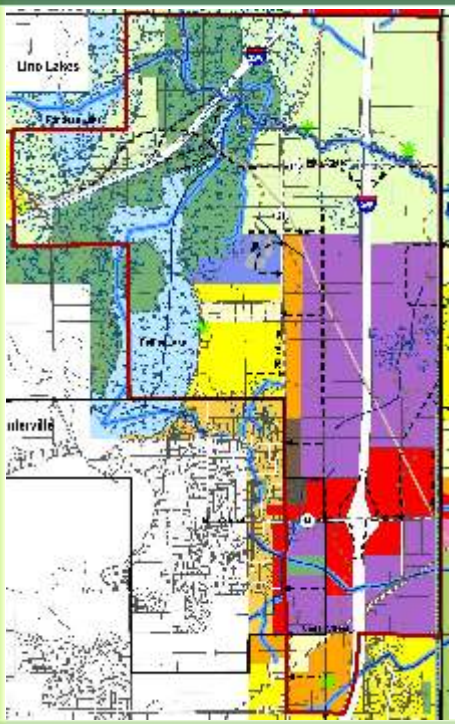
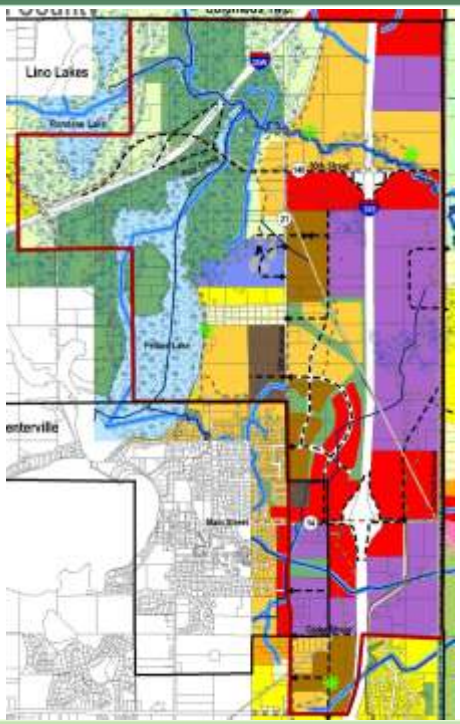
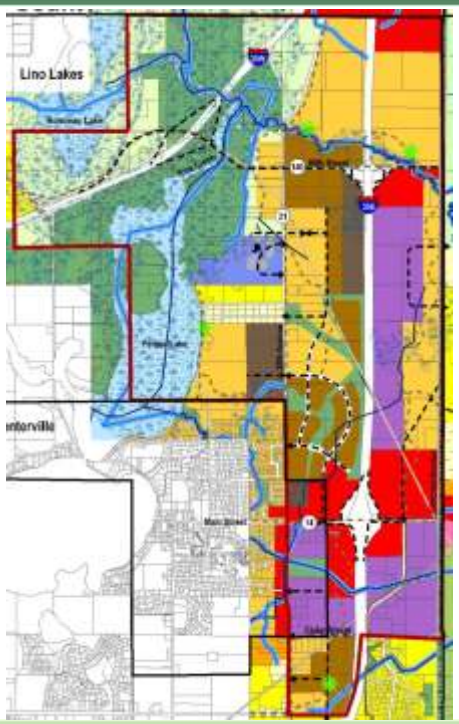
I-35E Corridor Final
Alternative Urban Areawide Review (AUAR)







Prepared For:
City of Lino Lakes, Minnesota

Prepared By:
Dahlgren, Shardlow and Uban, Inc.
Applied Ecological Services, Inc.
URS, Inc.
Toltz, King, Duvall, Anderson & Assoc., Inc.
106 Group, Inc.

September 26, 2005

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The 106 Group, Inc.

September 26, 2005

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Executive Summary

The I-35E Corridor Final AUAR has been prepared for the City of Lino Lakes (city) in accordance with Minnesota Rules Chapter 4410. This AUAR process was prompted by the fact that large portions of the AUAR area are facing development pressure, that the city has a strong commitment to conserving natural resources and that the city wants to balance development with natural resource conservation. The city determined that undergoing the AUAR process would provide the city with an invaluable tool as they plan for and manage growth within the northeastern portion of the city (Figure 5-1). The AUAR follows the format of an Environmental Assessment Worksheet (EAW) and provides a level of analysis commensurate with an Environmental Impact Statement (EIS).

The large geographic scope of the AUAR area (over 4,500 acres) allows for a comprehensive analysis of the cumulative impacts of development within the AUAR area (Figure 5-2). Mn Rules state that, "the Responsible Governmental Unit (RGU) may specify more than one scenario of anticipated development provided that at least one scenario is consistent with the adopted comprehensive plan. At least one scenario must be consistent with any known development plans of property owners within the area," (Mn Rules. Chapter 4410.3610 subp.3). This AUAR includes a review of three development scenarios.

1. Scenario One is consistent with the adopted plans of the city and allows for an additional 2,237 housing units, 2,985,733 ft^2 of commercial uses, and 11,175,035 ft^2 of industrial uses (see Figure 6-2).
2. Scenario Two is based on known development plans of property owners within the AUAR area and has a commercial and industrial emphasis (see Figure 6-3). Scenario Two allows for an additional 5,715 housing units, 5,617,890 ft^2 of commercial uses, and 9,570,045 ft^2 of industrial uses.
3. Scenario Three has a residential emphasis and allows for an additional 8,659 housing units, 4,141,554 ft^2 of commercial uses, and 5,829,722 ft^2 of industrial uses (see Figure 6-4).

Distribution of the proposed Final AUAR does not constitute approval of any specific project pursuant to zoning, subdivision, or other official controls of the City of Lino Lakes. Rather, preparation and distribution of the proposed Final AUAR is mandated by the Environmental Review Program, Environmental Quality Board, Chapter 4410 Minnesota Rules. Any proposed specific project within the AUAR area remains subject to applicable local zoning, subdivision, or other official controls. Specific projects that are consistent with the assumptions of the adopted Final AUAR and which comply with the mitigation plan within the Final AUAR are exempt from further environmental review pursuant to Minnesota Rules Section 4410.3610 Subp. 5 E.

AUAR PROCESS SUMMARY

This AUAR process is unique in that it includes a strong public participation and an agency participation component throughout the process, rather than only involving the public and reviewing agencies after the Draft AUAR is completed, which is the standard process required by Minnesota Rules. To ensure very strong and timely communication and the participation of numerous key stakeholder groups throughout the planning process, an Advisory Panel was selected to serve as the primary working group during the course of the research, planning and environmental review process. The Advisory Panel includes property and business owners within the AUAR area as well as members of the city's Planning and Zoning Board, Environmental Board, and Economic Development Advisory Committee. All information, work products, findings and recommendations developed by the AUAR consultant team were presented to the Advisory Panel for its review and comment. Also, this information was made available to the general public on the city's website

Advisory Panel
A series of Advisory Panel workshops were held to present research related to the AUAR, to assist in the creation of the development scenarios that are reviewed in this AUAR document, and to review the Draft and Final AUAR documents. Several Advisory Panel workshops were held for the purposes of presenting the development scenarios, receiving comments on the scenarios, reviewing the revised development scenarios. A list of workshops follows.

Topic	Date
Introduction to the AUAR Process	November 18, 2004
Municipal Services	December 2, 2004
Natural & Cultural Resources	December 16, 2004
Transportation	January 6, 2005
Demographics and Market Analysis	January 20, 2005
Development Scenarios I	February 3, 2005
Development Scenarios II	February 17, 2005
Development Scenarios III	March 3, 2005
Draft AUAR	June 9, 2005
Final AUAR	September 22, 2005

Environmental Board
Several members of the Lino Lakes Environmental Board are on the Advisory Panel. In addition to their participation on the Advisory Panel, the Environmental Board devoted its June 7, 2005 meeting to reviewing and discussing the Draft AUAR. The Environmental Board discussed and provided comments on each AUAR item. Several revisions to the Draft AUAR were made to address the comments of the Environmental Board prior to the City Council authorizing its distribution. The Environmental Board met jointly with the Advisory Panel on September 22, 2005 to review the Final AUAR. The focus of that meeting was reviewing the Mitigation Plan.

City Council
All of the information provided by the Advisory Panel and Environmental Board, including comments, suggestions, and concerns, was assembled and delivered to the Mayor and City Council prior to their review and consideration of the work completed. The City Council held three work sessions regarding the AUAR prior to ordering the preparation of the document at their April 11, 2005 City Council meeting. The purpose of the first work session, held January 19, 2005, was to introduce the City Council to the AUAR process and review the relevant background research. The City Council held two work sessions to review the draft development scenarios on March 29 and April 6, 2005. The City Council held a work session on September 21, 2005 to review the Final AUAR and Mitigation Plan. The City Council authorized distribution of the Final AUAR and Mitigation Plan at its September 26, 2005 meeting.

Agencies
To engage reviewing agencies early in the AUAR process, a series of agency meetings were held to present background research, to solicit initial comments on the research, and to help the AUAR team scope out the level of detail needed in the AUAR analysis. Valuable information was gained from agency staff that was incorporated into the AUAR analysis. Staff from the following agencies attended some or all of the meetings: Department of Natural Resources, Department of Transportation, Metropolitan Council, Anoka County, Washington County, US Army Corps of Engineers, US Fish and Wildlife Service, Anoka

Conservation District, Rice Creek Watershed District, and Environmental Quality Board. A list of agency meetings follows.

Topic	Date
Municipal Services & Tour of AUAR area	November 23, 2004
Natural & Cultural Resources	December 7, 2004
Transportation	December 28, 2004
Development Scenarios I	January 25, 2005
Development Scenarios II	February 22, 2005

The City received comment letters on the Draft AUAR from the following agencies: Department of Natural Resources, Department of Transportation, Metropolitan Council, Anoka County, Washington County, and Rice Creek Watershed District. City staff and members of the AUAR technical team met with agency staff to better understand the comments on the Draft AUAR and to further involve the agencies in the preparation of the Final AUAR and Mitigation Plan. City staff and members of the AUAR technical team met with the commenting agencies to discuss their comments, the city's approach to addressing the comments, and additional mitigation strategies. A meeting was held with Rice Creek Watershed District staff on August 23, 2005 to discuss stormwater management issues and a meeting was held on August 26, 2005 with staff from the Department of Transportation, Metropolitan Council, and Anoka County to discuss transportation issues.

Public Open House
In addition to the Advisory Panel, City Council, and agency workshops, a public open house was held on February 17, 2005. The purpose of the public open house was to give the general public the opportunity to review and submit comments on the background research and the draft development scenarios.

Public Comment Period
The Draft AUAR, including a draft Mitigation Plan Outline was prepared and distributed to the Environmental Quality Board (EQB) and persons and agencies on the official EQB mailing list in accordance with EQB rules. In addition, the Draft AUAR was transmitted to the Advisory Panel and surrounding communities. The 30-day comment period occurred from July 4 to August 3, 2005. Two state agencies, five local units of government, two business ventures, one citizen group and one citizen submitted comment letters on the I-35E Corridor Draft AUAR. The Draft AUAR comment letters are included in Appendix H.

MAJOR ISSUES AND PROPOSED MITIGATION SUMMARY

The potential impacts and major issues identified in the Draft AUAR and/or in the Draft AUAR comment letters are summarized in the following section. The major issues include traffic, ecologically sensitive resources, storm water management, regional sanitary sewer infrastructure capacity, and cultural resources. The discussion of each issue also includes a discussion of the proposed mitigation measures that address the identified impacts and issues. A comprehensive summary of potential impacts and the proposed mitigation strategies are included in the Mitigation Plan. The final Mitigation Plan will become a component of the action plan to ensure that the city avoid, minimize, or mitigate significant environmental impacts from the development of the AUAR area

Traffic
A detailed traffic impact analysis has been prepared to fully investigate the effects of the proposed land use scenarios on the local and regional roadway systems (see Item 21. Traffic). The traffic analysis focused on the operation of the primary roadways and their intersections during the p.m. peak period, which is

typically the time when the most severe traffic congestion is incurred. The traffic analysis was expanded to include a noise impact analysis (see Item 21, Traffic), a 2020 no-build traffic analysis (see Appendix E), and a 2030 a.m. peak analysis (see Appendix F) to address comments received on the Draft AUAR.

Evaluating the development scenarios involved the complex process of developing and distributing background and development scenario related traffic through the areas roadway network. The network includes a system of frontage roadways that will assist in the circulation of traffic through the area. This roadway system, which was presented to the City and Anoka County early in the AUAR process, was used as a guideline in determining where to put the various developments.

The key guidelines included:

- Limit access to CSAH 14 and 80th Street between CSAH 21 and Elmcrest Avenue North
- Limit access and preserve mobility on CSAH 14, CSAH 21, and 80th Street (assuming future interchange)
- Signalized (primary) intersections at ½ mile spacing
- Collector (secondary) intersections at ¼ mile spacing
- Enhance existing street network to serve local trips (e.g., upgrade Elmcrest Avenue North)
- Develop frontage/backage road system to provide property access
- Consolidate existing access as opportunities arise
- Consider I-35E park and ride location
- Provide bicycle/pedestrian trail connectivity

In general, the overall development scenarios resulted in significant increases in traffic to/from the AUAR area. The major problems with the intersection were southbound left-turns and westbound left-turns. The lane geometry that was assumed was single left-turns on all approaches. The results indicate that given the expected development in the AUAR area that several of the approaches would require dual left-turn lanes to adequately accommodate study area traffic. The redesigned interchange at CSAH 14 and I-35E overall functioned satisfactory during the p.m. peak hour for the 2030 land use scenarios. The northern section of the AUAR area, along 80th Street and the bypass, also showed high traffic volumes and intersections projected to operate over-capacity under the assumed lane geometry.

Table 21-5 displays the overall Level of Service (LOS) for all of the analyzed intersections for the development scenarios for 2030 build-out and post 2030 build-out conditions. Table 21-6 displays the LOS for each of the turning movements for the 2030 build-out conditions. The intersection traffic volumes for the full development of the scenarios (post 2030) resulted in severe congestion for virtually all turning movements and therefore are not shown in the table.

The proposed developments will increase traffic on roadways within, and adjacent to the AUAR area. Mitigation will include adding traffic signals and turn lanes and widening roads as necessary during the various stages of development (see Figures 25-8 through Figure 25-12). In general, Scenario One had the least impact on traffic congestion with two intersections performing at LOS F, without mitigation. Scenario Two had four intersections and Scenario Three had six intersections operating at LOS F, respectively. With reasonable mitigation measures all the intersections in Scenarios One and Two were able to operate at LOS E or better. Even with reasonable mitigation measures, Scenario Three, which has a residential emphasis, still had intersections performing at LOS F. These include the east ramps at the proposed Northerly Bypass/I-35W interchange, and the intersection of CSAH 14 and Otter Lake Road.

To mitigate the impact of the additional traffic on the regional system I-35W and I-35E would need to be reconstructed to provide a six-lane cross-section. It should be noted that it was determined that an expansion will be necessary even without the development scenarios used in this analysis. As the interstates serve a much larger area, the projected growth of the entire Twin Cities region should warrant expansion to the interstates by the year 2030.

As future growth occurs, alternative modes of transportation may be needed to maintain the area's mobility. These modes may include express bus service, buses operating on exclusive right-of-way (busways), or commuter rail. All three of these modes were looked at in the transit study conducted in 2001 by the Rush Line Corridor Task Forces. The general alignment proposed for the Rush Line is adjacent to TH 61 in Washington County, or within 2-miles AUAR area. Opportunities should be explored to provide a link to this system as it is being developed.

Pedestrian and bicycle paths are another way to improve mobility within and to the AUAR area. It is recommended that ***any*** roadway improvements being planned in the AUAR area should include provisions for the addition of pedestrian / bicycle facilities. These facilities should ideally be at least 10 feet wide and separated from the highway shoulder by a minimum of 20 feet.

Figures 21-8, 21-9, and 21-10 display the intersection LOS for each of the scenarios and also display the mitigation measures that were identified to address the deficiencies. These figures represent general/conceptual improvements that were shown to improve overall traffic operations for the respective development scenarios. The improvements are intended to represent the minimum level of infrastructure investment that would be needed to meet acceptable level of service standards. Additional roadway and non-motorized improvements, beyond the minimum level, may be identified to accommodate specific development needs that are identified within the AUAR area.

Draft AUAR comment letters suggested that the city establish a monitoring program in an effort to link permitted development to the capacity of the surrounding road network. The City will implement an on-going traffic management plan to monitor traffic volume growth and any operational issues that may develop in and around the AUAR area. This monitoring program is intended to give the City, County and other agencies the opportunity to evaluate future development projects within the AUAR area and their cumulative impacts on the transportation system. The results of the monitoring program will be shared with the various road authorities on a regular basis.

To implement the monitoring program, a traffic impact study will be required for all developments within the AUAR area and a consistent methodology will be followed. Each traffic impact study will identify the deficiencies and reasonable mitigation measures that are related to the development. Per the City of Lino Lakes subdivision and zoning ordinances, specific level of service guidelines must be followed to obtain an acceptable level of service. Section 1002-6 of the Lino Lakes Subdivision Ordinance states that if a proposed subdivision is not consistent with the Comprehensive Plan with respect to the Land Use Plan, or the Transportation Plan, specific guidelines to roads or highways to serve the development must be met. For reference, Section 1002 of the Subdivision Ordinance is included under the "General Implementation Tools" of the Mitigation Plan. If no reasonable mitigation measures are agreed upon or are unfeasible, the intensity or timing of the proposed development would be staged so as to not overly burden the transportation system.

Ecologically Sensitive Resources
The AUAR area contains a wealth of ecologically sensitive resources including high quality natural and semi-natural areas, wildlife corridors, two rare animals, the Peltier Lake Island Heron Rookery, two rare plant communities, and portions of the Rice Creek Chain of Lakes Regional Park. Mitigating impacts to ecologically sensitive resources is discussed throughout the Final AUAR.

The Conservation Design Framework (Figure 10-3 and described under Item 10) is designed to conserve wildlife habitat and natural plant communities, and will provide an invaluable tool for conservation of wildlife and rare features within the AUAR area. Most importantly, the Conservation Design Framework protects the existing significant fish, wildlife, and ecological sensitive resources in the northwest portion of the AUAR, and goes beyond to identify and protect the most significant outlier habitats, buffering them, and connecting them with greenway corridors. In brief, conservation design principles behind the Framework include:

- protect streams, lakes, and groundwater by purifying, filtering, and infiltrating surface runoff to the maximum extent possible
- preserve, restore, and enhance existing natural and semi-natural areas and wildlife habitat
- create wildlife opportunities by restoring and managing wildlife habitat
- establish wide buffers and connections around and between core and outlier habitats

The greenway corridors are designed to connect the larger and higher quality natural areas. These corridors will provide three main services: 1) stormwater collection and conveyance, 2) ecological corridors for wildlife movement and native plant dispersal, and 3) recreational trails for people. Certain greenway corridors may warrant design for specific wildlife species, may provide certain stormwater management opportunities, or may need to accommodate different types of trails or passive recreational uses. Design considerations may include corridor width, appropriate vegetation structure, human access and use, and whether or not it is appropriate for a corridor to cross a particular type of roadway.

New developments represent opportunities to plan and carry out ecological restoration and management. Ecological restoration, enhancement, and/or expansion will help mitigate potential impacts on wildlife and rare features, and if these activities are planned, scheduled, and carried out at the recommended broad scale, will likely result in a net increase in conservation and ecological benefits within the AUAR area compared with existing conditions.

Various tools exist or can be developed to ensure the protection and stewardship of the preserved, restored, and enhanced natural resources in the AUAR area. These tools can be used to establish a consistent set of standards for treating the open space across different areas as they are developed. For example, the buffers shown on the Conservation Design Framework (Figure 10-3) are conceptual and will allow the city the flexibility to consider several land protection and preservation tools in these areas. The variety of tools listed throughout this Final AUAR will enable public and private sectors to cooperate in creating this natural open space network over time in a realistic market and regulatory context.

Stormwater Management
Effective stormwater management and planning within the AUAR area is a challenging pursuit, but one that is critical to prudent and environmentally sound development. The AUAR process presents an opportunity for logical and innovative stormwater management that integrates traditional stormwater detention and water quality requirements with environmental restoration and conservation objectives. This ideal can be implemented on both a regional and site scale to minimize the impact of development on runoff rates and volumes, water quality, and the region's aquatic resources. The stormwater analysis is fully discussed under Item 17 and Appendix D contains the Hydrologic Analysis.

The majority of the AUAR area faces many obstacles to effective stormwater management. In many cases agricultural ditch and tile networks have significantly altered drainage basins and changed sub-watershed divides. The drainage capacity of these existing tile networks will be insufficient to convey stormwater runoff from further residential, commercial, or industrial development. The recommendations made within this AUAR document are intended to improve post-development runoff water quality; attenuate runoff release rates downstream and drainage infrastructure capacities for both frequent and occasional rainfall events; and enhance groundwater recharge as the AUAR area is developed.

Stormwater management areas (SMAs) will play a critical role in mitigating potential impacts from stormwater following development of the AUAR area. Appropriate design, construction, and maintenance of these areas will enable development to occur without compromising the integrity of the region's aquatic resources. The stormwater management approach outlined in this Final AUAR provides adequate detention of runoff for post-development conditions. It also provides a framework for water quality enhancement and increased groundwater recharge. The stormwater detention facility design will provide hydraulic properties appropriate for native plant species to thrive. All of these factors will help mitigate potential water quality problems associated with development in the AUAR area.

The most effective approach to addressing stormwater issues is by implementing an integrated system of stormwater management elements. The Conservation Design Framework provides an appropriate layout for the regional implementation of an integrated system (see Figure 10-3). Within the greenway corridors shown in the Framework, bio-swales, wet prairie, and wetlands can be oriented in series to effectively retard runoff rates, reduce stormwater volume, and enhance water quality. Runoff rates and volumes are decreased due to increased infiltration, evapotranspiration, and increased friction imparted on the flow. These decreased rates also reduce the ability of runoff to generate and carry sediment and associated pollutants.

The runoff volume into the receiving waters will likely increase with development due to the increased impervious area constructed in the AUAR area. However, with the stormwater management requirements outlined in this document, the peak runoff release rates will be decreased from storms of 1-, 10-, and 100-year recurrence intervals and runoff volumes will be no less than 80% and no more than 150% of existing conditions. The recommended large area stormwater management elements will result in relatively small water level fluctuations, provide area to enhance the groundwater recharge necessary to provide base flow to the receiving streams, and provide the detention time necessary to cleanse the runoff of contaminants and meter the increased runoff volume in compliance with Rice Creek Watershed District (RCWD) Rules.

Regional Sanitary Sewer Infrastructure Capacity

The city has met with Metropolitan Council Environmental Services (MCES) staff on several occasions from 2003 through Spring 2005 to discuss existing and future MCES service to Lino Lakes. The MCES is in the process of updating their comprehensive planning for the “Northeast Region,” which includes Lino Lakes, Centerville, North Oaks, Forest Lake, Hugo, White Bear Lake, and White Bear Township. They anticipate the need to provide additional capacity in the Forest Lake Interceptor and downstream facilities to serve the future needs of those communities. Currently, MCES is engaged in plans to construct additional capacity support for the Forest Lake Interceptor.

Following a series of meetings in early 2005, MCES agreed to construct an additional interceptor to serve the easterly portion of Lino Lakes. The MCES intends to construct this pipe in 2006, in conjunction with a proposed county highway improvement project. The new interceptor should be designed to convey the excess flow not accommodated by the existing Centerville Interceptor. Assuming the existing interceptor can handle 1.7 MGD, the new pipe should be designed to convey flows ranging from 1.3 MGD for Scenario One to 2.5 MGD for Scenario Three (see full discussion under Item 18).

Design of the new interceptor is now in progress. Lino Lakes provided flow estimates, based on the *Comprehensive Sanitary Sewer Plan Scenario*, to MCES in March 2005 (see Item 18 for additional information). MCES has directed the designers to provide capacity in the new interceptor for 2.0 MGD average daily flow. Discussions are currently underway between Lino Lakes and MCES regarding the capacity to be provided in the new interceptor. Assuming capacity remains at 2.0 MGD, the existing and new interceptors will have adequate capacity for projected development through at least 2030 under any of the three AUAR Scenarios. However, ultimate development as projected by Scenarios Two and Three could eventually exceed capacity. If the city chooses to amend its Comprehensive Plan to accommodate components of Scenarios Two or Three, then a subsequent revision to the Comprehensive Sanitary Sewer Plan will be required. The Comprehensive Planning process, including review by the Metropolitan Council, is the appropriate process to resolve any potential sewer capacity issues.

Cultural Resources

Ten precontact archaeological sites have been recorded in the north and western portions of the AUAR area, and numerous others have been documented in proximity to it (see Table 25-1). For the most part, sites are located in proximity to water: Centerville Lake, George Watch Lake, Peltier Lake, Rondeau Lake, Clearwater Creek, Hardwood Creek, and Rice Creek. The undisturbed landforms adjacent to these bodies of water have the greatest potential for containing intact archaeological sites. Several sites have been identified on slight rises within the wetlands surrounding Rice Creek; therefore, those wetlands, and the northern portion of Peltier Lake, have high potential to contain intact archaeological resources. Further, those undisturbed areas adjacent to known sites are also considered to have high archaeological potential.

Because of the high level of archaeological sites in the AUAR area, appropriate levels of historical and archaeological surveys in areas identified as having high potential for containing cultural resources will occur prior to future development. This is intended to mitigate any intentional or unintentional damage to, or destruction of, important archaeological sites and historic properties without due process and consideration.

The 106 Group created a map that shows areas with a high potential for archaeological sites. Given the sensitive nature of this information, this map cannot be included in the AUAR document, nor can it be made available to the public. The city will have this map on file and consult it when development applications are submitted for review. If a development application falls within an area that is considered to have a high potential for archaeological sites, the city will require that the following steps and procedures involved in the identification and analysis of any archaeological sites is followed prior to development:

- Conduct a Phase I archaeological survey within the area of potential effect (APE). The objective of the archaeological fieldwork is to determine if there are archaeological sites in the areas identified as having high potential for such, and define the extent of those sites that may be impacted by development plans.
- Conduct a Phase II archaeological survey. If archaeological resources are uncovered within the APE that may be eligible for listing on the National Register of Historic Places (NRHP) a Phase II survey should be conducted. The objective of the investigation is to determine whether archaeological resources are eligible for listing on the NRHP.
- Plan for avoidance or conduct Phase III data recovery. If a significant archaeological site is identified that will be impacted by development, avoidance is recommended. If this is not possible, then a data recovery of the site should occur.

MITIGATION PLAN

A comprehensive summary of potential impacts and the proposed Mitigation Plan are included in this Final AUAR. A draft mitigation plan outline was included in the Draft AUAR to assist in the public in understanding the City's initial approach to mitigating impacts. The potential impacts and mitigation strategies included in the Draft Mitigation Plan Outline in the Draft AUAR have been revised and expanded upon to address Draft AUAR comments. The final Mitigation Plan will become a component of the action plan to ensure that the city avoid, minimize, or mitigate significant environmental impacts from the development of the AUAR area.

I-35E Corridor – Final
Alternative Urban Areawide Review (AUAR)

The EQB requirements and guidance pertinent to the AUAR process are in *italics* throughout this AUAR document and the EQB Guidance Document is also included as Appendix B. All text from the EAW form is included in this AUAR document and is in **bold face font**. The *AUAR Guidelines* pertaining to each EAW item follows the **bold face** text from the EAW form.

Recommended Content and Format Alternative Urban Areawide Review Documents
- Environmental Quality Board Staff - April 2005

This guidance has been prepared by the Environmental Quality Board (EQB) staff to assist in the preparation of AUAR documents. It is based on the directive of 4410.3610, subpart 4, that "the content and format [of an AUAR document] must be similar to that of an Environmental Assessment Worksheet (EAW), but must provide for a level of analysis comparable to that of an Environmental Impact Statement (EIS) for impacts typical of urban residential, commercial, warehousing, and light industrial development and associated infrastructure."

GENERAL GUIDANCE FOR AN AUAR

This guidance is based on the items of the standard EAW form (February 1999 version); the numbers listed below refer to the item numbers of that form. Except where stated otherwise, the information requested here is intended to augment (or clarify) the requested information on the EAW form; therefore, the EAW form and the guidance booklet EAW Guidelines must be read along with this guidance.

The information requested must be supplied for each of the major development scenarios being analyzed, and it is important to clearly explain the differences in impacts between the various scenarios.

If this guidance indicates that an EAW item is not applicable to the AUAR, the item number and its title (the text in bold print on the EAW form) should be included with a notation that the EQB guidance indicates that no response is necessary in an AUAR (as opposed to just skipping reference to that item at all).

One general rule that should be kept in mind throughout the preparation of the AUAR document is that whenever a certain impact may or may not occur, depending on the exact design of future developments, the AUAR should cover the possible impacts through a "worst case scenario" analysis or else prevent the impacts through the provisions of the mitigation plan. Failure to cover possible impacts by one of these means risks the invalidation of the environmental review exemption for specific development projects.

Again, please note that the requirements on this form pertinent to the AUAR process are in *italics*.

1. Project Title: I-35E Corridor AUAR
AUAR Guidelines: An appropriate descriptive title for the geographic area of the AUAR should be chosen

2. Proposer: NA
AUAR Guidelines: It is not necessary for AUAR proposers to identify property owners within the AUAR area (although it may be useful to use such names as identifiers of various land parcels).

3. RGU (Responsible Governmental Unit): City of Lino Lakes

Contact	Jeff Smyser, AICP
Title	City Planner
Address	600 Town Center Parkway
	Lino Lakes, MN 55014
Phone	(651) 982-2425
Fax	(651) 982-2499
E-Mail	jsmyser@ci.lino-lakes.mn.us

4. Reason for EAW Preparation
AUAR Guidelines: Not applicable to AUAR

5. Project Location (Figures 5-1. Project Location and 5-2. AUAR Boundary)

County: Anoka City: Lino Lakes and Centerville

Attach each of the following maps to the EAW: county map, USGS map, and a site plan.

AUAR Guidelines: The county map is not needed for an AUAR. The USGS map should be included. Instead of a site plan, include: (1) a map clearly depicting the boundaries of the AUAR and any subdistricts used in the AUAR analysis; (2) land use and planning maps as required in conjunction with items 9 and 27; and (3) a cover type map as required for item 10. Additional maps may be included throughout the document wherever maps are useful for displaying relevant information

All required maps and additional maps displaying relevant information are found in Appendix A.

6. Description
   a. Provide a project summary of 50 words or less to be published in the *EQB Monitor.*
   b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.
   c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.
   d. Are future stages of this development including development on any outlots planned or likely to happen? ☐Yes ☐ No
      If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.
   e. Is this project a subsequent stage of an earlier project? ☐ Yes ☐ No
      If yes, briefly describe the past development, timeline and any past environmental review.

   AUAR Guidelines: For the AUAR the following elements for each major development scenario should be included ***instead*** *of the information called for on the EAW form:*

   6a. Anticipated types and intensity (density) of residential land and commercial/warehouse/light industrial development throughout the AUAR area

   6b. Infrastructure planned to serve the development (roads, sewers, water, stormwater system, etc.). Roadways intended primarily to serve as adjoining land uses within an AUAR area are normally expected to be reviewed as part of an AUAR. More arterial types of roadways that would cross an AUAR area are an optional inclusion in the AUAR analysis; if they are to be included, a more intensive level of review, generally including an analysis, is necessary

   6c. Information about the anticipated staging of various developments, to the extent known, and of the infrastructure, and how the infrastructure staging will influence the development schedule.

   Important Note: *Every AUAR document MUST review one or more development scenarios based on and consistent with the RGU's Comprehensive Plan in effect when the AUAR is officially ordered. (This is equivalent to reviewing the "no-build" alternative in an EIS.) If an RGU expects to amend its existing Comprehensive Plan, it has the options of deferring the start of the AUAR until after adopting the amended plan or reviewing developments based on both the existing and amended comprehensive plans; however, it cannot review* ***only*** *a development based on an expected amendment to the existing plan. Also, the rules require that one or more development scenarios analyzed must be consistent with known development plans of property owners within the AUAR area.*

BACKGROUND

The background section includes information related to existing and surrounding land use.

Existing Land Use – AUAR Area

The AUAR area is located in the northeast corner of the City of Lino Lakes in Anoka County and includes a portion of Centerville (see Figure 5-2. AUAR Boundary). The area is generally bounded on the east by the City of Hugo city limits in Washington County; on the north by Columbus Township; and on the southwest by the City of Centerville. Interstates 35W and 35E bisect the area, as do Anoka County Highways 14, 21, and 140. The existing land uses are described in Table 6-1 and shown on Figure 6-1. With the exception of the southernmost portion, the I-35E Corridor AUAR area is largely rural, consisting primarily of farmsteads and associated rolling agricultural fields, as well as portions of two lakes and associated wetlands. Housing dots the landscape along the few roads within the AUAR area, and the Eagle Brook Church is located along 20th Avenue north of 77th Street and to the east of Peltier Lake. The southernmost portion of the area, includes residential, commercial, and industrial development. The area also encompasses the northeast section of the Rice Creek Chain of Lakes Regional Park and includes Rice and Hardwood Creeks and portions of Rondeau and Peltier Lakes.

Table 6-1. 2000 Existing Land Use

Land Use	Acre
Agricultural	1,850
Farmstead	43
Single Family Detached	171
Single Family Attached	10
Commercial	8
Industrial and Utility	66
Institutional	0
Parks, Recreational or Preserves	775
Major Highway	256
Undeveloped	1,047
Open Water	437
Total	4,664

Source: Metropolitan Council 2000 Existing Land Use Data

2000 Existing Land Use – Surrounding Areas

In 2000, land use surrounding the AUAR is similar to land use within the area (see Figure 6-1). Land in Columbus Township and Hugo, along the northern and eastern edges, is predominantly rural and undeveloped with scattered farmsteads. However, housing development, which is not shown in the 2000 land use data displayed in Figure 6-1, has occurred around Everton Avenue in Hugo, along the Lino Lakes/Hugo border. Part of the Regional Park falls outside the northwest edge of the AUAR area and includes the remaining portions of Rice Creek and Rondeau and Peltier Lakes. Residential development also surrounds the AUAR area in Centerville to the Southwest and in Lino Lakes to the South.

Please note: The compatibility of development with adjacent land uses is discussed in Item 9.

6a. AUAR Guidelines: Anticipated types and intensity (density) of residential land and commercial warehouse/ light industrial development throughout the AUAR area.

Mn Rules state that, "the Responsible Governmental Unit (RGU) may specify more than one scenario of anticipated development provided that at least one scenario is consistent with the adopted comprehensive plan. At least one scenario must be consistent with any known development plans of property owners within the area" (Mn Rules. Chapter 4410.3610 subp.3). The AUAR includes the review of three (3) development scenarios. Scenario One is based on the City of Lino Lakes Comprehensive Plan (adopted August 2002); Parks, Open Space, and Trails Plan (adopted August 2004); and the Anoka County C.S.A.H. 14 Plan (dated July 2004) (Figure 6-2). Scenario Two is based on known development plans of property owners within the AUAR area and emphasizes commercial and industrial development (Figure 6-3). Scenario Three emphasizes residential development (Figure 6-4). The anticipated type and intensity (density) of development for each of the development scenarios is presented in Table 6-2.

Table 6-2. Development Scenarios

Land Use	Average Intesity (Density)	Scenario 1 (acres)	Scenario 2 (acres)	Scenario 3 (acres)
Rural Land Use	0.1 units/acre	1255	440	434
Low Density Unsewered Residential (LDUR)	NA	75	37	37
Low Density Sewered Residential (LDSR)	2.5 units/acre	225	56	56
Low-Medium Density Residential	4.0 units/acre	0	640	972
Medium Density Residential (MDR)	6.0 units/acre	188	0	0
Medium - High Density Residential	9.0 units/acre	0	242	379
High Density Residential (HDR)	12.0 units/acre	39	90	156
Commercial	0.25 FAR	274	528	383
Industrial	0.25 FAR	1072	938	555
Church	NA	91	91	91
Regional Park/Peltier lake and Rice Creek	NA	1002	1002	1002
Other Water and Open Space	NA	75	173	172
Right-of-Way	NA	368	427	427
Total		4664	4664	4664

DEVELOPMENT ASSUMPTIONS

A discussion of each land use type and the development assumptions associated with each land use type presented in Table 6-2 follows. The development assumptions are intended to satisfy the following guidance from the EQB:

> *One general rule that should be kept in mind throughout the preparation of the AUAR document is that whenever a certain impact may or may not occur, depending on the exact design of future developments, the AUAR should cover the possible impacts through a "worst case scenario" analysis or else prevent the impacts through the provisions of the mitigation plan. Failure to cover possible*

impacts by one of these means risks the invalidation of the environmental review exemption for specific development projects.

This means that the residential density assumptions used to analyze the development scenarios may be higher than the actual built density and the assumed intensity of commercial and industrial development may be more intense than that of future projects. Slightly overestimating the amount of potential development in the AUAR will help ensure the validity of the AUAR for specific development projects in the future. It is ultimately the RGU's decision regarding the consistency of future development projects with the AUAR development assumptions and mitigation measures. If the RGU determines that a future development project is not consistent with the AUAR development assumptions and mitigation measures, then the AUAR will need to be amended or a separate environmental analysis (e.g., EAW, AUAR or EIS) would need to be completed in accordance with Minnesota's Environmental Review Program (MN Rules Chapter 4410).

Rural Land Use
Areas guided Rural Land Use in the city's Comprehensive Plan are intended to accommodate development that protects the existing rural character of the area. The Comprehensive Plan and Zoning Ordinance allow development at a density of 1 unit per 10 gross acres. This density was used for estimating the number of rural residential units that could be accommodated in each of the development scenarios

Low Density Unsewered Residential (LDUR)
This land use category is associated with three (3) existing large lot residential areas within the AUAR area. No further subdivision at a rural density is anticipated; therefore, Table 6-2 indicates that the intensity (density) of development is not applicable (NA) and no additional LDUR units will be reviewed in the AUAR. The areas guided LDUR along 80th Street and south of Cedar Street could potentially be further subdivided to accommodate additional growth with urban services; therefore, these areas are guided Low-Medium Density Residential under Scenarios 2 and 3. The existing neighborhood guided LDUR, located between Peltier Lake and 20th Avenue (CSAH 21), is assumed to remain LDUR in all three scenarios (i.e., this existing residential neighborhood comprises the 37 acres of LDUR that remains in Scenarios 2 and 3).

Low Density Sewered Residential (LDSR)
Low Density Sewered Residential is the predominant residential land use planned for in the Lino Lakes Comprehensive Plan. These areas are guided for residential development at a density of one (1) to three (3) units per acre. The Comprehensive Plan indicates that the average built density in the city is approximately 2.5 units per acre and the AUAR adopts this development assumption.

Low-Medium Density Residential
This residential land use category was created for the AUAR analysis. The development density assumptions attributed to this category are based on the Metropolitan Council's residential density benchmark of three (3) to five plus (5+) units per acre in Developing Communities, which includes Lino Lakes. In addition, the Metropolitan Council's Plat Monitoring Program has shown that Developing Communities have accommodated residential development at an average density of four (4) units per acre. For the purposes of the AUAR analysis, an average density of four (4) units per acre and a 50/50 split of attached and unattached units was assumed.

Medium Density Residential (MDR)
The Comprehensive Plan allows for a density of three (3) to six (6) units per acre in areas guided MDR. The 188 acres guided MDR in the Comprehensive Plan are located along 20th Avenue (CSAH 21) and/or adjacent to I-35E. Given the location next to busy collectors and/or principal arterials, the AUAR will assume the "worse case" density of six (6) units per acre.

Medium-High Density Residential
This residential land use category was created for the AUAR analysis. The AUAR will assume that these areas will accommodate residential development at a density of nine (9) units per acre. This density assumption is based on the midpoint between the "worse case" densities allowed in the MDR (6 un/ac) and HDR (12 un/ac) land use categories from the Comprehensive Plan.

High Density Residential (HDR)
The Comprehensive Plan allows for a density of six (6) to 12 units per acre in areas guided HDR. Modern high quality apartments and townhome developments can achieve densities much greater than 12 units per acre; however, to assume that all of the areas shown as HDR in the scenarios would achieve these higher densities (e.g., 20 units per acre) would grossly overestimate the number of units that could be accommodated in HDR areas. Therefore, the AUAR will assume an average density of 12 units per acre for HDR areas.

Commercial & Industrial
To determine the appropriate Floor Area Ratio (FAR) assumptions for Commercial and Industrial development within the AUAR, a review of FAR standards and assumptions in Urban Land Institute (ULI) publications and previous AUARs was conducted. The research yielded a wide range of potential FARs (0.2 – 0.5) that could be applied to the AUAR area development scenarios. Given the wide range of commercial, retail, office, business park, light industrial and warehousing uses that could be accommodated in areas guided for Commercial or Industrial development, a composite FAR of 0.25 will be applied to these areas. This lower FAR takes into account land that will be used for right-of-way, utilities, and parking rather than the commercial or industrial structure. A FAR of 0.25 is also consistent with the market research analysis conducted as part of the background research for the AUAR.

Church
The Eagle Brook Church did not inform the AUAR preparers of any building addition plans during the AUAR panel meeting process. A potential expansion of the number of seats and additional parking was included in the Eagle Brook Church EAW analysis. Expansion of the number of seats would be internal and would not require a building addition. Any building additions to the church would require a separate environmental review as this AUAR is not addressing any additional building expansion plans for the Eagle Brook Church.

DEVELOPMENT SCENARIO DESCRIPTIONS

To conduct the AUAR, the development scenario land use acreages needed to be converted into residential units and square footages of industrial and commercial uses. The basic methodology includes calculating the number of developable acres (gross acres net of wetland) and multiplying the resultant number of net acres by the anticipated average intensity (density) of development. This methodology was used to determine the cumulative totals of development proposed in the development scenarios (see Table 6-2). The development assumptions are further discussed below.

Scenario One

Scenario One represents development based on the objectives of the city's Comprehensive Plan (2002) and its Parks, Natural Open Space/Greenways, and Trail System Plan (2004) (see Figure 6-2). Plans for Scenario One preserve some existing rural land in the AUAR area, while introducing more low density residential, industrial, and commercial development to the area. Commercial use is centered on the CSAH 14/I-35E interchange and surrounded by industrial space, while rural land use remains around the potential interchange at 80th Street and I-35E. South of this potential interchange, plans indicate residential development of land along CSAH 21 corridor as well as some commercial and industrial uses. Rice Creek Chain of Lakes Regional Park remains the same in all three scenarios.

Scenario Two

Development outlined by Scenario Two places emphasis on commercial and industrial growth in the AUAR area (see Figure 6-3). Land use in Scenario Two is predominantly commercial and industrial, interspersed with medium to high density residential development. Like Scenario One, these land uses are concentrated around interchanges in the AUAR area. Plans for the CSAH 14/35E interchange are very similar to the commercial and industrial intentions of Scenario One, but Scenario Two reflects known plans by a private developer, Hardwood Creek LLC, that mix residential, commercial and open space are incorporated along the CSAH 21 corridor. Plans for Scenario Two and, specifically, the 80th St./I-35E Interchange are based on the increased development potential attributed to improved access associated with the proposed interchange. These plans include the replacement of rural land use by low-medium density residential to the north and commercial to the south.

Scenario Three

Land use in Scenario Three emphasizes residential development and accommodates low, medium, and high density housing, commercial space, and industrial uses (see Figure 6-4). Most commercial and industrial spaces lay to the east of I-35E and south of the CSAH 14/I-35E interchange. Commercial uses surround the interchange and extend to the northwest into areas of medium-high density residential and open space. Plans for the CSAH 21 Corridor retain rural spaces along the northwestern edge adjacent to the park while introducing residential space (low-medium, medium-high, and high density) to the area between CSAH 21 and I-35E. Such development is planned for the potential interchange between 80th St. and I-35E along with a small commercial space to the southeast of the interchange.

6b. AUAR Guidelines: Infrastructure planned to serve the development (roads, sewers, water, stormwater system, etc.). Roadways intended primarily to serve as adjoining land uses within an AUAR area are normally expected to be reviewed as part of an AUAR. More arterial types of roadways that would cross an AUAR area are an optional inclusion in the AUAR analysis; if they are to be included, a more intensive level of review, generally including an analysis, is necessary.

The infrastructure planned to serve the area is based on the following plans and studies:

1. The *Draft Comprehensive Sanitary Sewer Plan* (CSSP)
2. The *2004 Comprehensive Water System Plan*
3. The Metropolitan Council Environmental Services' *Service Availability Charge (SAC) Procedures Manual* (MCES, 2000)
4. The *2002 Land Use Plan*
5. Facility Planning Study for Centerville Interceptor Improvements and Service Evaluation for the Northeast Region (MCES, 1998)
6. Alternative Analysis Report – CSAH 14: I-35W to I-35E Study (SRF, 2004)

The sanitary sewer, water, and roadway infrastructure needed to serve the AUAR area differs somewhat between Scenario One and the other two Scenarios, which make higher demands for infrastructure services. However, as each development proposal is submitted, the plans listed above and the AUAR Mitigation Plan will be followed to ensure that infrastructure can adequately support development proposed within the AUAR area.

As noted in the AUAR Guidelines, the inclusion of arterial types of roadways that cross the AUAR area are optional. These types of arterials are included in the analysis; however this AUAR does not include a detailed review of future improvements to I-35W, I-35E, or future interchange designs and alignments. These types of projects will need to undergo appropriate environmental review in accordance with Minnesota Rules and federal environmental review requirements.

SANITARY SEWER

The *Draft Comprehensive Sanitary Sewer Plan* (CSSP) will guide the orderly expansion of the sanitary sewer collection system for the AUAR area in Lino Lakes. The Centerville portion of the AUAR will be served by extending the existing Centerville sewer system. Flows for the AUAR area were determined using the *Service Availability Charge (SAC) Procedures Manual* for residential volume, and a conservative approach for commercial and industrial volumes.

Most of the AUAR area is not currently served by sanitary sewers. The *Draft Comprehensive Sanitary Sewer Plan* proposes major gravity sewers, major lift stations and force mains in addition to the local sewers needed to serve this area. The plan does not specify the location of local sewers.

All wastes from the area will be conveyed to the Metropolitan Council Environmental Services Division (MCES) system for treatment and disposal. The Metropolitan Waste Water Treatment Plant, serving 62 communities, currently treats an average of 215 million gallons per day (MGD) with capacity to treat 251 MGD. It provides advanced secondary treatment with chlorination/dechlorination techniques. Industrial development in the AUAR area is expected to be limited to office/warehouse and light manufacturing uses that will generate wastes similar in character to normal domestic wastes. Discharge of process water or other waste water containing

industrial contaminants is not anticipated. If such uses are proposed, appropriate environmental review will be required in accordance with Mn Rules Chapter 4410.

Based on the *Draft Comprehensive Sanitary Sewer Plan*, average daily sanitary flow for the AUAR area was calculated to be 2.968 MGD. As shown on the following table, Scenario One will produce less and Scenarios Two and Three will both produce more flow than this.

CSSP Scenario:	2.968 MGD
Scenario One:	2.529 MGD
Scenario Two:	3.646 MGD
Scenario Three:	3.733 MGD

In addition to the AUAR area, the MCES interceptor serves existing and future development in adjacent areas of Lino Lakes and Centerville, totaling about 0.5 MGD. Consequently, the total service needs range from 3.0 MGD for Scenario One to 4.2 MGD for Scenario Three. The capacity of the present MCES interceptor on an average day basis is 1.7 MGD. MCES is currently planning to construct a new interceptor in 2006 intended to serve growth in the AUAR area. The design work for this new line is presently underway. Current design size (2.0 MGD) is not adequate to serve the development proposed in Scenarios Two and Three. If the city chooses to amend its Comprehensive Plan to accommodate components of Scenarios Two or Three, then a subsequent revision of the CSSP will be required. The Comprehensive Planning process, including review by the Metropolitan Council, is the appropriate process to resolve any potential sewer capacity issues.

WATER

Most of the AUAR area is not currently served by the city water system. Existing service within the area is generally limited to the portion of the city south of CSAH 14. The system is currently served by a "linear trunk transmission system," with service to the northeast and the northwest parts of the city not interconnected with any looping. There are water system interconnects to the neighboring cities of Blaine, Centerville, Circle Pines, Hugo, and Shoreview.

The *2004 Comprehensive Water Plan* will guide the orderly expansion of the water system to 2030. The Plan proposes new wells, storage towers, and trunk mains. Flows for the AUAR area were determined to meet anticipated water demands including potential fire flows. Trunk main service is to be extended northerly from County Road 14 along both sides of I-35E. Placement of other lines will be integrated with specific development needs.

Water supply needs will be met by the addition of four new wells. Due to the location of the Jordan Aquifer, the city's water source, all wells are likely to be located outside of the AUAR area. Depending on development needs, and also upon well performance, new wells may have to come on line sooner than planned in the Water Plan. This can be determined in future years based on actual and expected development. Based on past experience in the city, groundwater levels are not expected to lower significantly based on development in any of the Scenarios. Additional storage needs have also been anticipated in the plan.

Because the city has planned for an adequate water supply and distribution system to accommodate future development, water supply and service issues are not anticipated with any of the development scenarios.

STORMWATER SYSTEM

A stormwater study was conducted and a stormwater management plan was developed for the AUAR area. Development of the AUAR area will include the creation of infiltration/detention basins for the treatment as well as rate and volume control of stormwater runoff. Some of these features will be created by property owners as development occurs while other, more regional facilities, will be designed and implemented prior to development.

At the site scale, stormwater detention surface area requirements have been sized for each potential development zone (Figure 17-3). The areas allocated for stormwater management have been designed to maximize native wetland communities to provide water quality mitigation in addition to stormwater management. Each stormwater management area was sized for a water surface fluctuation of 2.5 feet with 0.75 feet of freeboard during a 100-year storm event. Side slopes were designed with a horizontal to vertical ratio of 6:1.

Stormwater management areas will release treated runoff to an integrated system of stormwater management elements located in greenway corridors as seen in the Conservation Design Framework (herein referred to as "Framework") (Figure 10-3). Within the greenway corridors shown in the Framework, vegetated swales, wet prairie, and wetlands can be oriented in series to effectively retard runoff rates, reduce stormwater volume, and enhance water quality. Runoff rates and volumes will decrease due to increased infiltration, evapotranspiration, and increased friction imparted on the flow. These decreased rates also reduce the capacity of runoff to generate and carry sediment and associated pollutants.

The hydric soils throughout the AUAR area will pose problems for achieving infiltration criteria as outlined in the *Rice Creek Watershed Rules*. Native wetland and prairie plants are particularly useful for achieving infiltration requirements under these conditions, because they use large amounts of water and create preferential infiltration pathways. The greenway corridors established in the Framework provide appropriate locations for these types of infiltration facilities. The location and expansiveness of these corridors could provide the necessary surface area for the shared infiltration facilities as discussed in Item 17.

ROADS

The development scenarios presented in this AUAR are based on a network of existing and proposed roads in the AUAR area. This network was examined to analyze the impacts of future development on traffic levels and transportation efficiency and includes the following roadways, interchanges and intersections:

- Existing Roadway System
  - Principal arterials - I-35E and I-35W
  - Minor arterials - CSAH 21, CR 54 and CSAH 14
  - County and Local Roads - CR 140 (80th Street), Elmcrest Avenue North and Otter Lake Road

- Proposed Roadway Improvements
  - Frontage Roads – Extending north and south of CSAH 14
  - Northerly Bypass – Designed to link 1-35W and I-35E
  - Interchanges – CR 140 (80th Street)/I-35E, CSAH 14/I-35E

- Intersections
  - Existing: CSAH 14/CSAH 21, CSAH 14/I-35E
  - New:
    - CR 140 (I-35E, I-35W, CSAH 21, Elmcrest Avenue)
    - CSAH 14 (CSAH 21, West Frontage Road, I-35E, Otter Lake Road)
    - CSAH 21 (North, Middle, and South Crossroads to Frontage Road)
    - CR 54 (Crossroad to Frontage Road)

The traffic impact analysis and roadway system are discussed in detail in Item 21.

6c. AUAR Guidelines: Information about the anticipated staging of various developments, to the extent known, and of the infrastructure, and how the infrastructure staging will influence the development schedule.

The *Draft Comprehensive Sanitary Sewer Plan* identifies the sanitary sewer requirements necessary to accommodate growth in all scenarios through the projected 2030 planning period. The sizing and alignment of future city sewers will be determined during plan submittals by developers to ensure the sewer system is designed to accommodate the demand. Because the city has planned for expansion of the sewer system, no capacity issues internal to the city system are anticipated. However, the capacity of the MCES interceptor system must be increased to accommodate any of the scenarios.

Likewise, the *2004 Comprehensive Water Plan* identifies the municipal water requirements necessary to accommodate growth in all scenarios throughout the projected 2030 planning period. Because the city has also planned for an adequate water supply and distribution system to accommodate future development, water supply and service issues, other than those addressed in the Water Plan, are not anticipated

METROPOLITAN URBAN SERVICE AREA (MUSA)

The MUSA is the area within which the Metropolitan Council commits to provide sanitary sewage treatment and conveyance via regional interceptors. The City of Lino Lakes is one of several communities that use an Undesignated MUSA in its Comprehensive Plan to accommodate future growth. The city benefits by using the Undesignated MUSA method because it provides the city control and flexibility in planning for and guiding future growth, and allows the city to respond to changes in housing demand. This MUSA is not tied to a geographic boundary, but allows the MUSA to "float" depending upon availability of local and regional services. The city chose to modify the floating MUSA by establishing primary and secondary staging areas contiguous to the existing MUSA. Development of the AUAR area is expected to be contiguous to the current MUSA and will be timed as utility infrastructure can be extended/upgraded and financed.

6d. AUAR Guidelines: the RGU must assure that the development described complies with the requirements of 4410.3610, subpart 3 (and also that it properly orders the AUAR and sets the description in that order as required by 4410.3610, subpart 3).

Minnesota Rules state that, "the Responsible Governmental Unit (RGU) may specify more than one scenario of anticipated development provided that at least one scenario is consistent with the adopted comprehensive plan. At least one scenario must be consistent with any known development plans of property owners with the area" (MN Rules Chapter 4410.3610, Subp. 3). To comply with these requirements, the city ordered the AUAR on April 11, 2005 and specified three development scenarios.

7. Project Magnitude Data (see Tables 7-1, 7-2, & 7-3 below):
Total Project Acreage: _4,664 acres__
Number of residential units: _____ unattached _____ attached
Commercial, industrial or institutional building area (gross floor space): total square feet_____
Indicate areas of specific uses (in gross square feet):
Office: _____ Manufacturing: _____
Retail: _____ Other Industrial: _____
Warehouse: _____Institutional: _____
Light Industrial: _____ Agricultural: _____
Other Commercial (specify):_____
Building Height _____. If over two stories, compare to heights of nearby buildings.

AUAR Guidelines: The cumulative totals of the parameters called for should be given for each major development scenario, except that the information on manufacturing, other industrial, institutional, agricultural and building heights is optional:

The cumulative development within each development scenario is shown in Tables 7-1, 7-2, and 7-3. The cumulative project magnitude data is based on the full build out of the entire AUAR area under the development assumptions presented in AUAR Item 6 – Description. Given the large scope of the AUAR area (4,664 acres), the AUAR analysis takes into account potential growth projections

Table 7-1. Scenario 1 Project Magnitude Data

Land Use	Total Gross Acres	Total Net Acres	Density/Intensity	Project Magnitude Data
Rural Land Use	1,255	927	0.1 units/acre	125 units
LDSR (Low Density Sewered Residential)	225	204	2.5 units/acre	510 units
MDR (Medium Density Residential)	188	188	6.0 units/acre	1,129 units
HDR (High Density Residential)	39	39	12.0 units/acre	473 units
Commercial	274	274	0.25 FAR	2,985,733 ft^2
Industrial	1,072	1,026	0.25 FAR	11,175,035 ft^2

Scenario 2 Summary
Residential Units: 635 unattached 1,602 attached
Commercial: 2,985,733 ft^2
Industrial: 11,175,035 ft^2

Table 7-2. Scenario 2 Project Magnitude Data

Land Use	Total Gross Acres	Total Net Acres	Density/Intensity	Project Magnitude Data
Rural Land Use	440	168	0.1 units/acre	44 units
LDSR (Low Density Sewered Residential)	56	47	2.5 units/acre	118 units
Low-Medium Density Residential	640	605	4.0 units/acre	2,419 units
Medium-High Density Residential	242	241	9.0 units/acre	2,173 units
HDR (High Density Residential)	90	80	12.0 units/acre	961 units
Commercial	528	516	0.25 FAR	5,617,890 ft^2
Industrial	938	879	0.25 FAR	9,570,045 ft^2

Scenario 2 Summary
Residential Units: 1,372 unattached 4,343 attached
Commercial: 5,617,890 ft^2
Industrial: 9,570,045 ft^2

Table 7-3. Scenario 3 Project Magnitude Data

Land Use	Total Gross Acres	Total Net Acres	Density/Intensity	Project Magnitude Data
Rural Land Use	434	162	0.1 units/acre	43 units
LDSR (Low Density Sewered Residential)	56	47	2.5 units/acre	118 units
Low-Medium Density Residential	972	921	4.0 units/acre	3,685 units
Medium-High Density Residential	379	361	9.0 units/acre	3,247 units
HDR (High Density Residential)	156	131	12.0 units/acre	1,566 units
Commercial	383	380	0.25 FAR	4,141,554 ft^2
Industrial	555	535	0.25 FAR	5,829,722 ft^2

Scenario 3 Summary
Residential Units: 2,004 unattached 6,655 attached
Commercial: 4,141,554 ft^2
Industrial: 5,829,722 ft^2

GROWTH PROJECTIONS

To project commercial, industrial and residential growth in Lino Lakes, the market research analysis relied on a variety of data sources including:

- Historical building permit data for the city for commercial, industrial, and residential land use types.
- Data on the development pace for these land uses in the cities in the region containing Lino Lakes, particularly Blaine.
- Historical data on the development pace for these land use types throughout the Twin Cities.
- Demographic projections by household type over the next 2+ decades in the Twin Cities.

Essentially, DSU Research started with figures on the historical pace of development in Lino Lakes for commercial, industrial and residential development over the past 10 years (roughly 1995-2004). These were "benchmark" figures for a decade's worth of growth in the city. Then estimates of the amount of growth Lino Lakes could absorb for three future periods: 2006-2015, 2016-2025 and 2026-2030 were prepared. Growth was adjusted upward in each period to account for the outward growth of the Twin Cities, and thus the growing locational advantages of Lino Lakes. The amount of absorption that nearby cities such as Blaine have been able to accomplish in recent years, with a concerted effort by the city and the development community to attract growth was also taken into account.

All of the estimates are realistic, but somewhat aggressive (Table 7-4). Many factors that are extremely difficult (if not impossible) to predict can and will affect the ultimate pace of development achieved by the City of Lino Lakes over the next 25 years, (e.g. housing market, interest rates, etc).

The potential city-wide growth rates were applied to the AUAR scenarios. Although the AUAR area is not the only area within the city that can accommodate growth, the growth rates were applied to the AUAR area as a "worse case scenario" assumption. In summary, the projected residential development in all three scenarios could be realized by 2030. On the other hand, only a percentage of the commercial and industrial growth can realistically be absorbed by 2030.

Table 7-4. Growth Projections

Land Use	AUAR Scenario	AUAR Project Magnitude Data	Potential Average Yearly Growth Rate (2006 - 2030)	Potential Absorbtion by 2030	Growth post-2030[1]
Residential	1	2,238 units	350 units/year[2]	2,238 units	NA
	2	5,715 units		5,715 units	NA
	3	8,659 units		8,659 units	NA
Commercial	1	2,985,733 sq. ft.	100,000 sq. ft./year	2,500,000 sq. ft.	485,733 sq. ft.
	2	5,617,890 sq. ft.		2,500,000 sq. ft.	3,117,890 sq. ft.
	3	4,141,554 sq. ft.		2,500,000 sq. ft.	1,641,554 sq. ft.
Industrial	1	11,175,035 sq. ft.	150,000 sq. ft./year	3,750,000 sq. ft.	7,425,035 sq. ft
	2	9,570,045 sq. ft.		3,750,000 sq. ft.	5,820,045 sq. ft.
	3	5,829,722 sq. ft.		3,750,000 sq. ft.	2,079,722 sq. ft.

[1] Market research indicates that all of the residential units could be absorbed by 2030, whereas the commercial and industrial growth is not likely to be aborbed by 2030.

[2] The growth rate under Scenario 1 is 147 units/year based on adopted policy in the Comprehensive Plan

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.

AUAR Guidelines: A listing of major approvals and public financial assistance and infrastructure likely to be required by the anticipated types of development projects should be given. This list will help orient reviewers to the idea that the AUAR process is only one piece of the regulatory framework that will protect environmental resources. The list can also serve as a starting point for the development of the implementation aspects of the mitigation plan to be developed as part of the AUAR.

Table 8-1. List of Permits and Approvals*

Unit of Government	Type of Application	Status
Federal		
Army Corps of Engineers	Section 404 Permit	To be Applied for
	Letter of No Wetland Jurisdiction	To be Applied for
State		
Minnesota Environmental Quality Board	Environmental Assessment (AUAR)	In progress
Minnesota Board of Soil and Water Resources	Erosion and Sediment Control Plan Approval	To be Applied for
Minnesota Pollution Control Agency	Section 401 Water Quality Certificate	To be Applied for
	NPDES/SDS General Permit	To be Applied for
	Sanitary Sewer Extension Permit	To be Applied for
State Historic Preservation Office	Cultural Resources Review	To be Applied for
Minnesota Department of Transportation	Use of or Work within MnDOT right of way	To be Applied for
	Drainage Permit	To be Applied for
Minnesota Department of Natural Resources	Storm Sewer Discharge Permit	To be Applied for
	Water Appropriations Permit	To be Applied for
	Public Waters Work Permit	To be Applied for
	General Permit 97-0005 for Temporary Water Appropriations (need if more than 10,000 gpd of water is appropriated	To be applied for, if necessary
Minnesota Department of Health	Watermain Extension Approval	To be Applied for
	Sanitary Sewer Extension Permit Approval	To be Applied for
	Well Location and Construction Approval	To be Applied for
Regional		
Rice Creek Watershed District	Erosion and Sediment Control Plan Approval	To be Applied for
	Stormwater Management Plan Approval	To be Applied for
	Wetland Delineation Boundary Confirmation	To be approved upon completion of wetland delineation
	Certificate of Wetland Exemption	To be Applied for

Unit of Government	Type of Application	Status
	Wetland Delineation Boundary Confirmation	To be approved upon completion of wetland delineation
	Certificate of Wetland Exemption	To be Applied for
Metropolitan Council	Sanitary Sewer Service Connection Approval	To be Applied for
	Comprehensive Plan Amendment Review	To be Applied for
County		
Anoka County	County Roadway Access Permits	To be Applied for
Local		
City of Lino Lakes	Site Plan Approval	To be Applied for
	AUAR and Mitigation Plan Approval	To be Applied for
	Planned Unit Development Approval	To be Applied for
	Preliminary Plat Approval	To be Applied for
	Final Plat (multiple) Approval	To be Applied for
	Grading, Excavation and Foundation Permits (multiple)	To be Applied for
	Building Permits (multiple)	To be Applied for
	Sanitary Sewer Connection Permit (multiple)	To be Applied for
	Municipal Water Connection Permit (multiple)	To be Applied for
	Use Permit – Floodplain District	To be Applied for
	City Roadway Access/Crossing Permits	To be Applied for
	Comprehensive Plan Amendment(s)	To be Applied for

* All required permits and approvals will be obtained. Any necessary permits or approvals that are not listed in the table above were unintentionally omitted, and some listed may not be necessary.

9. Land Use. Describe the current and recent past land use and development on the site and on adjacent lands. Discuss the compatibility of the project with adjacent and nearby land uses; indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazard due to past land uses, such as soil contamination or abandoned storage tanks.

AUAR Guidelines: No changes from the EAW form.

Please note: The summary of existing land uses is included in the response to Item 6.

COMPATIBILITY WITH LAND USE

Compatibility with Existing Surrounding Land Use
All proposed scenarios present some components which are compatible with existing land uses surrounding the AUAR area. In Scenario One, the northeast corner of the area is reserved as rural land use similar to the agricultural lands found in bordering sections of the City of Hugo and Columbus Township. All three scenarios provide residential space adjacent to existing residential development in Centerville and in Lino Lakes south of the AUAR area. Because the boundaries of the Regional Park extend beyond the northwestern boundaries of the AUAR area, land use along this border is compatible in each Scenario.

Each scenario also includes elements which may cause potential conflict with current land use patterns. Scenario One, Two and Three all show commercial and industrial land uses along the eastern border of the area, which is currently being developed residential on the Hugo side.

Compatibility with Planned Surrounding Land Use
The City of Lino Lakes Comprehensive Plan acknowledges that there may be compatibility issues with existing land use and development as the area changes from a rural community to a suburban community. These issues are particularly apparent as surrounding municipalities such as the City of Hugo, Columbus Township, and the City of Centerville face similar changes. Potential conflicts may occur with surrounding land uses as the AUAR area develops in conjunction with these municipalities' plans to develop. If Scenario One or Two is implemented, Lino Lakes would be supporting industrial uses adjacent to low density residential development in Hugo's Comprehensive Plan as well as the city's own residential development along the southern border of the AUAR area. Scenario Three provides compatible low to medium density residential space along the Hugo border, but still places industrial development southeast of the CSAH 14/35E interchange, just north of low density residential development within Lino Lakes. According to the City of Hugo's Comprehensive Plan, the northern half of the AUAR area's eastern edge is designated 2020 Urban Development. The 2020 Urban Development land use designation does not specify the type of urban development allowed (e.g., residential, commercial, or industrial). Compatibility between the land uses in the three development scenarios and planned development in Hugo will depend on the character of future development in this part of Hugo.

MITIGATION SUMMARY
If compatibility issues should arise between implemented plans in the AUAR area and existing or planned land use for surrounding areas, planning techniques can be used to mitigate conflicts. Tools such as clustering, buffers, or screening, could be incorporated into development plans by the city and developers.

PAST LAND USE
Historically, the AUAR area has been rural and used as agricultural land.

POTENTIAL ENVIRONMENTAL HAZARDS
An inventory of storage tanks reveals that there are several aboveground storage tanks (AST) and underground storage tanks (UST) in the AUAR area. Four of the USTs in the area have been classified as Leaking Underground Storage Tanks (LUST):

- Eagle Trucking Inc, 7087 20th Ave
- Clearwater Creek Convenience, 7090 21st Ave
- Acton Construction Company Inc, 2209 Phelps Road
- McNeely Residence, 6687 20th Ave South

The Acton Construction Company Inc (2209 Phelps Road) site has a history of groundwater contamination and contains one LUST and an AST. This property has been classified on the Minnesota List of Sites as a participant of the Minnesota Pollution Control Agency's Voluntary Investigation and Cleanup Program (MN VIC).

MITIGATION SUMMARY
To mitigate the effects of the potential environmental hazards listed above, the removal of all leaking tanks and associated piping in accordance with applicable state and federal laws. Any residual contamination shall be reported to the MPCA for further investigation and potential remediation.

10. Cover Types. Estimate the acreage of the site with each of the following cover types before and after development

AUAR Guidelines: For an AUAR the following information should be provided:
a. Cover Type Map (Figure 10-1)*, at least at the scale of a USGS topographic map, depicting:*

- *wetlands - identified by type (Circular 39)*
- *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*

NATURAL RESOURCE INVENTORY
Minnesota Land Cover Classification System (MLCCS) data were available for the AUAR area. These data were reviewed by Applied Ecological Services, Inc. (AES) both on-screen and in the field, and the data were determined to be quite accurate. Some minor modifications to the land cover data were made based on field observations.

In summary, the eastern half of the AUAR area is dominated by agricultural and developed land, and the western half, particularly the northwestern portion of the AUAR area, is dominated by lakes, wetlands, and undeveloped uplands (Figure 10-1). The following table summarizes the acreage and percentage of major land cover categories in the AUAR area.

Table 10-1. Land Cover Types within the AUAR Area

Land Cover Type	Acres	Percent
Artificial Surfaces and Associated Areas	599	12.85%
Planted or Cultivated Vegetation	2,114	45.33%
Forest	285	6.12%
Woodland	10	0.20%
Shrubland	104	2.24%
Herbaceous	1,103	23.64%
Water	449	9.63%
Total:	**4,664**	**100.00%**

Notes: Land cover types follow the MLCCS.

A brief description of the different land cover types is provided below:

Artificial Surfaces and Associated Areas - 599 acres
This class is determined by the presence of manmade impervious surface. In these areas vegetation has been altered, with a vegetative cover of <96%. Vegetation may be planted or cultivated, or consist of pre-development vegetation that has been altered or fragmented by humans. These areas contain artificial cover as a result of human activities, such as construction (e.g. buildings, pavement), extraction sites (e.g. open mines, quarries, pits) and waste disposal sites. This subsystem loosely correlates to typical land uses such as those defined as residential, industrial, transportation, etc.

Most of the AUAR areas mapped as artificial surfaces and associated areas consist of commercial and industrial properties, roads, and single family residential lots. Concentrations of this land cover were mapped in the southern portion of the AUAR area, as well as along the 20th Avenue and Elmcrest Avenue corridors.

Planted or Cultivated Vegetation (>96% vegetation cover) - 2,114 acres
These are areas where vegetation may be planted, cultivated, treated with annual management and/or otherwise altered by humans, and has a vegetative cover of 96 - 100%. Natural vegetation has often been removed or modified and replaced with different types of vegetative cover resulting from human activities. Soils usually have been mechanically or physically altered for the establishment of vegetation. This formation class generally includes typical land uses of agriculture, parks, golf courses, or other such land use where the vegetation is cultivated, planted or maintained, and impervious surface contributes less than 5% of the area.

Most of the AUAR areas mapped as Planted or Cultivated Vegetation consist of active agricultural crop fields and hay fields. This is the dominant land cover type in the AUAR area, particularly along both sides of I-35E. An extensive network of drain tiles exist within the AUAR area, allowing agricultural production to occur on much of the land. These drainage systems are discussed more under Item 17.

Forest - 285 acres
These areas contain trees with crowns overlapping (generally forming 60 - 100% cover). Forest are defined primarily by the dominate species present, not by the current height of the cover. For example, if the area is composed by young elms and ashes that are only 15 feet tall but will become much taller trees, it would be classified as a forest or woodland depending on the density of the tree species. If the area is composed of willows and dogwoods also 15 feet tall, it would be classified as shrubland.

Most of the AUAR areas mapped as forest consist of either disturbed second growth forest, oak forest, maple-basswood forest, aspen forest, or floodplain forest. The majority of forests were identified in the northwestern portion of the AUAR area and along Hardwood Creek.

Woodland - 9 acres
These areas contain open stands of trees with crowns not usually touching (generally 25 - 60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover, respectively.

Only a few woodlands were identified in the AUAR area. One of these woodlands, located in the east-central portion of the AUAR area, contained a stand of mature bur oak trees and represented a degraded oak savanna.

Shrubland - 104 acres
These areas contain shrubs and dwarf-shrubs with individuals or clumps generally forming more than 25% cover and with trees generally less than 25% cover. Shrub cover may be less than 25% where it exceeds tree, herb, and nonvascular cover.

Most of the AUAR areas mapped as shrubland consist of shrub swamp/shrub-carr wetlands, and most of these wetlands were mapped in the large wetland complex north of Peltier Lake.

Herbaceous - 1,103 acres
These areas contain herbs (graminoids, forbs, and ferns) as the dominant vegetation (generally forming at least 25% cover; trees, shrubs, and dwarf-shrubs generally with less than 25% cover). Herb cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and nonvascular cover.

Most of the herbaceous areas consisted of saturated or emergent wetlands (mostly in the northwestern portion of the AUAR area) or old fields (throughout the remainder of the AUAR area).

Water - 449 acres
These areas contain open water. Open water may include large mats of floating algae or non-rooted vascular vegetation. Emergent vegetation generally contributes less than 5% total cover.

Areas mapped as water within the AUAR area include portions of Peltier Lake, Rondeau Lake, and Rice Creek (all MNDNR Public Waters). Rice Creek flows into Peltier Lake, where the water level is controlled by a dam located outside the AUAR area. Several other small, open water bodies were also mapped as water. Hardwood Creek (also a MNDNR Public Water) and Clearwater Creek are located within the AUAR area; however, these are not mapped as water because of their narrow width.

NATURAL RESOURCE ASSESSMENT
The MNDNR has identified most of the northwestern portion of the AUAR area as part of a high quality significant ecological resource (discussed further under Item 11). This classification is based on this area containing a large tract of natural and semi-natural land cover types that provide a mosaic of different plant communities and wildlife habitat along the Rice Creek Chain of Lakes. This area is noticeable because of it contains continuous permanent vegetation, in contrast to the cropland and other developed areas surrounding it. Many of the land cover types in this portion of the AUAR area are mapped by the MNDNR County Biological Survey as higher quality natural communities.

Using the refined MLCCS data and field observations, AES ranked the ecological quality of all natural and semi-natural areas as low, medium, or high based on their location, size, and condition These classifications are described below and are illustrated on Figure 10-2.

Wetlands and Aquatic Habitats
Wetland delineations have not been completed as part of this AUAR; therefore, jurisdictional wetland locations and exact wetland boundaries have not been confirmed. Wetland delineations will be required as individual development projects are proposed. It is also important to note that it is likely that existing drainage infrastructure in the AUAR area has effectively drained many wetlands for agricultural production.

Wetland and aquatic areas were categorically ranked by AES on the basis of location, size, and condition, as follows:

<u>Core Wetland and Aquatic Habitat - 1,210 acres</u>
These are large continuous areas that provide significant habitat for a wide range of wetland-dependent and aquatic species. A single large wetland complex associated with aquatic features exists in the northwestern portion of the AUAR area. Rice Creek, the associated chain of lakes, and extensive wetland habitats are found here and extend beyond the AUAR area. The core wetland habitat also contains most of the area's rare natural features, including higher quality

native plant communities (e.g., shrub swamp, tamarack swamp), rare animals (e.g., Blanding's turtle), and rare plants (discussed further under Item 11).

Outlier Wetland Habitat - 135 acres
These are relatively large areas that provide significant habitat for wetland-dependent and aquatic species, but are constrained compared to core wetland habitat because they are less connected to or isolated from large continuous wetland-aquatic complexes. Outlier wetland habitat often consists of a mosaic of higher quality natural communities interspersed with degraded ones. Surrounding the outlier wetland habitats are predominantly cultivated and other developed lands.

Other Wetland Habitat - 138 acres
These are generally more degraded, smaller, or more isolated areas that provide minimal habitat for wetland-dependent and aquatic species. They are usually surrounded by extensive cropland and development. While these wetlands are typically severely degraded and have little regional ecological significance, they do nevertheless provide some of the valuable ecological functions described above, such as detention of surface runoff.

Uplands
It is noteworthy that the majority of the AUAR area's uplands contain hydric soils (discussed further under Item 17). This indicates that, historically, drainage was slow across the AUAR area. Many areas currently functioning as uplands (e.g., crop fields) may be, at least in part, effectively drained wetlands.

Uplands were categorically ranked by AES on the basis of location, size, and condition as follows:

Core Upland Habitat - 136 acres
These are relatively large, closely-associated upland habitats inside or next to a continuous and extensive natural landscape. Core upland habitat supports hundreds of species of wildlife, game animals, and plant species, many of them unknown to the general public. The presence of these species in good abundance indicates that these upland habitats continue to provide free ecosystem services that benefit residents of Lino Lakes. These services include infiltration of groundwater (due to natural, undisturbed soils), the provision of bees and other pollinators for fruit trees (due to wildflowers and mature basswood trees), and the provision of nesting and feeding locations for birds, butterflies, and other wildlife.

Three clusters of core upland habitat were identified in the northern and western portions of the AUAR area. These core upland habitats fall within or adjacent to the large core wetland habitat discussed above. One of the core upland habitats is Peltier Lake Island, a forested island in Peltier Lake that contains a known heron rookery and other rare features. The other core upland areas are part of the upland-wetland mosaic along the Rice Creek corridor.

Outlier Upland Habitat - 81 acres
These are the largest of the upland habitats surrounded by agricultural lands and development and not within or adjacent to large, continuous permanent vegetation. These areas contain examples of natural communities that are in better condition than most other upland natural communities in the AUAR area. They provide the same benefits as the core upland habitat, but in locations that are overall degraded ecologically. Two outlier upland areas were identified in the west-central and east-central portions of the AUAR area. Each of these upland areas is adjacent to an outlier wetland habitat, creating an extensive upland-wetland complex.

Other Upland Habitat - 231 acres
These are generally small, or more degraded areas, and usually are separated from the previous upland habitats by roads or other barriers. They provide minimal habitat for upland species because they are surrounded by extensive cropland and development and are usually very disturbed and of poor quality for wildlife. While these uplands are typically severely degraded and of little regional ecological significance, they do nevertheless provide valuable ecological functions described above.

Lakes and Streams
The MPCA lists Peltier Lake as an impaired water due to excessive nutrients. Data acquired from the MNDNR indicates that Peltier Lake is hypereutrophic and Rondeau Lake is eutrophic. Hypereutrophic conditions are indicated by high concentrations of nutrients dissolved in the water, low visibility in the water column, and excessive growth of plants and algae. Eutrophic conditions are similar, but less extreme. Multiple land use factors in the watersheds of these lakes result in eutrophication. These land use factors include clearing of permanent vegetation, annual plowing of cropland, application of fertilizers and manure to cropland, drainage and filling of wetlands, construction activities, runoff from pavement and lawns, and the creation of an excess accumulation of nutrients stored in the vegetation and soils of the lakes. In brief, snowmelt and rainfall deliver nutrients and sediment to these lakes at a rate that depends on the land use factors in their watersheds. The rate of delivery of nutrients and sediments exceeds the natural cleansing and absorptive capacity of the lakes. This results in eutrophication, or the accumulation of excess nutrients over time. The watersheds of these lakes extend significantly beyond the AUAR area.

Portions of Rice Creek, Hardwood Creek and Clearwater Creek exist within the AUAR area. The upstream and on-site portion of Rice Creek is not listed as impaired by the MPCA; however, a downstream section of Rice Creek (outside of the AUAR area) is listed as impaired due to degraded biological communities. The MPCA has identified both Hardwood and Clearwater Creeks as impaired waters due to degraded biological communities, and Hardwood Creek is also identified as having low dissolved oxygen levels. Oxygen levels below 5 ppm (parts per million) slow the growth rates of aquatic life, including fish. Below 2 ppm of dissolved oxygen, most aquatic organisms leave an area or die. During AES' field work, clear water was observed in Hardwood Creek; however, very turbid water was observed in Clearwater Creek. Bank erosion was not severe in the locations visited by AES, but streams were largely devoid of aquatic vegetation, indicating that stream flows and sediment loads may be damaging in-stream aquatic vegetation. A small stream flowing eastward from Rondeau Lake towards Rice Creek in the northwest portion of the AUAR area was very clear, with a sand-gravel bottom. This represents a high quality stream within the AUAR area.

b. AUAR Guidelines: An 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.

The development scenarios cannot specify what the actual disturbance footprint will be within the AUAR area. Therefore, a detailed analysis of impacts on natural and semi-natural land cover types cannot be completed. However, a "Conservation Design Framework" will be used to guide future development. This Framework is focused on conservation of natural plant communities and high quality wildlife habitat. Its use will provide guidance to protect natural plant community and wildlife conservation in the AUAR area.

In brief, conservation design principles behind the Framework include:

- protect streams, lakes, and groundwater by purifying, filtering, and infiltrating surface runoff to the maximum extent possible
- preserve, restore, and enhance existing natural and semi-natural areas and wildlife habitat
- create wildlife opportunities by restoring and managing wildlife habitat
- establish wide buffers and connections around and between core and outlier habitats

MITIGATION SUMMARY

The conservation of natural and semi-natural land cover types within the AUAR area will be accomplished by consideration of a Conservation Design Framework (Figure 10-3). This Framework was developed to conserve the most ecologically significant natural resources within the AUAR area, protect these areas from adjacent land uses by employing ecological buffers, and connect these areas through the establishment of multi-functional greenway corridors. The Framework will result in a network of natural and semi-natural areas that provide habitat and travel corridors for native wildlife, clean and regulate stormwater, and provide benefits to people in the region. Restoration of woodland habitats and ecological enhancement of existing woodlands within the AUAR area will provide increased habitat for forest and savanna species. Ecological restoration and management of the resulting open space areas will be important to maximize the ecosystem functions and benefits of the resulting open space network.

The process used to develop the Conservation Design Framework is described below.

- Based on location, size, and condition, the more significant natural and semi-natural areas within the AUAR area (classified as core and outlier habitats, discussed further under Item 10.a.) were identified and mapped for conservation. It should be noted that the exclusion of the other habitat areas from the framework does not suggest that these areas provide no natural resource functions. However the larger, more significant habitat areas are the primary consideration from a regional conservation planning perspective. During the design and approval of individual development projects within the AUAR area, the city will require that the other habitat areas be considered and that opportunities for conservation and enhancement be pursued.

- The core and outlier habitat areas were buffered for wildlife habitat and surface water management. Buffers can provide water quality protection, erosion control, floodwater storage and flood damage reduction, wildlife habitat, maintenance of baseflow in streams, groundwater recharge, and attractive recreational and natural open space. Buffer widths

were derived from the scientific literature and were based on the relative quality of the habitat being buffered as well as the habitat buffering needs of target wildlife groups (e.g., birds, amphibians). The core habitat deserves the greatest protection among habitats, all other things being equal. Buffers are intended to be performance-based, employing a minimum and average width. The ecologically-defined buffers for wetlands are based on the life cycle needs of different species of wetland birds (e.g., sandhill crane), reptiles (e.g., Blanding's turtle), mammals (e.g., river otter), and amphibians (which are food for many of the above species). The wetland buffer of 660 feet represents a mean distance that these wetland-dependent animals range into adjacent upland grasslands and forests in order to find food, nest and lay eggs, perform mating rituals, and complete their entire annual life cycle. Regarding upland habitats, recent research on bird populations in the Twin Cities metropolitan area indicates that the most development-sensitive bird species living in forests and grasslands become rare when homes are placed nearer than 1,320 feet to them. The 100- and 300-foot buffers depicted in the Framework are based on the buffers adopted in the City's *Parks, Natural Open Space/Greenways and Trail System Plan* (August 2004).

- Conceptual greenway connections were made between core and outlier habitats and other significant natural features to provide connectivity for ecological and wildlife corridors, regional stormwater collection and conveyance, and passive recreation opportunities (e.g., trails). The greenway connections illustrated in Figure 10-3 are conceptual; it is likely that their location and alignment will change as individual properties are developed. However, appropriate design, establishment, and management of these greenway connections is critical to ensuring that the mitigation goals are fully met as development proceeds in the AUAR area. The conceptual greenway corridors are discussed in more detail under the Item 11 Mitigation Summary.

As mentioned above, exclusion of the other habitat areas from the framework does not suggest that these areas provide no natural resource functions. Other wetland habitat areas will be regulated if delineated as jurisdictional wetlands. This regulation will involve delineation, protection and mitigation under state and federal wetland regulations as an individual development project moves forward. Therefore these other wetlands are considered more at the individual project level, not the regional AUAR planning level. At the individual project level, these wetlands can not only be conserved, but improved by incorporating them into an ecological stormwater management system. Likewise, the other upland habitats can be conserved at the individual project level by incorporation into open space systems.

In addition to conservation and/or establishment of the areas discussed above, all of these open space areas will benefit significantly from ecological restoration and management. Ecological restoration and long term management focuses on approaches to ensure that the public-private investments in the Conservation Design Framework are maintained and the maximum benefits of the Framework are enjoyed by area residents now and into the future.

Various tools exist or can be developed to ensure the protection and stewardship of the preserved, restored, and enhanced natural resources in the AUAR area. These tools can be used to establish a consistent set of standards for treating the open space across different areas as they are developed. The tools listed below will enable public and private sectors to cooperate in creating this network over time in a realistic market and regulatory context.

- Core and outlier habitat conservation
  - Parkland dedication and other gifts
  - Land purchase
  - Conservation easements
  - Conservation development design
- Buffering
  - Appropriate land use zoning
  - Performance-based buffers
  - Minimum and average buffer widths
  - Ordinances and guidelines
  - Deed restrictions and covenants
- Greenway connections
  - Stormwater easements
  - Trail easements
  - Other tools listed above as appropriate
- Ecological restoration and perpetual management (applicable to all open space)
  - Restoration and management planning
  - Stewardship funding for perpetual management
  - Education programs

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.

AUAR Guidelines: The description of wildlife and fish resources should be related to the habitat types depicted on the cover type maps (item 10). Any differences in impacts between development scenarios should be highlighted in the discussion.

A fish or wildlife survey was not completed as part of this AUAR. The following sections are based on existing data for the AUAR area and inferences made about wildlife populations likely to utilize the plant communities and land cover types within the AUAR area.

AES contacted the Natural Heritage and Nongame Research Program of the MNDNR regarding rare natural features on and in the vicinity of the AUAR area. The MNDNR response letter can be found in Appendix C. General fish and wildlife issues are discussed below, and federally- or state-listed species are discussed under Item 11.b.

WILDLIFE

The MNDNR has identified most of the northwestern portion of the AUAR area (as well as adjacent, off-site areas) as part of a high quality significant ecological resource (Figure 11-1). The MNDNR classified this area as such because it contains a large tract of natural and semi-natural land cover types that provide a mosaic of different plant communities and wildlife habitat along the Rice Creek Chain of Lakes. Many of these land cover types are mapped by the MNDNR County Biological Survey as higher quality natural communities. This corridor is likely utilized by a wide variety of wildlife species, especially birds, for local migration, foraging, breeding, and nesting.

The MNDNR publication Wildland Urban Interface Project (2001) identified three important wildlife habitats and corridors within the AUAR area:

- Rondeau Lake Duck Pass Wildlife Corridor – consisting of Rondeau Lake and an area east of it;
- Chain of Lakes Regional Park Corridor – consisting of the Rice Creek Chain of Lakes;
- Elmcrest Pasture and Wetlands - located along the Hardwood Creek corridor and along the east side of I-35E from 80th Street on the north to County Road 14 on the south

These wildlife habitats and corridors were considered during the development of the Conservation Design Framework. The first two habitats and corridors (Rondeau Lake Duck Pass Wildlife Corridor and Chain of Lakes Regional Park Corridor) are accommodated by the Conservation Design Framework. However, the Conservation Design Framework only accommodates a portion of the Elmcrest Pasture and Wetlands area. A portion of the Elmcrest Pasture and Wetlands area east of Interstate 35E does not fall within the Framework's conservation areas, since the Framework focuses on existing, higher quality habitats.

Wildlife respond to vegetation structure, the variety of plant life, and the presence of key resources such as water; insects and other animal prey; or fruits, seeds and nuts. In the discussion below, the major land cover types identified within the AUAR area are presented along with the wildlife that might be expected to utilize these areas.

Artificial Surfaces and Associated Areas
Within the AUAR area, these areas vary significantly in terms of their wildlife habitat potential. On the one extreme, impervious surfaces of >75% suggest little opportunity for use and benefit by wildlife. However, areas with <25% impervious surface (e.g., residential lots within a subdivision) likely provide habitat for some wildlife species, including birds utilizing tree canopies for nesting and foraging.

Typical species that utilize suburban residential lots and similar areas include house sparrow and house finch in the vicinity of buildings, and also common grackle, European starling, and American robin foraging on mowed areas. Several mammals (e.g., house mouse, domestic cats, raccoon, gray squirrel) are also common in these areas. These species are abundant in urban and suburban settings, but are rarer in rural settings with no nearby development.

Planted or Cultivated Vegetation
Within the AUAR area, these areas are dominated by open, agricultural fields, which provide seasonal food and cover for species such as pheasant, meadowlark, and field sparrow. Regular disturbance of these areas due to harvesting and tilling limits their habitat value for some wildlife species.

Forest/Woodland
The wooded habitats within the AUAR area provide cover and habitat for species such as raccoon, red fox, white-tailed deer, woodcock, vireos, owls and woodpeckers. Herons use forests as rookeries (colonial nesting sites), and a heron rookery exists in forest cover on Peltier Lake Island. The bald eagle, which also uses forested habitats containing large trees for nesting, is discussed under Item 11.b.

Shrubland
Shrubland in the AUAR area is predominantly shrub swamp/shrub carr wetland. These plant communities provide valuable habitat for small mammals, amphibians, and many songbird species, such as common yellowthroat and yellow warbler.

Herbaceous
Within the AUAR area, many of the herbaceous areas consist of saturated or emergent wetlands. These plant communities provide valuable habitat for muskrats, amphibians, red-winged blackbirds, sedge wren, swamp sparrow, and rails. Sandhill cranes use herbaceous wetlands in the AUAR area.

Upland herbaceous habitats within the AUAR area generally consist of old fields and similar habitats. During the breeding season, a variety of bird life may be found in these areas - especially areas where the grassland meets other habitat types (e.g., savanna, wetland). Pocket gophers and other rodents use tall upland grasslands. Pocket gophers are predated by badgers, which may be in the general vicinity, and mice and voles are eaten by hawks, owls, and some snakes.

Water
Open water areas within the AUAR area, particularly those adjacent to herbaceous wetlands, provide habitat for ducks, geese, shorebirds, herons, and egrets. The Peltier Lake Island heron rookery was described above under Forest/Woodland.

General Wildlife Discussion
Some local decline in wildlife abundance is expected to result from development in the AUAR area. Previous agricultural activities have converted almost half the AUAR area to agricultural fields, most of which support annually tilled agricultural row crops. It is likely that development will affect agricultural and old field habitats and respective resident wildlife species more than wooded and wetland habitats.

Agricultural fields provide poorer habitat for grassland-utilizing wildlife species than permanently vegetated grasslands. However, populations of species that utilize agricultural and old field habitat will likely decrease or be displaced following development in the AUAR area. Migratory birds that depend on fields and grassland are expected to respond to the development by looking elsewhere for alternative nesting sites upon their return from wintering habitats. However, due to development pressure, the total acreage of grassland and brushland habitat is declining in the region, reducing the ease and potential for birds displaced within the AUAR area to find other places to forage, breed, and live. Non-migratory agricultural and grassland species with small home ranges, such as small mammals, will also decline or be displaced following development. Upland grasslands adjacent to wetland habitats in the northwest portion of the AUAR area have the greatest potential to support grassland and brushland species.

FISH
The MPCA lists Peltier Lake as an impaired water due to excessive nutrients. Data acquired from the MNDNR indicates that Peltier Lake is hypereutrophic; however, it does provide habitat for a moderate diversity of fish species. Rondeau Lake is classified by the MNDNR as eutrophic. This lake is quite shallow, leaving it susceptible to frequent winter-kill.

Portions of Rice Creek, Hardwood Creek and Clearwater Creek exist within the AUAR area. The upstream and on-site portion of Rice Creek is not listed as impaired by the MPCA, suggesting a somewhat intact biological community. However, a downstream section of Rice Creek (outside of the AUAR area, south of Peltier Lake) is listed as impaired due to degraded biological communities. The MPCA has identified both Hardwood and Clearwater Creeks as impaired waters due to degraded biological communities, and Hardwood Creek is also identified as having low dissolved oxygen levels. Recent fish surveys identified relatively few fish species in Hardwood and Clearwater Creeks.

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? ☑ Yes ☐ No. 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 Nongame Research Program has been contacted give the correspondence reference number: ERDB 20050382. (See Appendix C for letter.)

AUAR Guidelines: For an AUAR, prior consultation with the DNR Natural Heritage program for information about reports of rare plant and animal species in the vicinity is required. If such consultation indicates the need, an on-site habitat survey for rare species in the appropriate portions of the AUAR area is required. Areas of on-site surveys should be depicted on a map, as should any "protection zones" established as a result.

The MNDNR response letter from the Natural Heritage and Nongame Research Program identified 25 known occurrences of rare species or natural communities within an approximate one-mile radius of the AUAR area. These occurrences included 7 rare plant communities, 5 rare plants, 12 rare animals, and 1 colonial waterbird nesting site (Peltier Lake Island heron rookery). Only five of these occurrences were within the AUAR area, including 2 rare animals (a nesting bald eagle and an upland sandpiper observed during the breeding season), the Peltier Lake Island Heron Rookery, and 2 rare plant communities (shrub swamp and tamarack swamp).

In addition to the MNDNR data, conversations with city staff indicated two additional rare species occurrences within the AUAR area: a second bald eagle nest and a sandhill crane. In recent years, numerous rare plant species occurrences have been identified in other portions of Lino Lakes (outside of the AUAR area). Some of these rare plants include twisted yellow-eyed grass (*Xyris torta*), autumn fimbristylis (*Fimbristylis autumnalis*), cross-leaved milkwort (*Polygala cruciata*), and lance-leaved violet (*Viola lanceolata*). Most of these occurrences are found in transitional wetland areas classified as Wet Meadow/Rich Fen habitats. It is possible that some of these species may exist within the AUAR area.

The following table (Table 11-1) presents federally- or state-listed species (endangered, threatened, or special concern animals and plants) documented within or near the AUAR area. Additional rare features (e.g., those tracked by the MNDNR) documented within or near the AUAR area are discussed in the text that follows.

Table 11-1. State and Federal Listed Species Identified Within or Near the AUAR Area

Status	Species/Natural Community	Description
Federal Threatened, State Special Concern	Bald eagle (*Haliaeetus leucocephalus*)	Six bald eagle nesting sites have been documented in vicinity of the AUAR area. Of those, 2 are within the AUAR area.
State Special Concern	Waterwillow (*Decodon verticillatus*)	Documented in the AUAR area.
State Threatened	Blanding's turtle (*Emydoidea blandingii*)	Documented in vicinity of the AUAR area, but no records within AUAR area
State Special Concern	Red-shouldered hawk (*Buteo lineatus*)	Documented in vicinity of the AUAR area, but no records within AUAR area
State Threatened	Lance-leaved violet (*Viola lanceolata*)	Documented in vicinity of the AUAR area, but no records within AUAR area
State Special Concern	Autumn fimbristylis (*Fimbristylis autumnalis*)	Documented in vicinity of the AUAR area, but no records within AUAR area

The following sections provide a more detailed analysis of known rare features within or near the AUAR area.

RARE WILDLIFE

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a federally Threatened species and a species of Special Concern in Minnesota. The MNDNR identified 5 bald eagle nests within one mile of the AUAR area, and city staff identified 1 additional nest within the AUAR area. Two nests are within the AUAR area, and both were reportedly used in 2004. The remaining nests were last used in 2003, 2002, 1990, and 1988.

Bald eagles remain together for many years and usually return to the same territory each year (Coffin and Pfannmuller 1988). They occupy several nests in a territory covering one square mile

or more and move to different nests depending on conditions at the nest site (Ontario Ministry of Natural Resources 1987). Longer observation would be needed to fully understand the habits of the eagles using this area and to determine if the same pair is returning each year; however, this is beyond the scope of an AUAR. Some eagles have become habituated to disturbance and the presence of people. However, some eagles will abandon the nest during mating, egg laying, and incubation if they feel threatened (Ontario Ministry of Natural Resources 1987). The perceived threat may be in the form of disturbance to vegetation, constant loud noise, groups of people, increased traffic, frequent visual distractions, etc

Currently, there are two major sources of disturbance to the on-site nests: recreational motor boating and I-35W traffic. The No Wake Zone ordinance around Peltier Lake Island should limit the disturbance caused by recreational boaters on Lake Peltier. The presence of heavy traffic within the vicinity of one of the nests suggests that the eagles using this nest may have become habituated or accustomed to these nearby human activities.

The most sensitive time for Bald Eagles is February 1 – May 15. To ensure that eagles continue to use a traditional nesting area, the MNDNR and Ontario Ministry of Natural Resources developed disturbance limit guidelines (Table 11-2).

Table 11-2. Recommended Disturbance Limits for Bald Eagle Nesting Areas

Distance (feet)	Period	Recommendation
0-330	Entire year	Avoid any land use change
	February 1-May 15	Avoid human visitation
330-660	Entire year	Avoid significant change (e.g., clear-cutting, major construction)
	February 1-May 15	Avoid vegetation thinning, human visitation, trail construction
660-1320	Entire year	Avoid significant land use change in sight-line of nesting area
	February 1-May 15	Human visitation, other non-intensive activities are possible

Peltier Lake Island Heron Rookery

The great blue heron (*Ardea herodias*) and the great white egret (*Casmerodius albus*) are not listed as a state or federally rare species, but their colonial nesting sites (rookeries) are tracked by the MNDNR. According to MNDNR documents, the Peltier Lake Island Heron Rookery was established between 1979 and 1991. Through the years, the rookery has reportedly been used by both herons and egrets. DNR records indicate that the number of nests have ranged from 0 to 1,100, depending on the year. Motorboats and other recreational use on Peltier Lake may have contributed to nest abandonment in the past. However, in 2002, a No Wake Zone ordinance was designed and adopted by the City of Lino Lakes and Centerville to protect nesting herons, egrets and aquatic resources from the disturbances caused by motorboat and recreational use of the lake. Over 200 nesting birds were observed on the island in 2004; however, city staff indicated that raccoon predation was a significant contributor to nest abandonment in 2004. There are several other suspected causes of nest abandonment prior to, and including, 2004. At the time this text was prepared (May 2005), 71 birds had been observed on the island via an aerial survey.

As with most species, herons are particularly sensitive to disturbance during the breeding period. Herons typically identify nesting sites in March and early April. In a typical year, herons produce eggs around April 15, the eggs incubate for approximately 28 days, and young are born around

May 13. For 7 to 8 weeks, the young are cared for by adults and remain in their nests until they fledge. A Canadian Wildlife Service publication states, "Scientists suggest as a general rule that there should be no development within 300 m of the edge of a heron colony and no disturbance in or near colonies from March to August." It should be noted that a 300-meter buffer from the perimeter of Peltier Lake Island (not the rookery within the island) contains virtually no uplands within the AUAR area, but rather, contains almost exclusively open water of the lake and adjacent wetlands.

Sandhill Crane
The sandhill crane (*Grus canadensis*) is not listed as a state or federally rare species, but their occurrences are tracked by the MNDNR. These cranes have been observed both within and near the AUAR area. These gregarious birds require open fields or meadows for their mating display as well as wetlands for breeding and feeding. They also utilize cropland for feeding in the spring before the crop is planted, and in the fall after it is harvested.

Red-shouldered Hawk
The red-shouldered hawk (*Buteo lineatus*) is species of Special Concern in Minnesota. The one occurrence of this species was a nesting site observed over one mile outside of the AUAR area in 1988. This species is often found in woodlands located near wetlands.

Upland Sandpiper
The upland sandpiper (*Bartramia longicauda*) is not listed as a state or federally rare species, but their occurrences are tracked by the MNDNR. The occurrence within the AUAR area consisted of a single bird observed during the breeding season. This neotropical migrant requires open grassland for breeding. It has become rare in the region due to the lack of large, continuous grassland habitat.

Blanding's Turtle
The Blanding's turtle (*Emydoidea blandingii*) is listed as Threatened in Minnesota. The MNDNR identified 4 Blanding's turtle occurrences within one mile of the AUAR area; however, none were documented within the AUAR area.

Although formerly more widespread, the Blanding's turtle is now restricted to a small number of states and provinces in the Upper Midwest (Coffin and Pfannmuller 1988). This turtle requires a combination of wetland and upland habitats to complete its life cycle, making it susceptible to habitat loss in either wetlands or uplands. A species-specific habitat model, developed by the MNDNR and utilizing MLCCS data, identified that suitable foraging and nesting habitat exists for the Blanding's turtle in the northwestern portion of the AUAR area.

RARE PLANTS AND PLANT COMMUNITIES
The sections below describe briefly the three rare plant species documented in the vicinity of the AUAR area and the two rare plant communities identified within the AUAR area.

Lance-leaved Violet
The lance-leaved violet (*Viola lanceolata*) is listed as Threatened in Minnesota. The MNDNR identified one record within approximately one mile of the AUAR area, but no records within the AUAR area. This plant typically occurs on wet, sandy shores, peaty meadows, and wetland margins. Most state records of this species are from the Anoka Sandplain, and numerous new populations of this plant have been documented in recent years in this area.

Waterwillow
Waterwillow (*Decodon verticillatus*) is species of Special Concern in Minnesota. Populations of waterwillow are known to exist in Peltier Lake within the AUAR area. In addition, the MNDNR identified two records within approximately one mile of the AUAR area. This plant typically occurs along the margins of small lakes and swamps and can form extensive colonies, sometimes creating a quaking mat. The only state records known to persist are found in Anoka County (Coffin and Pfannmuller 1988).

Autumn Fimbristylis
Autumn fimbristylis (*Fimbristylis autumnalis*) is species of Special Concern in Minnesota. The MNDNR identified one record within approximately one mile of the AUAR area, but no records within the AUAR area. This plant typically occurs along shores, stream banks and wet meadows, often in sandy soils.

Shrub Swamp
The shrub swamp identified in the AUAR area is located on a floating mat of Sphagnum moss in Rondeau Lake. The community is dominated by native shrubs, contains a moderate diversity of forbs (wildflowers and ferns), and has a sparse cover of graminoids (grass-like species). No obvious disturbances were observed during a field visit conducted by MNDNR staff in 1989.

Tamarack Swamp
The tamarack swamp identified in the AUAR area is located on a floating mat of Sphagnum moss in Rondeau Lake. The community is dominated by tamarack trees and native shrubs, forbs and graminoids. No apparent threats or disturbances were observed during a field visit conducted by MNDNR staff in 1989.

MITIGATION SUMMARY

The development scenarios are not able to specify what the actual disturbance footprint will be within the AUAR area. Therefore, a detailed analysis of impacts on fish, wildlife, and ecologically sensitive resources cannot be completed. However, the Conservation Design Framework (Figure 10-3 and described under Item 10) is designed to conserve wildlife habitat and natural plant communities, and will provide an invaluable tool for conservation of wildlife and rare features within the AUAR area. Most importantly, the Conservation Design Framework protects the existing significant fish, wildlife, and ecological sensitive resources in the northwest portion of the AUAR, and goes beyond that by identifying and protecting the most significant outlier habitats, buffering them, and connecting them with greenway corridors.

The proposed northerly bypass that would connect I-35W and I-35E (assumed in all scenarios, Figures 6-2 through 6-4) would cross Rice Creek and an associated large wetland complex in the northwestern portion of the AUAR area. A water main is also proposed to cross at this location (Figure 13-3). This proposed road/utility line would cross the large conservation area identified in the Conservation Design Framework (Figure 10-3). While this major construction project will undergo a separate environmental review and permitting process, the following techniques would help mitigate potential impacts associated with this road/utility crossing:

- Construct the roadway/utility line on piers to minimize the footprint on existing wetland resources and minimize interference to hydrology and wildlife. The water main would require appropriate design to prevent freezing.

- Provide a stormwater collection system that routes roadway runoff (and associated contaminants, such as salt and sediment) to land-based management areas for treatment prior to discharging stormwater into aquatic receiving waters.

The proposed northerly bypass, and the interchange at I-35E and 80th Street is just south of Hardwood Creek and its associated wetlands and floodplain. These features are encompassed by the Conservation Design Framework (Figure 10-3). To help mitigate potential impacts associated with this interchange, a "folded diamond" design is assumed (Figures 6-2 through 6-4) to minimize the impact to Hardwood Creek and its associated conservation areas.

The greenway corridors are designed to connect the larger and higher quality natural areas. These corridors will provide three main services: 1) stormwater collection and conveyance, 2) ecological corridors for wildlife movement and native plant dispersal, and 3) recreational trails for people.

The design of each corridor will necessitate consideration of the combination of services desired from each corridor. Certain corridors may warrant design for specific wildlife species, may provide certain stormwater management opportunities, or may need to accommodate different types of trails or passive recreational uses. Design considerations may include corridor width, appropriate vegetation structure, human access and use, and whether or not it is appropriate for a corridor to cross a particular type of roadway. Corridor establishment would need to be scheduled appropriately to provide the desired services as development proceeds and requires those services. For example, a stormwater management corridor downstream of a proposed developed should be designed and construction at an appropriate time relative to beginning site grading for the development.

Habitat fragmentation will be minimized during development of the AUAR area through adherence to the Conservation Design Framework and other mitigation strategies in this document. Wildlife habitat quality and natural plant community integrity would be improved through ecological restoration and management planning and implementation. These activities should be implemented to the extent practical in all open space areas, focusing first on the larger blocks of higher quality habitat. New developments represent opportunities to plan and carry out ecological restoration and management. Ecological restoration, enhancement, and/or expansion will help mitigate potential impacts on wildlife and rare features, and if these activities are planned, scheduled, and carried out at the recommended broad scale, will likely result in a net increase in conservation and ecological benefits within the AUAR area compared with existing conditions.

As mentioned above, a No Wake Zone ordinance has already been established by the City of Lino Lakes and the City of Centerville to protect the Peltier Lake Island Heron Rookery and the overall quality and function of Peltier Lake.

Due to the incidence of rare plant species in nearby wetland habitats, rare plant surveys may be required prior to development within the AUAR area, especially areas of banded soils between muck soils and adjacent Isanti, Soderville, or Zimmerman soil map units.

12. Physical Impacts on Water Resources. Will the project involve the physical or hydrologic alteration (dredging, filling, stream diversion, outfall structure, diking, impoundment) of any surface water such as a lake, pond, wetland, stream, drainage ditch? ☑ Yes ☐ No If yes, identify water resource affected and give the DNR Protected Waters Inventory number(s) if the water resources affected are on the PWI: see Table 12-1.
Describe alternatives considered and proposed mitigation measures to minimize impacts

AUAR Guidelines: The information called for on the EAW form should be supplied for any of the infrastructure associated with the AUAR development scenarios, and for any residential or commercial development expected to physically impact any water resources. Where it is uncertain whether water resources will be impacted depending on the exact design of future developments, the AUAR should cover the possible impacts through a "worst case scenario" or else prevent impacts through the provision of the mitigation plan.

A final detailed site plan has not been approved for the AUAR area, therefore, the extent of wetland impacts that may occur as a result of development have not been determined completely.

Existing Water Resource Inventory

DNR PROTECTED WATERS
The DNR Protected Waters and Wetlands Inventory for Anoka County (Minnesota DNR, 1986) indicates that five protected waters and four protected wetlands are located within the AUAR area (Table 12-1 and Figure 12-1).

Table 12-1. Lake/Wetland Characteristics

Name	DNR ID No./PW	Surface Area/ Littoral Area	OHW	Depth (Max/ Mean)	Fishing Resource	Public Access	Chain of Lakes Park Location	Shared with Others
Centerville	02-0006	455/276	-	19/-	Managed Fishery	1	YES	YES
George Watch	02-0005	886/ -	-	7/-	NO	NO	YES	NO
Peltier	02-0004	465/412	-	18/-	YES	2	YES	YES
Rondeau	02-0015	275/275	-	7/-	NO	NO	YES	YES
Rice	02-0008	442/442	-	5/-	NO	2	YES	NO
8-534W,	-	-	-	-	-	-	-	-
82-195W	-	-	-	-	-	-	-	-
2-1W	-	-	-	-	-	-	-	-
2-545W	-	-	-	-	-	-	-	-
- indicates that data was not available								

Wetland delineations have not been conducted within the AUAR boundary. However, Figure 12-2 shows all of the wetlands within the AUAR boundary as defined by the National Wetland Inventory database (this includes the public water wetlands identified above) and Figure 10-1 shows wetlands as shown in the MLCCS data.

INSTITUTIONAL CONTROLS ON AFFECTED AUAR WATER RESOURCES

Individual projects within the AUAR area that propose altering a jurisdictional wetland will be required to follow the sequencing process of wetland avoidance, minimization, rectification, and mitigation as outlined in the *Wetlands Conservation Act* (WCA) if wetlands are altered. Wetland permit applications will need to be prepared and submitted to the appropriate regulatory agencies to obtain authorization for wetland alterations under the WCA prior to project construction. At least half of the replacement credit needs to be in the form of new wetland credit to satisfy WCA requirements. Up to half of the wetland replacement may come from public value credit, which may be applied toward the second half of the 2:1 replacement. Detailed wetland alteration and replacement plans are not yet available for developments within the AUAR area. Wetland replacement will be designed to expand upon existing on-site wetlands.

All waterbodies or wetland alterations would be governed by one of two watershed organizations and the City of Lino Lakes as follows.

Rice Creek Watershed District (RCWD)

The State of Minnesota adopted the Minnesota Watershed District Act in 1955. This Act, now codified in Minnesota Statues 103D (formerly Chapter 112), provides for establishment of watershed districts "to conserve the natural resources of the State by land use planning, flood control and other conservation projects, using sound scientific principles for the protection of the public health and welfare and provident use of the natural resources."

The RCWD is a special purpose unit of local government created to carry out watershed management. The Minnesota Water Resources Board (MWRB) established the District in 1972, under the authority of Minnesota Statutes 103D. Its original plan for water management was prepared in 1974. A “second generation” plan was completed in 1990, in compliance with the Metropolitan Surface Water Management Act (Minnesota Statutes 103B). This Plan has been updated in 1994, 1997, and 2000. The RCWD mission statement is “Prevent flooding and enhance water quality in harmony with development for the common good.”

The District's objectives include:

- Minimize Public Expenditure to Control Runoff
- Improve Water Quality
- Prevent Flooding and Erosion
- Promote Groundwater Recharge
- Protect and Enhance Fish and Wildlife Habitat and Recreation
- Provide for the Transition of Water Management to Local Units

The Minnesota Wetland Conservation Act (WCA) of 1991 requires the mitigation of wetland impacts. It gives the RCWD administrative and enforcement powers over wetlands in the City of Lino Lakes.

RCWD has been authorized by the Minnesota State Legislature to act as the local government unit responsible for administering the Wetland Conservation Act. RCWD does not have a local wetland-banking program and relies on the state program for mitigation purposes. It uses methods and procedures outlined in the WCA to determine replacement of wetland values in mitigation proposals.

Vadnais Lake Area Water Management Organization (VLAWMO)
VLAWMO was formed in 1983, through a Joint Powers Agreement ratified by the seven local units of government. The organization was formed to comply with the Metropolitan Surface Water Management Act. The VLAWMO originally adopted its Watershed Management Plan in 1987. The current (second-generation) plan was approved by the Minnesota Board of Water and Soil Resources and adopted by VLAWMO in 1997. This plan sets forth goals, policies, management strategies, and implementation criteria for the Watershed.

VLAWMO has been authorized by the Minnesota State Legislature to act as the local government unit responsible for administering the Wetland Conservation Act. VLAWMO does not have a local wetland-banking program and relies on the state program for mitigation purposes. It uses methods and procedures outlined in the WCA to determine replacement of wetland values in mitigation proposals. VLAWMO's plan includes goals and associated policies that form the framework for water resource management decisions.

The goals are:

- Prevent Flooding
- Protect Potable Water Supply
- Protect Waters for Wildlife Habitat and Recreation
- Enhance Public Participation
- Oversee the Maintenance of the Public Ditches
- Protect Groundwater Quality and Quantity
- Protect Wetland Resources
- Control Soil Loss, Sedimentation, and Water Quality Degradation Due to Soil Erosion
- Transition of Water Management to Local Units
- Enforce Compliance with State Water Resource Regulations within the Watershed
- Minimize Public Expenditure
- Find Appropriate Funding

City of Lino Lakes' Standards for Facility Design
The Standards for Facility Design are intended to guide the city staff in design and review of engineering calculations for storm water facilities being constructed in the city. The Policy elements are taken directly from the Policy Document, and are the basis for design elements. The Design Elements are the engineering foundation for all storm water facility construction in the city.

The City of Lino Lakes has approved several policies that determine Facility Design in the city. Selected policies that follow have been extracted from the Goals and Policies section of the Policy Document portion of the Local Water Management Plan, such as the identification of Runoff Sensitive Areas as shown on Figure 12-3. They should be adhered to when new development or redevelopment is considered.

MITIGATION SUMMARY
The institutional controls adopted by the Watershed Districts, the city and the State are expected to mitigate affected water resources within the AUAR. For instance, it is anticipated that proposed development could cause an increase in stormwater volume and associated sediments directly entering Rondeau and Peltier Lake, which are identified as priority lakes. A nutrient budget analysis is required and is presented under Item 17.

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)? ☑ Yes ☐ No.

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.

AUAR Guidelines: If the area requires new water supply wells, specific about that appropriation and its potential impacts on groundwater levels should be given; if groundwater levels would be affected, any impacts resulting on other resources should be addressed.

The City of Lino Lakes completed a Comprehensive Water System Plan in 2004. This plan provided an assessment of present and future water system needs for the City of Lino Lakes as a whole, and included allowances for the development of the northeast part of the city. The Plan evaluated the ability of the water system to meet all anticipated water demands and potential fire flows in a safe and dependable manner. Future water system needs were identified out to the year 2030.

EXISTING WATER SYSTEM

The existing water system in the northeast part is a combination of 16-inch diameter trunk mains and smaller sized distribution pipes located along I-35E, south of County Road 14. The mains are connected to the remainder of the Lino Lakes system by a 16-inch diameter trunk main that runs from Birch Street to 20th Avenue North. The northeast part also includes an elevated storage tank (located on Otter Lake Road just south of CSAH 14), and an emergency interconnect with the City of Hugo. Well and Pumphouse No. 4 is located adjacent to the northeast AUAR area boundary near Cedar Avenue, and also houses a booster station, which provides the Clearwater Creek subdivision with elevated water pressure.

Water Supply

Well No. 4 operates in concert with the other three city wells as part of the city-wide interconnected distribution system, providing 3,565 gpm of total capacity, and 2,365 gpm of firm (largest well out of service) capacity.

Water Storage

Tower No. 2 is located in the northeast area (between Otter Lake Road and I-35E), and has a capacity of 1,000,000 gallons and an overflow elevation of 1,054.5 feet. Tower No. 2 operates in concert with Tower No. 1 (1,000,000 gallon capacity) and the city-wide interconnected distribution system, and does not exist or operate exclusively for the east or northeast part of the City of Lino Lakes.

Water storage facilities serve several purposes in a water system, including capacity to meet peak demands, which exceed the supply source (well) capacity. They also help to maintain constant system pressure, and provide for smooth pumping operation by minimizing the amount of starting and stopping that may be required to perform to keep up with the customers' demands. Storage facilities are equally important when providing water during emergency conditions such as power outages, supply facility breakdowns, and fire fighting needs.

Ground elevations in the northeast range between 895 feet and 915 feet MSL, resulting in static water pressures between 60 psi and 70 psi.

Existing Wellhead Areas

The City of Lino Lakes obtains its drinking water from four wells located within the Prairie du Chien-Jordan Aquifer system. According to the Lino Lakes Wellhead Protection Plan, the four wells are constructed in areas with varying degrees of geologic protection. Analytical results of water samples from Well No. 2 indicate levels of tritium greater than one unit. Tritium is an indication that Well No. 2 is supplied with water that has recharged from the ground surface more recently than 1953. Due to the elevated levels of tritium, Well No. 2, and the drinking water supply management area (DWSMA) around it, are considerable vulnerable to contamination. Because of its vulnerability, Well No. 2 may also be impacted by land uses adjacent to the well site. Well Nos. 1, 3, and 4 are not considered vulnerable to contamination. In contrast to Well No. 2, Tritium samples in Well Nos. 1, 3, and 4 contained less than 1 tritium unit, an indication that these wells were supplied principally by water and recharge prior to 1953. In addition, land use does not have any significant impact on the aquifer used by Wells Nos. 1, 3, and 4 because the aquifer exhibits confined hydraulic conditions. Of Lino Lakes four wells, only Well No. 4 is located within the I-35E Corridor AUAR Study Area. As indicated, Well No. 4 is not vulnerable to contamination based on adjacent land use and aquifer characteristics. In addition, Well No. 4 meets the construction standards of the State Well Code and is therefore not considered a likely conduit for contamination to reach the Prairie du Chien-Jordan Aquifer system.

In addition to Lino Lakes, the City of Centerville operates two wells located within the Prairie du Chien-Jordan Aquifer system. Centerville Well No. 1 is located 460 feet west of 20th Avenue and 440 feet north of Main Street and is not considered vulnerable to contamination. Well No. 2 is located approximately 440 feet west of 20th Avenue and 50 feet south of Main Street. Well No. 2 and the DWSMA around it are classified as vulnerable to contamination from surface and near surface contamination sources. Although Well No. 2 is not located within the AUAR area, the eastern reaches of its DWSMA do stretch into the AUAR area. In particular, there are ten parcels of existing land within Lino Lakes that are located within Well No. 2's recharge zone. Although Well No. 2 is currently classified as vulnerable to contamination, it is not anticipated that future uses within the AUAR will increase the vulnerability of Well No.2. In addition, Centerville recently began its wellhead protection planning process for Well No. 2. By managing potential sources of contamination in the area which supplies water to Well No. 2, the wellhead protection process will help ensure that current and future land uses within the DWSMA do not increase the potential for drinking water contamination.

Distribution System

As previously mentioned, the existing water system in the AUAR area is a combination of 16-inch diameter mains and smaller pipes located along I-35E, south of County Road 14. The mains are connected to the remainder of the water system by a 16-inch diameter trunk main that runs from Birch Street to 20th Avenue North.

Due to the Rice Creek Chain of Lakes System that covers the center area of the City of Lino Lakes, and I-35W and I-35E corridors, the Lino Lakes' water system has been constructed in a linear trunk transmission system. Few opportunities exist to loop the trunk system, increasing its vulnerability to service interruption and reduced flow capability, should it experience a break. The City of Lino Lakes' water system is interconnected with the neighboring Cities of Blaine, Centerville, Circle Pines, Hugo, and Shoreview.

FUTURE WATER SYSTEM

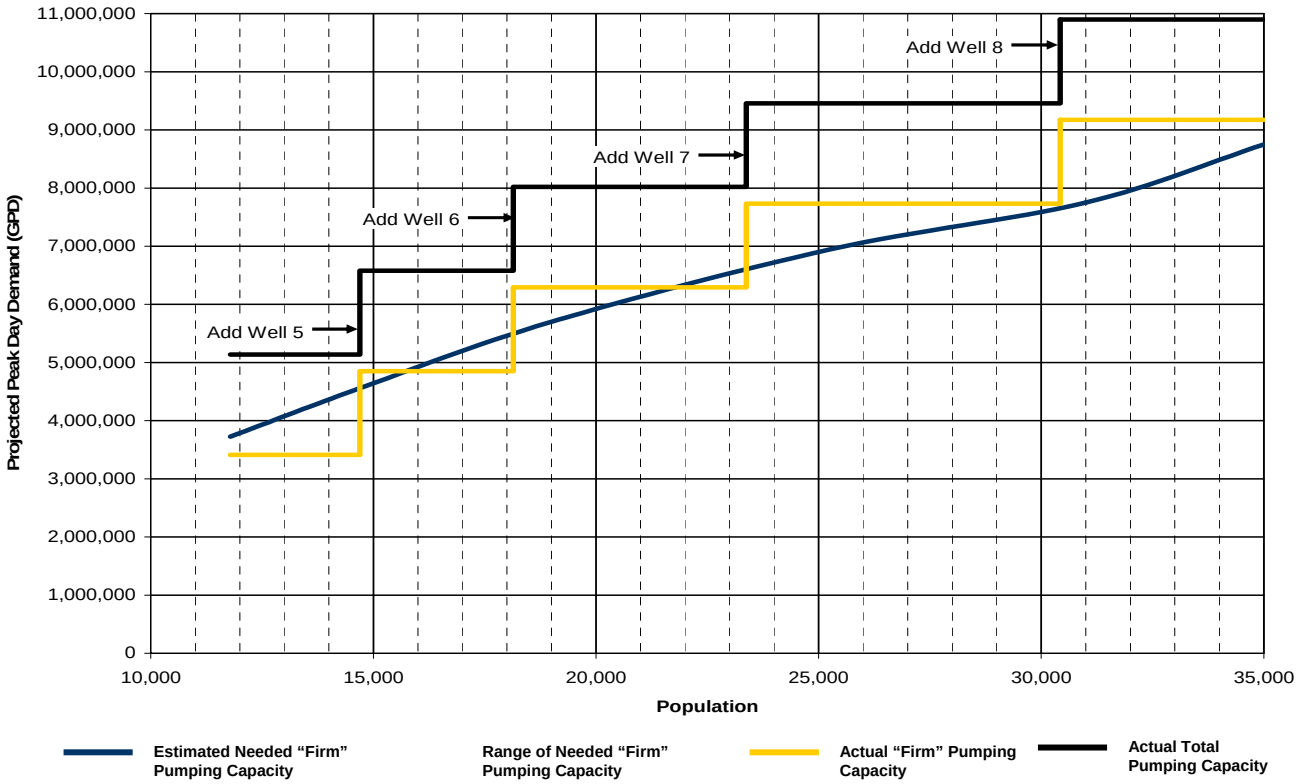
Proposed Improvements

Improvements throughout the city, including the northeast portion, have been identified in the Comprehensive Water Plan. Watermain sizing is typically driven more by fire demands than by domestic water needs. Due to the potential for significant industrial development within the northeast area, the distribution system should include extension of a new 16-inch trunk watermain loop around I-35E, extending north from CSAH 14 (Main Street). The plan also calls for a westward extension of a 16-inch trunk to I-35W to "loop" the system, connecting the northeast and northwest portions of the system. The city is considering an alternative to this line. The actual implementation and placement of watermains should be integrated in consideration with other utility issues, such as actual development plats and roadway locations, among other factors.

The recommended improvements do not include the construction of any new wells or water storage facilities within the northeast area. As the northeast area continues to grow, water supply will be met through extension of the existing distribution system and proposed water supply (wells) and storage improvements earmarked for construction in other areas of the city. Timing and the location and nature of specific improvements are explained further in the Comprehensive Water Plan's Capital Improvement Schedule.

Water Supply

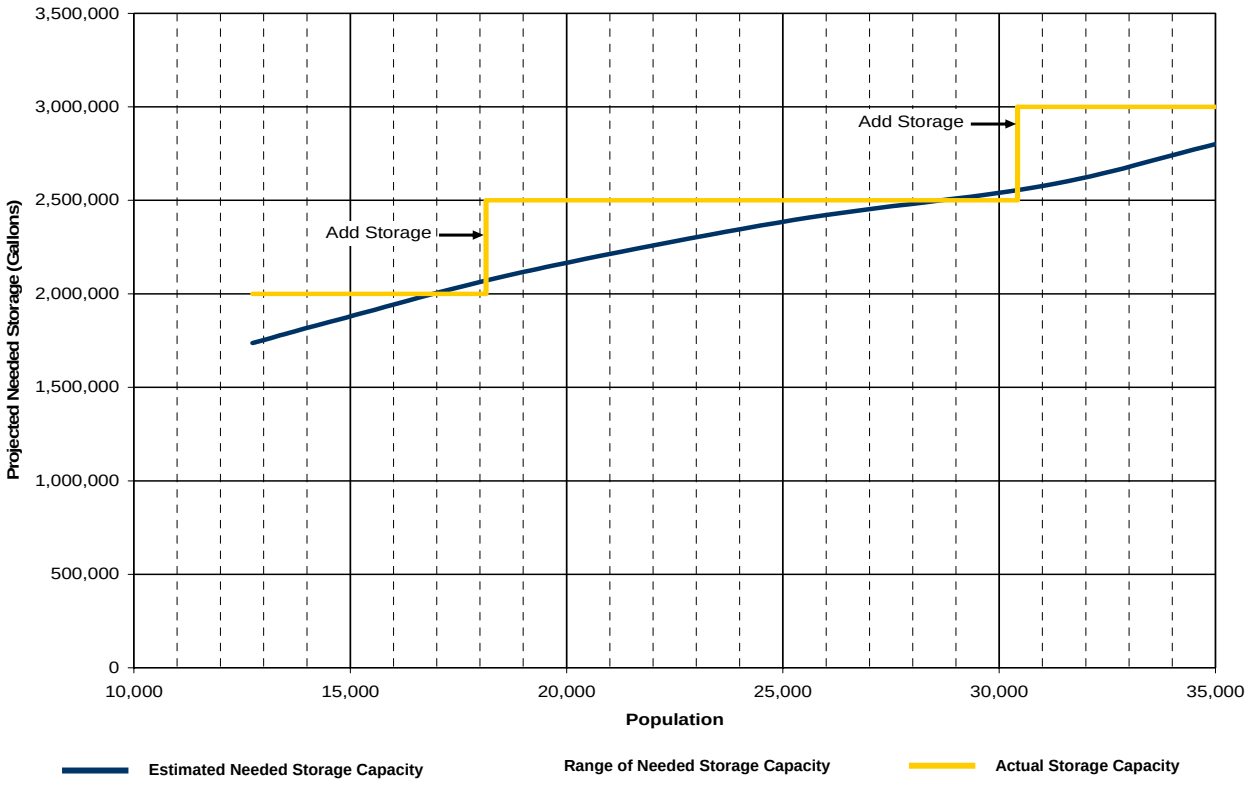
Future wells are recommended to be drilled into the Jordan aquifer to maintain a consistent water quality from all city wells. The Comprehensive Water Plan anticipates adding four additional wells, to bring the total to eight city wells. New wells are not anticipated to affect citizens' individual wells in either the AUAR area or any other parts of Lino Lakes. Municipal wells are drilled into the Jordan Aquifer at depths usually exceeding 280 feet. Most individual wells are in either the glacial drift or the Prairie du Chien Aquifer at depths less than 150 feet. The following graph depicts the anticipated sequencing of well construction as a function of population growth. Well 5 is currently under construction. Depending on actual population growth and realized well yield, the total number of future wells needed may increase or decrease.



All future wells will likely be located in the southern area of the city along Birch Street. This is because the Jordan Aquifer tapers out north of Birch Street and west of the boundary with the City of Hugo. The small amount of Jordan Aquifer that does exist tends to be fragmented and weathered, and is not well suited to yielding the large quantities of water desired for a municipal well.

Water Storage

The City of Lino Lakes has 2,000,000 gallons of elevated water storage available to the system. The Comprehensive Water Plan anticipates the addition of storage in the Year 2009, and a total system storage of 3,000,000 gallons by 2030. The following graph depicts the anticipated sequencing of storage tank construction as a function of population growth.



Future storage has been suggested to be in the form of ground storage, possibly at a future water treatment plant site. Although no sites have been formally identified, hydraulic concerns would likely preclude the northeast area.

Distribution System

The remainder of the future watermains in the northeast area can be placed as property develops and demand for water service dictates. The extension of the existing trunk mains to the north from existing stubs on CSAH 14 on both sides of I-35E (at Otter Lake Road and 21st Avenue) are proposed (see Figure 13-1).

An extension looped across I-35E (both at northern and southern extents), and around the north end of the Rice Creek Chain of Lakes, connecting with the existing system in the northwest part of the city would provide improved circulation, pressure, and fire protection city-wide.

Estimated Water Demand

The city's projected water demand for the Year 2030, including the northeast portion of the city, is estimated at 3.1 MGD on an average day (based on an assumed population of 31,000 and 100 gallons per person per day), and 7.75 MGD on a peak demand day (based on 250 gallons per person per day). The *2004 Comprehensive Water Plan* provides additional details on water demand for the city through the projected 2030 planning period.

Water demand will differ for each scenario according to the development density and land use type. The estimated water demand for full build-out under Scenario One, Two, and Three will be 1.86 MGD, 2.45 MGD, and 2.61 MGD respectively. Based on these estimates, development under Scenario One represents approximately 60% of the city's projected water demand for the Year 2030, Scenario Two represents approximately 79% of the city's projected water demand for the Year 2030, and Scenario Three represents approximately 84% of the city's projected water demand for the Year 2030.

Abandonment of Water Wells

The development of the northeast area may require the abandonment of domestic water wells. When water service is extended past previously unserviced properties, cities may require residents to "hook up" to the service within a certain grace period. Wells that are abandoned as part of this "hook up," and properties and wells that are vacated as part of transfer of ownership and subsequent development of the property and would require the sealing of the water wells in compliance with Minnesota Department of Health regulations prior to site development.

A search of Minnesota Geological Survey's (MGS) County Well Index (CWI) yielded 88 registered wells within Sections 1, 2, 10, 11, 12, 13, and 24 in Township 31N, Range 22W, which essentially defines the area (extent) encompassed by the AUAR area boundary. There may be private wells located within the AUAR area that are not registered or do not appear in the CWI. There are no municipal wells located within the AUAR area.

APPROPRIATION OF GROUND OR SURFACE WATER

Groundwater

State and regional agencies responsible for managing water resources supplies indicate that areas experiencing rapid development over time may experience a drop in groundwater levels. While this has not been experienced in Lino Lakes, water levels should be monitored on a regular basis.

Lino Lakes is currently permitted under DNR Water Appropriations Permit Number 856168, withdrawing water from four municipal wells with Unique ID Numbers of 240171, 110471, 559373, and 554207.

Dewatering

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. 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. The quantity and duration of construction dewatering is not known at this time, but dewatering activities will be temporary. Groundwater appropriated for construction dewatering purposes will be discharged into temporary or permanent ponds located within the AUAR Area.

A temporary DNR Water Appropriations Permit will be required if construction dewatering and pumping from development exceeds 10,000 gallons per day or 1,000,000 gallons per year. These thresholds trigger the need for a DNR Water Appropriations Permit.

MITIGATION SUMMARY

In addition to expansion of the water supply system outlined below, the City of Lino Lakes has adopted water conservation policies which are intended to attenuate peak water demands throughout the City. These policies include sprinkling restrictions which limit sprinkling, limiting odd-numbered property addresses to lawn watering on only odd-numbered days, and even-numbered properties lawn watering to only even-numbered days.

Development of the future water supply infrastructure will be designed in accordance with the recommendations set forth in the City of Lino Lakes Comprehensive Water System Plan (2004). The future city-wide water supply system proposed will include:

- Up to 1 million additional gallons of ground or elevated storage;
- Approximately four municipal water supply wells drilled in the Jordan sandstone aquifer; and
- A series of trunk and lateral watermains (Figure 13-1)

Installation of municipal water supply wells will be constructed in accordance with Minnesota Department of Health regulations (Minnesota Well Code) to ensure the water supply system meets federal and state public drinking water standards. The city will follow the Minnesota Department of Health's wellhead protection planning process, which involves:

1. Delineating the wellhead protection area and drinking water supply management area;
2. Assessing the vulnerability of the well; and
3. Creation of a Wellhead Protection Plan including goals, objectives, plan of action, evaluation program, and contingency plan.

The Minnesota Department of Health (MDH) also requires the city to submit a preliminary wellhead protection area delineation and assessment of land uses of the proposed new well with their construction plan for approval. The city will coordinate with the MDH to ensure that a new water supply system meets all applicable regulations.

Because the City of Lino Lakes has planned for an adequate water supply and distribution system to accommodate future development, water supply issues are not anticipated.

14. Water-Related Land Use Management Districts. 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?

☑ Yes ☐ No

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

AUAR Guidelines: Such districts should be delineated on appropriate maps and the land use restrictions applicable in those districts should be described. If any variances or deviations from these restrictions within the AUAR area are envisioned, this should be discussed.

SHORELAND DISTRICT

The City of Lino Lakes currently has a Shoreland Overlay District, with regulations provided in the Zoning Ordinance (see Figure 27-2). The Shoreland Overlay District includes all land located 1,000 ft. from the ordinary high water level of a lake or 300 ft. from a river or stream as shown on the Figure 27-2. The city's basic Shoreland District regulations regarding lot dimensions and setback requirements are summarized in Table 14-1. The Shoreland Ordinance also sets additional requirements, including shoreland and vegetation alterations, grading and draining, surface cover restrictions, erosion control, visibility reduction, and open space conservation.

Table 14-1. City of Lino Lakes Shoreland Overlay District Regulations Summary

Shoreland Zone	Natural Environment Lakes 1,000 ft.	Tributary Rivers and Streams 300 ft.
Lot Area: RESIDENTIAL (Sq. ft.)		
Unsewered	10 acres	10 acres
Sewered Abutting	Single: 20,000 Duplex: 8,775 Triplex/Quad/Townhome: 6,000	*Delineated by standards of base zoning districts.*
Sewered Non-Abutting	Single: 10,800 Duplex: 8,775 Triplex/Quad/Townhome: 5,000	*Delineated by standards of base zoning districts.*
Lot Width: RESIDENTIAL (Sq. ft)		
Unsewered	330	330
Sewered Abutting	Single: 80 Duplex: 130	Single: 80 Duplex:130

Table 14-1. City of Lino Lakes Shoreland Overlay District Regulations Summary

	Triplex/Quad/Townhome: 130	Triplex/Quad/Townhome: 130
Sewered Non-Abutting	Single: 80 Duplex: 130 Triplex/Quad/Townhome: 130	Single: 130 Duplex: 130 Triplex/Quad/Townhome: 130
Lot Area: COMMERCIAL & INDUSTRIAL (Sq. ft)		
Unsewered	1acre	1 acre
Sewered Abutting	Commercial: 1acre Industrial: 1 acre	Commercial: *Delineated by standards of base zoning districts.* Industrial: 1 acre
Sewered Non-Abutting	Commercial: *Delineated by standards of base zoning districts.* Industrial: 1acre	Commercial: *Delineated by standards of base zoning districts.* Industrial: 1 acre
Lot Width: COMMERCIAL & INDUSTRIAL (Sq. ft)		
Unsewered	Commercial: 100 Industrial 150	Commercial: 100 Industrial 150
Sewered Abutting	Commercial: 100 Industrial: 150	Commercial: 100 Industrial: 150
Sewered Non-Abutting	Commercial: *Delineated by standards of base zoning districts.* Industrial: 150	Commercial: *Delineated by standards of base zoning districts.* Industrial: 150
Setback from OHWL		
Sewage Treatment Plants	150 ft.	75 ft.
Unsewered Structures	150 ft.	100 ft.
Sewered Structures	150 ft.	50 ft.
Setback From Top of Bluff	30 ft.	30 ft.
Unplatted Cemetery	50 ft.	50 ft.

Right of Way		
Federal, State, County	40 ft.	40 ft.
Town, Public, Non-Classified	30 ft.	30 ft.
Maximum Building Height*	36 ft.	36 ft.

Source: City of Lino Lakes Zoning Ordinance

* This building height regulation does not apply to churches and nonresidential agricultural structures in Shoreland Districts

Land uses proposed for the development of the Shoreland District include residential space, public open space, new parks, and some commercial areas. In Scenarios One, Two and Three, it is assumed that all such development in the Shoreland District would occur in accordance with the regulations outlined in the Shoreland Overlay District. If any future plans implement higher densities or other variances from the regulations in Table 14-1, the development could be processed as a Shoreland Planned Development Overlay (PDO). The city's Zoning Ordinance provides alternative requirements for approved PDOs, ensuring the objectives of Shoreland Districts are met while allowing for varied development. Table 14-2 summarizes specific PDO requirements.

Table 14-2. Shoreland Planned Development Overlay (PDOs) Regulations

	Natural Environment Lakes	Tributary Rivers and Streams
Lot Area (Sq. ft)		
Townhome	5,000	5,000
Apartment/Condominium	2,900	2,900
Lot Width (Sq. ft)		
Townhome	150	130
Apartment/Condominium	1,150	130
Setback from OHWL	200 ft.	200 ft.
Right of Way		
Federal, State, County	40 ft.	40 ft.
Town, Public, Non-Classified	30 ft.	30 ft.
Side Yard Setback	20 ft.	20 ft.
Setback Between Buildings on Multiple Building Site	35 ft.	35 ft.
Setback to Top of Bluff	50 ft.	50 ft.

Source: City of Lino Lakes Zoning Ordinance

100-YEAR FLOODPLAIN

Figure 27-2 shows land that falls within the 100-year floodplain. Federal Emergency Management Agency (FEMA) floodplain mapping identifies the 100-year floodplain around Peltier and Rondeau Lakes, as well as along Rice, Clearwater, and Hardwood Creeks. The Zoning Ordinance and Local Water Management Plan provide permitted, conditional, and prohibited uses for Floodplain Overlay Districts in Lino Lakes. All three scenarios proposed for the AUAR area utilize permitted uses in floodplain areas. Permitted uses such as rural and open space are shown in each plan in the Regional Park and around portions of Peltier Lake and Rondeau Lake. Scenario One provides rural space around Hardwood Creek as well, while Scenario Two and Three incorporate residential and commercial space along the creek. Currently, land along Hardwood Creek is zoned as Rural and Rural/Business Reserve, which permits future residential and commercial development. Scenarios One, Two and Three provide commercial and industrial development along Clearwater Creek which is zoned Commercial and Industrial.

15. Water Surface Use. Will the project change the number or type of watercraft on any water body?
☑ Yes ☐ No

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

AUAR Guidelines: This item need only be addressed if the AUAR area would include or adjoin recreational water bodies.

RONDEAU LAKE
Currently, most of the land surrounding Rondeau Lake in the AUAR area is privately owned. Surrounding wetland vegetation and location away from roads make the lake inaccessible and no official boat access to Rondeau Lake exists within the area. Scenarios One, Two, and Three all propose that the land surrounding Rondeau Lake remain rural, therefore development of the AUAR area should not impact the existing usage of the lake.

PELTIER LAKE
The potential exists for additional watercraft on Peltier Lake as a result of developing the AUAR area. A DNR boat launch in the Regional Park on the west side of the lake is currently the only public access point. The land between Peltier Lake and Peltier Lake Drive is owned by St. Paul Water Utility. In the past, residents have had to obtain permits to construct private docks on this land. Recently, the Water Utility has been seeking variances to divide and sell the property. Residential land use and increased densities along the east side of the lake could increase demands on this property and the accompanying access.

MITIGATION SUMMARY
To combat the effect of increased water surface usage on Peltier Lake ecosystems and reduce shoreland disturbance, the City of Lino Lakes could encourage dock consolidation for new development along public and private shorelands. Impacts of increased usage on aquatic and riparian area resources and will also be mitigated by the existing No Wake Zone ordinance in the northern half of Peltier Lake.

16. Erosion and sedimentation. Give the acreage to be graded or excavated and the cubic yards of soil to be moved: _NA_ acres _NA_ cubic yards. 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

AUAR Guidelines: The number of acres to be graded and number of cubic yards of soil to be moved need not be given; instead, a general discussion of the likely earthmoving needs for development of the area should be given, with an emphasis on unusual or problem areas. In discussing mitigation measures, both the standard requirements of the local ordinances and any special measures that would be added for AUAR purposes should be included.

SOILS

The *Soil Survey of Anoka County, Minnesota* (Chamberlain, 1977) and a digitized version of this survey acquired from the NRCS were used to assess site soils and erosion/sedimentation issues within the AUAR area. The survey identifies 28 soil map units within the AUAR area. Soil unit name, symbol, slope, water erosion potential, and the hydrologic group for soils within the AUAR area, as described in the soil survey, are presented in Table 16-1.

HIGHLY ERODIBLE SOILS

According to the USDA/NRCS Highly Erodible Soil Map Unit List for Anoka County, Minnesota (October 1993), Hayden fine sandy loam, 12-24 percent slopes, is the only highly erodible soil identified within the AUAR area. Three mapped units of this soil type exist in the AUAR area. Two of these units are located north of Hardwood Creek, between I-35E and Elmcrest Avenue. The third unit is located along the southern boundary of the AUAR area, just west of I-35E. Two soils are identified as being potentially highly erodible, however the determinations were not made in the field; they are based on a typical slope percentage and length.

STEEP SLOPES

In general, the terrain of the AUAR area is flat to very gently rolling. The resolution of existing topographic data for the AUAR area (10 foot contour interval) does not allow for a detailed slope analysis to be completed. However, based on the county soil survey, steep slopes (>12%) likely occur in map units identified as Hayden fine sandy loam (HdD, 12-24% slopes) and may occur in map units identified as Braham loamy fine sand (BtC, 6-18% slopes). The three mapped units of Hayden fine sandy loam within the AUAR area are described above (under Highly Erodible Soils). Two mapped units of Braham loamy fine sand exist within the AUAR area: along I-35E, just north of Peltier Lake; and just east of 20th Avenue, south of Cedar Street.

EARTHMOVING

The scale and location of the AUAR area does not allow for a detailed discussion of grading and excavation activities that will occur as the area develops and the EQB AUAR guidelines do not require a detailed discussion. Development plans are known for some properties within the AUAR area; however it is likely that complete build-out will not occur for several decades. Earthmoving for development will include grading for streets, utilities, buildings, residential lots, and other amenities throughout the developable portions of the AUAR area. It is anticipated that stockpiles created for each phase of development will be used within a timely manner in conjunction with best management practices.

Table 16.1 Soil Characteristics within AUAR Area

Soil Name (Symbol)	% Slope	Soil Erodibility Factor (K-Factor)*	Hydrologic Group**
alluvial land/fluvaquents (Af)	nearly level	0.17	D
Blomford loamy fine sand (Bm)	nearly level	0.17	B/D
Braham loamy fine sand (BtB)	2-6	0.17	B
Braham loamy fine sand (BtC)	6-18	0.17	B
Cathro muck (Cb)	nearly level	0.00	A/D
Chetek sandy loam (CkB)	2-6	0.24	B
cut and fill land/udorthents (Cu)	---	0.24	B
Dundas loam (Du)	nearly level	0.28	C
Glencoe loam (Gc)	nearly level	0.28	C/D
Hayden fine sandy loam (HdB)	2-6	0.24	B
Hayden fine sandy loam (HdC2)	6-12	0.24	B
Hayden fine sandy loam (HdD)	12-24	0.24	B
Hubbard coarse sand (HuB)	2-6	0.15	A
Isanti fine sandy loam (Iw)	nearly level	0.20	A/D
Kratka loamy fine sand (Kr)	nearly level	0.17	B/D
lake beaches/Isan-Rushlake Complex (Lb)	nearly level	0.20	A/D
loamy wet land/Bluffton loam, depressional (Lw)	nearly level	0.28	C/D
Markey muck (Ma)	nearly level	0.00	A/D
Marsh/histosols (Mc)	nearly level	0.00	D
Millerville mucky peat (Mk)	nearly level	0.00	A/D
Nessel fine sandy loam (NeA)	1-4	0.24	B
Nowen sandy loam (No)	nearly level	0.28	B/D
Rifle mucky peat (Rf)	nearly level	0.00	A/D
Soderville fine sand (SoA)	0-4	0.15	A
water (W)	0	0.00	---
Webster loam (Wb)	nearly level	0.28	C
Zimmerman fine sand (ZmB)	2-6	0.17	A
Zimmerman fine sand (ZmC)	6-12	0.17	A

* K-Factor indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.64; the higher the value, the more susceptible the soil is to water erosion.

** Hydrologic soil groups are used to estimate runoff from precipitation: A=high infiltration rate, low runoff potential, through D=slow infiltration rate, high runoff potential.

Under Minnesota's new General Storm water Permit for Construction Activity (MNR100001) issued August 1, 2003, a NPDES/SDS permit must be obtained from the MPCA because development within the AUAR area involves disturbance of more than one (1) acre of land. Under the NPDES/SDS permit, best management practices (BMPs) will be used, and potential adverse erosion and sedimentation impacts are anticipated to be limited to short-term. The permit requires that temporary and permanent erosion and sediment control plans be completed prior to applying for the permit. Erosion control practices to be considered for use within the AUAR area include:

1. Construction of temporary sediment basins in the locations proposed for stormwater ponding, and development of these basins for permanent use following construction.
2. Silt fence and other erosion control features installed prior to initiation of earthwork and maintained until viable ground cover is established on exposed areas.

3. Street cleaning at the end of each workday and installation of a rock construction entrance to reduce tracking of dirt onto public streets.
4. Stabilization of exposed soils within 14 calendar days of completion of rough grading unless otherwise directed by the project engineer.
5. Energy dissipation, such as riprap, installed at storm sewer outfalls.
6. Use of cover crops, native seed mixes, sod, and landscaping to stabilize exposed surface soils after final grading.

Inspection and maintenance of BMPs during and after construction will be consistent with NPDES/SDS General Permit requirements, including site inspection after rainfall events, perimeter sediment control maintenance, and sediment removal. Long-term maintenance of the permanent storm water management system will be addressed in the developer's agreements with the city.

MITIGATION SUMMARY

Pre- and post-development activities will minimize runoff, improve the quality of runoff, and provide erosion control through BMPs and other low-impact development techniques such as the use of vegetated drainage swales, vegetated buffers, tree planting and mulching, and outfall stabilization. Project proposers within the AUAR area will submit detailed erosion and sediment control plans prior to project construction. These plans will undergo review and approval by the city and/or Rice Creek Watershed District. With the implementation of the above BMPs, potential adverse effects from construction-related sediment and erosion on water quality will be minimized to the extent practical. It is anticipated that potential adverse erosion and sedimentation impacts will be limited primarily to short-term effects.

Long-term erosion and sedimentation control measures that will be implemented within the AUAR area include both regional and site-specific strategies. At a regional scale (the scale of the entire AUAR area), erosion and sedimentation mitigation will be enhanced by a series of natural elements (e.g., vegetated swales, infiltration basins, and biofiltration wetlands, all planted to native vegetation), which will receive managed stormwater from individual project sites. This regional system will be located primarily within the open space/greenway connections depicted in the Conservation Design Framework (Figure 10-3). This approach to stormwater management results in greater opportunities for water filtration, biodegradation, infiltration, evaporation, and transpiration. These processes improve water quality, decrease the volume of stormwater requiring management, and decrease the rate at which managed stormwater is released into natural aquatic habitats (receiving waters). At the site scale (within individual project sites), erosion and sedimentation will be controlled using similar natural elements for stormwater management, as well as other low impact development techniques. No soils will be imported without city approval.

Ordinance Requirements

In addition to the requirements of the NPDES/SDS permit, the City of Lino Lakes has ordinances and the Rice Creek Watershed District has rules, both of which require the use of temporary and permanent erosion/sedimentation control techniques.

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.
    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.

AUAR Guidelines: For an AUAR the following additional guidance should be followed in addition to that in EAW Guidelines:

- *it is expected that an AUAR will have a detailed analysis of stormwater issues;*
- *a map of the proposed stormwater management system and of the water bodies that will receive stormwater should be provided;*
- *the description of the stormwater system should identify on-site and regional detention ponding and also indicate whether the various ponds will be new water bodies or converted existing ponds or wetlands. Where on-site ponds will be used but have not yet been designed, the discussion should indicate the design standards that will be followed.*

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.

STORMWATER MANAGEMENT ISSUES

Effective stormwater management and planning within the AUAR area is a challenging pursuit, but one that is critical to prudent and environmentally sound development. The AUAR process presents an opportunity for logical and innovative stormwater management that integrates traditional stormwater detention and water quality requirements with environmental restoration and conservation objectives. This ideal should be implemented on both a regional and site scale to minimize the impact of development on runoff rates and volumes, water quality, and the region's aquatic resources.

Watershed divides as represented by site topographic features largely represent pre-settlement conditions. The gradual establishment of these features by physical and chemical processes created a natural, stable system that could respond to hydrologic fluctuations. The introduction of modern agriculture increased runoff by limiting the system's natural ability to detain runoff flow and reduce runoff volume. This was primarily done through replacement of prairies and wetlands with tile-drained agricultural crops, the dominant land use under pre-development conditions (Figure 10.1).

Much of the site contains agricultural drainage ditches designed to manage runoff and keep fields dry for more reliable crop production. In many cases ditch and tile networks have significantly altered drainage basins and changed sub-watershed divides. It is likely that runoff amounts entering ditches will significantly increase as areas tributary to them develop. The drainage capacity of existing tile networks will be insufficient to convey stormwater runoff from further residential, commercial, or industrial development. To minimize this effect, stormwater management should be dispersed throughout the site as much as possible. Stormwater management elements employed for this function should be designed to maximize infiltration and groundwater

recharge potential. Site conditions may suggest that the potential for infiltration and recharge is minimal, but best management practices should be employed despite this. The cumulative impact of maximizing infiltration and recharge potential for all development will be to minimize ecological impacts and flooding threats throughout the AUAR project area.

Sound stormwater management philosophy encourages the utilization of the inherent ability of the site to handle runoff through re-establishment of pre-settlement watershed divides. Prior to settlement the landscape evolved through physical and chemical processes to maximize its ability to handle runoff. The stormwater management approach for the AUAR area should be to augment the inherent management potential of the site with stormwater management techniques that encourage infiltration and groundwater recharge.

In most cases maintaining or restoring pre-settlement watershed divides results in optimal conditions for the success of ecological resources. Typically the resources being protected and restored evolved in response to the presence of pre-settlement watershed divides. Restoring watershed divides will likely aid in producing hydrologic and hydraulic conditions optimal for resource protection, restoration, and creation.

There are significant logistical and legal challenges associated with the re-establishment of pre-settlement subwatershed divides. Any disconnecting of public drainage infrastructure, including tile lines, must be reviewed by the RCWD Engineer to ensure that the ditch capacity and landowner drainage rights are maintained. If such a disconnection is proposed, the proposed plan will need to be reviewed for compliance with Minnesota Statutes Section 103E.227 (impoundment & diversion proceedings) and/or Minnesota statute Section 103E.805 (abandonment proceedings) and a public hearing will be required. In the event that pre-settlement drainage divides are re-established, “benefited parties” will have opportunities to comment on, or object to, proposed changes. Mandated re-establishment of subwatershed divides is not included in the Mitigation Plan. Collection of 1-foot contour interval topographic data for new development sites are a requirement of the Mitigation Plan.

Maintaining or restoring pre-settlement subwatershed divides can be accomplished by disconnecting drainage infrastructure currently passing through watershed divides as suggested by existing site topographic mapping. Currently, for the majority of the AUAR area, this information is limited to 10-foot contour interval topographic mapping as provided by the United States Geological Survey (USGS). Development of high resolution contour interval mapping (2-foot or greater) is absolutely essential to any future development decision-making within the AUAR area.

A lack of high resolution topographic information is particularly important as new developments are designed to accommodate existing conditions, off-site sources of runoff. All new development must maintain existing conditions drainageways. Part of this accommodation is quantifying the amount of flow coming through the site. With the current level of topographic data resolution, it is unlikely that new development applicants will be able to accurately assess off-site runoff quantities. Flooding of properties may result from this condition.

Recommendations made within this AUAR document are intended to improve post-development runoff water quality; attenuate runoff release rates below stream and drainage infrastructure capacities for both frequent and occasional rainfall events; and enhance groundwater recharge as the AUAR area is developed. The AUAR area was sub-divided into 40 potential development zones (Figure 17-1). Generally, an area of prospective development is any area that is not within the FEMA 100-year floodplain and does not contain the most ecologically significant natural resources (as discussed under Item 10). Boundaries of potential development zones are largely

defined by sub-watershed divides and existing roadways. Potential development zones are further sub-divided by whether or not an area has direct access to drainageways or it is drained by an agricultural tile system. Potential development zones with access to positive surface drainage outlets (to either natural or constructed surface drainageways) total 1,536 acres, while those lacking a surface drainage outlet and are dependent on an underground tile system for drainage total 974 acres. In either case, most of the AUAR area is directly tributary to aquatic resources classified as MNDNR Public Waters, including Rondeau Lake, Peltier Lake, and Hardwood Creek.

PRE-DEVELOPMENT CONDITIONS

The AUAR area contains portions of the Rice Creek, Hardwood Creek, and Clearwater Creek watersheds. Most of the developable area within the AUAR area is mapped as hydric soils (Figure 17-1) and is used primarily for agriculture. The probable low infiltration capacity of the hydric soils suggests the area produces considerable runoff. Item 12 of this document addresses runoff sensitivity issues within the AUAR area. The site also contains very little relief, which prevents effective drainage. Thus, drainage for a large proportion of the AUAR area depends on a system of tile networks. Because runoff largely originates from agricultural areas, it is likely infused with pesticides, herbicides and fertilizer residues.

Stormwater models were used to define the peak pre-development runoff release rates (based on Rice Creek Watershed District regulatory criteria) for each potential development zone (Figure 17-1). Hydrologic modeling for the existing conditions analysis was done using XP-SWMM Version 9 and TR-55 methodology (Appendix D.1). Composite runoff curve numbers have been generated for each potential development zone (Appendix D.1.2). Runoff curve numbers used throughout this study are not to be used as regulatory parameters. The RCWD has established runoff curve numbers recommended for individual site development, and they are the definitive land cover parameters for characterizing pre- and post-development stormwater runoff. Rainfall depths for the 1-, 10-, and 100-Year rainfall events are 2.35 inches, 4.15 inches, and 5.9 inches, respectively. The SCS Type II rainfall distribution was used to distribute this rainfall over a 24-hour design event duration.

Potential development zones have been sub-divided into areas draining adjacent to free outfalls and areas requiring tile drainage (Figure 17-2). The analysis assumes that tile systems were designed to drain 2 inches of runoff over a 24-hour period to prevent crop damage. The assumption results in a site release rate for subdivisions in tile drained areas of 0.084 cubic feet per second, per acre (cfs/ac). Table 17-1 presents the results of the pre-development conditions modeling.

Table 17-1. Pre-Development Conditions Runoff Release Rates

Potential Development Zone	Tributary Area (acres)	Runoff Release Rate (cfs) Q_1	Q_{10}	Q_{100}
A-FR	6.62	3.0	12.0	23.0
C-FR	48.69	26.0	84.0	148.0
D-FR	36.98	18.0	61.0	110.0
E-FR	38.16	29.1	74.9	121.6
E-TD	53.50	4.5	4.5	4.5
F-FR	44.12	41.0	103.0	165.0
G-FR	46.04	16.0	63.0	118.0
H-FR	52.07	20.0	77.0	145.0
I-FR	64.10	45.1	116.3	190.7
I-TD	16.90	1.4	1.4	1.4
J-FR	16.17	15.0	40.0	67.0

K-FR	73.60	18.0	50.0	84.0
L-FR	63.87	15.5	44.1	75.0
L-TD	47.70	4.0	4.0	4.0
M-FR	162.49	25.0	94.2	176.8
M-TD	32.40	2.7	2.7	2.7
N-FR	8.55	4.0	16.0	29.0
O-FR	29.73	22.7	58.3	94.4
O-TD	21.30	1.8	1.8	1.8
Q-TD	276.53	23.2	23.2	23.2
R-FR	192.53	93.1	249.5	412.7
R-TD	32.80	2.8	2.8	2.8
S-TD	49.99	4.2	4.2	4.2
T-FR	71.97	45.0	120.0	198.0
U-FR	123.36	90.0	231.0	376.0
V-FR	190.14	45.9	119.5	196.6
V-TD	29.40	2.5	2.5	2.5
W-FR	13.32	7.2	19.5	32.8
W-TD	257.26	21.6	21.6	21.6
X-FR	39.28	27.0	64.0	103.0
Y-FR	59.40	22.6	60.4	100.2`
Y-TD	30.10	2.5	2.5	2.5
Z-FR	48.72	54.0	135.0	217.0
AA-FR	26.24	16.5	46.1	77.8
AA-TD	51.70	4.3	4.3	4.3
BB-FR	15.66	24.4	56.2	88.8
BB-TD	5.50	0.5	0.5	0.5
CC-FR	56.73	58.9	151.9	246.6
CC-TD	11.60	1.0	1.0	1.0
DD-FR	4.24	4.0	12.0	21.0

Notes: FR = free outfall
TD = tile-drained
Q_1 = 1-Year Event
Q_{10} = 10-Year Event
Q_{100} = 100-Year Event

POST-DEVELOPMENT CONDITIONS: SCENARIO TWO

As discussed under Item 7, three development scenarios were developed for the AUAR area. Based on qualitative analyses of spatial and statistical planned land uses, Scenario Two (Figure 6-3, Table 7-2) was chosen as the scenario that represents the most significant impact to property and receiving aquatic resources. This scenario was chosen to present a worst case scenario from a hydrologic and land use perspective. This document advocates, and the Mitigation Plan requires, implementation of regional and site-specific best management practices that will greatly reduce runoff rates and volume and enhance water quality. With the exception of the stormwater detention capacity of the designed conceptual stormwater management areas (SMAs), the beneficial impacts of these practices have not been included in the quantitative portion of this analysis.

Urbanization and development of the City of Lino Lakes as portrayed in Scenario Two will result in decreased amounts of agricultural chemicals and sediment transported into lakes and streams. The exception to this is when poorly designed or implemented erosion control plans fail during construction of development projects. Though agricultural pollutants may be decreased, an increase in constituents common to urban runoff is likely.

The design and implementation of both regional and local stormwater management plans will limit post-development runoff to pre-development rates, as required by *Rice Creek Watershed District Rules*. Total runoff volumes, however are likely to increase with increases in impervious surface due development. To minimize this impact, a runoff volume based regulatory criterion has been developed by the City. The criterion is designed to ensure that proposed conditions runoff volumes remain within a reasonable range to prevent personal property and sensitive ecological features from experiencing too much or too little flooding. This criterion is also important for increasing the stability of streams and ditches receiving runoff. Though regulatory criteria is provided to maintain proposed runoff rates below existing conditions runoff rates, failure to attenuate runoff volumes will result in the compromised stability of receiving water bodies such as Hardwood Creek, Clearwater Creek, and regional and local drainage ditches. Increased sediment flows resulting from this degradation would result in delta formation in Peltier Lake. Not only is sediment deposition enormously destructive to Peltier Lake, but it also increases difficulty of compliance with future TMDL standards. To that end, implementation of volume based stormwater release criteria is important in expediting responsible development of the AUAR area.

The volume based criterion states that proposed conditions runoff volumes must be no less than 80% and no greater than 150% of existing conditions runoff volumes for a given new development. The goal of all development within the AUAR area should be to maintain proposed conditions runoff volumes within 20% of existing conditions runoff volumes for each new development site. Dispersed stormwater management techniques that encourage runoff infiltration and groundwater recharge must be employed in addition to SMA recommendations made later in this document to achieve compliance with this criterion. Implementation of volume based runoff release rate regulatory criteria has well-established precedence throughout the United States, including in Washington County, Minnesota. The volume based release rate criterion is recommended after consultation with regulatory personnel and academics throughout the Midwest and the RCWD.

RUNOFF FLOW RATE

The hydrologic analysis of Scenario Two (Appendix D.2) showed that a majority of potential development zones would experience increases in runoff flow rate with unattenuated stormwater management (Table 17-2).

Table 17-2. Scenario Two: Unattenuated Runoff Release Rates

Potential Development Zone	Tributary Area (acres)	Runoff Release Rate (cfs)		
		Q_1	Q_{10}	Q_{100}
A-FR	6.62	4.8	15.9	28.3
C-FR	48.69	48.2	120.9	194.9
D-FR	36.98	35.9	94.6	155.5
E-FR	38.16	68.5	133.4	195.4
E-TD	53.50	95.2	199.3	299.9
F-FR	44.12	64.1	135.1	203.8
G-FR	46.04	36.9	100.2	167.8
H-FR	52.07	53.9	139.5	227.7
I-FR	64.10	48.4	123.6	201.0
I-TD	16.90	29.0	63.7	99.3
J-FR	16.17	7.4	28.5	53.0
K-FR	73.60	23.5	61.1	100.2
L-FR	63.87	66.1	171.1	279.3
L-TD	47.70	112.6	216.8	316.4

Potential Development Zone	Tributary Area (acres)	Runoff Release Rate (cfs)		
		Q_1	Q_{10}	Q_{100}
M-FR	162.49	247.8	508.6	759.9
M-TD	32.40	46.5	98.0	147.8
N-FR	8.55	10.5	25.4	41.0
O-FR	29.73	35.4	85.6	136.1
O-TD	21.30	55.0	112.2	167.3
Q-TD	276.53	224.7	527.4	830.0
R-FR	192.53	111.7	281.0	454.7
R-TD	32.80	45.5	98.4	149.9
S-TD	49.99	23.8	63.8	105.6
T-FR	71.97	88.1	186.0	280.8
U-FR	123.36	95.8	238.9	384.6
V-FR	190.14	86.1	183.1	277.7
V-TD	29.40	93.5	212.6	330.4
W-FR	13.32	17.9	37.9	57.3
W-TD	257.26	288.5	573.8	847.7
X-FR	39.28	51.7	103.6	153.5
Y-FR	59.40	122.6	252.6	377.8
Y-TD	30.10	67.6	132.2	194.2
Z-FR	48.72	59.6	144.9	231.1
AA-FR	26.24	54.0	111.3	166.5
AA-TD	51.70	81.6	170.6	256.5
BB-FR	15.66	31.0	64.5	97.4
BB-TD	5.50	10.9	22.6	34.1
CC-FR	56.73	83.4	181.1	276.4
CC-TD	11.60	20.8	46.2	71.0
DD-FR	4.24	7.9	16.8	25.6

Notes: FR = free outfall
TD = tile-drained
Q_1 = 1-Year Event
Q_{10} = 10-Year Event
Q_{100} = 100-Year Event

PERMANENT CONTROLS TO MANAGE OR TREAT RUNOFF

The stormwater management plan will improve stormwater quality, increase infiltration, maximize groundwater recharge, reduce peak stormwater discharge rates, and regulate runoff volume releases from the AUAR area through the use of dispersed stormwater management practices throughout the AUAR site and stormwater management areas (SMAs). Dispersed stormwater management will entail collection, conveyance, and management of stormwater runoff through the use of bio-swales, rain gardens, and infiltration areas. Conceptual SMAs have been designed and are discussed in detail later in this document. Any development within the Lino Lakes AUAR area must comply with all stormwater management criteria outlined in *Rice Creek Watershed District Rules*.

Vegetated /Bio-Swales

Vegetated swales, as defined by the MPCA in *Protecting Water Quality in Urban Areas - Best Management Practices for Dealing with Storm Water Runoff from Urban, Suburban, and Developing Areas of MN* (2000), are "…earthen conveyance systems in which pollutants are removed from urban storm water by filtration through the grass and infiltration through the soil. The primary purpose of these structures is often conveyance, but they differ from conveyance channels because water quality and quantity benefits are part of the design considerations.

Enhanced vegetated swales, or biofilters, utilize check dams and wide depressions and off-channel retention areas to increase runoff storage and promote greater setting of pollutants." Appropriate design of vegetated swales and biofilters (e.g., gentle slopes, diverse native vegetation, etc.) can provide storm water management functions as well as wildlife habitat/corridors and attractive natural open space.

Mitigated Runoff Release Rates

The Mitigation Plan establishes sizing criteria for SMAs that are designed to support wetland complexes or large infiltrating surfaces with native plant populations. To create conditions appropriate for these two types of stormwater management features, SMAs were designed to experience maximum water surface fluctuations of less than 2.5 feet and contain basin side slopes less than or equal to 6:1, horizontal to vertical. Permanent open water cannot exceed 20%of the total surface area of a given SMA. Emergent wetland is considered to be open water, as this feature infiltrates negligible amounts of water. The remaining 80% of surface area should be populated with mesic prairie or wet prairie plant communities and not permanently inundated to maximize infiltration potential.

Computer models were created to simulate the hydraulics of conceptual SMAs. Outlets for each SMA were designed to maintain proposed conditions runoff release rates below existing conditions runoff release rates for rainfall events of 1-, 10-, and 100-Year recurrence intervals (Table 17-3). The regulatory maximum site release rates for proposed conditions are based on the lesser of the existing tile system capacity or the *Rice Creek Watershed District Rules*. Rating curves were input to simulate three-stage outlets for detention of these rainfall events. Outlets for the 1-, 10-, and 100-Year rainfall events had invert elevations at SMA depths of 0.75-, 1.25-, and 2.5-feet, respectively.

Table 17-3. Scenario Two: Attenuated Runoff Release Rates

Potential Development Zone	Tributary Area (acres)	Runoff Release Rate (cfs)		
		Q_1	Q_{10}	Q_{100}
A-FR	6.62	2.9	12.5	19.0
C-FR	48.69	37.0	99.1	146.8
D-FR	36.98	18.8	70.5	105.8
E-FR	38.16	47.5	89.4	118.8
E-TD	53.50	1.4	2.9	4.4
F-FR	44.12	56.1	115.0	159.5
G-FR	46.04	20.8	75.2	115.2
H-FR	52.07	25.6	94.4	144.4
I-FR	64.10	45.9	119.3	191.0
I-TD	16.90	0.4	0.8	1.2
J-FR	16.17	6.9	24.1	44.9
K-FR	73.60	16.8	52.2	77.7
L-FR	63.87	13.9	52.0	75.0
L-TD	47.70	1.4	2.7	4.0
M-FR	162.49	41.3	120.1	173.9
M-TD	32.40	0.8	1.8	2.7
N-FR	8.55	3.5	16.2	22.8
O-FR	29.73	24.3	64.8	93.5
O-TD	21.30	0.5	1.0	1.5
Q-TD	276.53	5.8	13.4	21.1
R-FR	192.53	105.4	264.1	411.7
R-TD	32.80	0.7	1.6	2.4
S-TD	49.99	1.0	2.4	3.9

Potential Development Zone	Tributary Area (acres)	Runoff Release Rate (cfs) Q_1	Q_{10}	Q_{100}
T-FR	71.97	64.6	138.4	197.1
U-FR	123.36	88.9	227.3	365.1
V-FR	190.14	55.1	129.0	179.4
V-TD	29.40	1.9	4.2	6.5
W-FR	13.32	8.4	21.1	28.5
W-TD	257.26	6.5	13.3	19.9
X-FR	39.28	34.8	70.5	93.5
Y-FR	59.40	38.8	81.6	100.0
Y-TD	30.10	0.8	1.6	2.3
Z-FR	48.72	44.5	117.2	174.0
AA-FR	26.24	24.1	54.8	75.9
AA-TD	51.70	1.3	2.8	4.2
BB-FR	15.66	25.9	57.9	76.6
BB-TD	5.50	0.1	0.3	0.4
CC-FR	56.73	71.6	158.0	228.7
CC-TD	11.60	0.2	0.5	0.8
DD-FR	4.24	6.5	13.6	18.2

Notes: FR = free outfall
TD = tile-drained
Q_1 = 1-Year Event
Q_{10} = 10-Year Event
Q_{100} = 100-Year Event

RUNOFF VOLUME ANALYSIS (BOTH PRE- AND POST-DEVELOPMENT)

Runoff volumes for the 1-, 10-, and 100-year storm events were extracted from XP-SWMM modeling results (Table 17-4). These results suggest that the large proportions of impervious surface associated with commercial and industrial land uses can produce significant increases in runoff volume from pre- to post-development conditions.

Table 17-4. Runoff Volume Comparison

Potential Development Zone	Pre-Development Runoff Volume (ac-ft) 1-Yr	10-Yr	100-Yr	Scenario 2 Runoff Volume (ac-ft) 1-Yr	10-Yr	100-Yr
A-FR	0.3	0.9	1.7	0.4	1.1	1.9
C-FR	2.8	8.2	14.2	4.3	10.5	17.0
D-FR	1.9	5.8	10.2	3.0	7.8	12.8
E-FR	3.6	8.6	13.9	5.7	11.5	17.2
E-TD	4.1	10.6	17.5	6.6	14.1	21.6
F-FR	4.0	9.8	16.0	5.3	11.4	17.6
G-FR	2.0	6.4	11.6	3.4	9.0	15.0
H-FR	2.1	7.1	13.1	4.1	10.6	17.5
I-FR	5.0	12.8	21.0	5.4	13.4	21.9
I-TD	1.7	3.9	6.3	1.8	4.1	6.5
J-FR	1.1	3.1	5.2	0.7	2.4	4.4
K-FR	5.5	14.4	24.1	6.2	15.4	25.3
L-FR	3.2	9.8	17.4	5.1	13.0	21.5
L-TD	4.6	11.2	18.0	7.4	14.8	22.2
M-FR	7.2	23.3	42.3	20.7	43.3	65.9
M-TD	1.4	4.5	8.2	3.9	8.3	12.7
N-FR	0.4	1.3	2.4	0.8	1.9	3.1

Potential Development Zone	Pre-Development Runoff Volume (ac-ft)			Scenario 2 Runoff Volume (ac-ft)		
	1-Yr	10-Yr	100-Yr	1-Yr	10-Yr	100-Yr
O-FR	2.0	5.4	9.1	2.7	6.5	10.6
O-TD	2.3	5.3	8.4	3.0	6.4	9.7
Q-TD	21.9	56.0	92.5	28.1	65.8	104.6
R-FR	14.6	38.0	63.4	16.9	41.2	66.8
R-TD	3.3	7.6	12.2	3.8	8.3	12.8
S-TD	3.9	10.0	16.5	3.9	10.0	16.5
T-FR	5.8	15.0	24.8	8.6	18.5	28.4
U-FR	10.3	25.7	42.0	10.9	26.4	42.9
V-FR	16.0	39.2	63.8	22.5	48.3	74.1
V-TD	6.4	16.8	28.0	9.0	20.6	32.5
W-FR	1.0	2.6	4.3	1.6	3.4	5.3
W-TD	21.0	53.3	87.7	34.7	71.4	107.5
X-FR	4.0	9.6	15.4	5.9	12.2	18.4
Y-FR	4.5	11.7	19.5	7.8	16.7	25.7
Y-TD	2.5	6.3	10.1	4.4	8.9	13.3
Z-FR	7.1	19.0	31.9	9.5	22.6	36.3
AA-FR	1.9	5.1	8.6	3.4	7.4	11.3
AA-TD	3.6	9.6	16.2	6.4	13.8	21.2
BB-FR	1.5	3.6	5.8	2.0	4.2	6.5
BB-TD	0.5	1.3	2.0	0.7	1.5	2.3
CC-FR	4.5	11.5	11.7	6.3	14.1	22.1
CC-TD	0.9	2.4	2.5	1.3	3.0	4.7
DD-FR	0.3	0.8	1.3	0.5	1.1	1.7

Notes: FR = free outfall TD = tile-drained

Recommended Surface Area for Stormwater Management

SMA sizing criteria provided a basis for defining recommended surface area for stormwater management for each potential development zone (Table 17-5). Each SMA was assumed to be rectangular, and sized for a 100-year water surface fluctuation of 2.5 feet with 0.75 feet of freeboard. Side slopes were designed with a horizontal to vertical ratio of 6:1. Iterations were conducted to increase the 100-Year SMA depth to 2.5 feet to minimize the amount of SMA surface area needed for stormwater management. Potential infiltration in each SMA was not included in the optimization of SMA surface area, adding to the conservative nature of the surface areas recommended in Table 17-5 and appearing in Figure 17-3. The hydraulic characteristics of the SMAs will support native wetland vegetation. In general, tile-drained potential development zones with commercial and industrial land uses require the most surface area for stormwater management (Figure 17-3).

Table 17-5. Scenario Two: Recommended Surface Area for Stormwater Management

Potential Development Zone	100-Year Runoff Pre-Development Conditions (cfs)	100-Year Runoff Unattenuated Scenario 2 (cfs)	Recommended SMA Area (acres)
A-FR	23.0	28.3	0.13
C-FR	148.0	194.9	1.09
D-FR	110.0	155.5	1.09
E-FR	121.6	195.4	1.51
E-TD	4.5	299.9	10.29
F-FR	165.0	203.8	0.99
G-FR	118.0	167.8	1.20
H-FR	145.0	227.7	1.61
I-FR	190.7	201.0	0.00
I-TD	1.4	99.3	2.60
J-FR	67.0	53.0	0.00
K-FR	84.0	100.2	2.13
L-FR	75.0	279.3	3.37
L-TD	4.0	316.4	7.35
M-FR	176.8	759.9	12.32
M-TD	2.7	147.8	4.29
N-FR	29.0	41.0	0.57
O-FR	94.4	136.1	0.83
O-TD	1.8	167.3	4.19
Q-TD	23.2	830.0	35.54
R-FR	412.7	454.7	2.00
R-TD	2.8	149.9	4.90
S-TD	4.2	105.6	5.50
T-FR	198.0	280.8	1.75
U-FR	376.0	384.6	0.75
V-FR	196.6	277.7	36.80
V-TD	2.5	330.4	2.65
W-FR	32.8	57.3	8.26
W-TD	21.6	847.7	11.51
X-FR	103.0	153.5	1.72
Y-FR	100.2	377.8	3.37
Y-TD	2.5	194.2	5.00
Z-FR	217.0	231.1	2.65
AA-FR	77.8	166.5	1.35
AA-TD	4.3	256.5	7.14
BB-FR	88.8	97.4	0.46
BB-TD	0.5	34.1	1.09
CC-FR	246.6	276.4	0.30
CC-TD	1.0	71.0	2.13
DD-FR	21.0	25.6	0.19

Notes: FR = free outfall
TD = tile-drained

Information presented in Table 17-5 and Figure 17-3 is to be used by planning personnel as a tool to ascertain how much area will likely be required for stormwater management in a given development zone. The amount of area allocated to stormwater management is not mandatory; however, most of the criteria used to approximate these numbers are either required by RCWD or the Mitigation Plan. The results do not represent stormwater criteria that in any way change development permits required by RCWD or any other agency. Additionally, surface areas estimates were conservative, as basins were assumed to be rectangular in shape; a highly inefficient use of space.

Infiltration

The mitigation of stormwater runoff volume via enhanced infiltration and groundwater recharge is critical to the health of ecological resources fed by groundwater and the stability of streams and water bodies receiving runoff. Implementation of all appropriate runoff infiltration and groundwater recharge enhancement techniques are encouraged for development within the AUAR area. An action that is consistent with this approach is to limit permanent open water or emergent wetland in SMAs to 20% of their total surface area. The remaining portion of the SMA should be populated with mesic prairie or wet prairie plant communities and not permanently inundated. Reports of high groundwater tables and shallow clay layers create challenges for enhancement of infiltration and groundwater recharge, but creating SMAs with these characteristics will maximize infiltration potential.

The role of native prairie plant species is critical in areas that were previously under agricultural land uses, because deep-rooted native plants create preferential infiltration and groundwater recharge pathways through hardpan layers. Hardpan layers are common areas previously under row crop land uses due to repeated tillage of soil at the same depth.

Rice Creek Watershed District (RCWD) criteria require that all developments infiltrate runoff volumes generated from the mean rainfall event (0.34 inches) within a 72-hour period. The Minnesota Pollution Control Agency (MPCA) has NPDES requirements that mandate the infiltration of the runoff from this storm in 48 hours. Because this criterion is more restrictive, it should be used whenever possible. The MPCA also requires 3 feet of separation between infiltration facilities and groundwater when feasible.

Computer Modeling results suggest SMAs having the geometry outlined in the Mitigation Plan and containing plant and open water characteristics outlined previously will meet infiltration criteria required by *Rice Creek Watershed District Rules*. Modeling results are primarily due to the large infiltrating surface area of the assumed SMA geometry, and don't consider the role of native plant species. The infiltration rate in non-open water portions of SMAs was assumed to be 0.03 in/hr, which is the RCWD recommended infiltration rate for Type D soils (SCS Hydrologic Soil Group). Portions of SMAs with open water or emergent wetland were considered to have a negligible infiltration rate.

If insufficient infiltration is provided by SMAs, infiltration facilities meeting RCWD and MPCA criteria must be provided by the developer. Additional infiltration will be provided within dispersed stormwater management systems within each development that collect and infiltrate runoff through the use of bio-swales, rain gardens, and infiltration areas.

The RCWD requirement of on-site infiltration best management practices can be satisfied with a regional infiltration system design, though this arrangement is not yet established. In the future, the RCWD may allow each stormwater applicant to receive infiltration credits based on their relative contribution to the regional infiltration feature and its overall infiltration capacity. For

example, if a developer owns 3% of an area tributary to a regional infiltration feature, that entity could utilize 3% of the infiltration capacity of the feature for that entity's infiltration requirement. Any infiltration features within the AUAR area should be designed to utilize the water consumption characteristics of native plant species. Infiltration in these facilities should be augmented with large herbaceous and woody plant species (e.g., aspen and cottonwood), as they remove significant quantities of water through transpiration. This evapotranspiration enhancement technique is particularly critical in the AUAR area because the MPCA 3-foot facility separation from groundwater will be very difficult to achieve in many areas.

MITIGATION SUMMARY

Stormwater Management Areas

Stormwater management areas (SMAs) will play a critical role in mitigating potential impacts from stormwater following development of the AUAR area. Appropriate design, construction, and maintenance of these areas will enable development to occur without compromising the integrity of the region's aquatic resources.

Conservation Design Framework (CDF)

The stormwater management approach outlined in this document provides adequate detention of runoff for post-development conditions. It also provides a framework for water quality enhancement and increased groundwater recharge. The stormwater detention facility design will provide hydraulic properties appropriate for native plant species to thrive. All of these factors will help mitigate potential water quality problems associated with development in the AUAR area.

This approach, however, in many cases requires the allocation of large portions of potential development zones for stormwater management. The potential development zones requiring the greatest surface area for stormwater management are those considered to be drained by tile networks. Providing regional surface drainage infrastructure with greater drainage capacities will decrease the amount of surface area required for stormwater management. This regional drainage infrastructure must also address water quality concerns as they will be directly tributary to Clearwater Creek, Hardwood Creek, and the Rice Creek Chain of Lakes.

The most effective approach to addressing these issues simultaneously uses an integrated system of stormwater management elements, and the Conservation Design Framework (CDF) provides an appropriate layout for its regional implementation (Figure 10-3). Within the greenway corridors shown in the CDF, bio-swales, wet prairie, and wetlands can be oriented in series to effectively retard runoff rates, reduce stormwater volume, and enhance water quality. Runoff rates and volumes are decreased due to increased infiltration, evapotranspiration, and increased friction imparted on the flow. These decreased rates also reduce the ability of runoff to generate and carry sediment and associated pollutants.

The hydric soils throughout the AUAR area will pose problems for achieving infiltration criteria as outlined in the *Rice Creek Watershed Rules*. Native wetland and prairie plants are particularly useful for achieving infiltration requirements under these conditions, because they use large amounts of water and create preferential infiltration pathways. The greenway corridors established in the CDF provide appropriate locations for these types of infiltration facilities. The location and expansiveness of these corridors could provide the necessary surface area for the shared infiltration facilities discussed previously in this document.

Additional Stormwater Management Techniques
The City and RCWD will consider the use of additional stormwater management techniques when specific development proposals are submitted for review in the future. The appropriateness of such techniques will be evaluated by the City and RCWD based on soil suitability and compatibility with future development proposals. The following is a list of additional stormwater management recommendations:

- Adhere to surface area recommendations for stormwater management (Figure 17-3).
- During site design, follow low impact development practices, such as increased open space, disconnected and minimized impervious surfaces, capitalizing on high infiltration capacity soils, and dispersed stormwater management.
- In residential development areas, use of a combination of side and rear lot drainage easements that are no-mow zones planted with formal or informal native landscaping. The rear lot areas would be designed for infiltration, and side lot areas would be designed for effective drainage and conveyance of water from around foundations to ensure no standing water remains adjacent to the houses.
- Route driveway, sidewalk and gutter downspout waters into rain gardens and infiltration areas. This can be accomplished without compromising safe and effective drainage and dewatering needs around foundations and road subgrades.
- Route road runoff into parkway and road ROW swales, rain gardens, and infiltration areas.
- Route parking lot runoff into bio-swales, parking lot islands, and other suitable locations that support infiltration.

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.

- *AUAR Guidelines: if present in or adjoining the AUAR area, the following types of water bodies must be given special analyses:*
  - *<u>lakes:</u> within the Twin Cities metro area a nutrient budget analysis must be prepared for any "priority lake" identified by the Metropolitan Council (see Appendix E of EAW Guidelines (1990) or contact the Council staff. Outside of the metro area, lakes needing a nutrient budget analysis must be determined by consultation with the MPCA and DNR staffs;*
  - *<u>trout streams:</u> if stormwater discharges will enter or affect a trout stream an evaluation of the impacts on the chemical composition and temperature regime of the stream and the consequent impacts on the trout population (and other species of concern) must be included;*

RECEIVING WATER BODIES DISCUSSION
Implementing a management scheme that focuses on regional stormwater management involves taking a holistic view of the AUAR area and its associated watersheds. Understanding existing hydrologic regimes is critical in establishing a regulatory framework that ensures the safety of people, property, and natural resources. Prior to European settlement, precipitation was distributed between the watersheds of Clearwater Creek, Hardwood Creek, and the Rice Creek Chain of Lakes (Figure 17-4). This continues to be the case today, but the distribution of water between each of these receiving features has changed due to agricultural and residential development, as has the quality of the runoff.

The runoff volume into the receiving waters will likely increase with development due to the increased impervious area constructed in the AUAR area. However, with the stormwater management requirements and recommendations outlined in this document, peak runoff release rates will be decreased from storms of 1-, 10-, and 100-year recurrence intervals. The recommended large area stormwater management elements will result in relatively small water level fluctuations, provide area to enhance the groundwater recharge necessary to provide base flow to the receiving streams, and provide the detention time necessary to cleanse the runoff of contaminants and meter the increased runoff volume to an amount within the receiving streams ecological carrying capacity.

NUTRIENT BUDGET ANALYSIS

A nutrient budget analysis is required if activities from a project may affect lakes identified as a "priority lake" in the EAW Guidelines (Environmental Quality Board, 2000). The proposed development will cause an increase in stormwater volume entering Peltier Lake and Rondeau Lake, of which Peltier Lake is identified as a priority lake by the Metropolitan Council.

Sound watershed management requires an understanding of chemical components within stormwater runoff. One of the groups of constituents having the most detrimental effects on lakes, rivers, and streams is nutrients. At high concentrations they can be toxic to fish and plant species, but even in relatively small concentrations they can have profound effects on natural systems. Often times the nutrients that are most damaging are the phosphorus and nitrate species. These two subsets of the nutrient family expedite the process of eutrophication in lakes, which can destroy native ecosystems and make the system undesirable for recreation and water supply. Any development in the AUAR area should have a "no net release" total phosphorus policy to prevent further eutrophication of downstream water bodies. This premise is particularly applicable to Peltier Lake, one of the Twin Cities most eutrophied lakes according to MPCA staff.

The Minnesota Pollution Control Agency (MPCA) has established a list of impaired waters, which includes several of the systems within, or downstream of, the AUAR area. These systems include Peltier Lake, Rondeau Lake, and Hardwood Creek. Nutrient budget analyses are required for priority lakes within the AUAR area. These analyses focused on phosphorus, because it is one of the major contributors to water quality problems associated with development. It is also a nutrient that can be mitigated quite well if the problem is understood. Effective mitigation of total phosphorus can be achieved through responsible land use practices and stormwater design. Two models were used in for these analyses: the Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) Model[1] and the Reckhow and Simpson Model[2]. The MINLEAP model was chosen to approximate total phosphorus loading within each watershed on an annual basis. The Reckhow and Simpson Model was used to compare pre- and post-development total phosphorus loading originating from potential development zones in the AUAR area.

Watershed Analysis

The MINLEAP model was chosen to analyze total phosphorus loading in each priority lake watershed, because it can provide meaningful results despite a lack of high resolution site data. The model was designed as a screening tool for identifying problem waters. It utilizes water and phosphorus balances and a network of empirical models to predict total phosphorus, chlorophyll-a, and transparency values. Input parameters were taken from the Rice Creek Watershed District

1 Wilson, C.B. and W.W. Walker. 1989. Development of lake assessment methods based upon the aquatic ecoregion concept. Lake and Reservoir Management. 5(2): 11-22.

2 Reckhow, K.H. and J.T. Simpson. 1980 as designed by Wilson, B. (1994). A Procedure Using Modeling and Error Analysis for the Prediction of the Lake Phosphorus Concentration from Land Information. Canadian Journal of Fishery Aquatic Sciences. 37:1439-1448

(Table 17-6). Ecoregion mapping was obtained from the United States Environmental Protection Agency (USEPA) (Omerink and Gallant, 1988)[3] Results from the analysis (Table 17-7) are regional in nature and should be calibrated with field data.

Table 17-6: Input parameters for MINLEAP analysis for Peltier Lake and Rondeau Lake

Parameter	Peltier Lake	Rondeau Lake
Watershed Area (ac)	65,989	3,448
Lake Area (ac)	483	275
Mean Lake Depth (ft)	7	3
Observed Summer-Mean Total P (ppb)	150	44
In-Lake Chlorophyll Concentration (ppb)	75	5
Mean Secchi Disk Depth (ft)	1.1	0.75
Ecoregion	CHF	CHF

Table 17-7: Results from MINLEAP analysis for Peltier Lake and Rondeau Lake

Results	Peltier Lake	Rondeau Lake
Predicted Summer-Mean Total P (ppb)	99	74
Average Total P Inflow (ppb)	149	162
Total P Load (lbs/yr)	11,457	665
P Retention Coefficient	0.34	0.55
Lake Outflow (cfs)	38.96	2.08
Residence Time (yr)	0.1	0.5

Site Analysis

An analysis was completed to evaluate the amount of pre- and post-development non-point source phosphorus pollution generated from potential development zones in the AUAR area. This analysis does not include areas outside of the potential development zones established previously. Additionally, Peltier Lake was the only lake analyzed, because none of the potential development zones are tributary to Rondeau Lake.

The Reckhow and Simpson method utilizes land use information and empirically based export coefficients to approximate total phosphorus loading to lakes. The potential development zones were categorized by five different land use types: urban, agricultural, forest, wetlands, and open space. The surface areas associated with these land uses were then combined with empirical coefficients resulting in approximations of annual amounts of total phosphorus deposition in Peltier Lake. Results from the analysis (Table 17-8) suggest an increase from pre- to post-development conditions in total phosphorus deposition in Peltier Lake of 130% for small export coefficients and 65% for large export coefficients, if water quality treatment (as proposed through the use of SMAs) is not taken into account.

3 Omernik, J and A. Gallant. 1988. Ecoregions of the Upper Midwest States. EPA/600/3-88-037. U.S. Environmental Protection Agency, Washington D.C.

Table 17-8. Peltier Lake Total Phosphorus Loading Results

Pre-Development	Urban	Agricultural	Forest	Wetlands	Open Space	***Total***
Area (ac)	403	1784	40	104	119	**2450**
Phosphorus Export Coefficient (kg/acre-yr)	0.75-1.25	0.20-0.60	0.10-0.15	0.10	0.20-0.40	**NA**
Phosphorus Loading (kg/yr)	122-204	144-433	2	4	10-19	**282-662**

Post-Development	Urban	Agricultural	Forest	Wetlands	Open Space	***Total***
Area (ac)	2034	104	0	89	223	**2450**
Phosphorus Export Coefficient (kg/acre-yr)	0.75-1.25	0.20-0.60	0.10-0.15	0.10	0.20-0.40	**NA**
Phosphorus Loading (kg/yr)	617-1029	8-25	0	4	18-36	**647-1094**

MITIGATION SUMMARY

Results of the nutrient budget analysis suggest that mitigation will be required to prevent non-point source pollution in the form of total phosphorus from being deposited in Peltier Lake. Any development within the AUAR area should provide runoff treatment facilities and land uses that result in no increases in total phosphorus leaving the site. Facilities to achieve this objective were not designed as part of this analysis, however the stormwater management system discussed previously can provide an optimal design framework for nutrient removal. Dispersed stormwater management emphasizing infiltration as the treatment mechanism will optimize phosphorus removal. The use of constructed treatment wetlands for stormwater detention will enhance sediment removal, greatly decreasing quantities of non-soluble phosphorus reaching Peltier Lake, Hardwood Creek, and Clearwater Creek. The goal of the implementation of best management practices such as rain gardens, infiltration galleries, buffer strips, designed wetlands, bio-swales, and sedimentation basins should be no net increases in total phosphorus leaving a given development site.

18. Water Quality - Wastewater
    a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.
    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.
    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.
    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.

AUAR Guidelines: Observe the following points of guidance in an AUAR:

- *only domestic wastewater should be considered in an AUAR - industrial wastewater would be coming from industrial uses that are excluded from review through an AUAR process;*
- *wastewater flows should be estimated by land use subareas of the AUAR area; the basis of flow estimates should be explained;*
- *the major sewer system features should be shown on a map and the expected flows should be identified;*
- *if not explained under item 6, the expected staging of the sewer system construction should be described;*
- *the relationship of the sewer system extension to the RGU's comprehensive sewer plan and (for metro area AUARs) to Metropolitan Council regional systems plans, including MUSA expansions, should be discussed. For non-metro area AUARs, the AUAR must discuss the capacity of the RGU's wastewater treatment system compared to the flows from the AUAR area; any necessary improvements should be described;*
- *if on-site systems will serve part of the AUAR the guidance in EAW Guidelines (pages 16-17) should be followed.*

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

SOURCES AND COMPOSITION

Wastewater production estimates are based on the proposed land uses in Scenarios One, Two, and Three, including residential, commercial, and industrial land uses. It should be noted that industrial development is expected to be limited to office/warehouse and light manufacturing uses, and will generate wastes similar in character to normal domestic wastes. Discharge of process water or other wastewater containing industrial contaminants is not anticipated. If such uses are proposed appropriate environmental review (i.e., EAW, EIS) will be required in accordance with Mn Rules Chapter 4410.

QUANTITY OF WASTEWATER

The types and amounts of wastewater produced will be typical of residential, commercial, and light industrial uses. Both the Minnesota Pollution Control Agency (MPCA) and the Metropolitan Council Environmental Services (MCES) have compiled and documented extensive data that relates wastewater flow generation to population and land use. This information is used as the city's basis for estimating the wastewater design flows and peaking design conditions to determine the size and capacity of the existing and future sewer system. Additionally, the city has developed the *Draft Comprehensive Sanitary Sewer Plan* that outlines the improvements needed to the existing system to support future development throughout the city, including the AUAR area.

Sanitary wastewater production was estimated based on the methods outlined in the Service Availability Charge (SAC) Procedures Manual (MCES, 2000). The MCES has established 274 gallons per day (gpd) to be the average daily wastewater production from a typical residential connection. One SAC unit is defined as 274 gallons of wastewater flow volume, which is based on the assumption of 2.74 persons per unit and 100 gallons per capita day (gpcd) of wastewater production. Wastewater production for residential development in Lino Lakes has been estimated using the 274 gpd value for each residential unit including both detached and attached housing units.

Wastewater generation rates for commercial and industrial land uses are highly variable. A relatively conservative value of 1500 gallons per day (gpd) per acre of commercial or industrial land has been used for sewer planning throughout the city, including the AUAR area.

Land use and population forecasts used in the *Draft Comprehensive Sanitary Sewer Plan* were based on the city's Comprehensive Plan, with one major exception: areas shown as Rural Land Use in the 2002 Comprehensive Plan were assumed to eventually be converted to Low Density Sewered Residential use. Sanitary sewer flow projections were developed for this scenario, henceforth referred to as the "Comprehensive Sewer Plan Scenario." Subsequently, three additional development scenarios, referred to as Scenarios One, Two, and Three, were developed for the AUAR area.

Estimated sanitary sewer flows for the Comprehensive Sewer Plan Scenario and Scenarios One, Two, and Three are summarized below. It should be noted that the AUAR area includes approximately 154 acres (134 acres developable) in the City of Centerville. This area was not included in the Lino Lakes *Draft Comprehensive Sanitary Sewer Plan*, but has been added to the Comprehensive Sewer Plan Scenario for comparison purposes. Projected development for the area in Centerville is the same for all scenarios, and includes 14 acres high density residential, 28 acres commercial, and 92 acres industrial use.

COMPREHENSIVE SEWER PLAN SCENARIO

Projected development includes 3550 residential units (total of low-density, medium-density, and high-density residential areas) as well as 1330 acres of commercial and industrial land. All residential units are assumed to equal one SAC unit per dwelling. The estimated potential daily wastewater production for the AUAR area under this scenario is 2.968 million gallons per day (MGD). Estimated wastewater production based on land use is as follows.

Residential: 3550 units at 274 gpd/unit = 0.973 MGD
Commercial/industrial: 1330 acres at 1500 gpd/acre = 1.995 MGD
Total = 2.968 MGD

Flow estimates based on this scenario were provided to the Metropolitan Council Environmental Services (MCES) in March 2005, and are being used as the basis for planning future MCES interceptor sewers serving Lino Lakes and neighboring communities. See subsequent discussion of MCES facilities.

SCENARIO ONE

This scenario projects 2113 sewered residential units, 274 acres commercial and 1026 acres industrial development. Large areas of the AUAR area are assumed to remain in rural (un-sewered) land use under Scenario One. Estimated potential daily wastewater production is 2.529 MGD, summarized as follows.

Residential:	2113 units at 274 gpd/unit =	0.579 MGD
Commercial:	274 acres at 1500 gpd/acre =	0.411 MGD
Industrial:	1026 acres at 1500 gpd/acre =	1.539 MGD
		Total = 2.529 MGD

SCENARIO TWO

Projected development includes 5671 residential units, 516 acres commercial, and 879 acres industrial. Estimated potential daily wastewater production is 3.646 MGD, summarized as follows.

Residential:	5671 units at 274 gpd/unit =	1.554 MGD
Commercial:	516 acres at 1500 gpd/acre =	0.774 MGD
Industrial:	879 acres at 1500 gpd/acre =	1.318 MGD
		Total = 3.646 MGD

SCENARIO THREE

This scenario projects 8616 sewered residential units, 380 acres commercial, and 535 acres industrial. Estimated potential daily wastewater production is 3.733 MGD, summarized as follows.

Residential:	8616 units at 274 gpd/unit =	2.361 MGD
Commercial:	380 acres at 1500 gpd/acre =	0.570 MGD
Industrial:	535 acres at 1500 gpd/acre =	0.802 MGD
		Total = 3.733 MGD

Note that projected flows for both Scenarios Two and Three are significantly higher than the flow projections previously provided to MCES.

CITY SEWER SYSTEM EXPANSION

The existing Lino Lakes sewer system serves only a small portion of the AUAR area, bounded by Cedar Street on the south and Main Street (CSAH 14) on the north. Major existing facilities in this area include Lift Station 7, located east of I-35E near Cedar Street; a trunk sewer extending north along Otter Lake Road from Lift Station 7 to Main Street; Lift Station 8, located on 21st Avenue south of Main Street; and a trunk sewer extending north along 21st Avenue from Lift Station 8 to Main Street. The existing lift stations and trunk sewers are designed to permit future expansion to serve limited areas north of Main Street. However, service to the entire AUAR area is not currently feasible due to the limited capacity of the MCES Centerville Interceptor (Interceptor 97-08) located in Cedar Street. See subsequent discussion of MCES facilities.

The *Draft Comprehensive Sanitary Sewer Plan* includes a schematic layout of major sanitary sewer facilities required to extend sewer service into the area north of Main Street. The facilities include major gravity trunk sewers located both east and west of I-35E (extending north along future extensions of Otter Lake Road and 21st Avenue, respectively). Several major lift stations and associated forcemains are also proposed, discharging into the two major trunk sewers. Local sewer systems, constructed in conjunction with future land development, will connect to the major trunk sewers and lift stations. Local sewer systems are not shown in the *Draft Comprehensive Sanitary Sewer Plan*.

The planned expansion of the city sewer system is based on the assumption that MCES will provide additional capacity to serve the anticipated development by construction of a new interceptor in the vicinity of Main Street. MCES is currently in the early stages of design.

The *Draft Comprehensive Sanitary Sewer Plan* includes a Capital Improvement Plan for phased expansion of the trunk sanitary sewer system. The phasing plan provides for system expansion to progress northward from Main Street over the 2006 to 2030 period. The northerly portion of the AUAR area, from 80th Street north to the corporate boundary, will likely not be served by sanitary sewer until 2020 or later.

MCES INTERCEPTOR SYSTEM EXPANSION

The City of Lino Lakes *Draft Comprehensive Sanitary Sewer Plan* prepared in 2003 evaluated comprehensive sewer system requirements needed from the present to the year 2030. This plan included recommendations for addressing existing and future needs in the northeastern portion of the city. The plan was submitted to state and local agencies for comments, including Metropolitan Council Environmental Services (MCES).

All wastewater generated in the AUAR area (with the exception of private systems) is collected and treated per the MCES system. Future growth and expansion in the AUAR will necessitate additional expansion and connection to the MCES system.

Currently, all sanitary flow from the AUAR area discharges to MCES interceptor 97-08 (Centerville Interceptor), which then discharges to the MCES Forest Lake Interceptor/Forcemain located about one mile east of the Lino Lakes/Hugo boundary. The Centerville Interceptor also serves areas not part of the AUAR area, including the portion of Lino Lakes south of Cedar Street and east of I-35E, as well as the entire City of Centerville. This interceptor is a 24-inch gravity sewer constructed in 2000. MCES Meter Station M220 is located on the Lino Lakes/Hugo boundary at the intersection of Cedar Street and Elmcrest Avenue.

The gravity capacity of the existing Centerville Interceptor at the Lino Lakes east corporate boundary is approximately 5.0 million gallons per day (MGD). This is equivalent to average day flow of about 1.7 MGD, based on a typical MCES peak factor of 2.9. This is substantially less than the projected flow from the area tributary to the interceptor under any of the current scenarios. Estimated average daily flow for the "Comprehensive Sanitary Sewer Plan Scenario" and AUAR Scenarios One, Two, and Three are tabulated below. (These flow estimates do not match those given previously for the various scenarios because they include a larger area than the AUAR area (see Figure 18-1). Centerville flow estimates were obtained from MCES Facility Plan for the Centerville Interceptor, dated February 1998.)

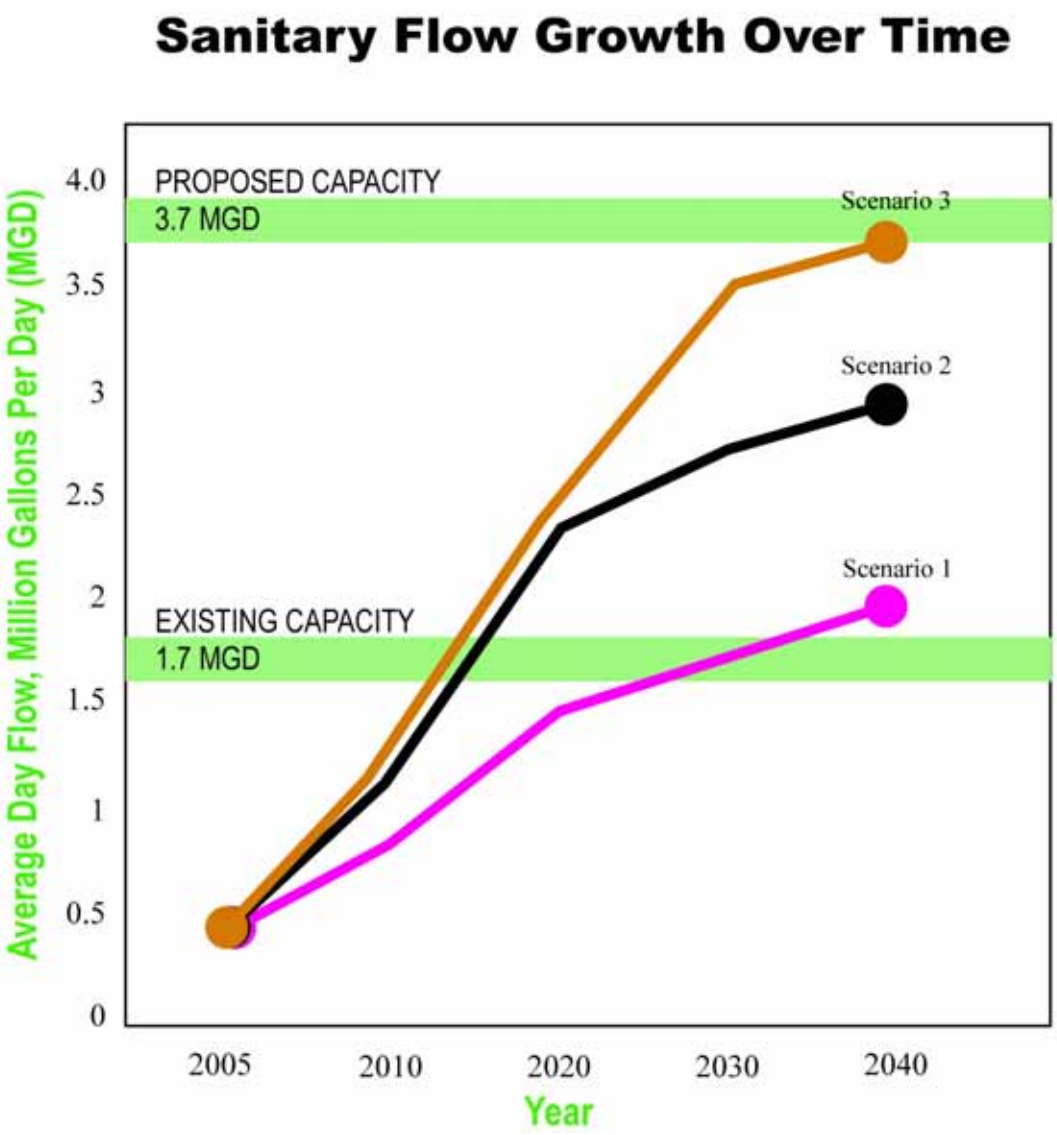
Table 18-1 Estimated Flows Tributary to MCES Centerville Interceptor (at Ultimate Development)

SCENARIO	AVERAGE DAILY FLOWS IN MGD			
	Lino Lakes Dist. 3	Lino Lakes NE Area	Centerville	Total
CSSP Scenario	1.425	1.542	0.464	3.431
Scenario One	1.425	1.103	0.464	2.992
Scenario Two	1.578	2.067	0.464	4.109
Scenario Three	1.669	2.063	0.464	4.196

The city has met with MCES staff on several occasions in 2003 through spring 2005 to discuss existing and future MCES service to Lino Lakes. The MCES is in the process of updating their comprehensive planning for the "Northeast Region," which includes Lino Lakes, Centerville, North Oaks, Forest Lake, Hugo, White Bear Lake, and White Bear Township. They anticipate the need to provide additional capacity in the Forest Lake Interceptor and downstream facilities to serve the future needs of those communities. Currently, MCES is engaged in plans to construct additional capacity support for the Forest Lake Interceptor.

Following a series of meetings in early 2005, MCES agreed to construct an additional interceptor to serve the easterly portion of Lino Lakes. This new interceptor will extend west from the Forest Lake Interceptor, generally following the alignment of Washington County CSAH 8, and will terminate at the Lino Lakes/Hugo boundary near Main Street (Anoka County CSAH 14). The MCES intends to construct this pipe in 2006, in conjunction with a planned county highway improvement project. The new interceptor should be designed to convey the excess flow not accommodated by the existing Centerville Interceptor. Assuming the existing interceptor can handle 1.7 MGD, the new pipe should be designed to convey flows ranging from 1.3 MGD (Scenario One) to 2.5 MGD (Scenario Three).

Design of the new interceptor is now in progress. Lino Lakes provided flow estimates, based on the *Comprehensive Sanitary Sewer Plan Scenario*, to MCES in March 2005. MCES has directed the designers to provide capacity in the new interceptor for 2.0 MGD average daily flow. Discussions are currently underway between Lino Lakes and MCES regarding the capacity to be provided in the new interceptor. Assuming capacity remains at 2.0 MGD, the existing and new interceptors will have adequate capacity for projected development through at least 2030 under any of the three AUAR Scenarios (see Table 7.4). However, ultimate development as projected by Scenarios Two and Three could eventually exceed capacity. If the city chooses to amend its Comprehensive Plan to accommodate components of Scenarios Two or Three, then a subsequent revision to the CSSP will be required. The Comprehensive Planning process, including review by the Metropolitan Council, is the appropriate process to resolve any potential sewer capacity issues. The following graph below shows projected sanitary sewer flow rates for all three scenarios for the area served by the existing and proposed interceptors. The service area includes the AUAR area, additional areas in Lino Lakes District 3, and all of Centerville.



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.

With the possible exception of some limited large-lot development, no on-site waste treatment is proposed. Development under all scenarios will be connected to the public sanitary sewer system, which is connected to the MCES interceptors. The MCES interceptors carry the wastewater to the Metropolitan Waste Water Treatment Plant (WWTP) for treatment.

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 Metropolitan Waste Water Treatment Plant is located at Pig's Eye Island in St. Paul, and is the largest plant in Minnesota. The plant treats wastewater from approximately 62 communities, and treats an average of 215 million gallons of wastewater per day using advanced secondary with chlorination/dechlorination techniques. The plant has the capacity to treat 251 million gallons of wastewater per day.

The plant minimizes the discharge impact on the Mississippi River by providing primary and secondary treatment to wastewater prior to discharging it into the Mississippi River. Because of the discharge requirements placed on wastewater treatment plants, and the type of wastewater generated from the AUAR area, no adverse impacts to the Mississippi River from the proposed AUAR area are anticipated.

Significant growth is expected in communities served by the Forest Lake Interceptor in the next 10 to 20 years. MCES is aware of this growth and reviews each community's comprehensive plan to evaluate their future wastewater collection, treatment, and infrastructure capabilities. MCES wastewater treatment facilities and interceptor systems are designed based on projected regional land use and growth plans.

The city will continue to coordinate with and provide the MCES with Plan updates, before sanitary sewer services become necessary.

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.

Projects within the AUAR area will not generate or require the disposal of liquid animal manure.

AUAR Guidelines: The relationship of the sewer system extension to the RGU's comprehensive sewer plan and (for metro area AUARs) to Metropolitan Council regional systems plans, including MUSA expansions, should be discussed.

The future sanitary sewer system is detailed in the city's *Draft Comprehensive Sanitary Sewer Plan*, which outlines the necessary sanitary sewer infrastructure needed to provide service to the AUAR area and is the current document used by the MCES for the purpose of providing sewer treatment and collection capacity to the city.

SANITARY SEWER SYSTEM CONSTRUCTION STAGING

Figure 18-1 shows the various sewer service areas that have been determined based on the existing topography or capacity limitations of the existing connection points. Service areas are created for the purpose of staging development in accordance with a structured sewer service plan that enables a timely and cost effective expansion of the sewer facilities.

Based on the *Draft Comprehensive Sanitary Sewer Plan*, the AUAR area of Lino Lakes is divided into two major sanitary sewer service areas, which are further subdivided to account for different connection points to the existing sewer system. The AUAR in Lino Lakes includes part of sub-district 3A, all of 3B, part of 3C, and all of sub-districts NE-A, NE-B, and NE-C. The AUAR also includes a small area in Centerville adjacent to sub-district 3B. Trunk sewer phasing is planned to provide service to areas 3A, 3C, and the southerly areas of 3B and NE-A by 2010. Service will be extended into the northerly and westerly areas of 3B, NE-A, and NE-B between 2011 and 2020. Most areas of NE-C will probably not be served until 2020 or later.

METROPOLITAN URBAN SERVICE AREA (MUSA)

The MUSA is the area within which the Metropolitan Council commits to provide sanitary sewage treatment and conveyance via regional interceptors. The City of Lino Lakes is one of several communities that use an Undesignated MUSA in its Comprehensive Plan to accommodate future growth. The city benefits by using the Undesignated MUSA method because it provides the city control and flexibility in planning for and guiding future growth, and allows the city to respond to changes in housing demand. This MUSA is not tied to a geographic boundary, but allows the MUSA to "float" depending upon availability of local and regional services. The city chose to modify the floating MUSA by establishing primary and secondary staging areas contiguous to the existing MUSA. Development of the AUAR area is expected to be contiguous to the current MUSA and will be timed as utility infrastructure can be extended/upgraded and financed.

MITIGATION SUMMARY

Development of the future Lino Lakes sanitary sewer system will be designed in accordance with the recommendations of the *Draft Comprehensive Sanitary Sewer Plan*. The plan identifies major sanitary sewers, lift stations, and forcemains necessary to accommodate orderly growth throughout the city through the projected 2030 planning period. Major facilities planned to serve the AUAR area include the following:

- MCES Lino Lakes Extension Interceptor
- Trunk Sewer in Otter Lake Road north of Main Street
- Trunk Sewer in 21st Avenue north of Main Street
- Upgrade existing Lift Station No. 7
- Upgrade existing Lift Station No. 8
- Trunk Sewer south of Cedar Street and west of I-35E
- Lift Station east of Peltier Lake
- Lift Station near 20th Avenue and 77th Street
- Lift Station near I-35E and 80th Street

Local sewers will be constructed in conjunction with future development projects and will be designed to discharge into the major facilities described above.

With these proposed improvements, the City of Lino Lakes has planned for an adequate sanitary sewer system to accommodate future development, and sewer capacity issues are not anticipated up to 2030. As development of the AUAR area occurs, the City of Lino Lakes will amend the Comprehensive Sanitary Sewer Plan to be consistent with any amendments to the Comprehensive Plan that would necessitate expansions or alterations to the sanitary sewer system and regional capacity needs.

19. Geologic Hazards & Soil Conditions.

a. Approximate depth (in feet) to groundwater: 1 minimum 4 average; to bedrock: 200 minimum 300 average. 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.

AUAR Guidelines: A map should be included to show groundwater hazards identified. A standard soils map for the area should be included.

There are no known geologic hazards in the form of sinkholes, faults, shallow limestone formations, and karst topography present on or beneath the area. Therefore, measures to avoid or minimize environmental problems due to these hazards are not proposed.

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.

AUAR Guidelines: A map should be included to show groundwater hazards identified. A standard soils map for the area should be included. Include any relevant information on soil contamination due to past land uses within the area, as mentioned under item 9.

SOIL CLASSIFICATION

The majority of Anoka County is located in a geologic region known as the Anoka Sandplain which also encompasses much of the AUAR area. In the Northwestern portion of the AUAR (near Peltier and Rondeau Lakes), soils were formed from lake sand deposits from the Grantsburg sublobe mixed with post glacial organic deposits. The rest of the AUAR area soils consist of combination of till (loam) and ice contact sand and gravel.

These soil types are considered poor to well-drained. From a hydrologic point of view, the NRCS classifies soils within hydrologic groups as A, B, C, or D. The majority of the city has Group "A" and Group "B" soils (Figure 19-1) with intermittent Group D characteristics. A general description of these groups is given below.

- **Group A** soils have low runoff potential and high infiltration rates even when thoroughly wetted. These consist of deep, well-drained sands or gravels.
- **Group B** soils have moderate infiltration rates and the potential for runoff. They consist of moderately-deep to deep, and moderate to well-drained soils.
- **Group D** soils generally have high runoff potential and consist chiefly of clay soils with a high swelling potential in permanent high water table conditions.

EXISTING SOLID WASTE OR GROUNDWATER CONCERNS

The city has no known solid waste or ground water concerns. A discussion of solid waste generation and potential environmental hazards based on past land use can be found in Item 20.

POTENTIAL FOR GROUNDWATER CONTAMINATION DUE TO PROPOSED LAND USES

The AUAR area has a flat topography, sandy soils, and shallow water table. Land use practices can have far reaching implications. Because the AUAR groundwater is very shallow, it is susceptible to pollutant impacts. Once groundwater is polluted, it is very difficult to clean up. Because development within the AUAR area will be typical of residential, public/institutional, 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 SUMMARY

Spill prevention is an effective mitigation technique and can be accomplished using institutional measures such as Spill Prevention Control and Countermeasure (SPCC) Plans for facilities with a potential oil storage capacity of oil and/or oil-containing products that exceed the EPA-specified threshold and oil and/or oil-containing products that can be reasonably expected to discharge to navigable waters.

At the State level, a release of any substance that may cause pollution of the air, land or water should be reported to the Minnesota Duty Officer for appropriate response. For example, the Minnesota Pollution Control Agency's (MPCA) Emergency Response Team (ERT) members are responsible for organizing the MPCA's efforts for oil and hazardous material emergencies. Chemical fires, train derailments, pipeline breaks, tanker truck accidents and petroleum vapors in a sewer are examples of environmental and public health emergencies that the MPCA's ERT members respond to.

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.

AUAR Guidelines: For an AUAR, only the estimated total quantity of municipal solid waste generated and information about any recycling or source separation programs of the RGU need to be included.

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.

AUAR Guidelines: For an AUAR, no response is necessary for this Item 20.b.

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.

AUAR Guidelines: Potential locations of storage tanks associated with commercial uses in the AUAR should be identified (e.g., gasoline tanks or service stations).

SOLID WASTE GENERATION

Anoka County does not delineate between residential and non-residential (commercial, industrial, or municipal) solid waste generation. The County tracks the total tonnage of solid waste generated from all sources; in 2004, this totaled 188,577.38 tons. Since the County was unable to separate the tonnage generated by residential vs. non-residential uses, the AUAR team reviewed the breakdown of solid waste generation in rapidly-evolving Carver County, which is also located in the seven-county Twin Cities Metropolitan Area.

In Carver County in 2002, residents accounted for 24,600 of the 46,650 total tons of municipal solid waste generated countywide (53% of total). If the same ratio is approximated for Anoka County in 2004, and the estimated 119,190 households accounted for 53% of the total municipal solid waste generated (99,946 tons), the per household rate would be 0.839 tons generated per household. With an estimated 111,394 employees in Anoka County in 2004, the municipal solid waste generated per employee would be 0.796 tons.

Regarding recycling, Anoka County does track tonnage generated at the municipal level. According to the County, residents of the City of Lino Lakes generated 1,849.94 tons of recycled solid waste in 2004. On a per household basis, this equates to 0.318 tons of recycled solid waste generated. The total quantity of municipal solid waste generated and recycled under each scenario is shown in Table 20-1.

Table 20-1. Estimated Solid Waste Generation, Scenarios One, Two, and Three

Residential	Total HH	Solid Waste (tons/HH)	Total Solid Waste Generation Tons/HH/yr	Recycled (tons/HH)	Total Amount Recycled Tons/HH/yr
Scenario One	2,238	.839	1877.7	.318	711.7
Scenario Two	5,715	.839	4794.9	.318	1817.4
Scenario Three	8,659	.839	7264.9	.318	2735.6
Non-Residential	**Total Employees**	**Solid Waste (tons/HH)**		**Total Solid Waste Generation Tons/HH/yr**	
Scenario One	21,535	.769		16,560.4	
Scenario Two	25,244	.769		19,412.8	
Scenario Three	16,916	.769		13,054.9	

POTENTIAL GAS STATIONS

The potential locations of gas stations are likely in the commercial areas near the major interchanges of all three scenarios. These possible locations include commercial development around the intersection of CSAH 14 and I-35E in Scenarios One, Two and Three, in the northeast corner of Scenario Two, and around the intersection of Highway 140 and I-35E in Scenarios Two and Three. The gas stations must comply with state law and regulations regarding such facilities.

21. Traffic. Parking spaces added NA. Existing spaces (if project involves expansion) **N.A.** . Estimated total average daily traffic generated___ . Estimated maximum peak hour traffic generated (if known) and time of occurrence__. 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.

For each affected road indicate the ADT and the directional distribution of traffic with and without the project. Provide an estimate of the impact on traffic congestion on the affected roads and describe any traffic improvements which will be necessary.

AUAR Guidelines: For most AUAR reviews a relatively detailed traffic analysis will be needed, especially if there is to be much commercial development in the AUAR area or if there are major congested roadways in the vicinity. The results of the traffic analysis must be used in the responses to item 22 and to the noise aspect of item 24.

Instead of responding to the information called for in item 21, the following information should be provided:

21a. a description and map of the existing and proposed roadway system, including state, regional, and local roads to be affected by the development of the AUAR area. This information should include existing and proposed roadway capacities and existing and projected background (i.e., without the AUAR development) traffic volumes

21b. trip generation data -- trip generation rates and trip totals -- for each major development scenario broken down by land use zones and/or other relevant subdivisions of the area. The projected distributions onto the roadway system must be included;

21c. analysis of impacts of the traffic generated by the AUAR area on the roadway system, including: comparison of peak period total flows to capacities and analysis of Levels of Service and delay times at critical points (if any);

21d. a discussion of structural and non-structural improvements and traffic management measures that are proposed to mitigate problems;

Note: in the above analyses the geographical scope must extend outward as far as the traffic to be generated would have a significant effect on the roadway system and traffic measurements and projections should include peak days and peak hours, or other appropriate measures related to identifying congestion problems, as well as ADTs.

EXISTING ROADWAY SYSTEM

Two existing principal arterial roadways serve the AUAR area:

- I-35W, to the west and northwest of the AUAR area, is a four-lane interstate freeway with an interchange located at CSAH 23 (Lake Drive), which is a considerable distance from the AUAR area. Current average daily traffic (ADT) in the vicinity of the AUAR area is 35,000 – 40,000.
- I-35E, which bisects the AUAR area, is a four-lane interstate freeway with an interchange located at CSAH 14. Current ADT in the vicinity of the AUAR area is 39,000 – 47,000.

The AUAR area is served by three minor arterials:

- CSAH 21 (20th Avenue North, north of Main Street) is a two-lane north-south arterial that bisects the AUAR area. CSAH 21, which had been a Major Collector roadway, was recently re-classified as an "A" Minor Arterial. Approximate ADT in the AUAR area ranges from 1,000 to 4,000.
- CR 54 (20th Avenue North, south of Main Street) is a two-lane north-south arterial that joins CSAH 21 at CSAH 14 (Main Street). Like CSAH 21, CR 54 had been a Major Collector roadway but was recently re-classified as an "A" Minor Arterial. Approximate ADT in the AUAR area ranges from 4,000 to 5,000.
- CSAH 14 (Main Street) is a two-lane "A" Minor Reliever and as an "A" Minor Expander that connects I-35E with Lino Lakes, Centerville and areas to the west of I-35W with I-35E via its interchange. Approximate ADT in the AUAR area ranges from 5,700 to 15,000.

PROPOSED, PLANNED AND/OR PROGRAMMED ROADWAY IMPROVEMENTS

Information provided by the City of Lino Lakes, Anoka County, as well as the Technical Advisory Committee identified the following improvements to include in the analysis of future traffic conditions.

- Expansion of I-694 from TH 36 to I-35W
- Expansion of I-35E from I-694 to I-94
- A new interchange would be constructed at 80th Street and I-35E
- The "Northerly Bypass" would be constructed to link I-35W and I-35E, and
- A new interchange would be constructed on I-35W to serve the Northerly Bypass.
- A reconstructed interchange at I-35E and CSAH 14.
- A north-south frontage/backage road west of I-35E, which would parallel CSAH 21 (20th Avenue north) and extend northward from CSAH 14. This roadway would extend approximately 1.75 miles to the north, but would not intersect with CR 140 (80th Street East)
- A north-south frontage/backage road south of CSAH 14, which would parallel CR 54 west of I-35E.

Figure 21-1 displays the existing/proposed transportation network along with current daily traffic counts and functional classification. In addition, the proposed or un-built transportation system is shown on the map. Note that all proposed or un-built alignments are purely conceptual.

EXISTING OR PROPOSED TRANSIT SERVICES

Express Route 275 provides weekday rush hour express service from Lake Drive and Lino Park to downtown Saint Paul. This route serves park and ride lots at Lake Drive and Lois Lane, Lino Lakes City Hall at Main Street and Rondeau Drive and Centerville Road and Main (CSAH 21 and CSAH 14). Express Route 250 also provides weekday rush hour service from St. Joseph's Church in Lino Lakes as well as the high frequency weekday rush hour Express Route 250 service from 95th and I-35W Park and Ride in Blaine.

In general, the Anoka County Transit System Plan, completed in October 2004, identified additional Anoka County transit services. The following was identified in the transit system plan:

"It is expected that Anoka County will also stay involved with a number of other transit activities and will expand its role in some new areas. The County should maintain its involvement with the Northstar Commuter Coach service operated along TH 10 between Elk River and Downtown Minneapolis with an intermediary stop at Coon Rapids/Riverdale. This service is currently

operated by the Northstar Corridor Development Authority (NCDA). In the event the Northstar Commuter Rail Project begins service, the County will need to look at how feeder service is operated to the rail stations. At that time, the Northstar Commuter Coach service could be redeployed to another corridor such as TH 65. Other activities in this timeframe include expanded Transportation Management Organization (TMO) activities focusing on meeting business needs, promoting the benefits of transit, and assisting in planning and other Transportation Demand Management (TDM) activities."

The Met Council's Park and Ride Facility Site Location Plan also includes a proposed new facility at/near 35E and Co Rd 140 (80th St E). Projections made in the plan indicate that there will be demand for a 600-space lot by 2030.

Between 2006 and 2010 the AUAR study area falls under the limited fixed route service area (see figure 28 of the Anoka County Transit System Plan). Commuter coach service and transit oriented corridors are identified as improvements between 2011 and 2015 (see figure 29 of the Anoka County Transit System Plan) that would approach the west boundary of the AUAR study area. Specifically, commuter coach service is identified as along I-35W while CSAH 14 is identified as transit oriented corridor extending west from I-35W.

TRANSPORTATION STUDY

A detailed traffic impact analysis has been prepared to fully investigate the effects of the proposed land use scenarios on the local and regions roadway systems. Traffic information and forecasts were based on traffic counts conducted from July 2003, to May 2004 as part of the County State Aid Highway 14 Alternatives Analysis Report completed in July 2004.[4] Presently only one intersection, CSAH 14/I-35E (east ramp), in the AUAR study area experiences significant peak period delays (For additional detail on existing conditions, see Appendix E.

Traffic generation was prepared using the Institute of Transportation Engineers "*Trip Generation* (7th Edition)." Traffic generation and distribution was also prepared with the assistance of the Anoka County Version of the Metropolitan Council's Travel Demand Forecasting Model. Several development and land use scenarios were evaluated as part of the AUAR. These scenarios reflected varying degrees of development intensity and development location. The development intensity for most scenarios exceeded the Met Council's 2030 development totals for the AUAR study area. A separate development scenario, consistent with the Met Council's development total, was also analyzed. This scenario, as with all the scenarios, uses the Met Council Travel Demand Model to take into account the impact of known large scale developments in the surrounding area. Although the timing of the development is uncertain, we assumed a timeline of 2030 and post-2030 for the scenarios. The scenarios include:

- Scenario 1: 2030 Build-out of Lino Lakes Comprehensive Plan; Parks, Open Space, and Trails Plan; and the Anoka County C.S.A.H. 14 Plan
- Scenario 2: 2030 Build-out of Known Plans – Commercial and Industrial Emphasis.
- Scenario 3: 2030 Build-out of Known Plans – Residential Emphasis.
- Scenario 1A: POST 2030 Build-out of Lino Lakes Comprehensive Plan; Parks, Open Space, and Trails Plan; and the Anoka County C.S.A.H. 14 Plan)
- Scenario 2A: POST 2030 Build-out of Known Plans – Commercial and Industrial Emphasis.
- Scenario 3A: POST 2030 Build-out of Known Plans – Residential Emphasis.

[4] Alternative Analysis Report – CSAH 14: I-35W to I-35E Study, *SRF Consulting Group, July 2004.*

The regional transportation planning modeling (developed and maintained by Met Council) was used to evaluate the development and land use impacts related to the various AUAR scenarios. Each transportation and land use scenario were run in the Met Council model to obtain future year daily traffic volumes for the roadways being analyzed. The future year daily traffic volumes from the model were then used to assist in determining the distribution of trips through the roadway network. The detailed traffic "operations" analysis for the respective AUAR scenarios was completed using Synchro/SimTraffic.

The Traffic analysis focused on the operation of the primary roadways and their intersections during the peak travel periods (a.m. and p.m. peak hours), which is typically the time when the most severe traffic congestion is incurred.

Existing Roadways

- I-35W
- I-35E
- CSAH 21 (20th Avenue North – north of CSAH 14, and Centerville Road south of CSAH 14))
- CR 54 (20th Avenue North – south of CSAH 14)
- CSAH 14 (Main Street)
- CR 140 (80th Street East)
- Elmcrest Avenue North
- Otter Lake Road
- Center Street
- Cedar Street
- Birch Street

New Roadways/Interchanges

Although the majority of projects are not slated for funding, it is assumed that at some point prior to 2030 each would occur in some capacity. A No-Build analysis, which used the Met Council 2030 development projection (representing only about 20-25 percent of the development of the AUAR Scenarios) showed that the existing transportation system would be insufficient. S Based on this analysis and on the fact that each of these improvements have been studied and are generally considered to reasonable improvements by 2030, they were assumed in the AUAR analysis. New interchanges will require an Interstate Access Request (IAR) that needs final approval by FHWA. The IAR should demonstrate:

1) Why the existing interchanges or local roads can not accommodate the design year traffic, and that all reasonable design options have been adequately assessed.

2) That the proposed Interstate access point mush not have a significant adverse impact on the safety and operation of the Interstate facility (an operation analysis would be needed to support this).

3) That the Interstate access would not be put into the context of area development.

4) That any request for new or revised access to the Interstate should be in the context of a long-term plan derived from an Interstate network study.

Projects include: [5]

- Northerly Bypass
- Northerly Bypass interchange with I-35W
- CR 140 (80th Street East) interchange with I-35E
- Reconstructed CSAH 14 interchange with I-35E (Diamond plus Northwest Loop)[6]
- Otter Lake Road Extension
- Center Street Extension
- 21st Avenue North Extension
- Frontage/Backage Road System

Existing Intersections

- CSAH 14/CSAH 21 (Centerville Road)
- CSAH 14/CSAH 21 (20th Avenue North)
- CSAH 14/I-35E West Ramp
- CSAH 14/I-35E East Ramp
- CR 54/Center Street
- CR 54/Cedar Street

New Intersections

- CR 140 (80th Street East) at:
  - I-35W (west ramps)
  - I-35W (east ramps)
  - CSAH 21
  - I-35E (west ramps)
  - I-35E (east ramps)
  - Elmcrest Avenue

- CSAH 14 at:
  - CSAH 21 (Centerville Rd.)
  - CSAH 21(20th Avenue North)
  - 21st Avenue North (West Frontage Road)
  - I-35E (west ramps) and new city street per new interchange design[7]
  - I-35E (east ramps)
  - Otter Lake Road

- CSAH 21 at:

[5] It must be noted that none of the first four projects listed are currently funded for implementation, however, it is expected that each would have to occur prior to 2030 to realize full build-out of the three land use scenarios. The four projects are: Northerly Bypass, Northerly Bypass with interchange with I-35W, CR 140 interchange with I-35E, and the reconstructed CSAH 14 interchange with I-35E. It should be noted that the assumption of a 6-lane cross section of I-35W and I-35E, up to CSAH 14, does not have funding identified and is not included in MnDOT's 20-year TSP. Prior to the construction of these proposed interchanges, FHWA would require that the supporting roadway network (county and city system) be constructed.

[6] Additional interchange analysis and design is needed to determine the ultimate interchange configuration. At the time of this study, the Diamond Plus Northwest Loop design was the design with the most support and was the alternative identified (in the Memorandum entitled: I-35E/CSAH 14 Interchange Alternatives Evaluation, conducted for Anoka County, by SRF Consulting Group, Inc. May 19, 2005.) as the most appropriate for evaluation as part of the AUAR.

[7] I-35E/SCSAH 14 Interchange Alternative Evaluation, SRF Consulting Group, Inc. May, 2005

- North Crossroad to Frontage Road
- Middle Crossroad to Frontage Road
- South Crossroad to Frontage Road

- CR 54 at:
  - South Crossroad to Frontage Road
  - Birch Street

Trip Generation

In determining the amount of traffic for the scenarios, it was necessary to designate the land-uses using ITE's Trip Generation handbook. The categories and assumptions for the three land uses are shown in Table 21-1. In determining the impact of the traffic generated by the land use scenarios, a process was followed to replace the trips generated by Met Council 2030 land use scenario. This is a necessary step in the analysis to avoid "double counting" the impact of new trips. This was accomplished by converting the trip values used in the Met Council Travel Demand Model to ITE Trip Generation values and then subtracting them out from the AUAR Land Use Scenario trip totals.

Tables 21-2, and 21-3 display the trip generation characteristics for the 2030 Base Timeframe, and the Post 2030 timeframe.[8]

Table 21-4 displays the increase in trips for the two timeframes. A trip is one movement to or from a location. For example, a resident leaving home in the morning to drive to work produces one morning trip *out of* the house, and one trip *in to* the workplace. Also included in the tables is the intensity of each development type for each scenario.

[8] In addition to these development scenarios, an analysis was conducted to determine the needs based on the 2030 land use scenario developed by the Twin Cities Metropolitan Council (Met Council). The transportation network used in this analysis reflected a no-build infrastructure system and contained only those transportation improvements either funded or planned for implementation. This transportation/land use scenario was analyzed to determine a purpose and need for improvements. A memorandum is contained in Appendix F of this report.

Table 21-1.Land Use Breakdown and Description

USE	SUB-USE	ITE	% of USE	DESCRIPTION
Rural	Single-Family Detached	210	100%	Single-family detached homes on individual lots. Typically a suburban subdivision.
Low Density Sewered Residential	Single-Family Detached	210	100%	Single-family detached homes on individual lots. Typically a suburban subdivision.
Low-Med Density Residential	Single-Family Detached	210	50%	Single-family detached homes on individual lots. Typically a suburban subdivision.
	Townhouse	230	50%	Ownership units that have at least one other owned unit within the same building structure. Both townhomes and condominiums are included in this land use
Med Density Residential	Townhouse	230	80%	Ownership units that have at least one other owned unit within the same building structure. Both townhomes and condominiums are included in this land use
	Senior Adult Housing - Attached	252	20%	Independent living developments for seniors, containing apartment-like residential units. May include limited social or recreational services. Residents may or may not be retired people
Med-high Density Residential	Townhouse	230	40%	Ownership units that have at least one other owned unit within the same building structure. Both townhomes and condominiums are included in this land use
	Senior Adult Housing - Attached	252	10%	Independent living developments for seniors, containing apartment-like residential units. May include limited social or recreational services. Residents may or may not be retired people
	Apartments	220	50%	Rental dwelling units located within the same building with at least three other dwelling units.
High Density Residential	Apartments	220	100%	Rental dwelling units located within the same building with at least three other dwelling units.
Commercial	Office Park	750	30%	Suburban subdivisions or PUDs containing general office buildings and support services, including banks, restaurants and service stations in a campus-like atmosphere.
	Business Park	770	60%	A group of one or two story buildings served by a common roadway system. May include offices, retail and wholesale stores, restaurants, recreational areas, and warehousing/industrial uses.
	Shopping Center	820	10%	An integratedgroup of commercial establishments, planned, owned and managed as a unit.Provides on site parking and may include outparcels located on the perimeter of the site.
Industrial	Light Industrial	110	30%	These facilities have an emphasis on activities other than manufacturing and typically have minimal office space.
	Industrial Park	130	30%	This land use is characterized by a mix of manufacturing, service and warehouse facilities. Some house a large number of small businesses, while others have one or two dominant industries.
	Warehousing	150	40%	This use is primarily devoted to the storage of materials, but also may include office and maintenance areas.

* Source: ITE *Trip Generation, Seventh Edition* , 2003.

R:\31809732\Traffic Data - Analysis-data\[ITE TRIP GEN.xls]Land Use Breakdown

Table 21-2. Base 2030 Trip Generation Summary[9]

Traffic Generation - 2030 Horizon Year (BASE)

	Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
SCENARIO 1 City Comprehensive Plan	Rural Land Use (du)	125	23	70	93	80	47	127	598	598	1,196
	Low Density (du)	510	96	287	383	325	191	516	2,440	2,440	4,880
	Medium Density (du)	1,129	76	340	416	330	165	495	3,039	3,039	6,078
	High Density (du)	473	48	193	241	191	103	294	1,589	1,589	3,178
	Commercial (1ksf)	2,500	3,459	804	4,263	1,935	3,738	5,673	26,633	26,633	53,266
	Industrial (1ksf)	3,750	2,239	416	2,655	512	2,263	2,775	11,556	11,556	23,112
	TOTAL		**5,941**	**2,110**	**8,051**	**3,373**	**6,507**	**9,880**	**45,855**	**45,855**	**91,710**

	Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
SCENARIO 2 Commerical/Industrial Emphasis	Rural Land Use (du)	44	8	25	33	28	16	44	211	211	422
	Low Density (du)	118	22	66	88	75	44	119	565	565	1,130
	Low/med Density (du)	2,419	317	1,122	1,439	707	353	1,060	9,331	9,331	18,662
	Med/high Density (du)	2,173	184	770	954	755	394	1,149	6,575	6,575	13,150
	High Density (du)	961	98	392	490	387	209	596	3,229	3,229	6,458
	Commercial (1ksf)	2,500	3,459	804	4,263	1,935	3,738	5,673	26,633	26,633	53,266
	Industrial (1ksf)	3,750	2,239	416	2,655	512	2,263	2,775	11,556	11,556	23,112
	TOTAL		**6,327**	**3,595**	**9,922**	**4,399**	**7,017**	**11,416**	**58,100**	**58,100**	**116,200**

	Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
SCENARIO 3 Residential Emphasis	Rural Land Use (du)	43	8	24	32	27	16	43	206	206	412
	Low Density (du)	118	22	66	88	75	44	119	565	565	1,130
	Low/med Density (du)	3,685	483	1,709	2,192	1,077	537	1,614	14,215	14,215	28,430
	Med/high Density (du)	3,247	274	1,151	1,425	1,129	589	1,718	9,825	9,825	19,650
	High Density (du)	1,566	160	639	799	631	340	971	5,262	5,262	10,524
	Commercial (1ksf)	2,500	3,459	804	4,263	1,935	3,738	5,673	26,633	26,633	53,266
	Industrial (1ksf)	3,750	2,239	416	2,655	512	2,263	2,775	11,556	11,556	23,112
	TOTAL		**6,645**	**4,809**	**11,454**	**5,386**	**7,527**	**12,913**	**68,262**	**68,262**	**136,524**

SOURCE: ITE Trip Generation, *7th Edition.*

R:\31809732\Synchro\AUAR Analysis\Excel\Unsignal 21\[Scenario 1 Traffic Analysis -w20 no signal Monday.xls]Trip Generation Summary

[9] The trips indicated in the table reflect absolute values for the land use scenario. These values were substituted for the values projected by the Met Council for the Study Area for use in the Travel Demand Model, which was used to determine background traffic and trip distribution into the AUAR area.

Table 21-3. Post 2030 Trip Generation Summary

Traffic Generation - POST 2030 Horizon Year

SCENARIO 1 — City Comprehensive Plan

Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
Rural Land Use (du)	125	23	70	93	80	47	127	598	598	1,196
Low Density (du)	510	96	287	383	325	191	516	2,440	2,440	4,880
Medium Density (du)	1,129	76	340	416	330	165	495	3,039	3,039	6,078
High Density (du)	473	48	193	241	191	103	294	1,589	1,589	3,178
Commercial (1ksf)	2,985	4,130	960	5,090	2,310	4,463	6,773	31,799	31,799	63,598
Industrial (1ksf)	11,175	6,673	1,239	7,912	1,525	6,745	8,270	34,436	34,436	68,872
TOTAL		**11,046**	**3,089**	**14,135**	**4,761**	**11,714**	**16,475**	**73,901**	**73,901**	**147,802**

SCENARIO 2 — Commerical/Industrial Emphasis

Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
Rural Land Use (du)	44	8	25	33	28	16	44	211	211	422
Low Density (du)	118	22	66	88	75	44	119	565	565	1,130
Low/med Density (du)	2,419	317	1,122	1,439	707	353	1,060	9,331	9,331	18,662
Med/high Density (du)	2,173	184	770	954	755	394	1,149	6,575	6,575	13,150
High Density (du)	961	98	392	490	387	209	596	3,229	3,229	6,458
Commercial (1ksf)	5,617	7,771	1,806	9,577	4,347	8,398	12,745	59,838	59,838	119,676
Industrial (1ksf)	9,570	5,714	1,061	6,775	1,306	5,776	7,082	29,490	29,490	58,980
TOTAL		**14,114**	**5,242**	**19,356**	**7,605**	**15,190**	**22,795**	**109,239**	**109,239**	**218,478**

SCENARIO 3 — Residential Emphasis

Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
Rural Land Use (du)	43	8	24	32	27	16	43	206	206	412
Low Density (du)	118	22	66	88	75	44	119	565	565	1,130
Low/med Density (du)	3,685	483	1,709	2,192	1,077	537	1,614	14,215	14,215	28,430
Med/high Density (du)	3,247	274	1,151	1,425	1,129	589	1,718	9,825	9,825	19,650
High Density (du)	1,566	160	639	799	631	340	971	5,262	5,262	10,524
Commercial (1ksf)	4,141	5,729	1,331	7,060	3,205	6,191	9,396	44,114	44,114	88,228
Industrial (1ksf)	5,829	3,481	646	4,127	795	3,518	4,313	17,962	17,962	35,924
TOTAL		**10,157**	**5,566**	**15,723**	**6,939**	**11,235**	**18,174**	**92,149**	**92,149**	**184,298**

SOURCE: ITE Trip Generation, *7th Edition.*

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Table 21-4. Increase over Base 2030 (Post 2030 – Base 2030)

Increase over Base 2030 (Post 2030 - Base 2030)

	Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
SCENARIO 1 City Comprehensive Plan	Rural Land Use (du)	-	-	-	-	-	-	-	-	-	-
	Low Density (du)	-	-	-	-	-	-	-	-	-	-
	Medium Density (du)	-	-	-	-	-	-	-	-	-	-
	High Density (du)	-	-	-	-	-	-	-	-	-	-
	Commercial (1ksf)	485	671	156	827	375	725	1,100	5,167	5,167	10,334
	Industrial (1ksf)	7,425	4,434	823	5,257	1,013	4,481	5,494	22,880	22,880	45,760
	TOTAL		**5,105**	**979**	**6,084**	**1,388**	**5,206**	**6,594**	**28,047**	**28,047**	**56,094**

	Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
SCENARIO 2 Commerical/Industrial Emphasis	Rural Land Use (du)	-	-	-	-	-	-	-	-	-	-
	Low Density (du)	-	-	-	-	-	-	-	-	-	-
	Low/med Density (du)	-	-	-	-	-	-	-	-	-	-
	Med/high Density (du)	-	-	-	-	-	-	-	-	-	-
	High Density (du)	-	-	-	-	-	-	-	-	-	-
	Commercial (1ksf)	3,117	584	1,753	2,337	1,983	1,165	3,148	14,915	14,915	29,830
	Industrial (1ksf)	5,820	1,091	3,274	4,365	3,703	2,175	5,878	27,849	27,849	55,698
	TOTAL		**1,675**	**5,027**	**6,702**	**5,686**	**3,340**	**9,026**	**42,764**	**42,764**	**85,528**

	Land Use	Intensity	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily Total In	Daily Total Out	Daily Total Total
SCENARIO 3 Residential Emphasis	Rural Land Use (du)	-	-	-	-	-	-	-	-	-	-
	Low Density (du)	-	-	-	-	-	-	-	-	-	-
	Low/med Density (du)	-	-	-	-	-	-	-	-	-	-
	Med/high Density (du)	-	-	-	-	-	-	-	-	-	-
	High Density (du)	-	-	-	-	-	-	-	-	-	-
	Commercial (1ksf)	1,641	308	923	1,231	1,044	613	1,657	7,852	7,852	15,704
	Industrial (1ksf)	2,079	390	1,169	1,559	1,323	777	2,100	9,948	9,948	19,896
	TOTAL		**698**	**2,092**	**2,790**	**2,367**	**1,390**	**3,757**	**17,800**	**17,800**	**35,600**

SOURCE: ITE Trip Generation, *7th Edition.*

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Traffic Impact

The process of evaluating the proposed land use involved the complex process of developing and distributing background and development related traffic through the areas roadway network. The network includes a system of frontage roadways that will assist in the circulation of traffic through the area. This roadway system, which was presented to the city and Anoka County early in the AUAR process, was used as a guideline in determining where to put the various developments.

The key guidelines included:

- Limit access to CSAH 14 and 80th Street between CSAH 21 and Elmcrest Avenue North
- Limit access and preserve mobility on CSAH 14, CSAH 21, and 80th Street (assuming future interchange)
- Signalized (primary) intersections at ½ mile spacing
- Collector (secondary) intersections at ¼ mile spacing
- Enhance existing street network to serve local trips (e.g., upgrade Elmcrest Avenue North)
- Develop frontage/backage road system to provide property access
- Consolidate existing access as opportunities arise
- Consider I-35E park and ride location
- Provide bicycle/pedestrian trail connectivity

The approach in determining the traffic impacts was to develop a traffic simulation model using Synchro/SimTraffic. This software package allows a technically sound and visually attractive method to present results to the public.

To provide a baseline from which to compare the impact of both the land use scenarios and the potential roadway improvements, it is first necessary to analyze a "No-Build" Scenario. The No-Build Scenario assumed only those projects approved for funding for the transportation system. The land use scenario used the 2030 forecasts developed by the Metropolitan Council. The analysis showed that even with a much lower development scenario, the transportation system was inadequate to effectively accommodate the projected travel demand. Detailed results of this analysis are provided in Appendix E.

The first step in analyzing the impact of the proposed land use scenarios with the potential 2030 transportation network, was to identify specific areas of proposed development and distribute the traffic across the network[10]. The traffic was then assigned to specific turn movements at the intersection level for the p.m. peak hour.[11] In addition to the turning movements, daily traffic forecasts were developed for the primary roadways within or adjacent to the AUAR area. Figures 21-2 21-3 and 21-4 display the projected trip distribution and assignment of 2030 traffic volumes for each of the three respective land use scenarios. Figures 21-5, 21-6, and 21-7 display the resulting level of service (LOS) as displayed in the SimTraffic network for each of these scenarios.

[10] It should also be noted that other proposed developments, not related to the three AUAR Scenarios were incorporated into the analysis. One such development is the Eagle Brook Church located west of CSAH 21, 1 ¼ miles north of CSAH 14. A full traffic analysis of this development was prepared by SRF Consulting Group for the Eagle Brook Church Environmental Assessment Worksheet (EAW), October, 2002.

[11] An additional a.m. peak hour analysis was completed for development scenario 2 with the results included in Appendix F. No significant overall differences in traffic operations were observed from the p.m. peak hour analysis. For all transportation scenarios evaluated, the p.m. peak hour conditions represented the worse case scenario.

In general, the overall land use/development scenarios resulted in significant increases in traffic to/from the AUAR area. Roadways that are projected to see large increases include CSAH 14, CSAH 21, and CR 144 (80th Street E.) Roadways beyond the defined AUAR area may also require upgrades or improvements to add capacity to accommodate increased traffic levels. One such example is TH 61 which is projected to more than double in traffic by 2030 regardless of the projected development scenario within the AUAR area. The major problems with the intersection were southbound left-turns and westbound left-turns. The lane geometry that was assumed was single left-turns on all approaches. The results indicate that given the expected development in the AUAR area that several of the approaches would require dual left-turn lanes to adequately accommodate AUAR area traffic.

The redesigned interchange at CSAH 14 and I-35E overall functioned satisfactory during the p.m. peak hour for 2030 land use Scenarios One – Comprehensive Plan, and Two Commercial and Industrial Emphasis. For Scenario Three – Residential Emphasis, the interchange system performed at unacceptable levels (LOS E). However, with reasonable mitigation measures it performed at LOS C. [12] The northern section of the AUAR area, along 80th Street and the bypass, also showed high traffic volumes and intersections projected to operate over-capacity under the assumed lane geometry.

Table 21-5 displays the overall Level of Service for all of the analyzed intersections for the three land use scenarios for 2030 build-out and post 2030 build-out conditions. Table 21-6 displays the LOS for each of the turning movements for the 2030 build-out conditions. The intersection traffic volumes for the full development of the scenarios (post 2030) resulted in severe congestion for virtually all turning movements and therefore is not shown in the table.

[12] In Development Scenario 3 – Residential Emphasis, the intersections of the I-35E ramps with CSAH 14 each operated at LOS E during the PM Peak hour of traffic. The mitigation measures enabled the movement, and the overall intersection of the west juncture of I-35E/CSAH 14 to operate at LOS D. The mitigation measures include the provision of an additional through lane for each direction of travel (6-lane cross-section), and an additional westbound left-turn lane (dual lefts). At the east juncture of the I-35E/CSAH 14 intersection, additional through lanes allowed for the through travel movement to operate at LOS D, and the entire intersection, a LOS C.

Table 21-5. Overall Intersection Level of Service by Scenario

Intersection	2030 Scenarios			Post 2030 Full-Build Scenarios		
	Land Use #1	Land Use #2	Land Use #3	Land Use #1	Land Use #2	Land Use #3
CR 140 (80th Street East)						
80th Street at I-35W (west ramps)	B	C	D	E	F	F
80th Street at I-35W (east ramps)	F	F	F	F	F	F
80th Street at CSAH 21	E	F	F	F	F	F
80th Street at I-35E (west ramps)	B	D	E	E	F	F
80th Street at I-35E (east ramps)	E	D	D	F	F	F
80th Street at Elmcrest Avenue	B	F	F	E	F	F
CSAH 14 (Main Street)						
CSAH 14 at CSAH 21 (Centerville Rd.)	B	B	B	E	E	E
CSAH 14 at CSAH 21	C	D	E	F	F	F
CSAH 14 at 21st Ave. N.	B	B	B	E	E	E
CSAH 14 at I-35E (west ramps)	C	C	E	F	F	F
CSAH 14 at I-35E (east ramps)	D	D	E	E	E	F
CSAH 14 at Otter Lake Road	F	F	F	F	F	F
CSAH 21 (20th Avenue North)						
CSAH 21 at North Crossroad	D	E	E	F	F	F
CSAH 21 at Middle Crossroad	B	C	D	E	F	F
CSAH 21 at South Crossroad	B	B	C	E	E	F
CR 54 South of CSAH 14						
CR 54 at Center Street	B	B	B	E	E	E
CR 54 at Ceder Street	B	B	B	E	E	E
CR 54 at South Crossroad	B	B	B	E	E	E
CR 54 at Birch Street	B	B	B	E	E	E

SOURCE: URS Corporation.

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Table 21-6. Intersection Turning Movement LOS For 2030 Build Scenarios

Intersection	Land Use Scenario	EASTBOUND Left	EASTBOUND Through	EASTBOUND Right	WESTBOUND Left	WESTBOUND Through	WESTBOUND Right	NORTHBOUND Left	NORTHBOUND Through	NORTHBOUND Right	SOUTHBOUND Left	SOUTHBOUND Through	SOUTHBOUND Right
80th Street E. (CR 140)													
80th Street at I-35W (west ramps)	1	--	E	C	A	A	--	--	--	--	E	--	A
	2	--	F	C	B	A	--	--	--	--	D	--	A
	3	--	F	C	B	A	--	--	--	--	F	--	A
80th Street at I-35W (east ramps)	1	F	A	--	--	F	B	D	--	F	--	--	--
	2	F	A	--	--	F	B	C	--	F	--	--	--
	3	F	A	--	--	F	A	C	--	F	--	--	--
80th Street at CSAH 21	1	E	C	F	F	D	B	F	C	A	E	E	C
	2	F	F	F	F	F	C	F	D	D	F	E	A
	3	E	D	F	F	C	A	F	E	D	F	E	A
80th Street at I-35E (west ramps)	1	--	B	A	C	B	--	--	--	--	B	--	C
	2	--	E	B	D	A	--	--	--	--	C	--	F
	3	--	E	A	F	D	--	--	--	--	D	--	F
80th Street at I-35E (east ramps)	1	F	A	--	--	E	A	D	--	F	--	--	--
	2	D	A	--	--	D	A	E	--	D	--	--	--
	3	F	A	--	--	E	A	F	--	E	--	--	--
80th Street at Elmcrest Avenue	1	--	B	A	E	B	--	B	--	D	--	--	--
	2	F	B	A	F	C	A	F	C	F	E	C	F
	3	F	A	A	F	C	A	F	E	F	F	E	F
CSAH 14 (Main Street)													
CSAH 14 at CR 21 (Centerville Rd.)	1	--	C	A	C	A	--	C	--	A	--	--	--
	2	--	C	A	C	A	--	B	--	A	--	--	--
	3	--	C	A	C	A	--	B	--	A	--	--	--
CSAH 14 at CSAH 21	1	F	E	C	C	D	D	E	E	A	E	E	B
	2	F	D	B	D	C	D	D	E	B	E	D	A
	3	F	E	B	D	C	F	E	F	C	F	D	A
CSAH 14 at 21st Avenue North	1	B	A	B	--	A	A	--	--	B	--	A	B
	2	B	A	B	--	A	A	--	--	B	--	A	B
	3	B	A	B	--	A	A	--	--	B	--	A	B
CSAH 14 at I-35E (west ramps)	1	--	A	A	E	B	--	D	--	E	D	D	D
	2	--	A	A	E	B	--	D	--	E	D	D	D
	3	--	A	A	E	D	--	D	--	F	D	D	F
CSAH 14 at I-35E (east ramps)	1	E	B	--	--	B	C	E	--	C	--	--	--
	2	E	B	--	--	B	C	E	--	C	--	--	--
	3	E	C	--	--	C	C	E	--	D	--	--	--
CSAH 14 at Otter Lake Road	1	F	A	A	E	C	A	F	B	A	D	C	F
	2	F	B	A	E	E	A	F	B	A	D	B	F
	3	F	B	A	E	F	A	F	B	A	D	B	F
CSAH 21 (20th Avenue North)													
CSAH 21 at North Crossroad	1	A	A	A	B	B	F	A	B	A	F	B	A
	2	A	A	A	B	B	D	A	C	A	F	A	A
	3	A	A	A	E	E	D	A	A	A	F	A	A
CSAH 21 at Middle Crossroad	1	C	B	B	C	D	C	A	A	A	D	A	A
	2	C	B	B	C	C	D	A	A	A	F	D	A
	3	E	D	C	D	D	D	A	A	A	F	A	A
CSAH 21 at South Crossroad	1	C	--	A	C	C	C	A	A	A	D	A	A
	2	B	B	A	B	B	B	A	A	A	B	A	A
	3	E	E	B	E	E	E	A	A	A	F	A	A
CR 54 South of CSAH 14													
CR 54 at Center Street	1	A	A	A	A	A	A	A	A	A	A	A	A
	2	A	B	A	B	B	A	A	A	A	A	A	A
	3	A	A	A	A	B	A	A	A	A	A	A	A
CR 54 at Cedar Street	1	A	A	A	A	A	A	A	A	A	A	A	A
	2	A	B	A	B	B	A	A	A	A	A	A	A
	3	A	A	A	A	B	A	A	A	A	A	A	A
CR 54 at South Crossroad	1	A	A	A	A	A	A	A	A	A	A	A	A
	2	A	B	A	B	B	A	A	A	A	A	A	A
	3	A	A	A	A	B	A	A	A	A	A	A	A
CR 54 at Birch Street	1	A	A	A	A	A	A	A	A	A	A	A	A
	2	A	B	A	B	B	A	A	A	A	A	A	A
	3	A	A	A	A	B	A	A	A	A	A	A	A

SOURCE: URS Corporation.

Regional System Impacts

I-35E and I-35W, the principal arterials serving the site currently operate at a LOS of C.[13] Without any expansion of the freeways, which are currently 4-lanes, the LOS is projected to drop to "E" or worse at every location. Table 21-7 displays the future LOS for each of the three 2030 scenarios.

Table 21-7. Level of Service for Regional Roadways

	2003 Conditions		2030 Scenario 1		2030 Scenario 2		2030 Scenario 3	
Roadway/Location	ADT	LOS	Daily Traffic	LOS	Daily Traffic	LOS	Daily Traffic	LOS
I-35W								
North of Bypass	35,500	C	68,600	E	76,600	E	78,500	F
South of Bypass	35,500	C	84,500	F	94,400	F	96,800	F
I-35E								
North of CR 140 (80th Street East)	39,500	C	95,600	F	106,600	F	109,200	F
Between CR 140 and CSAH 14	39,500	C	107,300	F	120,200	F	123,300	F
South of CSAH 14	46,500	C	108,300	F	121,000	F	124,000	F

R:\31809732\Synchro\AUAR Analysis\Excel\[LOS Summary.xls]Regional LOS

Source: URS Corporation.

Seasonal Traffic Impacts

As I-35E is a gateway to many popular recreational destinations north of the Twin Cities, there is a marked increase in traffic during the summer months. Recreational peak periods occur particularly on Fridays and Sundays and can result in significant traffic increases during these travel periods. While widening the Interstate and the CSAH 14 interchange could likely address this in traffic, it would likely not be very cost-effective as the system would operate well below capacity for the majority of the year.

MITIGATION SUMMARY

The proposed developments will increase traffic on roadways within, and adjacent to the AUAR area. Mitigation will include adding traffic signals and turn lanes and widening roads as necessary during the various stages of development. In general, Scenario One had the least impact on traffic congestion with two intersections performing at LOS F, without mitigation. Scenario Two had four intersections and Scenario Three had six intersections operating at LOS F, respectively. With reasonable mitigation measures all the intersections in Scenarios One and Two were able to operate at LOS E or better. [14] Even with reasonable mitigation measures, Scenario Three, which has a residential emphasis, still had intersections performing at LOS F. These include the east ramps at the proposed Northerly Bypass/I-35W interchange, and the intersection of CSAH 14 and Otter Lake Road.

To mitigate the impact of the additional traffic on the on the regional system, specifically Interstates 35W and 35E, each would need to be reconstructed to provide a six-lane cross-section. It should be noted that it was determined that an expansion will be necessary even without the land use scenarios used in this analysis. As the interstates serve a much larger area, the projected growth of the entire Twin Cities region should warrant expansion by the year 2030. Right of way

[13] The generalized daily traffic capacity threshold for a 4-lane freeway is A: <15,800, B: < 33,600, C: 50,400 D: 64,400, and E: 78,100. Source: I-94 IRC Study, May 2002 URS Corporation.

[14] Reasonable mitigation measures are of the types that have been implemented elsewhere in the region. Examples include dual right-turn and left-turn lanes. Triple turn lanes were not deemed to be reasonable and therefore were not employed.

should be preserved within the AUAR study area, especially along I-35E, to accommodate future expansion projects that would help mitigate projected future year traffic levels.

As future growth occurs, alternative modes of transportation may be needed to maintain the area's mobility. These modes may include express bus service, buses operating on exclusive right-of-way (busways), or commuter rail. All three of these modes were looked at in the transit study conducted in 2001 by the Rush Line Corridor Task Forces. The general alignment proposed for the Rush Line is adjacent to TH 61 in Washington County, or within 2-miles AUAR Study Area. Opportunities should be explored to provide a link to this system as it is being developed.

Pedestrian and bicycle paths are another way to improve mobility within and to the study area. It is recommended ***any*** roadway improvements in the AUAR area that are being planned should include provisions for the addition of pedestrian / bicycle facilities. These facilities should ideally be at least 10 feet wide and separated from the highway shoulder by a minimum of 20 feet.

Figures 21-8, 21-9, and 21-10 display the intersection LOS for each of the scenarios and also display the mitigation measures that were identified to address the deficiencies.

Traffic Impacts without the Northerly Bypass

An analysis was conducted to determine the impact on traffic without the Northerly Bypass and interchange at I-35W on the operation of traffic. Using the Anoka County Version of the Metropolitan Council Travel Demand Model, the traffic generated by Scenario One – Comprehensive Plan, was distributed to the roadway network, excluding the proposed Northerly Bypass. In general, the traffic decreased on the interstates, and increased substantially on the arterial and collectors. Traffic on CSAH 14 (Main Street) east of Centerville Road increased by nearly 16,000, while large increases were also recorded along many other roadways. Figure 21-11 presents the distribution and assignment of traffic onto the transportation system without the Northerly Bypass. With the increase in traffic, intersections, which were operating at acceptable Levels of Service, are now projected to need mitigation measures. One such intersection is CSAH 14 at CSAH 21 (Centerville Road). In general, the lack of the Bypass puts considerable strain on CSAH 14 and its intersections with the west leg of CSAH 21 (Centerville Road) and at the east leg (20th Avenue North). Figure 21-12 presents the LOS and mitigation measures recommended for the Scenario One, without the Northerly Bypass.

Traffic Noise

City and county roads outside of Minneapolis and St. Paul are exempt from the State Noise Standards. CSAH 21 and 80TH Street are exempt from the State Noise Standards, but I-35E is not exempt from the State Noise Standards. However, this rule is generally applied to roadway projects, and relates to the fact that is virtually impossible to provide noise mitigation to roadways that have occasional access points that would prohibit the effectiveness of noise barriers.

Minnesota Rule, 7030.0030 NOISE CONTROL REQUIREMENT, states in part that:

> *Any municipality having authority to regulate land use shall take all reasonable measures within its jurisdiction to prevent the establishment of land use activities listed in noise area classification (NAC) 1, 2, or 3 in any location where the standards established in part 7030.0040 will be violated*

immediately upon establishment of the land use.

This is accounted for with mitigation for this noise analysis, presented toward the end of this noise section of the AUAR.

Noise Description

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic increase in sound energy relative to a reference energy level. A sound increase of 3 dB is barely perceptible to the human ear, a 5 dB increase is clearly noticeable, and a 10 dB increase is heard twice as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a 3 dB increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dB increase and it is heard twice as loud.

For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of " A-weighted decibels" (dBA). In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 % and 50% of the time during the hour of the day and/or night that has the heaviest traffic. These numbers are identified as the L_{10} and L_{50} levels. The L_{10} value is compared to FHWA noise abatement criteria.

The following chart provides a rough comparison of the noise levels of some common noise sources. (Source: "A Guide to Noise Control in Minnesota," Minnesota Pollution Control Agency, http://www.pca.state.mn.us/programs/pubs/noise.pdf and "Highway Traffic Noise," FHWA, http://www.fhwa.dot.gov/environment/htnoise.htm)

Sound Pressure Level (dBA)	Noise Source
140	**Jet Engine (at 25 meters)**
130	**Jet Aircraft (at 100 meters)**
120	**Rock and Roll Concert**
110	**Pneumatic Chipper**
100	**Jointer/Planer**
90	**Chainsaw**
80	**Heavy Truck Traffic**
70	**Business Office**
60	**Conversational Speech**
50	**Library**
40	**Bedroom**
30	**Secluded Woods**
20	**Whisper**

AUAR Traffic Noise Analysis

Sensitive Noise Receptors

The analysis was conducted using three (3) receptor sites located in the study area. The general geographic location of the three sites, shown on Figure 21-13, are:

- Site 1 – West of CSAH 21, midway between 80th Street E and CSAH 14
- Site 2 – Southwest Quadrant of I-35E/80th Street E.
- Site 3 - Northeast Quadrant of I-35E/80th Street E.

Receptor locations have been placed 200 feet from the centerline of each of these nearest roadways for purposes of this noise analysis. Note that each of the sensitive noise receivers are included as a part of this study, and can be properly designed to accommodate noise impacts as the development is defined in more detail.

Methodology and Assumptions

Existing (2004) and future (2030) noise levels were projected using the FHWA noise prediction model STAMINA 2.0, as modified for use by Mn/DOT and the MPCA. Noise projections were based on 2004 traffic counts, and anticipated 2030 forecast peak-hour daily traffic volumes, vehicle speeds, mix of vehicles, roadway grades, and the distance from the roadway centerline to the receptor. Existing and anticipated future Average Daily Traffic (ADT) is provided in the traffic impact section of this report. The specific modeling locations are summarized in Table 21-8.

Table 21-8. Existing(2004) and Future (2030) Daily Traffic by Receptor Location

	Average Daily Traffic by Receptor Location		
Scenario	Adjacent to CSAH 21, at Receptor 1	Adjacent to I-35E, near Receptor 2	Adjacent to CSAH 21, at Receptor 3
Existing	1,500	39,500	1,100
2030 No-Build	7,900	91,700	7,200
2030 Build (Scenario 3)	35,200	123,300	47,100

The following assumptions were used in modeling the project noise levels:

Vehicle Speeds CSAH 21: 45 mph (near receptor 1)
I-35E: 65 mph (near receptor 2)
CR 140: 45 mph (near receptor 3)

Vehicle Mix 95% automobiles and light trucks
3% medium trucks
2% heavy trucks

Ground Cover soft ground

Time Period Daytime peak hour: 10% of ADT

The analysis found that there will be considerable increase in noise levels at the three locations over current levels. Table 21-9 presents these increases by location, and by Scenario including the base year (2004), the 2030 No-Build Scenario using Met Council's Land Use Scenario, and 2030 AUAR Scenario 3. All of the receptors analyzed exceed the State Noise Standards the Year

2030 for the Build Scenario. It is not uncommon for noise levels to exceed the State Noise Standards at sensitive noise receivers adjacent to major roadways similar to those in the project area. Therefore, noise abatement measures should be considered for all of the receptors.

Table 21-9. Existing and Predicted Daytime Noise Levels (dBA)

Daytime Noise Levels (7:00 a.m. - 10:00 p.m.)

	Existing		No Build		Build		Increase (No Build - Build)	
Receptor	L10	L50	L10	L50	L10	L50	L10	L50
1	54	45	62	55	67	63	6	8
2	72	68	75	72	76	73	1	2
3	53	43	61	55	68	65	7	10
State Standards	65	60	65	60	65	60	65	60

SOURCE: URS Corporation.

Since the noise levels exceed the State Noise Standards, noise mitigation has been considered as described below.

MITIGATION SUMMARY

Site plans for future developments should include measures such as appropriate setback distances, earthen berms, noise walls, and appropriate site design (such as outdoor activity areas being developed away from major noise sources). Each of these items should be considered on a case-by-case basis.

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.

AUAR Guidelines: The guidance provided in EAW Guidelines should also be followed for an AUAR. Mitigation proposed to eliminate any potential problems may be presented under item 21 and merely referenced here. The MPCA staff should be consulted regarding possible ISP requirements for certain proposed developments; although the RGU may not want to assume responsibility for applying for an ISP for specific developments, it may be desirable to coordinate the AUAR and ISP analyses closely.

BACKGROUND

Motor vehicle emissions are associated with vehicles traveling to and from the project along access roadways and through critical intersections in the AUAR area. At these locations, background traffic not related to the project also contributes to the overall emissions and related concentrations. The most critical pollutant associated with vehicular traffic in Minnesota is Carbon Monoxide (CO).

For this item, an analysis to predict Carbon Monoxide concentrations adjacent to intersections was completed for three intersections in the AUAR area. These intersections are CSAH 14 at CSAH 21, CSAH 14 at Otter Lake Road, and CSAH 21 at 80th Street.

Because Scenario Three revealed the most significant impacts on traffic, the air quality analysis was conducted under these development assumptions as worst-case scenario conditions.

RESULTS

The results of the air quality analysis concluded that resulting concentrations of Carbon Monoxide (CO) for all three intersections considerably less than the State Standards, which are the maximum allowable concentrations. Based on the analysis, no CO impacts will occur in the entire project area as a result of traffic-related activities. [15] The full air emissions analysis is provided in Appendix G.

MITIGATION

The air quality analysis demonstrates that all applicable state and federal regulations are satisfied even under the worst-case scenario. Based on this analysis no carbon monoxide impacts will occur in the entire AUAR area as a result of traffic-related activities. Therefore, no specific mitigation strategies are recommended.

[15] It should be noted that based on MnDOT project guidance, an air quality analysis is not needed unless the total intersection approach volume exceeds 77,000 vehicles per day. However, in the interest of the community, it was decided to conduct the analysis to address any environmental concerns with respect to traffic related air quality impacts.

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.

AUAR Guidelines: This item is not applicable to an AUAR. Any stationary source air emissions source large enough to merit environmental review requires individual review.

As stated in the AUAR Guidelines, this item is not applicable.

24. Dust, Odors, and Noise Impacts. Will the project generate odors, noise or dust during construction or during operation?
☑ Yes ☐ No
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.)

AUAR Guidelines: Dust, odors, and construction noise need not be addressed in an AUAR, unless there is some unusual reason to do so. The RGU might want to discuss as part of the mitigation plan, however, any dust control or construction noise ordinances in effect. If the area will include or adjoin major noise sources, a noise analysis is needed to determine if any noise levels in excess of standards would occur, and if so, to identify appropriate mitigation measures. With respect to traffic-generated noise, the noise analysis should be based on the traffic analysis of item 21.

As stated in the AUAR guidelines, this item need not be addressed unless there is some unusual reason to do so. No unusual circumstances have been identified that would necessitate a detailed noise analysis under item 24.

MITIGATION SUMMARY

Noise will occur during construction in the AUAR area and this construction noise may impact wildlife and humans. To control these impacts, the city limits construction activities to the following hours: Mondays through Fridays 7 A.M. to 7 P.M. and Saturdays 9 A.M. to 5 P.M. Construction is prohibited on Sundays and Holidays.

To minimize impacts to bald eagles and herons in the AUAR area, special consideration will be given to nesting behaviors and habitats during construction. All construction activity in the AUAR area will follow the recommended guidelines set out by the MNDNR and Ontario Ministry of Natural Resources to limit disturbances to eagle nests and described in Table 11-2 to the extent practical.

As stated previously under Item 11 of this AUAR, herons are particularly sensitive to disturbance during the breeding period. A Canadian Wildlife Service publication states, "Scientists suggest as a general rule that there should be no development within 300 m of the edge of a heron colony and no disturbance in or near colonies from March to August." It should be noted that a 300-meter buffer from the perimeter of Peltier Lake Island (not the rookery within the island) contains virtually no uplands within the AUAR area, but rather, contains almost exclusively open water of the lake and adjacent wetlands.

25. Sensitive Resources. Are any of the following resources on or in proximity to the site:

a. archeological, historical, or architectural resources?

☑ Yes ☐ No

AUAR Guidelines: For an AUAR, contact with the State Historic Preservation Office (SHPO) is required to determine whether there are areas of potential impacts to these resources. If any exist, an appropriate site survey of high probability areas is needed to address the issue in more detail. The mitigation plan must include mitigation for any impacts identified.

The full "Cultural Resources Assessment for the I-35E Corridor AUAR" is on file with the city. Due to the sensitive nature of the subject matter, this document is not available for public review.

PREVIOUS INVESTIGATIONS

Archaeology

Ten sites have been recorded (confirmed) within the AUAR area (Table 25-1). One of these sites, 21AN3, was recorded by Alfred J. Hill in 1883, who noted, "Formerly there were 15 or 18 mounds along this part of the lake. That one now remaining was originally about 12 ft. high. It is now only 9 ft. high and 80 ft. in diameter. The top of the mound is about 30 ft. above high water" (Winchell 1911:282). No mounds were visible when the Rice Creek Survey was conducted in 1987, or during the previously mentioned 2001 survey for the Eagle Brook Church (Harrison 2001; Minnesota State Site File Form, 21AN3, on file at the SHPO.). During the 1987 survey, however, an artifact scatter was discovered in the vicinity of the mound group.

Table 25-1. Previously Identified Archaeological Sites

Site No.	Site Name	T	R	S	Description
Sites Within the I-35E Corridor AUAR Survey Area					
21AN3		31N	22W	11	Mound Group and Artifact Scatter
21AN37	Paul Site	31N	22W	10	Artifact Scatter
21AN60	Peltier Island Site	31N	22W	11	Artifact Scatter
21AN71		31N	22W	14	Artifact Scatter
21AN72		31N	22W	14	Artifact Scatter
21AN83		31N	22W	2	Artifact Scatter
21AN90		31N	22W	2	Artifact Scatter
21AN91		31N	22W	2	Artifact Scatter
21AN95		31N	22W	2	Artifact Scatter
21AN132	Iverson III Site	31N	22W	12	Lithic Scatter
Sites Within One Mile of the I-35E Corridor AUAR Survey Area					
21AN2	Centerville Lake Mounds	31N	22W	15	Mound Group and Artifact Scatter
21AN5	Barrott Mound	32N	22W	35	Mound
21AN35	Rugroden Site	31N	22W	9	Artifact Scatter
21AN36	George Watch Lake	31N	22W	9/ 16	Artifact Scatter
21AN38	Hensel Site	31N	22W	15/ 16/ 21/ 22	Artifact Scatter
21AN40	Cartier Site	31N	22W	10/ 15	Artifact Scatter
21AN41		31N	22W	10	Lithic Scatter

Site No.	Site Name	T	R	S	Description
21AN49	Dupre Site	31N	22W	14	Artifact Scatter
21AN67		31N	22W	3	Artifact Scatter
21AN68		32N	22W	34	Lithic Scatter
21AN78		32N	22W	35	Artifact Scatter
21AN79		32N	22W	35	Artifact Scatter
21AN80		32N	22W	35	Artifact Scatter
21AN81		32N	22W	35	Artifact Scatter
21AN82		32N	22W	35	Artifact Scatter
21AN89		31N	22W	10	Lithic Scatter
21AN93		32N	22W	35	Artifact Scatter
21AN106		32N	22W	34	Artifact Scatter
21AN130	Iverson I Site	31N	22W	25	Lithic Scatter
21AN142	Baylor Road Site	32N	22W	34	Artifact Scatter
21AN143		31N	22W	14/ 23	Artifact Scatter
21ANd		31N	22W	14	Collected Precontact Artifacts
21ANe		31N	22W	15	Collected Precontact Artifacts
21ANp		31N	22W	15	Reported Precontact Habitation Site
21WAj	Iverson IV Site	31N	21W	18	Collected Precontact Artifacts
21WAk	Iverson V Site	31N	21W	30	Collected Precontact Artifacts
21WAl	Iverson VI Site	31N	21W	30	Collected Precontact Artifacts
21WAm	Iverson VII Site	31N	21W	30	Collected Precontact Artifacts
21WAn	Iverson VIII Site	31N	21W	31	Collected Precontact Artifacts

Site 21AN37 was identified during the MnSAS through a surface survey during which a shard and five flakes were discovered. This site, occurring on a low ridge surrounded by a marsh, was recorded as a possible Woodland stage habitation site.

In 1978, 21AN60 was field checked by students of the Hamline University Archaeological Field School as part of the MnSAS after a local informant mentioned the site. This site is located on an island in Peltier Lake. A cursory surface inspection was conducted and nine (25x25) cm test pits were excavated at the site. The site form for this site notes, "Most material found in bases of numerous windfalls; some found in test pits – no clear stratigraphy." The recommendation was made for a more thorough evaluation of the site because the surface survey was not systematic (Minnesota Archaeological Site File, 21AN60, on file at the SHPO). A letter from Christy Caine of the Hamline University Field School to the Minnesota Historical Society, on file at the SHPO, states that the site is a multi-component site, and it indicates plans to continue the field school for three to five years beginning in 1979. No additional information could be found, however, to indicate that such excavations occurred.

Sites 21AN71 and 21AN72 were recorded during the Rice Creek Survey between September of 1984 and June of 1985. These overlapping sites, consisting of artifact scatters, were both recorded as campsites. Though 21AN72 contained no diagnostic artifacts, 21AN71 was identified as Middle Woodland, based on a corner-notched point recovered from the site (Minnesota State Site File Forms, 21AN71 and 21AN72, on file at the SHPO).

Different portions of 21AN83, an artifact scatter, were recorded during the Rice Creek Survey and the MnSAS. These portions, located on the same landform, were subsequently combined into one site. In both cases, surface reconnaissance was employed to survey the area. Based on the artifacts observed, including bifaces, lithic debitage, ceramic fragments, projectile points, a knife, and a scraper, this site was identified as a Woodland habitation site (ca. 800 B.C. to A.D. 1630) (Minnesota State Site File Form, 21AN83, on file at the SHPO). A portion of this site was likely heavily disturbed by the construction of I-35W, which runs through its center.

Site 21AN90 is located on a rise west of 21AN83 and east of Rondeau Road, while 21AN91 is located on a rise to the north of and roughly in between those two sites. Sites 21AN90 and 21AN91, both artifact scatters, were also recorded as Woodland habitation sites during the Rice Creek Survey, in 1987 (Minnesota State Site File Forms 21AN90 and 21AN91, on file at the SHPO).

Several artifact scatters located along a rise near the marsh northeast of Peltier Lake, recorded during the Rice Creek Survey between 1984 and 1987, constitute 21AN95. These scatters consisted mostly of lithic debitage, but a triangular point was also recovered (Minnesota State Site File Form, 21AN95, on file at the SHPO).

Site 21AN132 is based on artifact collections that were donated to the Minnesota Historical Society and associated informant reports. An archaeological field survey of this site has not been conducted (Minnesota Archaeological Site Form, 21AN132, on file at the SHPO).

In 1996, The 106 Group prepared a NRHP registration form for the Rice Creek Chain of Lakes Park Archaeological District as part of an archaeological mitigation for 21AN75, an archaeological site located on the west end of Rice Lake in Lino Lakes (Ketz et al. 1996). The proposed Rice Creek Chain of Lakes Park Archaeological District consists of 25 previously identified precontact sites located within the boundaries of the Rice Creek Chain of Lakes Regional Park Reserve, three of which (21AN37, 21AN60, and 21AN83) are located within the boundaries for the I-35E Corridor AUAR.

An additional 21 sites have been recorded (confirmed) and 7 sites have been reported (not field checked) within one mile of the AUAR area (see Table 25-1), both to the west and to the southeast.

Architectural History

Based on the results of the SHPO files query submitted in November of 2004, no architectural history properties within the boundaries for the I-35E Corridor AUAR have been previously determined eligible for listing or listed on the NRHP.

RESULTS

Precontact Archaeology

As noted previously, 10 precontact archaeological sites have been recorded in the north and western portions of the AUAR area and numerous others have been documented in proximity to it. For the most part, sites in the vicinity are located in proximity to water: Centerville Lake, George Watch Lake, Peltier Lake, Rondeau Lake, Clearwater Creek, Hardwood Creek, and Rice Creek. The undisturbed landforms adjacent to these bodies of water, therefore, have the greatest potential for containing intact archaeological sites. While wetlands are generally considered to have low archaeological potential, much of Sections 2 and 11 was historically dry. Given that several sites have been identified on slight rises within the wetlands surrounding Rice Creek, those wetlands, and the northern portion of Peltier Lake, have high potential to contain intact

archaeological resources, which would be protected by the current water levels. Further, those undisturbed areas adjacent to known sites are also considered to have high archaeological potential, especially given that many of the previously recorded sites in the area were not fully spatially defined.

While the guidelines for identifying areas of high archaeological potential are based on distances of 500 ft. from a large body of water or 300 ft. from a previously documented site, these distances do not define the boundaries of high potential areas. If, therefore, a landform that begins within 500 ft. of a large body of water is continuous to a further distance, the entire landform may be considered to have high archaeological potential. For this reason, several undisturbed areas beyond 500 ft. of water or 300 ft. of known archaeological sites are still considered to have high potential for containing intact archaeological sites.

The remainder of the I-35E Corridor AUAR area is not considered to have high precontact archaeological potential due either to previous disturbance, lack of proximity to water or other archaeological sites, or lack of topographic prominence.

Post-Contact Archaeology

A plat map dating to 1887 (Foote 1887) depicts several structures within the boundaries of the I-35E Corridor AUAR. Because these structures represent habitations, farmsteads, and human activities dating to an early period of Euro-American activity in Minnesota, whether the structures are extant or not, their locations are considered to have moderate to high potential for post-contact archaeological resources. Any major impacts to the AUAR area, however, including gravel mining, road construction, and new residential development, may have resulted in heavy disturbance to some of these locations. Of these locations, therefore, those that have been heavily disturbed are considered to have low potential for intact post-contact archaeological resources. Those that appear to be undisturbed are considered to have high potential for containing intact post-contact archaeological resources.

Architectural History

Based on the results of the SHPO files query submitted in November of 2004, no architectural history properties within the boundaries for the I-35E Corridor AUAR have been previously determined eligible for listing or listed on the NRHP.

MITIGATION SUMMARY

In the AUAR area, there are 2,051 acres of land with high archaeological potential, which represents 44% of the AUAR area. Because of the high level of archaeological sites in the AUAR area, and the pride many citizens give to their local heritage, it is recommended here that the city should conduct, and/or support, appropriate levels of historical and archaeological surveys in areas identified as having high potential for containing cultural resources prior to future development. This recommendation is intended to prevent any intentional or unintentional damage to, or destruction of, important archaeological sites and historic properties without due process and consideration.

The final Mitigation Plan will provide a comprehensive overview of the specific steps and procedures involved in the identification and analysis of any archaeological sites that may be located in high potential areas. The appropriate process to follow is outlined below:

- Conduct a Phase I archaeological survey within the area of potential effect (APE). Background research will be undertaken; topographic and historical maps and other primary and secondary source material will be consulted; high potential areas will be identified and subsequently field-tested by professional archaeologists. The objective of

the archaeological fieldwork is to determine if there are archaeological sites in the areas identified as having high potential for such, and define the extent of those sites that may be impacted by development plans.

- Conduct a Phase II archaeological survey. If archaeological resources are uncovered within the APE that may be eligible for listing on the National Register of Historic Places (NRHP) a Phase II survey should be conducted. This involves a systematic level of investigation. The objective of the investigation is to determine whether archaeological resources are eligible for listing on the NRHP.
- Plan for avoidance or conduct Phase III data recovery. If a significant archaeological site is identified that will be impacted by development, avoidance is recommended. If this is not possible, then a data recovery of the site should occur.
- If archaeological resources are found during construction and the project is reviewed under Section 106 of the National Historic Preservation Act, federal agencies and the SHPO should be consulted about appropriate procedures and action.
- If archaeological resources are found during construction and the project has no federal involvement, there are no state laws dictating specific actions. The city will work with contractors and/or developers to determine the best course of action.
- If human remains are recovered at any time during archaeological investigation or development, all activities must stop and consultation initiated with the Office of the State Archaeologist and Minnesota Indian Affairs Council.

State Legislation

If there is any public involvement in a future development the following Minnesota laws exist.

Minnesota Field Archaeology Act, 1963 (M.S. 138.31 – 138.42)

This Act established the Office of State Archaeologist (OSA) and directs OSA and MHS to make recommendations for the preservation of archaeological sites endangered by construction or development on all public lands. The OSA issues licenses, with the concurrence of the Minnesota Indian Affairs Council, for all archaeological investigations associated with public funding or on public land.

- Licensure through the OSA is required for field archaeology undertaken on all lands or waters owned, leased by or subject to the paramount right of the state or its subdivisions, as well as on lands impacted by publicly-funded development projects (http://www.admin.state.mn.us/osa/).
- Only professional archaeologists meeting the Secretary of the Interior's Standards for Archaeology (36 CFR Part 61) may be licensed to conduct such investigations in the state of Minnesota.
- When a state archaeological site is known or suspected to exist, the controlling agency must submit development plans to MHS and OSA for review.
- The controlling agency (RGU), in consultation with MHS and OSA, is directed to preserve such sites and is authorized to use its funds for such activities.
- If a site is related to American Indian history or religion, OSA must coordinate with the Minnesota Indian Affairs Council (MIAC) for review and comment.
- For more information see http://www.mnhs.org/preserve/shpo/index.html

Minnesota Private Cemeteries Act, 1975 (M.S. 307.08)
This act provides protection for marked and unmarked human burials and remains older than 50 years, and located outside of platted, recorded or identified cemeteries, protection from unauthorized disturbance. This statute applies to burials on either public or private lands or waters. Highlights include:

- It is a crime to intentionally destroy or remove human skeletal remains or burials.
- The Act directs the OSA to authenticate all burial sites.
- When human remains or burials are American Indian, the OSA and MIAC must attempt to identify their tribal identity.
- No authenticated American Indian burial may be relocated without approval of the MIAC.
- When American Indian burials are known or suspected to exist on public lands, the political subdivision controlling the land must submit development plans to the state archaeologist and the MIAC for review prior to advertising bids.

For further information see http://www.admin.state.mn.us/osa/

Minnesota Historic Sites Act, 1965 (M.S. 138.661 - 138.6691)
This Act creates a state register of properties "possessing historical, architectural, archaeological, and aesthetic values" for which adverse effects resulting from state funded or licensed projects must be mitigated. Important points:

- Historic sites are defined as properties named in the Act or listed on the National Register of Historic Places.
- Any undertaking funded or licensed by a political subdivision of the state, with certain functions of local government (e.g., county, city, village, town), is covered by the Act.
- If the undertaking affects historic sites, the agency must consult with the Minnesota Historical Society (MHS) to avoid or mitigate adverse effects.
- If the parties agree in writing to an appropriate course of action, the undertaking may proceed.
- If the parties cannot reach agreement, any of the parties may request that the governor appoint a mediation task force.

For more information see http://www.mnhs.org/preserve/shpo/index.html

Federal Legislation
If there is any federal involvement in a proposed future development through funding, permitting, loans or other federal action, there area number of federal laws, of which the National Historic Preservation is the most significant.

National Historic Preservation Act of 1966
Section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The State Historic Preservation Office acts on behalf of the Advisory Council in each state. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency officials and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. A Federal undertaking includes such activities as transfer of funds, issuing of permits, providing loans etc.
For further information see http://www.achp.gov/regs.html

b. prime or unique farmlands?
☑Yes ☐ No

AUAR Guidelines: The extent of conversion of existing farmlands anticipated in the AUAR should be described. If any farmland will be preserved by special protection programs, this should be discussed.

ANOKA COUNTY AND LINO LAKES CENTURY FARMS

Minnesota's Century Farm program, coordinated by the Minnesota Farm Bureau and the Minnesota State Fair, honors the state's agricultural heritage and culture. As a way of paying tribute to the significance of Minnesota's family farming traditions, both past and present, the program recognizes families who have owned their farms for at least 100 years and are currently involved in agricultural production of a 50-acre farm, or larger. Century Farm families receive a sign to post, as well as a certificate signed by the Governor of Minnesota, the president of the State Fair, and the president of the Farm Bureau. Established in 1976, the program has honored over 8,000 Century Farms, and continues to enroll some 250 families each year. The original applications, which list such information as the chain of ownership, information about the family's origin, descriptions of original buildings, and the major crops produced on the farm, are on file at the Minnesota Historical Society in St. Paul.

The 106 Group obtained a list of Century Farms in Anoka County from the Minnesota Farm Bureau and the Minnesota State Fair during research for the this AUAR. These organizations coordinate the Minnesota Century Farm program. Contact was subsequently made with the Farm Bureau on March 3, 2005 to confirm the accuracy of this list and obtain further locational information.

Based on data obtained at both the Minnesota Farm Bureau and the archive files at the Minnesota Historical Society, as of 2004, Anoka County is home to 17 Century Farms.

Two Century Farms are located within the AUAR area (see Figure 25-1):
- Bernier, Frances, 7233 24th Avenue N, Hugo (1890)
- Marier, Donald R., 1801 77th Street E, Hugo (1858)

Three Century Farms are located in Lino Lakes, outside the AUAR:
- Cardinal, Andrew J., Sr., 6657 Centerville Road, Hugo (1866)
- Behm, Karl, 235 Lilac Street, Lino Lakes (1893)
- Rehbein, Mary, 638 Birch, Lino Lakes (1855)

Other Century Farms in the County:
- Anderson, Roy & Beryl, 3832 213th Avenue N, Cedar (1902)
- Furrer, Samuel & Anne, 14751 Hornsby Street, Forest Lake (1883)
- Granholm, Eunice M., 5251 Fawn Lake Drive NE, Stacy (1892)
- Holzem, Christian Peter, 19256 Baugh Street NW, Elk River (1873)
- Kliever, Arnold & Elsie, 9146 Norris Lake Road, Elk River (1882)
- Koehler, Ernest and Loren, 19147 Baugh Street NW, Elk River (1876)
- Moritz, Theodore B., 9518 205th Avenue NW, Elk River (1883)
- Nelson, Joyce (1902) (no address is known, application not on file at the MHS)
- Peterson, Graydon & Helen, 23500 Bridgestone Road, St. Francis (1887)
- Rahn, Ernest & Leona, 21945 Jarvis Street NW, Elk River (1889)
- Sausen, Meriel & Myrtle, 9800 205th Avenue, Wyoming (1869)
- Wyatt, Archie & Bruce, 23939 Highway 65 NE, Bethel (1883)

The 106 Group also recommends that consideration of issues related to local heritage and the protection of it address citizens' notable pride for their agricultural heritage. The city's Comprehensive Planning process should incorporate the essence of that pride into its planning process while simultaneously determining ways to enhance it. Thoughtful interpretive planning can provide the means to develop an expressive framework for community appreciation and deeper understanding of its agricultural past, present, and future. Preservation and interpretation, when successfully combined, offer exciting opportunities and ways to connect for both the local community and beyond. Planning techniques to promote and preserve local agricultural heritage could include the establishment of farmers' markets or community gardens.

PRIME AGRICULTURAL LAND

A large portion of the AUAR area is identified as prime agricultural land (see Figure 25-2). The majority of this land will be converted to urban and suburban development. Because the AUAR area is guided for development, and is not part of an Agricultural Preserve designation, no mitigation measures have been considered. However, please see the discussion below regarding Century Farms for additional information regarding farmland in the AUAR area.

c. designated parks, recreation areas, or trails?
☑ Yes ☐ No

AUAR Guidelines: If development of the AUAR will interfere or change the use of any existing such resource, this should be described in the AUAR. The RGU may also want to discuss under this item any proposed parks, recreation areas, or trails to be developed in conjunction with development of the AUAR area.

LOCAL PARK PLANS

In 1992, the City of Lino Lakes adopted the Lino Lakes Comprehensive Park Plan and Development Guide. Sections regarding open space, public parks, and community recreation in the city's Comprehensive Plan were based on this plan, including any amendments that may be made to it. In 2004, the Parks, Natural Open Space/Greenways and Trail System Plan (System Plan) was adopted to replace the 1992 Plan.

All development scenarios maintain the objectives of the Comprehensive Plan and the System Plan – each scenario incorporates the trails, access ways, and neighborhood parks outlined in the System Plan. All elements of the System Plan planned for the AUAR area are shown in the Conservation Design Framework (Figure 10-3). It should be noted that the introduction of four neighborhood parks in the AUAR area is dependent upon residential development and demand. Specifically, the parks will be developed assuming the area is rezoned for high density residential. In Scenario One, two parks lie within a rural, low density area. Scenario Two and Three both provide the density necessary to support the parks.

REGIONAL PARK

Rice Creek Chain of Lakes Regional Park Reserve comprises a portion of the AUAR area. In all scenarios, the Regional Park will maintain its existing character and the planned land use adjacent to the majority of the park remains Rural. The Conservation Design Framework should mitigate potential impacts to the park. The northerly bypass and interchange, which provide an alternative east-west corridor through the city, will impact the Regional Park. However, the bypass provides an alternative to the greater impacts caused by increasing the capacity of CSAH 14 through the park.

d. scenic views and vistas?
☑ Yes ☐ No

AUAR Guidelines: Any impacts on such resources present in the AUAR should be addressed. This would include both direct physical impacts and impacts on visual quality or integrity. EAW Guidelines contains a list of possible scenic resources (page 13). These include spectacular viewing points along lakes, rivers or bluffs; virgin timber tracts; prairie remnants; geological features; waterfalls; specimen trees; or plots of wildflowers.

Existing public viewing opportunities of the Regional Park from Peltier Lake Drive will be maintained since no development is proposed for the shorelands located between Peltier Lake Drive and Peltier Lake. In general, residents that are accustomed to a rural landscape may consider urban development to be a negative visual impact.

e. other unique resources?
☐Yes ☑ No
If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

26. Adverse 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?
☐ Yes ☑ No

If yes, explain.

AUAR Guidelines: If any non-routine visual impacts would occur from the anticipated development covered by the MUSA review, this should be discussed here along with appropriate mitigation.

The development of the AUAR area will not create adverse visual impacts during construction or afterwards, as a result of development. Any lighting affiliated with development in the AUAR area will follow Lino Lake Zoning Codes.

27. Compatibility with Plans. 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?
☑ Yes ☐ No
If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

AUAR Guidelines: The AUAR must include a statement of certification from the RGU that its comprehensive plan complies with the requirements set out at 4410.3610, subpart 1. The AUAR document should discuss the proposed AUAR area development in the context of the comprehensive plan. If this has not been done as part of the responses to items 6, 9, 18, 21, and others, it must be addressed here; a brief synopsis should be presented here if the material has been presented in detail under other items. Necessary amendments to comprehensive plan elements to allow for any of the development scenarios should be noted. If there are any management plans of any other local, state, or federal agencies applicable to the AUAR area, the document must discuss the compatibility of the plan with the various development scenarios studied, with emphasis on any incompatible elements.

The City of Lino Lakes Comprehensive Plan is consistent with the requirements of the Metropolitan Land Planning Act requirements for 1998 plan updates. The plans were reviewed by the Metropolitan Council and found to be consistent with the regional policies and with Metropolitan Council's regional system plans. The plan complies with the requirements set out in Minnesota Rules 4410.3610, subpart 1, which requires local comprehensive plans to address land use, transportation, and sanitary sewer systems and include an implementation program.

The AUAR area discussed in this document includes 154 acres of the City of Centerville. All Scenarios in the Lino Lakes AUAR reflect the land use designations in the City of Centerville Comprehensive Plan – Land Use Plan.

Differences in land use plans between the development scenarios discussed below can be found in Table 27-1.

SCENARIO ONE
This development scenario is based on adopted plans and for that reason, it is compatible with the land use designations adopted in the Lino Lakes and Centerville Comprehensive Plans. The City of Lino Lakes Land Use and Staging Plan is shown in Figure 27-1.

SCENARIO TWO
Scenario Two represents known plans of property owners and emphasizes commercial and industrial land use. This focus is compatible with the city's goal to expand the tax base by increasing commercial and industrial land use. Most of the planned commercial and industrial growth occurs in areas designated by the Comprehensive Plan (Scenario One). Scenario Two addresses a longer temporal range (post 2020) and identifies potential urban land uses for areas listed as rural in the Comprehensive Plan (these areas are located north of 80TH ST.). As a result, some of the development in Scenario Two is planned in rural areas set outside the staged growth area designated in the Comprehensive Plan. The Comprehensive Plan requires that no development requiring MUSA or public sewer services can occur in rural areas outside of the urban growth areas (Figure 27-1). Scenario Two converts these rural areas into commercial, industrial, and residential spaces and is not consistent with the Comprehensive Plan. Residential development in Scenario One is predominantly Low Density Unsewered Residential (LDUR),

Low Density Sewered Residential (LDSR), and Rural and is limited to four units per 40 acres in rural areas. Scenario Two provides low-medium density (4.0 units/acre) and medium-high density (9.0 units/acre) residential, commercial, and industrial development in areas outside the urban growth areas identified in the Comprehensive Plan (see Figures 6-3 and 27-1).

SCENARIO THREE

In Scenario Three, residential development is emphasized in the AUAR area. Scenario Three proposes development in areas outside the urban growth areas (see previous discussion regarding Scenario Two), as well as in areas planned for commercial and industrial development in the Comprehensive Plan. The Comprehensive Plan encourages the build out of these planned areas and small amounts of LDUR and LDSR, while Scenario Three provides low-medium, medium-high, and high density housing in the areas.

Table 27-1. Land Use Comparisons Between Scenarios One, Two, and Three.

Land Use	Scenario One	Scenario Two	% Change Scenario 1-2	Scenario Three	% Change Scenario 1-3
Rural Land Use	1255	440	-65	434	-65
Low Density Unsewered Residential	76	36	-53	36	-53
Low Density Sewered Residential	225	56	-75	56	-75
Low-Medium Density Residential	0	640	n/a	972	n/a
MDR	188	0	n/a	0	n/a
Medium-High Density Residential	0	242	n/a	379	n/a
HDR	39	90	131	156	300
Commercial	274	528	93	383	40
Industrial	1072	938	-13	555	-48
Church	91	91	0	91	0
Regional Park/Peltier Lake and Rice Creek	1001	1001	0	1001	0
Other Water and Open Space	75	175	133	173	131
Right-of-Way	368	427	16	427	16
Total AUAR Area	4664	4664	n/a	4664	n/a

ZONING ORDINANCE

In an effort to ensure the compatibility of land uses, prevent urban blight, and enhance the quality of life for its residents, the City of Lino Lakes has adopted a zoning ordinance. The AUAR area is zoned for Rural (R), Rural-Business Reserve (R-BR), Light Industrial (LI), and General Business (GB) land use (Figure 27-2). In Rural (R) areas, Zoning Ordinance permits uses such as agricultural, government, open space, and single family residential development (1 unit per 10 acres) to preserve areas as Rural until urban services are available. Likewise, the Rural-Business Reserve (R-BR) District preserves low density development and rural uses until the reserved land is needed for commercial and industrial uses. At that point, if urban services are available, the

Zoning Code is amended to rezone the area for urban scale development (e.g. rezoned from R to R-1 Single Family or rezoned from R-BR to LI, Light Industrial).

General Business areas are designed to support a variety of business uses, including retail, service, and public facilities. Light Industrial District permits wholesale, transit terminals, some manufacturing, and other uses that will have low impacts on surrounding residential areas. The city's ordinance that states that no new land shall be zoned Industrial/Commercial unless it can be served with utilities.

If components of the land uses proposed in Scenario Two or Three are adopted through a subsequent comprehensive planning process, zoning ordinances will need to be amended to be consistent with any amendments to the Comprehensive Plan.

METROPOLITAN COUNCIL - 2030 REGIONAL DEVELOPMENT FRAMEWORK (ADOPTED JANUARY 14, 2004)

The urbanization of the AUAR area is compatible with the regional policy document. Lino Lakes is designated as "Developing" in the 2030 Regional Development Framework. This indicates that the Metropolitan Council anticipated growth and development in the AUAR area. The urbanization of this area is compatible with regional policies including, but not limited to, achieving regional density goals, providing life-cycle housing opportunities, planning centers that are desirable places to live, shop and do business, planning interconnected bicycle and pedestrian paths, protecting locally significant natural resources, and capitalizing on regional infrastructure investments.

PARKS, NATURAL OPEN SPACE/GREENWAYS AND TRAIL SYSTEM PLAN (ADOPTED AUGUST, 2004)

All Scenarios regarding the development of the AUAR area are compatible with the city's Parks, Natural Open Space/Greenways and Trail System Plan. (See Item 25.)

MITIGATION SUMMARY

If the city chooses to implement any components of the land uses proposed in Scenario Two or Three, changes would have to be made to the city's Comprehensive Plan, urban growth area boundaries, and zoning ordinances through the city's amendment processes. To do this, the city would follow set guidelines and procedures regarding Comprehensive Plan and Zoning Ordinance amendments.

28. Impact on Infrastructure and Public Services. Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project?
☑ Yes ☐ No

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 EAW; see *EAW Guidelines* for details.)

AUAR Guidelines: This item should first of all summarize information on physical infrastructure presented under other items (such as 6, 18, 19, and 22). Other major infrastructure or public services not covered under other items should be discussed as well -- this includes major social services such as schools, police, fire, etc. As noted above and in the "EAW Guidelines," the RGU must be careful to include project-associated infrastructure as an explicit part of the AUAR review if it is to be exempt from project-specific review in the future.

PHYSICAL INFRASTRUCTURE

The infrastructure planned to serve the area is based on the following plans and studies:

1. The *Draft Comprehensive Sanitary Sewer Plan*
2. The *2004 Comprehensive Water System Plan*
3. The Metropolitan Council Environmental Services' *Service Availability Charge (SAC) Procedures Manual* (MCES, 2000)
4. The *2002 Comprehensive Plan*
5. Facility Planning Study for Centerville Interceptor Improvements and Service Evaluation for the Northeast Region (MCES, 1998)

The sanitary sewer, water, and roadway infrastructure needed to serve the AUAR area differs somewhat between Scenario One and the other two Scenarios, which make higher demands for infrastructure services. However, as each development proposal is submitted, the plans listed above will be followed to ensure that infrastructure can adequately support development proposed within the AUAR area.

Sanitary Sewer
The *Draft Comprehensive Sanitary Sewer Plan* will guide the orderly expansion of the sanitary sewer collection system for the AUAR area in Lino Lakes. The Centerville portion of the AUAR will be served by extending the existing Centerville sewer system. Flows for the AUAR area were determined using the *Service Availability Charge (SAC) Procedures Manual* for residential volume, and a conservative approach for commercial and industrial volumes.

Most of the AUAR area is not currently served by sanitary sewers. The *Draft Comprehensive Sanitary Sewer Plan* proposes major gravity sewers, major lift stations and force mains in addition to the local sewers needed to serve this area. The plan does not specify the location of local sewers.

All wastes from the area will be conveyed to the Metropolitan Council Environmental Services Division (MCES) system for treatment and disposal. The Metropolitan Wastewater Treatment Plant, serving 62 communities, currently treats an average of 215 million gallons per day (MGD) with capacity to treat 251 MGD. It provides advanced secondary treatment with

chlorination/dechlorination techniques. Industrial development in the AUAR area is expected to be limited to office/warehouse and light manufacturing uses that will generate wastes similar in character to normal domestic wastes. Discharge of process water or other wastewater containing industrial contaminants is not anticipated.

Based on the *Draft Comprehensive Sanitary Sewer Plan*, average daily sanitary flow for the AUAR area was calculated to be 2.968 MGD. As shown on the following table, Scenario One will produce less and Scenarios Two and Three will both produce more flow than this.

CSSP Scenario:	2.968 MGD
Scenario One:	2.529 MGD
Scenario Two:	3.646 MGD
Scenario Three:	3.733 MGD

In addition to the AUAR area, the MCES interceptor serves existing and future development in adjacent areas of Lino Lakes and Centerville, totaling about 0.5 MGD. Consequently, the total service needs range from 3.0 MGD for Scenario One to 4.2 MGD for Scenario Three. The capacity of the present MCES interceptor on an average day basis is 1.7 MGD. MCES is currently planning to construct a new interceptor in 2006 intended to serve growth in the AUAR area. The design work for this new line is presently underway. Current design size (2.0 MGD) is not adequate to serve the development proposed in Scenarios Two and Three.

In recent years, two large sewer facilities were extended north from the Centerville Interceptor into commercial and industrial areas in the AUAR area: a 21-inch gravity sewer along Otter Lake Road, and a lift station and 21-inch gravity sewer along 21st Avenue. These facilities were designed with capacity for a significant portion of the AUAR north of CSAH 14. Major capital improvements planned in this area include extending the Otter Lake Road and 21st Avenue trunk sewers north from Main Street and further into the northern areas of the AUAR Area. Specific locations will be dependent on and influenced by the location of MCES Interceptor improvements, currently under design development.

The city's Comprehensive Plan provides recommendations for the expansion of the city's sanitary sewer system to meet the projected growth and development for the AUAR Area. These recommendations apply to the trunk sewers, lateral sewers, and city sanitary lift stations.

Table 28-1. 2003 - 2030 City of Lino Lakes Capital Improvement Plan (AUAR Related Projects)

IMPROVEMENT	YEAR OR PERIOD
Gravity Sewer, Cedar Street/Centerville Road	2005
Gravity Sewer Extension, 21st Avenue	2006 - 2010
Gravity Sewer Extension, Otter Lake Road	2006 - 2010
Upgrade Lift Station No. 7	2006 - 2010
Upgrade Lift Station No. 8	2006 - 2010

The far northern portions of the AUAR area are not expected to develop and require sanitary sewer in the near future. The city's policy is to permit unsewered residential properties to remain as long-term land uses, and to extend sanitary sewers into unsewered subdivisions only at the request of the property owners. New installations of on-site systems will generally be restricted to rural land uses with a minimum lot size of 10 acres. Rural and low density unsewered residential

land use in the AUAR Area are identified provided in the city's August 2002 Comprehensive Plan.

Water

Most of the AUAR area is not currently served by the city water system. Existing service within the area is generally limited to the portion of the city south of Main Street (CSAH 14). The system is currently served by a "linear trunk transmission system," with service to the AUAR area and the northwest part of the city is not interconnected with any looping. There are water system interconnects to the neighboring cities of Blaine, Centerville, Circle Pines, Hugo, and Shoreview.

The *2004 Comprehensive Water Plan* will guide the orderly expansion of the water system to 2030. The Plan proposes new wells, storage towers, and trunk mains, including a northerly main connecting the northeast part with the northwest part of the city. Flows for the AUAR area were determined to meet anticipated water demands including potential fire flows. Trunk main service is to be extended northerly from County Road 14 along both sides of I-35E. Placement of other lines will be integrated with specific development needs.

Water supply needs will be met by the addition of four new wells. Due to the location of the Jordan Aquifer, the city's water source, all wells are likely to be located outside of the AUAR area. Depending on development needs, and also upon well performance, new wells may have to come on line sooner than planned in the Water Plan. This can be determined in future years based on actual and expected development. Based on past experience in the city, groundwater levels are not expected to lower significantly based on development in any of the Scenarios. Additional storage needs have also been anticipated in the plan.

Because the city has planned for an adequate water supply and distribution system to accommodate future development, water supply and service issues are not anticipated.

Stormwater System

A stormwater study was conducted and a stormwater management plan was developed for the AUAR area. Development of the AUAR area will include the creation of infiltration/detention basins for the treatment and rate and volume control of stormwater runoff. Some of these features will be created by property owners as development occurs while other, more regional facilities, will be designed and implemented prior to development.

At the site scale, stormwater detention surface area requirements have been sized for each potential development zone (Figure 17-3). The areas allocated for stormwater management have been designed to maximize native wetland communities to provide water quality mitigation in addition to stormwater management. Each stormwater management area was sized for a water surface fluctuation of 2.5 feet with 0.75 feet of freeboard during a 100-year storm event. Side slopes were designed with a horizontal to vertical ratio of 6:1.

Stormwater management areas will release treated runoff to an integrated system of stormwater management elements located in greenway corridors as seen in the Conservation Design Framework (Figure 10-3). Within the greenway corridors shown in the Framework, vegetated swales, wet prairie, and wetlands can be oriented in series to effectively retard runoff rates, reduce stormwater volume, and enhance water quality. Runoff rates and volumes will be decreased due to increased infiltration, evapotranspiration, and increased friction imparted on the flow. These decreased rates also reduce the ability of runoff to generate and carry sediment and associated pollutants.

The hydric soils throughout the AUAR area will pose problems for achieving infiltration criteria as outlined in the *Rice Creek Watershed Rules*. Native wetland and prairie plants are particularly useful for achieving infiltration requirements under these conditions, because they use large amounts of water and create preferential infiltration pathways. The greenway corridors established in the Framework provide appropriate locations for these types of infiltration facilities. The location and expansiveness of these corridors could provide the necessary surface area for the shared infiltration facilities as discussed in Item 17.

Roads
Because the development scenarios are based on the city's existing and proposed roadway system, the infrastructure provided by the proposed improvements and expansions is necessary to serve new development.

The AUAR area is bisected by I-35E, which carries through traffic and accesses the southern and northern parts of the area at the CSAH 14 interchange and the proposed 80th Street interchange. These interchanges access adjacent commercial and residential development. All three scenarios depend on these interchanges to access CSAH 14, 80th Street, and CSAH 21, which will serve residential areas located on minor arterials and local roads. Construction of a frontage/backage road system along the interstate will also increase property access in the AUAR area. To alleviate increased strain on these minor arterials and local streets, a Northerly Bypass is proposed to connect I-35E and I-35W.

In all three development scenarios, traffic levels are greatly increased. Under these conditions, the existing and improved roadway system was strained, even with the upgrades and additions provided by city transportation plans. Though the scenarios are based on the existing and proposed road network, traffic generated by the development scenarios will exceed the capabilities of the system and the system will need improvements to mitigate potential impacts. In all three scenarios, there are intersections that perform at LOS E or F, even with mitigation measures. These intersections include:

- Scenario 1 without the Northerly Bypass:
  - Southbound left turns at Main Street (CSAH 14) and CSAH 21.
  - Southbound left and right turns, eastbound left turns, northbound left turns at Frenchman Road (CSAH 8) and Otter Lake Road.

- Scenario 2
  - Northbound right turns onto I-35W at 80th Street.
  - Eastbound and northbound left turns, and westbound thru traffic at Otter Lake Road and Frenchman Road (CSAH 8).

- Scenario 3
  - Northbound right turns and westbound thru traffic at I-35W and 80th Street.
  - Northbound and westbound left turns at 80th Street and CSAH 21.
  - Southbound left turns at Main Street (CSAH 14) and 20th Avenue.
  - South bound left and right turns, eastbound and northbound left turns at Otter Lake Road and Frenchman Road (CSAH 8).

PUBLIC SERVICES

Police

To quantify the potential need for additional officers and associated police jobs needed due to the projected growth in the Lino Lakes AUAR Area, we reviewed data from the Bureau of Justice Statistics' (BJS) *Justice Expenditure and Employment Extracts Series: 2000* (most recent data available). The BJS extracts data from the Census Bureau's Annual Government Finance Survey and Annual Survey of Public Employment. This series includes national and state-by-state estimates of government expenditures and employment for the following justice categories: police protection, all judicial (including prosecution, courts, and public defense), and corrections.

According to the data, as of 2000, 1.31 municipal police jobs existed for every 1,000 persons in the State of Minnesota. In terms of actual sworn police officers, however, the ratio was 1.03 municipal officers to every 1,000 persons. Table 28-1 displays police jobs projections for each development scenario based on these rates and anticipated residential growth.

Table 28-2. Local Police Job Projections

	New Residents*	**Sworn Officers** per 1,000 Residents	**Total Police Jobs** per 1,000 Residents	**Additional Sworn Police Officers**	**Total Additional Police Jobs**
Scenario One	6,714	1.03	1.31	6.9	8.8
Scenario Two	17,145	1.03	1.31	17.7	22.5
Scenario Three	25,977	1.03	1.31	26.8	34.0

*Figures derived from estimating 3.0 persons per new household in Lino Lakes based on the Metropolitan Council's total population and household forecasts for the next 30 years.

Fire

As Lino Lakes expands its housing stock and commercial areas, the Centennial Fire Department (which services Lino Lakes) will likely need to concurrently increase the number of volunteer firefighters. Firefighter/citizen ratios vary considerably throughout the United States, but are largely determined by the use of full-time and/or volunteer firefighters. Basically, communities utilizing volunteer brigades require higher ratios, as they generally rotate who is actually on-call for firefighting at any given time. Full-time firefighter/citizen ratios are generally lower, as they are, by profession, able to increase efficiency and devote more time to firefighting and other associated services.

Unlike the data available through the Bureau of Justice Statistics for police/citizen ratios, data for similar ratios pertaining to firefighters is not readily available. The centennial Fire Department's current ration is 2.3 volunteer fire fighters per 1,000 residents and the Centennial Fire Chief supports using the existing ration to project future needs. Table 28-2 shows suggestions for additional volunteer firefighters for each development scenario, based on the projected residential growth anticipated with each plan.

Table 28-3. Volunteer Firefighter Projections

	New Residents*	**Volunteer Firefighters** per 1,000 Residents	**Additional Volunteer Firefighters**
Scenario One	6,714	2.3	15
Scenario Two	17,145	2.3	39
Scenario Three	25,977	2.3	60

*Figures derived from estimating 3.0 persons per new household in Lino Lakes based on the Metropolitan Council's total population and household forecasts for the next 30 years.

School Enrollment

White Bear Lake (#624), Forest Lake (#831), and Centennial (#12) operate in a rapidly-growing area of the Twin Cities, and their respective administrations have measured the growth in enrollment in recent years, particularly as it relates to new household growth in their district. Penetration rates available from Forest Lake and Centennial Districts were used to project school enrollments for each scenario.

The Forest Lake District recently published a new study that examined historic trends in enrollment, and projected future enrollment through multiple methods. In particular, the report's "new household growth method" of projecting new school enrollment was reviewed closely. When looking ahead, the District assumes that for every housing unit added, 0.51 pupils will be added to the district. Conversations with a representative of the superintendent's office at the Centennial School District revealed that they use a penetration rate of 0.75 pupils added per new district household.

These penetration rates take into account different types of residential development (multifamily versus single-family; owner versus rental; etc.), as they generate differing levels of school enrollment. Assuming this rate, the additional housing units provided by each scenario will each generate a unique range of potential students added. Table 28-3 displays school enrollment projections for each scenario.

Table 28-4. School Enrollment Projections

	Total HH	**Forest Lake** Pupils per HH	**Centennial** Pupils per HH	**Potential Students Added**
Scenario One	2,238	.51	.75	1,141-1,678
Scenario Two	5,715	.51	.75	2,915-4,286
Scenario Three	8,659	.51	.75	4,416-6,494

District #624 (White Bear Lake) schools are currently at capacity. In the fall, the administration will use spring registration figures to compute projected enrollments.

District #12 (Centennial) currently has no plans to build additional schools. Their elementary schools have substantial space to accommodate district growth, and projections indicate that space in the middle and high schools will open-up as smaller classes (currently in the elementary grades) move in to the schools.

District #831 (Forest Lake) also has no plans to add schools.

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 EAW 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).

AUAR Guidelines: This item does not require a response for an AUAR with respect to cumulative impacts of potential developments within the AUAR boundaries, since the entire AUAR process is intended to deal with cumulative impacts from related developments within the AUAR area; it is presumed that the responses to all items on the EAW form encompass the impacts from all anticipated developments within the AUAR area

However, the questions of this item should be answered with respect to the cumulative impacts of development within the AUAR boundaries compared with past, present, and reasonably foreseeable future projects outside of the AUAR area, where such cumulative impacts may be potentially significant. (As stated on the EAW form, these cumulative impact descriptions may be provided as part of the responses to other appropriate EAW items, or in response to this item).

The large geographic scope of this AUAR (4,500+ acres) was selected for the purposes of dealing with cumulative impacts from development in the northeastern portion of the City of Lino Lakes. Although the focus of the AUAR analysis is along the I-35E Corridor, the AUAR boundary extends far west of the I-35E Corridor to capture areas for a detailed cumulative impacts analysis throughout this AUAR document. The AUAR boundary was extended beyond the immediate I-35E Corridor to capture the following areas:

- Potential new interchange along I-35W north of the I-35W/CSAH 14 interchange to construct the northerly bypass (western extension of 80th Street)
- Portions of Rondeau Lake and the Rice Creek Chain of Lakes (and Regional Park)
- The easternmost portion of the City of Centerville, which is in the immediate vicinity of the I-35E/CSAH 14 interchange

In addition to the large geographic scope included within the AUAR boundary and the resultant cumulative impacts analysis contained throughout this document, the following cumulative impacts due to future projects located outside the AUAR and/or the implementation of other communities Comprehensive Plans were also addressed:

- Metropolitan Council Environmental Services is in the process of updating their comprehensive planning for the “Northeast Region,” which includes Lino Lakes, Centerville, North Oaks, Forest Lake, Hugo, White Bear Lake, and White Bear Lake Township. They anticipate the need to provide additional capacity in the Forest Lake Interceptor and downstream facilities to serve future wastewater treatment needs of these communities due to the projected growth that will be accommodated in the Northeast Region. The development of the AUAR area will be subject to any capacity constraints posed by the regional system and these constraints are discussed under Item 18.

- The traffic and intersection analysis takes into account the growing volumes of traffic within the AUAR area that are attributed to projected development, and the associated trips, originating outside of the AUAR area (e.g., volumes on I-35E, CSAH 14, & 80TH ST.). This analysis is included under Item 21.
- The northerly bypass mitigates potential impacts from needing to increase capacity (add lanes) to CSAH 14 through the Regional Park. The segment of CSAH 14 that goes through the Regional Park is located south and west of the AUAR area.
- The AUAR addresses water quality impacts within the AUAR area and discusses both upstream and downstream water resources under Items 12 and 17.

30. Other Potential Environmental Impacts If the project may cause any adverse environmental impacts which were not addressed by items 1 to 28, identify them here, along with any proposed mitigation.

AUAR Guidelines: If applicable, this item should be answered as requested by the EAW form.

31. Summary Of Issues (This section need not be completed if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document which must accompany the EAW.) List any impacts and issues identified above that may require further investigation before the project is commenced. 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.

AUAR Guidelines: The RGU may answer this question as asked by the form, or instead may choose to provide an Executive Summary to the document that basically covers the same information. Either way, the major emphasis should be on potentially significant impacts, the differences in impacts between major development scenarios, and the proposed mitigation.

An Executive Summary is provided at the beginning of this document (page vii) and a summary of potential impacts is included in the proposed mitigation plan.

Certification by RGU. The EQB will only accept SIGNED EAWs 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 EAW 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 of phased actions, as defined at MN Rules, parts 4410.0200, subparts 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

AUAR Guidelines: In an AUAR document, no certifications as listed at the end of the EAW form are necessary. (The RGU is legally responsible for the accuracy and completeness of the document and for properly distributing it nonetheless.)

Mitigation Plan

AUAR Guidelines: The final AUAR document must include an explicit mitigation plan. At the RGU's option, a draft plan may be included in the draft AUAR document; of course, whether or not there is a separate item for a draft mitigation plan, the proposed mitigation must be addressed through the document.

It must be understood that the mitigation plan in the final document takes on the nature of a commitment by the RGU to prevent potentially significant impacts from occurring from specific projects. It is more than just a list of ways to reduce impacts -- it must include information about how the mitigation will be applied and assurance that it will. Otherwise, the AUAR may not be adequate and/or specific projects may lose their exemption from individual review. The RGU's final action on the AUAR must specifically adopt the mitigation plan; therefore, the plan has a "political" as well as a technical dimension.

INTRODUCTION

This Mitigation Plan is submitted as part of the Final AUAR to provide reviewers, regulators and prospective tenants or purchasers of land with an understanding of the actions necessary to protect the environment and limit potential impacts by proposed development projects. The potential impacts and mitigation strategies included in the Draft Mitigation Plan Outline in the Draft AUAR have been revised and expanded upon to address Draft AUAR comments.

This Mitigation Plan is intended to satisfy the AUAR rules that require the preparation of a "mitigation plan" that specifies measures or procedures that will be used to avoid, minimize, or mitigate the potential impacts of development within the AUAR area. Although mitigation strategies are discussed throughout the AUAR document, this plan will be formally adopted by the RGU as their action plan to prevent potentially significant environmental impacts.

The primary mechanism for mitigation of environmental impacts is the effective use of ordinances, rules, and regulations. The plan does not modify the regulatory agencies responsibilities for implementing their respective regulatory programs, nor create additional regulatory requirements. The Mitigation Plan specifies the legal and institutional arrangements that will assure that the adopted mitigation measures are implemented.

The Mitigation Plan is organized by the AUAR Item numbers. Table 8-1 from Item 8, Permits and Approvals Required, has been revised to address Draft AUAR comments and is adopted as part of the Mitigation Plan. In addition to the permits and approvals presented in the following table, mitigation measures are presented for Items 11-13, 15-19, 21, 25 and 27. The preparers of the AUAR determined that other AUAR Items did not represent significant environmental impacts that required mitigation measures that go beyond existing ordinance and regulatory requirements; or that the necessary mitigation measures were presented under a different AUAR Item.

ITEM 8. PERMITS AND APPROVALS REQUIRED

Unit of Government	Type of Application	Status
Federal		
Army Corps of Engineers	Section 404 Permit	To be Applied for
	Letter of No Wetland Jurisdiction	To be Applied for
Federal Highway Administration	Interchange Access Request	To be Applied for
State		
Minnesota Environmental Quality Board	Environmental Assessment (AUAR)	In progress
Minnesota Board of Soil and Water Resources	Erosion and Sediment Control Plan Approval	To be Applied for
Minnesota Pollution Control Agency	Section 401 Water Quality Certificate	To be Applied for
	NPDES/SDS General Permit	To be Applied for
	Sanitary Sewer Extension Permit	To be Applied for
State Historic Preservation Office	Cultural Resources Review	To be Applied for
Minnesota Department of Natural Resources	Storm Sewer Discharge Permit	To be Applied for
	Water Appropriations Permit	To be Applied for
	Public Waters Work Permit	To be Applied for
	General Permit 97-0005 for Temporary Water Appropriations (need if more than 10,000 gpd of water is appropriated	To be applied for, if necessary
Minnesota Department of Transportation	Use of or Work within MnDOT right of way	To be Applied for
	Drainage Permit	To be Applied for
Minnesota Department of Health	Watermain Extension Approval	To be Applied for
	Sanitary Sewer Extension Permit Approval	To be Applied for
	Well Location and Construction Approval	To be Applied for
Regional		
Rice Creek Watershed District	Erosion and Sediment Control Plan Approval	To be Applied for
	Stormwater Management Plan Approval	To be Applied for
	Wetland Delineation Boundary Confirmation	To be applied for upon completion of wetland delineation
	Drainage Authority Review and Approval – Mn. Stat. Section 103E.227 (impoundments & diversion) and/or Mn. Stat. Section 103E.805 (abandonment proceedings)	To be applied for
	Certificate of Wetland Exemption	To be Applied for
Metropolitan Council	Sanitary Sewer Service Connection Approval	To be Applied for
	Comprehensive Plan Amendment Review	To be Applied for
County		
Anoka County	County Roadway Access Permits	To be Applied for

Unit of Government	Type of Application	Status
Local		
City of Lino Lakes	Site Plan Approval	To be Applied for
	AUAR and Mitigation Plan Approval	To be Applied for
	Planned Unit Development Approval	To be Applied for
	Preliminary Plat Approval	To be Applied for
	Final Plat (multiple) Approval	To be Applied for
	Grading, Excavation and Foundation Permits (multiple)	To be Applied for
	Building Permits (multiple)	To be Applied for
	Sanitary Sewer Connection Permit (multiple)	To be Applied for
	Municipal Water Connection Permit (multiple)	To be Applied for
	Use Permit – Floodplain District	To be Applied for
	City Roadway Access/Crossing Permits	To be Applied for
	Comprehensive Plan Amendment(s)	To be Applied for

All required permits and approval will be obtained. Any necessary permits or approvals that are not listed in the table above were unintentionally omitted, and some listed may not be necessary.

ITEM 11. FISH, WILDLIFE, ECOLOGICALLY SENSITIVE RESOURCES

Potential Impacts

- Development will convert natural and semi-natural land cover types to urban uses.
- Development may impact the use of property as a migratory corridor and wildlife habitat.
- Development may encroach on the eastern shore of Peltier Lake, potentially impacting water quality and eliminating the opportunity to provide a contiguous, connected green buffer zone and natural park-like experience along the lake.
- Development will likely affect wildlife species of agricultural and old field habitats more so than wooded and wetland habitats because development tends to focus on open uplands.
- Development (e.g., conventional road curbs) will create barriers to the movement of reptiles and amphibians, including the state-threatened Blandings turtle, which has been documented to occur near the AUAR area.
- Development may impact the use of an eagle's nest within the AUAR area.
- Development may impact the Peltier Lake Island Heron Rookery.
- Development may impact rare plant species in wetland habitats.
- Development of the proposed northerly bypass may impact Rice Creek, Hardwood Creek, and/or their associated wetlands and floodplains.

Mitigation Strategies

The city will:

11.1 Implement the Conservation Design Framework (CDF, see Figure 10-3), which includes conservation of "Core" and "Outlier" habitat areas, buffering these natural resources, and establishing greenway corridors throughout the AUAR area to provide connectivity for ecological

and wildlife corridors, regional stormwater collection and conveyance, and passive recreational opportunities

11.2 Add the "Core" and "Outlier" habitat areas to the City's *Parks, Natural Open Space/Greenways, and Trail System Plan* map.

11.3 Require public land dedication of priority natural open space areas through the subdivision process.

11.4 Require that cash in lieu of public land dedication for subdivisions within the AUAR area be spent within the AUAR area to purchase, restore, and/or maintain priority natural open space areas.

11.5 Consider provisions for conserving "Other" habitat areas (see Figure 10-2) during the development review process.

11.6 Establish mechanisms for ecological restoration, management, stewardship, and education.

11.7 Provide for turtle and other wildlife passage by continuing to require surmountable curbing in new residential developments and encouraging ecologically sensitive site design.

11.8 Consult with the DNR and/or US Fish and Wildlife Service to determine appropriate mitigation strategies for activities near the Bald Eagle's nests within the AUAR area before development occurs within the vicinity of the nests, including reviewing recommended disturbance limit guidelines developed by the DNR.

11.9 Continue to enforce the Peltier Lake No-Wake Zone ordinance and establish buffers to protect the Peltier Lake Heron Rookery.

11.10 Require rare plant surveys, by qualified personnel, prior to development in wetland areas.

11.11 Encourage ecologically sensitive design and construction practices for the proposed northerly bypass.

Implementing the CDF throughout the AUAR Area

The Conservation Design Framework (CDF, see Figure 10-3) provides the foundation for most of the conservation objectives within the AUAR area. Implementation of the CDF will:

- Conserve the most ecologically significant natural resources within the AUAR area (in particular, the "Core" and "Outlier" habitats, see Figure 10-2);
- Protect ecologically significant natural resources from adjacent land uses by implementing buffering; and
- Connect ecologically significant natural resources via multi-functional greenway corridors.

The AUAR area will be developed in phases over the course of 20 to 30 years. Likewise, the Conservation Design Framework (CDF) will need to be phased in as development occurs. This can be accomplished only through a cooperative partnership between private land owners, developers, and the City of Lino Lakes. Through the AUAR process, the City has made its conceptual conservation objectives known through the design and adoption of the CDF. The implementation of the CDF will occur over time through future plans and policy decisions by the City (e.g., land use plans, parks and open space plans, park and open space dedication requirements, etc.). The implementation of the CDF will largely take place through the development review process. Therefore, developers in the AUAR area will need to help implement the vision expressed in the CDF.

The City's existing procedures and requirements for reviewing and approving specific development projects (e.g., subdivision applications, site plan applications, etc.) cannot achieve all of the CDF objectives. Some parcels of land contain major components of the CDF (e.g., large core habitat areas) and, in some circumstances, it is unreasonable to require that an individual land owner donate a

conservation easement or dedicated to the public a significant percentage of their land to achieve the CDF elements. For example, if a land owner has a 40-acre parcel and 30 acres of it are identified as a "core habitat area", it would be unreasonable for one individual land owner to conserve 75% of their land without assistance from public or private resources. Conversely, some parcels do not include major components of the CDF (e.g., core habitat areas), but future residents and/or businesses within that parcel of land would realize the benefits of CDF and should contribute to the implementation of the CDF.

Minnesota Statues Chapter 462 and the City's Subdivision Ordinance give the city the authority to require public land dedication, or cash in lieu of land dedication, through the subdivision process. This authority provides the City an opportunity to implement the CDF. The Subdivision Ordinance requires that in all new residential, commercial and industrial subdivisions, ten (10) percent of the area subdivided shall be dedicated for public recreation space or other public use or shall pay a fee in lieu of such land dedication. This ten (10) percent is calculated on the net area, which is the gross area of the subdivided property minus the area in wetlands. Within the AUAR area, approximately 2,300 net acres could potentially be subdivided in the future. Given the ten (10) percent requirement, this could result in 230 acres of additional land being dedicated for public purposes or a combination of land and cash in lieu of land dedication. The City's authority to leverage resources (land and fees in lieu of land dedication) can provide a significant resource for achieving the vision of the CDF throughout the AUAR area.

Public Land Dedication, Section 1008-1(4) of the Subdivision Ordinance, states, "the applicant shall confer with City Staff and the Park Board at the time the preliminary plat is under consideration, to secure a recommendation as to the location of any property that should be dedicated to the public, such as parks, playgrounds or other public property." The city's standard practice is to consult the *Parks, Natural Open Space/Greenway and Trail System Plan* map to identify the location of property that should be considered for dedication to the public for future parks, playgrounds, public open spaces or trails.

The *Parks, Natural Open Space/Greenway and Trail System Plan* map identifies "Natural Resource Protected Areas," "Natural Resource Conservation Areas," "Natural Resource Corridor Enhancement Areas," and "Future Neighborhood Parks." This map could be amended to identify the core and outlier habitat areas (Figures 10-2 and 10-3) and greenway corridors depicted on the CDF. It is noted that some of these habitat areas and corridors identified on the CDF (Figure 10-3) are already depicted on the *Parks, Natural Open Space/Greenway and Trail System Plan* map. Generally, wetland and aquatic resources are identified as "Natural Resource Protected Areas," upland resources are identified as "Natural Resource Conservation Areas," and greenway corridors are identified as "Natural Resource Corridor Enhancement Areas."

The City could prioritize the habitat areas and greenway corridors on the CDF that would be included on the *Parks, Natural Open Space/Greenway and Trail System Plan* map. These priorities could be based on connections or proximity to natural resource areas and parks already included on the map, likely development phasing within the AUAR area (e.g., the southern portion of the AUAR area will likely develop before the northern portion), type of habitat area (aquatic/wetland vs. upland), and other priorities identified by the city.

Buffers

Buffers are a valuable conservation tool and integral to the CDF. Ecological restoration and management of natural buffer areas can provide conservation benefits. This, however, requires sound planning and stewardship funding. Long-term protection of buffer areas can be achieved through a variety of methods, including conservation easements, deed restrictions, and restrictive covenants. Establishing, restoring, and managing buffers rely on recognizing the importance of buffers in future decisions. Buffers depicted in the CDF should be considered during long range planning, zoning ordinance updates, and site design. Natural and designed open space areas will be buffered from development by:

- Implementing appropriate land use designations and corresponding zoning districts;
- Pursuing the buffer zone recommendations presented in the City's Parks, Natural Open Space/Greenways and Trail System Plan;
- Allowing performance-based buffers that may include minimum and average widths;
- Considering the quality of the habitat and the habitat needs of targeted wildlife groups when establishing buffers; and
- Providing for restoration and stewardship of buffer areas.

Buffer zone recommendations presented in the City's *Parks, Natural Open Space/Greenways and Trail System Plan* (the City's Park Plan) are shown on the CDF (Figure 10-3). The CDF is a fundamental precept for all development within the AUAR area. Every project can and must incorporate conservation development design and/or Low Impact Development techniques. The extent to which buffer systems can be created, and the specifics of each buffer, will be determined on a case by case basis. For example, a 100-foot buffer may be feasible on a large development site; however, such a buffer may constitute a large percentage of a smaller development site as to make the project economically unfeasible. In such cases, a 100-foot buffer may unreasonable.

Every development site will be examined for the potential for appropriate, feasible buffering of sensitive areas. The City's *Parks, Natural Open Space/Greenways and Trail System Plan* describes conceptual buffer systems. Recognizing that these are ideals and may not be achievable on every site, they provide guidance. The buffer systems are summarized as follows:

The Primary Buffer Zone (100 foot width) is directly adjacent to an ecologically sensitive area.

- Built structures (buildings, hard-surface trails, etc.) to be avoided in this zone where feasible, especially the first 50 feet.
- Limited flexibility within the second 50 feet of this zone, including development of a hard-surfaced trail as part of the overall trail system.
- Vegetative alteration, including mowing, limited to ecological restoration purposes.
- Grading work limited to restoration activities or integrating natural infiltration systems for stormwater management.

The Incentive Buffer Zone (200 foot width) extends from the edge of the Primary Zone and continues away from the buffered resource.

- Desired in locations abutting water bodies, lakes, wetlands, wet prairies, sedge meadows, streams, creeks, etc.
- Native landscaping would prevail.
- Flexibility is given to development which includes trails; nature observation areas; fencing to screen private and public use areas; etc.
- Houses or other built structures avoided.
- Natural infiltration systems for stormwater management can be integrated into this zone.

While the buffers zones recommended in the City's Park Plan provide many conservation benefits, scientific studies in recent ecological publications suggest that this approach to buffering alone will not provide sufficient habitat for some wildlife groups (e.g., wetland animals and upland birds). Therefore, the CDF depicts an ecologically-defined buffer of 660 feet for "Core" and "Outlier" wetlands in the AUAR area. Likewise, the CDF also depicts an ecologically-defined buffer of 1,320 feet for "Core" and "Outlier" uplands in the AUAR area. These buffers are presented in the CDF for consideration in conjunction with zoning updates, comprehensive plan updates, and planning of future developments within the AUAR area. These ecologically-defined buffer areas should be considered for park dedication, natural open space conservation, or ecological stormwater management. If these large buffers are created

intensive land uses should be avoided within these buffer areas whenever feasible. If intensive land uses are proposed within these buffers, buffer width averaging should be employed to mitigate the buffer infringement, and enhancement of the remaining buffer should be conducted in the vicinity of the infringement. Buffer enhancement may include installation of native trees and shrubs or restoration of other native plant communities to mitigate for the narrowed buffer width.

Multifunctional Greenway Corridors

Multifunctional greenway corridors are also integral to the effectiveness of the CDF. The greenway corridors depicted in Figure 10-3 are conceptual; it is likely that their location and alignment will change as individual properties are developed. However, appropriate location, design, establishment, and management of these greenway connections is critical to ensuring that the mitigation goals are fully met as development proceeds in the AUAR area.

These greenways will provide ecological and wildlife corridors, regional stormwater collection and conveyance, and passive recreational opportunities for people. Determining the location of multifunctional greenway corridors requires the integration of locational information from the following:

- Existing utility easements for stormwater management, including existing ditch and drainage systems, major underground conveyance systems, and existing stormwater management ponds;
- Existing trail easements and proposed trail corridors and linkages proposed in the City's Park Plan;
- Location of conservation easements and protected areas that can be part of a multifunctional greenway corridor without acquiring an interest in the land;
- Analysis of an individual development site using conservation development design principles. Where there is convergence of the following features in a development site, there is an opportunity to establish a multifunctional greenway corridor. These features include:
    - the location of existing drainageways and wetlands;
    - depressional areas that are suitable for conveying and storing stormwater runoff;
    - steep slopes that may become unstable and susceptible to erosion due to development; and
    - existing significant natural vegetation areas, particularly those indicated in the CDF.

Opportunities to establish multifunctional greenway corridors exist at locations where these elements co-occur, or are adjacent or near to each other. In addition, land that lies between these elements present opportunities to create linkages. Individual developments should consider the context surrounding them in order to identify whether multifunctional greenway corridors can or do exist within the development and/or extend off-site to adjacent lands. As the development of the AUAR area proceeds, the City will refine potential multifunctional greenway corridors through discussions with developers as a way to implement the vision of the CDF.

The specific design criteria of the multifunctional greenway corridors will vary, depending on the nature of the particular corridor. Certain greenway corridors may warrant design for specific wildlife species, may provide certain stormwater management opportunities, or may need to accommodate different types of trails or passive recreational uses. Design considerations may include corridor width, appropriate vegetation structure, human access and use, and whether or not it is appropriate for a corridor to cross a particular type of roadway.

Ecological restoration and management of the multifunctional greenway corridors will provide conservation benefits. This, however, requires sound planning and stewardship funding. Long-term protection of multifunctional greenway corridors can be achieved through a variety of methods, including conservation easements, deed restrictions, and restrictive covenants.

Habitat fragmentation will be minimized during development of the AUAR area through adherence to the CDF and other mitigation strategies in this document. Wildlife habitat quality and natural plant community integrity would be improved through ecological restoration and management planning and implementation. These activities should be implemented to the extent practical in all open space areas, focusing first on the larger blocks of higher quality habitat. New developments represent opportunities to plan and carry out ecological restoration and management. Ecological restoration, enhancement, and/or expansion will help mitigate potential impacts on wildlife and rare features, and if these activities are planned, scheduled, and carried out at the recommended broad scale, will likely result in a net increase in conservation and ecological benefits within the AUAR area compared with existing conditions.

Implementing the CDF within a Proposed Development Project Site
To achieve the objectives outlined in the CDF, the City will require future project proposers to do two things simultaneously:

1) plan for ecological stormwater management and natural resource conservation within the development project site, and
2) provide land, finances, and/or construction activities to implement components of the CDF.

Within a proposed development project site, tools to help achieve the CDF objectives include:

- Conservation development design and low impact development techniques
- Clustering/Density transfers
- Park dedication and other gifts
- Conservation easements, deed restrictions, and protective covenants
- Management planning, stewardship funding, and ecological education programs

Conservation development design and/or low impact development design principles will be required of new developments with an emphasis on ecological stormwater management and natural resource conservation. The stormwater and conservation components of individual developments must integrate with the CDF. Ecological stormwater management requirements are discussed in more detail under the Water Quality: Surface Water Runoff section of this Mitigation Plan.

Density transfers within a specific development site can help achieve natural resource conservation through clustering of development in appropriate areas. Land protection will be required through park dedication and/or conservation easements to ensure long term protection of the CDF elements. Within a specific development project, a stormwater utility easement will be placed on the elements of the regional stormwater management system.

A management plan and stewardship fund will be required to ensure long-term perpetuation of the public values conserved or restored in the natural open space and in the ecological stormwater management system of the CDF. Ecological education, provided by the developer, may be required for a specific development project (e.g., educational pamphlets, signage, Home Owner Association workshops, etc.).

Wildlife Mobility
Surmountable curbing to allow turtle and other wildlife passage will be required for new residential development within the AUAR area. Likewise, preservation of connections among habitat blocks and between habitat blocks and open waters will be encouraged within and between developments.

Bald Eagle

One eagle's nest is located on Peltier Lake Island and one eagle's nest is located along I-35W. The No Wake Zone ordinance around Peltier Lake Island should limit the disturbance caused by recreational boaters on Peltier Lake. The presence of heavy traffic within the vicinity of the other on-site nest suggests that the eagles using this nest may have become habituated or accustomed to these nearby human activities.

The city will consult with the DNR and/or US Fish and Wildlife Service to determine appropriate mitigation strategies for activities near the Bald Eagle's nests within the AUAR area before development occurs within the vicinity of the nests, including reviewing recommended disturbance limit guidelines developed by the DNR (see table below). The most sensitive time for Bald Eagles is February 10 – May 1.

Activity	Nesting Period Segment			
	Critical	Moderately	Less Critical	Non-critical
Primary Zone: (within 330 feet of the nest)				
Landscape Alteration[a]	avoid	avoid	avoid	avoid[b]
Construction (structures, trails, etc.)[c]	avoid	avoid	avoid	avoid[b]
Burning[d]	avoid	avoid	avoid	restrict/minimize[b]
Minor Forest Maintenance[e]	avoid	avoid	avoid	restrict/minimize[b]
Motorized Access	avoid[f]	avoid[f]	restrict/minimize[b]	restrict/minimize[b]
Human Entry	avoid[f]	avoid[f]	restrict/minimize[b]	restrict/minimize[b]
Low Flying Aircraft	avoid	avoid	no restrictions	no restrictions
Secondary Zone: (330 to 660 feet from the nest)				
Landscape Alteration[a]	avoid	avoid	avoid	restrict/minimize[b]
Construction (structures, trails, etc.)	avoid	avoid	restrict/minimize[b]	restrict/minimize[b]
Burning[d]	avoid	avoid	avoid	restrict/minimize[b]
Minor Forest Maintenance	avoid	avoid	no restrictions[f]	no restrictions[g]
Motorized Access	avoid[f]	restrict/minimize[b]	restrict/minimize[b]	no restrictions[g]
Human Entry	avoid[f]	restrict/minimize[b]	restrict/minimize[b]	no restrictions
Low Flying Aircraft	avoid	restrict/minimize[b]	no restrictions	no restrictions
Tertiary Zone: (660 feet to 1/4 mile from the nest - May extend up to 2 mile from the nest, if topography or vegetation permit a direct line of sight to the disturbance area.)				
Landscape Alteration[a]	avoid	avoid	avoid	no restrictions[g]
Burning[d]	avoid	avoid	avoid	restrict/minimize[b]
Other Activities (as listed above)	avoid[f]	no restrictions[g]	no restrictions[g]	no restrictions[g]

[a] Landscape alteration includes activities such as clear cutting or land clearing, which result in significant changes in the landscape.
[b] Restrictions should be decided on a case by case basis, based on type, extent, and duration of proposed activity, and sensitivity of individual eagle pairs. For assistance, contact your nearest DNR Nongame Specialist: Bemidji (218-755-2976); Grand Rapids (218-327-4267); Brainerd (218-828-2228); New Ulm (507-359-6033); Rochester (507-280-5070); St. Paul (651-297-2277).
[c] For construction involving land clearing, see also recommendations for the "Landscape Alteration" activity.
[d] *If burning can not be done within the non-critical nesting period segment, please contact your nearest DNR Nongame Specialist* (see contact numbers above).
[e] Such as thinning of tree stands, pruning, and other like maintenance.
[f] Some eagles have become habituated to human activity and can be tolerant of these activities, particularly if they were occurring regularly at the time the eagles began nesting. In these cases, complete avoidance of the activity may not be necessary. If you believe this is the case in your particular situation, contact your nearest Nongame Specialist (see contact numbers above).
[g] However, the habitat should not be altered in ways that would make it unsuitable for future nesting.

Nesting Period Segment	Dates for	
	Northern Minnesota*	Southern Minnesota*
Critical - Eagles are involved with courtship, egg-laying, and incubation.	March 15th - May 15th	Feb. 10th - May 1st
Moderately critical - Eagles are becoming physiologically conditioned for breeding (February/March), or newly hatched chicks require frequent brooding and feeding (May/June).	Feb. 15th - March 15th *and* May 15th - June 15th	Jan. 10th - Feb. 10th *and* May 1st - June 1st
Less critical - Eagle chicks are one month old to 1 week post-fledging.	June 15th - Aug. 15th	June 1st - July 31st
Non-critical - Most eagles are not regularly present at the nest site.	Aug. 15th - Feb. 15th	July 31st - Jan. 10th

*The state is arbitrarily divided into north and south by State Highway 210.

Heron Rookery

The City will continue to enforce the Peltier Lake No-Wake Zone ordinance in order to provide protection of the Peltier Lake Island Heron Rookery. In addition, the City will limit development within 300 meters of the edge of a heron colony and not allow disturbance in or near colonies from March to August. It should be noted that a 300-meter buffer from the perimeter of Peltier Lake Island (not the rookery within the island) contains virtually no uplands within the AUAR area, but rather, contains almost exclusively open water of the lake and adjacent wetlands.

Buffer requirements should be more stringent in the vicinity of Peltier Lake Island to provide protection for the heron rookery. This may include the preservation of vegetation at the lakeshore to visually screen human activity from the rookery during the nesting season, if warranted.

Rare Wetland Plants

Due to the incidence of rare plant species in nearby wetland habitats, the City will require rare plant surveys and the mapping of rare plant locations prior to disturbance of areas of banded soils between muck soils and adjacent Isanti, Soderville, or Zimmerman soil map units. These surveys shall be conducted by qualified professionals at an appropriate time of year to identify the rare plants.

Proposed Northerly Bypass

The proposed northerly bypass that would connect I-35W and I-35E (assumed in all scenarios, Figures 6-2 through 6-4) would cross Rice Creek and an associated large wetland complex in the northwestern portion of the AUAR area. A water main is also proposed to cross at this location (Figure 13-3). This proposed road/utility line would cross the large conservation area identified in the CDF (Figure 10-3). While this major construction project will undergo a separate environmental review and permitting process, the following techniques would help mitigate potential impacts associated with this road/utility crossing:

- Construct the roadway/utility line on piers to minimize the footprint on existing wetland resources and minimize interference to hydrology and wildlife. The water main would require appropriate design to prevent freezing.
- Provide a stormwater collection system that routes roadway runoff (and associated contaminants, such as salt and sediment) to land-based management areas for treatment prior to discharging stormwater into aquatic receiving waters.

The proposed northerly bypass, particularly the interchange at I-35E and 80th Street would be just south of Hardwood Creek and its associated wetlands and floodplain. These natural features are encompassed by the CDF (Figure 10-3). A "folded diamond" design of this interchange would help minimize the

impact to Hardwood Creek and its associated conservation areas associated with this transportation improvement.

Involvement by Other Agencies, if applicable
Jurisdictional wetland habitats are regulated by the U.S. Army Corps of Engineers (Section 404 of the Clean Water Act) and the Minnesota Wetland Conservation Act (administered by the Board of Water and Soil Resources). Wetland sequencing (avoidance, minimization, and mitigation) must be demonstrated and appropriate permits must be acquired prior to disturbance of any jurisdictional wetlands.

The MN DNR and/or the U.S. Fish & Wildlife Service may be consulted regarding development activities in the vicinity of the bald eagle nests.

Non-profit conservation organizations such as the Minnesota Land Trust, the Trust for Public Lands, or The Conservation Fund could potentially hold conservation easements and ensure compliance through annual field inspections.

The primary agency responsible for new interchanges is the Federal Highway Administration with planning, design, and funding support from Mn/DOT and Anoka County. It is noted that the discussion in this AUAR regarding the potential impacts of new interchanges and mitigation does not supersede the authority of the Federal Highway Administration, Mn/DOT, or Anoka County in the design and planning for potential interchanges. Any new interchanges will need to undergo appropriate environmental review in accordance with Federal and State environmental review requirements.

ITEM 12. WATER RESOURCES: WETLANDS

Potential Impacts
- The exact location of wetlands has not been delineated. Development may impact existing wetlands.
- All three development scenarios include a new crossing of 80th Avenue at the north end of Peltier Lake. The crossing could involve fill in public waters.

Mitigation Strategies

The city will:

12.1 Delineate wetlands in accordance with the Corps of Engineers Wetlands Delineation Manual and classify wetlands according to Wetlands of the United States (Circular 39) and Wetlands and Deepwater Habitats of the United States.

12.2 Follow sequencing process of wetland avoidance, minimization, rectification, and mitigation as outlined in the Wetland Conservation Act (WCA) if wetlands area altered.

12.3 Apply for applicable wetland permits to obtain authorization for wetland alterations under WCA and Section 404 prior to project construction if development activities will impact a jurisdictional wetland.

12.4 Mitigate areas of wetland impacts according to the requirements of the Wetland Conservation Act

12.5 Submit wetland permit applications and replacement plans, as appropriate, to the Minnesota Board of Water and Soil Resources, Rice Creek Watershed District, and the City of Lino Lakes.

12.6 Follow the requirements for wetland alterations delineated by the Rice Creek Watershed District (RCWD).

12.7 Minimize or avoid totally any filling of public waters through careful design.

How Will Mitigation be Applied and Assured
Individual projects within the AUAR area that propose altering a jurisdictional wetland will be required to follow the sequencing process of wetland avoidance, minimization, rectification, and mitigation as outlined in the *Wetlands Conservation Act* (WCA) if wetlands are altered. Wetland permit applications will need to be prepared and submitted to the appropriate regulatory agencies to obtain authorization for wetland alterations under the WCA prior to project construction. At least half of the replacement credit needs to be in the form of new wetland credit to satisfy WCA requirements. Up to half of the wetland replacement may come from public value credit, which may be applied toward the second half of the 2:1 replacement. Detailed wetland alteration and replacement plans are not yet available for developments within the AUAR area. Wetland replacement will be designed to expand upon existing on-site wetlands.

Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies
The RCWD, as the Local Governmental Unit, will administer the Wetland Conservation Act (WCA) on behalf of the city with opportunities for review and comment by members of the WCA Technical Evaluation Panel (TEP), the Army Corps of Engineers, and other state and federal agencies. Any fill of a public water or wetland will involve appropriate governmental jurisdiction including RCWD and DNR.

ITEM 13. WATER USE

Potential Impacts
- The future increase in population, households, and jobs impacts the City's current water supply system.
- Abandoned private water wells are a potential conduit for groundwater pollution

Mitigation Strategies

The city will:

13.1 Monitor water usage and do not permit new development to proceed if it exceeds the capacity of the water supply and distribution system.

13.2 Construct the water supply and distribution system in accordance with Minnesota Department of Health standards and with the goals, policies, and recommendations set forth in the city's Comprehensive Water System Plan.

13.3 As necessary, amend the city's Comprehensive Water System Plan and Capital Improvement Plan to be consistent with an future amendments or updates to the Comprehensive Plan that would necessitate expansions or alterations to the water system.

13.4 Prepare a Wellhead Protection Plan amendment for new wells and follow the adopted wellhead protection plans for Lino Lakes and Centerville.

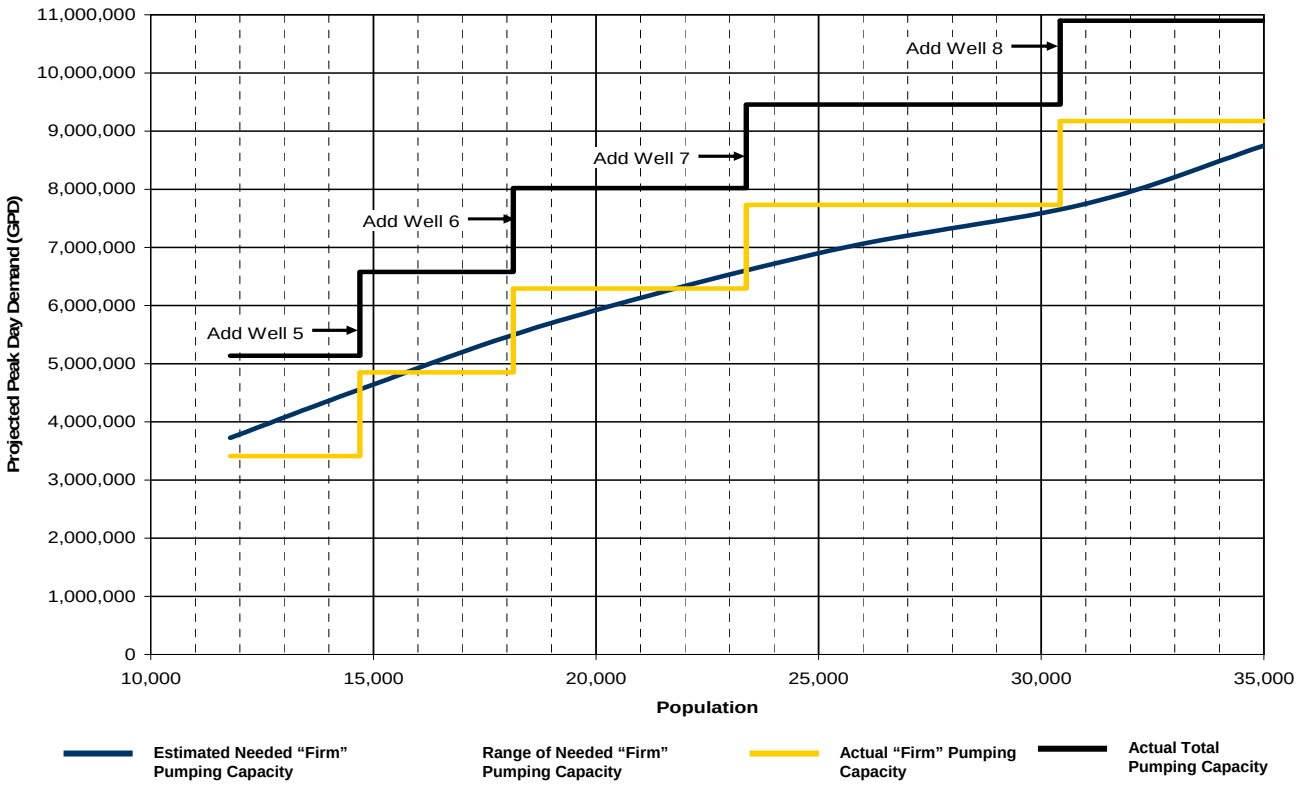
13.5 Require abandoned private wells to be sealed in compliance with the Minnesota Department of Health regulations

13.6 Require that the installation of any private individual wells be constructed and installed in accordance with the Minnesota Department of Health regulations (Minnesota Well Code).

13.7 Continue to implement the City's adopted water conservation policies which are intended to attenuate peak water demands throughout the City.

How Will Mitigation be Applied and Assured

Development of the future water supply infrastructure will be designed in accordance with the recommendations set forth in the City of Lino Lakes Comprehensive Water System Plan (2004). The following graph depicts the anticipated sequencing of well construction as a function of population growth. Well 5 is currently under construction. Depending on actual population growth and realized well yield, the total number of future wells needed may increase or decrease.

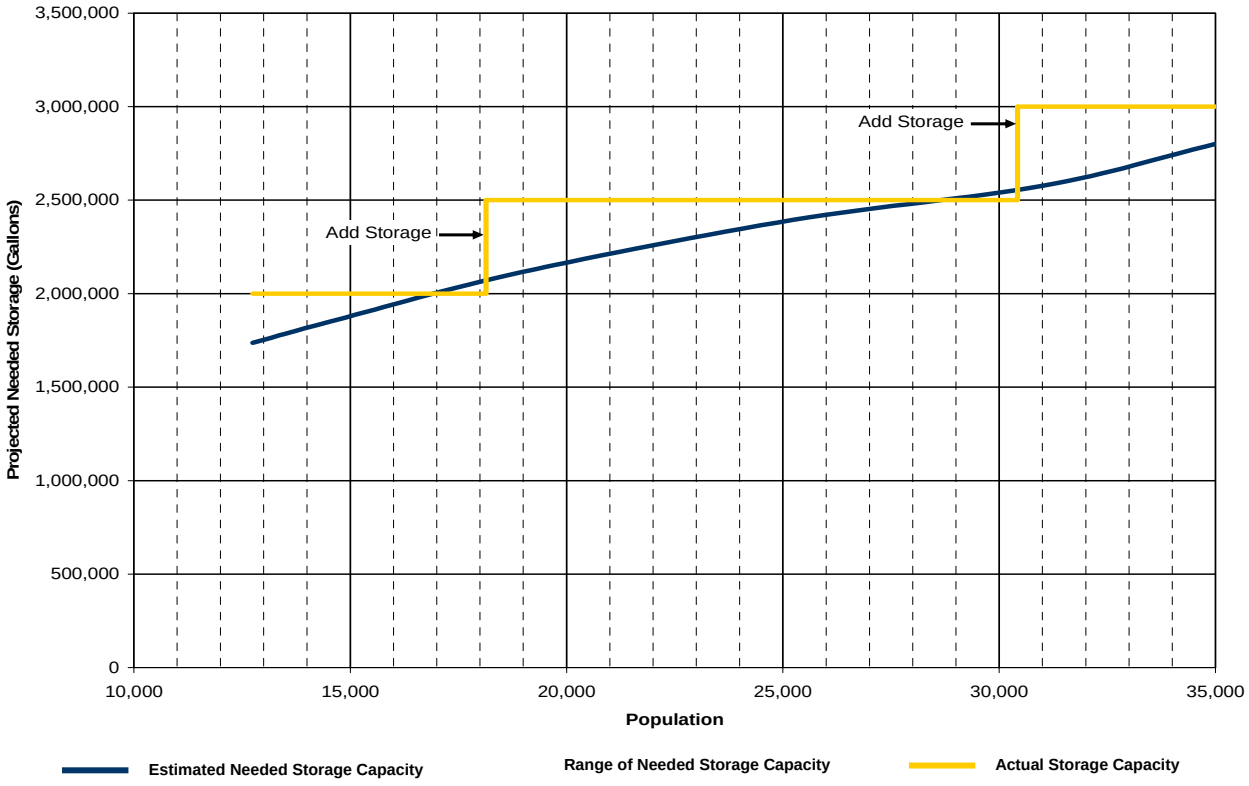


Installation of municipal water supply wells will be constructed in accordance with Minnesota Department of Health regulations (Minnesota Well Code) to ensure the water supply system meets federal and state public drinking water standards. The city will follow the Minnesota Department of Health's wellhead protection planning process, which involves:

- Delineating the wellhead protection area and drinking water supply management area;
- Assessing the vulnerability of the well; and
- Creation of a Wellhead Protection Plan including goals, objectives, plan of action, evaluation program, and contingency plan.

The Minnesota Department of Health (MDH) also requires the city to submit a preliminary wellhead protection area delineation and an assessment of land uses associated with the proposed protection area with their construction plan for approval. The city will coordinate with the MDH to ensure that a new water supply system meets all applicable regulations.

The following graph depicts the anticipated sequencing of storage tank construction as a function of population growth.



Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies
Amendments to the City's Water Supply and Distribution Plan will be reviewed by the Metropolitan Council and review and approved by the Department of Health. In addition, the Department of Health reviews and approves Wellhead Protection Plan amendments and consults with the Department of Agriculture, Department of Natural Resources, and Minnesota Pollution Control Agency before approving the plans. In addition, the public water supplier must submit the Wellhead Protection Plan amendments to local units of government wholly or partially within the wellhead protection area and the Metropolitan Council for review and comment.

ITEM 15. WATER SURFACE USE

Potential Impacts

- Increased water surface use may impact Peltier Lake and Peltier Lake Island Heron Rookery

Mitigation Strategies

The city will:

15.1 Consider restricting individual lake access and dock construction along public and private shorelands by encouraging the use of clustered access and dock facilities.

How Will Mitigation be Applied and Assured
The mitigation strategy could be implemented through the PUD provisions of the Shoreland Management Overlay Ordinance and the Zoning Ordinance, and the Conservation Design provisions of the Subdivision Ordinance. Achieving this mitigation strategy will occur during the development approval and permitting process as the result of negotiations between future project proposers and the City.

ITEM 16. EROSION AND SEDIMENTATION

Potential Impacts

- Construction activities that involve moving soil and/or removing vegetative ground cover may cause erosion and sedimentation impacts, including sedimentation issues in downgradient streams, lakes, and wetlands.
- Inadequate erosion control could provide a vehicle for invasive plant species traveling with the sediment and compromise native habitats.
- Chemical pollutants including, but not limited to, nutrients, pesticides, and herbicides could travel with eroded sediment to downgradient streams, lakes, and wetlands.

Mitigation Strategies

The city will:

16.1 Require project proposers to acquire NPDES/SDS General Stormwater Permit for Construction Activity from the MPCA prior to initiating earthwork.

16.2 Require project proposers to meet the erosion and sediment control regulations in all applicable regulations, ordinances and rules of the city and MPCA, and Rice Creek Watershed District.

16.3 Require project proposers to minimize runoff, improve the quality of runoff, and provide erosion control through BMPs and other low impact development techniques.

16.4 Provide construction oversight to ensure designed sediment and erosion control measures are being implemented.

16.5 Implement the Conservation Design Framework (CDF, Figure 10-3).

How Mitigation Will be Applied and Assured
A NPDES/SDS General Stormwater Permit for Construction Activity permit from the MPCA is required prior to initiating earthwork. This permit requires that the MPCA's Best Management Practices (BMPs) be used to control erosion and that all erosion controls be inspected after each rainfall exceeding 0.1 inch of precipitation.

All erosion and sediment control ordinances and regulations will be enforced.

Minimize runoff, improve the quality of runoff, and provide erosion control through BMPs and other low impact development techniques including:

- Reduce impervious surfaces (e.g., use narrow roads, efficient road layout, permeable pavement);
- Break up impervious surfaces to allow opportunities for infiltration;
- Use ecological stormwater management techniques, such as vegetated swales, infiltration systems, and biofilter wetlands;
- Provide energy dissipation and outfall stabilization; and
- Establish and maintain vegetated buffers around aquatic resources.

Require construction oversight of new developments to ensure sediment and erosion control measures are being implemented.

Implement the CDF, which is designed to help mitigate erosion and sedimentation caused by surface water runoff. Components of the CDF that help mitigate erosion and sedimentation include conservation of natural open spaces, buffering, and an ecological stormwater management system.

Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies, if applicable
The MPCA must approve a NPDES/SDS General Stormwater Permit for Construction Activity permit application prior to initiating earthwork. The MPCA and RCWD have approved Best Management Practices (BMPs) that are appropriate for erosion and sedimentation control. RCWD reviews and approves Erosion and Sediment Control Plan. Compliance with all City of Lino Lakes ordinances will be required.

ITEM 17. WATER QUALITY: SURFACE WATER RUNOFF

Potential Impacts

- Development may increase runoff rate and volume, and decrease the quality of runoff flowing into receiving waters.
- Subwatershed divides may be altered as drain tiles and ditches are modified.
- Development may result in production of deltas in Peltier Lake due to erosion and channel de-stabilization in its watershed.
- Development may result in bank failure and erosion in Hardwood Creek, Clearwater Creek, and drainage ditches.
- Development may result in de-watering of streams and wetlands by limiting infiltration and groundwater recharge. This effect may be exacerbated by the influence of drawing groundwater from aquifers for human consumption.
- Development may result in algal blooms, including toxic blue-green algae, due to high nutrient concentrations in stormwater runoff.
- Development may result in thermal pollution of water bodies as stormwater runoff may have relatively high temperatures after flowing over impervious surfaces.

Mitigation Strategies

The city will:

17.1 Work with project proposers to establish a regional stormwater management system within the Conservation Design Framework (CDF, see Figure 10-3) that consists of vegetated swales, wet prairies, and wetlands oriented in series to effectively retard runoff rates, reduce stormwater volume, and enhance water quality.

17.2 Work with project proposers to disperse collection, conveyance, and management of stormwater runoff as much as possible throughout the AUAR site through the use of bio-swales, rain gardens, and infiltration areas.

17.3 Require stormwater management systems to be developed in accordance with *Rice Creek Watershed District Rules*.

17.4 Require project proposers to design stormwater management areas (SMAs) to support native vegetation and maintain runoff rates at or below pre-development conditions.

17.5 Require project proposers to design stormwater management systems that can achieve proposed conditions runoff volumes that are no less than 80% and no greater than 150% of existing conditions runoff volumes.

17.6 Encourage project proposers to use techniques that produce no net increases in total phosphorus content of proposed conditions runoff relative to existing conditions runoff.

17.7 Require project proposers to provide detailed topographic information with a contour interval of 1-foot and drain tile mapping.

17.8 Require project proposers to disperse outflow from stormwater management facilities to prevent erosion and failure of outlet structures. Make attempts to simulate sheet flow at these locations as opposed to concentrated flows.

17.9 Require project proposers to use conservation development design and/or low impact development techniques, and ecological stormwater management techniques.

17.10 Require project proposers to limit the amount and connectedness of impervious surfaces and direct runoff into vegetated landscape areas including swales, prairies, and other infiltration.

17.11 Require project proposers to use stormwater management techniques that encourage infiltration of stormwater runoff and groundwater recharge, whenever possible, to maximize the infiltration potential of the site.

How Mitigation Will be Applied and Assured

Conservation Design Framework (CDF)
Surface water management is one of the most important components of the CDF. This regional perspective to stormwater management through the use of natural, surface features is integral to sensitive development of the AUAR area. Within the greenway corridors shown in the CDF, bio-swales, wet prairies, and wetlands would be oriented in series to effectively retard runoff rates, reduce stormwater volume, and enhance water quality. Runoff rates and volumes are decreased due to increased infiltration, evapotranspiration, and increased friction imparted on the flow. These decreased rates also reduce the ability of runoff to generate and carry sediment and associated pollutants.

The CDF should be designed to provide regional conveyance of runoff, but it should not have concentrated flows similar to ditches. The greenway corridors used to convey water in a regional way should consist of wetlands with very low flow velocities and should maximize flow path distances for increased water quality treatment. The CDF should not be viewed as an approach that can be used in the absence of dispersed stormwater management techniques throughout areas tributary to it. It is critical that best management practices outlined in this document be utilized to achieve initial treatment of stormwater runoff. This relationship between on-site stormwater management elements and the CDF will ensure the ecological integrity of greenway corridors within the CDF, and therefore maximize the ability of the system to meet future TMDL water quality standards.

The CDF and its phased implementation is described in more detail under the Fish, Wildlife, Ecologically Sensitive Resources section of this Mitigation Plan.

Stormwater Management Areas
Stormwater management areas (SMAs) will play a critical role in mitigating potential impacts from stormwater following development of the AUAR area. Appropriate design, construction, and maintenance of these areas will enable development to occur without compromising the integrity of the region's aquatic resources.

All new site developments will be required to compile:

- topographic information with a contour interval of 1-foot for all areas within the property boundary; and
- drainage tile information for areas within the property boundary.

All site development as it pertains to stormwater management must be complicit with *Rice Creek Watershed District Rules*, which state:

- proposed conditions runoff release rates cannot exceed existing conditions runoff release rates for rainfall events with 1- or 2-year and 100-year recurrence intervals; and
- best management practices (BMPs) shall be employed to infiltrate impervious surface runoff from the Minneapolis-St. Paul median storm (0.34 inches); developers must provide infiltration facilities that meet RCWD and MPCA criteria if insufficient infiltration is provided by SMAs.

Sizing criteria for SMAs are designed to support large infiltrating surfaces or wetland complexes. To create conditions appropriate for these two types of stormwater management features, SMAs within the AUAR area must have:

- no more than 20% of their surface area as permanent open water; the remaining surface area of each SMA shall contain mesic prairie or wet prairie plant communities to maximize the infiltration and water quality treatment capacities of the system.
- design high water levels (100-Year) less than or equal to 2.5 feet above the normal water level or lowest outlet invert.
- side slopes that are less than or equal to 6:1, horizontal to vertical, and a 10:1 safety bench at the normal water level per RCWD requirements.

Post-development runoff release volumes should be no less than 80% and no greater than 150% of existing conditions runoff volumes for a given new development. The goal of all development within the AUAR area should be to maintain proposed conditions runoff volumes within 20% of existing conditions runoff volumes for each new development site. Hydric soils, shallow groundwater tables, and clay layers throughout the AUAR area may pose challenges for achieving this runoff volume requirement. Native wetland and prairie plants are particularly useful for achieving infiltration requirements under these conditions because they use large amounts of water and create preferential infiltration pathways into the soil via their root systems. The greenway corridors established in the CDF provide appropriate locations for these types of infiltration facilities. The location and expansiveness of these corridors could provide the necessary surface area for the shared infiltration facilities discussed in the AUAR.

A no net increase in total phosphorus content of proposed conditions runoff relative to existing conditions runoff will be encouraged for new developments. Facilities to achieve this objective were not designed as part of the AUAR, however the AUAR does prescribe a stormwater design framework for effective nutrient removal. Dispersed stormwater management emphasizing infiltration as the treatment mechanism will optimize phosphorus removal. The use of constructed treatment wetlands for stormwater detention will enhance sediment removal, greatly decreasing quantities of non-soluble phosphorus reaching Peltier Lake, Hardwood Creek, and Clearwater Creek (impaired waters). In addition, state law that prohibits the use of fertilizer containing phosphorus within the Twin Cities Metropolitan Area will reduce the potential for phosphorus in runoff. The goal of the implementation of best management practices such as rain gardens, infiltration areas, buffer strips, designed wetlands, bio-swales, and sedimentation basins should be no net increases in total phosphorus leaving a given development site. P8 or other approved water quality models should be used to determine the phosphorus content of proposed conditions.

Additional Stormwater Management Recommendations

The City and RCWD will consider the use of additional stormwater management techniques when specific development proposals are submitted for review in the future. The appropriateness of such techniques will be evaluated by the City and RCWD based on, their proven effectiveness, soil suitability and compatibility with future development proposals. The following is a list of additional stormwater management recommendations:

- Adhere to surface area recommendations for stormwater management (Figure 17-3).
- During site design, follow low impact development practices, such as increased open space, disconnected and minimized impervious surfaces, capitalizing on high infiltration capacity soils, and dispersed stormwater management.
- In residential development areas, use of a combination of side and rear lot drainage easements that are no-mow zones planted with formal or informal native landscaping. The rear lot areas would be designed for infiltration, and side lot areas would be designed for effective drainage and

conveyance of water from around foundations to ensure no standing water remains adjacent to the houses.

- Route driveway, sidewalk and gutter downspout waters into rain gardens and infiltration areas. This can be accomplished without compromising safe and effective drainage and dewatering needs around foundations and road subgrades.
- Route road runoff into parkway and road ROW swales, rain gardens, and infiltration areas.
- Route parking lot runoff into bio-swales, parking lot islands, and other suitable locations that support infiltration.

Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies, if applicable

Proposed development projects within the AUAR area will need to submit development plans for approval by the City of Lino Lakes and the RCWD. The RCWD has rules relating to stormwater management plans, erosion control plans, floodplain alteration, drainage systems, and other development activities. Other state laws and statutes may also apply to proposed projects, which may require involvement by additional agencies.

ITEM 18. WATER QUALITY: WASTEWATER

Potential Impacts

- Future growth and expansion in the AUAR will necessitate additional expansion and connection to the MCES system and the City's sanitary sewer facilities.
- MCES interceptor is not planned for enough capacity for the full build out of Scenarios Two and Three.

Mitigation Strategies

The city will:

18.1 Monitor wastewater flows and not permit new development to proceed if it exceeds the capacity of the wastewater system.

18.2 Construct the major infrastructure improvements needed to expand the capacity of the wastewater system (i.e. lift stations, forcemains, and upgrades to the existing systems) in accordance with the Comprehensive Sanitary Sewer Plan and Capital Improvement Plan.

18.3 Adequately phase capacity improvements.

18.4 Amend the Comprehensive Sanitary Sewer Plan and Capital Improvement Plan to be consistent with any amendments to the Comprehensive Plan that would necessitate expansions or alterations to the sanitary sewer system and regional capacity needs.

How Will Mitigation be Applied and Assured

These strategies together will provide assurance that the City's wastewater system is adequate to transport the wastewater to the regional collection system. The City will make use of the mechanisms in place to assure that wastewater generated does not exceed either the local collection system, the regional collection system or the regional treatment system. The following discussion describes the process for achieving each mitigation strategy.

Monitor wastewater flows

- Lino Lakes has developed a staging plan as part of its Comprehensive Sanitary Sewer Plan. That staging plan is based upon a number of factors, including wastewater collection capacity. The city will adhere to this plan to guarantee that additional wastewater generation does not exceed the collection capacity.
- Each proposed development will be required to provide a detailed projection of wastewater generation and flows. These calculations will be checked by the City's Engineering Consultant.
- As development occurs, the City will monitor actual wastewater flows to compare actual flows with projected flows.
- If flows exceed projections, the city will phase development to assure that adequate infrastructure is available to serve development.
- The City will create a year-end report to evaluate wastewater increases by major sewer lines and overall system usage in relation to capacity. Results of this assessment will become the targets for growth for the following year.

Construct the major infrastructure improvements needed to expand the capacity of the wastewater system

- Lino Lakes will develop a capital improvement program for wastewater collection system. The Capital Improvement Program will be tied to the staging plan of the Comprehensive Sewer Plan.
- If actual flows exceed projections, the city can accelerate collection system expansions to address additional flows.
- Any expansion of the collection system would, if necessary, be coordinated with the Metropolitan Council Environmental Services.
- The City will require developers to construct the local wastewater collection system, where appropriate.

Phasing of capacity improvements.

- Lino Lakes will strive to follow its staging plan by monitoring actual wastewater flows and by a combination of appropriately phasing development or expanding collection systems.
- The City will update its capital improvement plan for wastewater collection yearly based upon actual growth and actual wastewater generation.
- The City will bond for sewer improvements, where appropriate.
- The City will require developers either to construct parts of the collection system or pay for improvements or expansions to the collection system, where appropriate.

Comprehensive Sanitary Sewer Plan Amendments

- Amendments to Lino Lakes' Sanitary Sewer Plan will be based upon its Comprehensive Plan, which contains staging areas with timing and geographic limits.

Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies
Sanitary Sewer Plans and amendments must be submitted to the Metropolitan Council for review.

ITEM 19. SOIL AND GROUNDWATER CONTAMINATION

Potential Impacts

- Underground storage tanks ("UST") and aboveground storage tanks ("AST) are located on the within the AUAR area and may have impacted groundwater.

Mitigation Strategies

The city will:

19.1 Require the removal of all tanks and associated underground piping in accordance with applicable state and federal laws.

19.2 Require that any party that may discover residual petroleum contamination shall follow state law and report the information to the MPCA for further investigation and potential remediation.

How Mitigation will be Applied and Assured
Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies, if applicable
The MPCA will be contacted if residual petroleum contamination is discovered.

ITEM 21. TRANSPORTATION

Potential Impacts

- Presently only one intersection, CSAH 14/I-35E (east ramps), in the AUAR study area experiences significant peak period delays.
- Regional background traffic is expected to grow significantly. The AUAR analysis and other studies indicate a need for additional capacity I-35E, south of CSAH 14. This would be needed regardless of the land use development scenario (including Met Council's scenario).
- The County and local roadway system will need to be improved to accommodate future traffic levels.

- The interchange of CSAH 14/I-35E will fail with increased traffic, as will several intersections located on CSAH 14 (with CSAH 21, Otter Lake Road, etc.).
- Projected traffic levels could adversely impact alternative travel modes without reasonable accommodations (sidewalk/bicycle network, bus stops).
- Noise levels related to traffic increase will rise significantly over present levels.

Mitigation Strategies

The city will:

21.1 Create a monitoring program that closely evaluates traffic impacts from proposed developments within the AUAR area.

21.2 Implement traffic mitigation measures as development occurs within the AUAR area. Specific mitigation measures for the three development scenarios are discussed in Item 21 and depicted on Figures 21-8, 21-9, and 21-10. These mitigation measures improve overall traffic operations for the respective development scenarios. The improvements are intended to represent the minimum level of infrastructure investment that would be needed to meet acceptable level of service standards. Additional roadway and non-motorized improvements, beyond the minimum level, may be identified to accommodate specific development needs that are identified within the AUAR area." Primary improvements, regardless of land use scenario, include:

21.2.1 Develop frontage road system in compliance with local, county and state access management guidelines to serve local and regional traffic.

21.2.2 Work with appropriate road authorities to reconstruct and provide additional capacity for CSAH 21.

21.2.3 Work with appropriate road authorities to construct Northerly Bypass with new interchanges at I-35W and I-35E (80th Street East) to improve traffic operations and access to and within the AUAR area. As recommended by FHWA and Mn/DOT, a phasing plan should be established to construct each piece of the Northerly Connector as it becomes necessary to maintain the serviceability of the transportation system.[16]

Phase	**Improvement**
1.	CSAH 14, I-35W to I-35E (funded and programmed for construction)
2.	CSAH 14, I-35E Interchange
3.	CR 140 (80th Street)/I-35E Interchange
4.	CSAH 14 across Peltier Lake (Northerly Bypass/Connector)
5.	CSAH 14/I-35W Interchange

As part of these improvements, the following steps should be taken as the opportunity is presented:

- Inclusion of the northerly bypass and proposed interchanges in future transportation and comprehensive plans
- Preservation of right of way through official mapping or other process
- Right of way dedication through the platting process

16 CSAH 14 Alternative Analysis Report – July, 2004, SRF Consulting Group,

21.3 Require a traffic impact analysis for all development projects within the AUAR area. The traffic impact analysis will assist the City and other road authorities in determining the appropriate mitigation measures that are required to mitigate impacts of a specific development proposal.

21.4 Work with appropriate road authorities to mitigate the impact of the additional traffic on the on the regional system, specifically Interstates 35W and 35E, by reconstructing each to provide a six-lane cross-section consistent with the recommendations outlined in the I-35 IRC. It should be noted that it was determined that an expansion will be necessary even without the development scenarios used in this analysis. As the interstates serve a much larger area, the projected growth of the entire Twin Cities region should warrant expansion by the year 2030.

21.5 Prioritize alternative travel modes within the AUAR study area and require project proposers to address alternative travel modes (e.g., buses, bicyclists, and pedestrians) by identifying appropriate accommodations.

21.6 Consider the need for additional infrastructure improvements (see item #21.2) in future updates or amendments to the Comprehensive Plan. Submit the plan update to the appropriate agencies (i.e., FHWA, MnDOT, Met Council, etc.).

21.7 Require project proposers to follow all appropriate guidelines and policies related to traffic nose and noise walls.

21.8 Require that site plans for each of the developments include measures such as appropriate setback distances, earthen berms, noise walls, and appropriate site design to reduce the impact of traffic noise to residential areas.

21.9 Continue to require the implementation of the conditions of approval for the Eagle Brook Church relating to mitigating traffic impacts.

21.10 Achieve effective traffic operations within the city by requiring that site plans make use of access management practices to promote sate, effective traffic flow.

21.11 Require project proposers to follow the Anoka County Highway Department Development Review Process Manual (dated December 2003.)

21.12 Continue to coordinate capital improvement programming with applicable transportation authorities.

How Mitigation Will be Applied and Assured

The City will implement an on-going traffic management plan to monitor traffic volume growth and any operational issues that may develop in and around the AUAR area. This monitoring program is intended to give the City, County and other agencies the opportunity to evaluate future development projects within the AUAR area and their cumulative impacts on the transportation system. A traffic impact study will be required for all developments within the AUAR area. To maintain consistency, the traffic impact study will use the following methodology:

a. Use the Metropolitan Council Model (or localized versions of the model, i.e., Anoka County) to determine the traffic and the distribution of traffic to the development site.

b. Use a traffic simulation model to determine operational traffic impacts for the proposed development.

c. Identify the deficiencies and reasonable mitigation measures that are related to the development. Per the City of Lino Lakes subdivision and zoning ordinances, specific level of service guidelines must be followed to obtain an acceptable level of service.[17] Section 1002-6 of the Subdivision Ordinance states that if a proposed subdivision is not consistent with the Comprehensive Plan with respect to the Land Use Plan, or the Transportation Plan, specific guidelines to roads or highways to serve the development must be met. For reference, Section 1002 of the Subdivision Ordinance is included under the "General Implementation Tools" of this Mitigation Plan

d. If no reasonable mitigation measures are agreed upon or are unfeasible, the intensity or timing of the proposed development would be staged so as to not overly burden the transportation system. For example, if it is determined that full-build out of a proposed development project would overly burden the transportation system, then varying degrees of development, i.e., 75%, 50%, 25% would be analyzed. As surrounding infrastructure is improved, i.e., new interchange at 80th Street E. / I-35E, the remaining portion of a proposed development could be evaluated to determine if it could be constructed. This is intended to address the cumulative traffic impacts that occur within the AUAR area (e.g., several projects will trigger the need for a new interchange at 80th Street E / I-35E).

Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies, if applicable

There are a number of potential transportation improvements and issues that have been identified as part of this AUAR. Numerous agencies will be responsible in varying degrees to implement the identified improvements. The following table identifies the improvement(s) and the responsible agencies to initiate and oversee implementation.

Responsible Agencies for Implementation of Improvements

General Improvement	Primary Agency	Additional Agencies
1. Reconstruction/New Interchanges	Mn/DOT, Federal Highway Administration (FHWA)	Mn/DOT, Anoka County
2. State and County Roadways	Mn/DOT, Anoka County	City of Lino Lakes
3. Local/Frontage roadways	City of Lino Lakes	
4. Access Control	FHWA, Mn/DOT, Anoka County, City of Lino Lakes	City of Lino Lakes
5 Transit	Metro Transit, Anoka County Traveler	Anoka County Regional Rail Authority, Washington County Regional Rail Authority, City of Lino Lakes
6. Bicycle / Pedestrian	City of Lino Lakes, Anoka County	Mn/DOT
7. Air / Noise	Minnesota Pollution Control Agency	Mn/DOT, Anoka County, City of Lino Lakes

R:\31809732\Synchro\AUAR Analysis\Excel\Unsignal 21\[Scenario 1 Traffic Analysis without bypass w20 no signal - Monday.xls]Reponsible Agencies Table

SOURCE: URS Corporation.

ITEM 25. CULTURAL RESOURCES

[17] The definition of subdivision includes industrial, commercial, and residential land uses.

Potential Impacts

- Intentional or unintentional damage to, or destruction of, important archaeological sites and historic properties without due process and consideration.

Mitigation Strategies

The city will:

25.1 Consult the map that shows areas with a high potential for archaeological sites when development applications are submitted for review. Given the sensitive nature of this information, this map cannot be included in the AUAR document, nor can it be made available to the public. If a development application falls within an area that is considered to have a high potential for archaeological sites, the city will require that the following steps and procedures involved in the identification and analysis of any archaeological sites is followed prior to development:

- Conduct a Phase I archaeological survey within the area of potential effect (APE). The objective of the archaeological fieldwork is to determine if there are archaeological sites in the areas identified as having high potential for such, and define the extent of those sites that may be impacted by development plans.
- Conduct a Phase II archaeological survey. If archaeological resources are uncovered within the APE that may be eligible for listing on the National Register of Historic Places (NRHP) a Phase II survey should be conducted. The objective of the investigation is to determine whether archaeological resources are eligible for listing on the NRHP.
- Plan for avoidance or conduct Phase III data recovery. If a significant archaeological site is identified that will be impacted by development, avoidance is recommended. If this is not possible, then a data recovery of the site should occur.
- If human remains are recovered at any time during archaeological investigation or development, all activities must stop and consultation initiated with the Office of the State Archaeologist and Minnesota Indian Affairs Council.

How Mitigation will be Applied and Assured

If a development application falls within an area that is considered to have a high potential for archaeological sites, the city will require that the above steps and procedures involved in the identification and analysis of any archaeological sites is followed prior to development. Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies, if applicable

The Office of State Archaeologist (OSA) and Minnesota Historical Society make recommendations for the preservation of archaeological sites endangered by construction or development on all public lands. The OSA issues licenses, with the concurrence of the Minnesota Indian Affairs Council, for all archaeological investigations associated with public funding or on public land. Section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The State Historic Preservation Office (SHPO) acts on behalf of the Advisory Council in each state.

ITEM 25. UNIQUE FARMLANDS

Potential Impacts

- Development may affect two classified Century Farms in the AUAR area.

Mitigation Strategies

The city will:

25.2 Consider preservation of agricultural heritage sites by implementing thoughtful interpretive planning.

How Will Mitigation be Applied and Assured
As development plans for the two Century Farms come to fruition, the City can encourage landscaping and other amenities that reflect the agricultural heritage of this city. In addition, the City can continue to reflect the agricultural heritage of the community in public buildings and gathering places (for example, City Hall reflects elements of the community's agricultural heritage).

ITEM 27. COMPATIBILITY WITH PLANS

Potential Impacts

- The location and intensity of the proposed land uses in Scenarios Two and Three are not consistent with the adopted Comprehensive Plan or Zoning Ordinance
- Commercial and industrial land uses may not be compatible with planned land uses within and adjacent to the AUAR area.

Mitigation Strategies

The city will:

27.1 Use the information contained in the AUAR during future considerations of updates or amendments to the adopted Comprehensive Plan and Zoning Ordinance. Any future consideration of amendments or updates to the Comprehensive Plan and Ordinances would follow the city's set procedures and guidelines for such amendments.

27.2 Require that tools such as clustering, buffering, and/or screening be incorporated into future development plans to mitigate potential land use conflicts.

How Mitigation Will be Applied and Assured
Mitigation will be regulated through the city's development approval and permitting process. Proposed master development plans, planned unit development and subdivision applications, plats, and/or site plans must address relevant mitigation measures prior to final approval by the city. Implementation of mitigation measures will be assured through developer agreements with the city, which will require a financial security for land and infrastructure improvements and/or revoke the right to acquire building permits and/or certificates of occupancy until all relevant mitigation measures have been addressed.

Involvement by Other Agencies, if applicable

The Metropolitan Council will be involved by providing technical assistance and reviewing Comprehensive Plan Amendments.

GENERAL IMPLEMENTATION TOOLS:

- All development must comply with the Comprehensive Plan. The Comprehensive Plan will guide the permitted land use, zoning, utility extensions, and other development activities.
- Approval of future planned unit developments (PUDs), together with the development agreements, which include specific requirements.
- Execution of future developer's agreements under the City of Lino Lakes's subdivision ordinances.
- Enforcement of the permitting requirements of all applicable local, state, and federal agencies.
- Update the AUAR in five years, or earlier, if certain conditions or assumptions change in accordance with Mn Rules 4410.3610, subp. 3.
  - Five years have passed since the RGU adopted the original environmental analysis document and plan for mitigation or the latest revision. This item does not apply if all development within the area has been given final approval by the RGU.
  - A comprehensive plan amendment is proposed that would allow an increase in development over the levels assumed in the environmental analysis document.
  - Total development within the area would exceed the maximum levels assumed in the environmental analysis document.
  - Development within any subarea delineated in the environmental analysis document would exceed the maximum levels assumed for that subarea in the document.
  - A substantial change is proposed in public facilities intended to service development in the area that may result in increased adverse impacts on the environment.
  - Development or construction of public facilities will occur on a schedule other than that assumed in the environmental analysis document or plan for mitigation so as to substantially increase the likelihood or magnitude of potential adverse environmental impacts or to substantially postpone the implementation of identified mitigation measures.
  - New information demonstrates that important assumptions or background conditions used in the analysis presented in the environmental analysis document are substantially in error and that environmental impacts have consequently been substantially underestimated.
  - The RGU determines that other substantial changes have occurred that may affect the potential for, or magnitude of, adverse environmental impacts
- Enforcement of the City's premature subdivision regulations (Section 1002-6) to ensure that adequate public facilities are available to mitigate potential impacts. The premature subdivision requirements follow:

1002-6 PREMATURE SUBDIVISION

Any concept plan, preliminary plat, final plat deemed premature pursuant to the following criteria shall be denied by the City Council:

1002-6-1 Conditions for Establishing a Premature Subdivision

A subdivision may be deemed premature should any of the following conditions not be met:

1. Consistency with the Comprehensive Plan including any of the following:
   a. Land use plan.
   b. Transportation plan.
   c. Utility (sewer and water) plans.

d. Local water management plan.
e. Capital improvement plan.
f. Growth management policies including MUSA allocation criteria.

2. Consistency with Infill Policies. A proposed urban subdivision shall meet the City's infill policies:
   a. The urban subdivision must be located within the Metropolitan Urban Service Area (MUSA) or the staged growth area as established by the City's Comprehensive Plan.

   b. The cost of utilities and street extensions must be covered by one or more of the following:

      (1) An immediate assessment to the proposed subdivision.

      (2) One hundred (100) percent of the street and utility costs are privately financed by the developer.

      (3) The cost of regional and/or oversized trunk utility lines can be financed with available City trunk funds.

      (4) The cost and timing of the expenditure of City funds are consistent with the City's capital improvement plan.

   c. The cost, operation and maintenance of the utility system are consistent with the normal costs as projected by the Water and Sewer Rate Study.

   d. The developer payments will offset additional costs of utility installation or future operation and maintenance.

3. Roads or Highways to Serve the Subdivision. A proposed subdivision shall meet the following requirements for level of service (LOS), as defined by the Highway Capacity Manual:
   a. If the existing level of service (LOS) outside of the proposed subdivision is A or B, traffic generated by a proposed subdivision will not degrade the level of service more than one grade.

   b. If the existing LOS outside of the proposed subdivision is C, traffic generated by a proposed subdivision will not degrade the level of service below C.

   c. If the existing LOS outside of the proposed subdivision is D, traffic generated by a proposed subdivision will not degrade the level of service below D.

   d. The existing LOS must be D or better for all streets and intersections providing access to the subdivision. If the existing level of service is E or F, the subdivision developer must provide, as part of the proposed project, improvements needed to ensure a level of service D or better.

   e. Existing roads and intersections providing access to the subdivision must have the structural capacity to accommodate projected traffic from the proposed subdivision or the developer will pay to correct any structural deficiencies.

   f. The traffic generated from a proposed subdivision shall not require City street improvements that are inconsistent with the Lino Lakes Capital Improvement Plan. However, the City may, at its discretion, consider developer-financed improvements to correct any street deficiencies.

   g. The LOS requirements in paragraphs a. to d. above do not apply to the I-35W/Lake Drive or I-35E/Main St. interchanges. At City discretion, interchange impacts must be

evaluated in conjunction with Anoka County and the Minnesota Dept. of Transportation, and a plan must be prepared to determine improvements needed to resolve deficiencies. This plan must determine traffic generated by the subdivision project, how this traffic contributes to the total traffic, and the time frame of the improvements. The plan also must examine financing options, including project contribution and cost sharing among other jurisdictions and other properties that contribute to traffic at the interchange.

h. The City does not relinquish any rights of local determination.

4. Water Supply. A proposed subdivision shall be deemed to have an adequate water supply when:
   a. The City water system has adequate wells, storage, or pipe capacity to serve the subdivision.

   b. The water utility extension is consistent with the Lino Lakes Water Plan and offers the opportunity for water main looping to serve the urban subdivision.

   c. The extension of water mains will provide adequate water pressure for personal use and fire protection.

   d. Rural subdivision can demonstrate that each of the proposed lots can be provided with a potable water supply.

5. Waste Disposal Systems. A proposed subdivision shall be served with adequate waste disposal systems when:
   a. The urban sewered subdivision is located inside the City's MUSA or is consistent with the MUSA allocation criteria.

   b. The City has sufficient MUSA and pipe capacity to serve the subdivision if developed to its maximum density.

   c. The subdivision will result in a sewer extension consistent with Lino Lakes Sewer Plan and Capital Improvement Plan.

   d. A rural subdivision can demonstrate that each lot can be served by an adequate sanitary sewer disposal system.

   e. A rural subdivision with a proposed communal sanitary sewer or water system has an effective long range management and maintenance program with proper financing.

RESPONSE TO COMMENTS ON THE DRAFT AUAR DOCUMENT

AUAR Guidelines: The final AUAR document must include a section specifically responding to each timely and substantive comment on the draft that indicates the way in which the comment has been addressed. Similar comments may be combined for purposes of responding.

The I-35E Corridor Draft Alternative Urban Areawide Review (Draft AUAR) was prepared for the City of Lino Lakes and distributed to the Environmental Quality Board (EQB) and persons and agencies on the official Environmental Quality Board (EQB) mailing list in accordance with EQB rules on June 30, 2005.

The 30-day comment period expired on August 3, 2005. Two state agencies, five local units of government, two business ventures, one citizen group and one citizen submitted comment letters on the I-35E Corridor Draft AUAR. Copies of all comment letters submitted are included in Appendix H in the order shown below.

Agency/Organization/Citizen	**Letter Dated**	**Signatory**
Washington County Department of Transportation and Physical Development (Washington County)	July 25, 2005	Mike Rogers
Brit-Vue, LLP	July 28, 2005	Bruce Houle Gene Houle Jennifer Lundquist
Emmons & Olivier Resources for Rice Creek Watershed District (RCWD)	July 28, 2005	Marcey L. Westrick
County of Anoka Public Services Division Highway Department (Anoka County)	August 1, 2005	Lance H. Bernard
City of Hugo	August 1, 2005	Andrew Gitzlaff
HERON Group	August 2, 2005	Barbara Bor Sylvia Marier
Minnesota Department of Natural Resources (MnDNR)	August 3, 2005	Matt Langan
Metropolitan Council	August 3, 2005	Phyllis Hanson
Minnesota Department of Transportation (MnDOT) Metropolitan District	August 3, 2005	Mary E. Jackson
Village of Hardwood Creek, LLC (VHC, LLC)	August 3, 2005	Greg Hayes
Wayne LeBlanc	August 4, 2005	Wayne LeBlanc

Responses are generally confined to substantive issues that "address the accuracy and completeness of the information provided in the draft analysis, potential impacts that may warrant further analysis, further information that may be required in order to secure permits for specific projects in the future, and mitigation measures or procedures necessary to prevent significant environmental impacts within the area when actual development occurs" (Minnesota Rules Part 4410.3610, Subp. 5). Although comments and recommendations that do not address these areas need not have a response, they have been duly noted for the record and are not necessarily specifically addressed in the responses. As required by MN Rules, the RGU has provided replies to comments that are ***substantive*** (involving matters with major or practical importance) and where necessary, note any correction(s) to be made to the appropriate sections of the AUAR or Mitigation Plan.

As suggested in the EQB's document "Recommended Content and Format for Alternative Urban Areawide Review Documents" (AUAR Guidelines) similar comments are combined for the purposes of responding. Responses to comments are organized by AUAR Item number. The substantive comments regarding each AUAR item are summarized and the agencies, organizations, and citizens submitting

similar comments are listed. This method assures consistency in the responses and allows the reviewer to easily identify the major issues raised amongst the comment letters received. A general response to each substantive comment follows.

ITEM 6. DESCRIPTION

6.1 **Comment Summary:** Full build-out of Scenarios Two and Three would result in the number of households within Lino Lakes exceeding the Metropolitan Council's most recent growth forecasts for 2030. If the comprehensive plan amendment to be submitted for Council review also contains forecasts higher than the Council's, that issue will need to be resolved in the context of metropolitan service system capacities available to accommodate the additional growth.

Agencies/Persons Commenting: Metropolitan Council

Response: The urbanization of the AUAR area under Scenarios Two and Three cannot commence without amendments to plans and regulations that guide the permitted land use, zoning, utility extensions, and other development activities. The Metropolitan Council will be involved in the plan amendment process by providing technical assistance, reviewing comprehensive plan updates or amendments, and resolving the additional growth in the context of metropolitan service system capacities.

The inclusion of Scenarios Two and Three in the AUAR process does not represent a Comprehensive Plan update or amendment. The city can use the information contained in the AUAR during future considerations of updates or amendments to the adopted Comprehensive Plan and Zoning Ordinance. Any future consideration of amendments to the Comprehensive Plan and Ordinances will follow the city's set procedures and guidelines for such amendments, including transmitting comprehensive plan updates or amendments to the Metropolitan Council for review.

6.2 **Comment Summary:** The Brite Vue LLP property is located in the northeast portion of the AUAR area. Because the northern portion of the property is in Columbus Township, which would receive utilities much sooner than the Lino Lakes portion, zoning/use must be cohesive across the Columbus property and within Lino Lakes. Therefore, the northern portion of the AUAR area should be considered residential, with the retail and mixed industrial along 80th Street as best reflected in Scenario Three.

Agencies/Persons Commenting: Brite-Vue, LLP

Response: Adoption of the Final AUAR does not include the selection of a particular development scenario. The AUAR process is intended to examine the effects of development scenarios within the AUAR area. Through the process, the impacts of varying levels of development can be examined to reveal feasible development options for the area. These development options and the Mitigation Plan are designed to guide the RGU in future land use decisions. Any proposed land use changes to the comprehensive plan must be submitted as amendments to the city's comprehensive plan or zoning code as directed by city policy.

The City is required to update its Comprehensive Plan by the year 2008 in accordance with the Metropolitan Land Planning Act. Your preferred land use for your property is duly noted for the record.

6.3 **Comment Summary:** The City of Hugo is experiencing tremendous residential development in the area along the shared Lino Lakes and Hugo border. The area is designated for future single family residential growth in the city's comprehensive land use plan. The residential emphasis of Scenario Three is most compatible with these plans.

Agencies/Persons Commenting: City of Hugo

Response: The adoption of the Final AUAR does not include the selection of a particular development scenario. The document identifies potential impacts of and mitigation strategies for different development options. The RGU is responsible for future land use decisions. Any future land use decisions will be made with respect to land use patterns and plans in surrounding areas.

6.4 **Comment Summary:** Scenarios Two and Three seem to have medium density housing between Eagle Brook Church and Hardwood Creek. There is also a light green area indicated on the map that appears to be "Urban Reserve (Hugo)" or maybe it is "Rural Land Use" it is difficult to see the color difference. In this area, wetlands and the portion of Peltier Lake must be protected. All new developments should be sewered, this area especially.

Agencies/Persons Commenting: Wayne LeBlanc

Response: Scenarios Two and Three indicate medium density residential uses for the land between Eagle Brook Church and Hardwood Creek. The surrounding land is "Rural Land Use," which will provide a natural buffer between the wetlands and lake and new residential development. In general, the AUAR document provides mitigation strategies and development concepts that promote the use of conservation design. If the AUAR is adopted by the city, these mitigation and design strategies must be implemented for new development, which will protect and improve the health of wetlands and lakes by using planning techniques such as natural stormwater drainage, vegetative buffers, and native landscaping. As sewer service to the AUAR area improves, it is anticipated the new development will be sewered.

6.5 **Comment Summary:** Limiting the number of residential units and clusters of commercial uses to medium to lower densities than those recommended by Scenarios Two and Three will promote a more livable landscape.

Agencies/Persons Commenting: HERON Group

Response: In order to successfully complete the AUAR process, it was important to evaluate the impacts of varying land uses and development intensities. Scenarios Two and Three represent full build-out of an intense commercial and industrial emphasis and a residential emphasis, respectively. Because these "worst-case" development intensities reveal significant transportation impacts, future considerations of comprehensive plan amendments can limit development intensity to mitigate potential impacts.

6.6 **Comment Summary:** In Figure 6-1, the Rice Creek Chain of Lakes Regional Park Reserve is shown as a golf course.

Agencies/Persons Commenting: Washington County

Response: In Figure 6-1, the Rice Creek Chain of Lakes is shaded in a pale green color indicating "Parks, Recreation, or Preserves." Golf courses are represented by a darker shade of green in the legend; however no golf courses are shown on the map.

ITEM 10. COVER TYPES

10.1 **Comment Summary:** The shaded areas shown in Figures 10-3 and 27-1 do not appear to be accurate (e.g., the 100-year floodplain). The AUAR should note that the 100-year floodplain needs to be determined by hydrological means based on existing or future proposed conditions.

Agencies/Persons Commenting: VHC, LLC

Response: Digital FEMA floodplain mapping was obtained from the Minnesota Department of Natural Resources and later was updated using the FEMA update maps provided by the City. Figure 10-3 incorporates the FEMA update data; therefore, this figure uses the most current and complete FEMA data available to our knowledge. Figure 27-1 does not illustrate FEMA floodplains; however, the FEMA floodplain illustrated on Figure 27-2 did incorporate the FEMA update mapping. It is expected that the delineation of the 100-year floodplain will be reviewed during the development review process and the delineation may change to reflect development plans. The city will require that future project proposers follow set procedures and guidelines and submit letter(s) of map revision(s) (LOMR) to FEMA.

10.2 **Comment Summary:** Figure 10-3 (the Conservation Design Framework) depicts several trail crossings adjacent to and/or crossing Hardwood Creek, Clearwater Creek, and Peltier Lake. Care should be taken to minimize the effects of these trails on the water quality of these impaired resources.

Agencies/Persons Commenting: RCWD

Response: Figure 10-3 illustrates conceptual trail alignments based on the City's *Parks, Natural Open Spaces/Greenways and Trail System Plan* (August 2004) and the findings of the AUAR. Water quality protection of adjacent or crossed aquatic resources will be addressed by sensitive, site-specific trail placement and utilizing appropriate best management practices during construction.

ITEM 11. FISH, WILDLIFE, AND ECOLOGICALLY SENSITIVE RESOURCES

11.1 **Comment Summary:** Surmountable curbing should be used for all new development within the AUAR area to mitigate impacts to Blanding's turtles found in the area. This should also be added to the mitigation plan.

Agencies/Persons Commenting: Metropolitan Council

Response: The City's design standards require surmountable curbing for new residential development. Surmountable curbing is not allowed on county roads. The City will add an item to the Final Mitigation Plan to indicate that surmountable curbing will be used for new residential development within the AUAR area.

11.2 **Comment Summary:** The shorelines of Peltier Lake, its tributaries, and associated wetlands should remain in their natural states to provide water quality protection of the lake and downstream receiving waters. The AUAR maps indicate medium to high density residential on some of the shore lands. Every effort should be made by the City to preserve these lands in a conservation easement set aside. The City should require a contiguous, connected green buffer zone along this lake and its incoming waterways to improve the lake's impaired water status and to provide an ongoing visual experience for visitors and residents that blends these natural areas into the adjacent Anoka County Park System to the west.

Agencies/Persons Commenting: HERON Group

Response: Peltier Lake and its associated tributaries and wetlands are valued by the City and recognized as sensitive aquatic resources. Scenario 1 represents land uses compliant with the City's existing Comprehensive Plan (the AUAR process requires such a scenario), and indicates low density sewered residential development along a portion of Peltier Lake's eastern shoreline. This same area is depicted as low and medium density sewered residential on Scenarios 2 and 3. While a less intensive land use (e.g., rural) is not explicitly depicted along this portion of the lake shoreline, the Conservation Design Framework (Figure 10-3) illustrates buffers around the lakeshore to convey the sensitivity of this area. A public trail is also identified in this area, based on the City's *Parks, Natural Open Spaces/Greenways and Trail System Plan* (August 2004). Future development proposals in this area will be reviewed by the City with special attention given to the treatment of this shoreline area in order to protect water quality, provide public access via trails, and allow for development in a manner that follows shoreland management regulations.

ITEM 12. PHYSICAL IMPACTS TO WATER RESOURCES

12.1 **Comment Summary:** There is no context for Figure 12-3. How were the rate control and runoff volume sensitive areas determined? What is the purpose of defining these areas as there appears to be no alternate stormwater criteria for these sensitive areas under Section 17?

Agencies/Persons Commenting: RCWD

Response: The figure in question is based on a similar figure provided by the Rice Creek Watershed District. The source of Figure 12-3 in this AUAR is Figure 5.2 from the June 2000 RCWD Water Management Plan. This Figure is included in the both the City and RCWD Plans to reinforce the need for prudent stormwater planning in these areas.

12.2 **Comment Summary:** All three development scenarios include a new crossing of 80th Avenue at the north end of Peltier Lake. If the City applies for a permit in relation to this crossing, all fill in public waters jurisdiction should be avoided.

Agencies/Persons Commenting: DNR

Response: The City always tries to avoid fill in public waters. The Mitigation Plan includes a strategy to minimize or avoid fill in public waters. Fill in Public Waters is regulated by permit from both MDNR and RCWD.

12.3 **Comment Summary:** Figure 12-2 "Wetlands" shows "wooded swamps" in areas currently cultivated and not wooded. The figure should note that these are approximations, cite the source, and note that specific sites will require further delineation.

Agencies/Persons Commenting: VHC, LLC

Response: This figure presents the Minnesota Department of Natural Resource's interpretation of the National Wetland Inventory. The aerial photography was from 1979 through 1988 and MDNR interpretation happened from 1991-1994.

ITEM 13. WATER USE

13.1 **Comment Summary:** There is no mention of how increased water supply demands may impact groundwater dependent resources within the AUAR, specifically around Hardwood Creek and Peltier Lake.

Agencies/Persons Commenting: RCWD

Response: There are no wells proposed to be located within AUAR Area. All future wells proposed for the City (up to and including Well 8) are proposed to be located along Birch Street which runs east-west across the southern portion of the City. This well field area is downstream from Hardwood Creek and Peltier Lake and would not impact these water bodies.

Additionally, all wells (existing and currently proposed) will be located in the Prairie du Chien - Jordan aquifer system. This is a confined aquifer, meaning there is an aquitard between this aquifer and the aquifer above it (glacial drift). Both Hardwood Creek and Peltier Lake are dependent on groundwater from this glacial drift, and therefore, should not be impacted by further use of the Prairie du Chien - Jordan aquifer system due to the confining layer between the two systems.

13.2 **Comment Summary:** After reviewing the water issues, we would like to say that we agree with the placement of additional trunk lines (not including northerly extension from County Road 14 along both sides of I-35E) being development driven. Based on the city planning for an adequate water supply and distribution system to accommodate future development, choosing one development scenario over another doesn't seem to be an issue.

Agencies/Persons Commenting: Brite-Vue, LLP

Response: The Comprehensive Water Plan can be adapted to all three development scenarios.

13.3 **Comment Summary:** The document states that the City completed a *Comprehensive Water Supply System Plan* in 2004, which assessed the present and future water system needs of the City, including this DAUAR area. The Council has no record of receiving this document for review and comment. Staff requests that a copy be submitted to the Council for review as soon as possible.

Agencies/Persons Commenting: Metropolitan Council

Response: A copy of the Comprehensive Water Plan will be sent to the Metropolitan Council for review and comment.

ITEM 17. WATER QUALITY: SURFACE WATER RUNOFF

17.1 **Comment Summary:** Comments from VHC, LLC regarding Item 17 were extensive and are summarized as follows:

a. Subwatershed divides presented in Figure 17-4 are not accurate and should be revised to reflect the higher resolution topographic information for the Village of Hardwood Creek provided to the City of Lino Lakes and the AUAR consultant.

b. Runoff curve numbers used in the stormwater evaluation are significantly different from RCWD approved curve numbers.

c. Proposed runoff release rates cannot exceed existing runoff release rates. Hydrologic modeling used to size stormwater management areas (SMAs) should be based on detailed modeling of proposed site development plans and actual subwatershed divides.

d. Approximations of SMA requirements should not be mandated by the mitigation plan. Needs for SMAs should be based on a design that maintains stormwater management objectives and meets the requirements of the LGU and RCWD. Determining the surface area needed for stormwater management in a given development zone should be based on, but not limited to site-specific topographic information, subwatershed divides, soil characteristics, best management practices (BMPs), and site development issues. Specific SMA requirements should be eliminated.

e. Stormwater management techniques outlined in the Mitigation Plan do not include many of the innovative alternatives that could be considered on a specific site. The mitigation plan should provide more flexibility. The AUAR report should be modified to provide the City with options to consider a variety of innovative mitigation options.

f. Mitigation measures listed include in residential areas, "side and rear lot drainage easements that are no-mow zones planted to formal or informal native landscaping" for drainage, treatment, and infiltration. In some single-family residential areas these areas may be difficult to maintain or may be undesirable.

g. The language "Placement of swales in depressional areas along buffers, parking lot islands, road ROWs, and other suitable locations that support infiltration" should include the language "locations that support infiltration *and/or controlled drawdown facilities.*"

h. Delete the phrase "for rare events" from the mitigation measure, "Intercept road runoff into parkway and road ROW swales or landscape features to encourage water cleansing and some storage capacity for rare events."

Commenter: VHC, LLC

Response:

a. Subwatershed divides presented in Figure 17-4 are based on USGS topographic information with a contour interval of 10 feet. These data are considered best available information. Subwatershed divides established in this analysis correspond with findings of the Minnesota Department of Natural Resources (MDNR) and the *Lino Lakes Water Resources Management Plan* (TKDA Inc., 2005). High resolution topographic data for the Village of Hardwood Creek was attained during hydrologic analysis of the AUAR area, and was utilized to validate the accuracy of previously established subwatershed divides. After delineation of subwatershed divides using the newly acquired data, it was concluded that there was enough agreement between the data sets to allow the analysis to move forward. The Mitigation Plan requires each new development to provide 1-foot existing conditions topographic information for on-site areas. The higher resolution topographic information will allow for more comprehensive and accurate assessment of subwatershed divides as each new development occurs.

b. See response to comment 17.5 under this section.

c. Stormwater management topics and criteria presented in the Lino Lakes AUAR do not supersede stormwater requirements of Rice Creek Watershed District (RCWD). *RCWD Rules* include the requirement that post-development stormwater release rates not exceed pre-development rates. Detailed hydrologic modeling of pre- and post-development stormwater runoff regimes must be completed for any and all development within the AUAR area to be consistent with *RCWD Rules*. A component of this detailed analysis is the mandate appearing in the Mitigation Plan requiring collection of 1-foot topographic information for each new development site. The accuracy of subwatershed divide predictions will be greatly increased with the higher resolution data collected as part of this process.

d. Information presented in Figure 17-3 of the AUAR is to be used by city planning and engineering staff as a tool to ascertain how much area will likely be required for stormwater management in a given development zone. The amount of area allocated to stormwater management is not mandatory; however, most of the criteria used to approximate these numbers are either required by RCWD or the Mitigation Plan. Additionally, surface areas estimates were conservative, as basins were assumed to be rectangular in shape; a highly inefficient use of space. Both the title and language in reference to Figure 17-3 have been changed to “Recommended Stormwater Management Area”.

The Mitigation Plan establishes sizing criteria for SMAs that are designed to support large infiltrating surfaces or wetland complexes. To create conditions appropriate for these two types of stormwater management features, SMAs were designed to experience maximum water surface fluctuations of less than or equal to 2.5 feet and contain basin side slopes less than or equal to 6:1, horizontal to vertical.

Computer models were created to simulate the hydraulics of SMAs. Outlets for each SMA were designed to maintain proposed conditions runoff release rates below existing conditions

runoff release rates for rainfall events of 1-, 10-, and 100-Year recurrence intervals. Rating curves were input to simulate three-stage outlets for detention of these rainfall events. Outlets for the 1-, 10-, and 100-Year rainfall events had invert elevations at SMA depths of 0.75-, 1.25-, and 2.5-feet, respectively. Iterations were conducted to increase the 100-Year SMA depth to 2.5 feet to minimize the amount of SMA surface area needed for stormwater management. Potential infiltration in each SMA was not included in the optimization of SMA surface area, adding to the conservative nature of the surface areas recommended for stormwater management appearing in Figure 17-3.

The mitigation of stormwater runoff volume via enhanced infiltration and groundwater recharge is critical to the health of ecological resources fed by groundwater and the stability of streams and water bodies receiving runoff. Implementation of all appropriate runoff infiltration and groundwater recharge enhancement techniques are encouraged for development within the AUAR area. An action that is consistent with this approach is to limit permanent open water in SMAs to 20% of their total surface area. The remaining portion of the SMA should be populated with mesic prairie or wet prairie plant communities and not permanently inundated. Reports of high groundwater tables and shallow clay layers create challenges for enhancement of infiltration and groundwater recharge, but creating SMAs with these characteristics will maximize the infiltration potential of the system.

The role of native prairie plant species is critical in areas that were previously under agricultural land uses, because deep-rooted native plants create preferential infiltration and groundwater recharge pathways through hardpan layers. Hardpan layers are commonly found under row crop land due to repeated tillage of soil at the same depth.

Computer Modeling results suggest SMAs having the geometry outlined in the Mitigation Plan and containing plant and open water characteristics outlined previously will meet infiltration criteria required by *RCWD Rules.* These criteria include the requirement for any development to infiltrate runoff generated from the mean rainfall event (0.34 inches). The modeling results are primarily due to the large infiltrating surface area of the assumed SMA geometry. The infiltration rate in non-open water portions of SMAs was assumed to be 0.03 in/hr, which is the RCWD recommended infiltration rate for Type D soils (SCS Hydrologic Soil Group). Portions of SMAs with open water were considered to have a negligible infiltration rate.

e. Text has been changed in the Mitigation Plan to be more inclusive of all alternative stormwater techniques. It states that implementation of appropriate alternative stormwater management techniques will be approved by the relevant regulatory body. In most cases this will be RCWD. Generally, any technique that enhances infiltration, limits production of stormwater runoff, or decreases the amount of impervious surfaces will be supported. Techniques must also protect the physical stability and ecological integrity of individual development sites and the AUAR area in general.

f. The significant reductions in contaminants in runoff due to interaction with deep-rooted perennial (native) plants is critical to overall health of sensitive watersheds in the AUAR area. Additionally, provisions of these types of features will make compliance with ongoing TMDL studies more manageable.

g. The AUAR does not prohibit the use of any appropriate stormwater management practice, however Best Management Practices (BMPs) should be used whenever possible. The Mitigation Plan states that vegetated bio-swales and rain gardens should be placed in

depressional areas along buffers, parking lot islands, road ROWs, and other suitable locations that support infiltration. It does not prescribe "controlled drawdown facilities", because the suggested facilities do not provide the runoff water quality and volume reduction characteristics of bio-swales and rain gardens. The language "controlled drawdown facilities" has not been included in the Mitigation Plan, because the basic function of "controlled drawdown facilities" is detention; not water quality enhancement and volume reduction.

h. The phrase "for rare events" has been deleted from the Mitigation Plan.

17.2 **Comment Summary:** It is mentioned that drainage from any development within the AUAR should conform to pre-settlement subwatershed divides. As the drainage authority, any disconnecting of public drainage infrastructure, including tile lines, must be reviewed by the District Engineer to ensure that the ditch capacity and landowner drainage rights are maintained. If such a disconnection is proposed, the proposed plan will need to be reviewed for compliance with Minnesota Statutes Section 103E.227 (impoundment & diversion proceedings) and/or Minnesota statute Section 103E.805 (abandonment proceedings) and a public hearing will be required.

Commenter(s): RCWD (EOR)

Response: Watershed divides as represented by site topographic features largely represent pre-settlement conditions. The gradual establishment of these features by physical and chemical processes created a natural, stable system that could respond to hydrologic fluctuations. The introduction of modern agriculture increased runoff by limiting the system's natural ability to detain runoff flow and reduce runoff volume. This was primarily done through replacement of prairies and wetlands with tile-drained agricultural crops.

Much of the site contains drainage ditches designed to manage the additional runoff and keep fields dry for more reliable crop production. It is likely that runoff volumes entering these ditches will significantly increase as areas tributary to them develop. To minimize this effect, the AUAR and Mitigation Plan advocate a goal of dispersing stormwater management throughout the site as much as possible. Stormwater management elements employed for this function should be designed to maximize the infiltration and groundwater recharge potential of the site. Site conditions may suggest that the potential for infiltration and recharge is minimal, but BMPs should be employed despite this. The cumulative impact of maximizing infiltration and recharge potential for all development will be to minimize ecological impacts and flooding threats throughout the AUAR area.

In many locations the ditches pass through subwatershed divides as depicted by best available topographic information (10-foot contour interval). Sound stormwater management philosophy encourages the utilization of the inherent ability of the site to handle runoff through re-establishment of pre-settlement watershed divides.

In most cases, maintenance of pre-settlement watershed divides results in optimal conditions for the success of ecological resources. Typically the resources being protected and restored evolved in response the presence of pre-settlement watershed divides. Restoring watershed divides will likely aid in producing hydrologic and hydraulic conditions optimal for resource protection, restoration, and creation.

The AUAR notes the logistical and legal challenges associated with the re-establishment of pre-settlement subwatershed divides. The AUAR also includes language in Item 17 stating the

established procedure for changes to public drainage infrastructure and includes RCWD authorities in Table 8-1. In the event that pre-settlement drainage divides are re-established, "benefited parties" will have opportunities to comment on, or object to, proposed changes. Mandated re-establishment of subwatershed divides is not included in the Mitigation Plan. Collection of 1-foot contour interval topographic data for new development sites are mandated in the Mitigation Plan.

17.3 **Comment Summary:** On page 55 it states that the AUAR area was divided into 40 potential development zones. In Appendix D, it states that the area was divided into 30 potential development zones. Please clarify.

Commenter(s): RCWD (EOR)

Response: The text in Appendix D is provided to explain the genesis of the hydrologic analysis. The 30 development zones discussed in Appendix D represents an intermediate step on the way to the eventual 40 development zones. Text clarifying this process was provided previously in Appendix D but has been added to the main body of the final AUAR.

17.4 **Comment Summary:** Please clarify the sizing criteria for the stormwater management areas. It is unclear how the presented sizing criteria were determined.

Commenter(s): RCWD (EOR)

Response: The Mitigation Plan establishes sizing criteria for SMAs that are designed to support large infiltrating surfaces or wetland complexes. To create conditions appropriate for these two types of stormwater management features, SMAs were designed to experience maximum water surface fluctuations of less than or equal to 2.5 feet and contain basin side slopes less than or equal to 6:1, horizontal to vertical.

Computer models were created to simulate the hydraulics of SMAs. Outlets for each SMA were designed to maintain proposed conditions runoff release rates below existing conditions runoff release rates for rainfall events of 1-, 10-, and 100-Year recurrence intervals. Rating curves were input to simulate three-stage outlets for detention of these rainfall events. Outlets for the 1-, 10-, and 100-Year rainfall events had invert elevations at SMA depths of 0.75-, 1.25-, and 2.5-feet, respectively. Iterations were conducted to increase the 100-Year SMA depth to 2.5 feet to minimize the amount of SMA surface area needed for stormwater management. Potential infiltration in each SMA was not included in the optimization of SMA surface area, adding to the conservative nature of the surface areas recommended for stormwater management appearing in Figure 17-3.

17.5 **Comment Summary:** Given the available topographic information (10-ft USGS), the runoff rate assessment presented is cursory. While this may be acceptable as a general planning tool, the District will not accept this assessment for purposes of development. 1-foot topographic mapping and detailed modeling of the existing hydraulics of the system (including all existing agricultural tile drainage systems) is necessary as described on Page 63 for accurate assessment of rate control compliance. In addition, the composite curve numbers generated for pre-development conditions listed Appendix D.1, Page 1 are based on initial land use curve numbers that are inappropriately high for certain land uses, causing pre-development rates to be overestimated. Pre-development condition curve numbers should be revised per the following table.

Land Use	Pre-Development Curve Number (From Table D.1-1)	Change to a Curve Number of	Comment
Saturated Soil	100	85	This is consistent with SCS recommendations for Marsh.
Agriculture – Row Crops	85	77	For land with very little slope – see footnote 1/ of Figure 3-1 of Hydrology Guide for Minnesota.
Wet Prairie	86	79	Pasture – fair condition
Forest	73	70	good condition

Commenter(s): RCWD (EOR), VHC, LLC

Response: Results of hydrologic analyses in support of the AUAR are to be used as a planning tool only. The results do not represent stormwater criteria that in any way change development permits required by RCWD or any other agency. The Mitigation Plan requires collection of 1-foot topographic data for all new development sites. The AUAR document expresses the need for the City to collect 1- or 2-foot contour interval topographic information for the entire AUAR area.

In preparation of the AUAR, Applied Ecological Services (AES) performed hydrologic analyses for parts of the year believed to be most prone to significant flooding. During wet periods, such as early to mid-spring, flood problems tend to be more severe. AES acknowledges that CNs presented in the preceding table will provide more stringent release rate criteria, but they do not represent conditions during early to mid-spring. AES also sought to avoid using artificially low CNs to prevent their use by developers to under-represent proposed runoff flow rates and volumes. Additionally, AES supports the use of CNs presented in the preceding table for regulatory compliance; however CNs used in support of the AUAR document were used to generate general, recommended surface areas allocated for stormwater management. They are not intended to, nor should they, be used as regulatory guidelines.

The discrepancy between the two sets of CNs presented in the preceding table highlight an important possible scenario for future development regulation. The scenario can evolve when an applicant provides applicable and defendable runoff CNs that disagree with CNs advocated by the RCWD. In response to this scenario, a volume based regulatory criterion for stormwater management has been introduced in the AUAR document and Mitigation Plan. The volume based criterion states that post-development runoff release volumes should be no less than 80% and no greater than 150% of existing conditions runoff volumes for a given new development. The goal of all development within the AUAR area should be to maintain proposed conditions runoff volumes within 20% of existing conditions runoff volumes for each new development site. Surface area recommendations for stormwater management appearing in Figure 17-3 do not accommodate this criterion. Dispersed stormwater management techniques that encourage runoff infiltration and groundwater recharge must be employed in addition to SMA recommendations made in Figure 17-3 to achieve compliance with this criterion.

Implementation of volume based runoff release rate regulatory criteria has well-established precedence throughout the United States, including in Washington County, Minnesota. The 20% criterion is recommended after consultation with regulatory personnel throughout the Midwest and the RCWD. The criterion is designed to ensure that proposed conditions runoff volumes

remain within a reasonable range to prevent sensitive ecological features from experiencing too much or too little flooding. This criterion is also important for increasing the stability of streams and ditches receiving runoff. Though regulatory criteria is provided to maintain proposed runoff rates below existing conditions runoff rates, failure to mitigate runoff volumes will result in the compromised stability of receiving water bodies such as Hardwood Creek, Clearwater Creek, and regional and local drainage ditches. Increased sediment flows resulting from this degradation would likely result in delta formation in Peltier Lake. Not only is sediment deposition enormously destructive to Peltier Lake, but it also increases the difficulty of compliance with future TMDL standards. To that end, implementation of volume based stormwater release criteria is important in the AUAR area.

17.6 **Comment Summary:** A nutrient budget was provided for Peltier Lake and its direct drainage area. It should be noted that in anticipation of the Peltier Lake TMDL, the District has recently completed a BATHTUB model for the lake. As part of this modeling effort, total phosphorus (TP) load reductions needed from Hardwood Creek and Clearwater Creek have been established. Under current land use conditions, the TP load from Hardwood Creek needs to be reduced by 47%-60% and current TP load from Clearwater Creek need to be reduced by 33%-50%. In the future, it may be the strategy of the District to develop methods for reducing phosphorus loads into Peltier Lake beyond current conditions so that water quality may be improved. With the assumed increased in nutrient loads as a result of future development, the District would strongly encourage the city to promote the use of Low Impact Development to further reduce stormwater from the development sites.

Commenter(s): RCWD (EOR)

Response: Characterization of the scope and assumed scheduling of ongoing TMDL studies within and adjacent to the AUAR area has been provided in the AUAR document. The role that the Conservation Design Framework and conservation design principles will play in compliance with TMDL requirements is discussed in the AUAR document. Low impact development solutions such as increased open space, disconnected and minimized impervious surfaces, and dispersed stormwater management are supported and discussed in the Mitigation Plan.

17.7 **Comment Summary:** The document states that both Peltier and Rondeau Lakes are metropolitan area Priority Lakes. Both lakes were on the Council's original Priority Lake list, but that list was changed in the Council's recently adopted *2030 Water Resources Management Policy Plan*. Peltier Lake is still on the Council's Priority Lake list and largely within the Rice Creek Chain of Lakes Regional Park Reserve, but Rondeau Lake has been dropped from the list.

Commenter(s): Metropolitan Council

Response: All references to Rondeau Lake as a "Priority Lake" have been removed from the Final AUAR document and Mitigation Plan.

17.8 **Comment Summary:** The document states on page 67 that the goal of implementing storm water best management practices for the site should be a no net increase in total phosphorus leaving each development zone as development occurs. The document has identified the recommended storm water management area calculated to be necessary to achieve the 'no net total phosphorus increase' goal for each potential development zone. However, the document states that facilities to achieve this objective have not been designed, and the assumptions used to achieve the acreages and stated goal have not been included in the document. Council staff requests those assumptions and planned removal efficiencies be incorporated into the final document and

mitigation plan as well as the tracking mechanism that will be utilized during and following development to insure adherence to the no-net-increase goal. The mitigation plan also needs to outline what courses of action will be taken if it is determined that the goal is not being met.

Commenter(s): Metropolitan Council

Response: The recommended stormwater management areas (SMAs) presented in the AUAR (Table 17-5) were sized to mitigate runoff release rates per RCWD requirements. The geometry of each SMA was designed to provide runoff rate control, but also provide optimal conditions for water quality treatment. Additional detail has been provided in the Final AUAR regarding the design criteria for SMAs.

The design of the SMAs provides suitable conditions for implementation of mesic prairie, wet prairie, and wetland applications. All of these features provide critical roles in reducing nutrients in runoff including phosphorus. The criteria established in the AUAR and Mitigation Plan to encourage runoff infiltration and groundwater recharge and require maintenance of proposed conditions runoff release volumes to be no less than 80% and no greater than 150% of existing conditions runoff volumes for a given new development, which will result in improved proposed conditions runoff water quality. The goal of all development within the AUAR area should be to maintain proposed conditions runoff volumes within 20% of existing conditions runoff volumes for each new development site. Detailed water quality modeling is beyond the scope of this analysis. Individual developments are encouraged to display no net increase in total phosphorus in proposed conditions runoff.

17.9 **Comment Summary**: The AUAR notes that there is the possibility to design for peak water storage along area roadways. We concur that this is possible, however, it should be noted that it is important to make sure that any storage structures are located outside the clear zone so they are not a safety or liability issue.

Agencies/Persons Commenting: Washington County

Response: The location of water storage areas will not compromise the safety of area roadways. A mitigation measure regarding the location of water storage areas along roadways has been added to the Mitigation Plan.

17.10 **Comment Summary:** The proposed development will need to maintain existing drainage rates towards Mn/DOT right-of-way. The applicant will need to submit plans as they develop. If drainage is being sent towards Mn/DOT right-of-way, a drainage permit will be required. The applicant will need to submit hydraulic computations, map, and plans used to calculate drainage.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: Proposed developments within the AUAR area will provide rate control to maintain existing drainage rates as required by RCWD and the city. The revised List of Permits and approvals includes the need to obtain a MnDOT drainage permit if drainage is being sent towards Mn/DOT right-of-way

ITEM 18. WATER QUALITY: WASTEWATER

18.1 **Comment Summary:** The capacity of the new MCES interceptor should be increased to accommodate development "beyond Scenario One."

Agencies/Persons Commenting: Brite-Vue LLP

Response: The interceptor is being designed to convey average daily flow of 2.0 MGD. When this increase is added to the existing interceptor capacity of 1.7 MGD, the total available capacity will be 3.7 MGD, which is significantly greater than the approximately 2.99 MGD required for Scenario One.

18.2 **Comment Summary:** The AUAR uses a significantly higher flow projection (1500 gallons per acre per day) than Metropolitan Council staff typically utilizes (1000 gallons per acre per day). Therefore the MCES interceptor system as proposed will have adequate capacity under any of the scenarios and thus does not appear to represent an impact to the Metropolitan Disposal System.

Agencies/Persons Commenting: Metropolitan Council

Response: While we believe that the higher figure is more appropriate for planning for an area this size, we agree with the Metropolitan Council's conclusions regarding capacity and impact.

ITEM 21. TRANSPORTATION

21.1 **Comment Summary:** The volume of projected traffic through this corridor on existing roads makes for an unsafe flow through the corridor. The finances for new roads despite the political schmoozing that has been and is being done, is unpredictable, and is an unknown. The amount of growth must be managed in concert with the traffic impacts of Hugo and Columbus Township. The impact to the peoples living in and traveling through the corridor is understated in the AUAR document.

Agencies/Persons Commenting: HERON GROUP

Response: The projected traffic volumes within the corridor are very high and do raise "quality of life" concerns and the traffic impacts at several intersections may not be feasible for reasonable mitigation measures. However, it should be noted that the high traffic volumes do not necessarily translate into "unsafe flow through the corridor." Improvements designed in accordance with State and local access design standards, policies, and procedures (i.e., MnDOT Access Category System and Spacing Guidelines, Anoka County Highway Department Development Review Process Manual, Anoka County Driveway Policy, and Anoka County Transportation Plan) could result in these transportation facilities having comparable crash rates to similar transportation facilities within the region.

21.2 **Comment Summary:** The proposed northern route over the north end of Peltier Lake and the surrounding wetlands will need a detailed environmental impact analysis if it moves forward. Other road options exist and could be entertained by Anoka County and Columbus Township.

Agencies/Persons Commenting: HERON Group

Response: The northerly bypass and its interchange at I-35W and I-35E will undergo appropriate environmental review in accordance with state and/or federal requirements. Any proposed impacts to wetlands will follow the sequencing process of wetland avoidance, minimization, rectification, and mitigation as outlined in the Wetland Conservation Act (WCA).

The northerly bypass provides an alternative route to CSAH 14 for the purposes of connecting I-35W and I-35E. The proposed location of the northerly bypass was the preferred alternative identified in the *Alternative Analysis Report - CSAH 14: I-35W to I-35E Study*. This study analyzed several alternatives for reconstructing CSAH 14. The northerly bypass (Option 4) with interchanges at I-35W and I-35E was identified as the most feasible and effective option to mitigate impacts to CSAH 14 and the Rice Creek Chain of Lakes Regional Park. The provision of the northerly bypass eliminates the need to widen CSAH 14 through the Regional Park.

21.3 **Comment Summary:** The future increased traffic projections and proposed road expansions are lacking noise and air quality assessments for the AUAR scenarios.

Agencies/Persons Commenting: HERON Group

Response: The air analysis was completed for Item 22, page 93 in the Draft AUAR and is attached as Appendix E. The air analysis conclusion is summarized as follows: "The intersections with the highest delay were analyzed for air quality impacts for 2030 Development Scenario 3 and no impacts were found. Based on this analysis of the worst-case location(s), no carbon monoxide impacts will occur in the entire project area as a result of traffic-related activities."

The noise analysis was completed and added to the AUAR under Item 21. The projected noise levels were calculated using Stamina noise prediction model developed the FHWA and modified by MnDOT to reflect the sound energy coefficients for heavy truck noise in Minnesota. The noise levels for each of the receptors were calculated for the p.m. peak hour. The analysis found that there will be considerable increase in noise levels at the three locations over current levels. All of the receptors analyzed exceed the State Noise Standards for the Year 2030 Build Scenario. It is not uncommon for noise levels to exceed the State Noise Standards at sensitive noise receivers adjacent to major roadways similar to those in the AUAR area. Therefore, noise abatement measures should be considered for all of the receptors. Presented in the report is Figure 21-13 (Traffic Noise) which displays the location of the three receptors as well as areas which would exceed Minnesota standards for day time and night time noise.

21.4 **Comment Summary:** Forecasting I-35 Traffic: The AUAR needs to be consistent with MnDOT's Metro District Transportation System Plan (TSP) and the Metropolitan Council's Transportation Policy Plan (TPP). The AUAR analysis needs to include a forecast that reflects a constrained network as a basis for evaluation. While some of these proposed improvements have previously been identified as needs on the system, no funding has been identified (through 2030) to improve any of these facilities within the project area. Neither I-35 W nor I-35 E is funded as an expansion project prior to 2030.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: In response to your suggestion to include an analysis of the no-build transportation system we have completed an analysis for the AUAR study area that includes only those projects approved for funding. This analysis is presented in the memorandum which is included as Appendix E in the Final AUAR. The following is the summary as it appears in the technical memorandum.

"The purpose of this technical memorandum was to analyze the traffic operation within the AUAR Study Area for a 2030 No-Build Transportation Scenario using the population and employment data for that area as forecast by the Metropolitan Council. The analysis showed that

even with a relatively modest increase in development (the Met Council development scenario represents approximately 15 percent of the trips in AUAR Scenario 1) the transportation system will experience areas of significant congestion. The area of greatest congestion is projected to be the CSAH 14/I-35E interchange area.

Under the No-Build Scenario, this interchange represents the only Interstate access point within the AUAR Study Area. Given the limited access to the Interstate system, traffic destined to the study area places additional pressure on the local roadway system. One such local roadway is CSAH 14, which through the City of Centerville is projected to carry nearly 13,000 trips per day, compared to 5,700 per day in 2004.

This analysis has shown that there is a need for additional infrastructure improvements to accommodate both local and regional traffic. The need for some of these improvements currently exist, such as at the interchange of CSAH 14/I-35E. Even with the relatively modest development scenario used to conduct this analysis (Met Council 2030 forecast); the transportation network will be negatively impacted. This is reflected by the increase in congestion at the intersection level, as well as the increase in daily traffic on local roadways such as CSAH 14."

21.5 **Comment Summary:** Forecasting I-35 Traffic: As the regional model was used to develop the traffic volumes, all trips beyond those in the comprehensive plan approved by the Metropolitan Council, need to be subtracted from the development in the surrounding area. The AUAR is unclear whether the trips generated by the various proposed development scenarios are in addition to the traffic already assumed for the study as part of the Metropolitan County regional model or whether these trips are replacing those assumed as part the regional model trip table.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: The Met Council 2030 land use study area generated trips were replaced with the AUAR land use trips. The difference was used to calculate the trips for the AUAR. The document will be changed accordingly to clarify.

21.6 **Comment Summary:** Forecasting I-35 Traffic: We greatly appreciate your efforts to prevent future growth from causing severe congestion. The mitigation strategy on page 123 states: "monitor traffic counts and do not permit new development (to) proceed if counts exceed the capacity of the transportation system." We would like to discuss this further with Lino Lakes, Centerville and Hugo to develop a traffic monitoring program in an effort to link permitted development to the capacity of the surrounding road network and check whether the mitigation strategy of relating development to roadway capacity is successful. Traffic level would be reported as various stages of development are proposed, for example, 25%, 50%, 75% and full build out. This monitoring program report should include analysis on all segments analyzed in the AUAR.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: The City will implement an on-going traffic management plan to monitor traffic volume growth and any operational issues that may develop in and around the AUAR area. This monitoring program is intended to give the City, County and other agencies the opportunity to evaluate future development projects within the AUAR area and their cumulative impacts on the transportation system. A traffic impact study will be required for all developments within the AUAR area. A detailed explanation of the traffic monitoring and management program is

included in the Mitigation Plan. To maintain consistency, each traffic impact study will use the following methodology:

a. Use the Metropolitan Council Model (or localized versions of the model, i.e., Anoka County) to determine the traffic and the distribution of traffic to the development site.

b. Use a traffic simulation model to determine operational traffic impacts for the proposed development.

c. Identify the deficiencies and reasonable mitigation measures that are related to the development. Per the City of Lino Lakes subdivision and zoning ordinances, specific level of service guidelines must be followed to obtain an acceptable level of service. Section 1002-6 of the Subdivision Ordinance states that if a proposed subdivision is not consistent with the Comprehensive Plan with respect to the Land Use Plan, or the Transportation Plan, specific guidelines to roads or highways to serve the development must be met.

a. If no reasonable mitigation measures are agreed upon or are unfeasible, the intensity or timing of the proposed development would be staged so as to not overly burden the transportation system. For example, if it is determined that a proposed development under a full-build scenario would overly burden the transportation system, then varying degrees of development, i.e., 75%, 50%, 25% would be analyzed. As surrounding infrastructure is improved, i.e., new interchange at 80th Street E. / I-35E, the remaining portion of a proposed development could be evaluated to determine if it could be constructed. This is intended to address the cumulative traffic impacts that occur within the AUAR area (e.g., several projects will trigger the need for a new interchange at 80th Street E / I-35E).

21.7 Comment Summary: Traffic Analysis: The following comment is divided into the following sections for purposes of responding to each issue:

a. This is a very large development that will take a number of years to be completed. As such, the traffic analysis needs should reflect this development scale by using the regional transportation planning modeling procedure as the basis of the analysis. This will account for all of the other forecasted land use and transportation system changes excepted to occur during the period being analyzed. The results of the regional model then should be used to do the detailed traffic analysis for this area.

b. Note that the regional model analysis needs to reflect any change in land use – expected or proposed and these changes should adjust the development assumptions up or down in the area so that they are all consistent with the Metropolitan Council's regional development totals. It should also be adjusted to reflect additional large scale developments in the vicinity of this proposed development (including any in adjacent municipalities).

c. As specific plats and/or site plans are sent to MnDOT for review from the cities, they should include a Traffic Impact Study for each site or plat.

d. MnDOT access management guidelines need to be followed for interchange ramps.

e. The traffic analysis should include both AM and PM peak traffic numbers, projected to 2030, to adequately evaluate this proposed development.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: The following responses relate to the comments identified above:

a. The regional transportation planning modeling (developed and maintained by Met Council) was used to evaluate the development and land use impacts related to the various AUAR scenarios. Each transportation and land use scenario were run in the Met Council model to obtain future year daily traffic volumes for the roadways being analyzed. The future year daily traffic volumes from the model were then used to assist in determining the distribution of trips through the roadway network. The detailed traffic "operations" analysis for the respective AUAR scenarios was completed using Synchro/SimTraffic.

b. Several development and land use scenarios were evaluated as part of the AUAR. These scenarios reflected varying degrees of development intensity and development location. The development intensity for most scenarios exceeded the Met Council's regional development totals. A separate development scenario, consistent with the Met Council's development total, was also analyzed (see Appendix F). This scenario, as with all the scenarios, takes into account the impact of known large scale developments in the surrounding area.

c. Specific site plans/plats within the AUAR area will include a Traffic Impact Study which can be provided to MnDOT for review. These plans can be provided to MnDOT as they become available.

d. All developments will follow MnDOT guidelines including access management guidelines for interchange ramps.

e. Year 2030 traffic volumes were projected for all transportation and land use scenarios. An additional a.m. peak hour analysis was completed for one transportation scenario (see Appendix F). After discussion with MnDOT, it was determined that transportation scenario #2 would be the most appropriate to be analyzed for a.m. peak hour conditions. No significant overall differences in traffic operations were observed from the p.m. peak hour analysis. For all transportation scenarios evaluated, the p.m. peak hour conditions represented the worse case scenario.

21.8 Comment Summary: The I-35 IRC Corridor Management Plan: MnDOT's recently released I-35 IRC Corridor Management Plan (2005) calls for a 6-lane section on I-35W and on I-35E up to CSAH 14. This plan is a vision for the corridors, however there is no funding for this work in MnDOT's 20-year TSP. Also, there is no funding for the proposed interchanges 80th Street/CR 140 on either I-35 W or I-35 E corridors in MnDOT's TSP. FHWA has stated that the supporting roadway network needs to be built out (county and city system) before an interchange (new access) to I-35 E and I-35 W would be considered.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: The following text will be added to the AUAR report as a footnote to address the above comment. "It must be noted that none of the first four projects listed are currently funded for implementation, however, it is expected that each would have to occur prior to 2030 to realize full build-out of the three land use scenarios. The four projects are: Northerly Bypass, Northerly

Bypass with interchange with I-35W, CR 140 interchange with I-35E, and the reconstructed CSAH 14 interchange with I-35E. It should be noted that the assumption of a 6-lane cross section of I-35W and I-35E, up to CSAH 14, does not have funding identified and is not included in MnDOT's 20-year TSP. Prior to the construction of these proposed interchanges, FHWA would require that the supporting roadway network (county and city system) be constructed."

21.9 Comment Summary: The I-35 IRC Corridor Management Plan: MnDOT cannot support the AUAR's Scenario 3. The volumes projected with this level of development cannot be mitigated sufficiently. The volume could impact future plans for I-35 E.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: We agree that the volumes in the AUAR scenario 3 are very high and would be extremely difficult to mitigate.

21.10 Comment Summary: The I-35 IRC Corridor Management Plan: The Diamond Plus Northwest Loop design mentioned in the AUAR is only a suggested design for the intersection of I-35 E at CSAH 14. Preliminary design work and modeling needs to be finished before the ultimate design is selected. This additional work will be done under a separate project document for the interchange.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: Additional interchange analysis and design is needed to determine the ultimate interchange configuration. At the time of this study, the Diamond Plus Northwest Loop design was the design with the most support and was the alternative identified (in the Memorandum entitled: I-35E/CSAH 14 Interchange Alternatives Evaluation, conducted for Anoka County, by SRF Consulting Group, Inc. May 19, 2005.) as the most appropriate for evaluation as part of the AUAR. A footnote was inserted under New Roadways/Interchanges to source the preferred interchange design.

21.11 Comment Summary: The I-35 IRC Corridor Management Plan: Frontage roads should be planned along the I-35 E corridor.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: The I-35 IRC identified "Local System Enhancements" (see page 5-10 of I-35 IRC) which stated that "local agencies will need to construct additional capacity on their roadway systems to connect new development to I-35. Additionally, local parallel routes to I-35 are recommended for improvement to serve local trips." The AUAR identified future year traffic impacts related to new development and also identified potential improvements to the local parallel routes. Given the existing spacing in the study area, it may be difficult to construct typical frontage roads along the corridor. However, a proposed system of frontage and backage roads have been identified to serve local trips.

21.12 Comment Summary: Transit and Non-motorized Transportation: There is a proposed Park and Ride lot near I-35 E and CSAH 14. The Metropolitan Council has this in their Transit Plan and Anoka County is pursuing a CMAQ Application for it using FY 2009/10 funding. Please provide details as to the transit service that would be expanded in this area.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: Text will be added to the AUAR to document transit improvements within the study area. In general, the Anoka County Transit System Plan, completed in October 2004, identified additional Anoka County transit services. The following was identified in the transit system plan:

"It is expected that Anoka County will also stay involved with a number of other transit activities and will expand its role in some new areas. The County should maintain its involvement with the Northstar Commuter Coach service operated along TH 10 between Elk River and Downtown Minneapolis with an intermediary stop at Coon Rapids/Riverdale. This service is currently operated by the Northstar Corridor Development Authority (NCDA). In the event the Northstar Commuter Rail Project begins service, the County will need to look at how feeder service is operated to the rail stations. At that time, the Northstar Commuter Coach service could be redeployed to another corridor such as TH 65. Other activities in this timeframe include expanded Transportation Management Organization (TMO) activities focusing on meeting business needs, promoting the benefits of transit, and assisting in planning and other Transportation Demand Management (TDM) activities."

Between 2006 and 2010 the AUAR study area falls under the limited fixed route service area (see figure 28 of the Anoka County Transit System Plan). Commuter coach service and transit oriented corridors are identified as improvements between 2011 and 2015 (see figure 29 of the Anoka County Transit System Plan) that would approach the west boundary of the AUAR study area. Specifically, commuter coach service is identified as along I-35W while CSAH 14 is identified as transit oriented corridor extending west from I-35W.

21.13 Comment Summary: Permits: Under "List of Permits and Approvals" (page 16); the Federal Highway Administration (FHWA) is missing from the list of agencies. The FHWA is needed for new freeway interchange approvals. The interchange project proposer will need to submit an Interstate Access Request (IAR) that needs final approval by the FHWA. The IAR should demonstrate:

1) Why the existing interchanges or local roads can not accommodate the design year traffic, and that all reasonable design options have been adequately assessed.

2) That the proposed Interstate access point mush not have a significant adverse impact on the safety and operation of the Interstate facility (an operation analysis would be needed to support this).

3) That the Interstate access would not be put into the context of area development.

4) That any request for new or revised access to the Interstate should be in the context of a long-term plan derived from an Interstate network study.

Any use of or work within MnDOT right of way or affecting MnDOT right of way (i.e., drainage) requires a permit. Please update the permits needed on page 14 of the Draft AUAR to include possible drainage permits required from MnDOT.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: Text will be added to the report to include FHWA in the permit process. The four bulleted points (1 to 4) in the above comment will also be added to the report. The IAR requirement was added to the List of Permits and Approvals (Table 8-1) and to the Mitigation

Plan. The need to obtain permits to work within or affect MnDOT right of way was added to the list of permits.

21.14 Comment Summary: Preservation of Right of Way: As this area is redeveloped land adjacent to the I-35E needs to be preserved for any expansion projects identified in the traffic mitigation section.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: Text was added to the report to address the above comment. The text states, "Right of way should be preserved within the AUAR study area, especially along I-35E, to accommodate future expansion projects that would help mitigate projected future year traffic levels."

21.15 Comment Summary: Noise Walls: Residential uses located adjacent to highways often result in complaints about traffic noise. Traffic noise from this highway could exceed noise standards established by the Minnesota Pollution Control Agency (MPCA), the U.S. Department of Housing and Urban Development, and the U.S. Department of Transportation. Minnesota Rule 7030.0030 states that municipalities are responsible for taking all reasonable measures to prevent land use activates listed in the MPCA's Noise Area classification (NAC) where the establishment of the land use would result in violations of established noise standards.

Mn/DOT policy regarding development adjacent to existing highways prohibits the expenditure of highway funds for noise mitigation measures in such areas. The project proposer should assess the noise situation and take the action deemed necessary to minimize the impact of any highway noise.

Agencies/Persons Commenting: MnDOT Metropolitan District

Response: A noise analysis was completed and is presented in Item 21. Additionally, the Mitigation Plan includes reference to applicable traffic noise policies and includes strategies for reducing the impacts of traffic noise.

21.16 Comment Summary: Section 21. Figures 21-8 to 21-12 were included in the AUAR Report, but were not on the website. Figures 21-8, 21-9 and 21-10 display mitigation measures designed to address the traffic Level of Service ("LOS") concerns. These figures suggest specific improvements as if these are the final improvement plans, which could restrict the City's ability to consider other options for access, intersection improvements and traffic management. As an example, we believe the intersection of CSAH 14 and 21st Avenue North will need a full access, signalized intersection with full right and left movements to accommodate the planned multi-use development for the VHC Site. While the limited turns shown on the Figures produce an acceptable LOS from a transportation standpoint, this should not be the sole basis for evaluating the improvements required at this intersection. The LOS does not reflect the level of pedestrian accessibility, nor does it provide the criteria that commercial users will rely upon to determine if a site has adequate access. We recommend that the AUAR Report be modified to identify Figures 21-8, 21-9, and 21-10 as representing the minimum improvements possible to meet the LOS demands and that the reference be expanded to allow for additional design as the City may require. This will provide the City with greater flexibility to evaluate traffic and roadway design and improvement alternatives based on specific development needs.

Agencies/Persons Commenting: VHC, LLC

Response: The report will be modified to reflect the suggestion provided by the commenter. The following language was added as a note on Figures 21-8, 21-9 and 21-10, "These alternatives represent general/conceptual improvements that were shown to improve overall traffic operations for the respective development and transportation scenarios. The improvements are intended to represent the minimum level of infrastructure investment that would be needed to meet acceptable level of service standards. Additional roadway and non-motorized improvements, beyond the minimum level, may be identified to accommodate specific development needs that are identified within the AUAR area."

21.17 **Comment Summary:** New developments need to follow the Anoka County Highway Department Development Review Process Manual, dated December 2003. The manual can be found online at www.co.anoka.mn.us under the Highway Department's link.

Commenter(s): Anoka County

Response: This requirement will be added to the Mitigation Plan.

21.18 **Comment Summary:** On page 81, CSAH 14 is classified as a "B" Minor Arterial. The current classification of CSAH 14 has a dual designation as an "A" Minor Reliever and as an "A" Minor Expander.

Agencies/Persons Commenting: Anoka County

Response: This was changed in the document.

21.19 **Comment Summary:** On pages 82 and 83, there are new roadways, interchanges and intersections mentioned. In reference to this list the County does not have any of the following County Road projects identified in our 2005 – 2009 Highway Improvement Plan:

- Northerly Bypass
- Northerly Bypass interchange with I-35W
- CR 140 (80th St. East) interchange with I-35E
- CR 140 (80th St. East) intersections at I-35W (west ramps), I-35W (east ramps), CSAH 21, I-35E (west ramps) and I-35E (east ramps).

The only scheduled improvement for the AUAR area at this time is the reconstruction of the CSAH 14 corridor, between I-35W and I-35E.

Agencies/Persons Commenting: Anoka County

Response: It is noted that the projects identified above do not appear in the 2005 – 2009 Highway Improvement Plan. However, the intent of the AUAR was to look beyond the timeline of 2009 to 2030 to identify improvements necessary to accommodate the various development scenarios. Although none of the mentioned projects are slated for funding, it is assumed that at some point prior to 2030 each would occur in some capacity. A No-Build analysis, which used the Met Council 2030 development projection (representing only about 20-25 percent of the development of the AUAR Scenarios) showed that the existing transportation system would be insufficient. Based on this analysis and on the fact that each of these improvements have been studied and are generally considered to reasonable improvements by 2030, they were assumed in the AUAR analysis. These assumptions are described in a footnote to accompany the New Roadways/Interchanges section under Item 21 (page 82 of Draft AUAR).

21.20 **Comment Summary:** Based on several of the land use scenarios there are significant impacts to the County roadway system. For instance, the interchanges listed in the Post 2030 Full-Build Scenarios are operating at levels of service "F" or "E". As mentioned before the County does not have any scheduled improvements besides the reconstruction of the CSAH 14 corridor, between I-35W and I-35E. A mitigation plan should be implemented for any new developments that would impact the County roadway system. Improvements will need to be covered by the City, project developer or coordinated with the County.

The City should also consider staging efforts for each of the land use scenarios. This would allow the appropriate steps to be taken to provide the infrastructure needed to accommodate new development(s).

Agencies/Persons Commenting: Anoka County

Response: The Mitigation Plan addresses the staging of transportation improvements and includes a traffic monitoring program in an effort to link permitted development to the capacity of the surround road network.

21.21 **Comment Summary:** Mitigation strategies should also take into consideration multimodal transportation options. The AUAR does mention a future park and pool facility at the I-35E/CSAH 14 interchange and pedestrian/bicyclist pathways. The AUAR should note the Anoka County Transit System Plan, dated October 2004, which addresses future multimodal transportation options for the area. However, the planning of transit infrastructure and amenities is not discussed as part of the scenarios. We would suggest that it can, and should, be included as part of the improvements.

Agencies/Persons Commenting: Anoka County

Response: Additional discussion of alternative transportation modes was added to the AUAR. Please see comment and response described in Response 33 of this section for additional detail.

21.22 **Comment Summary:** This study shows that if left as four lanes, both I-35E and I-35W will operate at unacceptable Levels of Service due to regional growth. To mitigate this, and allow for traffic generation from development in Lino Lakes, the study recommends both interstates be expanded to six lanes. Expansion of the interstates is not fully consistent with MnDOT's I-35 IRC study completed in June of this year. In this study, it was determined that south of CSAH 14 both interstates could be four lanes. We believe that it is appropriate to plan for both interstates to be six lanes when constructing/reconstructing the interchanges along I-35W and I-35E.

Agencies/Persons Commenting: Washington County

Response: For the section of I-35E south of CSAH 14, the I-35 IRC Study projected daily traffic volumes for 2030 ranging from 82,800 to 91,200 for an aggressive growth scenario. Using generalized daily traffic capacities for 4-lane freeways, the resulting Level of Service would be F (Daily Capacity for 4-lane Freeway is 78,100. SOURCE: I-94 IRC Study). Therefore, we believe that projected daily traffic volumes greater than this may warrant an expansion to 6-lanes.

21.23 **Comment Summary:** The traffic impact guidelines addressed on page 88 discuss access spacing, however there is no reference as to whether or not the guidelines are consistent with access spacing guidelines for MnDOT or Anoka County.

Agencies/Persons Commenting: Washington County

Response: The access guidelines outlined in the report exceed the minimum access spacing as allowed by MnDOT and Anoka County.

21.24 Comment Summary: Washington County 4A (80th Street in Anoka County) is shown to have 26,000 ADT in Figure 21-1 at its intersection with Elmcrest Avenue. However, mitigation measures for this traffic are not identified beyond this intersection. It is important to identify improvements needed to 4A and TH 61 to accommodate this traffic.

Agencies/Persons Commenting: Washington County

Response: Future year improvements to 4A and TH 61 are very valid concerns but fall beyond the scope of this AUAR.

21.25 Comment Summary: Access spacing along CSAH 21 may be compromised by allowing the northerly access from the church property to CSAH 21 within 1000 feet of a city street accessing CSAH 21. Opportunities for consolidating these access points should be investigated.

Agencies/Persons Commenting: Washington County

Response: Anoka County access guidelines will be followed to determine appropriate access spacing on CSAH 21**.**

21.26 Comment Summary: In figure 21-1, 80th Street is classified as collector, however, when considering future traffic volumes and future I-35E access the roadway would serve as a minor arterial. This figure also shows that Otter Lake Road changes from a major to a minor collector as it approaches CSAH 14. It is likely that in the future this road will function as a major collector or a minor arterial for its entire length.

Agencies/Persons Commenting: Washington County

Response: Future Functional Classification changes to the County roadway network will be determined by Anoka County.

21.27 Comment Summary: The CSAH 21 and 80th Street and Elmcrest and 80th Street intersections show p.m. peak left turning movements of over 1,000 vehicles. This heavy of a movement is likely to require triple left turn lanes, however, only two left turn lanes are proposed. We are concerned that both of these intersections will fail with the proposed mitigation.

Agencies/Persons Commenting: Washington County

Response: The analysis determined that the intersections would operate at an overall LOS of D or better with dual left-turns for Scenarios 1 and 2. In scenario 3, the intersection of CSAH 14 and 80th Street E. (CR 140) would operate at LOS E. The mitigation plan establishes a traffic monitoring program that will not permit development levels to generate traffic levels that would reach an unacceptable LOS on area roadways.

21.28 **Comment Summary:** On page 88, the fourth paragraph refers to major problems with southbound left turns and westbound left turns at the intersection. Which intersection is being referred to, or does the reference apply to more than on intersection?

Agencies/Persons Commenting: Washington County

Response: The discussion in the fourth paragraph of page 88 refers to left turning movements of all intersections in general.

21.29 **Comment Summary:** The discussion on the CSAH 14/I-35E interchange on page 88, should reference which movements were problematic and what mitigation measures brought the LOS up to C.

Agencies/Persons Commenting: Washington County

Response: In Development Scenario 3 – Residential Emphasis, the intersections of the I-35E Ramps with CSAH 14 each operated at LOS E during the PM Peak hour of traffic. The mitigation measures enabled the movement, and the overall intersection of the west juncture of I-35E/CSAH 14 to operate at LOS D (note: the graphic should indicate LOS D, not C) The mitigation measures include the provision of an additional through lane for each direction of travel (6-lane cross-section), and an additional westbound left-turn lane (dual lefts). At the east juncture of the I-35E/CSAH 14 intersection, additional through lanes allowed for the through travel movement to operate at LOS D, and the entire intersection, a LOS C. Figure 21-10 will be corrected to show that the intersection of the I-35E west ramps with CSAH 14 should be a LOS D with the mitigation measures.

21.30 **Comment Summary:** In reviewing the proposed mitigation for the CSAH 14 and 80th Street interchanges and their adjacent intersections it was apparent that three thru lanes would be needed in each direction. Washington County feels that additional analysis is needed to determine if an overpass of I-35E connecting CSAH 21 with Elmcrest Avenue could reduce the traffic impact on Washington County roadways. An overpass would have the additional benefit of providing an additional crossing of I-35E for area residents, augmenting the existing minor arterial system.

Agencies/Persons Commenting: Washington County

Response: Without having the appropriate empirical or field data, which was not available for this study, it would be difficult to establish a pattern of linked-trips within the study area that would be needed to sufficiently evaluate the effectiveness of an overpass within the AUAR study area. Typically, additional field data, such as a license plate trace survey, would be needed to perform an analysis that would support or rebut the potential construction of an overpass.

Currently, the area is not developed enough to the point where a license-plate trace would be effective.
Upon development occurring, a study could be conducted to determine if an overpass would be effective at reducing traffic on the existing or proposed I-35E interchange bridges.

21.31 **Comment Summary:** Perhaps most importantly, the timing of the new 80th Street interchange could have the most beneficial impact on the entire area. A new interchange will not only benefit Lino Lakes and the AUAR area, but the cites of Hugo, Forest Lake and a great deal of Columbus Township as well as any area served by the Hwy 14 interchange. Attached is a map provided to us by United Properties which outlines some of the current and proposed development in the area.

As you can see with the addition of the new rooftops in Hugo as well as both the CSM and Rehbein/Shingobee/Centex's projects in Lino Lakes and Centerville, Victor Gardens and its retail component etc. There will be significant need to take traffic pressure off the new Main Street interchange. We feel very strongly that the new 80th street interchange should be addressed immediately. This cooperative effort to study a new interchange at 80th street amongst the communities of Hugo, Lion Lakes, Centerville, Forest Lane and Columbus Twp. would be both an immediate and long term improvement to the area that we will benefit from immediately.

Agencies/Persons Commenting: Brite-Vue, LLP

Response: The AUAR supports the importance of a new 80th Street interchange.

21.32 **Comment Summary:** The second paragraph on Page X states that mitigation to the intersections would allow them to operate at "LOS E or worse," should this have stated "LOS E or better."

Agencies/Persons Commenting: Washington County

Response: Yes. The text was revised to state "LOS E or better."

21.33 **Comment Summary:** The summary of the Existing or Proposed Transit Services on page 81 should be revised as follows: Express Route 275 provides weekday rush hour express service from Lake Drive and Lino Park to downtown Saint Paul. This route serves park and ride lots at Lake Drive and Lois Lane, Lino Lakes City Hall at Main Street and Rondeau Drive and Centerville Road and Main (CSAH 21 and CSAH 14). (No Metro Transit park and ride lots exist at the described location at CSAH 14 north of I-35W.

Also, the AUAR refers to transportation improvements adjacent to the AUAR area including I-35W. It should acknowledge the Express Route 250 weekday rush hour service from St. Joseph's Church in Lino Lakes as well as the high frequency weekday rush hour Express Route 250 service from 95th and I-35W Park and Ride in Blaine.

In recognizing existing transit services the DAUAR indicates that as future growth occurs additional service may be needed to maintain the area's mobility. The AUAR also needs to acknowledge that the Council's *Park and Ride Facility Site Location Plan* includes a proposed new facility at/near 35E and Co Rd 140 (80th St E). Projections show that there will be demand for a 600-space lot by 2030. This new facility should also be factored into traffic mitigation plans.

Agencies/Persons Commenting: Metropolitan Council

Response: Item 21 in the Final AUAR was changed to include the comments as stated by the commenter.

21.34 **Comment Summary:** With respect to roads, the DAUAR does a thorough job of analyzing traffic impacts of the three land use scenarios on the local roads and surrounding metropolitan highways—I-35E and I-35W. The recently completed I-35 IRC Corridor Management plan identified a need for a 6-lane section on I-35E and I-35W up to CSAH 14, (regardless of the development within the study area). However, this improvement is not included in either the region's Transportation Policy Plan or the Minnesota Department of Transportation's (MnDOT) 20-year Transportation System Plan. The first scenario represents land uses and densities of the City's approved comprehensive plan. Scenarios two and three represent much greater number of

households. The traffic analysis indicates that with reasonable mitigation (adding traffic signals and turn lanes and widening roads as necessary during various stages of development), all intersections will operate at LOS E or better for Scenarios one and two. Scenario 3 still had intersections operating at LOS F even with mitigation.

The draft mitigation plan outline includes five transportation mitigation strategies. The first strategy is to "Monitor traffic counts and do not permit new development to proceed if counts exceed the capacity of the transportation system." The City should be commended for including such a strategy, but more detail should be provided regarding how this strategy would be implemented.

Agencies/Persons Commenting: Metropolitan Council

Response: See Response #6 under this section for additional detail regarding this strategy.

ITEM 25. SENSITIVE RESOURCES

25.1 **Comment Summary:** Figure 6-2 shows a proposed trail in the corridor along Main Street/CR 14, the final AUAR should explicitly recognize that the proposed trail is part of the Regional Park System Plan.

Agencies/Persons Commenting: Metropolitan Council

Response: Item 25, under the Regional Parks discussion, has been revised to note the location of the regional trail.

25.2 **Comment Summary:** If the section of I-35W that crosses Rice Creek is rebuilt it would be desirable to expand/replace the existing culvert for Rice Creek to safely accommodate canoe and kayak passage. For the other new roads or road improvements that cross over either Rice Creek or Hardwood Creek it is also suggested that they accommodate canoes and kayaks to the extent possible. Further, it is suggested that the road crossing of these creeks also facilitate appropriate wildlife passages.

Agencies/Persons Commenting: Metropolitan Council

Response: It is noted that the reconstruction of I-35W is not included in this AUAR and any future plans for such reconstruction would be subject to federal and state environmental review requirements. The accommodation of canoe and kayak passages under new roads or road improvements that cross over either Rice Creek or Hardwood Creek will be considered when these road improvements are designed. Wildlife passages are considered in the conservation design approach to new development instated by the adoption of the Mitigation Plan.

25.3 **Comment Summary:** Retaining some agricultural areas, including community garden spaces and a farmers' market would help remind residents of original uses in the area as development occurs.

Agencies/Persons Commenting: HERON Group

Response: Item 25, page 103, of the Draft AUAR states that, "Planning techniques to promote and preserve local agricultural heritage could include the establishment of farmers' markets or

community gardens." The issue is referenced again as a mitigation strategy under Unique Farmlands in the Draft Mitigation Plan on page 124, "Consider preservation of agricultural heritage sites by implementing thoughtful interpretive planning."

ITEM 27. COMPATIBILITY WITH PLANS AND REGULATIONS

27.1 Comment Summary: Citizens living in and around the geographic area of the review are worried that this product sets the stage for future undesirable Comprehensive Plan amendments that allow for high density, high intensity mixed use development scenarios as described in the AUAR as worse case scenarios. The HERON group accepts that development will occur but believes it can be done respectively while staying within the reality of the known infrastructure to support healthy neighborhoods and have businesses succeed.

Agencies/Persons Commenting: HERON Group

Response: The inclusion of Scenarios Two and Three in the AUAR process does not represent a Comprehensive Plan update or amendment. The city can use the information contained in the AUAR during future considerations of updates or amendments to the adopted Comprehensive Plan and Zoning Ordinance. Any future consideration of amendments to the Comprehensive Plan and Ordinances will follow the set procedures and guidelines for such amendments established by state statutes and the city.

DRAFT MITIGATION PLAN

DMP.1 Comment Summary: The mitigation plan should be developed in such a manner that it includes responsible parties and staging, or triggers, which will cause the implementation of the mitigation actions.

Agencies/Persons Commenting: Anoka County

Response: The Mitigation Plan identifies how various agencies will be involved to implement mitigation strategies. The Mitigation Plan also includes a traffic monitoring program that addresses the timing/triggers for planning transportation improvements.

DMP.2 Comment Summary: Many of the implementation activities will require investment of funds, or application for funds, that will need to take place in advance of the need for the improvements. Without staging and designation of responsible parties, these items may not be accomplished.

Agencies/Persons Commenting: Anoka County

Response: The AUAR documents the need for several transportation improvements and the Mitigation Plan includes a traffic monitoring program that will be used to identify the anticipated timing of improvements. The Mitigation Plan identifies potential funding sources for transportation improvements and the involvement of agencies in planning for and securing funding.

DMP.3 Comment Summary: In several sections the first listed mitigation strategy is to "not permit new development to proceed if it exceeds the capacity of the system." The determination of

development impact and of system capacity must be well defined if the mitigation plan is to do more than prevent new development from proceeding.

Agencies/Persons Commenting: VHC, LLC

Response: The Mitigation Plan establishes the processes that the city will follow to implement mitigation strategies. The Mitigation Plan is not intended to prevent development; rather, it is intended to assure that relevant mitigation measures are addressed prior to approving development plans.

DMP.4 Comment Summary: The first mitigation strategy listed under transportation reads, "…do not permit new development to proceed if counts exceed the capacity of the transportation system." Since traffic counts are projected to exceed system capacity whether or not development occurs, this restriction on development in the AUAR Draft Mitigation Plan is unrealistic and should be eliminated. The mitigation should provide for the city to review the system impacts from development projects (related to traffic counts) as compared to traffic without development and determine if the impact will be significant.

Agencies/Persons Commenting: VHC, LLC

Response: Each proposed development project within the AUAR area will be required to complete a detailed traffic analysis to determine the potential impacts from the proposed developments. Also, see the description of the traffic monitoring program outlined in Comment/Response 21.6.

EXHIBITS

E.1 Comment Summary: Reference to Figures 21-8, 9, and 10 should be amended to "and also display the *minimum* mitigation measures that were identified to address the deficiencies.

Agencies/Persons Commenting: VHC, LLC

Response: The text of this mitigation strategy has been revised to add the word "minimum." The Mitigation Plan is not intended to limit the implementation of improvements that go above and beyond those identified through the AUAR process.

E.2 **Comment Summary:** Figure 12-1 does not accurately reflect the alignment of County Ditch-72. In addition, while the alignment of County Ditches 47 and 55 is correct, these ditch systems should be labeled.

Agencies/Persons Commenting: RCWD

Response: Figure 12-1 uses Anoka County GIS data for the alignment of County Ditch 72.