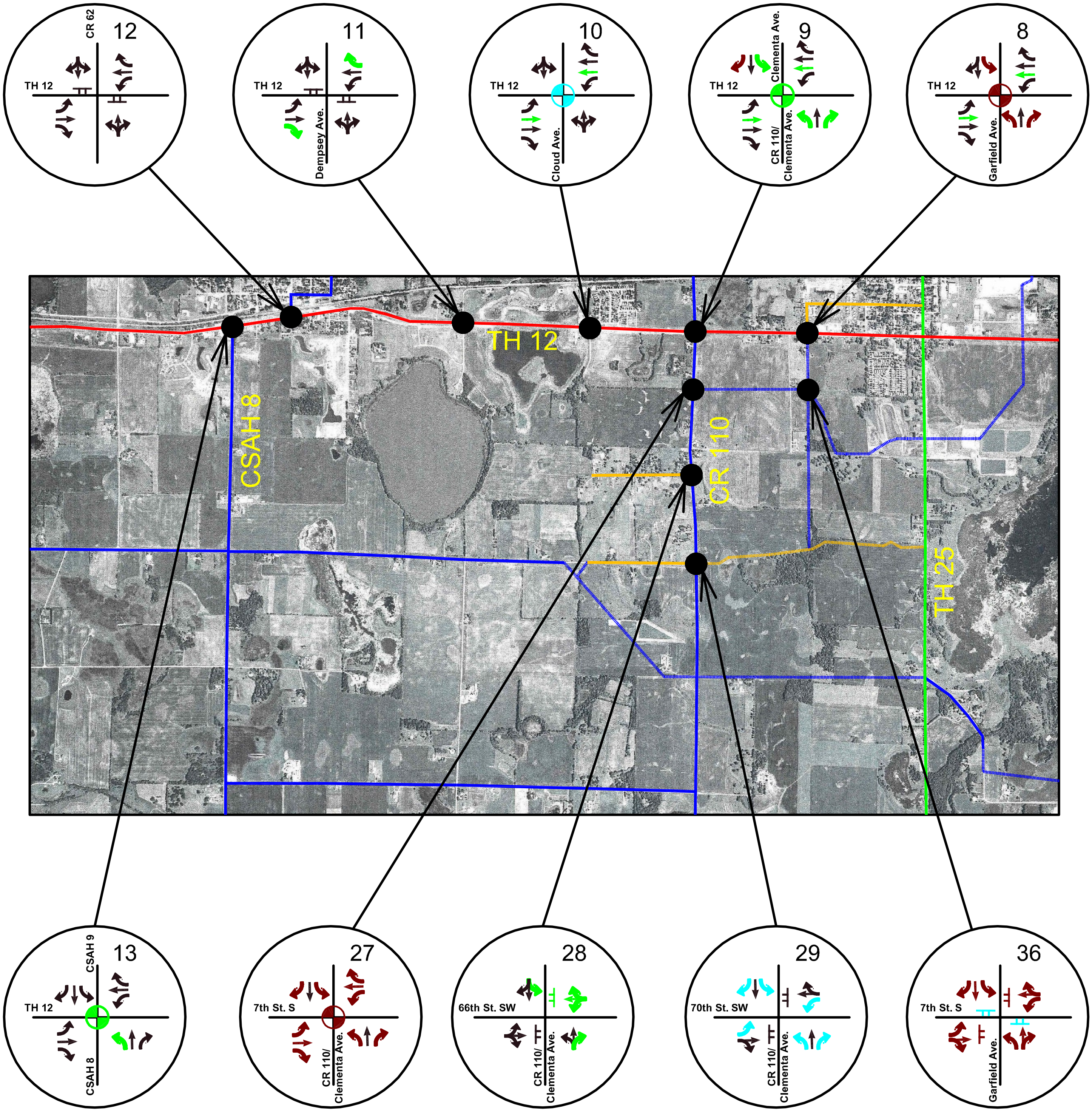

Legend

- Signalized Intersection
- Stop Sign
- Through Traffic Lane
- Turning Traffic Lane
- Shared-Movement Traffic Lane
- Traffic Control and Geometry
  - Existing
  - 2030 No-Build Mitigated
  - 2030 Interim Build Mitigated
  - 2030 Full Build Mitigated

N

No Scale

Figure 25 (4 of 4)
Full Build Mitigated
Traffic Control (Quadrant 4)

City of Montrose AUAR

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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5.3.6.3 TH 25 at CSAH 32

With the higher traffic volumes and increased delay on TH 12 under the Full Build Scenario, CSAH 32 would be an attractive alternate route for traffic. With this increased traffic on CSAH 32, the intersection of CSAH 32 with TH 25 would now warrant a change in traffic control to either a roundabout or to signalization with expanded turn lanes to maintain acceptable operations.

5.3.6.4 TH 25 at Armitage Avenue/75th Street SW

Armitage Avenue would carry a lot of traffic cutting through between CSAH 30 and TH 25 in addition to development traffic under the Full Build Scenario. Additionally, 75th Street would serve a complete east-west function for traffic from Waverly and Montrose. Due to the large volume of traffic through the intersection, a change in traffic control would be needed to maintain acceptable operations. Turn lanes would be required with the inclusion of a signal. A roundabout would also be an option under the Full Build Scenario.

5.3.6.5 CSAH 12 at Fifth Street North, 45th Street SW, & CR 107

All of these intersections would likely warrant signalization due to the increased traffic volumes under the Full Build Scenario. A 4-Lane divided highway through the 5th Street intersection would be needed to handle the peak hour traffic and maintain acceptable operations. The 45th Street and CR 107 intersections would only need signalization added. Under signalization, left turn and right turn lanes would be needed for all approaches at each intersection. A roundabout would also be an option at all of the intersections under the Full Build Scenario.

5.3.6.6 Seventh Street North at Zephyr Avenue & Aetna Avenue

These intersections would be a direct result of increased development of the Full Build Scenario and would be constructed with surrounding development. Both intersections would not operate within acceptable levels with two-way stop control. A change in traffic control would be needed to maintain acceptable operations. While signal warrants would be met in the Full Build Scenario, a four-way stop control or a roundabout is recommended as an initial mitigation measure.

5.3.6.7 Seventh Street South at Garfield Avenue

This intersection would be a direct result of increased development of the Full Build Scenario and would be constructed with surrounding development. The intersection would be important to serve the surrounding retail areas. The intersection would not operate within acceptable levels with two-way stop control. A change in traffic control would be needed to maintain acceptable operations. While signal warrants would be met in the Full Build Scenario, a four-way stop control or a roundabout is recommended as an initial mitigation measure.

6.0 Conclusions

The proposed developments are estimated to consist of residential, industrial, and commercial uses. The current roadway system in Montrose would not facilitate traffic effectively and would not maintain acceptable service levels with the level of development that the City is planning. The majority of traffic would filter through the intersections with TH 12, as it would be the primary east-west highway corridor for the City to access the Twin Cities Metropolitan Area. The nearest other east-west highways would include CSAH 30, approximately 1.5 miles to the south, and CSAH 32 to TH 55, which could be accessed from TH 25 to the northeast.

Based on the traffic analysis provided, extensive roadway improvements, intersection improvements, and traffic control modifications would be recommended to accommodate the anticipated Full Build Scenario development within the City of Montrose. These transportation improvements would be necessary to accommodate the intensity of development as proposed in this report, as well as provide capacity for external traffic growth caused by outside factors.

6.1 Summary and Recommendations

It is recommended that roadways be widened and intersections be improved to provide additional capacity for the 2030 Full Build Scenario. This additional capacity should be constructed in phases to best provide improvements as needed by the community to maintain acceptable service levels.

Improving and expanding the local and regional roadways would improve the traffic on TH 12 through Montrose. This would include the addition of intersections with TH 12 and local roadways for local traffic to travel on, without using TH 12. The recommended roadway network connections are shown in Figure 26.

By improving and expanding the local roadway network, traffic would move more efficiently throughout the City. The local roadways shown in Figure 26 would provide additional east-west corridors for local traffic. This study assumed that the local roadway connections would be constructed as the areas are developed. Without these additional local area connections, the geometric improvements recommended for the studied intersections would not operate well or function as expected.

The additional roadway corridors running parallel to TH 12 would allow the local traffic to travel across the City without traveling on TH 12, thus preserving TH 12 for traffic that needs to use it on a more regional basis.

All intersections and accesses must be consistent with the most current Minnesota Department of Transportation's Access Category System and Spacing Guidelines, (currently March 20, 2002) and most current Wright County Access and Spacing Requirements, which are currently located within the Northeast Wright County Sub-Area Transportation Study, June 2004.

6.1.1 US TH 12

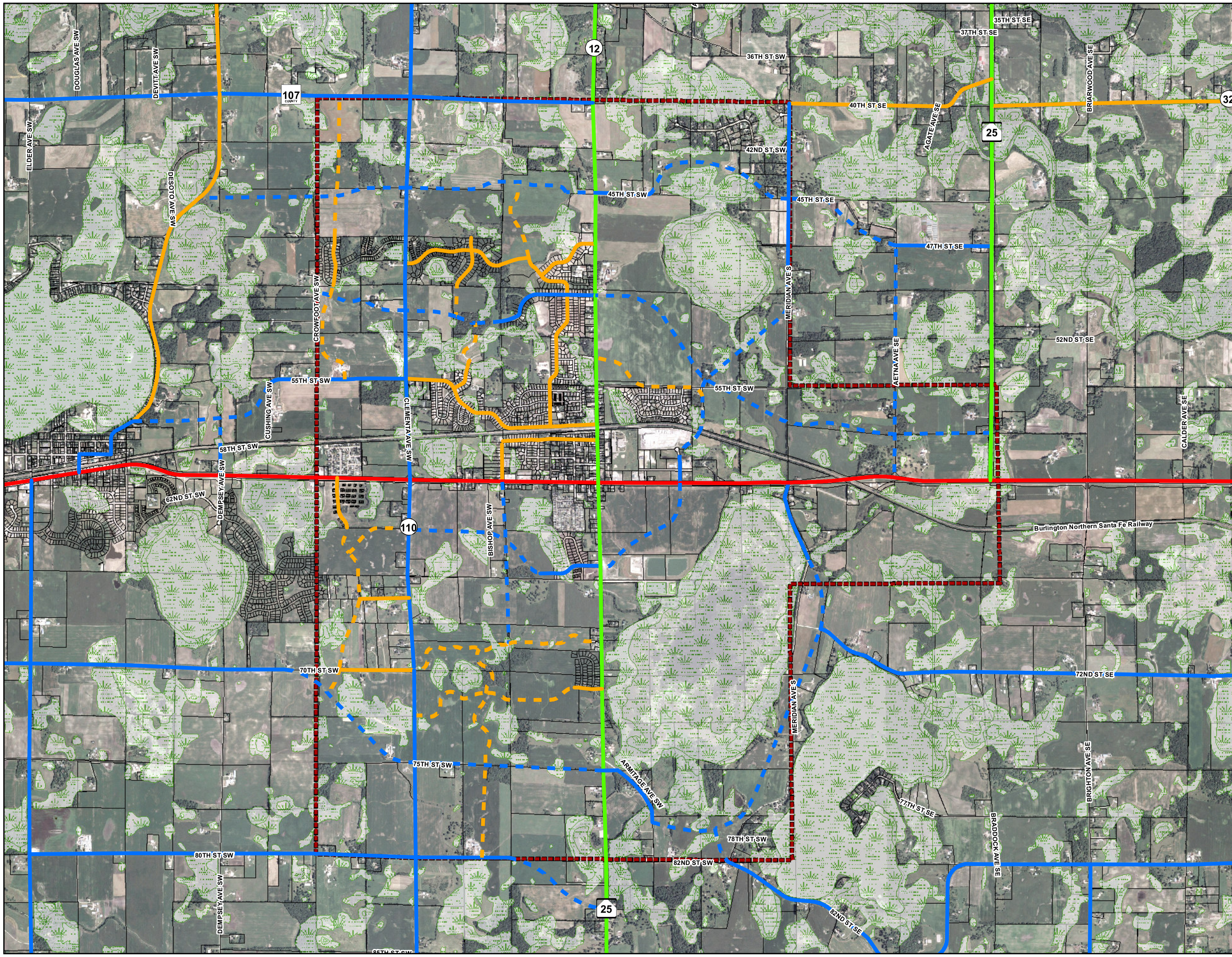
The traffic on TH 12 increases by approximately 3.0% per year under the Full Build Scenario. This results in a maximum forecast ADT of 31,800 between TH 25/CSAH 12 and Zephyr Avenue. This ADT would be similar to the ADT currently on TH 12 through Wayzata or TH 55 through Plymouth. Without any widening of TH 12, the entire roadway would be expected to operate over capacity. This would result in significant safety and delay concerns if no improvements are made.

The intersections along TH 12 would experience poor operations with no improvements under the Full Build Scenario. All streets that would intersect with TH 12 would experience LOS F for the left turn movements.

In order to maintain acceptable service levels, TH 12 would need to be widened to a four-lane expressway east of TH 25 (East Leg) and a 4-lane divided highway would be needed from TH 25 (East Leg) all the way through Waverly. Additionally, dual left turn lanes or additional thru lanes would be needed at each of the intersections between TH 25/CSAH 12 and Aetna Avenue to maintain acceptable operations.

Signals or roundabouts would be needed at each of the major intersections along TH 12 to ensure acceptable service levels with the forecasted Full Build Scenario traffic. As the TH 12 roadway is a regional corridor, it is recommended that the signals or roundabouts would be placed every ½ mile as consistent with the Mn/DOT Access Category System and Spacing Guidelines. This is the recommended spacing for the roadway in an urban or urbanizing area. The signalized or roundabout intersections to maintain acceptable service levels under the Full Build Scenario would be placed at:

- TH 25 (East Leg)
- Aetna Avenue
- Meridian Avenue
- Zephyr Avenue
- TH 25 (West Leg)/CSAH 12
- Garfield Avenue



CITY OF MONTROSE
AUAR
ULTIMATE FUTURE ROADWAY
FUNCTIONAL CLASSIFICATION

FIGURE NO. 26
APRIL, 2007

Legend

Future Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- A.U.A.R. Boundary
- National Wetlands Inventory

0.5 0 0.5 Miles

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Consulting Engineers & Surveyors

Map Document: (H:\Mtrs\W1337928\Arcview\Mtrs Future Functional Class 11x17.mxd)
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- CR 110/Clementa Avenue
- Cloud Avenue
- CSAH 8/CSAH 9

These intersections would need major improvements including additional thru lanes and turn lanes as noted in Figure 25 if signalized.

6.1.2 TH 25 (East leg)

TH 25 north of TH 12 experiences traffic growth of 3% per year under the Full Build Scenario. This results in a forecasted ADT of 11,100 north of TH 12. This traffic growth would be both traffic originating from the City of Buffalo and traffic originating within the City of Montrose. With the increase in volume, the roadway would operate at LOS F.

If TH 55 east of the City of Buffalo, to the City of Rockford, were improved with additional capacity and improved access than what is currently planned, the volumes on TH 25 from TH 12 to TH 55 would likely decrease. However, with the increased traffic levels associated with the additional development in Montrose under the Full Build Scenario, this decrease would likely not bring operations on the existing lanes to acceptable levels.

TH 25 would need to be widened to a 4-lane divided highway from TH 12 to CSAH 32 and to a 3-lane undivided highway north of CSAH 32 to maintain acceptable service levels. Turn lanes would also be needed at all major intersections. A signal or roundabout would be needed at the following intersection to maintain acceptable operations.

- CSAH 32

This intersection would need major improvements including additional thru lanes and turn lanes as noted in Figure 25 if signalized.

6.1.3 TH 25 (West Leg)/CSAH 12

Traffic volumes under the Full Build Scenario are slightly higher than under the Interim Build Scenario, both north and south of TH 12 on this corridor. North of TH 12, the ADT is forecasted to be 18,800, while the ADT south of TH 12 is forecasted to be 13,500. With the increased traffic, operations on this corridor would still be severely impacted with no improvements. LOS E and F would be prevalent all of the way from CSAH 30, through TH 12, north to CR 107. The current design of this entire corridor would be insufficient to handle the forecasted traffic.

Many of the intersections along the corridor would have unacceptable delay for the movements onto TH 25/CSAH 12 under the Full Build Scenario.

TH 25 would need to be widened to a 3-lane undivided highway between Armitage Avenue and TH 12 to maintain acceptable operations under the Full Build Scenario. Additionally, CSAH 12 would need to be widened to a 4-lane divided highway north of TH 12 to Aspen Lane. The existing 3-lane undivided highway section north of Aspen Lane would be adequate to handle the projected Full build Scenario traffic. The intersections that would need a roundabout or signalization to ensure acceptable service levels include:

- Armitage Avenue
- Seventh Street South
- Fifth Street North
- Seventh Street North
- 45th Street SW
- CR 107

These intersections would need major improvements under the Full Build Scenario, including additional thru lanes and turn lanes as noted in Figure 25 if signalized to ensure acceptable service levels.

6.1.4 CR 110/Clementa Avenue

With the increased development on Montrose, the ADT on the corridor near TH 12 would be similar to the forecasted traffic on TH 25/CSAH 12 under the Full Build Scenario. The projected ADT north of TH 12 is 11,400, while the ADT south of TH 12 is 12,800. Even with this increase, only the corridor between Seventh Street South and First Street North/55th Street SW would operate at LOS F with the current roadway design.

Some intersections would experience unacceptable delay for the movements onto CR 110/Clementa Avenue under the Full Build Scenario. CR 110 south of TH 12 and Clementa Avenue north of TH 12 would need to be widened to a four-lane divided roadway with turn lanes at each intersection between Seventh Street South and First Street North to maintain acceptable operations. The intersections that would need improvement with a roundabout, 4-way stop, or signalization to ensure acceptable service levels under the Full Build Scenario include:

- Seventh Street South
- First Street North/55th Street SW

These intersections would need major improvements including additional thru lanes and turn lanes to maintain acceptable operations under the Full Build Scenario as noted in Figure 25 if signalized.

6.1.5 Additional Roadways

With the high levels of development within the City under the Full Build Scenario, traffic uses many of the alternate routes available to cross the City including Seventh Street North, Seventh Street South, 45th Street, and 75th Street.

The ADT on CR 107 is forecasted at 8,400 under the Full Build Scenario. To maintain acceptable operations under the forecasted volume, CR 107 should be widened to include left turn lanes at Clementa Avenue and at the new development accesses, to handle traffic within the City until 45th Street is fully constructed.

Seventh Street North and Seventh Street South would both provide effective east-west routes through the City under the Full Build Scenario. These roadways would need to be designed as three-lane undivided facilities, providing left turn lanes at any of the major intersections to maintain acceptable operations. Additionally, roundabouts, all-way stops, or signals would be needed at the following intersections with Seventh Street North or Seventh Street South to ensure acceptable service levels under the Full Build Scenario.

- Zephyr Avenue
- Aetna Avenue
- Garfield Avenue

45th Street and 75th Street would provide good east-west connections through the City but would not completely serve substantial traffic to/from the east side of the City. The importance of completing these routes is seen by looking at the projected Full Build Scenario ADT on the gravel roads connecting to them. The gravel roads would need major improvements to ensure acceptable service levels. The projected Full Build Scenario ADT varies from 3,300 on 45th Street to an ADT of 4,200 on 82nd Street.

Additional gravel roads through the area would also serve high volumes of traffic under the Full Build Scenario. These would include 36th Street, 40th Street, 45th Street, 47th Street, and Aetna Avenue. Additionally, Meridian Avenue, and 82nd Street would provide an alternative route to CSAH 30 and TH 12 from TH 25. All of these gravel roadways would experience volumes over 400 vehicles per day (vpd) and may need improvement.

6.1.6 Regional Roadway System Improvements

In order for the regional roadway system to carry the volume of traffic projected in this study out to 2030, TH 12 would need to be widened to a four-lane facility (two-lanes in each direction). As the area grows further there may eventually be a need to widen TH 12 to a six-lane facility (three lanes in each direction) through the City of Montrose and to the east where TH 12 is currently designed as a six-lane freeway. This design would integrate into the I-394 freeway to handle the future growth on the TH 12 corridor from other communities in addition to the City of Montrose. Without expansion of the regional corridor infrastructure, development within the City of Montrose at the intensities shown under the Full Build Scenario would result in unacceptable delays on TH 12 east of the City. Expanding the TH 12 corridor and providing other regional routes would help to maintain acceptable service levels on the regional roadway system with some development increase along the TH 12 corridor.

6.1.7 Railroad Crossings

It is recommended that the City further explore the possibility of adding the additional railroad crossing north of TH 12, on Zephyr Avenue, which would connect with the proposed commercial development on the southeast side of the City. This crossing would provide an important roadway connection for the City, connecting the area north of the railroad tracks to the proposed retail area south of TH 12, and also provide an alternative roadway to the north. In addition, this location would provide a possible grade-separated crossing of the railroad. Grade-separating the railroad would allow traffic to cross the City efficiently and effectively even if a train is traveling through the City.

6.2 Recommended Additional Studies

As development is added to the City within the AUAR area, additional studies are recommended. These studies include looking at the:

- US TH 12 Corridor
    - To Develop a Corridor Vision that includes determining the Traffic Control, Geometry, and Right-of-Way Needs
    - Would be a Joint Study with Mn/DOT, Wright County, Hennepin County, Communities Adjacent to TH 12

- TH 25/CSAH 12 Corridor
    - To Develop a Corridor Vision that includes determining the Traffic Control, Geometry, and Right-of-Way Needs
    - Would be a Joint Study with Mn/DOT, Wright County, and the City of Buffalo

- Zephyr Avenue Railroad Crossing
    - To Determine if the Crossing Would be Granted and Whether it Would be At-Grade or Grade-Separated
    - To Determine if the Crossing Should be Signalized if At-Grade
    - Would be a Joint Study with BNSF Railroad, Mn/DOT Office of Freight and Commercial Vehicle Operations (OFCVO), Mn/DOT, Wright County

- Intersections with Traffic Control Changes
    - To Determine if a Change to Traffic Control is Justified/Warranted
    - Determined with Signal Justification Reports
    - Determined with Intersection Control Evaluations
    - Would be Joint Studies with Mn/DOT, Wright County

- Gravel Roadways
    - To Determine if Gravel Roadways Within and Outside of the City's Jurisdiction Need to be Improved
    - To Determine Appropriate Design Criteria, Including Surfacing and Jurisdiction Relative to Projected Traffic Volumes and Recommended Functional Classification
    - Specific Roadways Include 36th Street, 40th Street, 45th Street, 47th Street, Meridian Avenue, Aetna Avenue, Dempsey Avenue/55th Street, 70th Street, and 82nd Street
    - Would be Joint Studies with Developers, Wright County, and Townships

- Individual Development Traffic
    - To Ensure Consistency with the AUAR Plan Assumptions
        - Land Use Types and Intensities and Corresponding Traffic Projections Would Need to be Consistent with the AUAR Assumptions
    - To Determine Which Traffic Improvements Would Need to Happen With an Individual Development
        - Roadway Improvements Would Need to be Consistent with the AUAR Plan for Total Improvements
    - Would be a Study Completed by Developer, Reviewed and Approved by the City, Wright County, and Mn/DOT
        - Traffic Study Would Need to be Reviewed by Each Roadway Jurisdiction Including the City, Township, Wright County, and Mn/DOT.

- Roadway Improvement Funding
    - To Develop a Funding Strategy to Pay for Roadway, Infrastructure, and Traffic Control Improvements
    - Individual Developments Would Pay Their Proportionate Fair Share of Improvements
        - Improvements will be Needed to Maintain Acceptable Service Levels and be Consistent with the AUAR Document
    - To Determine How Roadway, Infrastructure, and Traffic Control Improvements will be Funded on a Development Driven Basis
        - Ensure Consistency Between Different Developments

Traffic Appendix A:

Traffic Model Methodology

City of Montrose AUAR
2030 Transportation Model

Model Used:

- Year 2000 Collar County Model
  - Existing Model: Year 2000
  - Future Model: Year 2030

Model Methodology:

The general approach to forecasting the traffic volumes consisted of the following:

- Utilize the Collar County travel demand model and model parameters, developed for the Minnesota Department of Transportation and maintained by the Metropolitan Council, as the primary instrument for forecasting the volumes.
- Collect year 2000 and current year traffic count data and basic roadway attribute information in the study area for the purpose of validating the model, run for the base year (2000).
- Collect year 2000 census data from the U.S. Census Bureau as needed to validate the model inputs.
- Determine Traffic Analysis Zones based on roadways, land use data, and land features.
- Split model Traffic Analysis Zones into smaller zones for basis of projections.
- Add additional county and other major local roadways to the roadway network in the Collar County Model.
- Apply the model for the base year and validate its projections against the observed traffic count information; make appropriate adjustments as necessary to reach an acceptable validation.
- Apply the model for the forecast year (2030), taking into account anticipated regional network changes and the adjustments made to the 2000 model run, to generate the projected volumes.
- Analyze traffic patterns that ultimately comprise the elements themselves, through a series of special selected link analyses; use this information as a basis for adjusting the forecasted volumes if determined to be necessary.
- Prepare the final set of forecast volumes.

Details:

Additional details concerning the methodology follow:

Collar County Model – The Collar County model is based off of the Twin Cities Regional Model. The models provide a systematic procedure for forecasting volumes, taking into account the projected changes in regional land use/socioeconomic data and the regional transportation network. The Collar County model was obtained from the Metropolitan Council for year 2000. Year 2030 Socioeconomic data and the year 2030 Regional Model were collected to ascertain year 2030 conditions.

Historical and Current Year Traffic Count Data – Traffic count data in the study area was collected from the Minnesota Department of Transportation (Mn/DOT), recent counts, and recent traffic studies in the area. This included A.M. and P.M. peak hour, as well as average daily traffic volumes.

Current Roadway Attribute Information – The model highway network was reviewed in detail for conformity to current conditions. A thorough check of roadway functional classification, speed, number of through lanes, and roadway capacity was completed for the area influencing the City of Montrose. Several roadways were added to the network to assist in the future network analysis. These roadways were populated with the appropriate attributes based on regional model documentation, so as to be consistent with the regional model parameters.

Census Data – Year 2000 census data was collected from the U.S. Census Bureau. This data includes population and households by census block.

Employment Data – Employment figures were obtained from the City of Montrose to identify trip attractions within the City.

Traffic Analysis Zones (TAZs) – Based on the census blocks, land use, roadway network, and land features (including railroads, waterways, and bluffs), zones were identified for traffic to enter and exit from the roadway network. These zones include both traffic productions and attractions. These zones were split from the regional traffic analysis zones, which cover a much larger area and were broken apart to allow for additional roadway traffic volume projections, which would not have been available in the base model. These zones and their relevant information were added to the Model.

Socioeconomic Data – Land Use data for year 2030 was received from the land use consultant. The projected population, households, and employment data was aggregated into the TAZs for each 2030 scenario. It is recognized that these numbers are higher than the 2030 MetCouncil population estimates for the City in 2030.

Base Model Validation – The year 2000 model was validated using many resources, including: 2000 to 2006 traffic count data, aerial photos, and field observations. The assigned volumes from the 2000 model were then compared to the 2000 traffic counts. Adjustments were made to centroid locations and additional centroid connectors were added to help smooth volumes along individual roadways and more closely match ground counts. Additionally, because of the "regional" nature of the model, roadways are categorized into a select number of functional classifications. Thus, roadways that have minor differences may have the same functional classification. Some roadways in the study area were refined to reflect these minor differences. Specifically, local gravel roadways were defined as minor collectors but were adjusted with a lower capacity and speed than a typical paved minor collector.

Future Model Forecasts – The model was updated to include the future roadways and future functional class changes that are anticipated based on the Transportation Improvement Plan for the area and what was in the Year 2030 Regional Model. Additional future roadways within the urban growth boundary were added and centroid connectors were adjusted as required to connect with the newly proposed roadways. Additionally, functional classifications, speed, and capacities were adjusted based on the expected future roadway attributes.

Review of Forecasts – The traffic forecasts were reviewed for reasonableness. As with any travel demand model, it would be inappropriate to rely solely on direct model output for design volumes. The modeled volumes were reviewed and adjusted based on existing and historic travel patterns and also through some additional selected link analysis of model output. A series of selected link assignments were performed and the model estimated volumes were adjusted to more accurately reflect future traffic patterns within the study area. The checks for reasonableness of the projected volumes follow the procedures as outlined in the Mn/DOT Metro: Model Output Checks for Reasonableness and Post Processing Adjustments (Revised 5 January, 2006). These include:

- Peak Hour Percentage of Daily Traffic: The peak hour percentages of daily traffic produced by the model for the forecast year were compared to existing/observed peak hour percentages within the project limits and on other routes nearby with the same functional classification.

- Directional Split of Peak Hour Traffic: The directional splits of peak hour traffic forecasts produced by the model for the forecast year were compared to existing/observed directional splits within the project limits and on other routes nearby with the same functional classification.

- Capacity of Road Segments Beyond Limits of Project: Peak hour traffic forecast volumes assigned to road segments beyond the limits of the study area were studied to determine if the projected growth from the area affects the capacities of those road segments. On roadways outside of the study area with volume to capacity ratios over 1.00, the model results were compared to the regional model results from MetCouncil and Mn/DOT.

- Daily Traffic Growth Factors: The daily traffic forecasts from the model on the state roadways were compared with the historical daily volumes and with the regional model results from MetCouncil and Mn/DOT.

Post Processing – The post-processing of the projected volumes follow some of the procedures as outlined in the Mn/DOT Metro: Model Output Checks for Reasonableness and Post Processing Adjustments (Revised 5 January, 2006). The post processing includes:

- Traffic forecast volumes were rounded to the closest 10 if less than 1,000 or to the nearest 100 if more than 1,000.

- All products depicting the forecast numbers (maps, tables, layouts, etc.) contain a very visible caution that the forecast numbers depicted have a likely confidence range of plus or minus 15 percent.

- Traffic smoothing and corridor diversion adjustments were accomplished using the procedures described in Chapter 9 of NCHRP Report 365, "Travel Estimation Techniques for Urban Planning".

Traffic Appendix B:

Land Use Assumptions and Methodology

LAND USE APPENDIX
SOCIOECONOMIC BUILD-OUT PROJECTIONS ASSUMPTIONS & METHODOLOGY

The following provides a description of the assumptions and methods used to determine population, housing, and employment projections for the Montrose AUAR Study Area.

ASSUMPTIONS & METHODOLOGY

The projections developed represent a range of estimates for potential population, dwelling units, and employment for the undeveloped areas within the Montrose AUAR Study Area. The land uses identified in the Comprehensive Plan serve as the basis for these projections. A key assumption in understanding the magnitude of these projections is that the projections reflect a theoretical build-out of all areas, rather than what is likely to appear on the ground over the next 20 years. The City of Montrose's Comprehensive Plan and Zoning Ordinance, as well as contemporary planning experience, have been used to define the factors below to estimate The City of Montrose's future socioeconomic environment.

Residential: Population & Dwelling Units

Developable Acres: Acreages were derived from GIS-based calculations for each of the land use designations within the AUAR Study Area, excluding areas identified as wetland on the National Wetland Inventory map, floodplain, and/or Department of Natural Resources protected waters.

DU/AC (dwelling units per acre): The estimated dwelling units per acre are identified for residential land use designations and account for roads, rights-of ways, easements and public facilities typically found in residential areas such as elementary schools, parks, etc. The Mixed Use designation was not projected, because there is no large undeveloped property and potential future redevelopment is not anticipated to result in wholesale changes.

Land Use Designation	Estimated DU/AC
Low Density (LDR)	3
Medium Density (MDR)	8
High Density (HDR)	12

Dwelling Units (DU): Dwelling unit projections are estimated by multiplying the number of developable acres by the DU/AC factor for each land use designation. For example, 400 acres of Low Density Residential with a density range of 3 DU/AC would result in approximately 1200 DUs.

Average Household Size: Based on the declining average size of households and maintaining consistency with similar rural growth centers and developing communities in the Twin Cities Metropolitan Area, a factor of 2.53 persons per household upon Full Build was used to estimate population.

Population: Population is determined by multiplying the projected number of dwelling units by the average persons per household factor. For example, 1,000 dwelling units with an average persons per household size of 2.53 would yield 2,530 residents.

Non-Residential: Building Square Footage & Employment

Employment generation for Commercial and Industrial land uses were calculated using the following method:

Developable Acres: Acreages were derived from GIS-based calculations for each of the land use designations within the AUAR Study Area, excluding areas identified as wetland on the National Wetland Inventory map, floodplain, and/or Department of Natural Resources protected waters.

Net Acres: It is estimated that 20% of the developable acreage will result in actual net square feet of building. The remaining 80% is assumed to be reserved for infrastructures such as roads, right-of-ways, easements, parking, stormwater treatment areas, landscaping, etc. For example, 200 developable acres of Commercial land use is equal to 40 net acres.

Building Square Feet: To convert net acres to building square feet, net acres are multiplied by 43,560. For example, 40 net acres of Commercial land use (200 developable acres) equals 1,742,400 square feet of building space.

Percent of Land Use: It is recognized there are different subcategories of commercial and industrial land use types exist within the broad land use designations. Percentages of each land use designation are listed in the table below. For example, 1,742,400 square feet of commercial building space square feet would yield 1,219,680 square feet of retail space and 522,720 square feet of office space.

Square Feet (SF)/Employee factor: This factor indicates the number of square feet of building space per employee and is used to estimate the number of jobs for a given land use designation. These factors for the commercial and industrial land use designations are listed in the table below.

Land Use Designation	% of Land Use	SF/Employee
Commercial		
Retail	70%	495
Office	30%	265
Industrial		
Light	40%	1,030
Heavy	40%	1,500
Business Park	20%	600

Employment: Employment for commercial, industrial, and business parkland uses is calculated by dividing the total number of building square feet by the SF/Employee factor. For example, 522,720 square feet of commercial office building space would yield 1,743 employees.

Schools: The City of Montrose is part of the Buffalo School District. Currently, there is one elementary school located in the city in traffic analysis zone (TAZ) 42, and approximately 32 acres have been purchased in TAZ 4 for a future junior high school. Based on a future build out population of the AUAR Study Area of approximately 35,000, it is anticipated that there would be 3 additional elementary schools built on approximately 20 acres within the City. For traffic forecasting purposes, these schools were estimated to be located in TAZs 29, 68, and 71.

Traffic Appendix C:

Socioeconomic and Trip Generation Data

2006 Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak Entering	AM Peak Exiting	PM Peak Entering	PM Peak Exiting	Daily Total
1	0.71	37	15	0	0	2	8	8	3	98
2	0.02	2	1	0	0	0	0	0	0	6
3	0.39	113	46	0	0	6	21	24	9	283
4	0.05	2	1	0	0	0	0	0	0	6
5	0.39	15	6	0	0	1	3	3	1	38
6	0.25	2	1	0	0	0	0	0	0	6
7	0.42	12	5	0	0	0	3	3	2	32
8	0.88	22	9	0	0	2	4	4	2	57
9	0.28	12	5	0	0	1	2	2	1	32
10	0.17	25	10	0	0	2	5	5	2	64
11	0.03	2	1	0	0	0	0	0	0	6
12	0.2	86	35	0	0	8	16	18	8	223
13	0.04	0	0	0	0	0	0	0	0	0
14	0.76	12	5	0	0	1	2	3	1	30
15	0.58	15	6	0	0	1	3	3	1	39
16	0.1	2	1	0	0	0	0	1	0	6
17	0.03	5	2	0	0	0	1	1	0	14
18	0.1	0	0	0	0	0	0	0	0	0
19	0.06	2	1	0	0	0	0	1	0	6
20	0.06	0	0	0	0	0	0	0	0	0
21	0.12	5	2	0	0	0	1	1	0	13
22	0.13	2	1	0	0	0	0	1	0	6
23	0.12	5	2	0	0	0	1	1	0	15
24	0.21	0	0	0	0	0	0	0	0	0
25	0.03	59	24	0	0	4	9	11	5	148
26	0.14	140	57	0	0	9	24	30	12	362
27	0.07	96	39	0	0	7	17	20	6	247
28	0.1	270	110	0	0	18	47	57	23	690
29	0.19	2	1	0	0	0	0	0	0	6
30	0.15	2	1	0	0	0	0	0	0	6
31	0.12	0	0	0	0	0	0	0	0	0
32	0.07	0	0	0	0	0	0	0	0	0
33	0.05	5	2	0	0	0	1	1	0	12
34	0.08	2	1	0	0	0	0	0	0	6
35	0.02	0	0	0	0	0	0	0	0	0
36	0.08	299	122	0	7	22	53	63	28	788
37	0.09	15	6	0	0	1	3	3	1	39
38	0.07	250	102	31	7	36	43	69	57	1272
39	0.03	76	31	8	7	12	13	21	18	394
40	0.01	0	0	0	1	0	0	0	0	2
41	0.02	34	14	10	3	9	7	15	16	325
42	0.03	0	0	0	52	11	2	3	13	111
43	0.06	0	0	25	165	46	8	26	68	849
44	0.11	5	2	0	0	0	1	1	0	12
45	0.43	17	7	0	0	1	3	4	1	44
46	0.4	12	5	0	0	1	2	3	1	31
47	0.14	10	4	0	0	1	2	2	1	26
48	1.05	0	0	0	0	0	0	0	0	0
49	0.19	12	5	0	0	1	2	3	1	30
50	0.16	12	5	0	0	1	2	3	1	32
51	0.17	10	4	0	0	1	2	2	1	25
52	0.04	0	0	0	0	0	0	0	0	0
53	0.07	22	9	0	1	0	0	0	0	0
54	0.08	0	0	0	0	0	0	0	0	0
55	0.06	0	0	0	0	0	0	0	0	0
56	0.07	2	1	0	0	0	0	0	0	6
57	0.03	69	28	29	9	23	15	37	43	864
58	0.1	328	134	0	0	23	52	62	28	801
59	0.07	17	7	0	0	1	3	4	2	45

2006 Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak		PM Peak		Daily
						Entering	Exiting	Entering	Exiting	Total
60	0.07	2	1	0	0	0	0	0	0	6
61	0.03	10	4	0	0	1	2	2	1	26
62	0.1	2	1	0	0	0	0	0	0	6
63	0.02	5	2	0	0	0	1	1	0	13
64	0.36	47	19	0	0	3	9	10	4	123
65	0.01	0	0	0	0	0	0	0	0	0
66	0.01	0	0	0	0	0	0	0	0	0
67	0.02	0	0	0	0	0	0	0	0	0
68	0.31	10	4	0	0	1	2	2	1	26
69	0.2	34	14	0	0	2	6	7	3	90
70	0.65	7	3	0	0	0	1	2	1	18
71	0.48	12	5	0	0	1	2	3	1	30
72	0.07	2	1	0	0	0	0	0	0	6
73	0.19	2	1	0	0	0	0	0	0	6
74	0.14	2	1	0	0	0	0	0	0	6
75	0.34	7	3	0	0	0	1	2	1	16
76	0.01	2	1	0	0	0	0	0	0	6
77	0.2	17	7	0	0	1	3	4	1	45
78	0.07	86	35	0	0	6	15	18	8	223
79	0.17	25	10	0	0	2	5	5	2	64
80	0.13	0	0	0	0	0	0	0	0	0
81	0.08	181	74	0	0	12	32	38	16	466
82	0.12	2	1	0	0	0	0	0	0	6
83	0.1	0	0	0	0	0	0	0	0	0
84	0.06	221	90	0	0	15	39	46	19	566
85	0.02	93	38	0	0	6	15	18	8	231
86	0.11	468	191	15	0	38	75	95	52	1370
87	0.02	25	10	0	0	2	4	5	2	62
88	0.02	51	21	0	0	4	8	10	4	128
89	0.02	49	20	0	0	4	8	9	4	122
90	0.01	15	6	23	10	16	6	23	31	597
91	0.01	2	1	0	0	0	0	0	0	6
92	0.01	0	0	0	0	0	0	0	0	0
93	0.03	0	0	0	0	0	0	0	0	0
94	0.03	0	0	0	0	0	0	0	0	0
95	0.09	120	49	0	0	8	22	26	11	316
96	11.89	972	317	3	83	86	183	223	121	3077
97	1.02	74	30	0	0	5	15	19	8	245
98	7.62	787	247	25	169	74	152	185	113	2565
99	11.67	999	384	7	92	78	188	236	120	3157
Total	47.19	6475	2467	176	606	617	1175	1508	888	21777

2030 No-Build Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak		PM Peak		Daily
						Entering	Exiting	Entering	Exiting	Total
1	0.71	37	15	0	0	2	8	8	3	99
2	0.02	2	1	0	0	0	0	0	0	6
3	0.39	113	46	0	0	6	21	24	9	284
4	0.05	2	1	0	0	0	0	0	0	6
5	0.39	15	6	0	0	1	3	3	1	39
6	0.25	2	1	0	0	0	0	0	0	6
7	0.42	12	5	0	0	0	2	2	1	32
8	0.88	22	9	0	0	2	4	5	2	58
9	0.28	348	142	0	0	23	62	73	31	904
10	0.17	25	10	0	0	2	4	5	2	65
11	0.03	2	1	0	0	0	0	0	0	6
12	0.2	500	204	0	0	33	89	106	44	1297
13	0.04	0	0	0	0	0	0	0	0	0
14	0.76	12	5	0	0	0	3	3	1	32
15	0.58	15	6	0	0	1	3	3	2	40
16	0.1	2	1	0	0	0	0	0	0	6
17	0.03	5	2	0	0	0	1	1	0	13
18	0.1	0	0	0	0	0	0	0	0	0
19	0.06	2	1	0	0	0	0	0	0	6
20	0.06	0	0	0	0	0	0	0	0	0
21	0.12	5	2	0	0	0	1	1	0	12
22	0.13	2	1	0	0	0	0	1	0	6
23	0.12	5	2	0	0	0	1	1	0	15
24	0.21	0	0	0	0	0	0	0	0	0
25	0.03	59	24	0	0	4	9	11	5	152
26	0.14	140	57	0	0	10	24	29	12	369
27	0.07	96	39	0	0	7	17	20	9	254
28	0.1	270	110	0	0	19	47	57	24	710
29	0.19	556	227	0	0	38	98	117	50	1443
30	0.15	2	1	0	0	0	0	0	0	6
31	0.12	0	0	0	0	0	0	0	0	0
32	0.07	0	0	0	0	0	0	0	0	0
33	0.05	5	2	0	0	0	1	1	0	13
34	0.08	2	1	0	0	0	0	0	0	6
35	0.02	0	0	0	0	0	0	0	0	0
36	0.08	299	122	0	7	23	52	63	29	805
37	0.09	15	6	0	0	1	3	3	1	40
38	0.07	250	102	31	7	42	44	81	70	1561
39	0.03	76	31	8	7	13	14	24	21	464
40	0.01	0	0	0	1	0	0	0	0	2
41	0.02	34	14	10	3	10	7	18	19	399
42	0.03	0	0	0	52	11	2	3	14	123
43	0.06	0	0	25	165	51	9	32	76	1010
44	0.11	5	2	0	0	0	1	1	0	13
45	0.43	17	7	0	0	1	3	4	1	45
46	0.4	12	5	0	0	1	2	3	1	31
47	0.14	10	4	0	0	1	2	2	1	26
48	1.05	0	0	0	0	0	0	0	0	0
49	0.19	12	5	0	0	1	2	3	1	30
50	0.16	12	5	0	0	1	2	3	1	32
51	0.17	10	4	0	0	1	2	2	1	25
52	0.04	0	0	0	0	0	0	0	0	0
53	0.07	22	9	0	1	1	4	4	2	59
54	0.08	0	0	0	0	0	0	0	0	0
55	0.06	0	0	0	0	0	0	0	0	0
56	0.07	2	1	0	0	0	0	0	0	6
57	0.03	69	28	29	9	25	16	41	47	969
58	0.1	328	134	0	0	23	52	63	29	819
59	0.07	17	7	0	0	1	3	4	2	46

2030 No-Build Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak Entering	AM Peak Exiting	PM Peak Entering	PM Peak Exiting	Daily Total
60	0.07	2	1	0	0	0	0	0	0	6
61	0.03	10	4	0	0	1	2	2	1	26
62	0.1	590	241	0	0	43	102	125	54	1551
63	0.02	5	2	0	0	0	0	0	0	12
64	0.36	539	220	0	0	39	76	115	49	1418
65	0.01	0	0	0	0	0	0	0	0	0
66	0.01	0	0	0	0	0	0	0	0	0
67	0.02	0	0	0	0	0	0	0	0	0
68	0.31	96	39	0	0	7	17	20	9	259
69	0.2	176	72	0	0	12	32	38	16	470
70	0.65	1426	582	0	0	97	252	303	124	3678
71	0.48	12	5	0	0	1	2	2	1	32
72	0.07	2	1	0	0	0	0	0	0	6
73	0.19	2	1	0	0	0	0	0	0	6
74	0.14	2	1	0	0	0	0	0	0	6
75	0.34	7	3	0	0	0	1	2	1	18
76	0.01	2	1	0	0	0	0	0	0	6
77	0.2	17	7	0	0	1	3	4	1	45
78	0.07	86	35	0	0	6	15	18	8	227
79	0.17	546	223	0	0	36	95	115	48	1409
80	0.13	78	32	0	0	5	14	17	6	198
81	0.08	181	74	0	0	12	32	38	16	475
82	0.12	2	1	0	0	0	0	0	0	6
83	0.1	0	0	0	0	0	0	0	0	0
84	0.06	221	90	0	0	16	39	47	20	580
85	0.02	93	38	0	0	7	15	18	8	237
86	0.11	468	191	15	0	42	76	101	59	1521
87	0.02	25	10	0	0	2	4	5	2	63
88	0.02	51	21	0	0	4	8	10	5	131
89	0.02	49	20	0	0	3	7	9	4	124
90	0.01	15	6	23	10	19	7	29	39	771
91	0.01	2	1	0	0	0	0	0	0	6
92	0.01	0	0	0	0	0	0	0	0	0
93	0.03	0	0	0	0	0	0	0	0	0
94	0.03	0	0	0	0	0	0	0	0	0
95	0.09	120	49	0	0	9	22	26	11	324
96	11.89	868	336	74	410	183	186	267	265	4878
97	1.02	767	313	0	0	57	145	184	85	2447
98	7.62	846	328	64	401	150	186	247	221	4107
99	11.67	999	384	45	283	146	193	263	209	4301
Total	47.19	11753	4740	324	1356	1253	2149	2830	1774	41734

2030 Interim Build Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak Entering	AM Peak Exiting	PM Peak Entering	PM Peak Exiting	Daily Total
1	0.71	37	15	0	0	3	7	8	4	102
2	0.02	0	0	183	131	103	33	94	166	2852
3	0.39	113	46	0	0	7	21	25	10	295
4	0.05	0	0	0	80	18	3	6	22	200
5	0.39	15	6	0	0	1	2	4	2	41
6	0.25	2	1	0	0	0	0	0	0	6
7	0.42	12	5	0	0	0	3	3	1	31
8	0.88	22	9	0	0	1	4	4	2	60
9	0.28	728	297	0	0	49	128	155	67	1962
10	0.17	25	10	0	0	2	4	5	2	67
11	0.03	7	3	183	131	107	35	101	177	3017
12	0.2	817	333	0	0	55	141	171	73	2181
13	0.04	0	0	281	200	157	50	145	258	4391
14	0.76	1014	414	0	30	68	184	220	96	2743
15	0.58	32	6	0	0	3	5	5	3	57
16	0.1	2	1	0	0	0	0	1	0	6
17	0.03	5	2	0	0	0	1	1	0	14
18	0.1	0	0	0	0	0	0	0	0	0
19	0.06	2	1	0	0	0	0	0	0	6
20	0.06	0	0	0	0	0	0	0	0	0
21	0.12	5	2	0	0	0	1	1	0	14
22	0.13	2	1	0	0	0	0	1	0	6
23	0.12	5	2	0	0	0	1	1	0	14
24	0.21	1486	607	0	0	94	250	309	139	3628
25	0.03	59	24	0	0	4	9	12	6	160
26	0.14	878	358	0	0	61	147	184	82	2396
27	0.07	219	89	0	0	16	38	46	21	604
28	0.1	605	247	0	0	43	103	127	57	1650
29	0.19	662	270	0	60	58	116	144	77	1931
30	0.15	1073	438	0	0	72	182	224	98	2861
31	0.12	0	0	0	0	0	0	0	0	0
32	0.07	0	0	0	0	0	0	0	0	0
33	0.05	5	2	0	0	0	1	1	0	14
34	0.08	2	1	0	0	0	0	0	0	6
35	0.02	0	0	146	105	89	26	86	149	2572
36	0.08	568	232	0	164	75	80	128	93	1908
37	0.09	567	232	0	0	40	95	117	53	1533
38	0.07	294	120	85	61	72	60	105	111	2274
39	0.03	76	31	8	7	11	14	20	16	391
40	0.01	0	0	0	1	0	0	0	0	2
41	0.02	34	14	10	3	7	7	12	12	260
42	0.03	0	0	0	52	11	2	4	14	129
43	0.06	0	0	0	310	66	13	24	83	743
44	0.11	0	0	0	442	95	19	33	118	1052
45	0.43	17	7	0	0	1	3	4	1	47
46	0.4	12	5	0	0	1	2	3	1	32
47	0.14	10	4	0	0	1	2	2	1	27
48	1.05	0	0	0	0	0	0	0	0	0
49	0.19	12	5	0	0	1	2	3	1	31
50	0.16	12	5	0	0	1	2	3	1	32
51	0.17	10	4	0	0	1	2	2	1	26
52	0.04	0	0	232	166	129	41	126	215	3765
53	0.07	0	0	525	375	293	102	296	495	8967
54	0.08	902	368	0	0	65	143	176	81	2321
55	0.06	0	0	0	0	0	0	0	0	0
56	0.07	0	0	0	276	61	12	21	76	682
57	0.03	0	0	256	183	147	46	138	243	4177
58	0.1	718	293	0	0	52	106	131	66	1842
59	0.07	566	231	0	0	42	92	115	53	1528

2030 Interim Build Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak Entering	AM Peak Exiting	PM Peak Entering	PM Peak Exiting	Daily Total
60	0.07	7	3	500	357	299	92	289	498	8608
61	0.03	0	0	220	157	131	41	123	217	3707
62	0.1	823	336	0	0	58	138	171	77	2215
63	0.02	5	2	0	0	0	1	1	0	14
64	0.36	495	202	0	0	33	88	107	45	1348
65	0.01	0	0	61	44	35	11	34	59	1022
66	0.01	0	0	0	0	0	0	0	0	0
67	0.02	0	0	134	96	77	24	72	127	2187
68	0.31	956	390	0	60	80	165	206	106	2758
69	0.2	1379	563	0	0	99	231	287	131	3774
70	0.65	1976	806	0	0	133	346	424	181	5366
71	0.48	12	5	0	0	1	2	3	1	31
72	0.07	15	6	0	0	1	3	3	1	40
73	0.19	15	6	0	0	1	3	3	1	39
74	0.14	2	1	0	0	0	0	0	0	6
75	0.34	7	3	0	0	0	1	2	1	18
76	0.01	2	1	0	0	0	0	0	0	6
77	0.2	17	7	0	0	1	3	4	1	46
78	0.07	286	117	0	0	20	49	61	27	786
79	0.17	680	278	0	0	47	118	144	64	1851
80	0.13	406	166	0	0	28	71	87	38	1111
81	0.08	502	205	0	0	35	85	105	47	1368
82	0.12	2	1	0	0	0	0	0	0	6
83	0.1	117	48	0	187	49	28	39	61	779
84	0.06	425	173	0	0	30	71	88	40	1153
85	0.02	93	38	0	0	7	14	16	9	247
86	0.11	468	191	61	44	68	85	123	101	2222
87	0.02	126	51	0	0	9	19	24	12	330
88	0.02	51	21	0	0	4	8	10	5	139
89	0.02	49	20	0	0	3	9	9	5	132
90	0.01	15	6	23	10	19	7	16	23	436
91	0.01	2	1	0	0	0	0	0	0	6
92	0.01	0	0	0	40	9	2	3	11	96
93	0.03	0	0	225	161	126	41	125	211	3724
94	0.03	0	0	225	161	128	41	129	218	3821
95	0.09	646	264	0	0	47	108	134	61	1767
96	11.89	868	336	74	410	178	190	259	253	4572
97	1.02	767	313	0	0	55	144	180	80	2353
98	7.62	846	328	64	401	149	189	245	217	3965
99	11.67	999	384	45	283	140	200	259	199	4069
Total	47.19	24691	10013	3541	5188	4283	4968	7332	6375	131774

2030 Full Build Socioeconomic and Trip Generation Data

TAZ #	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees	AM Peak Entering	AM Peak Exiting	PM Peak Entering	PM Peak Exiting	Daily Total
1	0.71	37	15	0	0	3	7	8	4	104
2	0.02	0	0	183	131	111	35	107	185	3207
3	0.39	1286	525	0	0	77	231	275	109	3359
4	0.05	0	0	0	80	19	3	7	24	215
5	0.39	1308	534	0	0	89	231	278	121	3539
6	0.25	853	348	0	0	55	151	181	75	2246
7	0.42	12	5	0	0	0	3	3	1	32
8	0.88	22	9	0	0	1	4	4	2	60
9	0.28	1213	495	0	0	85	212	257	113	3311
10	0.17	680	278	0	0	49	118	144	64	1859
11	0.03	7	3	183	131	116	37	115	195	3377
12	0.2	817	333	0	0	39	141	172	76	2217
13	0.04	0	0	281	200	170	53	165	284	4920
14	0.76	2029	828	0	60	141	364	437	195	5521
15	0.58	32	6	0	0	3	5	5	2	58
16	0.1	2	1	0	0	0	0	0	0	6
17	0.03	0	0	232	166	135	41	121	219	3685
18	0.1	0	0	0	344	80	15	27	98	865
19	0.06	0	0	0	319	73	14	25	91	807
20	0.06	0	0	366	261	211	63	187	341	5691
21	0.12	172	70	0	349	91	47	66	114	1350
22	0.13	303	124	0	487	131	77	105	164	2052
23	0.12	96	39	24	172	56	29	47	76	1048
24	0.21	1486	607	0	0	108	253	310	142	4079
25	0.03	59	24	0	0	4	9	12	8	162
26	0.14	878	358	0	0	64	150	185	84	2421
27	0.07	219	89	0	0	16	38	47	21	606
28	0.1	605	247	0	0	43	104	128	57	1657
29	0.19	662	270	0	60	60	117	145	79	1951
30	0.15	1073	438	0	0	73	184	225	96	2869
31	0.12	0	0	0	0	0	0	0	0	0
32	0.07	0	0	0	0	0	0	0	0	0
33	0.05	5	2	0	0	0	1	1	0	14
34	0.08	2	1	0	0	0	0	0	0	6
35	0.02	0	0	146	105	94	29	92	158	2732
36	0.08	568	232	0	164	78	102	129	99	1943
37	0.09	567	232	0	0	41	96	118	53	1542
38	0.07	294	120	85	61	75	62	110	118	2385
39	0.03	76	31	8	7	11	13	20	16	404
40	0.01	0	0	0	1	0	0	0	0	2
41	0.02	34	14	10	3	8	7	13	13	272
42	0.03	0	0	0	52	12	3	4	15	137
43	0.06	0	0	0	310	70	14	26	87	795
44	0.11	0	0	0	442	100	20	36	124	1126
45	0.43	1536	627	0	9	98	294	351	138	4193
46	0.4	12	5	0	0	1	2	3	1	33
47	0.14	10	4	0	0	1	2	2	1	27
48	1.05	22	9	0	0	1	4	5	2	59
49	0.19	566	231	0	0	36	104	123	49	1502
50	0.16	559	228	0	0	37	102	122	50	1503
51	0.17	492	201	0	0	29	91	107	42	1287
52	0.04	0	0	232	166	139	44	138	233	4095
53	0.07	0	0	525	375	316	160	325	536	9574
54	0.08	902	368	0	0	67	146	178	83	2362
55	0.06	0	0	0	0	0	0	0	0	0
56	0.07	0	0	0	276	65	13	23	80	724
57	0.03	0	0	256	183	156	47	147	258	4436
58	0.1	718	293	0	0	53	108	135	67	1862
59	0.07	566	231	0	0	43	94	117	55	1543

2030 Full Build Socioeconomic and Trip Generation Data

	Area			Retail	Non-Retail	AM Peak		PM Peak		Daily
TAZ #	(sq. mi.)	Population	Households	Employees	Employees	Entering	Exiting	Entering	Exiting	Total
60	0.07	7	3	500	357	318	97	312	533	9256
61	0.03	0	0	220	157	139	42	132	231	3974
62	0.1	823	336	0	0	59	139	171	77	2224
63	0.02	0	0	122	87	76	22	75	128	2217
64	0.36	1485	606	0	0	103	257	314	137	4005
65	0.01	0	0	61	44	38	11	37	64	1111
66	0.01	0	0	110	78	68	20	65	113	1953
67	0.02	0	0	134	96	83	25	78	137	2355
68	0.31	956	390	0	60	83	167	207	107	2781
69	0.2	1379	563	0	0	102	184	290	132	3813
70	0.65	2470	1008	0	0	170	427	527	229	6714
71	0.48	1933	789	0	60	140	342	418	189	5279
72	0.07	15	6	0	0	1	3	3	1	40
73	0.19	15	6	0	0	1	3	3	1	38
74	0.14	338	138	0	0	23	58	72	31	907
75	0.34	1345	78	0	0	96	72	67	65	1110
76	0.01	22	9	0	0	2	4	5	2	61
77	0.2	17	7	0	0	1	3	4	2	47
78	0.07	286	117	0	0	21	49	61	28	794
79	0.17	680	278	0	0	49	118	145	64	1861
80	0.13	406	166	0	0	29	71	87	39	1118
81	0.08	502	205	0	0	37	86	106	48	1383
82	0.12	172	70	0	349	92	45	64	115	1346
83	0.1	233	95	0	374	101	57	80	127	1597
84	0.06	425	173	0	0	31	72	89	41	1164
85	0.02	93	38	0	0	7	15	18	9	251
86	0.11	468	191	61	44	71	86	125	105	2297
87	0.02	126	51	0	0	9	19	24	12	333
88	0.02	51	21	0	0	4	8	10	5	140
89	0.02	49	20	0	0	4	7	10	5	133
90	0.01	15	6	23	10	14	7	17	24	462
91	0.01	2	1	0	0	0	0	0	0	6
92	0.01	0	0	0	40	9	2	3	11	102
93	0.03	0	0	225	161	135	43	137	229	4055
94	0.03	0	0	225	161	137	43	140	232	4126
95	0.09	646	264	0	0	48	110	136	62	1782
96	11.89	868	336	74	410	183	191	259	259	4603
97	1.02	767	313	0	0	56	144	177	79	2327
98	7.62	846	328	64	401	157	190	247	225	4027
99	11.67	999	384	45	283	146	201	261	205	4120
Total	47.19	39219	15471	4395	8086	6477	7734	11089	9421	193744

Socioeconomic and Trip Generation Data

Scenario	Zonal Area	Area (sq. mi.)	Population	Households	Retail Employees	Non-Retail Employees
2006	AUAR	10.98	3,505	1,432	141	262
	Total	47.19	6,475	2,467	176	606
2030 No-Build	AUAR	10.98	8,092	3,312	141	262
	Total	47.19	11,753	4,740	324	1,356
2030 Interim Build	AUAR	10.98	21,030	8,585	3,358	4,094
	Total	47.19	24,691	10,013	3,541	5,188
2030 Full Build	AUAR	10.98	35,558	14,043	4,212	6,992
	Total	47.19	39,219	15,471	4,395	8,086

Scenario	Zonal Area	AM Peak		PM Peak		Daily
		Entering	Exiting	Entering	Exiting	Total
2006	AUAR	366	611	816	515	12,369
	Total	617	1,175	1,508	888	21,777
2030 No-Build	AUAR	709	1,414	1,841	983	25,633
	Total	1,253	2,149	2,830	1,774	41,734
2030 Interim Build	AUAR	3,749	4,212	6,352	5,611	116,355
	Total	4,283	4,968	7,332	6,375	131,774
2030 Full Build	AUAR	5,923	6,975	10,109	8,638	178,202
	Total	6,477	7,734	11,089	9,421	193,744

Institute of Transportation Engineers (ITE) Trip Generation Manual Comparisons

Scenario	AM Peak		PM Peak		Daily	
	Model	ITE	Model	ITE	Model	ITE
2006	1,792	2,142	2,396	2,640	21,777	26,017
2030 No-Build	3,402	4,069	4,604	4,652	41,734	46,170
2030 Interim Build	9,251	9,540	13,707	11,770	131,774	113,226
2030 Full Build	14,211	14,283	20,510	16,347	193,744	157,895

Traffic Appendix D:

Roadway Segment Analysis

Existing Traffic Volumes and Capacity Analysis

Roadway			Existing Characteristics					Historical Traffic				
SYS	NUM	ROADWAY SEGMENT	Functional Class	Lanes	Left Turn Lanes?	Roadway Type	Posted Speed	2000 ADT	2004 ADT	2006 ADT	Annual Growth	2006 V/C Ratio
US TH	12	East of TH 25 (East Leg)	PA	2	yes	Expressway	55	9,800	12,500	12,850	4.62%	0.82
		Aetna Avenue to TH 25 (East Leg)	PA	2	yes	Undivided	55	8,800	11,800	-	7.61%	-
		Meridian Avenue to Aetna Avenue	PA	2	no	Undivided	55	8,800	11,800	-	7.61%	-
		Zephyr Avenue to Meridian Avenue	PA	2	no	Undivided	55	8,800	11,800	-	7.61%	-
		Arizona Avenue to Zephyr Avenue	PA	2	no	Undivided	35	8,800	11,800	-	7.61%	-
		TH 25/CSAH 12 to Arizona Avenue	PA	2	yes	Undivided	35	8,800	11,800	12,300	5.74%	0.97
		Center Avenue to TH 25/CSAH 12	PA	2	yes	Undivided	35	8,600	11,400	-	7.30%	-
		Emerson Avenue to Center Avenue	PA	2	yes	Undivided	35	8,600	11,400	-	7.30%	-
		Garfield Avenue to Emerson Avenue	PA	2	yes	Undivided	35	8,600	11,400	-	7.30%	-
		CR 110 to Garfield Avenue	PA	2	yes	Undivided	45	8,600	11,400	9,900	2.37%	0.74
		Cloud Avenue to CR 110	PA	2	yes	Undivided	55	7,300	9,900	10,150	5.65%	0.73
		Dempsey Avenue to Cloud Avenue	PA	2	yes	Undivided	55	7,300	9,900	-	7.91%	-
		CR 62 to Dempsey Avenue	PA	2	yes	Undivided	55	7,300	9,900	-	7.91%	-
		CSAH 8 to CR 62	PA	2	yes	Undivided	35	7,300	9,900	-	7.91%	-
		West of CSAH 8	PA	2	yes	Undivided	55	7,300	9,900	-	7.91%	-
TH	25	South of Armitage Avenue	MiA	2	no	Undivided	55	2,200	2,750	-	5.74%	-
		Armitage Avenue to 70th Street	MiA	2	no	Undivided	55	2,200	2,750	-	5.74%	-
		70th Street to 7th Street South	MiA	2	no	Undivided	55	2,200	2,750	2,250	0.38%	0.18
		7th Street South to TH 12	MiA	2	yes	Undivided	45	2,200	2,750	-	5.74%	-
		TH 12 to 7th Street North	MiA	2	no	Undivided	55	3,150	4,650	3,900	10.23%	0.34
		7th Street North to 47th Street	MiA	2	no	Undivided	55	3,150	4,650	-	10.23%	-
		47th Street to CSAH 32	MiA	2	no	Undivided	55	3,150	4,650	-	10.23%	-
		CSAH 32 to 40th Street	MiA	2	no	Undivided	55	3,650	5,100	-	8.72%	-
		North of 40th Street	MiA	2	no	Undivided	55	3,650	5,100	-	8.72%	-
CSAH	8	South of TH 12	MC	2	no	Undivided	55	1,800	2,750	-	11.18%	-
CSAH	9	North of TH 12	MiC	2	no	Undivided	30	1,300	1,650	-	6.14%	-
CSAH	12	TH 12 to 3rd Street South	MiA	2	yes	Undivided	30	2,850	4,100	5,500	11.58%	0.48
		3rd Street South to 2nd Street South	MiA	2	yes	Undivided	30	2,850	4,100	-	9.52%	-
		2nd Street South to 1st Street North	MiA	2	yes	Undivided	30	2,850	4,100	-	9.52%	-
		1st Street North to 5th Street North	MiA	2	yes	Undivided	30	2,850	4,100	5,000	9.82%	0.39
		5th Street North to 7th Street North	MiA	2	yes	Undivided	50	2,850	4,100	-	9.52%	-
		7th Street North to Aspen Lane	MiA	2	yes	Undivided	50	2,850	4,100	-	9.52%	-
		Aspen Lane to 45th Street	MiA	2	yes	Undivided	55	2,950	3,350	-	3.23%	-
		45th Street to CR 107	MiA	2	yes	Undivided	55	2,950	3,350	3,750	4.08%	0.22
		North of CR 107	MiA	2	yes	Undivided	55	2,950	3,350	-	3.23%	-
CR	107	Clementa Avenue to CSAH 12	MiC	2	no	Undivided	55	1,000	1,200	-	4.66%	-
		West of Clementa Avenue	MiC	2	no	Undivided	55	1,000	1,200	-	4.66%	-
CR	110	South of 80th Street	MC	2	no	Undivided	55	270	720	-	27.79%	-
		80th Street to 75th Street	MC	2	no	Undivided	55	270	720	-	27.79%	-
		75th Street to 70th Street	MC	2	no	Undivided	55	270	720	-	27.79%	-
		70th Street to 7th Street South	MC	2	no	Undivided	55	270	720	-	27.79%	-
		7th Street South to TH 12	MC	2	no	Undivided	55	270	720	670	16.36%	0.08
CSAH	32	East of TH 25 (East Leg)	MiC	2	no	Undivided	55	700	850	-	4.97%	-

Existing Traffic Volumes and Capacity Analysis

Roadway			Existing Characteristics					Historical Traffic				
SYS	NUM	ROADWAY SEGMENT	Functional Class	Lanes	Left Turn Lanes?	Roadway Type	Posted Speed	2000 ADT	2004 ADT	2006 ADT	Annual Growth	2006 V/C Ratio
	Aetna Avenue	TH 12 to 7th Street North	Local	2	no	Undivided	-	-	-	-	NA	-
		7th Street North to 47th Street	Local	2	no	Undivided	-	-	-	-	NA	-
	Armitage Avenue	TH 25 to Meridian Avenue	Local	2	no	Undivided	-	-	-	-	NA	-
	Breckenridge Avenue	East of Clementa Avenue	Local	2	no	Undivided	-	-	-	-	NA	-
	Clementa Avenue	TH 12 to 3rd Street South	Local	2	no	Undivided	30	-	-	350	NA	0.05
		3rd Street South to 55th Street	Local	2	no	Undivided	30	-	-	-	NA	-
		55th Street to Breckenridge	Local	2	no	Undivided	30	-	-	-	NA	-
		Breckenridge to 45th Street	Local	2	no	Undivided	30	-	-	-	NA	-
		45th Street to CR 107	Local	2	no	Undivided	30	-	-	300	NA	0.04
		North of CR 107	Local	2	no	Undivided	-	-	-	-	NA	-
	Dempsey Avenue	North of TH 12	Local	2	no	Undivided	-	-	-	-	NA	-
	Garfield Avenue	North of TH 12	Local	2	no	Undivided	30	-	-	-	NA	-
	Meridian Avenue	TH 12 to 72nd Street	Local	2	no	Undivided	-	-	-	-	NA	-
		72nd Street to Armitage Avenue	Local	2	no	Undivided	-	-	-	-	NA	-
		40th Street to 45th Street	Local	2	no	Undivided	-	-	-	-	NA	-
	Zephyr Avenue	TH 12 to 3rd Street South	Local	2	no	Undivided	30	-	-	-	NA	-
	1st Street North	Clementa Avenue to CSAH 12	Local	2	no	Undivided	30	-	-	-	NA	-
	3rd/5th Street North	East of CSAH 12	MiC	2	no	Undivided	30	-	-	-	NA	-
		West of CSAH 12	Local	2	no	Undivided	30	-	-	-	NA	-
	7th Street North	West of CSAH 12	Local	2	no	Undivided	30	-	-	-	NA	-
	7th Street South	West of TH 25	Local	2	no	Undivided	-	-	-	-	NA	-
	36th Street	East of CSAH 12	Local	2	no	Undivided	-	-	-	-	NA	-
	40th Street	West of TH 25	Local	2	no	Undivided	-	-	-	-	NA	-
	45th Street	Meridian Avenue to Aetna Avenue	Local	2	no	Undivided	-	-	-	-	NA	-
	47th Street	Aetna Avenue to TH 25	Local	2	no	Undivided	-	-	-	-	NA	-
	55th Street	West of Clementa Avenue	Local	2	no	Undivided	-	-	-	-	NA	-
	70th Street	West of CR 110	Local	2	no	Undivided	-	-	-	-	NA	-
	82nd Street	Armitage Avenue to CSAH 30	Local	2	no	Undivided	-	-	-	-	NA	-

PA: Principal Arterial
MiA: Minor Arterial
MC: Major Collector
MiC: Minor Collector
Local: Local Collector (Existing Gravel or Paved Road, or Unknown Designation)
New: New Roadway that Currently Does Not Exist

No-Build Traffic Volumes and Capacity Analysis

Roadway			Forecasted Traffic									
SYS	NUM	ROADWAY SEGMENT	Proposed Functional Class	2030 ADT	Annual Growth	2030 V/C Ratio	2030 Mitigated Lanes	Mitigated Left Turn Lanes?	2030 Mitigated Type	2030 Mitigated V/C Ratio	D-Factor	K-Factor
US TH	12	East of TH 25 (East Leg)	PA	13,700	0.27%	1.06	4	yes	Expressway	0.46	0.706	0.111
		Aetna Avenue to TH 25 (East Leg)	PA	15,500	1.05%	1.94	4	yes	Divided	0.95	0.739	0.133
		Meridian Avenue to Aetna Avenue	PA	15,500	1.05%	2.42	4	yes	Divided	0.95	0.737	0.132
		Zephyr Avenue to Meridian Avenue	PA	15,500	1.05%	2.71	4	yes	Divided	0.98	0.734	0.132
		Arizona Avenue to Zephyr Avenue	PA	16,100	1.20%	2.80	6	yes	Divided	0.68	0.740	0.131
		TH 25/CSAH 12 to Arizona Avenue	PA	16,100	1.13%	2.24	6	yes	Divided	0.68	0.739	0.131
		Center Avenue to TH 25/CSAH 12	PA	14,400	0.90%	1.70	4	yes	Divided	0.77	0.722	0.113
		Emerson Avenue to Center Avenue	PA	14,100	0.82%	1.68	4	yes	Divided	0.76	0.735	0.113
		Garfield Avenue to Emerson Avenue	PA	13,900	0.77%	1.62	4	yes	Divided	0.74	0.724	0.112
		CR 110 to Garfield Avenue	PA	13,900	1.42%	1.52	4	yes	Divided	0.69	0.700	0.109
		Cloud Avenue to CR 110	PA	12,600	0.91%	1.33	4	yes	Divided	0.61	0.689	0.107
		Dempsey Avenue to Cloud Avenue	PA	11,800	0.68%	1.01	4	yes	Divided	0.50	0.651	0.103
		CR 62 to Dempsey Avenue	PA	12,300	0.84%	0.91	2	yes	Undivided	0.91	0.579	0.100
		CSAH 8 to CR 62	PA	11,400	0.54%	0.93	2	yes	Undivided	0.93	0.557	0.102
		West of CSAH 8	PA	13,100	1.08%	1.25	4	yes	Divided	0.57	0.560	0.118
TH	25	South of Armitage Avenue	MiA	3,300	0.70%	0.49	2	no	Undivided	0.49	0.582	0.160
		Armitage Avenue to 70th Street	MiA	5,300	2.56%	0.66	2	no	Undivided	0.66	0.509	0.135
		70th Street to 7th Street South	MiA	5,400	3.72%	0.66	2	no	Undivided	0.66	0.509	0.133
		7th Street South to TH 12	MiA	5,600	2.77%	0.55	2	yes	Undivided	0.55	0.519	0.133
		TH 12 to 7th Street North	MiA	6,900	1.53%	2.02	4	yes	Divided	0.79	0.769	0.238
		7th Street North to 47th Street	MiA	6,900	1.53%	2.02	4	yes	Divided	0.79	0.769	0.238
		47th Street to CSAH 32	MiA	6,900	1.53%	2.01	4	yes	Divided	0.60	0.793	0.243
		CSAH 32 to 40th Street	MiA	6,600	1.00%	1.10	2	yes	Undivided	0.88	0.552	0.199
		North of 40th Street	MiA	6,700	1.06%	1.21	2	yes	Undivided	0.97	0.693	0.172
CSAH	8	South of TH 12	MC	3,200	0.58%	0.69	2	no	Undivided	0.69	0.543	0.177
CSAH	9	North of TH 12	MC	1,800	0.34%	0.29	2	no	Undivided	0.29	0.528	0.138
CSAH	12	TH 12 to 3rd Street South	MiA	7,000	1.01%	0.75	2	yes	Undivided	0.75	0.615	0.117
		3rd Street South to 2nd Street South	MiA	6,400	1.73%	0.73	2	yes	Undivided	0.73	0.641	0.120
		2nd Street South to 1st Street North	MiA	6,800	1.96%	0.77	2	yes	Undivided	0.77	0.649	0.117
		1st Street North to 5th Street North	MiA	6,000	0.76%	0.60	2	yes	Undivided	0.60	0.618	0.112
		5th Street North to 7th Street North	MiA	5,500	1.14%	0.47	2	yes	Undivided	0.47	0.605	0.111
		7th Street North to Aspen Lane	MiA	4,700	0.53%	0.35	2	yes	Undivided	0.35	0.545	0.107
		Aspen Lane to 45th Street	MiA	4,400	1.05%	0.31	2	yes	Undivided	0.31	0.519	0.106
		45th Street to CR 107	MiA	4,400	0.67%	0.31	2	yes	Undivided	0.31	0.521	0.106
		North of CR 107	MiA	5,700	2.07%	0.36	2	yes	Undivided	0.36	0.605	0.087
CR	107	Clementa Avenue to CSAH 12	MC	7,500	7.30%	1.02	2	yes	Undivided	0.81	0.591	0.109
		West of Clementa Avenue	MC	6,400	6.65%	0.98	2	no	Undivided	0.98	0.524	0.138
CR	110	South of 80th Street	MC	1,300	2.30%	0.27	2	no	Undivided	0.27	0.743	0.133
		80th Street to 75th Street	MC	1,300	2.30%	0.27	2	no	Undivided	0.27	0.741	0.132
		75th Street to 70th Street	MC	1,400	2.59%	0.39	2	no	Undivided	0.39	0.804	0.157
		70th Street to 7th Street South	MC	3,900	6.71%	0.50	2	no	Undivided	0.50	0.504	0.115
		7th Street South to TH 12	MC	3,700	7.38%	0.49	2	no	Undivided	0.49	0.520	0.115
CSAH	32	East of TH 25 (East Leg)	MiC	940	0.39%	0.61	2	no	Undivided	0.61	0.961	0.296

No-Build Traffic Volumes and Capacity Analysis

Roadway			Forecasted Traffic									
SYS	NUM	ROADWAY SEGMENT	Proposed Functional Class	2030 ADT	Annual Growth	2030 V/C Ratio	2030 Mitigated Lanes	Mitigated Left Turn Lanes?	2030 Mitigated Type	2030 Mitigated V/C Ratio	D-Factor	K-Factor
	Aetna Avenue	TH 12 to 7th Street North	Local	70	NA	0.02	2	no	Undivided	0.02	0.750	0.114
		7th Street North to 47th Street	Local	50	NA	0.01	2	no	Undivided	0.01	0.800	0.111
	Armitage Avenue	TH 25 to Meridian Avenue	Local	1,300	NA	0.50	2	no	Undivided	0.50	0.815	0.173
	Breckenridge Avenue	East of Clementa Avenue	MiC	950	NA	0.18	2	no	Undivided	0.18	0.644	0.106
		West of Clementa Avenue	MiC	770	NA	0.18	2	no	Undivided	0.18	0.725	0.118
	Clementa Avenue	TH 12 to 3rd Street South	MC	2,400	8.35%	0.37	2	no	Undivided	0.37	0.622	0.111
		3rd Street South to 55th Street	MC	2,500	NA	0.37	2	no	Undivided	0.37	0.613	0.109
		55th Street to Breckenridge	MC	2,600	NA	0.29	2	no	Undivided	0.29	0.516	0.096
		Breckenridge to 45th Street	MC	2,500	NA	0.36	2	no	Undivided	0.36	0.668	0.096
		45th Street to CR 107	MC	2,500	NA	0.34	2	no	Undivided	0.34	0.668	0.096
		North of CR 107	Local	400	NA	0.05	2	no	Undivided	0.05	0.575	0.100
	Dempsey Avenue	North of TH 12	Local	1,000	NA	0.13	2	no	Undivided	0.13	0.557	0.097
	Garfield Avenue	North of TH 12	MiC	700	NA	0.10	2	no	Undivided	0.10	0.524	0.090
		South of TH 12	Local	550	NA	0.17	2	no	Undivided	0.17	0.851	0.136
	Meridian Avenue	TH 12 to 72nd Street	Local	160	NA	0.04	2	no	Undivided	0.04	0.684	0.118
		72nd Street to Armitage Avenue	Local	70	NA	0.01	2	no	Undivided	0.01	0.571	0.104
		40th Street to 45th Street	Local	230	NA	0.06	2	no	Undivided	0.06	0.778	0.155
	Zephyr Avenue	South of TH 12	Local	40	NA	0.01	2	no	Undivided	0.01	0.800	0.122
		TH 12 to 3rd Street South	Local	1,000	NA	0.22	2	no	Undivided	0.22	0.697	0.106
		North of 3rd Street South	Local	1,000	NA	0.21	2	no	Undivided	0.21	0.704	0.107
	1st Street North	Clementa Avenue to CSAH 12	MiC	1,500	NA	0.35	2	no	Undivided	0.35	0.715	0.119
	3rd/5th Street North	East of CSAH 12	MiC	670	NA	0.15	2	no	Undivided	0.15	0.549	0.152
		West of CSAH 12	MiC	340	NA	0.07	2	no	Undivided	0.07	0.722	0.107
	7th Street North	West of CSAH 12	MC	1,400	NA	0.29	2	no	Undivided	0.29	0.746	0.123
	7th Street South	West of TH 25	MC	320	NA	0.06	2	no	Undivided	0.06	0.703	0.114
		West of CR 110	MiC	320	NA	0.07	2	no	Undivided	0.07	0.676	0.116
	36th Street	East of CSAH 12	Local	640	NA	0.20	2	no	Undivided	0.20	0.776	0.182
	40th Street	West of TH 25	Local	800	NA	0.26	2	no	Undivided	0.26	0.804	0.180
	45th Street	Meridian Avenue to Aetna Avenue	Local	180	NA	0.07	2	no	Undivided	0.07	0.889	0.196
		2nd Avenue to CSAH 12	MC	200	NA	0.00	2	no	Undivided	0.00	0.667	0.158
	47th Street	Aetna Avenue to TH 25	Local	200	NA	0.08	2	no	Undivided	0.08	0.897	0.192
	55th Street	West of Clementa Avenue	MC	1,900	NA	0.30	2	no	Undivided	0.30	0.652	0.108
	70th Street	Garfield Avenue to TH 25	MiC	410	NA	0.10	2	no	Undivided	0.10	0.740	0.123
		CR 110 to Garfield Avenue	MiC	940	NA	0.17	2	no	Undivided	0.17	0.571	0.112
		West of CR 110	Local	2,200	NA	0.43	2	no	Undivided	0.43	0.613	0.109
	75th Street	CR 110 to TH 25	MC	440	NA	0.17	2	no	Undivided	0.17	0.760	0.227
	80th Street	East of CR 110	Local	10	NA	0.00	2	no	Undivided	0.00	0.500	0.286
	82nd Street	Armitage Avenue to CSAH 30	Local	1,400	NA	0.49	2	no	Undivided	0.49	0.817	0.173

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MiA: Minor Arterial
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Interim Build Traffic Volumes and Capacity Analysis

Roadway			Forecasted Traffic									
SYS	NUM	ROADWAY SEGMENT	Proposed Functional Class	2030 ADT	Annual Growth	2030 V/C Ratio	2030 Mitigated Lanes	Mitigated Left Turn Lanes?	2030 Mitigated Type	2030 Mitigated V/C Ratio	D-Factor	K-Factor
US TH	12	East of TH 25 (East Leg)	PA	19,500	1.75%	1.27	4	yes	Expressway	0.55	0.631	0.105
		Aetna Avenue to TH 25 (East Leg)	PA	20,300	2.11%	1.97	4	yes	Divided	0.96	0.632	0.120
		Meridian Avenue to Aetna Avenue	PA	20,300	2.11%	2.45	4	yes	Divided	0.96	0.630	0.120
		Zephyr Avenue to Meridian Avenue	PA	20,500	2.15%	2.78	6	yes	Divided	0.67	0.628	0.120
		Arizona Avenue to Zephyr Avenue	PA	25,500	3.01%	2.99	6	yes	Divided	0.72	0.581	0.112
		TH 25/CSAH 12 to Arizona Avenue	PA	25,700	3.12%	2.42	6	yes	Divided	0.73	0.631	0.104
		Center Avenue to TH 25/CSAH 12	PA	23,700	2.85%	2.00	4	yes	Divided	0.91	0.586	0.100
		Emerson Avenue to Center Avenue	PA	23,100	2.75%	1.98	4	yes	Divided	0.90	0.623	0.095
		Garfield Avenue to Emerson Avenue	PA	22,700	2.68%	1.90	4	yes	Divided	0.87	0.614	0.095
		CR 110 to Garfield Avenue	PA	18,200	2.57%	1.57	4	yes	Divided	0.72	0.634	0.095
		Cloud Avenue to CR 110	PA	15,000	1.64%	1.37	4	yes	Divided	0.62	0.630	0.101
		Dempsey Avenue to Cloud Avenue	PA	13,400	1.17%	1.02	4	yes	Divided	0.50	0.609	0.098
		CR 62 to Dempsey Avenue	PA	13,800	1.29%	0.99	2	yes	Undivided	0.99	0.542	0.103
		CSAH 8 to CR 62	PA	12,600	0.93%	1.05	4	yes	Divided	0.48	0.530	0.109
		West of CSAH 8	PA	14,000	1.34%	1.29	4	yes	Divided	0.59	0.558	0.115
TH	25	South of Armitage Avenue	MiA	6,800	3.54%	0.67	2	no	Undivided	0.67	0.527	0.116
		Armitage Avenue to 70th Street	MiA	10,300	5.21%	1.09	2	yes	Undivided	0.87	0.511	0.115
		70th Street to 7th Street South	MiA	10,600	6.67%	1.07	2	yes	Undivided	0.86	0.511	0.110
		7th Street South to TH 12	MiA	9,300	4.80%	0.79	2	yes	Undivided	0.79	0.523	0.113
		TH 12 to 7th Street North	MiA	7,000	1.59%	1.16	4	yes	Divided	0.46	0.608	0.171
		7th Street North to 47th Street	MiA	7,000	1.59%	1.16	4	yes	Divided	0.46	0.608	0.171
		47th Street to CSAH 32	MiA	7,200	1.70%	1.36	4	yes	Divided	0.40	0.682	0.183
		CSAH 32 to 40th Street	MiA	6,600	1.00%	0.82	2	yes	Undivided	0.66	0.550	0.149
		North of 40th Street	MiA	6,700	1.06%	0.85	2	yes	Undivided	0.68	0.567	0.148
CSAH	8	South of TH 12	MC	3,200	0.58%	0.79	2	no	Undivided	0.79	0.595	0.186
CSAH	9	North of TH 12	MC	1,800	0.34%	0.42	2	no	Undivided	0.42	0.551	0.190
CSAH	12	TH 12 to 3rd Street South	MiA	18,400	5.16%	1.31	4	yes	Divided	0.60	0.555	0.086
		3rd Street South to 2nd Street South	MiA	17,900	5.83%	1.31	4	yes	Divided	0.60	0.570	0.086
		2nd Street South to 1st Street North	MiA	18,400	5.94%	1.35	4	yes	Divided	0.61	0.575	0.086
		1st Street North to 5th Street North	MiA	17,500	5.36%	1.14	4	yes	Divided	0.52	0.541	0.084
		5th Street North to 7th Street North	MiA	14,900	5.09%	0.74	2	yes	Undivided	0.74	0.502	0.077
		7th Street North to Aspen Lane	MiA	16,800	5.57%	0.99	2	yes	Undivided	0.99	0.508	0.091
		Aspen Lane to 45th Street	MiA	11,000	4.68%	0.67	2	yes	Undivided	0.67	0.504	0.094
		45th Street to CR 107	MiA	11,900	4.93%	0.88	2	yes	Undivided	0.88	0.579	0.100
		North of CR 107	MiA	10,400	4.45%	0.69	2	yes	Undivided	0.69	0.502	0.110
CR	107	Clementa Avenue to CSAH 12	MC	7,500	7.30%	0.93	2	yes	Undivided	0.74	0.652	0.090
		West of Clementa Avenue	MC	7,000	7.02%	0.66	2	no	Undivided	0.66	0.526	0.085
CR	110	South of 80th Street	MC	2,600	5.06%	0.46	2	no	Undivided	0.46	0.577	0.147
		80th Street to 75th Street	MC	2,600	5.06%	0.46	2	no	Undivided	0.46	0.570	0.146
		75th Street to 70th Street	MC	2,500	4.90%	0.44	2	no	Undivided	0.44	0.532	0.149
		70th Street to 7th Street South	MC	4,800	7.57%	0.60	2	no	Undivided	0.60	0.531	0.105
		7th Street South to TH 12	MC	9,700	11.78%	1.09	2	yes	Undivided	0.87	0.555	0.091
CSAH	32	East of TH 25 (East Leg)	MiC	1,800	2.93%	0.92	2	no	Undivided	0.92	0.894	0.253

Interim Build Traffic Volumes and Capacity Analysis

Roadway			Forecasted Traffic									
SYS	NUM	ROADWAY SEGMENT	Proposed Functional Class	2030 ADT	Annual Growth	2030 V/C Ratio	2030 Mitigated Lanes	Mitigated Left Turn Lanes?	2030 Mitigated Type	2030 Mitigated V/C Ratio	D-Factor	K-Factor
	Aetna Avenue	TH 12 to 7th Street North	Local	70	NA	0.02	2	no	Undivided	0.02	0.800	0.154
		7th Street North to 47th Street	Local	40	NA	0.01	2	no	Undivided	0.01	0.857	0.167
	Armitage Avenue	TH 25 to Meridian Avenue	Local	2,000	NA	0.69	2	no	Undivided	0.69	0.788	0.160
	Breckenridge Avenue	East of Clementa Avenue	MiC	380	NA	0.09	2	no	Undivided	0.09	0.717	0.122
		West of Clementa Avenue	MiC	1,800	NA	0.39	2	no	Undivided	0.39	0.704	0.113
	Clementa Avenue	TH 12 to 3rd Street South	MC	9,900	14.94%	1.23	2	yes	Undivided	0.98	0.589	0.094
		3rd Street South to 55th Street	MC	8,300	NA	1.07	2	yes	Undivided	0.85	0.607	0.095
		55th Street to 7th Street North	MC	6,200	NA	0.69	2	no	Undivided	0.69	0.513	0.097
		7th Street North to 45th Street	MC	5,000	NA	0.53	2	no	Undivided	0.53	0.534	0.090
		45th Street to CR 107	MC	4,500	NA	0.58	2	no	Undivided	0.58	0.658	0.092
		North of CR 107	Local	600	NA	0.07	2	no	Undivided	0.07	0.550	0.100
	Dempsey Avenue	North of TH 12	Local	1,500	NA	0.32	2	no	Undivided	0.32	0.612	0.139
	Garfield Avenue	North of TH 12	MiC	1,300	NA	0.19	2	no	Undivided	0.19	0.504	0.099
		TH 12 to 7th Street South	MC	7,300	NA	0.97	2	no	Undivided	0.97	0.528	0.113
		7th Street South to 70th Street	MC	3,600	NA	0.50	2	no	Undivided	0.50	0.538	0.116
	Meridian Avenue	TH 12 to 72nd Street	Local	320	NA	0.06	2	no	Undivided	0.06	0.511	0.140
		72nd Street to Armitage Avenue	Local	240	NA	0.05	2	no	Undivided	0.05	0.541	0.152
		40th Street to 45th Street	Local	1,040	NA	0.27	2	no	Undivided	0.27	0.701	0.161
	Zephyr Avenue	South of TH 12	MC	8,900	NA	0.89	2	no	Undivided	0.89	0.525	0.081
		TH 12 to 3rd Street South	MC	5,100	NA	1.01	2	yes	Undivided	0.81	0.600	0.141
		3rd Street South to 3rd Street North	MC	4,600	NA	0.98	2	no	Undivided	0.98	0.663	0.145
		3rd Street North to 7th Street North	MC	3,300	NA	0.77	2	no	Undivided	0.77	0.582	0.181
		7th Street North to Merdian Avenue	Local	2,800	NA	0.66	2	no	Undivided	0.66	0.600	0.142
	1st Street North	Clementa Avenue to CSAH 12	MiC	2,800	NA	0.58	2	no	Undivided	0.58	0.655	0.113
	3rd/5th Street North	CSAH 12 to Zephyr Avenue	MiC	2,700	NA	0.45	2	no	Undivided	0.45	0.513	0.118
		West of CSAH 12	Local	2,100	NA	0.45	2	no	Undivided	0.45	0.708	0.109
	7th Street North	CSAH 12 to Zephyr Avenue	MC	2,800	NA	0.68	2	no	Undivided	0.68	0.680	0.159
		2nd Avenue to CSAH 12	MC	3,800	NA	0.72	2	no	Undivided	0.72	0.694	0.122
		Clementa Avenue to 2nd Avenue	MC	2,400	NA	0.44	2	no	Undivided	0.44	0.646	0.128
		West of Clementa Avenue	MC	530	NA	0.10	2	no	Undivided	0.10	0.672	0.126
	7th Street South	East of TH 25	MC	7,700	NA	1.05	2	yes	Undivided	0.84	0.607	0.095
		Garfield Avenue to TH 25	MC	5,300	NA	0.82	2	no	Undivided	0.82	0.665	0.104
		CR 110 to Garfield Avenue	MC	6,200	NA	0.79	2	no	Undivided	0.79	0.559	0.103
		West of CR 110	MiC	5,500	NA	0.76	2	no	Undivided	0.76	0.502	0.100
	36th Street	East of CSAH 12	Local	1,000	NA	0.24	2	no	Undivided	0.24	0.658	0.161
	40th Street	West of TH 25	Local	1,450	NA	0.44	2	no	Undivided	0.44	0.769	0.175
	45th Street	Meridian Avenue to Aetna Avenue	Local	1,000	NA	0.39	2	no	Undivided	0.39	0.832	0.206
		CSAH 12 to Arizona Avenue	MC	4,000	NA	0.59	2	no	Undivided	0.59	0.656	0.096
		2nd Avenue to CSAH 12	MC	1,100	NA	0.18	2	no	Undivided	0.18	0.650	0.109
		West of 2nd Avenue	Local	20	NA	0.01	2	no	Undivided	0.01	0.667	0.143
	47th Street	Aetna Avenue to TH 25	Local	980	NA	0.40	2	no	Undivided	0.40	0.841	0.212
	55th Street	West of Clementa Avenue	MC	4,600	NA	0.75	2	no	Undivided	0.75	0.622	0.117
	70th Street	Garfield Avenue to TH 25	MiC	1,400	NA	0.42	2	no	Undivided	0.42	0.775	0.141
		CR 110 to Garfield Avenue	MiC	3,600	NA	0.62	2	no	Undivided	0.62	0.524	0.119
		West of CR 110	Local	2,600	NA	0.45	2	no	Undivided	0.45	0.581	0.103
	75th Street	CR 110 to TH 25	MC	190	NA	0.05	2	no	Undivided	0.05	0.724	0.152
	80th Street	East of CR 110	Local	50	NA	0.01	2	no	Undivided	0.01	0.800	0.109
	82nd Street	Armitage Avenue to CSAH 30	Local	2,200	NA	0.68	2	no	Undivided	0.68	0.782	0.161

PA: Principal Arterial
MiA: Minor Arterial
MC: Major Collector
MiC: Minor Collector
Local: Local Collector (Existing Gravel or Paved Road, or Unknown Designation)
New: New Roadway that Currently Does Not Exist

Full Build Traffic Volumes and Capacity Analysis

Roadway			Forecasted Traffic									
SYS	NUM	ROADWAY SEGMENT	Proposed Functional Class	2030 ADT	Annual Growth	2030 V/C Ratio	2030 Mitigated Lanes	Mitigated Left Turn Lanes?	2030 Mitigated Type	2030 Mitigated V/C Ratio	D-Factor	K-Factor
US TH	12	East of TH 25 (East Leg)	PA	22,500	2.36%	1.43	4	yes	Expressway	0.62	0.607	0.106
		Aetna Avenue to TH 25 (East Leg)	PA	21,200	2.28%	2.04	4	yes	Divided	1.00	0.636	0.118
		Meridian Avenue to Aetna Avenue	PA	24,900	2.91%	2.84	6	yes	Divided	0.74	0.626	0.114
		Zephyr Avenue to Meridian Avenue	PA	25,700	3.04%	2.80	6	yes	Divided	0.68	0.584	0.104
		Arizona Avenue to Zephyr Avenue	PA	31,800	3.89%	3.11	6	yes	Divided	0.75	0.540	0.101
		TH 25/CSAH 12 to Arizona Avenue	PA	31,700	4.02%	2.74	6	yes	Divided	0.83	0.610	0.099
		Center Avenue to TH 25/CSAH 12	PA	27,100	3.39%	2.16	4	yes	Divided	0.98	0.570	0.097
		Emerson Avenue to Center Avenue	PA	26,400	3.28%	2.14	4	yes	Divided	0.97	0.604	0.093
		Garfield Avenue to Emerson Avenue	PA	26,000	3.22%	2.06	4	yes	Divided	0.94	0.595	0.093
		CR 110 to Garfield Avenue	PA	19,800	2.93%	1.56	4	yes	Divided	0.71	0.627	0.087
		Cloud Avenue to CR 110	PA	16,800	2.12%	1.43	4	yes	Divided	0.65	0.606	0.098
		Dempsey Avenue to Cloud Avenue	PA	15,100	1.64%	1.07	4	yes	Divided	0.53	0.581	0.096
		CR 62 to Dempsey Avenue	PA	16,000	1.86%	1.09	4	yes	Divided	0.53	0.521	0.102
		CSAH 8 to CR 62	PA	15,000	1.61%	1.17	4	yes	Divided	0.53	0.502	0.108
		West of CSAH 8	PA	16,000	1.86%	1.34	4	yes	Divided	0.61	0.541	0.108
TH	25	South of Armitage Avenue	MiA	8,000	4.19%	0.96	2	no	Undivided	0.96	0.605	0.123
		Armitage Avenue to 70th Street	MiA	13,200	6.22%	1.24	2	yes	Undivided	1.00	0.515	0.102
		70th Street to 7th Street South	MiA	13,500	7.75%	1.23	2	yes	Undivided	0.98	0.525	0.096
		7th Street South to TH 12	MiA	11,500	5.66%	0.92	2	yes	Undivided	0.92	0.536	0.104
		TH 12 to 7th Street North	MiA	10,000	2.99%	1.34	4	yes	Divided	0.52	0.588	0.142
		7th Street North to 47th Street	MiA	11,100	3.40%	1.30	4	yes	Divided	0.51	0.517	0.142
		47th Street to CSAH 32	MiA	10,400	3.14%	1.38	4	yes	Divided	0.41	0.600	0.146
		CSAH 32 to 40th Street	MiA	8,600	2.03%	1.15	2	yes	Undivided	0.92	0.599	0.148
		North of 40th Street	MiA	9,500	2.42%	1.15	2	yes	Undivided	0.92	0.569	0.140
CSAH	8	South of TH 12	MC	3,300	0.70%	0.89	2	no	Undivided	0.89	0.627	0.194
CSAH	9	North of TH 12	MC	2,000	0.74%	0.43	2	no	Undivided	0.43	0.529	0.183
CSAH	12	TH 12 to 3rd Street South	MiA	18,800	5.25%	1.38	4	yes	Divided	0.63	0.552	0.089
		3rd Street South to 2nd Street South	MiA	18,200	5.90%	1.38	4	yes	Divided	0.63	0.568	0.089
		2nd Street South to 1st Street North	MiA	18,700	6.01%	1.43	4	yes	Divided	0.65	0.575	0.089
		1st Street North to 5th Street North	MiA	17,800	5.43%	1.20	4	yes	Divided	0.55	0.532	0.088
		5th Street North to 7th Street North	MiA	15,400	5.22%	0.84	2	yes	Undivided	0.84	0.514	0.083
		7th Street North to Aspen Lane	MiA	18,900	6.05%	1.11	4	yes	Divided	0.54	0.501	0.091
		Aspen Lane to 45th Street	MiA	13,800	5.60%	0.86	2	yes	Undivided	0.86	0.541	0.090
		45th Street to CR 107	MiA	13,500	5.48%	0.91	2	yes	Undivided	0.91	0.551	0.096
		North of CR 107	MiA	11,800	4.96%	0.88	2	yes	Undivided	0.88	0.552	0.112
CR	107	Clementa Avenue to CSAH 12	MC	8,400	7.77%	0.86	2	yes	Undivided	0.68	0.616	0.079
		West of Clementa Avenue	MC	9,000	8.06%	0.84	2	no	Undivided	0.84	0.529	0.084
CR	110	South of 80th Street	MC	3,500	6.27%	0.77	2	no	Undivided	0.77	0.638	0.163
		80th Street to 75th Street	MC	3,100	5.78%	0.64	2	no	Undivided	0.64	0.624	0.157
		75th Street to 70th Street	MC	5,300	7.98%	0.73	2	no	Undivided	0.73	0.539	0.115
		70th Street to 7th Street South	MC	9,200	10.30%	0.85	2	no	Undivided	0.85	0.503	0.083
		7th Street South to TH 12	MC	12,800	13.08%	1.26	4	yes	Divided	0.46	0.517	0.085
CSAH	32	East of TH 25 (East Leg)	MiC	3,100	5.10%	1.13	2	yes	Undivided	0.90	0.832	0.193
	Aetna Avenue	TH 12 to 7th Street North	MC	8,200	NA	1.07	2	yes	Undivided	0.85	0.510	0.114
		7th Street North to 47th Street	Local	1,300	NA	0.28	2	no	Undivided	0.28	0.603	0.156
	Armitage Avenue	TH 25 to Meridian Avenue	MC	6,000	NA	1.07	2	yes	Undivided	0.85	0.571	0.140
	Breckenridge Avenue	East of Clementa Avenue	MiC	1,000	NA	0.19	2	no	Undivided	0.19	0.619	0.112
		West of Clementa Avenue	MiC	1,700	NA	0.22	2	no	Undivided	0.22	0.637	0.074

Full Build Traffic Volumes and Capacity Analysis

Roadway			Forecasted Traffic									
SYS	NUM	ROADWAY SEGMENT	Proposed Functional Class	2030 ADT	Annual Growth	2030 V/C Ratio	2030 Mitigated Lanes	Mitigated Left Turn Lanes?	2030 Mitigated Type	2030 Mitigated V/C Ratio	D-Factor	K-Factor
	Clementa Avenue	TH 12 to 3rd Street South	MC	11,400	15.62%	1.26	4	yes	Divided	0.46	0.560	0.089
		3rd Street South to 55th Street	MC	9,800	NA	1.10	2	yes	Undivided	0.88	0.574	0.087
		55th Street to 7th Street North	MC	8,100	NA	0.88	2	no	Undivided	0.88	0.517	0.095
		7th Street North to 45th Street	MC	6,900	NA	0.62	2	no	Undivided	0.62	0.511	0.078
		45th Street to CR 107	MC	4,700	NA	0.58	2	no	Undivided	0.58	0.611	0.096
		North of CR 107	Local	600	NA	0.07	2	no	Undivided	0.07	0.550	0.100
	Dempsey Avenue	North of TH 12	Local	1,900	NA	0.42	2	no	Undivided	0.42	0.619	0.144
	Garfield Avenue	North of TH 12	MiC	1,400	NA	0.20	2	no	Undivided	0.20	0.508	0.098
		TH 12 to 7th Street South	MC	9,100	NA	1.21	2	yes	Undivided	0.96	0.518	0.115
		7th Street South to 70th Street	MC	5,000	NA	0.72	2	no	Undivided	0.72	0.564	0.115
	Meridian Avenue	TH 12 to 72nd Street	MC	6,000	NA	1.09	2	yes	Undivided	0.87	0.633	0.129
		72nd Street to Armitage Avenue	Local	2,700	NA	0.62	2	no	Undivided	0.62	0.513	0.182
		40th Street to 45th Street	Local	3,800	NA	0.70	2	no	Undivided	0.70	0.540	0.151
	Zephyr Avenue	South of TH 12	MC	10,100	NA	0.98	2	no	Undivided	0.98	0.504	0.082
		TH 12 to 3rd Street South	MC	7,100	NA	1.01	2	yes	Undivided	0.81	0.602	0.101
		3rd Street South to 3rd Street North	MC	6,800	NA	0.99	2	no	Undivided	0.99	0.561	0.117
		3rd Street North to 7th Street North	MC	7,400	NA	1.10	2	yes	Undivided	0.88	0.516	0.130
		7th Street North to Merdian Avenue	MC	4,400	NA	0.64	2	no	Undivided	0.64	0.535	0.121
	1st Street North	Clementa Avenue to CSAH 12	MiC	2,900	NA	0.66	2	no	Undivided	0.66	0.671	0.123
	3rd/5th Street North	CSAH 12 to Zephyr Avenue	MiC	3,000	NA	0.98	2	no	Undivided	0.98	0.779	0.151
		West of CSAH 12	Local	2,200	NA	0.46	2	no	Undivided	0.46	0.700	0.108
	7th Street North	Aetna Avenue to TH 25	MC	7,000	NA	0.95	2	no	Undivided	0.95	0.602	0.096
		Zephyr Avenue to Aetna Avenue	MC	6,000	NA	1.08	2	yes	Undivided	0.86	0.717	0.112
		CSAH 12 to Zephyr Avenue	MC	4,900	NA	0.86	2	no	Undivided	0.86	0.666	0.118
		2nd Avenue to CSAH 12	MC	3,800	NA	0.76	2	no	Undivided	0.76	0.741	0.120
		Clementa Avenue to 2nd Avenue	MC	2,200	NA	0.46	2	no	Undivided	0.46	0.724	0.129
		West of Clementa Avenue	MC	380	NA	0.19	2	no	Undivided	0.19	0.606	0.372
	7th Street South	East of TH 25	MC	8,500	NA	1.14	2	yes	Undivided	0.91	0.613	0.093
		Garfield Avenue to TH 25	MC	5,500	NA	0.81	2	no	Undivided	0.81	0.692	0.094
		CR 110 to Garfield Avenue	MC	6,900	NA	0.89	2	no	Undivided	0.89	0.533	0.108
		West of CR 110	MiC	5,400	NA	0.94	2	no	Undivided	0.94	0.506	0.124
	36th Street	East of CSAH 12	Local	610	NA	0.27	2	no	Undivided	0.27	0.819	0.237
	40th Street	West of TH 25	Local	2,200	NA	0.84	2	no	Undivided	0.84	0.851	0.199
	45th Street	Meridian Avenue to Aetna Avenue	Local	3,900	NA	0.94	2	no	Undivided	0.94	0.744	0.143
		Arizona Avenue to Meridian Avenue	MC	4,100	NA	0.71	2	no	Undivided	0.71	0.608	0.128
		CSAH 12 to Arizona Avenue	MC	6,800	NA	1.00	2	yes	Undivided	0.80	0.628	0.100
		2nd Avenue to CSAH 12	MC	4,800	NA	0.84	2	no	Undivided	0.84	0.634	0.118
		Clementa Avenue to 2nd Avenue	MC	4,300	NA	0.82	2	no	Undivided	0.82	0.706	0.121
		West of Clementa Avenue	MC	2,300	NA	0.46	2	no	Undivided	0.46	0.680	0.133
	47th Street	Aetna Avenue to TH 25	Local	3,000	NA	0.68	2	no	Undivided	0.68	0.719	0.139
	55th Street	West of Clementa Avenue	MC	4,800	NA	0.72	2	no	Undivided	0.72	0.601	0.112
	70th Street	Garfield Avenue to TH 25	MiC	1,500	NA	0.44	2	no	Undivided	0.44	0.672	0.157
		CR 110 to Garfield Avenue	MiC	5,100	NA	0.84	2	no	Undivided	0.84	0.536	0.111
		West of CR 110	MiC	5,100	NA	0.74	2	no	Undivided	0.74	0.513	0.096
	75th Street	West of CR 110	MC	2,200	NA	0.44	2	no	Undivided	0.44	0.637	0.140
		CR 110 to TH 25	MC	4,400	NA	0.80	2	no	Undivided	0.80	0.664	0.123
	80th Street	East of CR 110	MC	250	NA	0.08	2	no	Undivided	0.08	0.736	0.209
	82nd Street	Armitage Avenue to CSAH 30	Local	4,200	NA	1.14	2	yes	Undivided	0.91	0.772	0.142

PA: Principal Arterial
MiA: Minor Arterial
MC: Major Collector
MiC: Minor Collector
Local: Local Collector (Existing Gravel or Paved Road, or Unknown Designation)
New: New Roadway that Currently Does Not Exist

ADT Comparsion

Roadway			ADT Comparison				D-Factor Comparison				K-Factor Comparison			
SYS	NUM	ROADWAY SEGMENT	2006 ADT	No-Build ADT	Interim Build ADT	Full Build ADT	2006 D-Factor	No-Build D-Factor	Interim Build D-Factor	Full Build D-Factor	2006 K-Factor	No-Build K-Factor	Interim Build K-Factor	Full Build K-Factor
US TH	12	East of TH 25 (East Leg)	12,850	13,700	19,500	22,500	0.715	0.706	0.631	0.607	0.090	0.111	0.105	0.106
		Aetna Avenue to TH 25 (East Leg)	-	15,500	20,300	21,200	-	0.739	0.632	0.636	-	0.133	0.120	0.118
		Meridian Avenue to Aetna Avenue	-	15,500	20,300	24,900	-	0.737	0.630	0.626	-	0.132	0.120	0.114
		Zephyr Avenue to Meridian Avenue	-	15,500	20,500	25,700	-	0.734	0.628	0.584	-	0.132	0.120	0.104
		Arizona Avenue to Zephyr Avenue	-	16,100	25,500	31,800	-	0.740	0.581	0.540	-	0.131	0.112	0.101
		TH 25/CSAH 12 to Arizona Avenue	12,300	16,100	25,700	31,700	0.697	0.739	0.631	0.610	0.088	0.131	0.104	0.099
		Center Avenue to TH 25/CSAH 12	-	14,400	23,700	27,100	-	0.722	0.586	0.570	-	0.113	0.100	0.097
		Emerson Avenue to Center Avenue	-	14,100	23,100	26,400	-	0.735	0.623	0.604	-	0.113	0.095	0.093
		Garfield Avenue to Emerson Avenue	-	13,900	22,700	26,000	-	0.724	0.614	0.595	-	0.112	0.095	0.093
		CR 110 to Garfield Avenue	9,900	13,900	18,200	19,800	0.663	0.700	0.634	0.627	0.088	0.109	0.095	0.087
		Cloud Avenue to CR 110	10,150	12,600	15,000	16,800	0.662	0.689	0.630	0.606	0.085	0.107	0.101	0.098
		Dempsey Avenue to Cloud Avenue	-	11,800	13,400	15,100	-	0.651	0.609	0.581	-	0.103	0.098	0.096
		CR 62 to Dempsey Avenue	-	12,300	13,800	16,000	-	0.579	0.542	0.521	-	0.100	0.103	0.102
		CSAH 8 to CR 62	-	11,400	12,600	15,000	-	0.557	0.530	0.502	-	0.102	0.109	0.108
		West of CSAH 8	-	13,100	14,000	16,000	-	0.560	0.558	0.541	-	0.118	0.115	0.108
TH	25	South of Armitage Avenue	-	3,300	6,800	8,000	-	0.582	0.527	0.605	-	0.160	0.116	0.123
		Armitage Avenue to 70th Street	-	5,300	10,300	13,200	-	0.509	0.511	0.515	-	0.135	0.115	0.102
		70th Street to 7th Street South	2,250	5,400	10,600	13,500	0.569	0.509	0.511	0.525	0.094	0.133	0.110	0.096
		7th Street South to TH 12	-	5,600	9,300	11,500	-	0.519	0.523	0.536	-	0.133	0.113	0.104
		TH 12 to 7th Street North	3,900	6,900	7,000	10,000	0.647	0.769	0.608	0.588	0.090	0.238	0.171	0.142
		7th Street North to 47th Street	-	6,900	7,000	11,100	-	0.769	0.608	0.517	-	0.238	0.171	0.142
		47th Street to CSAH 32	-	6,900	7,200	10,400	-	0.793	0.682	0.600	-	0.243	0.183	0.146
		CSAH 32 to 40th Street	-	6,600	6,600	8,600	-	0.552	0.550	0.599	-	0.199	0.149	0.148
		North of 40th Street	-	6,700	6,700	9,500	-	0.693	0.567	0.569	-	0.172	0.148	0.140
CSAH	8	South of TH 12	-	3,200	3,200	3,300	-	0.543	0.595	0.627	-	0.177	0.186	0.194
CSAH	9	North of TH 12	-	1,800	1,800	2,000	-	0.528	0.551	0.529	-	0.138	0.190	0.183
CSAH	12	TH 12 to 3rd Street South	5,500	7,000	18,400	18,800	0.628	0.615	0.555	0.552	0.088	0.117	0.086	0.089
		3rd Street South to 2nd Street South	-	6,400	17,900	18,200	-	0.641	0.570	0.568	-	0.120	0.086	0.089
		2nd Street South to 1st Street North	-	6,800	18,400	18,700	-	0.649	0.575	0.575	-	0.117	0.086	0.089
		1st Street North to 5th Street North	5,000	6,000	17,500	17,800	0.559	0.618	0.541	0.532	0.088	0.112	0.084	0.088
		5th Street North to 7th Street North	-	5,500	14,900	15,400	-	0.605	0.502	0.514	-	0.111	0.077	0.083
		7th Street North to Aspen Lane	-	4,700	16,800	18,900	-	0.545	0.508	0.501	-	0.107	0.091	0.091
		Aspen Lane to 45th Street	-	4,400	11,000	13,800	-	0.519	0.504	0.541	-	0.106	0.094	0.090
		45th Street to CR 107	3,750	4,400	11,900	13,500	0.530	0.521	0.579	0.551	0.093	0.106	0.100	0.096
		North of CR 107	-	5,700	10,400	11,800	-	0.605	0.502	0.552	-	0.087	0.110	0.112
CR	107	Clementa Avenue to CSAH 12	-	7,500	7,500	8,400	-	0.591	0.652	0.616	-	0.109	0.090	0.079
		West of Clementa Avenue	-	6,400	7,000	9,000	-	0.524	0.526	0.529	-	0.138	0.085	0.084
CR	110	South of 80th Street	-	1,300	2,600	3,500	-	0.743	0.577	0.638	-	0.133	0.147	0.163
		80th Street to 75th Street	-	1,300	2,600	3,100	-	0.741	0.570	0.624	-	0.132	0.146	0.157
		75th Street to 70th Street	-	1,400	2,500	5,300	-	0.804	0.532	0.539	-	0.157	0.149	0.115
		70th Street to 7th Street South	-	3,900	4,800	9,200	-	0.504	0.531	0.503	-	0.115	0.105	0.083
		7th Street South to TH 12	670	3,700	9,700	12,800	0.615	0.520	0.555	0.517	0.097	0.115	0.091	0.085
CSAH	32	East of TH 25 (East Leg)	-	940	1,800	3,100	-	0.961	0.894	0.832	-	0.296	0.253	0.193

ADT Comparsion

Roadway			ADT Comparison				D-Factor Comparison				K-Factor Comparison			
SYS	NUM	ROADWAY SEGMENT	2006 ADT	No-Build ADT	Interim Build ADT	Full Build ADT	2006 D-Factor	No-Build D-Factor	Interim Build D-Factor	Full Build D-Factor	2006 K-Factor	No-Build K-Factor	Interim Build K-Factor	Full Build K-Factor
	Aetna Avenue	TH 12 to 7th Street North	-	70	70	8,200	-	0.750	0.800	0.510	-	0.114	0.154	0.114
		7th Street North to 47th Street	-	50	40	1,300	-	0.800	0.857	0.603	-	0.111	0.167	0.156
	Armitage Avenue	TH 25 to Meridian Avenue	-	1,300	2,000	6,000	-	0.815	0.788	0.571	-	0.173	0.160	0.140
	Breckenridge Avenue	East of Clementa Avenue	-	950	380	1,000	-	0.644	0.717	0.619	-	0.106	0.122	0.112
		West of Clementa Avenue	-	770	1,800	1,700	-	0.725	0.704	0.637	-	0.118	0.113	0.074
	Clementa Avenue	TH 12 to 3rd Street South	350	2,400	9,900	11,400	0.525	0.622	0.589	0.560	0.115	0.111	0.094	0.089
		3rd Street South to 55th Street	-	2,500	8,300	9,800	-	0.613	0.607	0.574	-	0.109	0.095	0.087
		55th Street to 7th Street North	-	2,600	6,200	8,100	-	0.516	0.513	0.517	-	0.096	0.097	0.095
		7th Street North to 45th Street	-	2,500	5,000	6,900	-	0.668	0.534	0.511	-	0.096	0.090	0.078
		45th Street to CR 107	300	2,500	4,500	4,700	0.667	0.668	0.658	0.611	0.081	0.096	0.092	0.096
		North of CR 107	-	400	600	600	-	0.575	0.550	0.550	-	0.100	0.100	0.100
	Dempsey Avenue	North of TH 12	-	1,000	1,500	1,900	-	0.557	0.612	0.619	-	0.097	0.139	0.144
	Garfield Avenue	North of TH 12	-	700	1,300	1,400	-	0.524	0.504	0.508	-	0.090	0.099	0.098
		TH 12 to 7th Street South	-	550	7,300	9,100	-	0.851	0.528	0.518	-	0.136	0.113	0.115
		7th Street South to 70th Street	-	-	3,600	5,000	-	-	0.538	0.564	-	-	0.116	0.115
	Meridian Avenue	TH 12 to 72nd Street	-	160	320	6,000	-	0.684	0.511	0.633	-	0.118	0.140	0.129
		72nd Street to Armitage Avenue	-	70	240	2,700	-	0.571	0.541	0.513	-	0.104	0.152	0.182
		40th Street to 45th Street	-	230	1,040	3,800	-	0.778	0.701	0.540	-	0.155	0.161	0.151
	Zephyr Avenue	South of TH 12	-	40	8,900	10,100	-	0.800	0.525	0.504	-	0.122	0.081	0.082
		TH 12 to 3rd Street South	-	1,000	5,100	7,100	-	0.697	0.600	0.602	-	0.106	0.141	0.101
		3rd Street South to 3rd Street North	-	1,000	4,600	6,800	-	0.704	0.663	0.561	-	0.107	0.145	0.117
		3rd Street North to 7th Street North	-	-	3,300	7,400	-	-	0.582	0.516	-	-	0.181	0.130
		7th Street North to Merdian Avenue	-	-	2,800	4,400	-	-	0.600	0.535	-	-	0.142	0.121
	1st Street North	Clementa Avenue to CSAH 12	-	1,500	2,800	2,900	-	0.715	0.655	0.671	-	0.119	0.113	0.123
	3rd/5th Street North	CSAH 12 to Zephyr Avenue	-	670	2,700	3,000	-	0.549	0.513	0.779	-	0.152	0.118	0.151
		West of CSAH 12	-	340	2,100	2,200	-	0.722	0.708	0.700	-	0.107	0.109	0.108
	7th Street North	Aetna Avenue to TH 25	-	-	-	7,000	-	-	-	0.602	-	-	-	0.096
		Zephyr Avenue to Aetna Avenue	-	-	-	6,000	-	-	-	0.717	-	-	-	0.112
		CSAH 12 to Zephyr Avenue	-	-	2,800	4,900	-	-	0.680	0.666	-	-	0.159	0.118
		2nd Avenue to CSAH 12	-	1,400	3,800	3,800	-	0.746	0.694	0.741	-	0.123	0.122	0.120
		Clementa Avenue to 2nd Avenue	-	-	2,400	2,200	-	-	0.646	0.724	-	-	0.128	0.129
		West of Clementa Avenue	-	-	530	380	-	-	0.672	0.606	-	-	0.126	0.372
	7th Street South	East of TH 25	-	-	7,700	8,500	-	-	0.607	0.613	-	-	0.095	0.093
		Garfield Avenue to TH 25	-	320	5,300	5,500	-	0.703	0.665	0.692	-	0.114	0.104	0.094
		CR 110 to Garfield Avenue	-	-	6,200	6,900	-	-	0.559	0.533	-	-	0.103	0.108
		West of CR 110	-	320	5,500	5,400	-	0.676	0.502	0.506	-	0.116	0.100	0.124
	36th Street	East of CSAH 12	-	640	1,000	610	-	0.776	0.658	0.819	-	0.182	0.161	0.237
	40th Street	West of TH 25	-	800	1,450	2,200	-	0.804	0.769	0.851	-	0.180	0.175	0.199
	45th Street	Meridian Avenue to Aetna Avenue	-	180	1,000	3,900	-	0.889	0.832	0.744	-	0.196	0.206	0.143
		Arizona Avenue to Meridian Avenue	-	-	-	4,100	-	-	-	0.608	-	-	-	0.128
		CSAH 12 to Arizona Avenue	-	-	4,000	6,800	-	-	0.656	0.628	-	-	0.096	0.100
		2nd Avenue to CSAH 12	-	200	1,100	4,800	-	0.667	0.650	0.634	-	0.158	0.109	0.118
		Clementa Avenue to 2nd Avenue	-	-	20	4,300	-	-	0.667	0.706	-	-	0.143	0.121
		West of Clementa Avenue	-	-	-	2,300	-	-	-	0.680	-	-	-	0.133
	47th Street	Aetna Avenue to TH 25	-	200	980	3,000	-	0.897	0.841	0.719	-	0.192	0.212	0.139
	55th Street	West of Clementa Avenue	-	1,900	4,600	4,800	-	0.652	0.622	0.601	-	0.108	0.117	0.112
	70th Street	Garfield Avenue to TH 25	-	410	1,400	1,500	-	0.740	0.775	0.672	-	0.123	0.141	0.157
		CR 110 to Garfield Avenue	-	940	3,600	5,100	-	0.571	0.524	0.536	-	0.112	0.119	0.111
		West of CR 110	-	2,200	2,600	5,100	-	0.613	0.581	0.513	-	0.109	0.103	0.096
	75th Street	West of CR 110	-	-	-	2,200	-	-	-	0.637	-	-	-	0.140
		CR 110 to TH 25	-	440	190	4,400	-	0.760	0.724	0.664	-	0.227	0.152	0.123
	80th Street	East of CR 110	-	10	50	250	-	0.500	0.800	0.736	-	0.286	0.109	0.209
	82nd Street	Armitage Avenue to CSAH 30	-	1,400	2,200	4,200	-	0.817	0.782	0.772	-	0.173	0.161	0.142

Peak Hour Roadway Capacity

AreaType	Type of Roadway: Number of Lanes in Each Direction										
	Expressway		Principal Arterial			Minor Arterial		Major Collector		Minor Collector	
	1	2	1	2	3	1	2	1	2	1	2
Rural	1100	2865	900	2415	3620	900	2415	645	2080	600	2080
Developing	1100	2545	850	1735	2605	850	1735	645	1400	550	1400
Developed	960	2285	755	1660	2490	755	1660	610	1340	495	1100
Residential Core	960	2030	730	1605	2410	730	1605	605	1320	490	1085
Business Core	960	2030	705	1555	2335	705	1555	580	1275	465	1035
Outlying Business Concentration	960	2030	705	1555	2335	705	1555	580	1275	465	1035

Adjustment Factors

Lanes	1	1	2	2
Type	Divided	Undivided	Undivided	Undivided
Left Turn Lanes?	yes	no	yes	no
Factor	1.05	0.8	0.95	0.75

* Peak Hour Roadway Capacity and Adjusment Factors Obtained from a Combination of MetCouncil, Quality/Level of Service Handbook, and Highway Capacity Manual Values

Traffic Appendix E:

Intersection Analysis

TH 12 at TH 25 (East Leg)								
					Turn Lane Lengths (ft)***			
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**WBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	25.3-D-0.51	375	300	-	450
		PM	-	19.6-C-0.44				
2030	No Build *Unsignalized*	AM	9.70 veh-hrs	258.6-F-1.29	375	300	-	475
		PM	16.04 veh-hrs	266.2-F-1.40				
	No Build Mitigated *Signalized*	AM	10.8-B	30.7-C-0.75	475	475	-	475
		PM	11.9-B	26.7-C-0.68				
	Interim *Unsignalized*	AM	37.60 veh-hrs	815.5-F-2.50	375	300	-	#
		PM	1000 veh-hrs	1000-F-1000				
	Interim Mitigated *Signalized*	AM	11.5-B	24.9-C-0.71	475	475	-	475
		PM	18.1-B	39.5-D-0.82				
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-6.09	375	300	-	#
		PM	1000 veh-hrs	100-F-6.60				
	Build Mitigated *Signalized*	AM	15.9-B	40.5-D-0.83	500	500	-	-
		PM	22.8-C	53.3-D-0.89				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Turn Lane extends to upstream intersection

TH 12 at Aetna Ave.

					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	27.4-D-0.04	-	-	-	175	-	-	-	-
		PM	0.01 veh-hrs	53.5-F-0.03								
	No Build Mitigated *Unsignalized*	AM	-	14.5-B-0.34	475	475	475	475	-	-	-	-
		PM	-	27.8-D-0.39								
	Interim *Unsignalized*	AM	-	49.3-E-0.05	-	-	-	175	-	-	-	-
		PM	0.03 veh-hrs	113.5-F-0.06								
	Interim Mitigated *Unsignalized*	AM	-	17.7-C-0.39	475	475	475	475	-	-	-	-
		PM	-	34.7-D-0.45								
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-1000	-	-	-	175	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	Build Mitigated *Signalized*	AM	11.9-B	30.3-C-0.79	475	475	475	475	225	-	225	225
		PM	13.7-B	54.2-D-0.84								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at Meridian Ave.								
					Turn Lane Lengths (ft)***			
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBR**	**WBL**	**NBL**	**NBR**
2006	Existing	AM	-	-	-	-	-	-
		PM	-	-				
2030	No Build *Unsignalized*	AM	-	26.0-D-0.06	-	-	-	-
		PM	-	44.6-E-0.36				
	No Build Mitigated *Unsignalized*	AM	-	18.4-C-0.34	475	475	-	-
		PM	-	18.1-C-0.39				
	Interim *Unsignalized*	AM	0.24 veh-hrs	61.3-F-0.77	-	-	-	-
		PM	1.29 veh-hrs	220.8-F-0.66				
	Interim Mitigated *Unsignalized*	AM	-	30.6-D-0.38	475	475	-	-
		PM	-	30.5-D-0.45				
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-4.65	-	-	-	-
		PM	1000 veh-hrs	1000-F-23.09				
	Build Mitigated *Signalized*	AM	7.0-A	31.7-C-0.63	475	475	-	225
		PM	10.4-B	42.7-D-0.76				

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

TH 12 at Zephyr Ave.												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	19.4-C-0.12	-	-	-	225	-	-	-	-
		PM	-	16.5-C-0.42								
2030	No Build *Unsignalized*	AM	-	37.9-E-0.05	-	225	-	225	-	-	-	-
		PM	0.06 veh-hrs	104.8-F-0.73								
	No Build Mitigated *Unsignalized*	AM	-	26.0-D-0.35	275	275	475	475	-	-	-	-
		PM	-	27.5-D-0.39								
	Interim *Unsignalized*	AM	1000 veh-hrs	1000-F-1000	-	225	-	225	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	Interim Mitigated *Signalized*	AM	12.4-B	39.3-D-0.61	275	275	475	475	400	400	400	400
		PM	19.3-B	45.5-D-0.74								
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-1000	-	225	-	225	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	Build Mitigated *Signalized*	AM	11.7-B	44.1-D-0.69	275	275	475	475	400	400	400	400
		PM	21.0-C	52.3-D-0.82								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at TH 25 (West Leg)/CSAH 12													
					Turn Lane Lengths (ft)***								
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Signalized*	AM	15.6-B	23.6-C-0.66	TWLTL	200	TWLTL	200	-	-	-	150
		PM	9.8-A	24.6-C-0.49								
2030	No Build *Signalized*	AM	1000-F	1000-F-1000	TWLTL	325	TWLTL	675	-	-	-	525
		PM	1000-F	1000-F-1000								
	No Build Mitigated *Signalized*	AM	24.2-C	40.2-D-0.80	275	275	275	275	225	225	275	225
		PM	23.7-C	46.6-D-0.76								
	Interim *Signalized*	AM	152.1-F	269.0-F-1.50	TWLTL	1525	TWLTL	1725	-	-	-	1150
		PM	233.2-F	388.1-F-1.77								
	Interim Mitigated *Signalized*	AM	21.1-C	50.9-D-0.88	275	275	350	350	225	225	275	225
		PM	25.1-C	44.4-D-0.89								
	Build *Signalized*	AM	1000-F	1000-F-1000	800	800	700	700	550	550	725	725
		PM	1000-F	1000-F-1000								
	Build Mitigated *Signalized*	AM	23.7-C	47.9-D-0.91	325	325	425	425	225	225	225	225
		PM	27.8-C	53.1-D-0.93								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at Center Ave.												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	17.0-C-0.34	TWLTL	150	TWLTL	150	-	-	-	-
		PM	-	21.4-C-0.37								
2030	No Build *Unsignalized*	AM	1000 veh-hrs	1000-F-1000	TWLTL	#	TWLTL	#	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	No Build Mitigated *Unsignalized*	AM	-	11.8-B-0.24	-	275	-	275	-	225	-	225
		PM	-	9.7-A-0.28								
	Interim *Unsignalized*	AM	0.68 veh-hrs	221.7-F-0.67	TWLTL	#	TWLTL	#	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	Interim Mitigated *Unsignalized*	AM	-	15.3-C-0.32	-	275	-	275	-	225	-	225
		PM	-	15.5-C-0.45								
	Build *Unsignalized*	AM	82.39 veh-hrs	282.2-F-1.59	1550	1550	#	#	-	-	-	-
		PM	1000 veh-hrs	1000-F-3.03								
	Build Mitigated *Unsignalized*	AM	-	16.4-C-0.35	-	275	-	275	-	-	-	-
		PM	-	18.3-C-0.53								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Turn Lane extends to upstream intersection

TH 12 at Emerson Ave.								
					Turn Lane Lengths (ft)***			
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	WBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	16.2-C-0.35	TWLTL	150	-	-
		PM	-	16.9-C-0.38				
2030	No Build *Unsignalized*	AM	-	22.3-C-0.50	TWLTL	150	-	-
		PM	-	24.5-C-0.54				
	No Build Mitigated *Unsignalized*	AM	-	9.1-A-0.25	-	275	-	225
		PM	-	10.3-B-0.27				
	Interim *Unsignalized*	AM	-	24.3-C-0.75	TWLTL	150	-	-
		PM	-	37.4-E-0.79				
	Interim Mitigated *Unsignalized*	AM	-	10.4-B-0.37	-	275	-	225
		PM	-	11.5-B-0.41				
	Build *Unsignalized*	AM	-	14.3-B-0.80	TWLTL	150	-	-
		PM	-	29.5-D-0.89				
	Build Mitigated *Unsignalized*	AM	-	11.0-B-0.40	-	275	-	-
		PM	-	11.5-B-0.44				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at Garfield Ave.												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	15.8-C-0.36	TWLTL	-	-	150	-	-	-	-
		PM	-	15.0-C-0.36								
2030	No Build *Unsignalized*	AM	-	23.7-C-0.50	TWLTL	150	TWLTL	150	-	-	-	-
		PM	-	29.2-D-0.48								
	No Build Mitigated *Unsignalized*	AM	-	23.7-C-0.25	375	375	275	275	-	-	-	-
		PM	-	21.2-C-0.24								
	Interim *Unsignalized*	AM	3.81 veh-hrs	915.5-F-2.15	TWLTL	150	TWLTL	150	-	-	-	-
		PM	1000 veh-hrs	1000-F-5.18								
	Interim Mitigated *Signalized*	AM	13.6-B	34.6-C-0.77	400	400	275	275	225	225	225	225
		PM	11.4-B	34.0-C-0.76								
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-76.42	TWLTL	150	TWLTL	150	-	-	-	-
		PM	1000 veh-hrs	1000-F-17.71								
	Build Mitigated *Signalized*	AM	14.8-B	38.8-D-0.84	400	400	275	275	225	225	225	-
		PM	8.6-A	26.4-C-0.72								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at CR 110/Clementa Ave.

					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	14.7-B-0.27	TWLTL	300	TWLTL	300	-	-	-	-
		PM	-	16.2-C-0.37								
2030	No Build *Unsignalized*	AM	1.76 veh-hrs	91.8-F-0.88	TWLTL	300	TWLTL	300	-	-	-	-
		PM	4.91 veh-hrs	226.5-F-1.31								
	No Build Mitigated *Signalized*	AM	13.5-B	29.7-C-0.54	475	475	500	500	400	400	400	-
		PM	16.3-B	32.8-C-0.64								
	Interim *Unsignalized*	AM	1000 veh-hrs	1000-F-5.43	TWLTL	300	TWLTL	300	-	-	-	-
		PM	1000 veh-hrs	1000-F-15.99								
	Interim Mitigated *Signalized*	AM	15.3-B	31.9-C-0.62	475	475	500	500	400	400	400	400
		PM	16.9-B	43.5-D-0.73								
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-8.40	TWLTL	300	TWLTL	300	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	Build Mitigated *Signalized*	AM	15.6-B	34.5-C-0.70	475	475	400	400	400	400	400	400
		PM	18.7-B	51.8-D-0.80								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at Cloud Ave.												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	21.5-C-0.33	TWLTL	175	TWLTL	175	-	-	-	-
		PM	-	22.7-C-0.37								
	No Build Mitigated *Unsignalized*	AM	-	21.5-C-0.33	TWLTL	475	TWLTL	475	-	-	-	-
		PM	-	22.7-C-0.37								
	Interim *Unsignalized*	AM	-	48.8-E-0.54	TWLTL	175	TWLTL	175	-	-	-	-
		PM	-	49.4-E-0.50								
	Interim Mitigated *Unsignalized*	AM	1.37 veh-hrs	63.2-F-0.63	475	475	475	475	-	-	-	-
		PM	0.79 veh-hrs	55.6-F-0.54								
	Build *Unsignalized*	AM	1.26 veh-hrs	56.6-F-0.59	TWLTL	175	TWLTL	175	-	-	-	-
		PM	1.00 veh-hrs	61.1-F-0.57								
	Build Mitigated *Signalized*	AM	9.1-A	31.9-C-0.59	475	475	475	475	-	-	-	-
		PM	9.6-A	50.4-D-0.51								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at Dempsey Ave.												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	15.6-C-0.27	TWLTL	-	TWLTL	-	-	-	-	-
		PM	-	17.2-C-0.33								
2030	No Build *Unsignalized*	AM	-	17.6-C-0.29	TWLTL	-	TWLTL	-	-	-	-	-
		PM	-	24.2-C-0.32								
	No Build Mitigated *Unsignalized*	AM	-	17.4-C-0.29	TWLTL	475	TWLTL	475	-	-	-	-
		PM	-	18.7-C-0.20								
	Interim *Unsignalized*	AM	-	22.7-C-0.39	TWLTL	-	TWLTL	-	-	-	-	-
		PM	0.32 veh-hrs	58.0-F-0.53								
	Interim Mitigated *Unsignalized*	AM	-	22.4-C-0.39	TWLTL	475	TWLTL	475	-	-	-	-
		PM	0.32 veh-hrs	57.1-F-0.52								
	Build *Unsignalized*	AM	-	26.7-D-0.42	TWLTL	-	TWLTL	-	-	-	-	-
		PM	0.55 veh-hrs	193.1-F-0.94								
	Build Mitigated *Unsignalized*	AM	-	26.5-D-0.40	TWLTL	475	TWLTL	475	-	-	-	-
		PM	0.42 veh-hrs	109.2-F-0.71								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at CR 62

					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	14.2-B-0.27	TWLTL	175	TWLTL	175	-	-	-	-
		PM	-	21.8-C-0.30								
	No Build Mitigated *Unsignalized*	AM	-	14.1-B-0.27	TWLTL	275	TWLTL	475	-	-	-	-
		PM	-	21.8-C-0.30								
	Interim *Unsignalized*	AM	-	16.7-C-0.37	TWLTL	175	TWLTL	175	-	-	-	-
		PM	-	35.8-E-0.47								
	Interim Mitigated *Unsignalized*	AM	-	16.7-C-0.37	TWLTL	275	TWLTL	475	-	-	-	-
		PM	-	35.8-E-0.47								
	Build *Unsignalized*	AM	-	18.9-C-0.41	TWLTL	175	TWLTL	175	-	-	-	-
		PM	0.42 veh-hrs	63.2-F-0.66								
	Build Mitigated *Unsignalized*	AM	-	18.9-C-0.41	TWLTL	275	TWLTL	475	-	-	-	-
		PM	0.42 veh-hrs	63.2-F-0.66								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 12 at CSAH 8/CSAH 9												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	19.0-C-0.22	TWLTL	200	TWLTL	200	-	150	-	-
		PM	-	28.0-D-0.29								
2030	No Build *Unsignalized*	AM	-	26.5-D-0.37	TWLTL	200	TWLTL	200	-	650	-	-
		PM	27.78 veh-hrs	520.7-F-2.01								
	No Build Mitigated *Signalized*	AM	7.9-A	19.6-B-0.41	TWLTL	275	TWLTL	275	225	225	225	225
		PM	14.7-B	31.7-C-0.70								
	Interim *Unsignalized*	AM	-	39.6-E-0.50	TWLTL	200	TWLTL	200	-	750	-	-
		PM	30.60 veh-hrs	867.3-F-2.74								
	Interim Mitigated *Signalized*	AM	9.2-A	27.8-C-0.52	TWLTL	275	TWLTL	450	225	225	225	225
		PM	16.5-B	39.8-D-0.76								
	Build *Unsignalized*	AM	0.67 veh-hrs	51.2-F-0.57	TWLTL	200	TWLTL	200	-	700	-	-
		PM	36.64 veh-hrs	789.9-F-2.57								
	Build Mitigated *Signalized*	AM	10.3-B	35.0-C-0.56	300	300	275	275	225	225	225	225
		PM	16.9-B	41.2-D-0.78								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 25 (East Leg) at CSAH 32								
					Turn Lane Lengths (ft)***			
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**WBL**	**WBR**	**NBR**	**SBL**
2006	Existing *Unsignalized*	AM	-	9.4-A-0.07	-	-	200	-
		PM	-	10.0-B-0.14				
2030	No Build *Unsignalized*	AM	-	10.5-B-0.17	-	-	200	-
		PM	-	27.8-D-0.65				
	No Build Mitigated *Unsignalized*	AM	-	12.9-B-0.17	475	475	475	475
		PM	-	26.3-D-0.58				
	Interim *Unsignalized*	AM	-	13.3-B-0.20	-	-	200	-
		PM	-	31.8-D-0.78				
	Interim Mitigated *Unsignalized*	AM	-	14.3-B-0.19	475	475	475	475
		PM	-	21.7-C-0.63				
	Build *Unsignalized*	AM	-	34.7-D-0.35	-	-	200	-
		PM	47.44 veh-hrs	488.0-F-1.98				
	Build Mitigated *Signalized*	AM	6.2-A	17.9-B-0.50	-	475	475	475
		PM	9.9-A	16.9-B-0.63				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 25 (East Leg) at 47th St. SE

					Turn Lane Lengths (ft)***			
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**NBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-
		PM	-	-				
2030	No Build *Unsignalized*	AM	-	11.8-B-0.10	-	-	-	-
		PM	-	15.4-C-0.39				
	No Build Mitigated *Unsignalized*	AM	-	11.8-B-0.10	-	-	-	-
		PM	-	15.4-C-0.39				
	Interim *Unsignalized*	AM	-	19.7-C-0.38	-	-	-	-
		PM	-	14.9-B-0.36				
	Interim Mitigated *Unsignalized*	AM	-	15.6-C-0.25	-	400	475	475
		PM	-	15.5-C-0.14				
	Build *Unsignalized*	AM	3.90 veh-hrs	88.9-F-0.99	-	-	-	-
		PM	2.80 veh-hrs	205.7-F-1.15				
	Build Mitigated *Unsignalized*	AM	-	28.5-D-0.51	-	225	475	475
		PM	-	41.1-E-0.35				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 25 (East Leg) at 7th St. N								
					Turn Lane Lengths (ft)***			
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**NBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-
		PM	-	-				
2030	No Build	AM	-	-	-	-	-	-
		PM	-	-				
	No Build Mitigated	AM	-	-	-	-	-	-
		PM	-	-				
	Interim	AM	-	-	-	-	-	-
		PM	-	-				
	Interim Mitigated	AM	-	-	-	-	-	-
		PM	-	-				
	Build *Unsignalized*	AM	-	25.6-D-0.33	-	-	-	-
		PM	21.82 veh-hrs	398.8-F-1.72				
	Build Mitigated *Unsignalized*	AM	-	18.4-C-0.17	-	225	475	475
		PM	3.81 veh-hrs	75.7-F-0.87				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 25 (West Leg) at 7th St. S												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	9.9-A-0.04	-	-	-	-	-	-	-	-
		PM	-	10.0-B-0.01								
2030	No Build *Unsignalized*	AM	-	12.1-B-0.16	-	-	-	-	-	-	-	-
		PM	-	13.9-B-0.24								
	No Build Mitigated *Unsignalized*	AM	-	12.1-B-0.16	-	-	-	-	-	-	-	-
		PM	-	13.9-B-0.24								
	Interim *Unsignalized*	AM	11.84 veh-hrs	346.6-F-1.63	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-5.39								
	Interim Mitigated *Signalized*	AM	10.5-B	20.4-C-0.52	400	-	400	400	225	225	475	475
		PM	13.2-B	29.3-C-0.69								
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-3.64	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-1000								
	Build Mitigated *Signalized*	AM	11.1-B	23.5-C-0.53	400	-	400	400	475	475	225	225
		PM	14.8-B	30.9-C-0.72								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 25 (West Leg) at 70th St. SW

					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	11.5-B-0.16	-	-	-	-	-	-	-	-
		PM	-	15.5-C-0.26								
	No Build Mitigated *Unsignalized*	AM	-	11.5-B-0.16	-	-	-	-	-	-	-	-
		PM	-	15.5-C-0.26								
	Interim *Unsignalized*	AM	-	18.6-C-0.36	-	-	-	-	-	-	-	-
		PM	0.49 veh-hrs	78.4-F-0.53								
	Interim Mitigated *Unsignalized*	AM	-	16.1-C-0.25	-	400	-	-	475	475	475	475
		PM	0.39 veh-hrs	64.0-F-0.46								
	Build *Unsignalized*	AM	-	29.3-D-0.50	-	-	-	-	-	-	-	-
		PM	2.57 veh-hrs	264.4-F-1.21								
	Build Mitigated *Unsignalized*	AM	-	21.4-C-0.41	-	400	-	-	475	475	475	475
		PM	1.43 veh-hrs	146.7-F-1.02								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

TH 25 (West Leg) at Armitage Ave./75th St. SW												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	9.0-A-0.04	-	-	-	-	-	-	-	-
		PM	-	9.0-A-0.07								
2030	No Build *Unsignalized*	AM	-	17.0-C-0.13	-	-	-	-	-	-	-	-
		PM	-	15.3-C-0.36								
	No Build Mitigated *Unsignalized*	AM	-	17.0-C-0.14	-	-	-	400	475	-	475	-
		PM	-	14.5-B-0.19								
	Interim *Unsignalized*	AM	-	11.2-B-0.21	-	-	-	-	-	-	-	-
		PM	-	14.9-B-0.42								
	Interim Mitigated *Unsignalized*	AM	-	11.2-B-0.21	-	-	-	-	-	475	475	-
		PM	-	14.9-B-0.42								
	Build *Unsignalized*	AM	1000 veh-hrs	1000-F-1000	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-1001								
	Build Mitigated *Signalized*	AM	16.8-B	28.7-C-0.67	400	400	400	400	475	475	475	475
		PM	11.8-B	27.7-C-0.53								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

CSAH 12 at CR 107								
					Turn Lane Lengths (ft)***			
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**NBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	11.8-B-0.09	-	150	250	200
		PM	-	13.1-B-0.10				
2030	No Build *Unsignalized*	AM	-	17.5-C-0.34	-	150	250	200
		PM	-	20.2-C-0.25				
	No Build Mitigated *Unsignalized*	AM	-	17.5-C-0.34	-	475	475	475
		PM	-	20.2-C-0.25				
	Interim *Unsignalized*	AM	-	34.6-D-0.61	-	150	250	200
		PM	-	33.7-D-0.33				
	Interim Mitigated *Unsignalized*	AM	-	34.6-D-0.61	-	475	475	475
		PM	-	33.7-D-0.33				
	Build *Unsignalized*	AM	5.52 veh-hrs	92.8-F-0.97	-	150	250	200
		PM	2.18 veh-hrs	90.1-F-0.77				
	Build Mitigated *Signalized*	AM	16.3-B	40.1-D-0.67	-	475	475	475
		PM	13.3-B	32.7-C-0.72				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CSAH 12 at 45^{th} St. SW												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	14.4-B-0.16	-	-	-	-	250	275	250	275
		PM	-	10.4-B-0.22								
	No Build Mitigated *Unsignalized*	AM	-	14.4-B-0.16	-	-	-	-	475	475	475	475
		PM	-	10.4-B-0.22								
	Interim *Unsignalized*	AM	-	21.7-C-0.25	-	-	-	-	250	275	250	275
		PM	-	36.9-E-0.71								
	Interim Mitigated *Unsignalized*	AM	-	23.4-C-0.25	400	-	400	400	475	475	475	475
		PM	-	34.5-D-0.44								
	Build *Unsignalized*	AM	7.46 veh-hrs	506.9-F-1.87	-	-	-	-	250	275	250	275
		PM	1000 veh-hrs	1000-F-1000								
	Build Mitigated *Signalized*	AM	13.6-B	40.4-D-0.55	400	400	400	400	475	475	475	475
		PM	16.7-B	32.5-C-0.67								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CSAH 12 at Aspen Lane												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	10.3-B-0.10	-	-	-	-	325	-	-	275
		PM	-	10.6-B-0.13								
2030	No Build *Unsignalized*	AM	-	12.9-B-0.20	-	-	-	-	325	275	325	275
		PM	-	14.4-B-0.22								
	No Build Mitigated *Unsignalized*	AM	-	12.9-B-0.20	-	-	-	-	475	475	475	475
		PM	-	14.4-B-0.22								
	Interim *Unsignalized*	AM	-	45.0-E-0.48	-	-	-	-	325	275	325	275
		PM	36.40 veh-hrs	829.3-F-2.55								
	Interim Mitigated *Unsignalized*	AM	-	45.0-E-0.28	-	225	-	-	475	475	475	475
		PM	36.40 veh-hrs	829.3-F-2.55								
	Build *Unsignalized*	AM	0.42 veh-hrs	56.0-F-0.59	-	-	-	-	325	-	-	275
		PM	1000 veh-hrs	1000-F-4.65								
	Build Mitigated *Unsignalized*	AM	0.42 veh-hrs	56.0-F-0.40	-	225	-	-	475	475	475	475
		PM	1000 veh-hrs	1000-F-4.65								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CSAH 12 at 7th St. N												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing *Unsignalized*	AM	-	10.1-B-0.10	-	-	-	-	325	-	-	275
		PM	-	10.7-B-0.13								
2030	No Build *Unsignalized*	AM	-	12.0-B-0.19	-	-	-	-	325	-	-	275
		PM	-	13.4-B-026								
	No Build Mitigated *Unsignalized*	AM	-	14.4-B-0.19	-	225	-	-	475	-	-	475
		PM	-	20.2-C-0.22								
	Interim *Unsignalized*	AM	6.13 veh-hrs	272.6-F-1.45	-	-	-	-	325	275	325	275
		PM	1000 veh-hrs	1000-F-1000								
	Interim Mitigated *Signalized*	AM	13.7-B	29.9-C-0.55	400	400	400	400	475	475	475	475
		PM	15.0-B	28.9-C-0.58								
	Build *Unsignalized*	AM	36.34 veh-hrs	976.4-F-2.97	-	-	-	-	325	-	-	275
		PM	1000 veh-hrs	1000-F-1000								
	Build Mitigated *Signalized*	AM	16.2-B	39.6-D-0.70	400	400	400	400	475	475	475	475
		PM	21.8-C	50.7-D-0.75								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CSAH 12 at 3rd St. N/5th St. N												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	10.9-B-0.09	-	-	-	-	-	-	-	-
		PM	-	11.5-B-0.18								
2030	No Build *Unsignalized*	AM	-	16.0-C-0.22	-	-	-	-	325	275	325	275
		PM	-	18.4-C-0.32								
	No Build Mitigated *Unsignalized*	AM	-	16.0-C-0.22	-	-	-	-	325	275	475	475
		PM	-	18.4-C-0.32								
	Interim *Unsignalized*	AM	1.84 veh-hrs	58.1-F-0.72	-	-	-	-	325	275	325	275
		PM	5.15 veh-hrs	180.1-F-1.16								
	Interim Mitigated *Unsignalized*	AM	-	32.9-D-0.50	225	225	225	-	225	225	475	475
		PM	2.23 veh-hrs	63.6-F-0.71								
	Build *Unsignalized*	AM	2.07 veh-hrs	63.0-F-0.73	-	-	-	-	325	275	325	275
		PM	16.79 veh-hrs	487.5-F-1.90								
	Build Mitigated *Signalized*	AM	7.6-A	33.3-C-0.50	225	225	225	-	225	225	475	475
		PM	9.3-A	44.1-D-0.62								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CSAH 12 at 1st St. N								
					Turn Lane Lengths (ft)***			
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	NBL	SBR
2006	Existing *Unsignalized*	AM	-	10.4-B-0.15	-	-	-	-
		PM	-	10.9-B-0.12				
2030	No Build *Unsignalized*	AM	-	12.5-B-0.25	-	-	-	-
		PM	-	17.9-C-0.25				
	No Build Mitigated *Unsignalized*	AM	-	12.4-B-0.24	-	-	200	200
		PM	-	15.6-C-0.36				
	Interim *Unsignalized*	AM	-	24.2-C-0.45	-	-	-	-
		PM	0.75 veh-hrs	72.9-C-0.72				
	Interim Mitigated *Unsignalized*	AM	-	15.5-C-0.31	-	-	200	200
		PM	-	20.8-C-0.33				
	Build *Unsignalized*	AM	-	29.7-D-0.54	-	-	-	-
		PM	3.69 veh-hrs	340.7-F-1.44				
	Build Mitigated *Unsignalized*	AM	-	17.5-C-0.36	-	-	200	200
		PM	-	31.2-D-0.48				

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CSAH 12 at 2nd St. S													
					Turn Lane Lengths (ft)***								
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	11.8-B-0.03	-	-	-	-	-	100	-	-
		PM	-	14.7-B-0.06								
2030	No Build *Unsignalized*	AM	-	15.0-C-0.06	-	-	-	-	-	100	-	-
		PM	-	33.1-D-0.29								
	No Build Mitigated *Unsignalized*	AM	-	15.2-C-0.27	-	-	-	-	200	200	200	200
		PM	-	24.8-C-0.40								
	Interim *Unsignalized*	AM	-	34.1-D-0.18	-	-	-	-	-	100	-	-
		PM	1.17 veh-hrs	114.2-F-0.64								
	Interim Mitigated *Unsignalized*	AM	-	20.8-C-0.21	-	-	-	-	200	200	200	200
		PM	-	28.0-D-0.27								
	Build *Unsignalized*	AM	-	32.0-D-0.18	-	-	-	-	-	100	-	-
		PM	3.85 veh-hrs	355.2-F-1.20								
	Build Mitigated *Unsignalized*	AM	-	21.2-C-0.22	-	-	-	-	200	200	200	200
		PM	-	37.5-E-0.32								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

CR 110/Clementa Ave. at 7th St. S

					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	9.5-A-0.12	-	-	-	-	-	-	-	-
		PM	-	9.8-A-0.14								
	No Build Mitigated *Unsignalized*	AM	-	9.5-A-0.12	-	-	-	-	-	-	-	-
		PM	-	9.8-A-0.14								
	Interim *Unsignalized*	AM	2.79 veh-hrs	125.5-F-1.01	-	-	-	-	-	-	-	-
		PM	26.08 veh-rhs	670.6-F-2.32								
	Interim Mitigated *Signalized*	AM	15.7-B	26.8-C-0.67	225	225	225	225	400	400	400	400
		PM	17.8-B	38.4-D-0.60								
	Build *Unsignalized*	AM	11.15 veh-hrs	461.4-F-1.77	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-4.93								
	Build Mitigated *Signalized*	AM	15.5-B	29.7-C-0.62	225	225	225	225	400	400	400	400
		PM	19.0-B	45.4-D-0.54								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

CR 110/Clementa Ave. at 66th St. SW												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	13.1-B-0.22	-	-	-	-	-	-	-	-
		PM	-	12.8-B-0.09								
	No Build Mitigated *Unsignalized*	AM	-	13.1-B-0.22	-	-	-	-	-	-	-	-
		PM	-	12.8-B-0.09								
	Interim *Unsignalized*	AM	-	11.7-B-0.14	-	-	-	-	-	-	-	-
		PM	-	12.0-B-0.17								
	Interim Mitigated *Unsignalized*	AM	-	11.7-B-0.14	-	-	-	-	-	-	-	-
		PM	-	12.0-B-0.17								
	Build *Unsignalized*	AM	-	23.4-C-0.48	-	-	-	-	-	-	-	-
		PM	-	19.3-C-0.07								
	Build Mitigated *Unsignalized*	AM	-	23.4-C-0.48	-	-	-	-	-	-	-	-
		PM	-	19.3-C-0.07								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

CR 110/Clementa Ave. at 70th St. SW

					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	8.8-A-0.01	-	-	-	-	-	-	-	-
		PM	-	8.7-A-0.02								
2030	No Build *Unsignalized*	AM	-	14.6-B-0.37	-	-	-	-	-	-	-	-
		PM	-	14.9-B-0.23								
	No Build Mitigated *Unsignalized*	AM	-	16.6-C-0.27	400	-	400	-	475	-	475	475
		PM	-	16.8-C-0.20								
	Interim *Unsignalized*	AM	-	20.1-C-0.47	-	-	-	-	-	-	-	-
		PM	-	17.4-C-0.32								
	Interim Mitigated *Unsignalized*	AM	-	20.1-C-0.47	-	-	-	-	-	-	-	-
		PM	-	17.4-C-0.32								
	Build *Unsignalized*	AM	5.46 veh-hrs	225.8-F-1.33	-	-	-	-	-	-	-	-
		PM	3.21 veh-hrs	101.5-F-1.03								
	Build Mitigated *Unsignalized*	AM	-	36.6-E-0.58	400	-	400	-	475	475	475	475
		PM	-	31.7-D-0.52								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Aetna Ave. at 7th St. N												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	No Build Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Build *Unsignalized*	AM	-	17.9-C-0.41	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-3.61								
	Build Mitigated *All Way Stop*	AM	9.4-A	10.5-B-0.43	400	-	400	-	225	-	225	-
		PM	14.7-B	18.0-C-0.56								
	Build Mitigated *Signalized*	AM	10.7-B	28.8-C-0.51	400	400	400	400	225	225	225	225
		PM	16.3-B	39.9-D-0.78								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Clementa Ave. at CR 107												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	9.0-A-0.01	-	-	-	-	-	-	-	-
		PM	-	8.9-A-0.01								
2030	No Build *Unsignalized*	AM	-	12.0-B-0.22	-	-	-	-	-	-	-	-
		PM	-	13.6-B-0.18								
	No Build Mitigated *Unsignalized*	AM	-	14.1-B-0.13	475	475	475	-	-	400	-	-
		PM	-	17.0-C-0.13								
	Interim *Unsignalized*	AM	-	18.1-C-0.49	-	-	-	-	-	-	-	-
		PM	-	24.8-C-0.49								
	Interim Mitigated *Unsignalized*	AM	-	18.7-C-0.27	475	475	475	-	-	400	-	-
		PM	-	26.9-D-0.40								
	Build *Unsignalized*	AM	-	28.7-D-0.65	-	-	-	-	-	-	-	-
		PM	-	36.7-E-0.66								
	Build Mitigated *Unsignalized*	AM	-	24.0-C-0.39	475	475	475	-	-	400	-	-
		PM	-	30.8-D-0.48								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

Clementa Ave at 45th St. SW												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	No Build Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Build *Unsignalized*	AM	-	15.3-C-0.37	-	-	-	-	-	-	-	-
		PM	-	23.9-C-0.51								
	Build Mitigated *Unsignalized*	AM	-	15.3-C-0.37	-	-	-	-	-	-	-	-
		PM	-	23.9-C-0.51								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

Clementa Ave. at Breckenridge Lane												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build *Unsignalized*	AM	-	10.1-B-0.09	-	-	-	-	-	-	-	-
		PM	-	11.0-B-0.07								
	No Build Mitigated *Unsignalized*	AM	-	10.1-B-0.09	-	-	-	-	-	-	-	-
		PM	-	11.0-B-0.07								
	Interim *Unsignalized*	AM	-	11.9-B-0.23	-	-	-	-	-	-	-	-
		PM	-	12.7-B-0.13								
	Interim Mitigated *Unsignalized*	AM	-	11.9-B-0.23	-	-	-	-	-	-	-	-
		PM	-	12.7-B-0.13								
	Build *Unsignalized*	AM	-	15.1-C-0.18	-	-	-	-	-	-	-	-
		PM	-	15.3-C-0.13								
	Build Mitigated *Unsignalized*	AM	-	15.1-C-0.18	-	-	-	-	-	-	-	-
		PM	-	15.3-C-0.13								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Clementa Ave. at 7th St. N												
					Turn Lane Lengths (ft)***							
Year	Scenario	Peak Hour	Delay*-LOS	Max Delay-LOS-V/C**	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	No Build Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim *Unsignalized*	AM	-	11.7-B-0.18	-	-	-	-	-	-	-	-
		PM	-	14.0-B-0.23								
	Interim Mitigated *Unsignalized*	AM	-	11.7-B-0.18	-	-	-	-	-	-	-	-
		PM	-	14.0-B-0.23								
	Build *Unsignalized*	AM	-	20.0-C-0.18	-	-	-	-	-	-	-	-
		PM	-	27.9-D-0.31								
	Build Mitigated *Unsignalized*	AM	-	20.0-C-0.18	-	-	-	-	-	-	-	-
		PM	-	27.9-D-0.31								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Clementa Ave. at 55th St. SW												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing *Unsignalized*	AM	-	8.8-A-0.01	-	-	-	-	-	-	-	-
		PM	-	8.7-A-0.01								
2030	No Build *Unsignalized*	AM	-	11.0-B-0.20	-	-	-	-	-	-	-	-
		PM	-	13.5-B-0.18								
	No Build Mitigated *Unsignalized*	AM	-	12.3-B-0.24	-	-	-	-	400	-	400	-
		PM	-	15.0-B-0.21								
	Interim *Unsignalized*	AM	-	39.5-E-0.77	-	-	-	-	-	-	-	-
		PM	10.16 veh-hrs	530.2-F-2.00								
	Interim Mitigated *All Way Stop*	AM	12.7-B	16.0-C-0.56	-	225	-	-	400	-	400	-
		PM	17.5-C	20.9-C-0.66								
	Interim Mitigated *Signalized*	AM	6.2-A	9.6-A-0.40	-	225	-	-	400	-	400	-
		PM	7.3-A	14.5-B-0.48								
	Build *Unsignalized*	AM	2.03 veh-hrs	91.5-F-1.04	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-4.16								
	Build Mitigated *All Way Stop*	AM	17.0-C	25.8-D-0.75	-	225	-	-	400	-	400	-
		PM	33.6-D	47.9-E-0.92								
	Build Mitigated *Signalized*	AM	7.2-A	12.0-B-0.41	-	225	-	-	400	-	400	-
		PM	8.1-A	14.4-B-0.45								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

Garfield Ave. at 7th St. S												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	No Build Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim *Unsignalized*	AM	-	24.6-C-0.45	-	-	-	-	-	-	-	-
		PM	6.72 veh-hrs	148.5-F-1.17								
	Interim Mitigated *Unsignalized*	AM	-	20.4-C-0.29	225	-	225	225	225	-	225	225
		PM	-	42.2-E-0.67								
	Build *Unsignalized*	AM	0.76 veh-hrs	53.8-F-0.67	-	-	-	-	-	-	-	-
		PM	34.75 veh-hrs	508.5-F-2.01								
	Build Mitigated *All Way Stop*	AM	14.4-B	19.1-C-0.63	225	-	225	-	-	-	-	225
		PM	18.5-C	23.5-C-0.68								
	Build Mitigated *Signalized*	AM	6.4-A	26.5-C-0.35	225	-	225	225	225	-	225	225
		PM	9.1-A	16.6-B-0.63								

*Delay in seconds per vehicle

**Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Turn lane lengths based on 95th percentile queue

Zephyr Ave. at 7th St. N												
					Turn Lane Lengths (ft)***							
Year	**Scenario**	**Peak Hour**	**Delay*-LOS**	**Max Delay-LOS-V/C****	**EBL**	**EBR**	**WBL**	**WBR**	**NBL**	**NBR**	**SBL**	**SBR**
2006	Existing	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
2030	No Build	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	No Build Mitigated	AM	-	-	-	-	-	-	-	-	-	-
		PM	-	-								
	Interim *Unsignalized*	AM	-	10.3-B-0.21	-	-	-	-	-	-	-	-
		PM	-	14.2-B-0.19								
	Interim Mitigated *Unsignalized*	AM	-	10.3-B-0.21	375	-	-	-	-	-	-	-
		PM	-	14.2-B-0.19								
	Build *Unsignalized*	AM	-	40.8-E-0.73	-	-	-	-	-	-	-	-
		PM	1000 veh-hrs	1000-F-3.16								
	Build Mitigated *All Way Stop*	AM	14.6-B	17.0-C-0.54	400	-	400	-	400	-	400	-
		PM	17.6-C	22.7-C-0.69								
	Build Mitigated *Signalized*	AM	6.2-A	9.1-A-0.41	400	400	400	-	400	400	400	-
		PM	9.8-A	13.1-B-0.56								

*Delay in seconds per vehicle
**Maximum delay, LOS, and v/c ratio on any approach and/or movement
***Turn lane lengths based on 95th percentile queue

APPENDIX B – MITIGATION PLAN

Montrose
Alternative Urban Areawide Review

FINAL MITIGATION PLAN

City of Montrose, Minnesota

2017 AUAR Revision Note: As stated in the body of the 2017 AUAR Revision, the City of Montrose has not experienced sustained growth at the pace implied in 2008. Therefore, this appendix to the AUAR Revision is the same as the 2008 document. Additional text boxes with comments are included within to clarify status for selected impact categories.

October, 2008

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

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PURPOSE OF THE AUAR PROCESS

The Alternative Urban Areawide Review (AUAR) is an alternative review process adopted by the Environmental Quality Board (EQB) that can be used by local units of government to review anticipated residential and commercial projects. The AUAR substitutes for the preparation of an Environmental Assessment Worksheet (EAW) or Environmental Impact Statement (EIS) required for specific projects within the area of review, provided the projects are consistent with the assumptions made in the review and the mitigation measures identified in the review are implemented.

EXECUTIVE SUMMARY

a. Introduction

This Executive Summary/Mitigation Plan has been prepared to summarize major features of the development scenario proposed for evaluation in the Montrose AUAR Area. Additionally, mitigation steps are included for each topic that specifies the City controls, procedures and/or other steps that will be utilized to avoid or minimize environmental impacts of potential future development within the AUAR area. The Mitigation Plan is designed to identify the required actions, and to describe how the actions will be implemented in order to protect the environment from impacts related to development that is consistent with, or less intense than, the scenario evaluated in the AUAR.

Several landowners surrounding the City of Montrose municipal limits have properties under an orderly annexation order and are considering the sale of their land for development purposes. Developers have expressed interest in these properties and will likely be requesting approvals to allow for eventual urban development in this area. Wright County and Marysville, Woodland and Franklin Townships have given RGU authority to the City of Montrose.

The City has used one scenario to review potential environmental impacts for the Montrose AUAR area, which was broken into Interim and Full Build stages. The AUAR process of evaluating the cumulative potential impacts of property development is the most appropriate form of environmental assessment for a large geographic area with multiple owners in advance of a development concept. Furthermore, the AUAR process allows for the identification of mitigative measures for anticipated impacts, the specification of institutional requirements to implement these measures, and an understanding of financial implications of mitigation activities before development proceeds.

The City of Montrose desires an evaluation of the environmental impacts associated with urban development of the aforementioned properties before consideration of development requests. It is anticipated that the City of Montrose will adopt the Final AUAR and Mitigation Plan before development approvals in the area are requested.

It is recognized that this AUAR does not substitute for any other governmental unit's regulatory program or authority.

b. Summary of Issues and Mitigation

The key issues of this AUAR are cover type conversion, loss of wildlife habitat, wetland impacts, steep slopes and erosion, shoreland impacts, storm water management, and traffic. Land cover will be converted from primarily agricultural uses to primarily urban uses. Wetland and shoreland impacts from the change in land use will be minimized and mitigated. Development on steep slopes will be avoided as much as possible, and erosion will be prevented by the use of Best Management Practices. Storm water will be managed by a system of storm water basins. Improving the existing streets and building new ones will mitigate traffic impacts. These issues are analyzed in greater depth in the AUAR document. It is based upon existing information that may require updating as development occurs in the AUAR area. The discussion of the following items corresponds to the numbered items of the AUAR form as developed by the EQB.

MITIGATION PLAN

6. General Project Description: Infrastructure

Responsible Parties:	City of Montrose, Developers
Agencies Involved:	City of Montrose, Wright County, Buffalo/Montrose/Hanover School District
Regulatory Program:	Montrose Municipal Ordinance (Building and Land Use Regulations), City of Montrose Comprehensive Plan (2007)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

Development of the AUAR study area will require the provision of urban levels of municipal services and facilities. All of the facilities for sanitary sewer, public water, and storm water are to be staged in accordance with the development phases of properties within the AUAR study area. Utilities will be built concurrent with the streets. It should be noted that certain improvements are also required to accommodate other development occurring in the City of Montrose and to improve existing municipal facilities as discussed in the AUAR. The construction of roadway improvements is planned with development phasing as discussed later in this section. Expected staging is shown on Figures 4 and 5 of the AUAR.

<u>Sanitary Sewer</u>

Urban levels of development will require the extension and provision of sanitary sewer facilities to the AUAR area. The sanitary sewer extensions and facilities will be staged according to development phasing described under Item 6 of the AUAR. Existing sanitary sewer lines will need extension to serve properties in the AUAR area. Eight additional lift stations will be required to serve the AUAR area as well as expansions and upgrades to two other lift stations. Multiple trunk lines and force mains will be required as well. Expansions and process changes will be required to the existing Montrose Regional Wastewater Treatment Facility to treat the additional sanitary sewer flows. Permits to allow for the new facilities will be required from the Minnesota Pollution Control Agency (MPCA).

<u>Municipal Water</u>

Urban levels of development will require the extension and provision of municipal water facilities to the AUAR area. The anticipated water demand of development within the AUAR area is higher than the current facilities can accommodate; therefore additional facilities are required. Mitigation of the increased water demand within the AUAR area, demands of other developing portions of the City, and improvements to the existing water supply system will require an expansion of the municipal water system. Improvements to the system will include:

- A series of 12-inch, 10-inch and 8-inch water supply pipes will be constructed to provide water supply to the area.
- Three additional water towers totaling 2.25 million gallons in addition to a planned 500,000-gallon water tower to be constructed in the near future will provide adequate water storage to serve the AUAR area.

2017 Revision: Water tower improvements are partially complete. See AUAR Section 13.

- Additional wells will be constructed to provide water supply for the area.

Permits to allow for the new facilities will be required from the Minnesota Department of Natural Resources (MNDNR) and the Minnesota Department of Health (MDH). The City has adopted water conservation measures through public education and outreach measures that will apply to the AUAR area to encourage the reduction of water use and the improvement of water efficiency.

Storm Water Management

Increased storm water runoff will result from development within the AUAR area. The City's *Surface Water Management Plan* identifies the mitigation methods that are required as a result of development to provide adequate ponding and other facilities to protect water resources and improve water quality. Because the SWMP did not cover the entire AUAR area, the Comprehensive Plan was updated to include the AUAR study area. Development within the AUAR area will need to comply with the requirements of the aforementioned City plans as well as MNDNR and MPCA requirements.

Mitigation of increased runoff from development within the AUAR area will necessitate the construction of local and regional ponds and other drainage facilities prior to discharge from the AUAR area. The ponds will be sized to accommodate runoff from increased impervious surfaces and to attain water quality standards established in the City plans that meet State and Federal requirements.

Based on the specific features of the site, low impact development (LID) techniques may be considered during the concept plan review process and strategies could include, but not be limited to: impervious area minimization, natural vegetation retention, infiltration or filtration techniques (when soils permit) to aid in the reduction of discharge volumes, and storm sewer reduction (i.e. more overland flow through grass/vegetated swales to increase infiltration).

Storm water mitigation is described in more detail under Item 17.

10. Cover Types

Responsible Parties:	City of Montrose, Developers
Agencies Involved:	City of Montrose
Regulatory Program:	Montrose Municipal Ordinance Section 1090 (PUD), Montrose Municipal Subdivision Ordinance Section 1107.05 (Conservation Subdivision Design), Montrose Municipal Subdivision Ordinance Section 1107.14 (Tree Inventory, Preservation and Replacement)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

The AUAR contains an overlay map showing anticipated development in relation to existing land cover types (Figures 8 and 9).

The City currently has a Conservation Subdivision Design Ordinance (Section 1107.05). The purpose of this ordinance is to compatibly integrate development with the natural features of the site to accomplish the following objectives:

- The perpetual preservation of natural habitat areas and land forms unique to Montrose, including but not limited to wetlands, slopes, trees, etc.
- The creation of open spaces for passive and active recreational uses.
- The creation of well designed neighborhoods that feature common open space.
- The establishment of a unified landscape amenity for the enjoyment of City residents.

There are three open space classification designations: Natural Habitat, Neighborhood Recreation, and Trail Corridors. The open space is either owned by a homeowners' association, a land trust, non-profit organization or the City, depending on the open space classification designation.

Design of residential lots in a Conservation Subdivision must take tree preservation, the view shed and streetscape into account. By following this ordinance, land can be developed while still preserving open space that can provide habitat for wildlife. Natural areas will be accentuated by future design to give the suburban development a more natural feeling and to give residents a sense of place. This process will protect selected elements of the scenic beauty that citizens can view from their residences and from roadways, at the same time retaining habitat for mammals, birds and vegetation. The City will encourage Conservation Subdivision design where applicable.

The City currently has a Tree Preservation Plan Ordinance (Section 1107.14). Prior to the issuance of building permits for all new and/or expanded single and multiple-family residential, commercial, industrial and institutional uses, a tree preservation plan shall be submitted to the City Engineer and Zoning Administrator. The plan shall include the size, species, tag numbers, and location of all significant trees proposed to be saved and removed on the area of development, and the measures to protect the significant trees to be saved. Subdividers are encouraged to preserve all healthy trees of significant value even if the trees are less than six inches in diameter. Developers and/or home builders shall be required to replace significant trees which were indicated on the tree preservation plan to be saved but ultimately were destroyed or damaged. Each significant tree destroyed or damaged shall be replaced with trees totaling two (2) caliper inches for every one (1) caliper inch of tree loss.

11. Fish, Wildlife and Ecological Resources

Responsible Parties:	City of Montrose, Developers, Construction Contractors
Agencies Involved:	City of Montrose, Minnesota Department of Natural Resources
Regulatory Program:	Not applicable
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

Development is expected to have the greatest effect on populations of wildlife that currently utilize the agricultural and grassland areas. Impacts on woodland wildlife species are also anticipated. Development will likely result in the displacement of wildlife that depend upon upland habitat. Impacts will occur in the short-term, during grading and construction activities, and in the long-term, when deer and small mammals are expected to leave the area due to competition for limited habitat and the inability to adapt to urban conditions. Although some woodland will be preserved, development will increase habitat fragmentation, decrease natural area connectivity, and result in more barriers to wildlife movement. The City will strive to minimize local impacts through appropriate conservation design measures.

Preservation of trees, as discussed in Items 10 and 11, combined with wetland preservation and mitigation (see Item 12), will mitigate adverse effects on wildlife to some degree. The City's Conservation Subdivision Ordinance (see Item 10) will encourage open space preservation, which can provide habitat for wildlife. The City would encourage developers to employ "better site design" techniques to minimize impervious surface and to utilize native landscaping where practicable.

The City of Montrose has a tree preservation ordinance. The ordinance requires that a minimum of 50% of trees be preserved. In addition the City requires that a minimum of two trees be planted in every front yard of every home. The combination of these two requirements allows forested tracts to be preserved and replaces trees that are lost through development. The City currently has two greenway/habitat corridors included in their Park and Trail Plan. The first corridor follows a drainage way designated by the DNR as a tributary to the North Fork of the Crow River. The corridor will connect a 20 acre hardwood forest located southwest of Clementa Avenue and 55th Street N. to several large wetland complexes in the northern portion of the AUAR area. The second corridor connects Malardi State Wildlife Management Area and Woodland State Wildlife Management Area. The corridor follows a series of existing wetlands between the two management areas. The DNR was consulted in the location of this corridor to select the best possible corridor for movement of wildlife between the two management areas. The City will consider additional "greenway/habitat corridors" and the best use of park areas and regional stormwater ponding locations to assist in the creation of these corridors.

Mitigation for impacts to wetland habitat is covered under Item 12.

12. Physical Impacts on Water Resources

Responsible Parties:	City of Montrose, Developers
Agencies Involved:	Wright SWCD, U.S. Army Corps of Engineers, Minnesota Department of Natural Resources, Minnesota Board of Water and Soil Resources, Minnesota Pollution Control Agency
Regulatory Program:	Minnesota Wetland Conservation Act, Federal Clean Water Act, Montrose Municipal Subdivision Ordinance Section 1110.08 (Wetland Monuments), Montrose Municipal Land Use Ordinance Section 151.23 (Minimum Protection for Natural Wetlands); Montrose Municipal Land Use Ordinance Section 151.24 (Vegetative Buffer Protection for Rivers, Streams and Wetlands); Montrose Municipal Land Use Ordinance Section 151.25 (Additional Requirements)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

The City of Montrose recognizes the value of wetlands of all sizes and is committed to avoidance of wetland impacts where practicable. All impacts to jurisdictional wetlands will need to follow the sequencing process of avoidance, minimization, rectification, and mitigation as outlined in the Minnesota Wetland Conservation Act (WCA). Wetland permit applications will also be submitted as required by the WCA and Section 404 of the Federal Clean Water Act prior to project construction.

Prior to development, wetland boundaries must be delineated and approved by the City of Montrose, which is the local governmental unit (LGU) administering the Minnesota *Wetland Conservation Act* (WCA). As stated in Part 8420.0225 Subp. D of the WCA, wetland delineation boundary confirmation by the LGU is valid for three years unless the Technical Evaluation Panel determines that natural or artificial changes to the hydrology, vegetation, or soils of the area have been sufficient to alter the wetland boundary or type. Therefore, wetlands that were delineated more than three years prior to the start of project construction may potentially require an updated delineation.

Individual developers within the AUAR area that propose alterations to jurisdictional wetlands will be required to follow the sequencing process of wetland avoidance, minimization, rectification, and mitigation as outlined in the Minnesota Wetland Conservation Act (WCA). Wetlands will need to be delineated and permit applications will need to be prepared and submitted to the City of Montrose and the U.S. Army Corps of Engineers to obtain authorization for wetland alterations under the WCA and Section 404 of the Federal Clean Water Act prior to project construction. Wetland applications and designs will undergo additional review and comment by the Minnesota DNR, the Minnesota Board of Water and Soil Resources, the Wright Soil and Water Conservation District, and the Minnesota Pollution Control

Agency. The City's ordinances list methods of protection for wetlands, including a minimum 30-ft vegetated buffer for wetlands.

Wetland impacts will be replaced in compliance with the Minnesota WCA and the Federal Clean Water Act. Under the WCA, a minimum of 2 to 1 wetland replacement is required to compensate for wetland alteration including filling and drainage. At least the first 1 to 1 wetland replacement must be in the form of New Wetland Credit to satisfy WCA requirements. Detailed wetland alteration and replacement plans have not been completed for developments within the AUAR area, therefore, the extent of mitigation is not known at this time. Wetland replacement will either be designed to expand upon existing on-site wetlands, created in conjunction with stormwater ponding, or credits will be purchased from a local wetland bank. On-site wetland replacement will be explored as the first alternative for compensatory mitigation.

The City of Montrose will study the feasibility of creating a wetland bank within the AUAR area. If the feasibility study reveals that the creation of a wetland bank within the AUAR area is feasible and necessary, the City will employ necessary measures to develop a wetland bank.

13. Water Use

Responsible Parties:	City of Montrose, Developers, Construction Contractors
Agencies Involved:	City of Montrose, Minnesota Department of Natural Resources, Minnesota Department of Health
Regulatory Program:	Minnesota Statutes 103G.271 (Appropriation and Use of Waters), Minnesota Rules Chapter 6115 (Public Water Resources), Minnesota Rules Chapter 4725 (Wells and Borings), Montrose Municipal Subdivision Ordinance Section 1107.10 (Public Utilities), Montrose Municipal Subdivision Ordinance Section 1110.02 (Water Facilities), Montrose Municipal Subdivision Ordinance Section 1110.14 (Trunk Facilities)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

There are a total of 109 wells within the AUAR boundary listed on the County Well Index Online from the Minnesota Department of Health (MDH). As properties that have wells are developed, these wells will be sealed and properly abandoned in accordance with MDH regulations. Other unregistered wells encountered during construction will be sealed and properly abandoned in compliance with MDH regulations prior to site development. The existing farmsteads will be connected to City water mains when development reaches them and they are annexed into the City.

Public water service is not presently available to the entire AUAR area. The City has four existing wells. The wells have a total pumping capacity of 1,100 gpm. Additional wells will be required to meet the development demands. Based upon an assumed average pumping capacity of 400 gpm for each well, it is anticipated that an additional 17 wells will need to be constructed to meet the demands of the Full Build area. Additional wells will be constructed as development within the areas progress and additional pumping capacity is warranted. The current Minnesota Department of Natural Resources (DNR) Water Appropriations Permit will need to be amended to provide for this water usage.

2017 Clarification: No new wells have been constructed since the 2008 AUAR.

Monitoring wells to monitor effects of the increase in appropriation will be drilled at each proposed well location prior to the construction of the well. Test pumping and aquifer data at the proposed well location will be gathered and submitted to the DNR for approval prior to the new well construction. Also, the City will be installing a continuous aquifer monitoring system in their primary two wells. The system will allow the aquifer to be monitored at existing well locations for aquifer levels including drawdowns, static water level, and provide a history of aquifer level data useful in analyzing aquifer sustainability.

The City's existing water supply currently meets all National Primary Drinking Water Regulations. The existing water supply does contain levels of manganese around 0.8 mg/L to 1.4 mg/L. These levels exceed the recommended secondary drinking water standard of 0.05 mg/L. Polyphosphate is currently added into the distribution system to help combat the higher levels of manganese by keeping the manganese particles in suspension. Iron and manganese levels will continue to be monitored as new wells are constructed.

Development within the AUAR area will require that the City of Montrose trunk water distribution system be extended to serve future development. The trunk water distribution system will be installed as development occurs, and will be funded by development charges.

Currently, the City of Montrose has one 250,000-gallon elevated water tower. The City will be constructing an additional 500,000-gallon water tower in the near future. This will bring the total storage capacity to 750,000 gallons. One additional 750,000-gallon water tower will be constructed within the Interim Build area towards the north boundary line. Another 500,000-gallon and 1,000,000-gallon water tower will be constructed as part of the full build area. All towers will be constructed as development progresses and storage needs warrant an additional water tower. Water flow and pressure will be adequate for service to the entrire AUAR area with the proposed water towers and trunk line distribution system.

One or more temporary Minnesota DNR Water Appropriation Permits may be necessary to conduct construction dewatering. Dewatering may be necessary during construction to install sanitary sewer, municipal water, and storm sewer in some areas. Construction dewatering is usually conducted less than 15 feet under the ground. Contractors will carry out these activities on a case-by-case basis at the minimum duration and quantity necessary to construct utility service for the affected sites. A temporary DNR Water Appropriation Permit will be required if construction dewatering and pumping from development exceeds 10,000 gallons per day or 1,000,000 gallons per year. The DNR General Permit 97-0005 for Temporary Water Appropriations will apply if construction dewatering does not exceed 50 million gallons in total and duration of one year from the start of pumping. The quantity and duration of construction dewatering is not known at this time, but dewatering activities will be temporary. It is not anticipated that construction dewatering or pumping will be extensive or continue long enough to impact domestic or municipal wells. Groundwater appropriated for construction dewatering purposes will be discharged into temporary or permanent ponds located within the AUAR area.

14. Water-related Land Use Management District

Responsible Parties:	City of Montrose, Developers
Agencies Involved:	City of Montrose, Minnesota DNR
Regulatory Program:	Montrose Municipal Ordinance Section 1095 (Floodplain Overlay District), Montrose Municipal Ordinance Section 1096 (Shoreland Overlay District), Montrose Municipal Subdivision Ordinance Section 1107.05 (Conservation Subdivision Design), and Montrose Municipal Subdivision Ordinance Section 1107.12 (Flood Warning Signs in Flood-Prone Areas)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

The AUAR area does contain areas within the FEMA-delineated 100-year floodplain, near Mud Lake in the Woodland WMA, Fountain Lake, and a small portion in the northeast corner of the AUAR area in Franklin Township. Flood warning signs will be posted in areas that have been or would be inundated by the 100-year storm, as provided in Section 1107.12 of the City's Subdivision Ordinance. Development of floodplain areas will comply with the requirements of the City's Floodplain Overlay District, provided in Chapter 1095 of the Zoning Ordinance.

The City of Montrose's Shoreland Overlay District ordinance is provided in Chapter 1096 of the Zoning Ordinance. Mud Lake and Malardi Lake are classified as Natural Environment Lakes. Malardi Lake is also in a Special Protection Shoreland District (S-1).

The AUAR area does include the shoreland overlay district of Mud Lake (aka Woodland WMA) (DNR Public Water 86-85P), Malardi Lake (PW 86-112P), Fountain Lake (PW 86-86P), an unnamed DNR Public Water (wetland) (86-372W), an unnamed DNR Public Water (wetland) (86-446W), and an unnamed tributary to the North Fork Crow River (Figure 8). The shoreland overlay districts extend 1,000 feet from the ordinary high water levels (OHWL) of these waterbodies. The OHWL of both Mud Lake and Fountain Lake is 932 feet. The OHWL of Malardi Lake is 935.1 feet. The OHWL of the unnamed wetlands will be determined by the DNR as development reaches these wetlands. The current Shoreland Overlay District Ordinance already includes Mud Lake, Malardi Lake, Fountain Lake, an unnamed DNR Public Water (wetland) (86-105P), and an unnamed tributary to the North Fork Crow River. Upon annexation, the City will revise their Shoreland Overlay District ordinance to include the three unnamed creeks (86025a, 86035a, 86032a, and 86032b) (Figures 9 and 10). The revised ordinance will be submitted to the Minnesota DNR for review at that time.

Under the current shoreland ordinance, the required suitable lot area per single home with City sewer service for non-riparian residential units within the shoreland of natural environment lakes is 20,000 square feet. This corresponds to the required area per unit for the underlying Low Density Residential zoning district. The required suitable lot area per single home for riparian residential units within the shoreland of natural environment lakes is 40,000 square feet. The required areas for riparian residential lots correspond to the larger lot area requirements set forth in the Minnesota DNR model shoreland ordinance. The higher development density allowed for non-riparian residential lots provides an added incentive for developers to dedicate the land adjacent to the OHWL for public use and natural vegetation.

Development within the Shoreland Overlay Districts will be compatible with the land use restrictions set forth in the City of Montrose Shoreland Overlay District ordinance. As concept plans for development are submitted, the City will ensure plans are consistent with the ordinance and evaluate whether certain areas such as steep slopes, wetlands, and woodlands, could be considered for preservation through means that may include planned unit design negotiations, park land dedication, public acquisition, or other means.

Subdivision Ordinance 1107.05, Conservation Subdivision Design, will help guide preservation of open space in subdivisions.

16. Erosion and Sedimentation Control

Responsible Parties:	City of Montrose, Project Developer, Construction Contractor
Agencies Involved:	City of Montrose, Wright SWCD, Minnesota Pollution Control Agency
Regulatory Program:	NPDES General Permit for Construction Activity, MPCA Phase II Stormwater Permit, Montrose Subdivision Ordinance Section 1107.09 (Erosion and Sediment Control)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

Planned urbanization within the AUAR area will likely result in the potential for erosion and sedimentation. Mass and staged grading activities throughout the developable areas of the AUAR are anticipated for residential subdivisions, commercial and commercial/light industrial development areas, and the installation of streets and utilities.

Mitigation of erosion and sedimentation include administration and/or enforcement of the following:

A. Pre-and post-development activities will minimize runoff and provide erosion control through Best Management Practices (BMPs) and other techniques such as the use of vegetation buffers, tree planting and mulching, and outfall stabilization. Appropriate erosion and sedimentation controls proposed will be in place prior to land-disturbing activity. With the implementation of BMPs, potential adverse effects from construction-related sediment and erosion on water quality will be minimized to the extent practicable. It is anticipated that potential adverse erosion and sedimentation impacts will be limited to short-term effects.

B. Proper erosion and sedimentation control strategies in areas of highly erodible soils and steep slopes will be considered during the planning and plan approval phase. These measures will be implemented as needed during and after construction.

C. Individual projects will submit detailed erosion and sediment control plans prior to project construction and will undergo review and approval by the City of Montrose. The plans must be in compliance with:

- the City *Comprehensive Plan* policies;
- the City's *Surface Water Management Plan* requirements;
- the City's *Title XV, Land Usage, Ordinance 151, Stormwater Pollution*: Performance standards requiring storm water to be managed in accordance with the MPCA's NPDES/SDS permit guidelines and the MPCA's *Protecting Water Quality in Urban Areas*.
- the National Pollutant Discharge Elimination System (NPDES) Phase II permit, which requires implementation of best management practices (BMPs) and the preparation of a Storm Water Pollution Prevention Plan (SWPPP) for activities disturbing a site over one acre. The SWPPP and the BMP implementation strategy must be prepared before submitting a Permit application; and
- The Permit requires stabilization of any water conveyance within 200 lineal feet from the property edge or from the point of discharge to any surface water. Stabilization must occur within 24 hours of connecting to a surface water. Culvert outlets must have energy dissipation within 24 hours of connection to a surface water. All exposed soil areas with a continuous positive slope within 200 lineal feet of a surface water must have temporary erosion protection or permanent cover for the exposed soil areas, varying based on a table of slopes and time frames. The new property owner must submit a subdivision registration within seven days of assuming operational control of the site, commencing work on their portion of the site, or of the legal transfer, sale or closing on the property.

D. The City of Montrose will require a long-term maintenance plan to be in place for storm water ponds before giving final plan approval. The City charges each resident a stormwater utility fee each month, and these funds are used to operate and maintain the storm water retention ponds.

17. Water Quality – Storm Water Runoff

Responsible Parties:	City of Montrose, Developers, Construction Contractors
Agencies Involved:	City of Montrose, Wright SWCD, U.S. Army Corps of Engineers, Minnesota Pollution Control Agency
Regulatory Program:	Montrose Municipal Ordinance Title XV, Land Usage, Ordinance 151 (Stormwater Pollution); Montrose General Regulations Ordinance Chapter 97 (Phosphorous Fertilizer); Montrose Municipal Subdivision Ordinance Section 1110.05 (Storm Sewer); Montrose Municipal Subdivision Ordinance Section 1110.14 (Trunk Facilities); City of

	Montrose's draft *Surface Water Management Plan*; City of Montrose *Comprehensive Plan*; NPDES General Permit for Construction Activity
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

The AUAR area is located within the North Fork of the Crow River watershed. Presently, there is no pretreatment of runoff into existing wetlands or drainageways due to the agricultural nature of the AUAR area. Development within the AUAR area will increase the rate and volume of runoff to ponding areas and drainageways, and introduce pollutants to ponding areas. Wetland impacts are discussed in Item 12.

Storm water retention and water quality treatment is required for development within the City as regulated by the City's *Zoning Ordinance, Surface Water Management Plan (June 2003)*, and *Comprehensive Plan*. Mitigation of impacts includes:

A. City's *Title XV, Land Usage, Ordinance 151, Stormwater Pollution*: Performance standards requiring storm water to be managed in accordance with the MPCA's NPDES/SDS permit guidelines and the MPCA's *Protecting Water Quality in Urban Areas*.

B. City's *General Regulations Ordinance Chapter 97, Phosphorus Fertilizer*: Restriction of use of phosphorus fertilizers.

C. City's *Surface Water Management Plan* and City's *Comprehensive Plan*: This plan establishes the design criteria for storm water facilities to accommodate storage needs and reduce pollutant and nutrient loading with urban development. The ponding areas identified in the *Surface Water Management Plan* are designed to accommodate storm water resulting from the 2-, 10- and 100-year recurrence interval storms. The ultimate design of the ponding areas is based upon the Walker/NURP criteria.

D. MPCA Requirements: The rules require that water quality standards be met including *Protecting Water Quality in Urban Areas*, NPDES Phase II permit specifications, and Storm Water Pollution Prevention Program (SWPPP) requirements. The ultimate TMDL requirements will be met by reserving space and funds to construct or retrofit the watershed with the necessary additional facilities to achieve those goals, once they have been finalized.

The primary technique for mitigation of the development effects will be through the construction of "wet" regional retention ponds, which will be designed to treat the runoff and maintain existing peak discharge rates for the design storms. Wet sedimentation ponds shall be designed to Walker design standards, which reduce phosphorus loading at the downgradient site boundary by 40-70 percent on an annual average removal basis. The ponds will be located within outlots, with the City of Montrose having ownership and being responsible for long-term maintenance. The regional ponds will not be built in wetlands. The regional ponds will be constructed as development occurs, and will be funded by development charges. These development charges will be determined on a "per acre" basis, based on the cost of land for the pond and pond construction costs. The developer would pay the City for the number of acres that drain to each regional pond, as applicable.

When soils permit, it is recommended that infiltration or filtration techniques be utilized to aid in the reduction of discharge volumes. Design of such techniques is outside the scope of this mitigation plan as it is desirable to see these methods on a localized scale. Based on the specific features of the site, low impact development (LID) techniques may be considered during the concept plan review process and strategies could include, but not be limited to: impervious area minimization, natural vegetation retention, infiltration or filtration techniques (when soils permit) to aid in the reduction of discharge volumes, and storm sewer reduction (i.e. more overland flow through grass/vegetated swales to increase infiltration).

Improvement in water quality of the unnamed creek that is a tributary to the North Fork of the Crow River is also anticipated because the agricultural and rural conditions that lead to fecal coliform pollution will be replaced by urban development.

When detailed grading plans are completed for each development area, plans and detailed calculations will be submitted for review and individual permit approval.

A final contributor to the reduction of phosphorus loading to local water bodies will come from compliance with Minnesota legislation (Chapter 179), effective January 1, 2005, that phosphorus cannot be included in fertilizer applied to lawns. The City has an ordinance that addresses use of phosphorus fertilizer.

According to the MPCA, an Unnamed Creek/Unnamed Ditch (Assessment Unit ID 07010204-527), which runs from Mud Lake (Woodland WMA) to the North Fork Crow River on the eastern side of the AUAR area, is impaired for oxygen. In addition, the North Fork of the Crow River (Assessment Unit ID 07010204-503), which is northeast but not inside of the AUAR area, is impaired for oxygen and turbidity. These reaches will be bundled into the same TMDL project, which is in the beginning stages of development. Activities to develop TMDL and load allocations will begin soon. Once the TMDL and load allocations have been decided, the City of Montrose will implement appropriate ordinances and other controls to meet the TMDL requirements. The City will comply with current and future requirements as set forth by the DNR, MPCA, and any other state and federal agencies resulting from the TMDL study of the Crow River watershed and the Mississippi River watershed.

18. Water Quality – Wastewater

Responsible Parties:	City of Montrose, Developers, Construction Contractors
Agencies Involved:	City of Montrose, MPCA
Regulatory Program:	Montrose Municipal Subdivision Ordinance Section 1107.10 (Public Utilities), Montrose Municipal Subdivision Ordinance Sections 1110.03 (Sanitary Sewer), Montrose Municipal Subdivision Ordinance Section 1110.14 (Trunk Facilities); MPCA NPDES/SDS General Permit
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

Planned urbanization within the AUAR area will require the extension of public facilities to serve the new land uses as required by the City's *Zoning Ordinance*. As described in Item 18 of the AUAR, mitigation requires the extension and provision of sanitary sewer trunk facilities to the AUAR area. The extension of trunk sanitary sewer will be constructed as development occurs, and will be funded by development charges.

Currently wastewater from Montrose and Waverly are treated at the Montrose Regional Wastewater Treatment Facility. The current receiving water for the discharge from Montrose's wastewater treatment facility is to an unnamed wetland (Woodland WMA) and then to an unnamed creek. The treatment facility is meeting all current permit limits. 2017 Revision: NPDES/SDS permit extended by MPCA. See AUAR Section 18.

The current NPDES/SDS Permit will expire on June 1, 2012. Due to expected growth in the cities of Montrose and Waverly, as well as more stringent limits on receiving waters, discharge limits for the Montrose Wastewater Treatment Facility might become more stringent. The BOD limit might change from 25 mg/L to 15 mg/L and the TSS limit might change from 45 mg/L to 30 mg/L for the monthly average. The phosphorus limit might change from a monthly average of 1 mg/L to a mass-loading limit based on the current NPDES permit. Based on the current treatment facility AWW flow of 0.781 mgd, the phosphorous monthly mass limit is 6.51 lbs/day. The Minnesota Pollution Control Agency (MPCA) must yet determine the final NPDES permit limits for future upgrades to the wastewater treatment facility.

Currently the farmsteads in the AUAR area have septic systems. The farmsteads will be connected to City sanitary sewer as the development reaches them and they are annexed into the City. Their septic systems will be properly abandoned at that time. This will improve the quality of groundwater in areas that currently have septic systems.

Development in the AUAR area is also expected to help improve water quality in the North Fork of the Crow River, as discussed in Item 17. The North Fork of the Crow River, just to the northeast of the AUAR area, was listed as an MPCA impaired water for low oxygen and turbidity. The unnamed creek that is a tributary to the North Fork of the Crow River was also listed for low oxygen.

Since the Montrose Regional Wastewater Treatment Facility expansion in 2002 the NPDES SDS permit has required that the City monitor the effects of increased wastewater discharge rates to the Woodland WMA. Specific items included in the monitoring are Chlorophyll, Dissolved Oxygen, pH, Phosphorus, specific conductance, temperature, and transparency. The permit also requires a plant community integrity study be completed to monitor any effects of the WWTP discharge on the plant community. Current monitoring shows no impacts on Woodland WMA. If it is determined that future loadings will have impacts, alternative discharge points or treatment methods will be investigated.

19. Geologic Hazards and Soil Conditions

Responsible Parties:	City of Montrose, Developers, Construction Contractors
Agencies Involved:	City of Montrose, Wright County, Minnesota Pollution Control Agency
Regulatory Program:	Minnesota Rules Chapters 7045 (Hazardous Waste)
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

Because development within the AUAR area will be typical of residential, commercial and light industrial land uses, no unusual wastes or chemicals are anticipated to be spread or spilled onto the soils that would cause significant groundwater contamination.

Mitigation of potential groundwater pollution includes:

A. Policies and design standards are included in the City's *Surface Water Management Plan* to reduce the introduction of pollutants to wetlands, ponds and drainageways from surface water runoff resulting from development. The policies and standards are directed towards the creation of ponds to meet water quality design requirements and the construction of water quality devices such as skimmers, as appropriate.

B. Any existing private wells that are found within the AUAR area will be capped according to MDH requirements, once municipal water is supplied to the area. Abandoned wells that are discovered as part of the site development will be capped according to MDH regulations.

C. As development occurs, individual on-site sanitary treatment systems will be replaced with municipal services to reduce the potential for pollution from septic system sources.

21. Traffic

Responsible Parties:	City of Montrose, Developers
Agencies Involved:	City of Montrose, Wright County, Minnesota Department of Transportation
Regulatory Program:	Not applicable

Implementation Timeframe: Start: 2007 End: Driven by Development Demands

The mitigation needed to assure acceptable operations at each intersection was determined through the traffic analysis. The final proposed lanes and traffic control measures recommended for the roadways studied are included in Appendix A, Figures 19, 20, 24 and 25, and in Appendix A Sections 6.1.1 to 6.1.7. These lane and traffic control recommendations assure Level of Service D or better for all intersections, except where traffic volumes are extremely low or where delay and volume would not be expected to meet signal warrant requirements. The roadway improvements recommended should be built concurrent with any development of the area.

2017 Clarification: The transportation projects listed below have not been completed nor programmed since the 2008 AUAR.

Specific improvements to the roadway network include:

- US TH 12: Roadway widening to a 4-Lane Divided Highway and intersection control improvements at major intersections.
- TH 25 (East Leg): Roadway widening to a 4-Lane Divided Highway to CSAH 32, 3-Lane section north to the City of Buffalo and intersection control improvements at CSAH 32.
- TH 25 (West Leg)/CSAH 12: Roadway widening to a 3-Lane section south of TH 12 and to a 4-Lane Divided Highway north of TH 12. Intersection control improvements at major intersections.
- CR 110/Clementa Ave: Roadway widening to a 4-Lane Divided roadway near TH 12 and intersection improvements at 7th St. S. and 1st St. N/55th St. SW.
- Seventh Street North and Seventh Street South: Expanded roadways with east-west continuity through the City of Montrose to help alleviate TH 12.
- Railroad Crossings: Upgraded railroad crossings to maintain north-south continuity and safety.

Additional studies are recommended as development is added to the City. These include studies that analyze the:

- US TH 12 Corridor
- TH 25/CSAH 12 Corridor
- Clementa Avenue Railroad Crossing
- Zephyr Avenue Railroad Crossing
- Intersection Traffic Control Improvements
- Gravel Roadways
- Development Studies; to ensure consistency with the AUAR
- Develop a Funding Strategy to have development pay its proportionate fair share of roadway, infrastructure, and traffic control improvements

The full traffic impact study, conclusions, mitigation, and the full explanation of the additional recommended studies are included in Appendix A.

24. Odors, Noise and Dust

Responsible Parties: City of Montrose, Developers
Agencies Involved: City of Montrose, Minnesota Pollution Control Agency
Regulatory Program: Minnesota Rules Chapters 7030 (Noise Pollution Control) and 7009 (Ambient Air Quality Standards)
Implementation Timeframe: Start: 2007 End: Driven by Development Demands

No mitigation measures have been considered for odors. Consideration will be given to suppression of fugitive dust by applying water to grading areas and haul roads during dry, dusty construction conditions to minimize dust emissions. Additional dust control measures may include minimizing the area of open grading and phasing development of the AUAR area.

Although development of the AUAR area is expected to result in increased noise associated with site-generated traffic, the increased traffic noise is not expected to be substantial or interfere with outdoor activities. Proposed development shows that much of the land use along proposed major roadways is expected to be commercial or light industrial, medium to high density residential, and parkland. These land uses will help buffer the single-family residential areas from potential objectionable effects of increased traffic noise. Although vegetation is not as effective as topography or structural noise barriers in reducing noise levels, vegetation can create a visual barrier and a psychological buffer between noise receptors and noise sources.

Short-term increases in local noise levels are expected during project construction. Consideration will be given to limiting construction activities to the hours between 7:00 am and 7:00 pm. The limited hours of construction and the distance from most of the AUAR area to sensitive noise receptors is expected to mitigate adverse effects of construction noise.

The City will require, in the developer's contract, that as part of the developer's homeowner covenants with the new property owners, the developer will provide the new owners with information about possible issues of odor, dust, noise, and/or hours of operation that may arise from living and working near a farming operation. Informing nonfarm residents about life in agricultural areas is a tool that will be used to help lessen potential conflicts between nonfarm residents and agricultural land uses.

25. Sensitive Resources

Responsible Parties:	City of Montrose, Project Developer
Agencies Involved:	City of Montrose, Wright County, Minnesota Historical Society
Regulatory Program:	Minnesota Field Archaeology Act, Minnesota Private Cemetaries Act, Minnesota Historic Sites Act, Section 106 of the National Historic Preservation Act, Montrose Subdivision Ordinance 1107.05 (Conservation Subdivision Design), Montrose Subdivision Ordinance 1107.13 (Public Sites and Open Spaces [Park Land Dedication])
Implementation Timeframe:	Start: 2007 End: Driven by Development Demands

<u>Archaeological, historical or architectural resources</u>

A search for historic properties and archaeological sites in the database of the Minnesota State Historic Preservation Office (SHPO) yielded 14 sites under the "History/Architecture" heading and 4 sites under the "Archaeological" heading. In general, the known historical sites are associated with old town Montrose and the TH 12 alignment. The known archaeological sites are generally scattered on the east and southeast portions of the AUAR area. These sites are known because professional surveys were conducted tied to construction projects. As new projects are conducted in the AUAR area, the potential for historical and archaeological resources will be further assessed in Cultural Resources Reviews and Phase I surveys done for individual projects as development occurs. The City will require developers to submit this information as part of the platting process. The preliminary assessments will include background research at the SHPO, review of historical maps and aerial photos, and a visual reconnaissance of the project area. The Phase I investigations will include using systematic pedestrian survey and shovel testing.

If there is any public involvement in future development projects, there will also be compliance with the Minnesota Field Archaeology Act, the Minnesota Private Cemeteries Act, and the Minnesota Historic Sites Act, as appropriate. Additionally, the City of Montrose and Wright County will be consulted regarding their requirements and philosophy for cultural stewardship.

<u>Prime or Unique Farmlands</u>

Agricultural lands currently occupy much of the AUAR area. According to the *Prime and Other Important Farmlands of Wright County, Minnesota* (USDA NRCS, 2006), the site contains soil units classified as prime farmland, prime farmland when drained, farmland of statewide importance and prime farmland if protected from flooding. There are currently parcels within the AUAR area that are enrolled in the Agricultural Preserves Program (also known as the Farmland Preservation Property Tax Credit Program). These are shown on Figure 34. In the Agricultural Preserves Program, in return for a tax break landowners agree to not develop the enrolled land for seven years after filing papers for cancellation. Property owners in the Agricultural Preserves Program must also develop and implement a conservation compliance plan on land classified as highly erodible land.

A related topic is the “Green Acres” program. The Agricultural Property Tax Law is a Minnesota Statute that is commonly referred to as "Green Acres." With this law, bare farmland is valued for tax purposes on its agricultural value, rather than its future development potential or highest and best use value. These "Green Acres" are entitled to valuation and tax deferments. Otherwise, taxes on potential development land could get so high they would force farmers off the land prematurely.

Most agricultural land in the AUAR area is in Green Acres. Since Green Acres is a property tax incentive program renewed on a yearly basis, a property in Green Acres is not prevented from development for a certain number of years like land in the Agricultural Preserves Program. Therefore, the Green Acres helps farmers continue to farm on their property, but will not really affect their development timeline should they decide to sell or develop their land.

Because the project area is guided for development according to the City of Montrose’s *Comprehensive Plan* (2007), no alternative to conversion of prime farmland or farmland of statewide importance is readily identifiable.

Designated Parks, Recreation and Trails

Increased areas of urban development and associated increases in the number of household units will place greater demand upon City and County recreational facilities. As part of development within the AUAR area, a neighborhood park and a trail system that connects to City and County trail corridors will be developed. As land is developed, the developer is required to either dedicate parkland or pay the City to set aside parkland elsewhere, as required in the City’s Subdivision Ordinance Section 1107.13. Examination of a joint recreational facility, which may include a neighborhood park, should be pursued if a junior high school is proposed within the AUAR area. Placing regional stormwater ponds in parks, where possible, should also be considered.

Mitigation includes review of trail and park needs and requirements, including the determination of trails along all the major transportation corridors in the AUAR area at the time development approvals are reviewed by the City. At a minimum, mitigation will be regulated by compliance of development plans with the City’s *Subdivision Ordinance*. The City will coordinate with Wright County in providing for regional trails.

Scenic Views and Vistas

Viewsheds will become more suburban and less agrarian in nature. Design of residential lots in a Conservation Subdivision must take tree preservation, the view shed and streetscape into account. By following this ordinance, land can be developed while still preserving the view shed to some extent. The City will encourage Conservation Subdivision design where applicable. Natural areas will be accentuated by future design to give the suburban development a more natural feeling and to give residents a sense of place. This process will protect selected elements of the scenic beauty that citizens can view from their residences and from roadways, at the same time retaining habitat for mammals, birds and vegetation.

APPENDIX C – RESPONSE TO COMMENTS

OFFICE OF THE STATE ARCHAEOLOGIST • MINNESOTA •

October 9, 2007

RECEIVED OCT 11 2007

Barbara Swanson
Administrator, City of Montrose
PO Box 25
311Buffalo Ave. N.
Montrose, MN 55363

RE: Montrose AUAR

Dear Ms. Swanson:

I appreciate being given the opportunity to comment on the above listed project. I have reviewed it pursuant to the Minnesota Field Archaeology Act (MS 138.31 - .41), the Private Cemeteries Act (MS 307.08), and the Minnesota Environmental Policy Act (MS 116D). As State Archaeologist, I have no official role in federal environmental review processes so this letter does not address Section 106 of the National Historic Preservation Act should this project involve any federal funds, federal lands, or federal permits. In addition, my comments do not address historic sites of a non-archaeological nature.

There are two *recorded* archaeological sites within the project area, a group of prehistoric burial mounds known as 21WR2 and a single prehistoric artifact find known as 21WR94. The burials mounds are protected under MS 307.08. Furthermore, the project area in general has numerous settings with high archaeological potential. I recommend that a qualified archaeologist undertake an archaeological reconnaissance survey of the areas with known sites and areas with high site potential. The areas with high potential are distinct hilltops and upland areas within 500 feet of significant bodies of water, including now-drained lakes/major wetlands and former streambeds (see hydric soils map, Figure 26). If you can demonstrate that the post-glacial soils of any of these areas have been removed or are otherwise fully disturbed, I will reconsider my recommendation for those specific areas. Cultivation or utility development alone are not considered full disturbance.

You can obtain a list of qualified archaeologists from the State Historic Preservation Office (SHPO) at: http://www.mnhs.org/shpo/review/contract_arch.pdf I would be available to discus this recommendation with you if you need further explanation or assistance.

Sincerely,

Scott Anfinson
Minnesota State Archaeologist
612-725-2411
scott.anfinson@state.mn.us

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
2040 Highway 12 East • Willmar, MN 56201-5818
Phone (320) 231-3956 • FAX (320) 231-9710

April 11, 2008

Mr. Scott Anfinson
Office of the State Archaeologist
Fort Snelling History Center
St. Paul, MN 55111-4061

RE: Alternative Urban Areawide Review (AUAR)
Montrose, Minnesota
BMI Project No: W13.37928

Dear Mr. Anfinson:

Thank you for your comments on the Montrose AUAR. The following represents paraphrasing of the issues identified in your letter dated October 9, 2007 and our proposed response to these comments.

Comment SA-1: Recommend that a qualified archaeologist undertake an archaeological reconnaissance survey of the areas with known sites and areas with high site potential.

Response SA-1: The Draft AUAR already mentioned that developers will be required to have Cultural Resources surveys done at the time of platting – see page 44 in the Draft AUAR and page 15 in the Draft Mitigation Plan. The City has a checklist of items that Developers are required to submit at the time of Preliminary Plat approval. The archaeological reconnaissance survey will be required as part of this checklist. We feel that this would be a more appropriate time to complete the survey and analyze the results of the survey with the layout of the plat. At that time the City can require any necessary changes in the plat layout to avoid findings from the archaeological survey. Since the AUAR does not contain specific plat layouts, we feel that a reconnaissance survey at this time would not be of significant benefit to the AUAR.

This response to your comments is proposed to be included in the Montrose Final AUAR and Mitigation Plan. If you would like to discuss this proposed response, please feel free to contact me at 320-231-3956 or justinka@bolton-menk.com.

Sincerely,

BOLTON & MENK, INC.

Justin L. Kannas

Justin L. Kannas, P.E.
Project Engineer

cc: Barbara Swanson, City of Montrose Administrator
Bradley C. DeWolf, P.E., City Engineer, Bolton & Menk, Inc.
Chantill A. Kahler Royer, P.E., Bolton & Menk, Inc.
Gina Mitchell, Bolton & Menk, Inc.

MARYSVILLE TOWNSHIP

3733 Dempsey Ave SW
Waverly, MN 55390
Tele: 763-658-4064
Fax: 763-658-4056
TDD# 711

RECEIVED
OCT 19 2007

Richard Sawatzke, Supervisor, Chairman
Dale Ronning, Supervisor, Vice-Chairman
Augie Riebel, Supervisor
Dorothy Rahn, Clerk/Treasurer

October 15, 2007

City of Montrose
Attn Barbara Swanson, Administrator
PO Box 25
311 Buffalo Ave N
Montrose, MN 55363

Re: Montrose Alternative Urban Area Wide Review

Dear Ms Swanson,

In response to the AUAR review received at the Marysville Township hall, we will not be able to respond to your request for comments by October 24, 2007. We did not have a full board at our monthly meeting on September 24, 2007 so the review of said document was tabled until October 29, 2007. At our monthly meeting on October 29, 2007 the report will be reviewed along with our Attorney and Planning & Zoning. Comments, if any, will be forwarded to you after the 29th of October.

Sincerely,

Dorothy Rahn

Dorothy Rahn
Clerk/Treasurer

MARYSVILLE TOWNSHIP

3733 Dempsey Ave SW
Waverly, MN 55390
Tele: 763-658-4064
Fax: 763-658-4056
TDD# 711

Richard Sawatzke, Supervisor, Chairman
Dale Ronning, Supervisor, Vice-Chairman
Augie Riebel, Supervisor
Dorothy Rahn, Clerk/Treasurer

RECEIVED
NOV 15 2007

November 12, 2007

City of Montrose
Attn Barbara Swanson, Administrator
PO Box 25
311 Buffalo Ave N
Montrose, MN 55363

Re: Montrose Alternative Urban Areawide Review (AUAR)
BMI Project No. M13.39361

Dear City of Montrose:

This letter contains Marysville Township's comments on the above referenced AUAR.

Before making substantive comments, the Town has complaints related to the process followed by Montrose.

First, the arbitrary reply date set forth in the City's letter dated September 14, 2007, denies Marysville due process of law. The reply deadline is incompatible with Marysville's meeting schedule. The City mailed a 2-inch thick book containing the study and solicited comments. The Clerk reported its receipt to the Town Board at the meeting held September 24, 2007. Because the report was so large, the board members deferred action until the study could be reviewed. The Town Board then acted on the study at the next board meeting, October 29, 2007.

The essence of due process is a meaningful opportunity to be heard. The City's arbitrary reply deadline denies Marysville Township due process because it ignores the nature of township government.

Second, when the City asked the Township to consent to the study the City failed to disclose that the City would automatically impose a moratorium throughout the study area including land within the exclusive jurisdiction of the Marysville Township. The Town believes the City mislead the Town on the moratorium.

Third, Marysville Township has had a long and successful partnership with Wright County for the conduct of planning and zoning activities within the Township. Marysville reserves all rights to engage in planning and zoning inside the boundaries of the Township and expressly denies that the City's AUAR creates any planning authority of any kind for the City to plan and zone within Marysville Township.

With regard to the substance of the AUAR, the Township makes these comments.

First, on page 7 the report states "The City of Montrose has orderly annexation agreements with Marysville….". That is simply not true.

Marysville Township has no Orderly Annexation Agreement with the City of Montrose. The City's claim that is study area is coincident with an OAA area lends a false sense of appropriateness to the AUAR. The City has no jurisdiction over these parts of Marysville Township.

Second, the AUAR makes no effort to preserve prime farmland. The report merely states as a foregone conclusion that since Montrose's comprehensive plan calls for development, these important farmlands will be lost. This logic is unacceptable to Marysville Township. Simply because someone has drawn a line around farmland and decreed that is should be develop is insufficient reasoning to destroy a resource forever.

Third, the AUAR identifies needed highway improvements. The desired highway construction will easily cost hundreds of millions of dollars. Nowhere does the AUAR say where these $ millions will come from. Nowhere does the AUAR show how these road projects sit on the priority lists at MNDOT. Marysville believes this is pie in the sky planning that ignores the constrained realities of highway funding in the foreseeable future.

In summary, Marysville Township rejects the City of Montrose AUAR because Marysville was denied a reasonable opportunity to comment on the report with the City's arbitrary comment deadline, because the AUAR presumes to study land in Marysville under the false claim that the study area is subject to an Orderly Annexation Agreement, and because the AUAR is based on the mere belief that farmland will inevitably be developed and that roads will inevitably be built.

Marysville Township reasserts its intent to continue to exercise its full authority under law to plan and zone within the Township in partnership with Wright County free of intervention or interference from the City of Montrose.

Sincerely,

Dorothy Rahn

Dorothy Rahn
Clerk/Treasurer

CC: Tim Young
Tom Salkowski

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
2040 Highway 12 East • Willmar, MN 56201-5818
Phone (320) 231-3956 • FAX (320) 231-9710

February 12, 2008

Ms. Dorothy Rahn
Clerk/Treasurer
Marysville Township
3733 Dempsey Ave SW
Waverly, MN 55390

FILE COPY

RE: Montrose Alternative Urban Areawide Review (AUAR)
Montrose, Minnesota
BMI Project No: W13.37928

Dear Ms. Rahn:

Thank you for your comments on the Montrose AUAR. The following represents paraphrasing of the topics identified in your letter dated November 12, 2007 and our responses to these comments.

Comment 1: The arbitrary reply date set forth in the City's letter denies Marysville due process of the law. The City's arbitrary reply deadline denies Marysville Township due process because it ignores the nature of township government.

Response 1: The AUAR is a process governed by Minnesota Statues 4410.3600. This process, which is administered and reviewed by the Environmental Quality Board, is very specific in regards to timelines for review of the document by State and local agencies and the public. The 30 - day review period provided in the Montrose AUAR was consistent with State Statute requirements. While the deadline has passed, we appreciate receiving your comments and will consider them as part of the Final AUAR document. Should you require additional time to review documents in the future because of meeting schedules, please contact us and we will accommodate your schedule as much as possible.

Comment 2: The City failed to disclose that the City would automatically impose a moratorium throughout the study area including land within the exclusive jurisdiction of the Marysville Township.

Response 2: We apologize for any misunderstandings that may have occurred with the initiation of this AUAR. We anticipate that the AUAR will be adopted within the next two months and interested landowners will be able to propose plats.

Comment 3: Marysville reserves all rights to engage in planning and zoning inside the boundaries of the Township and expressly denies that the City's AUAR creates any planning authority of any kind for the City to plan and zone within Marysville Township.

Response 3: Marysville Township and Wright County will remain the planning and zoning authority within the Township limits. As with all planning and zoning changes, the City of Montrose reserves the right to comment on any proposed changes during the public comment period. The City of Montrose will work cooperatively with Wright County and Marysville Township in planning and zoning matters, working towards the best long term fit for the County, Township and City.

Comment 4: Marysville Township has no Orderly Annexation Agreement with the City of Montrose.

Response 4: At the time of the Draft AUAR, an Orderly Annexation Agreement was still in the process of final execution by the Township and City. Since that time, an Orderly Annexation Agreement coinciding with the AUAR Study area has been signed by both the Township and City of Montrose.

Comment 5: The AUAR makes no effort to preserve prime farmland.

Response 5: Unfortunately, the process of development does require that land use be converted from farmland to urban development. However, as the Twin Cities metro area continues to grow, development for new housing, commercial and industrial uses must occur to support this growth. One purpose of the AUAR is to guide where and how this development should occur within the Montrose area. By carefully planning this development, utilizing the AUAR as a planning tool, development can be planned in a concentrated area. The two scenarios (Intermediate Build and Full Build) within the AUAR are utilized to encourage infill development around existing partially developed areas. By concentrating development within an area, prime farmland outside of the concentrated area remains in tact. The alternative of not planning for development and not concentrating the development to one area would have a larger impact on prime farmland in the area. In this scenario, development would be spread throughout a very large area leaving smaller tracts of land amongst partially developed areas. The smaller tracts of land would be more difficult to farm requiring more movement of equipment through and around developed areas. Farming efficiency would also be decreased. The City of Montrose feels they are making responsible choices by completing this AUAR study to determine the effects of development and mitigate those effects to the fullest extent possible.

Comment 6: The AUAR identifies needed Highway improvements. Nowhere does the AUAR say where the funds will come from to fund these improvements. Marysville believes this is pie in the sky planning that ignores the constrained realities of highway funding in the foreseeable future.

Response 6: Highway improvements will be required to mitigate the effects of development as planned in the AUAR. The AUAR is a first step planning tool to determine these effects and then mitigate these effects on a large scale basis. Additional studies, discussions and determinations will need to be made as to funding measures for the necessary improvements. The City of Montrose has already begun preliminary development of a local funding measure called Transportation Improvement Districts. In concept, Transportation Improvement Districts would charge developers a fee to fund the required transportation improvements necessary due to development. This item and other funding mechanisms are discussed in the draft AUAR document under item number 8 on pages 12 and 13.

We believe that the creation and adoption of an AUAR study is proactive planning. Agencies such as Mn/DOT have applauded the City of Montrose for undertaking such a comprehensive effort in the future planning of development. They consider this as forward thinking and good planning that will benefit all.

Once again, thank you for your input. If you have any questions or would like to discuss these responses, please contact me by March 7, 2008 at 320-231-3956 or justinka@bolton-menk.com. As we have indicated previously, if the Township Board is interested in meeting to discuss any aspects of the AUAR in greater detail, we would be more than happy to meet.

Sincerely,

BOLTON & MENK, INC.

Justin L. Kannas, P.E.

Enclosure

cc: Barbara Swanson, City of Montrose Administrator
~~Bradley C. DeWolf, P.E., City Engineer~~
Chantill A. Kahler Royer, P.E., Bolton & Menk, Inc.
Gina Mitchell, Bolton & Menk, Inc.

Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, Minnesota 55155-4025

October 24, 2007

City of Montrose
Attn.: Barbara Swanson, Administrator
P.O. Box 25
311 Buffalo Avenue North
Montrose, MN 55363

RE: CITY OF MONTROSE DRAFT ALTERNATIVE URBAN AREAWIDE REVIEW

Dear Ms. Swanson:

The Department of Natural Resources (DNR) has reviewed the Draft Alternative Urban Areawide Review (AUAR) for the City of Montrose Project, Wright County, MN. We offer the following comments for your consideration.

The DNR's concerns with this project focus on increased loadings of phosphorus into wetlands and streams; wastewater impacts on the Woodland Wildlife Management Area (WMA); potentially excessive loading of pollutants entering the Crow River; cumulative effects on the Mississippi River which is an Outstanding Resource Value Water (ORVW); effects of groundwater appropriation on aquifer and wetlands; effects of increased erosion/sedimentation from impervious surfaces; physical or hydrological alteration of existing habitats; and potential restriction on certain outdoor recreational uses.

The scope of this document is extraordinary from the standpoint that it covers 7,100 acres and is projected to cover residential growth expected to occur over a 63-year period. It is questionable whether environmental review conducted today can adequately assess impacts that might occur several decades out. For example, stormwater and wetlands regulations are likely to change, and the suite of species listed today as threatened or endangered will likely change in the future. This concern is mitigated somewhat by the proposal to revisit the AUAR periodically (e.g., every five years) to assure that it is adequate. Furthermore, it is necessary to consider this project in the context of surrounding communities, the Montrose-Waverly-Howard Lake growth corridor along U.S. Highway 12, and to assess the potential degradation of terrestrial and aquatic resources that can result from the projected growth.

We believe the AUAR needs refinement in several key areas and believe a meeting with the City is needed to discuss them in more detail. Major issues include:

1) Better plans for the treatment of wastewater and protection of receiving waters (Item No. 18);
2) Better descriptions of potential impacts on aquifer(s) and wetlands due to increased water appropriation (Item No. 13);
3) Additional plans for the creation of habitat corridors to connect existing green infrastructure (Item No. 12);
4) Better wetland mitigation by accomplishing Wetland Conservation Act replacement, including consideration of creating a wetland bank within the AUAR area (Item No. 12);
5) Better documentation of potential effects resulting from urbanized encroachment on WMAs including influences on their usage, especially hunting on public lands (Item No. 11); and
6) Opportunities for additional public input and agency coordination. These interrelated topics are discussed in further detail as follows.

Item 18. Water Quality: Wastewater (pp. 33-36): Montrose Facility Expansion

In 2001, the Department of Natural Resources provided substantive comment for the Montrose Regional Wastewater Treatment Facility. This facility combined the wastewater flow from Montrose, Waverly, and the 12 Hi-Estates mobile home community. While this facility subsequently was required to provide final clarifiers and phosphorus treatment, we were concerned with the 540% increase in design flow to the Woodland Wildlife Management Area. Additionally, the expanded facility had a continuous discharge whereas the pre-2001 discharge was a stabilization pond system with only spring and fall discharge. DNR was also concerned about the increase in discharge volume into the Woodland Wildlife Management Area and subsequently to a stream that flows into the North Fork of the Crow River. The wetland complex also receives inputs from an unnamed creek and County Ditch 31 to the south. These streams drain over 15,000 acres in Wright County, most of which is agricultural land.

The Woodland WMA represents one of the most successful DNR wetland restoration projects within the east central portion of the state. For over 30 years, the Department has invested considerable personnel and financial resources in restoring this valuable system. This includes the negotiations for abandonment of the judicial ditch system that had formerly drained this extensive wetland, land acquisitions, development of comprehensive management plans, and construction of a water level control structure for maintaining optimal hydrologic conditions within the marsh. The marsh has supported a healthy and diverse vegetative community, characterized as a mosaic of open water with abundant submersed macrophytes, and emergent aquatic plant areas that provided important nesting and foraging habitat for many important wildlife species. As a result, this is a high public use area for hunting, nature observation and other outdoor activities. Maintaining and enhancing the biological integrity of this system is a high priority for the DNR as well as local hunting groups.

The new plans provided in the AUAR suggest that another five-fold increase in facility design capacity will be needed to handle projected growth scenarios. It is suggested that the current phosphorus loading (6.51 lbs/day), established by the 1 mg/l effluent limitation, may become the new facility mass effluent limitation. In order to achieve the new limit, an NPDES permit would have to establish an effluent limitation of < 0.2 mg/l for the expanded facility. This level of effluent limitation requires considerable additional expenditures for the facility upgrade, and is at the practical limit of current technology.

The AUAR does not identify the capacity of the Woodland WMA wetlands to assimilate phosphorus, which they have been receiving for many years from the existing wastewater treatment facilities, as well as from the ditch and stream system to the south. During early coordination discussions on the EAW for the facility expansion in 2001, we requested that Minnesota Pollution Control Agency (MPCA) conduct wetland assessments on the Woodland WMA to assess nutrient impact to aquatic communities. We were not able to obtain the results of any studies; however, the stream system above and below Mud Lake was listed by the MPCA in 2006 as impaired for aquatic life.

The AUAR suggests that there may be some minor reductions in the permitted effluent concentrations for carbonaceous biochemical oxygen demand and total suspended solids. However, these reductions will only offset a fraction of the effluent loading with the projected five-fold increase in design flow above the approved 2001 levels. Increased organic loading from CBOD, and increased ammonia will exert additional oxygen demand on the WMA wetlands. We are particularly concerned about impacts to aquatic communities that would occur with anoxic conditions under ice cover. Increased suspended solids loading will increase loadings of associated toxic constituents. Potential toxicity from nitrate and ammonia loadings are also not discussed, nor are effects from the greatly increased loading of nonylphenol and other metabolites of common detergent formulations, which are known to be endocrine disruptors.

From pre-2001 plant capacity to the projected full-build level of the AUAR, there would be a 27-fold increase in effluent entering the Woodland WMA. Effluent flow, prior to 2001 was 0.22 cubic feet/second and this will be increased to 6.19 cubic feet/second, with average wet weather (AWW) design flow estimates of 4 million gallons per day (MGD). Increased wastewater discharge to the Woodland WMA is counter to the management initiatives of this Department. We are concerned with simplification of the vegetative community, changes to the zooplankton populations (*Gammarus* spp. are now abundant), shading of macrophyte communities from increased algal biomass, and toxicity to aquatic organisms during the winter ice period. The planned increase in capacity of the Montrose WWTF as projected in the AUAR would exacerbate the pollutant levels and degrade water quality of the receiving waters.

Item 18. Water Quality: Wastewater (pp. 33-36): Need for Alternative Regional Wastewater Treatment System
The DNR is already concerned about current treated wastewater flows into the Woodland WMA and will be opposed to any proposed increase in pollutant loadings or effluent volumes. It is our perspective that the agencies and local communities are at a critical planning juncture for examining appropriate regional treatment. Future growth along the Montrose-Waverly-Howard Lake growth corridor of U.S. Highway 12 will require additional treatment system expansions. Lakes near Waverly and Montrose are proposed for listing in 2008 as impaired waters because of high total phosphorus levels. Lakes downstream from the town of Howard Lake are hypereutrophic and may be designated as impaired waters following the completion of planned monitoring studies by MPCA. By acting now, state and local agencies could address impaired aquatic resources and identify cost efficient future options that acknowledge inevitable growth pressures and regulatory requirements for resource protection/restoration.

We suggest consideration of an expanded regional system to more efficiently accommodate projected population growth and additional wastewater. This could involve consolidation of Montrose, Howard Lake and Waverly municipal flows into a technologically advanced regional facility with effluent re-use and/or discharge to one or more receiving waters. This would divert effluent from Woodland WMA by incorporating the Montrose WWTF, and eliminate discharge to the lake flowage between Howard Lake and Waverly. Without the regional wastewater treatment system, the DNR would propose that Montrose reroute their existing and future discharges around the Woodland WMA to another receiving water.

Item 18. Water Quality: Wastewater (pp. 33-36): Crow River Watershed and Mississippi River
We have reviewed this project within the context of other recent wastewater treatment proposals for the Crow River Watershed, and in relationship to the information that has been generated through meetings and planning initiatives regarding the water quality of the Crow River. Since early 1998, the MPCA, the Metropolitan Council, the C.R.O.W. Joint Powers, and the DNR have cooperated in public outreach and information gathering activities to foster a broad understanding of the water quality problems associated with rapidly expanding urbanization occurring within the watershed. The agencies have also discussed these initiatives in connection with the Mississippi River, an Outstanding Resource Value Water (ORVW) and the public water supply for the Twin Cities.

Within the last seven years, the MPCA and DNR have cooperated on NPDES permits within this watershed, and have called for phosphorus limitations for expanded discharges. The Lake Pepin TMDL may ultimately require additional phosphorus limitations for dischargers in the Crow River watershed. The DNR is concerned the AUAR designated project has the potential to impact the North Fork of the Crow River, since the effluent flows through the wetland, and then an unnamed stream for 2 1/4 miles to the North Fork of the Crow River. The North Fork of the Crow River has important sport fisheries for smallmouth bass, walleye, channel catfish and northern pike.

Item No. 13. Water Use (pp. 19-20)
The DNR has several concerns under this item: 1) groundwater impacts and aquifer sustainability; and 2) the groundwater and wetland impacts caused by the increase of impervious surfaces and infrastructure developments. With the potential of 17 additional wells in the full build-out scenario, a total of 21 wells would

service the AUAR. Working with numbers provided in the AUAR, it appears there would be a ten-fold increase in population and a six- to seven-fold increase in groundwater appropriated. This would increase the annual water appropriation to over 400 million gallons per year. Recently, the Environmental Quality Board and the DNR assessed Wright County's current and future water demands and availability of water resources. According to the study, Wright County used 46% of its renewable water resource in 2005 and was projected to use 81 percent by 2030, which places Wright County the fifth highest among Minnesota counties in this measure.[1] The DNR requests the proposer to: 1) provide additional details and maps of the proposed well system configuration; 2) incorporate monitoring wells into the water supply system to monitor the effects of the increase in appropriation; 3) provide additional information on the capability of the aquifer to support the increased discharge rate; and 4) provide additional information on whether any mitigation will be provided for impacts to local wetlands caused by aquifer drawdown. These measures would provide a better overall picture through time of impacts on the aquifer and wetlands.

The installation of water, sewer, and storm sewers lines often produces a "French Drain effect," consequently impacting surface waters, wetlands and wildlife corridors. The increase in impervious surfaces and water and sewer infrastructures could degrade wetlands and lakes and has the potential of impacting quantity and quality of groundwater over time.

Also when going through the County Well Index (CWI) we noticed the City of Montrose has a 10 inch - 693 foot Mt. Simon Hinckley aquifer well. The DNR is interested in the reason why this well is not in production and would like to know whether the City of Montrose has another potential source of water?

<u>Item No. 12. Physical Impacts on Water Resources (pp. 17-10)</u>
At full build out, the proposed ultimate land use plan would appear to require the loss of wetlands. This seems especially likely for the area planned for industrial development. The AUAR figures show extensive wetlands in the proposed industrial area. It is expected that these would be more difficult to avoid than wetlands in residential areas due to the large footprints required for industrial facilities. Therefore it seems a wetland bank would be not only desirable, but a necessity for developing the industrial area. We would propose that a desirable location for a wetland bank would be the western end of the proposed industrial area north of U.S. Highway 12. That location would take advantage of hydric soils and provide a green corridor between Malardi Lake and Woodland WMAs.

The principal natural habitats remaining in the Montrose AUAR area are Woodland WMA, Malardi Lake WMA, shoreland areas of Fountain Lake, and the stream courses shown on Figure 10. The proposed ultimate land use plan (i.e., page 57) shows these natural areas becoming largely isolated from one another. We recommend that the final AUAR include a proposal for creating connections between certain key areas as included in the following select examples:

- There is a series of wetlands and/or drained hydric soils occurring between Malardi Lake and Woodland WMAs. Part of this area is slated for industrial development. Instead, there could be a focus on preserving wetlands between the WMAs and creating a wetland bank that incorporates some of the drained hydric soils.
- The riparian area draining northeast from Woodland WMA could also be preserved with increased setbacks from development and used as a wetland replacement focus area.
- The proposed park between Fountain Lake and Woodland WMA is a desirable feature, especially if it can be used to connect the two lakes via contiguous habitat, but another area where habitat should be established between the two lakes is where wetlands exist between the south end of Mud Lake (within

[1] Use of Minnesota's Renewable Water Resources: Moving Toward Sustainability. A report of the Environmental Quality Board and Department of Natural Resources, April 2007. Available at the Environmental Quality Board's Internet site: www.eqb.state.mn.us .

Woodland WMA) and the southwest end of Fountain Lake.
- Another connection between existing habitats could be made between the north end of Malardi Lake WMA and the creek system to the west. That corridor could focus on linking the wetlands north of Malardi Lake WMA to the wetlands north of 45th Street then west to the creek system.

Special efforts to preserve any remaining forested tracts would be beneficial to the project area, considering the almost total loss of natural uplands in the area to agriculture and suburban developments.

Item No. 11. Fish, Wildlife and Ecologically Sensitive Resources (pp. 15-17)
Urban development along the boundaries of the Woodland and Malardi Lake WMAs presents challenges to maintaining high quality habitat and managing and operating the WMAs for public benefit. The additional developments proposed in the AUAR could limit the ability of the DNR to adjust management practices and strategies to adapt to the effects of other drivers of resource management, such as climate change, and to respond to the emerging scientific understanding of plant and animal ecology.

A general listing of AUAR development activities that could impact the WMAs include the following: 1) Land and vegetation clearing and soil compaction on edge of WMA (may cause a loss of wildlife habitat and reduce natural vegetated buffers near WMAs); 2) Additional traffic, noise, debris, contaminants and exposure to invasive species during and after construction; 3) Adjacent occupancy for residential, business or industrial purposes may include additional ditching, streets, obstructions, stormwater runoff, nutrient enrichment, predation by or on domestic animals, road salt and wastewater effluent discharge. We request that the local governmental units provide consideration for appropriate development setbacks from WMA boundaries. Protective measures recently enacted by Sherburne County for buffering state forest and national wildlife refuge lands could provide useful guidance to the City.

The AUAR could enable, either inadvertently or purposefully, a fundamental shift in the use and management of state lands. Because of additional proposed activities adjacent to the WMAs, the DNR could lose its ability to manage that land in the manner for which it was purchased. According to §86A.05, Subdivision 8, in part: "A state wildlife management area shall be established to protect those lands and waters which have a high potential for wildlife production and to develop and manage these lands and waters for the production of wildlife, for public hunting, fishing, and trapping, and for other compatible outdoor recreational uses." It appears that the cumulative impacts on the two enclosed WMAs could result in the inability to continue the present hunting uses as has happened on other WMAs that have encountered increased urbanization. Landowners, developers and local governments need to avoid reaching this point. The AUAR could be used to institute wise landscape-level development planning and identify and implement innovative land use tools (best practices) to ensure that WMAs can continue to be managed as efficiently and effectively as possible.

Because American Ginseng is exploited for commercial uses, the DNR recommends that the statement noting "a large area of American Ginseng," found in Item No. 11b, be replaced with "a rare plant". The Trumpeter Swan, a threatened species, has nested on Malardi Lake WMA marshes occasionally in the past and with higher frequency the last five years. The Trumpeter Swan observations have not yet been entered into the Natural Heritage Information System and, as such, do not show up on the printouts provided with the Natural Heritage and Nongame Research Program's response letter dated June 12, 2006.

Item No. 14. Water-related Land Use Management District (page 20)
In the first part of the third paragraph, the number for Mud Lake should be 86-85P not 86-585P. In the second to the last sentence of the third paragraph, it mentions three unnamed creeks (86035a, 86032a, and 86032b). A fourth unnamed creek, (86025a), should be added to the list, if not already included in the City's Shoreland Ordinance. The first sentence of the last paragraph should specify natural environment lakes 'with sewer' so as not to be confused with 'unsewered septic system lots,' which require lots double the size of the 'with sewer' lots.

Item No. 17. Water Quality – Surface-water Runoff (pp. 22-33)
The DNR would like to emphasize the importance of stormwater pond outlet screens. According to Best Management Practice guidelines of both the US Environmental Protection Agency and MPCA, 1.5 inch spaced trash rack rods are recommended to prevent discharge of floatable trash and litter to public waters.

We strongly urge staff from both of our agencies to meet and further discuss concerns and issues regarding this AUAR. Recent research has suggested ways to improve the AUAR process by expanding public involvement (see enclosed journal article by Ms. Schively). An example of planners using this approach is the I-35E Corridor AUAR by the City of Lino Lakes. It would be appropriate to establish additional coordination with the relevant agencies and the general public prior to completion of the final document. However, if this does not meet the needs of the City, it may be possible to hold meetings external to the AUAR process in the near future. DNR staff would be interested in meeting with City staff to further discuss these concepts. Please contact me at 651-259-5157 to schedule a meeting or to discuss this AUAR review further.

Thank you for the opportunity to provide comments on the Draft AUAR and thank you for your consideration. Please feel free to contact me with any questions or comments.

Sincerely,

Ronald Wieland

Ronald Wieland, Senior Planner
Environmental Review and Planning Unit
Division of Ecological Resources
(651) 259-5157

Enclosure: Shively, Carissa. 2006. Participation in environmental review: the outcomes of expanded public involvement in Minnesota's Alternative Urban Areawide Review Process. CURA Reporter, Summer Issue, pp. 9-12.

cc:

Environmental Quality Board: Jon Larsen
Minnesota Pollution Control Agency: Jessica Ebertz
DNR Regional Officers: Joe Kurcinka, Dale Homuth, Tim Bremicker, Bonita Eliason, Wayne Barstad, Mike North, Eric Altena
DNR Area Officers: Roger Stradal, Dan Lais, Paul Diedrich, Fred Bengtson, Mark Hauck, Nicholas Roy Snavely,
DNR Environmental Review and Planning Staff: Steve Colvin, Matthew Langan, Jack Enblom, Lisa Joyal, Scott Ek

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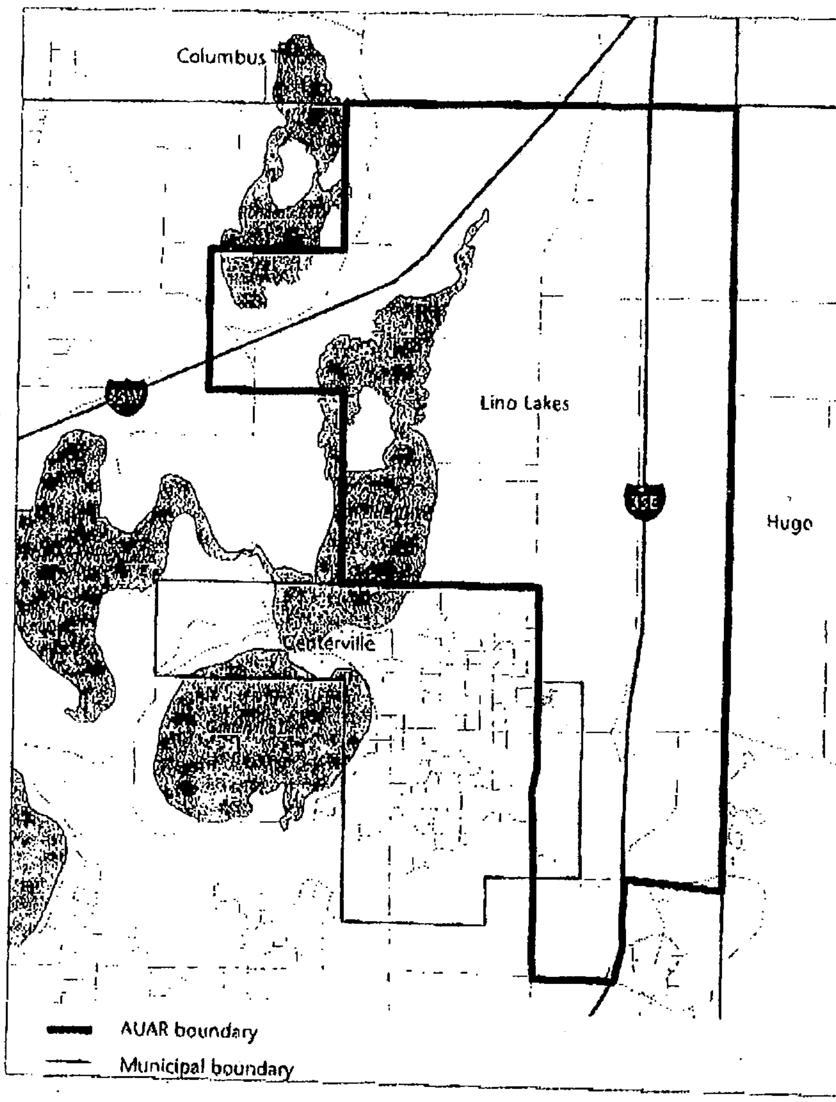
Participation in Environmental Review: The Outcomes of Expanded Public Involvement in Minnesota's Alternative Urban Areawide Review Process

by Carissa Schively

The review of environmental impacts in development and planning processes can be a highly political undertaking. The public's response to proposed development can run the gamut from support for the project to skepticism about environmental impact information, distrust of the local government and developers, and vocal opposition. A community's ability to respond to public concerns is important in gaining support for development and change. But even more important, effective public engagement is essential to conducting effective environmental review that taps into local knowledge of the environment and produces responsive mitigation measures.

This article reports on one community's pursuit of an alternative approach to public involvement in environmental review. I focus specifically on the I-35E Corridor Alternative Urban Areawide Review (AUAR) completed by the City of Lino Lakes in the summer of 2005. Lino Lakes is a suburban community of approximately 20,000 residents located 20 miles north of Minneapolis. The AUAR is an innovative approach to environmental review allowed under Minnesota's Environmental Policy Act (Minn. Statutes Annotated §§ 116D.01-116D.11) as an alternative to a more traditional site- or project-specific environmental impact analysis. The AUAR tool allows for consideration of environmental and other development impacts from multiple development scenarios for a large geographic area, typically involving multiple landowners. This was the case in Lino Lakes, where the City—prompted by a development application for 360 acres—decided against a development-specific environmental impact analysis in favor of a comprehensive environmental review for 4,664 acres (approximately one-fifth of the city) in the I-35E corridor area (Figure 1). Noting significant development pressure in this area—as well as the presence of highly sensitive natural resources including the Rice Creek Chain of Lakes Regional Park, blue heron and bald eagle nesting habitat, wetlands, and several creeks—the city saw an opportunity to accomplish more effective environmental review and take a regional approach to natural resource conservation, restoration, and mitigation. Other potential significant impacts included threats to cultural/historic resources, greater transportation demand, and increased storm water runoff.

Figure 1. Location of the I-35E Corridor AUAR Area



Participation in the I-35E Corridor AUAR

Considering the large area covered by the AUAR and the significant environmental and other development impact concerns, the City undertook a more extensive participation effort than is typically used in environmental review processes. Minnesota Statutes require only minimal participation, in the form of public hearings, at the time of completion of the draft and final AUAR documents. Written comment periods for agencies and the public also are required. Typically, there is little to no public involvement during the preparation of the AUAR, with comment opportunities provided only after the draft document is completed.

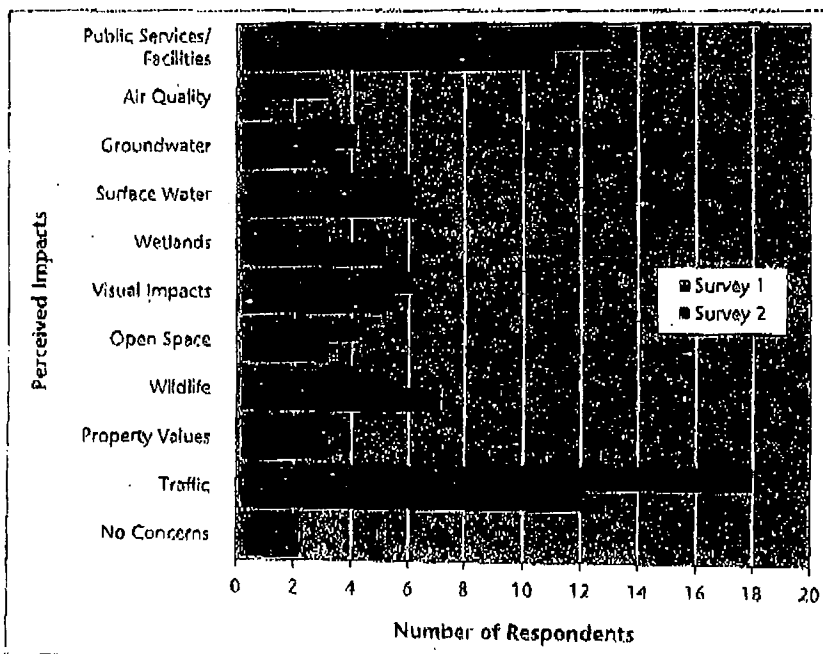
Lino Lakes took an alternative approach, engaging representatives of the public throughout the process. A key element in their approach was the establishment of a stakeholder advisory panel. The panel included 39 members appointed by the city council, approximately 30 of whom participated consistently. Members represented the local environmental board, property owners in the AUAR area, prospective developers, and the general public. The stakeholder advisory panel played a significant role, meeting 10 times throughout the AUAR process. Consultants the City hired to complete the AUAR facilitated panel meetings. The consultants presented information about the methodologies to assess environmental impacts and the results of the environmental review. Later meetings focused on reviewing proposed development scenarios. Broad participation, discussion, and questioning were encouraged at each of the meetings. Other features intended to facilitate an effective flow of information among the City, consultants, panel members, and the general public included posting meeting materials (e.g., PowerPoint presentations, maps) on the city website, providing public access to printed copies of development scenario maps at city hall, and providing written answers to panel members' questions after each meeting.

The City and its consultants also facilitated a series of meetings with relevant agencies (e.g., U.S. Army Corps of Engineers, Minnesota Department of Natural Resources, Anoka County, Metropolitan Council) during the preparation of the draft AUAR. This early engagement provided access to agency information and minimized reactive responses when the draft document was submitted to these agencies for review.

Photo © Steve Schneider, 2006

Most of Peltier Lake lies within the Interstate-35E Corridor AUAR area.

Figure 2. Changes in Participants' Perceptions of Impacts of Development in the AUAR Area (number of participants = 25)



Note: The "Number of Responses" reflects the number of participants who identified a particular development impact as one of their top three concerns from a given list of potential development impacts.

Understanding the Outcomes of Participation

To understand the outcomes of this approach to participation, I conducted an analysis of how public participation in the stakeholder advisory panel process affected participants' perceptions of the impacts of development in the AUAR study area, the AUAR process, the advisory panel process, and other participants. I also asked participants to consider how effective the advisory panel process was in addressing their concerns about development in the study area. I gathered information for the study through two mail surveys of participants. The first was administered at the beginning of the AUAR process in

November 2004. The second was administered at the end of the AUAR process in March 2005 after the final stakeholder advisory panel meeting, but before publication of the draft AUAR. The survey process resulted in 25 usable responses for the two questionnaires. Of the survey respondents, 14 identified themselves as property owners in the AUAR area and 12 were Lino Lakes residents. Appointed officials, environmental group members, and developers also were represented among respondents.

Does Participation Change Perceptions of Impacts?

To understand participants' perceptions of impacts, the survey asked respondents to identify their top three concerns from a list of potential development impacts. Between the two survey periods, there was a decrease in concern related to traffic, loss of open space, visual impacts, groundwater, air quality, and public services/facilities. Respondents' concerns about wildlife and wetland impacts increased during the course of the AUAR process. Based on the data presented in Figure 2 (p. 10), a general pattern in the shifts in concern among the various impacts appears, even though each of the impacts was discussed in detail in the advisory panel meetings. My observations of the meetings suggest more time may have been spent discussing mitigation efforts related to transportation and public services/facilities—the impacts that incited higher levels of concern. Further, the availability of engineering solutions to address these impacts, rather than a reliance on policies such as wetland buffers and habitat protection, may have been more effective in reducing participants' concerns. Based on this finding, it appears more information about environmental impacts may have been needed, including a more specific discussion of mechanisms to ensure that development does not affect natural resources. Gathering information from participants about their concerns at the beginning of the advisory panel process might have been helpful in tailoring the information provided during the meetings and addressed in drafting the AUAR.

Is it Possible to Measure Changes in Perceptions?

The discussion above provides clear evidence of changes in perception of

Table 1. Assessment of Changes in Participants' Perceptions (number of participants = 25)

Question	Survey One	Survey Two	Change†	*Wilcoxon Signed Rank Test*
[illegible]				
Potential positive benefits of development in the AUAR area exceed the potential negative impacts	4.32	4.24	–	–0.413
Perceptions of AUAR Process				
AUAR process is effective in accounting for and mitigating environmental impacts	3.48	3.80	+	–1.517
AUAR process is effective in accounting for mitigating other impacts (e.g., traffic, land use, public services/facilities)	3.56	3.76	+	–0.804
Outcomes of the AUAR process will ensure that future development in the AUAR area is compatible with existing development in the vicinity	3.24	3.52	+	–1.048
Perceptions of Stakeholder Advisory Panel Process				
Advisory panel process produced consensus among participants about the type of future development that is appropriate for the AUAR area	2.68	2.64	–	–0.133
Membership of the advisory panel was representative of the Lino Lakes community	3.20	3.72	+	–1.936*
[illegible]				
Confident that City of Lino Lakes' staff will effectively implement the outcomes of the AUAR process	3.72	3.92	+	–0.558
Confident that City of Lino Lakes' elected officials will effectively implement the outcomes of the AUAR process	2.88	3.24	+	–1.340
Confident that other relevant agencies (e.g., Anoka County, MN DNR) will effectively implement the outcomes of the AUAR process	3.32	3.64	+	–1.141
Confident that future developers within the AUAR area will comply with the outcomes of the AUAR process	3.24	3.64	+	–1.337
Believe that most other participants in the AUAR Advisory Panel feel the same way as I do about development in the AUAR area	2.68	2.80	+	–0.683

†A "+" indicates a net positive change, or a greater degree of agreement with the statement, whereas a "–" indicates a net negative change, or a greater degree of disagreement with the statement.

*Statistically significant at the 0.10 level ($p < 0.10$), meaning there is a less than 10% probability that the statistical relationship is a result of chance.

impacts among the survey respondents. The key research question for this study is whether this change can be quantified. Two techniques were used to measure change in perceptions associated with participation in the stakeholder advisory panel. First, I compared the responses to the first survey with those provided on the second survey to identify changes in perceptions of development impacts, the AUAR process, the advisory panel process, and other participants. Perceptions were measured on a five-point scale with 5 representing the strongest level of agreement with a series of statements. The outcomes of this analysis are provided in Table 1 (p. 11), where the mean (average) response for survey one is compared to the mean response for survey two. An increase in means between the first and second surveys represents a more positive response to the statement on the part of the participants. There was a positive change for nearly all of the questions. Exceptions included the following statements: (1) "Potential positive benefits of development in the AUAR area exceed the potential negative impacts," and (2) "Advisory panel process produced consensus among participants about the type of future development that is appropriate for the AUAR area." Despite the lack of agreement about impacts and lack of perceived consensus, increasingly positive perceptions about the AUAR process, about advisory panel representativeness, and about other participants were evident. Because the stakeholder advisory panel meetings often focused on the negative impacts of development, it is possible that the level of concern about some of these impacts increased, whereas perceptions of benefits remained the same. This suggests the need to identify the benefits of development, as well as the costs and impacts.

An alternative measure of change in perceptions among advisory panel participants also is provided in Table 1. I used a technique called the Wilcoxon Signed-Rank Test to assess the statistical significance of changes in the median response between the first and second surveys. Despite the numerical increases shown by the previous comparison of means, the results of this test indicated only one statistically significant outcome, namely respondents' perceptions of the representativeness of the advisory panel. The increasingly positive view of representation may be associated with interaction among participants through the panel process, as they became more aware of who other participants were and how their perspective related to the general public. Overall, the outcomes of the statistical analysis are limited due to the small sample size.

Table 2. Post-Process Participant Reflections on the Stakeholder Advisory Panel (number of participants = 25)

	My interests and concerns about development in the AUAR were addressed through my involvement in the advisory panel
Mean	3.52
Standard Deviation	0.872
Strongly Disagree (1)	1 (4%)
Disagree (2)	3 (12%)
Neutral (3)	3 (12%)
Agree (4)	18 (72%)
Strongly Agree (5)	0 (0%)

Participant Reflections on the Stakeholder Advisory Panel

The second survey also included a question intended to capture participants' retrospective view of the effectiveness of the panel process itself, specifically its ability to address participants' interests and concerns about development impacts. These outcomes, summarized in Table 2, suggest relatively positive perceptions of the stakeholder advisory panel process, with 72% of the respondents agreeing that their interests and concerns about development in the AUAR area were addressed. Only 4 of the 25 respondents indicated disagreement or strong disagreement with this statement.

Concluding Thoughts

Overall, the results of this study point to positive outcomes associated with increased public participation in AUAR processes. These positive outcomes likely can be inferred relative to other types of environmental review, including environmental assessment worksheets (EAW) and environmental impact statements (EIS). However, in designing these processes, one should not assume that they necessarily will produce consensus about development impacts and potential mitigation efforts. The results of this study suggest that consensus was not achieved. However, most of the participants believed that the process addressed their concerns and they developed more positive views of the environmental review process, advisory panel process, and other participants. These findings suggest that there is significant value in stakeholder engagement in terms of building confidence in the effectiveness of environmental review in identifying and mitigating development impacts.

With respect to designing processes for stakeholder engagement, this study suggests the need to engage a broad range of stakeholders, the importance of addressing both the positive and negative impacts of development, and the value of identifying stakeholder concerns at the beginning of the participation process and tailoring the provision of information accordingly. Stakeholder participation has the potential to increase confidence among those involved in overseeing the development process and implementing mitigation efforts identified in environmental review. This confidence comes from the knowledge that a base of support for decisions about development and environmental protection has been established through an early and extensive investment in stakeholder participation.

Carissa Schively is assistant professor in the Urban and Regional Planning program at the University of Minnesota's Hubert H. Humphrey Institute of Public Affairs. She has a Ph.D. in urban and regional planning from Florida State University and is a member of the American Institute of Certified Planners (AICP). Her research is focused on participation in environmental and land-use decision-making processes.

The research upon which this article is based was supported by a New Initiative grant from CURA. These grants support projects that are initiated by faculty, community organizations, government agencies, or students and that are not appropriate for consideration under another CURA program.

The author would like to thank Karisha Kuypers of the Humphrey Institute of Public Affairs for her assistance administering the survey and compiling the data. In addition, the author thanks the members of the I-35E AUAR Stakeholder Advisory Panel, Jeff Smyser and Mike Grochala of the City of Lino Lakes, and Ciara Schlichting and John Shardlow at DSU, Inc., for their participation in this study.

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February 12, 2008

Mr. Ronald Wieland, Senior Planner
Environmental Review and Planning Unit
Division of Ecological Resources
Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4025

FILE COPY

RE: Montrose Alternative Urban Areawide Review (AUAR)
BMI Project No: W13.37928

Dear Mr. Wieland:

Thank you for your comments on the Montrose AUAR. The following represents paraphrasing of the issues identified in your letter dated October 24, 2007 and our proposed responses to these comments.

Comment DNR-1: Increased loadings of phosphorus into wetlands and streams. Lake Pepin TMDL may require phosphorus limit in Crow River Watershed.

Response DNR-1: The City will comply with current and future requirements as set forth by the DNR, MPCA, and any other state and federal agencies resulting from the TMDL study of the Crow River watershed.

Comment DNR-2, 11: Wastewater impacts on Woodland WMA. What is the Woodland WMA wetlands' capacity to assimilate phosphorus? Increased wastewater loading may cause anoxic conditions under ice cover. Increased suspended solids loading and associated toxics. Potential nitrate and ammonia toxicity, nonylphenol and other metabolites of common detergent formulations. Increased wastewater discharge to Woodland WMA could cause: Simplification of the vegetative community, changes to the zooplankton population, shading of macrophyte communities from increased biomass, and toxicity to aquatic organisms during the winter ice period. Consider alternative discharge points or expanded regional system of wastewater treatment. Better plans for the treatment of wastewater and protection of receiving waters (Item 18).

Response DNR-2, 11: Since the Montrose Regional Wastewater Treatment Facility expansion in 2002 the NPDES SDS permit has required that the City monitor the effects of increased wastewater discharge rates to the Woodland WMA. Specific items included in the monitoring are Chlorophyll, Dissolved Oxygen, pH, Phosphorus, specific conductance, temperature, and transparency. The permit also requires a plant community integrity study be completed to monitor any effects of the WWTP discharge on the plant community. Current monitoring shows no impacts on Woodland WMA. If it is determined that future loadings will have impacts, alternative discharge points or treatment methods will be investigated.

Comment DNR-3: Potential excessive loading of pollutants entering the Crow River.

Response DNR-3: The City of Montrose will comply with the limits that result from the MPCA's Crow River TMDL Study.

Comment DNR-4: Cumulative effects on the Mississippi River, which is an Outstanding Resource Value Water.

Response DNR-4: The City of Montrose will comply with the limits that result from the MPCA's TMDL Study and other agency requirements.

Comment DNR-5, 6, 12: Effects of groundwater appropriation on aquifer and wetlands. Effects of increased erosion/sedimentation from impervious surfaces. Better descriptions of potential impacts on aquifer(s) and wetlands due to increased water appropriation (Item 13). Groundwater and wetland impacts due to increased impervious surfaces.

Response DNR-5, 6, 12: The groundwater aquifer is considered "non-vulnerable" in the Montrose area, due to a thick clay layer that separates the water table that feeds the surface water from the drinking water aquifer. Therefore, additional pumping of the drinking water aquifer should not affect the surface water.

Low impact development (LID) will be encouraged where feasible. This will help reduce impervious surfaces and encourage treatment and infiltration of stormwater near where it falls.

The stormwater management plan recommends stormwater ponds sized by the Walker method, which is above and beyond the MPCA sizing requirements.

The City recognizes the importance of wetlands, and plans to protect them. In addition to all developments meeting the Wetland Conservation Act requirements, the City requires that a minimum 40-foot vegetative buffer be maintained around all wetlands. This further protects the integrity of the wetland and provides further treatment of sheet flow storm water runoff prior to entering the wetland.

The City is very concerned and watchful of construction erosion and sedimentation. The City has strict requirements in place that all builders and developers must meet regarding the prevention of construction erosion and sedimentation. The City performs weekly checks on construction sites and will terminate building inspections if contractors do not comply with the erosion and sedimentation control requirements.

Comment DNR-7, 13: Physical or hydrological alteration of existing habitats. Additional plans for creation of habitat corridors to connect existing green infrastructure (Item 12). Final AUAR should have a proposal for creating connections between key areas. Preserve remaining forested tracts.

Response DNR-7, 13: The City of Montrose has a tree preservation ordinance. The ordinance requires that a minimum of 50% of trees be preserved. In addition the City requires that a minimum of two trees be planted in every front yard of every home. The combination of these two requirements allows forested tracts to be preserved and replaces trees that are lost through development. The City currently has a greenway/habitat corridor included in their Park and Trail Plan. The corridor follows a drainage way designated by the DNR as a tributary to the North Fork of the Crow River. The corridor will connect a 20 acre hardwood forest located southwest of Clementa Avenue and 55th Street N. to several large wetland complexes in the northern portion of the AUAR area. The City will consider additional "greenway/habitat corridors" and the best use of park areas and regional stormwater ponding locations to assist in the creation of these corridors.

Comment DNR-8, 15, 24: Potential restriction on certain outdoor recreational uses. Better documentation of potential effects resulting from urbanized encroachment on WMAs including influences on their usage, especially hunting on public lands (Item 11). Increased population density and usage could lead to inability to allow hunting. Request that LGU provide consideration for appropriate development setbacks from WMA boundaries (See Sherburne County for example)

DNR-8, 15, 24: The City will consider increasing existing setbacks from WMA's (currently consistent with DNR model ordinance of 150' from a Natural Environment Lake). The City will also consider whether buffer areas may be established through acquisition of public open space through the park dedication process or clustering development away from the WMA.

Comment DNR-9: Can such a large AUAR area be accurately assessed when it will be developed over a 63-year period?

Response DNR-9: The AUAR will be evaluated every 5 years or as required by Minnesota Rule 4410.3610 sub. 7. The re-evaluation process will allow the AUAR to be a working document that will change as development trends, environmental requirements and needs, and local, state, and federal requirements change.

Comment DNR-10: Consider the project in the context of the Montrose-Waverly-Howard Lake growth corridor.

Response DNR-10: It is recognized that all communities in this area have and will continue to grow. The City of Montrose is taking a proactive approach to deal with the associated impacts of growth by completing this AUAR.

Comment DNR-14: Better wetland mitigation by accomplishing WCA replacement, including consideration of creating a wetland bank within AUAR area (Item 12). A desirable location would be the western end of the proposed industrial area north of U.S. Highway 12.

Response DNR-14: The City of Montrose will study the feasibility of creating a wetland bank within the AUAR area. If the feasibility study reveals that the creation of a wetland bank within the AUAR area is feasible and necessary, the City will employ necessary measures to develop a wetland bank.

Comment DNR-16: Opportunities for additional public input and agency coordination.

Response DNR-16: As part of the Montrose AUAR process, there have been 2 planning commission workshops, 2 planning commission hearings, 2 City Council meetings, 2 Transportation Advisory Council (TAC) meetings and a joint City and Township workshop meeting. The AUAR was posted on the City's website, was available at the City offices and public library, and a notice of the review period was publicized in the local newspaper. The public and agencies will also have an opportunity for input and comment at any time the AUAR is updated in the future.

Comment DNR-17: The DNR requests the proposer to: 1.) Provide additional details and maps of the proposed well system configuration 2.) Incorporate monitoring wells into the water supply system to monitor effects of the increase in appropriation 3.) Provide additional information on the capability of the aquifer to support the increased discharge rate 4.) Provide additional information on whether any mitigation will be provided for impacts to local wetlands caused by aquifer drawdown.

Response DNR-17: 1.) Due to the unknown layout of plats within the AUAR area a proposed well configuration layout would only be conceptual at this time. Also, since watermains will be installed as development progresses and the location of future wells is dependent upon the proximity of adjacent watermains it would be difficult to determine the location of future wells at this time. As the AUAR is updated every five years, maps could be developed showing the location of more immediate proposed wells. 2. & 3) Monitoring wells will be drilled at each proposed well location prior to the construction of the well. Test pumping and aquifer data at the proposed well location will be gathered and submitted to the DNR for approval prior to the new well construction. Also, the City will be installing a continuous aquifer monitoring system in their primary two wells in 2008. The system will allow the aquifer to be monitored at existing well locations for aquifer levels including drawdowns, static water level, and provide a history of aquifer level data useful in analyzing aquifer sustainability. 4.) As discussed in Response 5, 6, 12 above the groundwater aquifer is considered "non-vulnerable" in the Montrose area, due to a thick clay layer that separates the water table that feeds the surface water from the drinking water aquifer.

Comment DNR-18: The City has a 10-inch – 693 ft Mt. Simon Hinckley aquifer well. Why is this not in production and does the City have another potential source of water?

Response DNR-18: The 10-inch – 693 ft. Mt. Simon Hinckley aquifer well mentioned used to be the City of Montrose's Well Number 1. However, the well has not been in production for many years. The well was drilled in 1940. It is reported that a large skew exists on the well of over 100-feet. Reports indicate that during the original drilling of the well, rock was hit causing the large skew. Because of the age, condition and skew of the well it would not be cost effective to use this well as a Municipal source of water; therefore the City of Montrose will proceed with abandonment and sealing of this well.

Comment DNR-19: Replace reference to "American Ginseng" on Item 11b with "a rare plant." Add trumpeter swan?

Response DNR-19: These changes will be made.

Comment DNR-20: Change reference number of Mud Lake to "86-85P" in Item 14.

Response DNR-20: This change will be made.

Comment DNR-21: Add unnamed creek 86025a to list in Item 14.

Response DNR-21: This change will be made in the AUAR text and to Figure 10. The ordinance will also be amended to include the creek numbers specifically as these areas are annexed into the City.

Comment DNR-22: Item 14 – specify whether lakes are with or without sewers.

Response DNR-22: The phrase "with City sewer service" will be added to the text.

Comment DNR-23: Emphasize importance of stormwater pond outlet screens. 1.5-inch spaced trash rack rods are recommended.

Response DNR-23: The requirement for outlet screens is in the City ordinances already, and will be mentioned in Item 17 in the AUAR text.

Once again, thank you for your input. As indicated in your comments, you felt that a meeting between City staff and the DNR may be helpful. We have prepared these responses to clarify and respond to many of the comments that the DNR had. If after reviewing these responses, you feel that a meeting would be beneficial, please contact me.

These responses to your comments are proposed to be included in the Montrose Final AUAR and Mitigation Plan. If you would like to discuss these proposed responses, please feel free to contact me at 320-231-3956 or justinka@bolton-menk.com.

Sincerely,

BOLTON & MENK, INC.

Justin L. Kannas

Justin L. Kannas, P.E.
Project Engineer

Enclosure

cc: Barbara Swanson, City of Montrose Administrator
~~Bradley C. DeWolf, P.E., City Engineer, Bolton & Menk, Inc.~~
Chantill A. Kahler Royer, P.E., Bolton & Menk, Inc.
Gina Mitchell, Bolton & Menk, Inc.

Fax Cover Sheet

Minnesota Pollution Control Agency

Regional Division
St. Paul Office
520 Lafayette Road North - St. Paul, MN 55155

Date:	10/24/07	**Number of pages (including this page):**	5
To:	Ms. Barbara Swanson, Administrator		
Company or agency:	City of Montrose		
Fax number:	763-675-3032		
Subject:	Montrose Draft AUAR Comments		
Message:	Letter follows. Original will follow by U.S. mail.		
From:	Jessica Ebertz		
Division:	Regional Division		
Telephone number:	651-296-8011		
Fax number:	651-297-2343		
If you have any questions regarding this fax, please call:	651-297-8510		

Minnesota Pollution Control Agency
520 Lafayette Road North | St. Paul, MN 55155-4194 | 651-296-6300 | 800-675-3843 | 651-282-5332 TTY | www.pca.state.mn.us

October 24, 2007

Ms. Barbara Swanson, Administrator
City of Montrose
P.O. Box 25
311 Buffalo Avenue North
Montrose, MN 55363

RE: Montrose Draft Alternative Urban Areawide Review

Dear Ms. Swanson:

Thank you for the opportunity to review and comment on the Montrose Draft Alternative Urban Areawide Review (Draft AUAR). Regarding matters for which the Minnesota Pollution Control Agency (MPCA) has regulatory responsibility and other interests, the MPCA staff has the following comments for your consideration.

General
The Draft AUAR analyzes one development scenario, which is consistent with the city of Montrose's (City) *Comprehensive Plan*. This scenario includes development of over 5,000 acres and an approximate time frame of 63 years, dependant upon population growth. Given the large scope of the study, in terms of both area and time, it seems beneficial to make some general comments regarding the environmental review process as it applies to this project.

- As noted in the opening paragraph of the draft Mitigation Plan (Attachment B to the Draft AUAR), an AUAR can substitute for the preparation of an Environmental Assessment Worksheet (EAW) or Environmental Impact Statement (EIS) for certain projects within the area of review, provided the projects are consistent with the assumptions made in the review and the mitigation measures identified in the review are implemented. If actual development – in this case for either the Interim Build or Full Build areas -- exceeds the maximum development analyzed in the AUAR, the AUAR is invalid as a substitute for an EAW or EIS. The MPCA has a particular interest and concern that the substitution of the AUAR for an EAW in the case of sewage collection systems under Minn. R. 4410.4300, subp. 18.A. remains valid, since the MPCA would normally be the Responsible Governmental Unit (RGU) to complete the EAW for this category of project. We would also like to point out, and request that language to this effect be added to the Final AUAR and Mitigation Plan, that expansion or reconstruction of the City wastewater treatment facility that results in an increase by 50 percent or more and by at least 200,000 gallons per day of its average wet weather design flow capacity will require preparation of an EAW, with the MPCA as the RGU. See Minn. R. 4410.4300, subp. 18.B. The AUAR process may not be used as a substitute for a mandatory EAW for the expansion of wastewater treatment facilities.

Ms. Barbara Swanson
October 24, 2007
Page 2

- As stated in Minn. R. 4410.3610, subp. 7, there are eight separate circumstances under which the AUAR and the Mitigation Plan must be revised. Circumstances include the passage of five years since adoption of the AUAR or latest revision; new information demonstrating that important assumptions or background conditions used in the original analysis are in error; etc. (see rule for full list). We make this comment to emphasize that the AUAR and Mitigation Plan must be revisited and consulted on a regular basis in order to maintain its validity. This is particularly important given the long-range scope of this particular AUAR. The next 63 years will undoubtedly see many changes in environmental knowledge and regulations, and possibly the development plans of the City, and the City will need to ensure that the AUAR and Mitigation Plan remain current, valid, and viable documents to address environmental impacts associated with the proposed development.

Wetland Impacts
The Draft AUAR identifies and addresses the potential for construction and post-development stormwater runoff and treatment issues in a general, conceptual manner. The Final AUAR should also identify if the proposed on-site and/or regional storm ponds may be located in existing wetlands or if they would be required to be constructed in upland sites. It should be noted that Minn. R. ch. 7050 requires the protection of all wetlands that are considered "waters of the state" as defined in Minn. Stat. § 115.01, subd.22. In addition, wetland impacts that may be considered non-jurisdictional or exempted from the Clean Water Act (CWA) 404 program, the Minnesota Department of Natural Resources (DNR) program, or the State of Minnesota's Wetland Conservation Act (WCA) may still be regulated by the MPCA. For example, any existing wetlands that are altered by excavation, fill, draining, or inundation to function as stormwater retention basins should be considered to be adversely impacted, and should be evaluated under the sequence mitigation requirements of water quality standards in Minn. R. 7050.0186 and the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit. The requirement in water quality standards to avoid, minimize, and mitigate wetland impacts must be satisfied for the issuance of all NPDES/SDS permits, including the General Construction Stormwater (CSW) NPDES/SDS permits. If a project involves altering a wetland by draining, filling, excavation, or inundating and that impact is <u>not</u> addressed (mitigated) by either the U.S. Army Corps of Engineers Section 404 program, the DNR program, or the WCA permits, then the project proposer must demonstrate compliance with the mitigation requirements of Minn. R. 7050.0186. For the purposes of the MPCA CSW NPDES/SDS Permit, *deminimus* determinations by another permitting agency that address the project impacts are recognized by the MPCA and no additional mitigation is required. However, a *non-jurisdiction* determination by another permitting agency does not address project impacts and, therefore, does require the project proposer to demonstrate mitigation to meet NDPES/SDS Permit conditions and Minn. R. 7050.0186. Where it is uncertain whether water resources will be impacted because the exact design of future development is not currently known, the Final AUAR should cover the possible impacts through a "worst case scenario" or else prevent impacts through the provisions of the Mitigation Plan.

The Draft AUAR does not discuss proposed protections - such as buffers - to the wetlands that will remain on the site. The MPCA supports a requirement that adequate buffers be included surrounding wetlands. At a minimum, these buffers should be in the 20 – 50 foot range with more buffer dependant on the protection goals. The buffer of native vegetation needs to be perpetually maintained around the wetlands and we recommend for those wetlands that are not in public ownership that the City prohibit the alteration of the natural vegetation within the buffer strip. Conservation easements, covenants, recorded deed restriction, or other permanent restriction have been used to prohibit lot owners from filling or altering wetlands and buffers on their lots, however, enforcing the buffer restriction on each of the individual lot owners can be burdensome and difficult if lot owners desire to mow these areas to expand their back yard. We recommend that the wetland boundary and an appropriate buffer be designated public property under the City's management to assure the maintenance of the buffer and to avoid the difficulties of enforcing these restrictions on individual lot owners in the future.

The Draft AUAR indicates that design requirements and policies regarding storm water management are contained in the City's Surface Water Management Plan. Though this plan is referenced in the Draft AUAR, specific requirements that may be in the plan where not provided. We note that some municipalities have designed their entire storm-sewer system using wetlands as the discharge point or where numerous isolated wetland basins were artificially connected via a storm-sewer network creating a "flow through" system where none existed previously. Use of wetlands for such stormwater purposes is often justified by the proposer on the basis of cost savings, convenience, or ease of construction, since many wetlands are topographic depressions. However, the exclusive exploitation of a single wetland function, such as stormwater retention, is likely to degrade the other functions of the wetland and, therefore, causes degradation of the multiple functions and multiple values of the designated uses of that wetland. A local community may place more public value on a single function of a wetland, such as stormwater retention; however, that single-value emphasis should not distort the application of designated use to a single function to the detriment of the multiple functions that the natural wetland provides.

As a technique for mitigation of stormwater impacts associated with increased development, the MPCA encourages the inclusion of Low Impact Design (LID) elements in the development - such as leaving un-mowed natural areas, minimizing impervious surface, redirecting stormwater drainage to natural areas, and using rain gardens. There are many resources available on the Internet that discuss LID elements.

If you have any questions about wetland impacts or stormwater issues, please contact Larry Zdon at 651-297-8219.

Wastewater

Total anticipated wastewater flows from the Full Build AUAR study area are 3.01 million gallons per day (MGD) average daily flow. In the Final AUAR (Item 18.a), please include a table or list that offers a summary of how the 3.1 MGD total was calculated (i.e., the number of residential, commercial, industrial units and per-unit flows used).

The City also provides wastewater services to the city of Waverly and a mobile home park located between the two cities. The discussion of wastewater collection and treatment in the Final AUAR (Item 18) should include an estimate of the *total* future flows from Montrose, Waverly, the mobile home park, and any other future additions.

Ms. Barbara Swanson
October 24, 2007
Page 4

We would like to see the Final AUAR contain a general analysis and discussion of surface water impacts as they relate to discharge from the City wastewater treatment facility. This should encompass a discussion of the potential impacts associated with the current discharge point, i.e., expanded discharge to the Woodland Wildlife Management Area and downstream receiving waters (the unnamed creek that flows out of the Woodland WMA, North Fork Crow River, Crow River, Mississippi River, and Lake Pepin). It should also encompass a discussion of potential alternative discharge points and how this treatment system fits in with other municipal treatment systems in the region. Total Maximum Daily Loads - current status, potential for exacerbation of impairments through increased discharge, probability of changing permit requirements and lower effluent limits, etc. - should be discussed. The Final AUAR should also include an estimated time line for treatment plant expansions based on anticipated population growth and accompanying flow increases.

If you have any questions about wastewater issues, please contact Dave Sahli at 651-296-8722.

We look forward to receiving your responses to our comments. Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the project for the purpose of pending or future permit action(s) by the MPCA. We may have additional comments or requests for information in the future to address specific issues related to the development of MPCA permit(s). Ultimately, it is the responsibility of the project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any additional questions, feel free to contact me at 651-296-8011.

Sincerely,

Jessica Ebertz
Planner Principal
Environmental Review and Operations Section
Regional Division

JE:mbo

cc: Larry Zdon, MPCA
Kevin Molloy, MPCA
Dave Sahli, MPCA

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
2040 Highway 12 East • Willmar, MN 56201-5818
Phone (320) 231-3956 • FAX (320) 231-9710

February 12, 2008

Ms. Jessica Ebertz
Planner Principal
Environmental Review and Operations Section
Regional Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

FILE COPY

RE: Montrose Alternative Urban Areawide Review (AUAR)
Montrose, Minnesota
BMI Project No. W13.37928

Dear Ms. Ebertz:

Thank you for your comments on the Montrose AUAR. The following represents paraphrasing of the issues identified in your letter dated October 24, 2007 and our proposed responses to these comments.

Comment MPCA-1: The MPCA has a concern about the substitution of the AUAR for an EAW in the case of sewage collection systems. MPCA is normally the RGU for sewage collection system EAWs.

Response MPCA-1:

The City will comply with Minnesota Rule 4410.

4410.3610 ALTERNATIVE URBAN AREAWIDE REVIEW PROCESS. Subpart 1. **Applicability.**

"A local unit of government may use the procedures of this part instead of the procedures of parts 4410.1100 to 4410.1700 and 4410.2100 to 4410.3000 to review anticipated residential, commercial, warehousing, and light industrial development and associated infrastructure in a particular geographic area within its jurisdiction, if the local unit has adopted a comprehensive plan that includes at least the elements in items A to C. The procedures of this part may not be used to review any project meeting the requirements for a mandatory EAW in part 4410.4300, subparts 2 to 13, 15 to 17, 18, item B or C, or 24, or a mandatory EIS in part 4410.4400, subparts 2 to 10, 12, 13, or 25. The local unit of government is the RGU for any review conducted under this part……"

4410.4300 MANDATORY EAW CATEGORIES. Subp. 18. **Wastewater systems.** Items A to C designate the RGU for the type of project listed:

A. For expansion, modification, or replacement of a municipal sewage collection system resulting in an increase in design average daily flow of any part of that system by 1,000,000 gallons per day or more if the discharge is to a wastewater treatment facility with a capacity less than 20,000,000 gallons per day or for expansion, modification, or replacement of a municipal sewage collection system resulting in an increase in design average daily flow of any part of that system by 2,000,000 gallons per day or more if the discharge is to a wastewater treatment facility with the capacity of 20,000,000 gallons or greater, the PCA shall be the RGU.

B. For expansion or reconstruction of an existing municipal or domestic wastewater treatment facility which results in an increase by 50 percent or more and by at least 200,000 gallons per day of its average wet weather design flow capacity, or construction of a new municipal or domestic wastewater treatment facility with an average wet weather design flow capacity of 200,000 gallons per day or more, the PCA shall be the RGU.

C. For expansion or reconstruction of an existing industrial process wastewater treatment facility which increases its design flow capacity by 50 percent or more and by at least 200,000 gallons per day or more, or construction of a new industrial process wastewater treatment facility with a design flow capacity of 200,000 gallons per day or more, 5,000,000 gallons per month or more, or 20,000,000 gallons per year or more, the PCA shall be the RGU. This category does not apply to industrial process wastewater treatment facilities that discharge to a publicly-owned treatment works or to a tailings basin reviewed pursuant to subpart 11, item B.

Comment MPCA-2: AUAR and Mitigation Plan must be revised to maintain their validity.

Response MPCA-2: The AUAR will be evaluated every 5 years or as required by Minnesota Rule 4410.3610 sub. 7.

Comment MPCA-3: Final AUAR should address whether stormwater ponds will be located in wetlands. If wetland impacts not covered by Army Corps, DNR or WCA, then proposer must show they meet requirements of Minn. R. 7050.0186. Deminimus determinations by other agencies are recognized by MPCA, but not a non-jurisdictional determination. Final AUAR should cover "worst case scenario" or else prevent impacts through provisions of the Mitigation Plan.

Response MPCA-3: Wetland impacts are discussed in Item 12 on page 18 of the AUAR. The discussion has been updated to include that MPCA may also be involved. The wetland discussion in Item 12 (page 18) has been referenced in Item 17.

Comment MPCA-4: Draft AUAR doesn't discuss proposed protections – such as buffers – to the wetlands. Should be in the 20-50 ft range, or larger. Wetland boundary and buffer should be designated public property, and City should maintain them.

Response MPCA-4: The City has a 40-ft buffer requirement around all wetlands. The buffer area must be contained within a drainage and utility easement to allow for City management of this property. This will be added to Item 12 in the AUAR text.

Comment MPCA-5: Include specific requirements from Surface Water Management Plan in the AUAR/Mitigation Plan. Exploitation of one wetland function, like stormwater detention, at the expense of the other wetland functions, is likely to degrade the wetland.

Response MPCA-5: Wetlands will not be impacted by the stormwater system. The text from the update to the Storm Water Management Plan was used in the AUAR.

Comment MPCA-6: MPCA encourages LID.

Response MPCA-6: Incorporating LID on a site-by-site basis was discussed in Item 17, page 25.

Comment MPCA-7: Include table or list of assumptions for total wastewater flow (number of units).

Response MPCA-7:

Table 18-1
Summary of Total Wastewater Flows within AUAR Study Boundary
(Includes Flows from Existing Developed Areas and AUAR Study Exclusion Areas)

Land Use	Developable Acres	Households Per Acre	Total Households	Population	Flow Calculation	Total Avg Daily Flow (MGD)
Low Density Residential	3438	3	10314	25785	100 gal/person/day	2.58
Medium Density Residential	421	8	3368	8420	100 gal/person/day	0.84
High Density Residential	30	12	360	900	100 gal/person/day	0.09
Commercial	342				1500 gal/acre/day	0.51
Industrial	420				2500 gal/acre/day	1.05
					Total Avg. Daily Flow from AUAR Full Build Area =	**5.07**

The above table will be added to the Final AUAR. The Final AUAR will be modified to include a total average daily flow of 5.07 MGD and a peak flow of 15.22 MGD (3.0 Peaking Factor) resulting from the Full Build scenario. The total flow includes existing and future flows from the study area exceptions within the AUAR study boundary as shown in Figure No. 3.

Comment MPCA-8: AUAR should include estimate of total future flows from Montrose, Waverly, the mobile home park, and any other future additions.

Response MPCA-8:

The below table will be added to the Final AUAR. The table shows an estimated future flow to the Montrose Regional Wastewater Treatment Facility of 5.86 MGD average daily flow. Flows from the mobile home park are included in the Montrose subtotal flows.

Table 18-2
Summary of Total Wastewater Flows to Montrose Regional Wastewater Facility

Location	Number of Connections	Population	Flow Calculation	Total Avg Daily Flow (MGD)
Existing Waverly Flow Total	520	1300	80 gal/person/day	0.104
Future Flows from Waverly LS #1 (TH 12)	551	1378	100 gal/person/day	0.138
Future Flows from Waverly LS #2 (Carrigan Meadows)	953	2383	100 gal/person/day	0.238
Future Flows from Waverly Future LS (NE Waverly)	1248	3120	100 gal/person/day	0.312
SUBTOTAL WAVERLY FLOWS	3272	8180		0.792

SUBTOTAL MONTROSE FLOWS				5.07
TOTAL FLOW TO MONTROSE REGIONAL WWTF				**5.862**

Comment MPCA-9: Include general analysis of surface water impacts as they relate to discharge from the City wastewater treatment facility (including discussion of potential impacts associated with the current discharge point, expanded discharge to Woodland WMA, and downstream receiving waters). Include potential alternative discharge points and how this system fits in with the rest of the region.

Response MPCA-9: Since the Montrose Regional Wastewater Treatment Facility expansion in 2002 the NPDES SDS permit has required that the City monitor the effects of increased wastewater discharge rates to the Woodland WMA. Specific items included in the monitoring are Chlorophyll, Dissolved Oxygen, pH, Phosphorus, specific conductance, temperature, and transparency. The permit also requires a plant community integrity study be completed to monitor any effects of the WWTP discharge on the plant community. Current monitoring shows no impacts on Woodland WMA. If it is determined that future loadings will have impacts, alternative discharge points or treatment methods will be investigated.

Comment MPCA-10: Discuss TMDLs – current status, potential for exacerbation of impairments through increased discharge, probability of changing permit requirements and lower effluent limits, etc.

Response MPCA-10: The City will comply with current and future requirements as set forth by the DNR, MPCA, and any other state and federal agencies resulting from the TMDL study of the Crow River watershed.

Comment MPCA-11: Include an estimated timeline for treatment plant expansions.

Response MPCA-11: A timeline has been created using population milestones. Since the timeline for treatment plant expansions will rely solely on how quickly development occurs, accurate dates for treatment plant expansions cannot be estimated. In the table below an estimate of 100 gallons/person/day has been used. At the present time, flows from commercial and industrial land uses within Montrose and Waverly are minimal. Current trends have shown that residents in Montrose and Waverly typically use less than 80 gallons/person/day. Therefore, the 100 gallons/person/day would allow for some flow from commercial and industrial uses. If large industrial wastewater developments occur, the below table would need to be adjusted accordingly.

Facility Expansion	**WWTP Capacity**	**Estimated Maximum Population WWTP Will Service (Combined Montrose & Waverly)**
Current	0.78	7,800
Expansion #1	1.5	15,000
Expansion #2	3.0	30,000
Expansion #3	6.0	60,000

Once again, thank you for your input. These responses to your comments are proposed to be included in the Montrose Final AUAR and Mitigation Plan. If you would like to discuss these proposed responses, please feel welcome to contact Justin Kannas by February 29, 2008 at 320-231-3956 or justinka@bolton-menk.com.

Sincerely,

BOLTON & MENK, INC.

Justin L. Kannas

Justin L. Kannas, P.E.

Enclosure

cc: Barbara Swanson, City of Montrose Administrator
Bradley C. DeWolf, P.E., City Engineer
Chantill A. Kahler Royer, P.E., Bolton & Menk, Inc.
Gina Mitchell, Bolton & Menk, Inc.

Minnesota Department of Transportation

District 3B - Project Development
3725 12th St. N.
St. Cloud, MN 56303

Office Telephone: 320-223-6530
Fax Number: 320-223-6581

October 24, 2007

Ms. Barb Swanson, City Administrator
City of Montrose
311 Buffalo Avenue South
P.O. Box 25
Montrose, MN 55363

Re: Montrose Alternative Urban Areawide Review (AUAR)
Trunk Highways (TH) 12 & 25, CS 8601, 8603 & 8604

Dear Ms. Swanson:

The Minnesota Department of Transportation (Mn/DOT) applauds the City of Montrose for undertaking the huge task of long range planning. We appreciate the City's willingness to work with Mn/DOT on issues related to TH 12 and 25 within the community.

The Mn/DOT District 3 office has reviewed the Montrose AUAR for impacts to the trunk highway system and offers the following comments:

page 38, Section 5.1.1 US TH 12: This section discusses the expansion of TH 55, and states that expansion between Plymouth and Rockford is assumed by year 2030, but none between Rockford and Buffalo. Mn/DOT District 3 is planning for expansion between Rockford and Buffalo before year 2030, but is unable to construct a four-lane expressway until the Metro District completes the Plymouth to Rockford segment. District 3 does include expansion from Rockford west to Annandale in its 2030 long range plan, but Metro does not include any funding for the Plymouth to Rockford expansion.

pages 45 & 46, Section 5.1.6, etc Needed Improvements: Mn/DOT has no plans to expand capacity on TH 12 or either leg of TH 25. Right of Way constraints at the junction of TH 12 & TH 25 & CSAH 12 limited the recent expansion on TH 12 to right and left turn lanes at the intersection. The capacity improvements noted in the document will be the responsibility of the local jurisdiction.

page 86. Section 6.1.1 US TH 12: The fourth paragraph discusses future full access spacing. The District agrees with the one-half mile spacing between Clementa and Meridian Avenues, but does not agree that Aetna Avenue should be a planned full access intersection.

page 90, Section 6.1.6 Regional Roadway System Improvements: This section discusses the need to widen TH 12 to a six-lane facility through the City of Montrose and to the east to where TH 12 is designed as a 6-lane freeway. The current freeway segment is located 19 miles east of Montrose. Traffic volumes in the west metro where TH 12 is under construction are currently more than double the volumes between Delano and Montrose, and taper off significantly as Highway 12 moves west. Due to funding constraints, it is unlikely that a four-lane section will be constructed west of Maple Plain.

Thank you for the opportunity to review and comment on this AUAR.

Sincerely,

Claudia Dumont

Claudia Dumont
Senior Transportation Planner

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
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Phone (320) 231-3956 • FAX (320) 231-9710

February 12, 2008

FILE COPY

Ms. Claudia Dumont
Senior Transportation Planner
Minnesota Department of Transportation
District 3B – Project Development
3725 12th Street N.
St. Cloud, MN 56303

RE: Montrose Alternative Urban Areawide Review (AUAR)
Montrose, Minnesota
BMI Project No. W13.37928

Dear Ms. Dumont:

Thank you for your comments on the Montrose AUAR. The following represents paraphrasing of the issues identified in your letter dated October 24, 2007 and our proposed responses to these comments.

Comment DOT-1: Mn/DOT District 3 plans for the expansion of Trunk Highway 55 between Rockford and Buffalo before year 2030, but Mn/DOT Metro District does not plan for expansion of the segment between Plymouth to Rockford by 2030. Without the expansion of Plymouth to Rockford, the expansion between Rockford and Buffalo will not be complete.

Response DOT-1: Expansion schedule is noted. The Travel Demand Model used to develop the traffic volumes was developed by Mn/DOT based on the Metropolitan Council Model. It showed expansion of Trunk Highway 55 between Plymouth and Rockford, but none between Rockford and Buffalo by 2030. This would appear to be contrary to the above statement from Mn/DOT District 3, however both recognize the limited capacity on Trunk Highway 55 and neither would alter the AUAR traffic distribution significantly. If Trunk Highway 55 is expanded to four lanes all the way from Plymouth to Buffalo, the resulting traffic volume on Trunk Highway 12 would be less than what is shown in the report.

Comment DOT-2: MN/DOT has no plans to expand capacity on Trunk Highway 12 or either leg of Trunk Highway 25. Capacity improvements noted will be the responsibility of the local jurisdiction.

Response DOT-2: While it is recognized that Mn/DOT has no plans to expand capacity on Trunk Highway 12 or on either leg of Trunk Highway 25, the City will continue to work with developers, adjacent cities, counties, and Mn/DOT to obtain alternative funding for capacity improvements on Trunk Highway 12 and Trunk Highway 25.

Comment DOT-3: MN/DOT does not agree that Aetna Avenue should be a planned full access intersection.

Response DOT-3: This intersection location was based on the half mile spacing requirement for full access on Trunk Highway 12 and the recognition of the current access at Aetna Avenue. With the expanded roadway network planned by the City of Montrose, the full access off of Trunk Highway 25 could serve the area north of Trunk Highway 12, adjacent to Aetna Avenue with additional improvements to other intersections. Closing the Aetna full access could require that the intersection of 7th Street North at Trunk Highway 25 to be signalized to handle the additional traffic. A signalized intersection at that location would defy half mile spacing on Trunk Highway 25 (between 7th Street North and Trunk Highway 12). Also with the change, dual left turn lanes would be needed from Eastbound Trunk Highway 12 to northbound Trunk Highway 25, from southbound Trunk Highway 25 to eastbound Trunk Highway 12, and from northbound Trunk Highway 25 to westbound 7th Street North to maintain acceptable operations. Due to the changes that would be needed with the closure of full access at Aetna Avenue (changes on Trunk Highway 25, additional signal on Trunk Highway 25); it is recommended that Mn/DOT further consider the proposed full access at Aetna Avenue.

Comment DOT-4: Due to funding constraints, it is unlikely that a four-lane section of Trunk Highway 12 will be constructed west of Maple Plain.

Response DOT-4: This constraint is recognized by the City of Montrose. The City will continue to work with adjacent cities, counties, and Mn/DOT to ensure safe and efficient traffic operations on Trunk Highway 12 with the increased traffic expected from development.

Once again, thank you for your input. These responses to your comments are proposed to be included in the Montrose Final AUAR and Mitigation Plan. If you would like to discuss these proposed responses, please feel free to contact Bryan Nemeth by February 29, 2008, at 952-890-0509 or bryanne@bolton-menk.com.

Sincerely,

BOLTON & MENK, INC.

Justin L. Kannas

Justin L. Kannas, P.E.

Enclosure

cc: Barbara Swanson, City of Montrose Administrator
Bradley C. DeWolf, P.E., City Engineer
Chantill A. Kahler Royer, Bolton & Menk, Inc.
Bryan Nemeth, Bolton & Menk, Inc.
Gina Mitchell, Bolton & Menk, Inc.