

~~DRAFT~~ FINAL ALTERNATIVE URBAN AREAWIDE REVIEW
UMORE STUDY AREA

Prepared For:

City of Rosemount

~~May 8, 2013~~ August 21, 2013

Prepared By:

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I. EXECUTIVE SUMMARY

I.i. INTRODUCTION/BACKGROUND

The UMore Study Area is approximately 4,900 acres located in the southern portion of the City of Rosemount and the northern portion of Empire Township (Appendix A - Figure 5-1 to 5-3). Both governmental units have worked together along with the University of Minnesota in the preparation of this AUAR with Rosemount assuming the Responsible Government Unit role. A summary of the public involvement process that was completed to prepare the AUAR is included in Appendix D.

The UMore Park AUAR includes the review of four development scenarios. Scenarios 1 through 3 are generally consistent with known plans of the primary owner of the property, the University of Minnesota. Plans for the property have been shaped by a number of policy, strategic and physical planning initiatives undertaken by the University. Additional background information on these actions can be found in Appendix B. It is currently anticipated that most, if not all of development within the study area will be undertaken by private entities, not the University of Minnesota, pursuant to land sales or ground leases.

Scenarios 1 through 3 represent interpretations of the University's Concept Master Plan for UMore Park that was adopted by the Board of Regents on December 12, 2008. Scenario 4 is consistent with the comprehensive plans of the City of Rosemount and Empire Township. A description of each scenario's type and intensity of development follows:

Scenario 1 (Figure 6-1)

Scenario 1 contains residential, commercial, industrial, mixed-use, and park/open spaces uses organized around a neighborhood, village, community or regional center. Long-term, the plan accommodates a transit connection between the three higher density center areas and points north of the UMore site. An extensive planned system of greenways and open space meanders through the site accommodating active and passive recreational uses, preservation of natural features and establishing corridors for wildlife movement.

On the west side of the site, development will surround a new lake that will be an amenity resulting from gravel mining operations that are scheduled to commence in 2013. The gravel mining area was the subject of an Environmental Impact Statement. The Record of Decision for the UMore Park Sand and Gravel Resources Project EIS was published in November of 2010.

County State Aid Highway (CSAH) 46 bisects the site in an east/west direction forming the boundary between the City of Rosemount and Empire Township. Akron Avenue and Blaine Avenue will be extended through the site and will be transferred to Dakota County following construction and connection to the overall Dakota County highway system. In the north, the UMore Park property surrounds the Dakota County Technical College (DCTC) which abuts County State Aid Highway (CSAH) 42.

Residential uses occur in four different density classifications ranging from low density (1 - 3.5 units/acre) to high density (12 – 24 units per acre). Scenario 1 uses the maximum density within the residential ranges to determine population. Neighborhood, Village, Community and Regional Centers contain varying mixes of residential and non-residential uses. Employment

land uses, which are generally concentrated in the eastern portion of the site, include office/business park and light industrial uses. Scenario 1 accommodates a future population of approximately 35,000 people and about 18,000 jobs.

Scenario 2 (Figure 6-2)

The quantities and locations of future land uses shown on Scenario 2 are identical to those shown on Scenario 1. Scenario 2 allows testing of an alternative that has residential densities that are more in line with the traditional densities in suburban communities like the City of Rosemount. For this Scenario, the middle of the residential density ranges have been used for the low density, low-medium density, medium density and high density categories. As a result, Scenario 2 projects a future population of approximately 25,000 people and about 18,000 jobs.

Scenario 3 (Figure 6-3)

Scenario 3 is intended to examine the implications of a future land use pattern that includes expanded employment opportunities. With the exception of areas lying between Barbara and Blaine Avenues, the land use pattern shown on Scenario 3 is identical to that shown on Scenarios 1 and 2. Scenario 3 replaces largely residential uses lying west of Blaine Avenue with office/business park uses and light industrial. The maximum residential densities are used, the same as used in Scenario 1. As a result, Scenario 3 accommodates a future population of approximately 31,500 people and about 24,500 jobs.

Scenario 4 – Existing Comprehensive Plans

Scenario 4 depicts the current comprehensive plans of both the City of Rosemount and Empire Township. Both comprehensive plans recognize UMore Park and reference future growth and development. Rosemount's plan categorizes the UMore site as Agricultural Research (AGR). The plan states, "This land use designation is used solely for the UMore Park property that is owned and operated by the University of Minnesota. It is anticipated that, after the UMore Park Master Plan is created and adopted, a major Comprehensive Plan amendment will be conducted to re-designate the land to its appropriate land use category."

The Empire Township Comprehensive Plan categorizes the UMore Park property as University of MN (UMORE). The property is also designated as being in a Mining Overlay Area. The plan states, "The University of Minnesota Outreach, Research and Education Park (UMore Park) consisted of nearly 4,530 acres in Empire Township. Approximately 2,830 acres of land has become part of the Vermillion Highlands Wildlife Management Area (WMA) jointly operated by the University and the DNR for agricultural research and WMA usage. The remaining 1700 acres of UMore Park is being planned for mineral extraction and eventual urbanization. The University has completed a two-year long study of potential urban uses in Empire and the City of Rosemount (additional 2900 acres). The UMore Property in Empire is also included in the Mineral Extraction Overlay area."

I.ii. INFRASTRUCTURE PLANNED TO SERVE THE DEVELOPMENT

If future development occurs as proposed under Scenarios 1, 2 or 3, new utilities, roads and other infrastructure will be needed to serve the AUAR area. Comprehensive Plans and this AUAR identify the infrastructure needed to support the varying levels of development identified in the Scenarios. Infrastructure needs are discussed in greater detail under the response to AUAR Items: 13 – Water Use, 17 – Water Quality: Surface Water Runoff, 18 – Water Quality:

Wastewaters and 21 – Traffic. Item 28 – Infrastructure and Public Services includes a summary of new infrastructure that would be needed and where appropriate, provides comparisons between the scenarios.

I.iii. ANTICIPATED DEVELOPMENT STAGING

The development of UMore Park is expected to occur over the next 30 to 40 years depending on market conditions and overall development demand. The timing of development will also be influenced by the timing of construction for required infrastructure improvements both locally and regionally. The future availability of transit may also influence the timing of the full build-out of the UMore Park property.

In general, development is anticipated to be phased from the north in Rosemount along County State Aid Highway (CSAH) 42 to the south extending into Empire Township. The timing of development in the western portion of the UMore Park property will be influenced by the timing of the extraction of minerals in the area and the restoration of the property to accommodate urban development.

II. SUMMARY OF MITIGATION MEASURES

Pursuant to Minnesota Rules, mitigation measures have been developed as part of the AUAR. These measures would apply to any proposed development that may occur over time within the study area.

II.i. Fish, Wildlife, and Ecologically Sensitive Resources

- A. Wetlands will need to be delineated in conformance with the Wetland Conservation Act as part of the development process. Depending on the location of the wetlands, either the City of Rosemount or Empire Township will review and verify the wetland delineation.
- B. Wetland impact is anticipated to be minimized to the maximum extent practical and feasible throughout the review area. If wetland impacts are proposed, wetland mitigation will be required of the project proposer pursuant to current wetland regulations and City or Township requirements.
- C. The City of Rosemount and Empire Township will require buffers around wetlands at a width dependent upon the wetland's management classification, per their respective ordinances.
- D. Storm water management features should incorporate native plantings of grasses, trees, and shrubs.
- E. A loggerhead shrike survey is recommended by the DNR as part of a development project if disturbance would be planned during the nesting season (nesting season is generally April through July). The DNR will need to be contacted before any survey work is completed.
- F. While ideally suited habitat for Blanding's turtles is not apparent within the study area, they have been noted near the study area and some habitat in the area could be marginally suitable. Development projects should take into consideration the use of oversized culverts, surmountable curbs, and revegetation with native species.
- G. Development plans for the northeastern corner of the site will consider incorporating the oak woodland that has been identified on the County Biological Survey as open space to protect or enhance this habitat to the extent practical.
- H. Development plans will consider incorporating the existing or remaining wildlife habitat areas within the Regionally Significant Ecological Areas (RSEA) and other areas within the site as open space to the extent practical. However, depending on environmental remediation that may be required, disturbance of these areas may be necessary.
- I. Tree removal within the study area that occurs as part of development will need to meet the requirements of the City's or Township's Tree Preservation Ordinance.

II.ii. Water Use Mitigation Plan

- A. Extend trunk water main services as shown in **Figures 13-3 through 13-5** consistent with the CWP. For Scenario 1, an additional 16" trunk main may be extended from the intersection of Akron Avenue and CSAH 42 to approximately 2,600 feet east of the intersection of CSAH 42 and Blaine Avenue (**Figure 13-3 – Alt. 1**).

- B. 6-8 municipal wells are recommended as a result of this development, with up to 2 of the wells being in addition to what was planned as part of the CWP. For Scenario 1, one well may be located within the study area depending upon the trunk water mains extended to the development (see **Figure 13-3 – Alt. 2**). Well fields have been preliminarily allocated to the north and to the east of the study area close to the future water treatment plants, in accordance with the CWP.
- C. 2,750,000 to 3,500,000 gallons of water system storage is recommended as a result of this development, with up to 700,000 gallons being in addition to what was planned as part of the City’s CWP. The storage should be constructed in a location to best serve the entire City and overall water system.
- D. Any abandoned wells found within the study area will be sealed in accordance with with Dakota County Ordinance No. 114, Well and Water Supply Management, and Minnesota Department of Health guidelines.
- E. In accordance with the City’s Wellhead Protection Plan (WHPP), continue protection of the existing Drinking Water Supply Management Area (DWSMA) located in the study area as shown in **Figure 13-2**. A DWSMA will be established for future wells as they are constructed and the WHPP is updated.
- F. There exists potential for future interconnection of the proposed water system in the study area between the City of Rosemount and Empire Township. Additional water system assessments and agreements between the City of Rosemount and Empire Township may be required if further development interests beyond the presented material were to arise.
- G. Industrial and Business Park land use water demands can be highly variable depending upon the business operation or manufacturing process employed at each property. At the time of the five year AUAR ~~update~~evaluation, water demands from individual properties in the Industrial and Business Park land use areas should be evaluated and estimated future demands revised if necessary.
- G.H. Any new wells (supply, dewatering, monitoring, or other) shall be constructed in accordance with Dakota County Ordinance 114, Minnesota Statutes Chapter 103I and Minnesota Rules Chapter 4725.

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II.iii. Erosion and Sedimentation Mitigation Plan

- A. A Storm Water Pollution Prevention Plan (SWPPP) to the extent required by NPDES regulations will be needed for any development in the study area. Review of the SWPPP for each development will be required by the City or the Township.

II.iv. Water Quantity and Quality Mitigation Plan

- A. Each new development within the AUAR area will need to incorporate BMPs to meet applicable water quantity and water quality regulatory requirements. These policies are outlined in the local stormwater management requirements section. The soils within the

AUAR area are primarily comprised of Hydrologic Soil Group A and B soils; therefore, it is likely that these policies will be met using infiltration.

- B. Infiltration to the Rosemount or Empire Township's standards will be provided on each development site or in a regional infiltration system that is created to serve a defined drainage area. The selection of a development-specific or regional system will be based on identifying feasible areas that take into consideration soils, drainage patterns, existing and past land use, and other factors. Areas where infiltration is not feasible or where contamination is possible will not be used for infiltration practices.
- C. To protect adjacent structures, an overflow from the Lake 2162 will be developed that would allow water to overflow either to the northeast toward pond 2246 or to the South toward the Vermillion River. This overflow could potentially occur if a rainfall event occurs that exceeds a 100-year 24-hour event, and/or water elevations reach extremely high levels. Based on this analysis and the installation of the proposed BMP'S, the volume of runoff generated within the AUAR area will be significantly reduced in the future, and the corresponding probability of this overflow occurring will be also reduced from that which exists today.
- D. If any storm water in the study area within Empire Township is to be directed to the City of Rosemount, the Rosemount infiltration standard will be applied to the development.
- E. Design considerations for comprehensive stormwater management should include regional ponding.
- F. Approved TMDL load reductions and implementation plans shall be addressed by a development's stormwater management plan. These will need to be addressed per the schedule identified in the current version the MS4 permit. The proposed language states "For TMDLs approved prior to the effective date of the MS4 permit the Waste Load Allocation (WLA) discharge requirement will become a requirement of the permittee".
- G. In the City of Rosemount, post-development discharge rates will be limited to 0.05 cfs/acre of the 100-year, 24-hour event.
- H. In Empire Township, it will be required that post-development discharge rates will not be greater than pre-development discharge rates for the 1-year and 10-year, 24-hour storm critical duration events to reduce erosion impacts downstream of the site.
- I. The developer will be responsible for grading the site appropriately to provide adequate stormwater management to the extent necessary and will be required to obtain the necessary permits for stormwater management and grading, to preserve the existing natural features, and to provide water quality protection to meet MPCA Construction General Permit requirements in addition to City of Rosemount, Empire Township, and VRWJPO requirements.
- J. Stormwater will be required to be pretreated prior to discharge to wetlands and Lake 2162.

- K. A SWPPP required by the NPDES regulations will be needed for any development in the study area. Review of the SWPPP for each development will be required by the City and Township.

II.v. Wastewater Mitigation Plan

- A. **Figures 18-3, 18-4, and 18-5** show conceptual layout of gravity sewers, lift stations and forcemains to serve the proposed study area under each scenario. All of the scenarios maintain an identical pipe layout network and can be identified by sewer district or Rosemount Interceptor connection points as defined in **Figure 18-2**.
- B. The East sewer district consists primarily of gravity sewers, and two lift stations and forcemains that convey wastewater north to the Rosemount Interceptor along County Road (CR) 42. The south lift station capacity ranges from 700 gpm to 900 gpm and the north lift station capacity ranges from 1,700 gpm to 2,000 gpm in capacity, depending on the scenario. Sewers within the East sewer district range between 8" and 21" in diameter.
- C. The Central sewer district consists of primarily gravity sewers, and one lift station and forcemain that convey the wastewater north to the Rosemount Interceptor along CR 42. The lift station ranges in capacity from 1,600 gpm to 2,000 gpm depending on the scenario. Sewers within the Central sewer district range in size from 8" to 24" in diameter.
- D. The Northwest sewer district consists of all gravity sewers which flows to the north and discharges to the Rosemount Interceptor along CR 42. The gravity sewer ranges in size from 8" to 21" depending on the scenario.
- E. Similar to the Northwest sewer district, the Southwest sewer district consists of all gravity sewers. Wastewater flows to the west where it discharges to the Rosemount Interceptor along Biscayne Ave. The gravity sewers in the Southwest district range in size from 8" to 15" in diameter.

II.vi. Geologic Hazards and Soil Conditions Mitigation Plan

- A. NPDES Phase II Construction Site permit will be required for development within the study area. This permit requires a site specific Storm Water Pollution Prevention Plan (SWPPP) to be completed for construction. This SWPPP is required to include pollution prevention management measures for solid waste and hazardous material spills that occur during construction.
- B. Development or construction work will require conformance with the City spill response plan. Spills will be reported to the Minnesota State Duty Officer and 911, along with applicable City staff. Those authorities will in turn notify any other appropriate officials depending on the nature of the incident.
- C. For all gas stations with underground tanks, annual licensing from the MPCA will be needed.
- D. The area of partially hydric soils in the northeast corner of the site is proposed to remain as a natural open space area.
- E. Should any other conditions be identified during site development activities that have the potential to materially impact either groundwater recharge or groundwater quality, investigations will be conducted and mitigation measures will be identified to address the impact consistent with applicable State and Federal requirements.

- F. Project contingency plans should be prepared and reviewed/approved by MPCA to address potential releases of hazardous substances identified during construction activities. These plans should include current Phase I evaluations prior to beginning construction activities to identify potential releases.
- G. The City requests project proposers prepare and submit to the MPCA Construction Contingency Plans (“CCPs”) to help identify and address any potential releases of hazardous substances that may be encountered during construction activities. Phase I Environmental Site Assessments should also be completed for the proposed project area and submitted to MPCA along with the CCPs.
- H. Any business or institutional uses that use or store petroleum or other hazardous products will be subject to local and state rules regulating such uses.

II.vii. Transportation Mitigation Plan

- A. ~~Update-Evaluate and compare~~ the traffic analysis ~~prepared as part of the AUAR~~ in coordination with the City of Rosemount, Empire Township and Dakota County with detailed roadway mitigation. ~~Updates-Evaluations~~ will occur with each large scale development plan submitted for approval, the City, Township and County Comprehensive Plan updates and/or with each five year AUAR ~~update~~ review.
- B. Expansion of CSAH 42 from Biscayne Avenue to US 52 from 4 lanes to 6 lanes when warranted by traffic volumes.
- C. Construction of an interchange to replace the existing TH 3/CSAH 42 intersection. Interchange geometry will be proposed with future studies.
- D. Reconstruction of the existing interchange at CSAH 42 and US 52 as a system interchange to accommodate higher turning movements. The City of Rosemount’s and Dakota County’s 2030 Comprehensive Plans have identified this interchange as potentially serving a rerouted alignment of TH 55 in the future. Interchange configuration and lane geometry will be determined in future studies.
- E. Addition of ~~signalized~~ intersections ~~control (signal, roundabout, etc), documented in an Intersection Control Evaluation report,~~ at locations that meet the required traffic warrants and intersection spacing guidelines ~~in accordance with the City, County, and Township including the updated CSAH 42 Segment 15 recommendations adopted by the County Board.~~
- F. Provide right-of-way required for future roadway expansion adjacent to ~~and within~~ the UMore property.
- G. Design and construction of the internal roadway system within the UMore development providing adequate service to each zone of development with turn lanes and traffic control as needed for safe and efficient traffic flow.

- H. Preparation of a Travel Demand Management (TDM) plan for the site, or portions thereof, prior to the first large scale development proposal. This would include, but is not limited to, action items for: transit (both bus and rail), non-motorized, and new technologies.
- I. Preparation of an Access Management Plan for the affected arterial and collector roadways prior to the first development proposal.

II.viii. Noise Mitigation Plan

- A. 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. The site plans developed for specific projects should show the proposed locations and types of mitigation, with the estimated noise reductions for all areas projected to exceed noise standards.

II.ix. Nearby Resources Mitigation Plan

- A. Currently, UMore Park is not receiving federal funding or permitting. Should federal funding or permitting be required in the future, the project:
 - Must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106);
 - The lead federal agency will be required to initiate consultation with applicable Native American Tribes; and
 - Additional architectural surveys may be required.
- B. Erosion control measures will be required during construction to control the loss of Waukegan soils and other soil types susceptible to erosion. All disturbed areas will be required to be re-seeded and mulched as needed.
- C. As appropriate, site and building plans will reflect and enhance any significant views of natural features.
- D. Park dedication will be in conformance to the codes and requirements of the City of Rosemount and Empire Township.

II.x. Visual Impact Mitigation Plan

- A. Through the development review process, the City will require appropriate screening of development in the study area to control adverse visual impacts.

II.xi. Compatibility with Land Use Regulations Mitigation Plan

- A. If the AUAR area develops as shown in Scenarios 1, 2 or 3, changes will be needed to the City of Rosemount's Comprehensive Plan, Empire Township's Comprehensive Plan, the Metropolitan Council's 2030 Regional Development Framework, and both the City's and Township's zoning ordinances through the respective amendment processes.
- B. While no impacts to floodplain are anticipated, if impacts occur, mitigation in conformance with Empire Township regulations will be required.

III. UMORE STUDY AREA AUAR

1) PROJECT TITLE

UMore Study Area

2) PROPOSER

The University of Minnesota
Steven Lott
1605 W 160th Street
Rosemount, MN 55068
651-423-2562
Lottx020@umn.edu

3) RGU

City of Rosemount
Mr. Eric Zweber
2875 145th Street W
Rosemount, MN 55068
651-423-4411
eric.zweber@ci.rosemount.mn.us

4) REASON FOR EAW PREPARATION

EQB guidance indicates no response is necessary.

5) PROJECT LOCATION

County: Dakota
City/Township: City of Rosemount; Empire Township
Section 33, 34, 34, 36 T115, R19
Section 25, 26, 27, 28 T115, R19
Section 1, 2, 3, 4 T114, R19

Figures 5-1 to 5-3 show the study area location.

6) DESCRIPTION

A. ANTICIPATED TYPES AND INTENSITY OF DEVELOPMENT

The UMore Study Area is approximately 4,900 acres located in the southern portion of the City of Rosemount and the northern portion of Empire Township (**Figure 5-1 to 5-3**). Both governmental units have worked together along with the University of Minnesota in the preparation of this AUAR with Rosemount assuming the Responsible Government Unit role.

The UMore Park AUAR includes the review of four development scenarios. Scenarios 1 through 3 are generally consistent with known plans of the primary owner of the property, the University of Minnesota. Plans for the property have been shaped by a number of policy, strategic and physical planning initiatives undertaken by the University. Additional background information on these actions can be found in **Appendix B**.

Scenarios 1 through 3 represent interpretations of the University's Concept Master Plan for UMore Park that was adopted by the Board of Regents on December 12, 2008. Scenario 4 is consistent with the comprehensive plans of the City of Rosemount and Empire Township. A description of each scenario's type and intensity of development follows:

Scenario 1 (Figure 6-1)

Scenario 1 contains residential, commercial, industrial, mixed-use, and park/open spaces uses organized around a neighborhood, village, community or regional center. Long-term, the plan accommodates a transit connection between the three higher density center areas and points north of the UMore site. An extensive planned system of greenways and open space meanders through the site accommodating active and passive recreational uses, preservation of natural features and establishing corridors for wildlife movement.

On the west side of the site, development will surround a new lake that will be an amenity resulting from gravel mining operations that are scheduled to commence in 2013. The gravel mining area was the subject of an Environmental Impact Statement. The Record of Decision for the UMore Park Sand and Gravel Resources Project EIS was published in November of 2010.

County State Aid Highway (CSAH) 46 bisects the site in an east/west direction forming the boundary between the City of Rosemount and Empire Township. Akron Avenue and Blaine Avenue will be extended through the site and will be transferred to Dakota County following construction and connection to the overall Dakota County highway system. In the north, the UMore Park property surrounds the Dakota County Technical College (DCTC) which abuts County State Aid Highway (CSAH) 42.

Residential uses occur in four different density classifications ranging from low density (1 - 3.5 units/acre) to high density (12 – 24 units per acre). Scenario 1 uses the maximum density within the residential ranges to determine population. Neighborhood, Village, Community and Regional Centers contain varying mixes of residential and non-residential uses. Employment land uses, which are generally concentrated in the eastern portion of the site, include office/business park and light industrial uses. Scenario 1 accommodates a future population of approximately 35,000 people and about 18,000 jobs.

Table 6-1 summarizes Scenario 1.

Table 6-1. Scenario 1

SCENARIO 1							
LAND USE	GROSS ACREAGE	%	NET ACREAGE*	UNITS	POPULATION**	EMPLOYEES***	
LOW DENSITY RESIDENTIAL (1-3.5 DU/AC.) ^a	1014.3	20.7%	811.4	2,840	9,088		
LOW-MED DENSITY RESIDENTIAL (3.5-6 DU/AC.) ^a	739.2	15.1%	591.4	3,548	8,516		
MEDIUM DENSITY RESIDENTIAL (6-12 DU/AC.) ^a	465.1	9.5%	372.1	4,465	10,716		
HIGH DENSITY RESIDENTIAL (12-24 DU/AC.) ^a	5.9	0.1%	4.7	113	158		
NEIGHBORHOOD CENTER							
15% Low-Med Density Residential (3.5-6 DU/AC.) ^a	19.2	0.4%	15.4	92	222		
50% Medium Density Residential (6-12 DU/AC.) ^a	64.1	1.3%	51.3	615	1,477		
25% High Density Residential (12-24 DU/AC.) ^a	32.1	0.7%	25.6	615	862		
10% Retail/Commercial/Office (.35 FAR)	12.8	0.3%	10.3			447	
VILLAGE CENTER							
35% Medium Density Residential (6-12 DU/AC.) ^a	44.0	0.9%	35.2	422	1,014		
40% High Density Residential (12-24 DU/AC.) ^a	50.3	1.0%	40.2	966	1,352		
25% Retail/Commercial/Office (.5 FAR)	31.4	0.6%	25.1			1,565	
COMMUNITY CENTER							
15% Medium Density Residential (6-12 DU/AC.) ^a	17.2	0.3%	13.7	165	396		
10% High Density Residential (12-24 DU/AC.) ^a	11.4	0.2%	9.2	220	308		
75% Retail/Commercial/Office (.25 FAR)	85.9	1.7%	68.7			2,137	
REGIONAL CENTER							
5% Medium Density Residential (6-12 DU/AC.) ^a	8.2	0.2%	6.6	79	189		
5% High Density Residential (12-24 DU/AC.) ^a	8.2	0.2%	6.6	158	221		
90% Retail/Commercial (.25 FAR)	147.8	3.0%	118.3			3,680	
OFFICE / BUSINESS PARK (.3 FAR)	284.0	5.8%	227.2			8,247	
LIGHT INDUSTRIAL (.4 FAR)	180.2	3.7%	144.2			2,166	
OPEN SPACE	938.5	19.1%	938.5				
OPEN WATER	259.2	5.3%	259.2				
RIGHT-OF-WAY (COLLECTORS AND ARTERIALS)	491.9	10.0%	491.9				
LOCAL STREETS RIGHT-OF-WAY & NEIGHBORHOOD PARKS			644.3				
TOTAL	4911.0	100.0%	4,911.0	14,299	34,518	18,242	

NOTES / ASSUMPTIONS:

*Net Acreage calculated by subtracting 20% (for local ROW, neighborhood parks, municipal and institutional uses) off of all land uses except Open Space, Open Water and Collector/Arterial Right-of-Way

**Population calculated at an average rate of:

- Low Density Residential: 3.2 persons per household
- Low-Med Density Residential: 2.4 persons per household
- Medium Density Residential: 2.4 persons per household
- High Density Residential: 1.4 persons per household

***Average Employee assumptions:

- Centers: 1 employee per 350 sq. ft. floor area
- Office / Business Park: 1 employee per 360 sq. ft. floor area
- Light Industrial: 1 employee per 1,160 sq. ft. floor area

*Residential Densities used for Concept 1:

- Low Density Residential: 3.5 DU/AC.
- Low-Med Density Residential: 6 DU/AC.
- Medium Density Residential: 12 DU/AC.
- High Density Residential: 24 DU/AC.

Workforce Population (65% of Population):	22,436
Jobs/Workforce Population Ratio:	.81:1

Scenario 2 (Figure 6-2)

The quantities and locations of future land uses shown on Scenario 2 are identical to those shown on Scenario 1. Scenario 2 allows testing of an alternative that has residential densities that are more in line with the traditional densities in suburban communities like the City of Rosemount. For this Scenario, the middle of the residential density ranges have been used for the low density, low-medium density, medium density and high density categories. As a result, Scenario 2 projects a future population of approximately 25,000 people and about 18,000 jobs.

Table 6-2 summarizes Scenario 2.

Table 6-2. Scenario 2

SCENARIO 2							
LAND USE	GROSS ACREAGE	%	NET ACREAGE*	UNITS	POPULATION**	EMPLOYEES***	
LOW DENSITY RESIDENTIAL (1-3.5 DU/AC.) ^a	1014.3	20.7%	811.4	1,826	5,842		
LOW-MED DENSITY RESIDENTIAL (3.5-6 DU/AC.)	739.2	15.1%	591.4	2,809	6,742		
MEDIUM DENSITY RESIDENTIAL (6-12 DU/AC.) ^a	465.1	9.5%	372.1	3,349	8,037		
HIGH DENSITY RESIDENTIAL (12-24 DU/AC.) ^a	5.9	0.1%	4.7	85	118		
NEIGHBORHOOD CENTER							
15% Low-Med Density Residential (3.5-6 DU/AC.) ^a	19.2	0.4%	15.4	73	175		
50% Medium Density Residential (6-12 DU/AC.) ^a	64.1	1.3%	51.3	462	1,108		
25% High Density Residential (12-24 DU/AC.) ^a	32.1	0.7%	25.6	462	646		
10% Retail/Commercial/Office (.35 FAR)	12.8	0.3%	10.3			447	
VILLAGE CENTER							
35% Medium Density Residential (6-12 DU/AC.) ^a	44.0	0.9%	35.2	317	760		
40% High Density Residential (12-24 DU/AC.) ^a	50.3	1.0%	40.2	724	1,014		
25% Retail/Commercial/Office (.5 FAR)	31.4	0.6%	25.1			1,565	
COMMUNITY CENTER							
15% Medium Density Residential (6-12 DU/AC.) ^a	17.2	0.3%	13.7	124	297		
10% High Density Residential (12-24 DU/AC.) ^a	11.4	0.2%	9.2	165	231		
75% Retail/Commercial/Office (.25 FAR)	85.9	1.7%	68.7			2,137	
REGIONAL CENTER							
5% Medium Density Residential (6-12 DU/AC.) ^a	8.2	0.2%	6.6	59	142		
5% High Density Residential (12-24 DU/AC.) ^a	8.2	0.2%	6.6	118	166		
90% Retail/Commercial (.25 FAR)	147.8	3.0%	118.3			3,680	
OFFICE / BUSINESS PARK (.3 FAR)	284.0	5.8%	227.2			8,247	
LIGHT INDUSTRIAL (.4 FAR)	180.2	3.7%	144.2			2,166	
OPEN SPACE	938.5	19.1%	938.5				
OPEN WATER	259.2	5.3%	259.2				
RIGHT-OF-WAY (COLLECTORS AND ARTERIALS)	491.9	10.0%	491.9				
LOCAL STREETS RIGHT-OF-WAY & NEIGHBORHOOD PARKS			644.3				
TOTAL	4911.0	100.0%	4,911.0	10,571	25,278	18,242	

NOTES / ASSUMPTIONS:

*Net Acreage calculated by subtracting 20% (for local ROW, neighborhood parks, municipal and institutional uses) off of all land uses except Open Space, Open Water and Collector/Arterial Right-of-Way

**Population calculated at an average rate of:

- Low Density Residential: 3.2 persons per household
- Low-Med Density Residential: 2.4 persons per household
- Medium Density Residential: 2.4 persons per household
- High Density Residential: 1.4 persons per household

***Average Employee assumptions:

- Centers: 1 employee per 350 sq. ft. floor area
- Office / Business Park: 1 employee per 360 sq. ft. floor area
- Light Industrial: 1 employee per 1,160 sq. ft. floor area

^aResidential Densities used for Concept 2:

- Low Density Residential: 2.25 DU/AC.
- Low-Med Density Residential: 4.75 DU/AC.
- Medium Density Residential: 9 DU/AC.
- High Density Residential: 18 DU/AC.

Workforce Population (66% of Population):	16,431
Jobs/Workforce Population Ratio:	1.11:1

Scenario 3 (Figure 6-3)

Scenario 3 is intended to examine the implications of a future land use pattern that includes expanded employment opportunities. With the exception of areas lying between Barbara and Blaine Avenues, the land use pattern shown on Scenario 3 is identical to that shown on Scenarios 1 and 2. Scenario 3 replaces largely residential uses lying west of Blaine Avenue with office/business park uses and light industrial. The maximum residential densities are used, the same as used in Scenario 1. As a result, Scenario 3 accommodates a future population of approximately 31,500 people and about 24,500 jobs.

Table 6-3 summarizes Scenario 3.

Table 6-3. Scenario 3

SCENARIO 3				NET ACREAGE*		POPULATION**		EMPLOYEES***	
LAND USE	GROSS ACREAGE	%		NET ACREAGE*	UNITS	POPULATION**		EMPLOYEES***	
LOW DENSITY RESIDENTIAL (1-3.5 DU/AC.) ^a	784.3	16.0%		627.4	2,196	7,027			
LOW-MED DENSITY RESIDENTIAL (3.5-6 DU/AC.) ^a	755.2	15.4%		604.2	3,625	8,700			
MEDIUM DENSITY RESIDENTIAL (6-12 DU/AC.) ^a	412.3	8.4%		329.8	3,958	9,498			
HIGH DENSITY RESIDENTIAL (12-24 DU/AC.) ^a	5.9	0.1%		4.7	113	158			
NEIGHBORHOOD CENTER									
15% Low-Med Density Residential (3.5-6 DU/AC.) ^a	19.2	0.4%		15.4	92	222			
50% Medium Density Residential (6-12 DU/AC.) ^a	64.1	1.3%		51.3	615	1,477			
25% High Density Residential (12-24 DU/AC.) ^a	32.1	0.7%		25.6	615	862			
10% Retail/Commercial/Office (.35 FAR)	12.8	0.3%		10.3				447	
VILLAGE CENTER									
35% Medium Density Residential (6-12 DU/AC.) ^a	44.0	0.9%		35.2	422	1,014			
40% High Density Residential (12-24 DU/AC.) ^a	50.3	1.0%		40.2	966	1,352			
25% Retail/Commercial/Office (.5 FAR)	31.4	0.6%		25.1				1,565	
COMMUNITY CENTER									
15% Medium Density Residential (6-12 DU/AC.) ^a	17.2	0.3%		13.7	165	396			
10% High Density Residential (12-24 DU/AC.) ^a	11.4	0.2%		9.2	220	308			
75% Retail/Commercial/Office (.25 FAR)	85.9	1.7%		68.7				2,137	
REGIONAL CENTER									
5% Medium Density Residential (6-12 DU/AC.) ^a	8.2	0.2%		6.6	79	189			
5% High Density Residential (12-24 DU/AC.) ^a	8.2	0.2%		6.6	158	221			
90% Retail/Commercial (.25 FAR)	147.8	3.0%		118.3				3,680	
OFFICE / BUSINESS PARK (.3 FAR)	462.2	9.4%		369.7				13,421	
LIGHT INDUSTRIAL (.4 FAR)	269.0	5.5%		215.2				3,233	
OPEN SPACE	938.5	19.1%		938.5					
OPEN WATER	259.2	5.3%		259.2					
RIGHT-OF-WAY (COLLECTORS AND ARTERIALS)	491.9	10.0%		491.9					
LOCAL STREETS RIGHT-OF-WAY & NEIGHBORHOOD PARKS				644.3					
TOTAL	4911.0	100.0%		4,911.0	13,224	31,422		24,483	

NOTES / ASSUMPTIONS:

*Net Acreage calculated by subtracting 20% (for local ROW, neighborhood parks, municipal and institutional uses) off of all land uses except Open Space, Open Water and Collector/Arterial Right-of-Way

**Population calculated at an average rate of:

- Low Density Residential: 3.2 persons per household
- Low-Med Density Residential: 2.4 persons per household
- Medium Density Residential: 2.4 persons per household
- High Density Residential: 1.4 persons per household

***Average Employee assumptions:

- Centers: 1 employee per 350 sq. ft. floor area
- Office / Business Park: 1 employee per 360 sq. ft. floor area
- Light Industrial: 1 employee per 1,160 sq. ft. floor area

^aResidential Densities used for Concept 3:

- Low Density Residential: 3.5 DU/AC.
- Low-Med Density Residential: 6 DU/AC.
- Medium Density Residential: 12 DU/AC.
- High Density Residential: 24 DU/AC.

Workforce Population (95% of Population):	20,424
Job/Workforce Population Ratio:	1.20:1

Scenario 4 – Existing Comprehensive Plans

Scenario 4 depicts the current comprehensive plans of both the City of Rosemount and Empire Township. Both comprehensive plans recognize UMore Park and reference future growth and development. Rosemount’s plan categorizes the UMore site as Agricultural Research (AGR). The plan states, “This land use designation is used solely for the UMore Park property that is owned and operated by the University of Minnesota. It is anticipated that, after the UMore Park Master Plan is created and adopted, a major Comprehensive Plan amendment will be conducted to re-designate the land to its appropriate land use category.”

The Empire Township Comprehensive Plan categorizes the UMore Park property as University of MN (UMORE). The property is also designated as being in a Mining Overlay Area. The plan states, “The University of Minnesota Outreach, Research and Education Park (UMore Park) consisted of nearly 4,530 acres in Empire Township. Approximately 2,830 acres of land has become part of the Vermillion Highlands Wildlife Management Area

(WMA) jointly operated by the University and the DNR for agricultural research and WMA usage. The remaining 1700 acres of UMore Park is being planned for mineral extraction and eventual urbanization. The University has completed a two-year long study of potential urban uses in Empire and the City of Rosemount (additional 2900 acres). The UMore Property in Empire is also included in the Mineral Extraction Overlay area.”

Since both of the current comprehensive plans recognize the current agricultural condition of the UMore Park property, neither plan provides a projected basis for examining planned residential and non-residential uses.

B. INFRASTRUCTURE PLANNED TO SERVE THE DEVELOPMENT

If future development occurs as proposed under Scenarios 1, 2 or 3, new utilities, roads and other infrastructure will be needed to serve the AUAR area. Comprehensive Plans and this AUAR identify the infrastructure needed to support the varying levels of development identified in the Scenarios. Infrastructure needs are discussed in greater detail under the response to AUAR Items: 13 – Water Use, 17 – Water Quality: Surface Water Runoff, 18 – Water Quality: Wastewaters and 21 – Traffic. Item 28 – Infrastructure and Public Services includes a summary of new infrastructure that would be needed and where appropriate, provides comparisons between the scenarios.

C. ANTICIPATED DEVELOPMENT STAGING

The development of UMore Park is expected to occur over the next 30 to 40 years depending on market conditions and overall development demand. The timing of development will also be influenced by the timing of construction for required infrastructure improvements both locally and regionally. The future availability of transit may also influence the timing of the full build-out of the UMore Park property.

In general, development is anticipated to be phased from the north in Rosemount along County State Aid Highway (CSAH) 42 to the south extending into Empire Township. The timing of development in the western portion of the UMore Park property will be influenced by the timing of the extraction of minerals in the area and the restoration of the property to accommodate urban development. The location of actual land uses may shift within the study area to accommodate underlying past land use, updated information, storm water management needs, internal road access, etc. However, any development density is anticipated to remain in conformance with the densities reviewed in this AUAR.

7) PROJECT MAGNITUDE

Table 7-1 summarizes the proposed land uses for each scenario.

Table 7-1 Composite Scenarios Table

COMPOSITE SCENARIOS TABLE

LAND USE	SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
	GROSS ACREAGE	%						
LOW DENSITY RESIDENTIAL (1-3.5 DU/AC) ^a	1014.3	20.7%	1014.3	20.7%	784.3	16.0%	N/A	N/A
LOW-MED DENSITY RESIDENTIAL (3.5-6 DU/AC) ^a	739.2	15.1%	739.2	15.1%	755.2	15.4%	N/A	N/A
MEDIUM DENSITY RESIDENTIAL (6-12 DU/AC) ^a	465.1	9.5%	465.1	9.5%	412.3	8.4%	N/A	N/A
HIGH DENSITY RESIDENTIAL (12-24 DU/AC) ^a	5.9	0.1%	5.9	0.1%	5.9	0.1%	N/A	N/A
NEIGHBORHOOD CENTER								
15% Low-Med Density Residential (3.5-6 DU/AC) ^a	19.2	0.4%	19.2	0.4%	19.2	0.4%	N/A	N/A
50% Medium Density Residential (6-12 DU/AC) ^a	64.1	1.3%	64.1	1.3%	64.1	1.3%	N/A	N/A
25% High Density Residential (12-24 DU/AC) ^a	32.1	0.7%	32.1	0.7%	32.1	0.7%	N/A	N/A
10% Retail/Commercial/Office (.35 FAR)	12.8	0.3%	12.8	0.3%	12.8	0.3%	N/A	N/A
VILLAGE CENTER								
35% Medium Density Residential (6-12 DU/AC) ^a	44.0	0.9%	44.0	0.9%	44.0	0.9%	N/A	N/A
40% High Density Residential (12-24 DU/AC) ^a	50.3	1.0%	50.3	1.0%	50.3	1.0%	N/A	N/A
25% Retail/Commercial/Office (.5 FAR)	31.4	0.6%	31.4	0.6%	31.4	0.6%	N/A	N/A
COMMUNITY CENTER								
15% Medium Density Residential (6-12 DU/AC) ^a	17.2	0.3%	17.2	0.3%	17.2	0.3%	N/A	N/A
10% High Density Residential (12-24 DU/AC) ^a	11.4	0.2%	11.4	0.2%	11.4	0.2%	N/A	N/A
75% Retail/Commercial/Office (.25 FAR)	85.9	1.7%	85.9	1.7%	85.9	1.7%	N/A	N/A
REGIONAL CENTER								
5% Medium Density Residential (6-12 DU/AC) ^a	8.2	0.2%	8.2	0.2%	8.2	0.2%	N/A	N/A
5% High Density Residential (12-24 DU/AC) ^a	8.2	0.2%	8.2	0.2%	8.2	0.2%	N/A	N/A
90% Retail/Commercial (.25 FAR)	147.8	3.0%	147.8	3.0%	147.8	3.0%	N/A	N/A
OFFICE / BUSINESS PARK (.3 FAR)	284.0	5.8%	284.0	5.8%	462.2	9.4%	N/A	N/A
LIGHT INDUSTRIAL (.4 FAR)	180.2	3.7%	180.2	3.7%	269.0	5.5%	N/A	N/A
OPEN SPACE	938.5	19.1%	938.5	19.1%	938.5	19.1%	N/A	N/A
OPEN WATER	259.2	5.3%	259.2	5.3%	259.2	5.3%	N/A	N/A
RIGHT-OF-WAY (COLLECTORS AND ARTERIALS)	491.9	10.0%	491.9	10.0%	491.9	10.0%	N/A	N/A
LOCAL STREETS RIGHT-OF-WAY & NEIGHBORHOOD PARKS								
TOTAL	4911.0	100.0%	4911.0	100.0%	4911.0	100.0%	N/A	100.0%

Building heights will be as regulated by zoning provisions in place at the time of development or as specifically modified as part of a Planned Unit Development approval.

8) PERMITS AND APPROVALS

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.

It is anticipated similar permits and approvals will be needed for most scenarios. However, where differences occur, they are noted. Development within the study area will be funded through a combination of developers' funds and local agency funds. Mitigation will include the need for development in the area to obtain the required permits and adhere to permitting stipulations.

Table 8-1. List of Permits and Approvals

<i>Federal</i>	<i>Permit/Approval</i>
US Army Corps of Engineers	Section 404 Permit
<i>State</i>	<i>Permit/Approval</i>
Pollution Control Agency	NPDES Storm Water Permit
Pollution Control Agency	Sanitary Sewer Permit
Pollution Control Agency	Section 401 Water Quality Certification Permit, if Section 404 Individual Permit is needed
Pollution Control Agency	Approval of remediation and cleanup plans, as applicable
Department of Natural Resources	Temporary dewatering for construction
Department of Natural Resources	Water appropriation permit and New Well Construction approval
Department of Health	Water main permit
Department of Health	Well permit
State Historic Preservation Office	Coordination, if federal permits are needed with development
MnDOT	State Aid approval
MnDOT	Work in right-of-way permit, if applicable
<i>Regional/ County/ Local</i>	<i>Permit/Approval</i>
City of Rosemount	Comprehensive Plan amendment for scenarios
City of Rosemount	Wetland Conservation Act Approval
City of Rosemount	Preliminary and final plat approvals
City of Rosemount	Building permits
City of Rosemount	Rezoning or text amendments for scenarios
Empire Township	Comprehensive Plan amendment for scenarios
Empire Township	Preliminary and final plat approvals
Empire Township	Building permits
Empire Township	Rezoning or text amendments for scenarios
Empire Township	Wetland Conservation Act Approvals
Metropolitan Council	Comprehensive Plan amendments for scenarios
Metropolitan Council	Review of new sanitary sewer plans
Dakota County	Approval of county road improvements
Dakota County	Access permits
Dakota County	New Well/Abandonment Permit
Dakota County	Conformance with County Ordinances, where applicable

9) LAND USE

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

A. EXISTING LAND USES

The UMore Park property has been owned and operated by the University of Minnesota since the late 1940s. The property lies in both the City of Rosemount and Empire Township. Existing land use patterns for UMore Park within the two jurisdictions have been similar or consistent with one another over the years.

The University of Minnesota has used the land for educational outreach programs, research, agricultural production, and to a more limited extent, recreational activities. Developed uses on the property in Rosemount include the administrative office; two beef research facilities, a poultry research facility, the west research complex, and the contracts and leasing office. Developed uses on the property in Empire Township include the central research complex, the south research complex and the Lone Rock Trailhead. Approximately 76 acres on the site are currently used for community farming. Fourteen families currently raise crops on this land that are sold predominantly at local area farmers markets

Approximately 1,700 acres in the northwest part of the UMore Park site is anticipated for gravel mining and has been approved for issuance of local mining permits. Gravel mining in the area is expected to last for up to 40 years; however, resource extraction will be phased over time in accordance with the project EIS with restoration efforts occurring as mining operations are relocated.

Areas of traditional suburban growth have emerged over the past twenty-five years near the UMore Park property, particularly on the north and west in the City of Rosemount. The development patterns in these areas are consistent with development patterns found in central Dakota County.

B. SURROUNDING LAND USES – CITY OF ROSEMOUNT

Surrounding land uses in the City of Rosemount include a mix of residential, industrial and educational uses. Residential neighborhoods are located north of the northwest portion of the UMore Park site including a mix of single-family detached dwelling units and attached townhomes. County State Aid Highway (CSAH) 42 serves as a divide between these existing residential areas and the UMore Park site. A business park and a general industrial land use pattern are located adjacent to the northwest edge of the UMore Park site. This area encompasses approximately 335 acres of manufacturing, office, warehousing and storage spaces. Biscayne Avenue separates these developments from the UMore site.

The Dakota County Technical College (DCTC) is located along County State Aid Highway (CSAH) 42, surrounded by UMore Park on the west, south and east sides. Ground was broken in June of 2012 for a new Rosemount community park that lies immediately south of

the DCTC campus. The 26 acre park features ball diamonds and other active recreational facilities.

Land lying north of County State Aid Highway (CSAH) 42 is just beginning to see construction of new single-family neighborhoods which are displacing land used for agriculture. Development in this area is consistent with the development pattern examined as part of the CSAH 42/Akron AUAR completed by the City of Rosemount in 2007 and updated in 2012. The Flint Hills Resources facility is located along Highway 52, northeast of the UMore site. This facility, which is not contiguous to UMore's boundary, includes the Pine Bend Refinery which processes approximately 320,000 barrels of crude oil per day.

The northeast corner of the UMore site abuts land currently used for agriculture and an industrial use that abuts Highway 52. The eastern border of UMore in Rosemount also abuts land that is in the City of Coates. The existing land use pattern in Coates is predominately agricultural.

C. SURROUNDING LAND USES – EMPIRE TOWNSHIP

Existing land use patterns in Empire Township primarily consist of agricultural uses including active mining operations which are shown on Empire Township's existing land use map as Industrial. In addition to mining operations south of the UMore Park site, two significant recreational resources are adjacent to the site as well. Dakota County and the Minnesota Department of Natural Resources acquired 817 acres, commonly known as the Butler Land Trust property. In 2012, Dakota County completed a Master Plan for 457 acres of the Butler property for development of the new Whitetail Woods Regional Park. The remaining 360 acres of the Butler property is owned and maintained by the Minnesota Department of Natural Resources as a Wildlife Management Area (WMA).

East of the Butler property is the 2,822 acre Vermillion Highlands Modified Wildlife Management Area. The facility is jointly operated by the University of Minnesota and the Minnesota Department of Natural Resources, in conjunction with Dakota County and Empire Township. Vermillion Highlands contains equestrian, hiking and cross country ski trails and offers major hunting opportunities in the region. Land in the northern portion of the Vermillion Highlands property will be used for agricultural research by the University of Minnesota as development displaces current research facilities in the UMore Park property over time.

The southeast portion of the UMore Park site in Empire Township abuts the City of Coates. All of the abutting land in this area is used for agricultural purposes.

Figure 9-1 identifies the general existing land use pattern in the vicinity of the UMore site.

D. LAND USE COMPATIBILITY

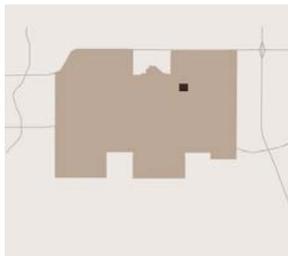
The UMore Park property sits on the developing edge of urban growth in the Twin Cities Metropolitan Area in the City of Rosemount. Accordingly, much of the surrounding land remains under agricultural and semi-rural land uses. Land lying west of the UMore Park property is either industrial or agriculture which is generally compatible with both the proposed interim gravel mining use of the property and the eventual transition to urban

development. The gravel mining operation was addressed in an Environmental Impact Statement prepared in October of 2010.

Land lying along County State Aid Highway (CSAH) 42 which is UMore's northern boundary will experience additional residential and commercial development, consistent with Rosemount's Comprehensive Plan as well as the CSAH 42/Akron AUAR. Scenarios 1, 2 and 3 that are included in this AUAR depict a pattern of future land use that closely mirrors the planned land use pattern to the north. In this area, the planned land use pattern generally transitions from residential uses on the west to commercial uses in the center to industrial uses to the east extending to Highway 52.

In the southern portion of the UMore Park property, Scenarios 1, 2 and 3 depict a land use pattern that contains low-density residential uses which will be compatible with the long-term development of the adjoining area in Empire Township. In the south, the eastern portion of the UMore Park site that abuts Vermillion Highlands is shown as low-density residential or open space uses on Scenarios 1, 2 and 3, which will be compatible with the use of the Vermillion Highlands property. The extreme southeast corner of the AUAR area is a parcel owned by Dakota County which long-term, is expected to have an industrial use and be compatible with both Vermillion Highlands and agricultural property to the east.

E. SUPERFUND SITE STATUS



The University of Minnesota Rosemount Research Center Superfund Site ("UMRRC Site") consists of three electrical transformer recycling facilities operated by former University tenants, known as the George's Used Equipment (GUE) site, the Porter Electric and Machine Company ("PE") site, and the U.S. Transformer ("UST") site, and a former University chemical waste disposal site. The UMRRC Site was added to the Minnesota Permanent List of Priorities ("PLP") on October 30, 1984 and the federal National Priorities List ("NPL") on June 10, 1986.

The UMRRC Site was the subject of extensive investigation and cleanup by the University in the late 1980s and early 1990s, with regulatory oversight by the United States Environmental Protection Agency ("U.S. EPA") and the Minnesota Pollution Control Agency ("MPCA"). The response actions selected by MPCA, with concurrence by U.S. EPA, for the UMRRC Site are documented in the Minnesota Enforcement Decision Document dated December 4, 1986 ("MEDD") and the Record of Decision dated June 11, 1990 ("ROD"). The objectives of the response actions required under the MEDD and ROD were to eliminate human health risks associated with hazardous substances in soil, provide safe drinking water to affected residences, and achieve Federal and State drinking water standards for chloroform in groundwater. With U.S. EPA concurrence, MPCA modified the ROD via Explanations of Significant Differences ("ESDs") in August 1991 and October 1993, respectively, to make various changes to treatment and disposal methods for the soil response action.

Response actions implemented by the University under the MEDD and ROD included:

- Operable Unit 1 (OU 1) - construction of a community rural water supply system and a groundwater pump and treat system;
- Operable Unit 2 (OU 2) - Excavation and off-site disposal of soil impacted by metals at multiple concentrations and PCBs at concentrations greater than 25 parts per million (“ppm”) from GUE; consolidation and on-site containment of soil impacted by metals and PCBs between 10 and 25 ppm in a containment unit designated as GUE Deep; and
- Operable Unit 3 (OU 3) - Excavation and on-site thermal destruction of PCB-impacted soil with concentrations greater than 25 ppm from multiple areas with disposal of treatment residuals and wastewater in GUE Deep; placement of a 10-inch soil cover on excavated areas with PCBs in soil at concentrations between 1 and 10 ppm; and placement of a 16-inch soil cover and fencing of GUE Deep. This OU is co-located with OU 2.

The University completed the cleanup in 1994. The UMRRC Site was administratively closed, and was removed by MPCA and U.S. EPA from the PLP and NPL on November 27, 2000 and February 6, 2001, respectively.

Because hazardous substances remained in place after the cleanup, the UMRRC Site is statutorily subject to review by U.S. EPA and MPCA every five years to confirm that the completed response actions remain protective of public health and the environment. In all four of the Five-Year Reviews performed since the UMRRC Site was administratively closed, the last of which was completed between October 2011 and June 2012, U.S. EPA and MPCA determined that the response actions continue to be protective of public health and the environment. In the Fourth Five Year Review Report (June 14, 2012), U.S. EPA recommended several actions to ensure long-term protectiveness of the response actions. The University is discussing those recommendations with appropriate MPCA and U.S. EPA Superfund Program requirements.

The Fourth Five Year Review Report can be viewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_405352.pdf

F. POTENTIAL ENVIRONMENTAL HAZARDS

Significant portions of UMore Park have historically been used primarily or exclusively for farming. In those areas, the potential for significant environmental impacts from past land use is very low. However, other remaining portions of UMore Park have a higher risk of environmental impacts due to land uses that occurred there during and after World War II.

The roughly eastern two-thirds of UMore Park comprised the industrial portion of the Gopher Ordnance Works (“GOW”), a WWII-era government-owned, contractor-operated facility. The GOW operations were focused primarily on the production of smokeless gunpowder for cannon shells. The plant also was used for the manufacture of several intermediary products for powder production, including nitric acid and a concentrated form of sulfuric acid known as oleum, which was used on-site and was also exported to other ordnance plants. No munitions assembly or high explosives production took place at GOW.

The federal government condemned approximately 11,500 acres of Dakota County farm land for the GOW in 1942. The construction period for the GOW, which was designed to include over 900 buildings, two power plants, a wastewater treatment facility and associated industrial and sanitary sewer systems, and other infrastructure, was relatively short and involved intense activity from 1942 through 1944. Construction of the facility began in 1942, was halted in 1943, and then restarted in 1944. The facility included two sets of powder production lines (the “ABC” and “DEF” lines). Construction of the DEF lines was never completed. Limited production of gunpowder and related products occurred on the ABC lines only during the period from approximately January to August of 1945. After August of 1945, the plant was kept in use for a brief period for the purpose of reworking salvaged powder.

The GOW was declared war surplus in 1946. Demolition activities were initiated including burning off excess powder and powder-coated materials in a designated area at the site, demolishing buildings and other above-ground infrastructure, and stripping and shipping salvaged building materials and equipment for use at other federal facilities or public sale. At least some of the demolition debris was disposed by the federal government’s contractors on-site. GOW construction, operation and demolition activities have resulted in releases of hazardous substances and petroleum products in areas of UMore Park where those activities occurred.

Approximately 8,000 acres of former GOW property were transferred to the University by the federal government in 1947 and 1948 for use in agricultural and other research. Post-GOW land uses by the University and its tenants have also resulted in releases of hazardous substances and petroleum in limited areas of UMore Park.

The former GOW was determined to be eligible to participate in the Formerly Used Defense Sites (“FUDS) Program. The FUDS Program is not a regulatory program, but is an administrative program managed by the United States Army Corps of Engineers for the investigation/cleanup of former defense sites. The Corps needs concurrence for its actions at FUDS sites from the appropriate state regulatory program, in this case, the MPCA Superfund Program.

The applicable state law pertaining the releases of hazardous substances is the Minnesota Environmental Response and Liability Act, Minn. Stat. §§ 115B. 01, et. seq. (“MERLA”). Under MERLA, owners and operators (including property owners) may be considered responsible parties for releases of hazardous substances and be required to perform appropriate response actions to address releases that pose a threat to public health or the environment.

Several significant environmental studies and investigations of UMore Park and the adjacent Vermillion Highlands have been completed since 2002, which have documented releases of hazardous substances from both GOW operations and post-GOW activities. A listing of those initiatives can be found at:

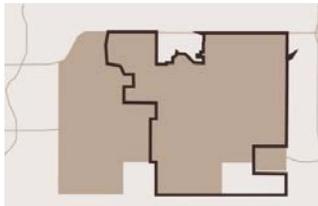
<http://www.umorepark.umn.edu/planning/gowinvestigation/repository/index.htm>

These investigations have also identified potential physical hazards to the public, such as debris and abandoned structures, and areas that contain asbestos. The University has posted signs on segments of the UMore Park property that are not open to the public due to the presence of potential physical hazardous and identified substances in some areas.

The following is a brief summary of the more significant environmental studies and investigations that have been completed to date (in reverse chronological order):

i) February, 2012 – Remedial Investigation Report – Barr Engineering

The Remedial Investigation Report presents the results of the Remedial Investigation (“RI”) of the eastern two-thirds of UMore Park. The study area comprised approximately 3,500 acres and included the GOW powder production lines and ancillary facilities. The RI was conducted to investigate the known and potential releases of hazardous substances and petroleum products associated with both GOW and post-GOW land uses.



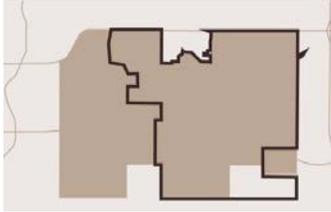
The RI investigated 71 Sites of Concern (“SOCs”) that were identified through the Phase I Environmental Site Assessment (Barr Engineering, 2011) and prior studies. The investigation included the collection of approximately 578 soil samples collected from test trenches, soil borings, surface soil and sewer sampling locations; groundwater monitoring from existing and newly installed monitoring wells; completion of two geophysical investigations; and televising selected reaches of GOW sewers.

Releases of hazardous substances that resulted in constituent of concern (“COC”) concentrations above MPCA Tier 1 Soil Reference Values for unrestricted site use scenarios (“Tier 1 SRVs”) were identified in 39 of the 71 investigated SOCs. Nitrate+nitrite (as N), which was detected in shallow groundwater above drinking water standards at and upgradient of the project area, is attributed to regional agricultural land use. The results of the RI provide sufficient detail for the University to identify significant data gaps for the investigated SOCs and develop conceptual response action strategies to address identified releases.

The RI findings will be used to determine the future additional investigations and response actions that are necessary to protect public health and the environment and inform future use of the property. All future investigation and cleanup activities will be conducted with MPCA Superfund and/or Brownfields Program oversight, and will be based on the planned use of the property.

The report can be reviewed at:
<http://www.umorepark.umn.edu/planning/SelectPublications/2012finalrireport/index.htm>

ii) **April 2011 - Phase I Environmental Site Assessment, UMore East, Dakota County, Minnesota – Barr Engineering**



The purpose of the Phase I Environmental Site Assessment was to identify recognized environmental conditions (“RECs”) on approximately 3,175 acres of UMore Park. The Phase I ESA revealed no evidence of RECs in connection with the subject property, except for the following:

- Releases at George’s Used Equipment, Porter Machine and Electric, U.S. Transformer and former Burn Pit sites (i.e., the UMRRC Site);
- Presence of Asbestos Containing Building Materials on the ground near some GOW structures in former powder manufacturing and processing areas;
- Documented releases associated with the GOW construction, use, or decommissioning/demolition activities and identified post-GOW activities;
- Potential releases associated with GOW construction, use, or decommissioning/demolition activities and the identified post-GOW activities;
- Documented presence of cannon powder after GOW decommissioning;
- Suspected or known improper waste disposal; and
- Potential releases of arsenic in GOW powder production areas from possible past use of arsenic-containing pesticides.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_338076.pdf

iii) **December 2010 – Phase I Environmental Site Assessment, Vermillion Highlands Property, Dakota County, MN – Barr Engineering**



The purpose of the Phase I Environmental Site Assessment was to identify RECs on approximately 2,840 acres of the Vermillion Highlands Property, located adjacent and to the south of UMore Park. The Phase I ESA revealed no evidence of RECs in connection with the property, except for the following:

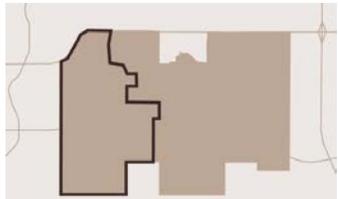
- Documented past releases of smokeless gunpowder at identified finished powder shipping houses, rifle powder blending tower and packing house;
- Waste disposal at the “M” Street/Coates Dump and potential waste disposal at the Northern 1945 Disturbed Area;

- Presence of Asbestos-Containing Building Materials on the ground in the vicinity of the powder screening houses, shaker sieve houses, rifle blending tower and packing house;
- Potential improper waste disposal at the Dole Explosives site;
- Past application of sewage sludge at the Sewage Sludge Application Research Site;
- Suspected spillage of petroleum products from the above ground storage tank at the Forage Hill site;
- GOW-era wastewater discharge to the GOW drainage ditch;
- Former operations of the law enforcement agencies shooting range resulting in lead impacts to soil; and
- Fugitive battery disposal at the abandoned Ohmann Farm.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_338072.pdf

iv) October 2010 – UMore Park Sand and Gravel Resources Project Final EIS Report – SEH



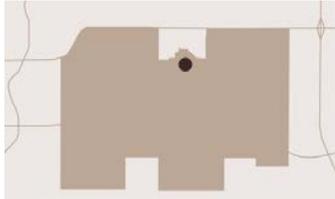
The University of Minnesota prepared a Final Environmental Impact Statement (“EIS”) for the establishment of new aggregate mines and ancillary operations on approximately 1,722 acres of the UMore Park property. The area is known as the UMore Mining Area (“UMA”). Prior to the preparation of the Final EIS, a Draft EIS, a Scoping Decision Document and a companion Scoping Environmental Assessment Worksheet were prepared. The Draft EIS was prepared and distributed to the Environmental Quality Board (“EQB”) as well as other local and regional units of government, agencies and interest groups.

The alternatives evaluated in the Final EIS included the Build (mining and ancillary uses on the UMA) condition and the No-Build condition. Subject areas included, but were not limited to, land use, sensitive resources, surface water quality, groundwater, traffic, air quality, visual impacts and archaeological, historical and architectural resources. The Final EIS includes a summary of mitigation measures to address potential impacts. The Record of Decision for the EIS was issued in November of 2010.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_338066.pdf

v) **August 2010 – Technical Memorandum – Preliminary Investigation, Naval Intelligence Reserve Center Gun Ranges – Barr Engineering**

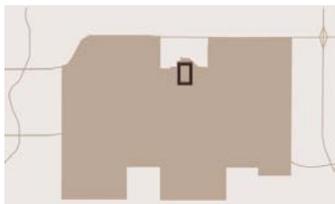


A Preliminary Investigation was conducted of the former skeet shooting range, trap shooting range and firing range at the former Naval Intelligence Reserve Center (“NIRC”). The gun ranges were constructed for recreational uses for Navy personnel stationed at the NIRC. Approximately 110 soil samples were collected and analyzed. The results of the investigation found that the use of the NIRC firing range did not significantly affect soil quality in the investigation area. The detected lead and zinc concentrations in the soil were below Tier 1 SRVs for residential land use. Five of the 110 samples had arsenic concentrations between 9.2 mg/kg and 13 mg/kg, which were slightly above the Tier 1 SRV of 9.0 mg/kg.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_338063.pdf

vi) **August 2010 – Environmental Baseline Survey, Naval Intelligence Reserve Command (Post-demolition) – Versar**

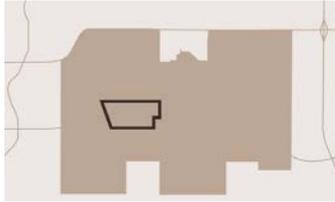


An Environmental Baseline Survey (“EBS”) of the Naval Intelligence Reserve Command was performed in July of 2010. Based on observations and reviewed data, all areas on the subject property were judged to have no storage, release, or disposal of hazardous substances or petroleum products or their derivatives, including no migration of these substances from adjacent areas, with six exceptions. Further, Asbestos-Containing Building Materials were found in 6 former buildings including caulk, sealant, mastic, vinyl flooring, Transite and thermal system insulation. Lead-based paint was found in 10 former buildings. Polycyclic biphenols were detected in the soil adjacent to a transformer and disposed in a Subtitle D landfill. According to the Navy, all structures and environmental issues noted in the EBS were removed from the property and cleaned to regulatory limits promulgated by the MPCA or as established/recommended by U.S. EPA as of August 2010. The EBS recommended no further action.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_337951.pdf

vii) May 2010 – Technical Memorandum – Preliminary Subsurface Investigation Results, Ancillary Use Facility, UMore Mining Area – Barr Engineering

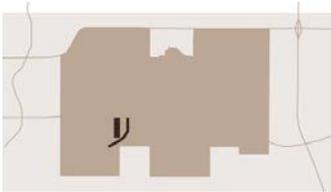


A Preliminary Subsurface Investigation (“PSI”) was conducted at the Ancillary Use Facility (“AUF”) located at UMore Park. Nineteen test trenches were excavated in six areas of potential concern. No evidence of a release of a hazardous substance or petroleum products or the presence of dump materials was identified during the PSI.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_338059.pdf

viii) January 2010 - Supplemental Site Inspection (SOC 4) / Remedial Investigation (SOC 5) Report – Barr Engineering



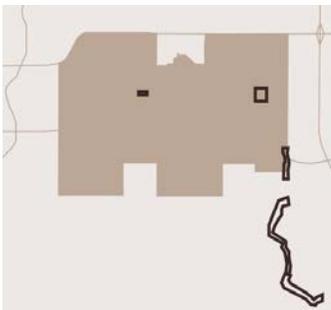
As part of the Draft Environmental Impact Statement (“DEIS”) for proposed mining operations at the UMore Mining Area (“UMA”), sites of concern (“SOCs”) were investigated at the Former DNT Loading Platform and Drainage Ditch (SOC 4) and at the Central Services Station/former DNT Storage Bunkers (SOC5). The Supplemental Site Inspection

and Remedial Investigation were designed to evaluate the nature and extent of hazardous substances or petroleum products in SOCs 4 and 5 that were released during or after the operation of the GOW.

The results of the investigation are detailed in the full report which can be found at:

http://conservancy.umn.edu/bitstream/91608/11/SSI-RIreport_UMA_011210_Report.pdf

ix) December 2009 – Final Expanded Site Inspection Report – U.S. Army Corps of Engineers – Omaha District



Tidewater, Inc. prepared a Final Expanded Site Inspection (“ESI”) Report for the United States Army Corps of Engineers (“USACE”). The purpose of the ESI was to expand on the existing Focused Site Inspection data set (USACE, 2009) to further define boundaries of certain GOW-related Areas of Concern (“AOCs”) and to provide a higher level of confidence with risk assessment decision-making. Based on the results of the ESI and associated risk assessments, hazardous substances have been

released, impacting the groundwater, surface water, soil and sediment in the study area. These releases occurred as a result of activities performed in the AOCs, and present potential risks to human health and/or the environment. A summary of the conclusions of the risk assessments is provided in the ESI.

The report can be reviewed at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_338057.pdf

x) November 2009 – Phase II Investigation Report, Sites of Concern 1 – 3 and 6 – 8 – Barr Engineering



A Phase II Investigation was conducted to determine whether historical activities at six Sites of Concern (“SOCs”) identified in the UMore Mining Area resulted in releases of hazardous substances or petroleum products to the environment. A total of 66 test trenches, 15 direct-push soil borings, and 14 surface sampling locations were evaluated. No

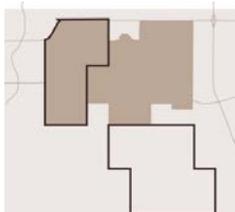
incidental odors, discoloration, or elevated headspace measurements indicative of a past release of hazardous substances or petroleum products were encountered during the field investigation. Forty-six soil samples and 10 groundwater samples were also collected and analyzed. Sampling results that slightly exceeded health risk-based regulatory screening criteria included semi-volatile organic compounds (“SVOCs”) were detected in one soil sample, arsenic was detected in two soil samples, and nitrate-nitrate was found in one groundwater sample. Additional investigation was recommended to further evaluate SVOC concentrations.

Asbestos Containing Building Material (“ACBM”) was encountered during the investigation at the ground surface in locations identified in the Phase II ESA Report. The University reported the presence of ACBM to the MPCA and coordinated ACBM abatement in accordance with the University’s Emission Control Plan.

The report can be reviewed at:

<http://www.umorepark.umn.edu/planning/SelectPublications/2009phaseiisocs/index.htm>

xi) March 2009 - Final Focused Site Inspection Report – Former Gopher Ordnance Works – United States Army Corps of Engineers – Omaha District



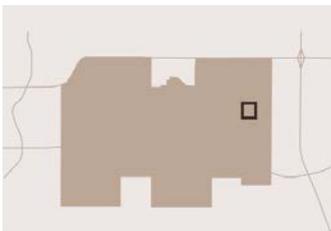
The Final Focused Site Inspection Report (“Focused SI”) summarizes the results of the field and laboratory work described in the July 2007 Final Sampling and Analysis Plan for the seven AOCs at the Former Gopher Ordnance Works site located in Rosemount, Minnesota. The field portion of the Focused SI included a land survey of AOC7, sampling for the media of concern in the AOCs and background sampling for

chemicals. Analytical samples were sent to Seven Trent Laboratories for chemical analysis. The Focused SI also included a risk screening-level Human Health Risk Assessment and screening-level Ecological Risk Assessment.

Based on the results of the field work and the screening-level Risk Assessments, potential hazardous substances were found to have been released impacting the groundwater, surface water, soil and sediment. These releases occurred as a result of activities performed in AOCs and there exist potential risks to human health and/or the environment. Conclusions of the screening-level Risk Assessments are provided in the full report which is available at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_337969.pdf

xii) March 2009 - Limited Preliminary Assessment Report – Final – Steam Plant & Associated 26.7 Acres and Segments B, C, and D – former Gopher Ordnance Works – Rosemount, MN – U. S. Army Corps of Engineers – Omaha District



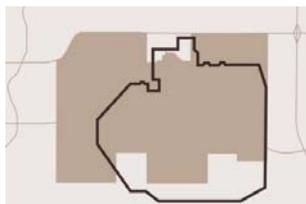
A Limited Preliminary Assessment was conducted to collect information to determine if further investigation at the Steam Plant and the associated 26.7 acres surrounding the property was warranted. The USACE-Omaha District conducted site reconnaissance in July 2005 and designated the Steam Plant as a DERP-FUDS eligible AOC in August 2006.

The Limited Preliminary Assessment recommended a Site Inspection project for AOC7. The purpose of the Site Inspection was not only to characterize the contaminants of concern in the Steam Plant property but to accurately locate the precise boundaries of the 26.7 acre parcel of property transferred from the Government to the Regents of the University of Minnesota in March 1961. This study recommended that further environmental research be conducted and proposed that a Site Investigate (SI) be performed on the Steam Plant and associated 26.7 acres.

The full report is available at:

http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_337973.pdf

xiii) October 2006 – Concrete and Soil Assessment, UMore Park – Peer Engineering



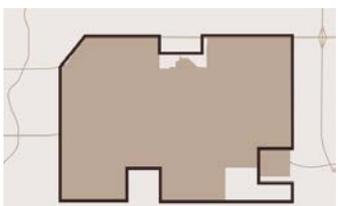
The Concrete and Soil Assessment was performed to: (1) quantify by volume, and assess remnant concrete GOW building foundations and walls; (2) determine possible alternatives for reuse, reconditioning and/or disposal of the concrete; and (3) evaluate the environmental condition of soils adjacent to and/or in contact with the remnant concrete foundations.

Based on the concrete and soil sampling conducted as part of the Concrete and Soil Assessment, approximately 70% of the concrete remnants/structures at UMore Park are suitable for reuse without mitigation. Mitigation will be required for the remainder of the remnants/structures where the concrete is impacted or potentially impacted with asbestos and/or other hazardous materials, to allow reuse of the material.

The report can be reviewed at:

<http://www.umorepark.umn.edu/planning/SelectPublications/csa/index.htm>

xiv) July 2006 – Phase I Environmental Site Assessment, UMore Park – Peer Engineering



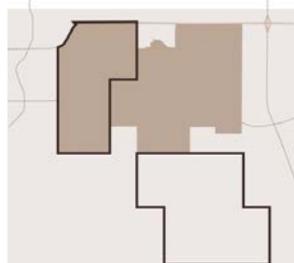
The Phase I Environmental Assessment (“Phase I ESA”) was conducted to identify Recognized Environmental Conditions (“RECs”) associated with UMore Park. The Phase I ESA revealed on-site RECs, which indicate that there are existing, undefined releases of hazardous substances and petroleum products at GOW operational/functional areas

identified in prior studies, and there is a potential for unidentified soil and/or ground water impacts at UMore Park from other GOW operational/functional areas, waste sites identified by Dakota County, and past and/or present University and University tenant property use. A Phase II Environmental Site Assessment was recommended to further evaluate these RECs.

The report can be reviewed at:

<http://www.umorepark.umn.edu/planning/SelectPublications/2006phasei/index.htm>

xv) March 2006 – Preliminary Assessment Report, Final Quitclaim Property, Former Gopher Ordnance Works, UMore Park – U.S. Army Corps of Engineers – Omaha District

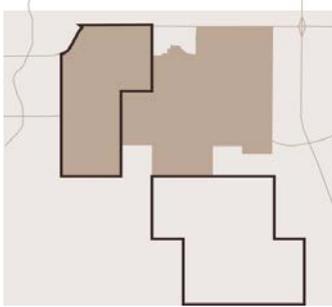


The Preliminary Assessment was undertaken by USACE as part of the Formerly Used Defense Sites (“FUDS”) Program. The purpose of the Preliminary Assessment was to collect information to determine if further investigation of the former GOW was warranted. The study area included land transferred to the University in 1947, as well as lands returned to private ownership after World War II. In the Preliminary Assessment, USACE identified six Areas of Concern (“AOCs”) related to GOW, and recommended that further investigation be completed in those areas.

The report can be reviewed at:

<http://www.umorepark.umn.edu/planning/SelectPublications/2006fgowassess/index.htm>

xvi) August 2003 – Preliminary Environmental Investigation, Former Gopher Ordnance Works, UMore Park – Peer Engineering



In 2002, the University, MPCA and Dakota County jointly funded a Preliminary Investigation of the former GOW. Peer Engineering reviewed readily available historical information regarding the GOW, including aerial photography, contemporaneous GOW, and documents past environmental studies. Based on the review, Peer identified a number of former GOW operation areas with potential for environmental impacts. Dakota County staff also completed detailed information review as well as site visits and historical aerial photograph review. Information

from the aerial photograph review was mapped using GIS to allow for easy identification of locations in the field. Based on the results of the information review and subsequent discussions between the MPCA, the University and Dakota County, six GOW operational areas were tagged for initial investigation. They included the Oleum Plant, the Nitric Acid Plant, the Burning Grounds, the Waste Water Treatment Plant, the Maintenance Shops and the Primary Settling Basin. Findings from the Preliminary Investigation indicated that hazardous substances were released as a result of GOW construction, operation and demolition.

The report can be reviewed at:

<http://www.umorepark.umn.edu/planning/SelectPublications/2003prelimgowinvest/index.htm>

10) COVER TYPES

Provide a cover type map and overlay map showing anticipated development.

To assess cover types on the UMore Park property, data was obtained from the Minnesota Land Cover Classification System (MLCCS). The data is based on a combination of aerial photograph review and on-the-ground verification of cover types (see **Figure 10-1**). The MLCCS data was translated into the Land Cover Types shown in **Table 10-1** in order to be consistent with the classifications used in the UMore Park Sand and Gravel Resources Final Environmental Impact Statement. The proposed mining operations addressed in the EIS in the western portion of the property will substantially modify the current landscape. Accordingly, the post mining landscape pattern which includes cropland and open water has been used to depict overall site cover types.

Table 10-1. Land Cover

Land Cover	Acres
Bare Ground	27.14
Brushland/Grassland with Sparse Trees	850.35
Cropland	2,521.35
Forest - Plantation	66.94
Forest - Woodland	230.44
Herbaceous/Shrub Wetland	0.93
Impervious < 25% with Vegetation	73.38
Impervious > 25%	46.29
Native Shrubland	5.53
Non-native Grassland	824.14
Non-native Shrubland	0.00
Open Water	259.16
Wetland	16.73
TOTAL	4,922.39

Figures 10-2, 10-3, and 10-4 show Concept Plans 1 through 3 with post mining reclamation cover types as a map overlay. The resulting impacts on land cover types are almost identical on all of the three concepts. Open space corridors that are integral to the future development pattern have been identified based on natural resource data. Accordingly, almost all of the existing wetlands, forest areas, and substantial areas of herbaceous cover lie within open space corridors are intended to be preserved.

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.
- b. Are any state (endangered or threatened) 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 20060789 . Describe measures to minimize or avoid adverse impacts.

i) Existing Conditions

The existing fish, wildlife, and ecologically sensitive resources have been analyzed based on previous studies, historical aerial photos, information from the DNR, and a site visit during July 2012. In addition, a separate environmental review was completed for the western-most third of the UMore site where sand and gravel mining are anticipated to occur. A separate Environmental Impact Statement (EIS) was completed for the mining project (University of

Minnesota, 2010). For purposes of this AUAR, the post-mining conditions land use was used as the existing conditions for this analysis. The habitat on site is described below.

- **Wetlands:** Based on the National Wetlands Inventory database and the post-mining conditions, the existing site contains approximately 17 acres of wetland. All of the wetlands appear to be isolated and not connected to other water resources. No DNR Public Waters are located within the site. Most of the wetlands within the UMore site are located on agricultural land and are likely drained or highly degraded, but still may provide some habitat for species accustomed to disturbance. In the post-gravel mining existing conditions, there will be a large (260 acre) open water body present in the western portion of the site as shown on **Figure 10-1**. **Figure 11-1** shows the National Wetlands Inventory within the study area.
- **Forest and Woodland Communities:** Based on the Dakota County Minnesota Land Cover Classification System (MLCCS), approximately 296 acres of forest or woodland communities exist on the site. Many of these wooded areas are planted and serve as wind breaks between buildings or tree lines between agricultural fields. Many of the forests contain green ash, boxelder, cottonwood, and mixed conifers but are disturbed and of low quality, with invasive species such as buckthorn growing throughout the understory. An oak woodland of slightly higher quality is located in the northeast corner of the UMore site. This woodland is also listed in the Department of Natural Resources Minnesota County Biological Survey (MCBS) Sites of Biodiversity Significance database (**Figure 11-1**), although it is described as being below the minimum biodiversity significance threshold.
- **Grassland/Shrubland:** Based on the Dakota County MLCCS and the July 2012 site visit, approximately 855 acres of grassland and mixed shrubland exist within the site. The grassland areas are primarily dominated by non-native species, such as smooth brome. While many of these areas are fragmented by agricultural land, larger tracts of grassland and mixed shrubland exist near the center of the site, in the footprint of the former Gopher Ordnance Works site. Wildlife observed during the site visit included American goldfinch, American crow, chipping sparrow, mourning dove, various species of warblers, turkeys, and tree frogs. Various signs of larger species of wildlife, such as deer, were also visible throughout the grassland areas.
- **Agricultural Areas:** Based on the Dakota County MLCCS and the July 2012 site visit, approximately 2,520 acres of agricultural land exists within the site. This agricultural activity is located throughout most of the western and southern portions of the site, with various smaller fields located in the eastern and northern areas. Much of the area that is now under agricultural production has been since the early 1900s. The agricultural areas are expected to provide little habitat, except for resting areas during bird migration. The area provides limited cover with an occasional and monotypic food source. The regular farming operations result in wildlife at the site that are accustomed to frequent disturbance.
- **Rare Features/Endangered Species:** A review of the DNR-licensed Natural Heritage Information System (NHIS; License # LA-579; ERDB 20120373) revealed that two rare

features, the Blanding's turtle and the loggerhead shrike (*Lanius ludovicianus*) were documented near or within the UMore site. The correspondence with the DNR is included in Appendix B.

The DNR has no record of the turtles within the study area, but they have been reported in the vicinity of the site and the DNR indicated the site could also contain turtles if suitable habitat exists. Blanding's turtles are a state-listed threatened species and require both wetland and upland habitats to complete their lifecycle. They can also travel up to and over a mile from wetlands. The DNR's review states that the site contains several wetlands. However, of the nearly 5,000 acres, approximately 17 acres are wetland. Based on this, it seems that the project area is not ideal for turtles.

Information from the DNR also indicates that loggerhead shrike, a state-listed threatened bird species that prefers dry upland prairie or open grassland with scattered hedgerows, shrubs, and small trees, were observed in the area during breeding season. Given the presence of grassland and shrubland areas scattered throughout agricultural land and the adjoining trees associated with the windbreaks within the study area, this area could be suitable for loggerhead shrike. Potential impacts to loggerhead shrike were also documented in the UMore Park Sand and Gravel Resources EIS (2010). The EIS concluded that given the lack of open grassland, suitable nesting trees, and limited hunting perches, the habitat within the proposed mining area (the western portion of the size encompassing 1,700 acres) was not suitable to loggerhead shrike. Additionally, a loggerhead shrike survey (Barr, 2010) was completed in the eastern side of the study area as part of the environmental review in that area for the University of Minnesota's wind turbine project. No shrikes or evidence of shrikes were identified in the area.

The US Fish and Wildlife Service was also consulted regarding federally threatened and endangered species via their online Section 7 Consultation process. Based on this consultation, two federally-listed species occur within Dakota County. These species are summarized below.

- Higgins eye pearl mussel (*Lampsilis higginsii*), a federally endangered species, is found within the Mississippi River. Mussels can be affected by changes in water flow or water quality. The Higgins eye pearl mussel is also a state listed endangered species, but was not documented within the UMore site.
- Prairie bush clover (*Lespedeza leptostachya*) is a federally threatened species which grows in native prairies on well-drained soils. Prairie bush clover is also a state listed threatened species, but was not documented within the UMore site.

The Department of Natural Resources (DNR) Central Region's Regionally Significant Ecological Areas (RSEA) database, DNR's MCBS Sites of Biodiversity Significance, and the DNR publication "Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife" were reviewed for occurrences of features within the UMore site. These features are summarized below.

- Regionally Significant Ecological Areas: In 2003, the Minnesota DNR conducted a landscape-scale assessment of the seven-county metro area to identify ecologically significant terrestrial and wetland areas. This resulted in the Regionally Significant Ecological Areas (RSEA) mapping for the Twin Cities area. This assessment was based on LandSat data and aerial photo interpretation of grassland. In 2008, the DNR updated the assessment using MLCCS data. The RSEA gives rankings between 1 (lowest) to 3 (highest). Five sites identified within the UMore site had a ranking of 1. A sixth site, bordering the north-central portion of the site, was given a ranking of 2. These RSEA areas are on the western portion of the Dakota County Technical College (DCTC) as well as the central portion of the study area. These areas have either already been developed (as is the case with DCTC) or contain areas where the former Gopher Ordnance Works (GOW) was located and some remnants of the GOW still remain in portions of this area. Based on a field review of the RSEA areas, they either contained developed land, have previously been disturbed, or contain remnants of the GOW. Additionally, some of these areas have been altered since the RSEA data was compiled as noted on **Figure 11-1**.
- Minnesota County Biological Survey: The DNR's MCBS Sites of Biodiversity Significance database identifies plant communities that are considered significant at a statewide level. Factors taken into account include the number of rare species documented within a site, the quality of the native plant communities, the size of the site, and the context of the site within the landscape. Sites are given a ranking of Outstanding, High, Moderate, and Below. One MCBS Site of Biodiversity Significance, an oak woodland, was identified within the UMore site (**Figure 11-1**). This site was given a ranking of "Below". A ranking of "Below" means that the site does not meet the minimum biodiversity threshold for statewide significance, but still may have conservation value at a local level.
- "Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife": This document outlines Species of Greatest Conservation Need and Habitat of Greatest Conservation Need. Oak Savanna habitat and upland deciduous forest is noted within this publication. The oak woodland identified in by the MCBS is in this category.
- Surrounding Resources: The land that borders the UMore site to the north, east, and west consists mainly of agricultural land use with some urban/residential uses to the northwest, where the City of Rosemount is located. The land that borders the UMore site to the southwest is also mainly agricultural, with some MCBS Site of Biodiversity Significance and RSEA sites located further south. In general, these sites are of higher quality than those located within the UMore site.

To the southeast, the Vermillion Highlands Research, Recreation, and Wildlife Management Area borders the UMore site. This area is over 2,800 acres in size and is managed by the DNR and University of Minnesota to provide recreation opportunities for the public and research opportunities for the University. A few MCBS Sites of Biodiversity Significance and RESAs are located within the WMA, although these are of lesser quality

than those areas located to the west. Through the joint management and planning by the University of Minnesota and DNR, proposed master plans have been developed that include buffers between the UMore study area and Vermillion Highlands. These buffers are reflected in the land use scenarios for UMore. More information about Vermillion Highlands and the master planning of this area can be found at <http://www.vermillionhighlands.umn.edu/about/index.htm>.

- Rosemount Natural Area Identification
The City of Rosemount developed a Natural Area Identification map (**Figure 11-2**). Some of the land within the study area is identified on this map as highest priority, lower priority, and the Mississippi River Greenway. Most of the area that is identified on the map is ranked as a lower priority.

Scenario 1

This scenario allows for a population of approximately 35,000 people and employment for approximately 18,000. Agricultural land uses would be removed and replaced with low, medium, and high density residential areas, office/business parks, and light industrial.

With this scenario, approximately 940 acres of open space and 260 acres of open water would remain. The open space would be located throughout the UMore site, and would create habitat corridors for wildlife from north to south as well as west to east. Much of the land that borders the Vermillion Highlands WMA would remain as open space as well. The 260 acres of open water space would be located in the west and southwest portion of the UMore site, in an area that is anticipated to be mined in the interim. Any impacts as a result of this potential mining operation has been documented in the EIS dated October 2010. This open water area would be surrounded by green space and provide recreational opportunities for the public as well as wildlife habitat. The area of biodiversity significance in the northeast corner would not be impacted. Various portions of the RSEAs would remain as open space as well depending on the need to conduct contamination remediation in the area (see **Section 9** of the AUAR for discussion on pollutants and past land uses). Based on state and federal requirements, the wetlands would likely remain intact with some anticipated impact and resulting mitigation. There would be opportunities to create habitat with storm water management requirements as part of development. The main wildlife habitat impact from these scenarios would be the potential reduction in loggerhead shrike habitat, a state-listed threatened species, if mitigation is not provided.

Scenario 2

This scenario allows for a population of approximately 25,000 people and employment for approximately 18,000. Similar to Scenario 1, agricultural land uses will be replaced with low, medium, and high density residential areas, office/business parks, and light industrial. The overall land cover will be identical to Scenario 1, with the difference being in population density. The area of biodiversity significance in the northeast corner would not be impacted with this scenario. Various portions of the RSEAs would remain as open space as well, depending on the need to conduct contamination remediation in the area (see **Section 9** of the AUAR for discussion on pollutants and past land uses). Based on state and federal requirements, the wetlands would likely remain intact with some anticipated impact and resulting mitigation. There would be opportunities to create habitat with storm water

management requirements as part of development. Again, the main wildlife habitat impact from these scenarios would be the potential reduction in loggerhead shrike habitat if mitigation is not provided.

Scenario 3

This scenario allows for a population of approximately 31,000 people and employment for approximately 24,000. Again, the agricultural land uses would be removed and replaced with low, medium, and high density residential areas, office/business parks, and light industrial.

Compared with Scenarios 1 and 2, this scenario would create more office/business park and light industrial space. The amount and location of green space and open water would remain the same as outlined in Scenarios 1 and 2. Again, similar to the first two scenarios, the area of biodiversity significance in the northeast corner would not be impacted and various portions of the RSEAs would remain as open space as well depending on the need to conduct contamination remediation in the area (see **Section 9** of the AUAR for discussion on pollutants and past land uses). Based on state and federal requirements, the wetlands would likely remain intact with some anticipated impact and resulting mitigation. There would be opportunities to create habitat with storm water management requirements as part of development. The main wildlife habitat impact from these scenarios would be the potential reduction in loggerhead shrike habitat if mitigation is not provided.

Scenario 4

Scenario 4 calls for the UMore site remaining under the current comprehensive plans of both the City of Rosemount and Empire Township. Rosemount's plan categorizes the UMore site as Agricultural Research and states, "This land use designation is used solely for the UMore Park Property that is owned and operated by the University of Minnesota. It is anticipated that, after the UMore Park Master Plan is created and adopted, a major Comprehensive Plan amendment will be conducted to re-designate the land to its appropriate land use category."

The Empire Township Comprehensive Plan categorizes the UMore Park property as University of MN (UMORE) and is also designated as being in a Mining Overlay Area. The plan states, "The University of Minnesota Outreach, Research and Education Park (UMore Park) consisted of nearly 4,530 acres in Empire Township. Approximately 2,830 acres of land has become part of the Vermillion Highlands Wildlife Management Area (WMA) jointly operated by the University and the DNR for agricultural research and WMA usage. The remaining 1,700 acres of UMore Park is being planned for mineral extraction and eventual urbanization. The University has completed a two-year long study of potential urban uses in Empire and the City of Rosemount (additional 2900 acres). The UMore Property in Empire is also included in the Mineral Extraction Overlay area."

Based on these comprehensive plans, land cover under Scenario 4 would generally remain in its existing state, with the possible exception of the area within Empire Township that is designated as being in the Mining Overlay Area. Any potential ecological resource impacts as a result of mining, and potential mitigation measures, were discussed in the EIS completed in October 2010. With regard to the remaining areas of the UMore site, because land use would not change substantially, there would not likely be any impacts to ecological resources.

B. Fish, Wildlife, and Ecologically Sensitive Resources Mitigation Plan

The following mitigation measures will be employed for Scenarios 1-3:

- Wetlands will need to be delineated in conformance with the Wetland Conservation Act as part of the development process. Depending on the location of the wetlands, either the City of Rosemount or Empire Township will review and verify the wetland delineation.
- Wetland impact is anticipated to be minimized to the maximum extent practical and feasible throughout the review area. If wetland impacts are proposed, wetland mitigation will be required of the project proposer pursuant to current wetland regulations and City or Township requirements.
- The City of Rosemount and Empire Township require buffers around wetlands at a width dependent upon the wetland's management classification, per their respective ordinances.
- Storm water management features should incorporate native plantings of grasses, trees, and shrubs.
- A loggerhead shrike survey is recommended by the DNR as part of a development project if disturbance would be planned during the nesting season (nesting season is generally April through July). The DNR will need to be contacted before any survey work is completed.
- While ideally suited habitat for Blanding's turtles is not apparent within the study area, they have been noted near the study area and some habitat in the area could be marginally suitable. Development projects should take into consideration the use of oversized culverts, surmountable curbs, and revegetation with native species.
- Development plans for the northeastern corner of the site will consider incorporating the oak woodland that has been identified on the County Biological Survey as open space to protect or enhance this habitat to the extent practical.
- Development plans will consider incorporating the existing or remaining wildlife habitat areas within the Regionally Significant Ecological Areas (RSEA) and other areas within the site as open space to the extent practical. However, depending on environmental remediation that may be required, disturbance of these areas may be necessary.
- Tree removal within the study area that occurs as part of development will need to meet the requirements of the City's or Township's Tree Preservation Ordinance.

12) PHYSICAL IMPACTS ON WATER RESOURCES

Will the project involve the physical or hydrologic alteration (dredging, filling, stream diversion, outfall structure, diking, and impoundment) of any surface waters such as a lake, pond, wetland, stream or drainage ditch? Yes No

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

There are very few wetland resources within the study area (17 acres within the 5,000 acre study area). There are no DNR Public Waters within the study area. No specific development plans have been developed for the study area. Both state and federal wetland regulations require avoidance and minimization of wetland impact. However, with anticipated infrastructure needed to serve the study area such as roads and utilities, it is anticipated some wetland impact would occur.

Wetland impact would be subject to State regulations through the Wetland Conservation Act (WCA). Additionally, any impacts within the City of Rosemount would be subject to the City's Wetland Management Plan. Impacts could also be regulated by the US Corps of Engineers through Section 404 of the Clean Water Act. Wetland impact would need to be avoided and minimized to the greatest extent practical.

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.

A. Existing Conditions

Currently, private wells within the study area serve the agricultural, residential, irrigation, commercial and public water use needs. According to a review of the County Well Index, the study area contains some domestic use private wells utilized for potable water. There could be other existing residences in the study area that have private wells, however, no information is available regarding additional private wells beyond those listed on the County Well Index. The wells on the County Well Index are shown on **Figure 13-1**.

Recent ground water modeling has defined the 10 year time of travel for source wellheads for wells to determine the Drinking Water Supply Management Area (DWSMA) within the City of Rosemount. The DWSMA is within a portion of the study area and was established as a part of the City's current Wellhead Protection Program as shown in **Figure 13-2**.

The geology of the City's existing wells is consistent with other communities in the Twin Cities Metro Area. The Paleozoic sedimentary rocks around the Twin Cities Metro area have three primary aquifers (in descending order): the Prairie du Chien–Jordan, the Franconian-Ironton-Galesville (FIG), and the Mt. Simon–Hinckley. Each of these is separated by a confining layer that essentially separates the aquifers.

The deepest of the three aquifers is the Mt. Simon-Hinckley. There are no geologic factors that would limit the City's use of this aquifer. However, Minnesota Statute 103G.271 Subd 4a prohibits the issuance of permits to appropriate water from this aquifer in the Metro area unless there are no feasible alternative to this source. Therefore, this aquifer is not an option for future use in Rosemount at this time.

The second deepest aquifer available to Rosemount is the Franconia- Ironton- Galesville, or FIG. Due to poor water quality and low water yield, the FIG is not commonly used in the south Metro area. The yield of a new FIG well in Rosemount would be estimated in the 200-500 gallons per minute (gpm) range. The FIG recharges slowly, and water does not move through the aquifer very efficiently resulting in limited well capacity and excessive drawdown. This can cause unanticipated well problems when adding new wells in the FIG, with the new wells frequently failing to meet production expectations and old wells decreasing in productivity. This does not preclude any FIG wells, but indicates well production expectations must be modest and the risks must be understood.

The Prairie du Chien – Jordan aquifer is the highest yielding aquifer in the Metro. Although these formations have different names and are geological different the two units have been shown to be hydraulically connected. The Prairie du Chien – Jordan aquifer is present over most of the City except for a southeast-northwest trending bedrock valley that is present along the northern portion of the City, generally located from 1 to 3 miles north of Dakota County Rd. 42. Unfortunately, in this area of the City where the bedrock valley is present, a continuous layer of water-bearing Prairie du Chien – Jordan bedrock is absent which limits the usefulness of the aquifer by the City. Despite limitations, Prairie du Chien – Jordan wells are optimal because they generally produce five to ten times more water per foot of drawdown than FIG wells. All of Rosemount's existing operational wells are located in the Jordan aquifer, which underlies the Prairie du Chien, and all future wells are anticipated to be in the Jordan aquifer also.

Existing and future demands for the entire City have been included in the City's Comprehensive Water System Plan (CWP). Future infrastructure needs for the City, encompassing the AUAR study area, were developed in the CWP. As a part of the CWP, well fields were preliminarily located to the north and to the west of the study area. The well field locations were selected due to their proximity to the future water treatment plant sites.

The City's water system is divided into two pressure zones, western and eastern, and is connected through a pressure reducing valve (PRV). The western pressure zone is the higher elevation zone, and is able to serve the entire study area. There are three water towers in the west pressure zone with an overflow elevation of 1,105.00 feet and there is one tower in the east pressure zone with an overflow elevation of 1,050.00 feet. Service to future development outside the study area has been addressed in the CWP.

The water system currently has eight wells, two in the eastern zone and six in the western. Well capacities range from 400 gpm to 1,600 gpm with a system firm capacity (assumes the largest well out of service) of 6500 gpm and a western zone system firm capacity of 5,700 gpm. Two wells are located in the eastern pressure zone with a capacity of 400 gpm each.

The western zone is the high elevation zone, so wells in the western pressure zone can serve either pressure zone, since pressure is reduced through the PRV for the eastern pressure zone. The eastern wells are designed to serve the eastern zone only, but could supply water at very low pressure to the western zone during an emergency situation. The PRV separating the two systems allows for each system to be supplied from either the eastern or western wells, but water typically flows from the western pressure zone to the eastern.

Well firm capacity should meet or exceed maximum day demands. Historical water usage for the City has indicated average water use of 95 gallons per capita per day (gpcd) with 3 people/unit for residential units, 800 gallons per acre per day (gpad) for commercial property, and 250 gpad for public/institutional property. Also, historical maximum day to average day ratio (peaking factor) has been approximately 3.0 and is expected to decrease in the future as the City grows and possibly implements water conservation programs as indicated in the CWP. Existing system demands are shown below in **Table 13-1**.

Table 13-1. Existing Average Day Water Usage and Maximum Day Water Usage for Rosemount's Water System*

Type	Area Served	Number of Units	Population Served	Avg. Day Water Use (GPD)	Maximum Day Water Use (GPD)
Residential	2400	6339	19017	1.81	5.42
Non-Residential	2511	216		0.64	1.91
Total	4911	6555	19017	2.44	7.33

*Based on the City's Comprehensive Water Plan.

Average day existing water use is estimated to be 2.44 million gallons per day (MGD) (1,696 gpm) and maximum day existing water use is estimated to be 7.33 MGD (5,088 gpm). Since system well firm capacity exceeds the maximum day demand no additional wells are needed at this time.

[In Rosemount, when additional water storage is needed with new development, it is paid for by the developer. Water is also treated within the City's system. Treatment is paid via user water bills proportionate to the user's water usage.](#)

i) Scenario 1

Development within the study area will be connected to municipal water service in this scenario. Development within the study area consists of residential with varying densities, office and business park, light industrial, and community centers composed of residential land uses with varying densities and commercial land use. **Table 13-2** below summarizes the development plans and population density assumptions to determine the water demand for the study area. As discussed in the existing conditions, it was assumed that current water usage per capita is 95 gpcd. Non-residential demands were estimated based on Metropolitan Council Environmental Service (MCES) sewer availability charge (SAC) criteria. In accordance with MCES's SAC development criteria,

each SAC unit was based on 14 employees where one SAC unit equals 274 gallons per day (GPD). The assumed maximum day demand to average day demand ratio (peaking factor) is 3.0 based on historic water demands. Future projected water demands for the study area are shown below in **Table 13-2**.

Table 13-2. Future water demand for Scenario 1

Type	Gross Area (ac)	Net Area Served (ac)	Number of Units	Population/Employees Served	Avg. Day Water Use (GPD)	Maximum Day Water Use (GPD)
Low Density Residential	1014	811	2840	9088	863,366	2,590,097
Low-Med Density Residential	739	591	3548	8516	809,061	2,427,184
Medium Density Residential	465	372	4465	10716	1,018,083	3,054,248
High Density Residential	6	5	113	158	14,934	44,801
<i>Neighborhood Center</i>						
Low-Med Density Residential	19	15	77	185	21,125	63,374
Medium Density Residential	64	51	513	1231	140,326	420,977
High Density Residential	32	26	615	862	81,769	245,306
Retail/Commercial/Office	13	10		447	8,763	26,288
<i>Village Center</i>						
Medium Density Residential	44	35	352	845	96,334	289,002
High Density Residential	50	40	966	1352	128,409	385,227
Retail/Commercial/Office	31	25		1565	30,658	91,975
<i>Community Center</i>						
Medium Density Residential	17	14	137	330	37,562	112,686
High Density Residential	11	9	220	308	29,386	88,157
Retail/Commercial/Office	86	69		2137	41,808	125,425
<i>Regional Center</i>						
Medium Density Residential	8	7	66	158	17,985	53,954
High Density Residential	8	7	158	221	21,029	63,088
Retail/Commercial	148	118		3680	72,044	216,131
<i>Office/Business Park</i>						
Office/Business Park	284	227		8247	161,399	484,198
<i>Light Industrial</i>						
Light Industrial	180	144		2166	42,399	127,196
<i>Open Space</i>						
Open Space	939	939	NA	NA	NA	NA
<i>Open Water</i>						
Open Water	259	259	NA	NA	NA	NA
<i>ROW (Collectors/Arterials)</i>						
ROW (Collectors/Arterials)	492	492	NA	NA	NA	NA

Local Streets/Neighborhood Parks		644	NA	NA	NA	NA
Total	4911	4911		52212	3,636,438	10,909,313

Based on the water use associated with Scenario 1, average day water demand is estimated to be 3.64 MGD (2,525 gpm), and maximum day water demand is estimated at 10.91 MGD (7,576 gpm) for the proposed study area. Current average day demand in Rosemount is 2.44 MGD (1,696 gpm) and maximum day demand is 7.33 MGD (5,088 gpm).

Ground elevations in the study area are consistent with existing western pressure zone elevations therefore, the entire study area would be served by the western pressure zone and all demands were calculated as western pressure zone demands. There are significant topography variations within the study area, and a few properties with elevations below 910 feet may require an individual PRV as shown in **Figure 13-3**.

UMore development would result in 3.64 MG of additional storage needs. Current system storage is 3.5 MG. It is recommended that system storage should meet or exceed average day demand based on ten state standards and American Water Works Association (AWWA) recommendations. This development would increase the City's average day demand from approximately 2.44 MGD to 6.0 MGD. Because the CWP anticipated some development, but not that depicted in Scenario 1, an additional 2.5 MG of storage would be needed to serve the entire city upon full development of the study area, and constructed in a location to best serve the entire community. The CWP indicates a 1.5 MG elevated storage tower to be constructed in the western portion of the study area, and ground storage reservoirs to be constructed at the proposed Water Treatment Plant (WTP) locations. Since the WTPs have not yet been constructed, it is assumed water towers would be constructed for storage needs. So, in addition to the 1.5 MG tower planned in the CWP, an additional 1.0 MG elevated tower is proposed to be located in the eastern portion of the study area.

Development of the study area alone would generate a maximum day demand of 10.91 MGD (7,576 gpm) and average day of 3.636 MGD (2,525 gpm). Well firm capacity should meet or exceed maximum day water use, resulting in the need for seven (7) to eight (8) wells to supply the study area. The City's total maximum day demand upon complete development of the study area would be 18.24 MGD (12,664 gpm) and average day of 6.078 MGD (4,221 gpm). As discussed previously, current western zone system well firm capacity is 5,700 gpm. The full development of the study area will require an additional 6,964 gpm of well capacity to be constructed. If individual well capacities are similar to those constructed in the past (1,000 gpm each), then approximately seven (7) wells will be required to serve the entire city upon full development of the study area. The well capacity required to meet the study area demand was located in well fields with locations predetermined in the CWP. Initial water system modeling evaluation indicated the ultimate water system layout included in the CWP did not have capacity to deliver adequate domestic operating pressure.

Therefore, two water system design alternatives were reviewed and are described below.

As part of the Rosemount CWP, approximately 2.9 MG of storage and 6 wells were planned to serve the study area. Estimated water demands and resulting supply and storage necessary to serve development included in Scenario 1 differs from what was planned in the CWP, as shown in **Table 13-3**.

Table 13-3. Comparison of supply and storage included in CWP and Scenario 1.

	Rosemount Area Included in CWP (2007)	Total Study Area Included in Scenario 1	Rosemount Area Included in Scenario 1
Area (Acres)	3107	4911	3107
Average Day Demand (MGD)	2.93	3.64	2.56
Maximum Day Demand (MGD)	8.79	10.91	7.67
Estimated Wells Required	6	7 to 8	5 to 6
Estimated Storage Required (MG)	2.93	3.64	2.56

Alternative 1

This alternative maintained CWP planned well locations. Three wells will be located in the southwestern well field and four wells in the northwestern well field.

Development within the project area will require the construction of trunk water mains. The anticipated trunk water main layout and sizes are shown in **Figure 13-3** (Alt. 1). These trunk mains would outline the proposed study area, and are sized to serve the ultimate Rosemount water system. The pipe network follows the ultimate water system layout included in the CWP, however to supply adequate service, a 16" trunk main and a few 12" trunk mains connecting to the 16" trunk main were added to the northeast corner of the study area. Additional 8" distribution mains that would serve development and interconnect the trunk main loop are not shown. Existing residents will be given the opportunity to connect to the municipal water system.

Alternative 2

In an attempt to maintain pipe sizes and layouts consistent with the ultimate water system layout included in the CWP, this alternative required one well to be located in the study area. Three wells will be located at each the southwest and northwest well fields.

Development within the project area will require the construction of trunk water mains. The anticipated trunk water main layout and sizes are shown in **Figure 13-3** (Alt. 2). These trunk mains would outline the proposed study area, and are sized to serve the ultimate Rosemount water system. Some additional 8" distribution mains that would serve development and interconnect the trunk main loop are not shown.

ii) **Scenario 2:**

This scenario is similar to Scenario 1. The land use areas are the same as Scenario 1, however the development densities have been decreased. As discussed in the existing conditions, it was assumed that water usage per capita is 95 gpcd. Non-residential demands were estimated based on Metropolitan Council Environmental Service (MCES) sewer availability charge (SAC) criteria. Each SAC unit was based on 14 employees where one SAC unit equals 274 gallons per day (GPD). The assumed maximum day demand to average day demand ratio (peaking factor) is 3.0 based on historic water demands. **Table 13-4** shows the projected future water demands for Scenario 2.

Table 13-4. Future water demands for Scenario 2

Type	Gross Area (ac)	Net Area Served (ac)	Number of Units	Population/ Employees Served	Avg. Day Water Use (GPD)	Maximum Day Water Use (GPD)
Low Density Residential	1014	811	1826	5842	554,990	1,664,970
Low-Med Density Residential	739	591	2809	6742	640,490	1,921,470
Medium Density Residential	465	372	3349	8037	763,515	2,290,545
High Density Residential	6	5	85	118	11,153	33,459
Neighborhood Center						
Low-Med Density Residential	19	15	73	175	16,625	49,875
Medium Density Residential	64	51	462	1108	105,260	315,780
High Density Residential	32	26	462	646	61,370	184,110
Retail/Commercial/Office	13	10		447	8,763	26,288
Village Center						
Medium Density Residential	44	35	317	760	72,200	216,600
High Density Residential	50	40	724	1017	96,615	289,845
Retail/Commercial/Office	31	25		1565	30,658	91,975
Community Center						
Medium Density Residential	17	14	124	297	28,215	84,645
High Density Residential	11	9	165	231	21,945	65,835
Retail/Commercial/Office	86	69		2137	41,808	125,425
Regional Center						
Medium Density Residential	8	7	59	142	13,490	40,470
High Density Residential	8	7	118	166	15,770	47,310
Retail/Commercial	148	118		3680	72,044	216,131
Office/Business Park						
Office/Business Park	284	227		8247	161,399	484,198
Light Industrial	180	144		2166	42,399	127,196
Open Space						
Open Space	939	939	NA	NA	NA	NA
Open Water						
Open Water	259	259	NA	NA	NA	NA
ROW (Collectors/Arterials)						
ROW (Collectors/Arterials)	492	492	NA	NA	NA	NA
Local Streets/Neighborhood Parks						
Local Streets/Neighborhood Parks		644	NA	NA	NA	NA
Total	4911	4911		41958	2,758,709	8,276,127

Based on the water use associated with Scenario 2, average day water demand is estimated to be 2.76 MGD (1,916 gpm), and maximum day water demand is estimated at 8.28 MGD (5,747 gpm) for the proposed study area. Current average day demand is 2.44 MGD (1,696 gpm) and maximum day demand is 7.33 MGD (5,088 gpm).

Similar to the Scenario 1 analysis, the study area will be served by the western pressure zone. A few properties with elevations below 910 feet may require an individual PRV as shown in **Figure 13-4**. Evaluation methods are described in detail in the Scenario 1 section.

Development of the study area alone would generate a maximum day demand of 8.28 MGD (5,747 gpm) and average day of 2.758 MGD (1,916 gpm). Well firm capacity should meet or exceed maximum day water use, resulting in the need for six (6) wells to supply the study area. The City's total maximum day demand upon complete development of the study area would be 15.60 MGD (10,835 gpm) and average day of 5.20 MGD (3,612 gpm). As in the Scenario 1 evaluation, current western zone system firm capacity is 5,700 gpm and should be increased to meet the maximum day water demand of 10,835 gpm. Approximately five wells would be needed to serve the entire city upon full development of the study area, which is consistent with the CWP projections. The analysis (which included water system modeling) indicated that three wells should be located at the southwest well field and two wells at the northwest well field, in accordance with the CWP.

Trunk and distribution water main development would be in accordance with the ultimate water system layout included in CWP. The anticipated trunk water main layout and sizes are shown in **Figure 13-4**.

This development would result in 2.76 MG of additional storage needs. The additional storage recommended to serve the entire city upon full development of the study area would be 1.70 MG in this scenario. The system was designed with one 2.0 MG elevated tower located in the western section of the study area.

As part of the Rosemount CWP, approximately 2.9 MG of storage and 6 wells were planned to serve the study area. Estimated water demands and resulting supply and storage necessary to serve development included in Scenario 1 differs from what was planned in the CWP, as shown in **Table 13-5**.

Table 13-5. Comparison of supply and storage included in CWP and Scenario 2.

	Rosemount Area Included in CWP (2007)	Total Study Area Included in Scenario 2	Rosemount Area Included in Scenario 2
Area (Acres)	3107	4911	3107
Average Day Demand (MGD)	2.93	2.76	1.98
Maximum Day Demand (MGD)	8.79	8.28	5.93
Estimated Wells Required	6	6	4 to 5
Estimated Storage Required (MG)	2.93	2.76	1.98

iii) Scenario 3

Development densities in Scenario 1 and 3 were consistent, but land use areas and locations are different. Land uses in the eastern portion of the study area were changed from lower density residential to higher densities or to industrial or business park. As discussed in the existing conditions, it was assumed that water usage per capita is 95 gpcd. Non-residential demands were estimated based on Metropolitan Council Environmental Service (MCES) sewer availability charge (SAC) criteria. Each SAC unit was based on 14 employees where one SAC unit equals 274 gallons per day (GPD). The assumed maximum day demand to average day demand ratio (peaking factor) is 3.0 based on historic water demands. **Table 13-6** shows the projected future water demands for Scenario 3.

Table 13-6. Future water demands for Scenario 3

Type	Gross Area (ac)	Net Area Served (ac)	Number of Units	Population/Employees Served	Avg. Day Water Use (GPD)	Maximum Day Water Use (GPD)
Low Density Residential	784	627	2196	7027	667,565	2,002,695
Low-Med Density Residential	755	604	3625	8700	826,500	2,479,500
Medium Density Residential	412	330	2958	9498	902,310	2,706,930
High Density Residential	6	5	113	158	15,010	45,030
Neighborhood Center						
Low-Med Density Residential	19	15	92	222	21,090	63,270
Medium Density Residential	64	51	615	1477	140,315	420,945
High Density Residential	32	26	615	862	81,890	245,670
Retail/Commercial/Office	13	10		447	8,763	26,288
Village Center						
Medium Density Residential	44	35	422	1014	96,330	288,990
High Density Residential	50	40	966	1352	128,440	385,320
Retail/Commercial/Office	31	25		1565	30,658	91,975
Community Center						
Medium Density Residential	17	14	165	396	37,620	112,860
High Density Residential	11	9	220	308	29,260	87,780
Retail/Commercial/Office	86	69		2137	41,808	125,425
Regional Center						
Medium Density Residential	8	7	79	189	17,955	53,865
High Density Residential	8	7	158	221	20,995	62,985
Retail/Commercial	148	118		3680	72,044	216,131
Office/Business Park	462	370		13421	262,645	787,934
Light Industrial	269	215		3233	63,277	189,830
Open Space	939	939	NA	NA	NA	NA
Open Water	259	259	NA	NA	NA	NA
ROW (Collectors/Arterials)	492	492	NA	NA	NA	NA
Local Streets/Neighborhood Parks		644	NA	NA	NA	NA
Total	4911	4911		55907	3,464,474	10,393,422

Based on the water use associated with Scenario 3, average day water demand is estimated to be 3.46 MGD (2,406 gpm), and maximum day water demand is estimated at 10.39 MGD (7,217 gpm) for the proposed study area. Current average day demand is 2.44 MGD (1,696 gpm) and maximum day demand is 7.33 MGD (5,088 gpm).

Similar to the Scenario 1 and 2 analyses, the study area will be served by the western pressure zone. A few properties with elevations below 910 feet may require an individual PRV as shown in **Figure 13-5**. Evaluation methods are described in detail in the Scenario 1 section.

Development of the study area alone would generate a maximum day demand of 10.39 MGD (7,217 gpm) and average day of 3.464 MGD (2,406 gpm). Well firm capacity should meet or exceed maximum day water use, resulting in the need for seven (7) to eight (8) wells to supply the study area. The City's total maximum day demand upon complete development of the study area would be 17.720 MGD (12,305 gpm) and average day of 5.91 MGD (4102 gpm). Similar to the Scenario 1 and 2 evaluation, current western zone system firm capacity is 5,700 gpm and should be increased to meet the maximum day water demand of 12,305 gpm. Approximately six wells would be needed to serve the entire city upon full development of the study area. Three wells would be located at each of the southwest and northwest well fields, in accordance with the CWP.

Trunk and distribution water main development would be in accordance with the ultimate water system layout included in the CWP. The anticipated trunk water main layout and sizes are shown in **Figure 13-5**.

This development would result in 3.46 MG of additional storage needs. The additional storage required to serve the entire city upon full development of the study area would be 2.41 MG in this scenario. Storage tank size and placement would be consistent with Scenario 1, with one 1.5 MG elevated tower located in the western section of the study area and one 1.0 MG elevated tower located in the eastern section.

As part of the Rosemount CWP, approximately 2.9 MG of storage and 6 wells were planned to serve the study area. Estimated water demands and resulting supply and storage necessary to serve development included in Scenario 3 differs from what was planned in the CWP, as shown in **Table 13-7**.

Table 13-7. Comparison of supply and storage included in CWP and Scenario 3.

	Rosemount Area Included in CWP (2007)	Total Study Area Included in Scenario 3	Rosemount Area Included in Scenario 3
Area (Acres)	3107	4911	3107
Average Day Demand (MGD)	2.93	3.46	2.41
Maximum Day Demand (MGD)	8.79	10.39	7.24
Estimated Wells Required	6	7 to 8	5
Estimated Storage Required (MG)	2.93	3.46	2.41

B. Water Use Mitigation Plan

- Extend trunk water main services as shown in **Figures 13-3 through 13-5** consistent with the CWP. For Scenario 1, an additional 16" trunk main may be extended from the intersection of Akron Avenue and CSAH 42 to approximately 2,600 feet east of the intersection of CSAH 42 and Blaine Avenue (**Figure 13-3 – Alt. 1**).
- 6-8 municipal wells are recommended as a result of this development, with up to 2 of the wells being in addition to what was planned as part of the CWP. For Scenario 1, one well may be located within the study area depending upon the trunk water mains extended to the development (see **Figure 13-3 – Alt. 2**). Well fields have been preliminarily allocated to the north and to the east of the study area close to the future water treatment plants, in accordance with the CWP.
- 2,750,000 to 3,500,000 gallons of water system storage is recommended as a result of this development, with up to 700,000 gallons being in addition to what was planned as part of the City's CWP. The storage should be constructed in a location to best serve the entire City and overall water system.
- Any abandoned wells found within the study area will be sealed in accordance with with Dakota County Ordinance No. 114, Well and Water Supply Management, and Minnesota Department of Health guidelines.
- Any abandoned wells found within the study area will be sealed in accordance with Minnesota Department of Health guidelines.
- In accordance with the City's Wellhead Protection Plan (WHPP), continue protection of the existing Drinking Water Supply Management Area (DWSMA) located in the study area as shown in **Figure 13-2**. A DWSMA will be established for future wells as they are constructed and the WHPP is updated.
- There exists potential for future interconnection of the proposed water system in the study area between the City of Rosemount and Empire Township. Additional water system assessments and agreements between the City of Rosemount and Empire Township may be required if further development interests beyond the presented material were to arise.
- Industrial and Business Park land use water demands can be highly variable depending upon the business operation or manufacturing process employed at each property. At the time of the ~~5~~five year AUAR evaluation updates, water demands from individual properties in the Industrial and Business Park land use areas should be evaluated and estimated future demands revised if necessary.
- Any new wells (supply, dewatering, monitoring, or other) shall be constructed in accordance with Dakota County Ordinance 114, Minnesota Statutes Chapter 103I and Minnesota Rules Chapter 4725

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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.

There are no shoreland districts or wild and scenic river districts within the study area. **Figure 14-1** shows the Federal Emergency Management Agency (FEMA) designated 100-year and 500-year floodplain and the Dakota County floodplain map. These areas are within the portion of the study area within Empire Township. No impacts to floodplain are anticipated. However, if impacts occur, conformance with Dakota County ordinances will be needed and mitigation in conformance with Empire Township regulations will be required.

A. Water-Related Land Use Management Districts Mitigation Measures

- Any development is required to meet the standards in the local Floodplain Ordinance.

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.

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

A. Existing Conditions

A detailed list of the soils present on the site is provided in **Item 19** and shown in **Figure 19-1**. The site can be described as generally flat with some hilly areas in the north-central and northeast portions of the site. Of the soils on the site, **Figure 16-1** shows the location of Highly Erodible Land (HEL).

B. Scenarios 1-3

In these scenarios, much of the proposed area would be graded to construct roads, residential, and commercial/industrial areas. For all scenarios, it is anticipated that grading will be needed to accommodate building pads and storm water drainage from the area. It is anticipated that grading will be phased and there will not be mass grading of the entire site at one time.

C. Scenario 4

In this scenario, the area will remain as agricultural and no grading activities would be occurring.

D. Erosion and Sedimentation Mitigation Plan

- A Storm Water Pollution Prevention Plan (SWPPP) to the extent required by NPDES regulations will be needed for any development in the study area. Review of the SWPPP for each development will be required by the City or the Township.

17) WATER QUALITY – SURFACE WATER RUNOFF

- Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any storm water pollution prevention plans.**
- 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.**

i) Procedures and Methods Followed

The procedures and methods used to estimate the runoff volumes and pollutants loads within the AUAR were based on the simple method as discussed in the Minnesota Stormwater Manual and in Section III of the City of Rosemount's non-degradation plan dated December 20, 2007. The simple method provides an easy yet reasonably accurate way to estimate the pollutant loads as they change in response to development.

To estimate the pollutant loads the annualized runoff volumes, pollutant concentrations from different land uses, and site areas were used. The pollutant loads were then estimated for the existing and proposed conditions to determine the change with development.

The change in pollutant loads from implementing BMPs during development was incorporated into the analysis. In the City of Rosemount where areas are proposed to be developed, the runoff volume for events equal to or less than the 100-year 24-hour would be retained on-site as required by Rosemount's Plan. In reviewing the rainfall data no events were recorded over this threshold; therefore, it was assumed in the analysis that the discharge would be zero on an annual average basis.

In Empire Township, it is required to retain the increase in the runoff volume from the existing conditions to the proposed conditions for the 2-year 24-hour storm event. This is the same requirement as the Vermillion River Joint Powers Organization rules. The flow weighted runoff volume was calculated for the existing conditions to determine what runoff volume needs to be retained on-site to match existing conditions. This was used in the analysis to determine the runoff volume that would be infiltrated and the pollutant loading for the proposed conditions could be estimated.

ii) Existing Conditions

The study area currently consists of the sand and gravel mining operation located on the western portion of the site, small grain straight rows, small wooded and grassed areas and a few small wetlands. The impervious surface is primarily comprised of the existing roadways. These include County Road 42, County Road 46, and 170th Street which run east and west. The major roads which run north to south include Biscayne Avenue, Akron Avenue, Audrey Avenue, and Blaine Avenue East.

The major watersheds include the future mining drainage, drainage to the Mississippi River, and discharges to the Vermillion River (**Figure 17-1**). The Mississippi River receives drainage from approximately 2,641 acres. The Vermillion River receives drainage from 1,408 acres of the AUAR area and the River is located approximately 2.5 miles downstream from the project boundary. The drainage area to the future lake (Lake 2162) associated with the mining operation is 871 acres. The basins shown as land locked on **Figure 17-1** are located within Empire Township and consist of 159 acres. There are areas within the City of Rosemount that are currently landlocked; however, there are plans to provide an overflow path through storm sewer constructed as a part of future development.

Future development will need to address any requirements that are established due to current regulatory standards adopted by the Vermillion River Watershed Joint Powers Organization (VRWJPO), City of Rosemount, Empire Township, and Minnesota Pollution Control Agency (MPCA).

About 115 acres of the study area consists of Group A rated soils and the remaining area contains Group B rated soils. These soil ratings are based on hydrologic soil classifications with A soils having high infiltration rates even when thoroughly wetted. The infiltration rates range from 0.8 to 1.63 inches per hour (Minnesota Stormwater Manual). These soils consist chiefly of deep, well drained to excessively drained sands and gravel. Group A soils have a high rate of water transmission, therefore resulting in a low runoff potential. Group B soils have moderate infiltration rates ranging from 0.3 to 0.6 inches per hour when thoroughly wetted. Group B soils consist of deep moderately well to well drained soils with moderately fine to moderately coarse textures.

iii) Proposed Conditions

Due to the conceptual nature of the development scenarios, the amount of impervious surfaces for each land use was estimated based on the estimates in the City of Rosemount's Nondegradation Report Dated December 20, 2007 and by characterizing the impervious surface amounts of existing developments in the City.

The existing conditions and three proposed land use scenarios were evaluated. All three of the land use scenarios represent a similar amount of proposed impervious surface. Scenario 1 represents a 27 percent impervious, Scenario 2 represents a 26 percent impervious, and Scenario 3 represents a 28 percent impervious. Stormwater management for any scenario can be provided through a combination of wet detention ponds and infiltration features. The soils within the study area will likely provide ideal conditions for achieving volume reduction and pollutant reduction through the use of infiltration.

iv) Local Stormwater Management Requirements

Stormwater management within the future development of the study area must be in conformance with local requirements of the Vermillion River Water Joint Powers Organization (VRWJPO), City of Rosemount, Empire Township and Minnesota Pollution Control Agency (MPCA). Some requirements are more stringent than others. However, the

development in the study area will need to demonstrate that all local standards are being met under proposed stormwater management techniques. The following is a summary of major stormwater management requirements:

(1) Vermillion River Watershed Joint Powers Organization

The VRWJPO design standards require that for rate control, proposed runoff rates shall not exceed existing for the 1-year and 10-year critical during storm events.

The proposed runoff rates shall also keep future peak flood flows for the Vermillion River 100-year, 4-day event from increasing above existing conditions peak flows.

Numerical flow standards must be adopted in intercommunity boundaries as identified in the VRWJPO Hydrologic Model. This would apply to the communities of Rosemount and Empire Township. These communities must apply the VRWJPO Hydrologic Model values in the calibration of their own local hydrologic models.

The VRWJPO prefers that infiltration/volume control be used for meeting the water quality standards identified in their rule. The volume control criteria requires development that creates one acre or more of new impervious surface must incorporate volume control practices into the design sufficient to prevent an increase in the runoff volume for the 2-year 24-hour storm above pre-development conditions. The criteria can either be satisfied by the LGU on a regional basis or calculated on a site by site basis for each individual proposal.

In instances where infiltration/volume control is not feasible and the site is discharging to a designated trout stream this criteria can be met through ponding providing the pond does not discharge for the 2-year 24-hour storm (preferred option) or the wet pond is designed with a combination of measures such as shading, filtered bottom withdrawal, vegetated swale discharges, or constructed wetland treatment cells that will limit temperature increases.

(2) City of Rosemount Stormwater Management Requirements and Design Standards

The City's 2007 Surface Water Management Plan (SWMP) design standards require that all water from a 100-year 24-hour storm event be retained on-site. For events with longer duration, a maximum peak stormwater discharge rate will be limited to 0.05 cfs/acre. The City requires that this standard be met through the use of infiltration and regional treatment where it is practical and feasible to do so.

Landlocked depressions that presently do not have a defined outlet and do not typically overflow may be allowed a positive overflow to prevent damage to adjacent properties. Any overflows from landlocked depressions will comply with the City's rate control, runoff volume control and low floor requirements including storing runoff from the 100-year, 24-hour storm event for new development and restricting discharge to 0.05 cfs/acre for longer duration storm events.

Pretreatment to NURP standards is required prior to the discharge of stormwater to waterbodies and wetlands classified as Preserve and Manage 1 and infiltration basins.

The NURP guidelines require that a permanent pool (dead storage) volume below the principal spillway shall be greater than or equal to the runoff from a 2.5-inch storm event for the entire drainage area assuming full development. The NURP pond shall meet the design criteria identified in the City's 2007 Surface Water Management Plan.

Infiltration/volume control shall be provided that is equivalent to 1/12 of an acre-foot/acre/day for the entire site's acreage. Water discharged to infiltration basins shall be pretreated to NURP standards.

(3) Empire Townships Stormwater Management Requirements and Design Standards

Empire Township's stormwater management requirements for rate control state that proposed rates shall not exceed the existing runoff rates for the 1-year, and 10-year critical duration storm events. The runoff rates shall be implemented such that peak runoff rate controls keep future peak flood flow for the Vermillion River 100-year 4-day event from increasing above existing conditions peak flows. The Township's standards are the same as the VRWJPO requirements.

For land disturbing activities where one acre of new impervious surface is created, sufficient volume control shall be provided to prevent an increase in the runoff volume for the 2-year 24-hour storm above pre-development conditions, unless soil conditions limit infiltration.

In cases where land disturbance of 40 acres or more, Empire Township refers to the VRWJPO for review and comment prior to review or approval.

(4) National Pollution Discharge Elimination System (NPDES) Standards

The MPCA is responsible for implementing NPDES standards. The NPDES requirements in the AUAR area will be from the NPDES Construction General Permit and the NPDES Municipal Separate Storm Sewer System (MS4) Permit.

The NPDES Construction General Permit will require that for sites replacing pervious surfaces with one acre or more of impervious surface a water quality volume equivalent to 1/2 inch of runoff from the new impervious surface should be treated. This can be met through wet sedimentation basins, infiltration/filtration, or regional ponding. There are no impaired waterbodies, ~~or~~ trout streams, or special waters within one mile of the study area; therefore, no additional stormwater requirements will apply. The post-construction water quality standards of the NPDES permit are not more restrictive than what will be required by the other regulatory agencies.

The NPDES MS4 permit requires permittees to provide post-construction water quality standards adopted at the local level. The NPDES MS4 Permit is currently being rewritten and additional stormwater requirements may apply and will need to be addressed as a part of future development. The MS4 permit will also require permittees to meet the requirements of future TMDLs. Currently there is a TMDL proposed for discharges to the Mississippi River and it is identified as the South Metro Turbidity TMDL. The South Metro Turbidity TMDL is proposed to require a 25% reduction in TSS loading.

B. Water Quantity and Quality Analysis

A water quantity and quality analysis was completed for the existing and proposed conditions within the study area. This quantitative analysis used the procedures and methods described previously and the results are summarized in **Table 17-1** and **Table 17-2**. **Table 17-1** summarizes the total runoff volumes for each development scenario compared to the existing condition.

Table 17-1: Existing and Proposed Runoff Volumes

LGU	Existing conditions (AC-FT)	Scenario 1 w/o infiltration (AC-FT)	Scenario 1 with infiltration (AC-FT)	Scenario 2 w/o infiltration (AC-FT)	Scenario 2 with infiltration (AC-FT)	Scenario 3 w/o infiltration (AC-FT)	Scenario 3 with infiltration (AC-FT)
Rosemount ¹	610	1,874	75	1,775	75	1,949	75
Empire Township ²	394	815	565	780	553	866	555

¹ The estimates on the scenarios with infiltration are based on the City of Rosemount’s policy requiring storage of the 100-year 24-hour rainfall event on-site.

² The estimates on the scenarios with infiltration are based on the Empire Townships policy requiring that storage be provided to retain the increase in runoff from predevelopment conditions for the 2-year 24-hour event.

Table 17-2 summarizes the total pollutant loads for each development scenario compared to the existing condition.

Table 17-2: Total Suspended Solids and Total Phosphorus Loads

LGU	Pollutant	Existing conditions	Scenario 1 w/o infiltration	Scenario 1 with infiltration	Scenario 2 w/o infiltration	Scenario 2 with infiltration	Scenario 3 w/o infiltration	Scenario 3 with infiltration
Rosemount ¹	TSS (tons/yr)	128	309	5	290	5	312	5
	TP (lbs/yr)	842	1,491	20	1,411	20	1,518	20
Empire Township ²	TSS (tons/yr)	95	196	96	130	94	140	93
	TP (lbs/yr)	632	636	443	607	434	659	431

¹ The estimates on the scenarios with infiltration are based on the City of Rosemount’s policy requiring storage of the 100-year 24-hour rainfall event on-site.

² The estimates on the scenarios with infiltration are based on the Empire Townships policy requiring that storage be provided to retain the increase in runoff from predevelopment conditions for the 2-year 24-hour event.

To achieve compliance with regulatory requirements, future development must provide annual volume and pollutant load reductions in the amounts presented in **Tables 17-1** and **17-2**. These values represent reductions from the post-development condition and are comparable to the City of Rosemount, Empire Township, and VRWJPO regulatory standards. Empire Township has adopted the VRWJPO regulatory standards.

C. Potential Impact to Downstream Receiving Waters

The analysis within the AUAR area for the City of Rosemount shows that the runoff volumes will be reduced from 610 ac-ft for the existing conditions down to 75 ac-ft for each of the three land use scenarios. This is a reduction in runoff volume of 88 percent, achieved through implementing City of Rosemount’s volume reduction requirements. This reduction in runoff translates directly to the reduction in pollutant loads shown in **Table 17-2**.

The City of Rosemount's regulatory policy requires that all the water from a 100-year 24-hour storm event be retained on-site. Runoff will still occur from undeveloped areas such as open space and there is potential for events to exceed the 100-year 24-hour storm event. This necessitates the need to provide an overflow discharge route. Providing an overflow discharge route is required by the City of Rosemount.

In Empire Township, the analysis shows that the runoff volumes increase. However, the TSS and TP loadings will decrease. Empire Township's regulatory policy requires that the increase in runoff volumes from predevelopment conditions be retained on-site for the 2-year 24-hour storm event. Predevelopment is considered the condition of the site immediately prior to development. There will be no impact to the Vermillion River for TSS and TP and the increase in runoff volume will be mitigated by implementing Empire Township's policy where rates shall not exceed the existing runoff rates for the 1-year, and 10-year critical duration storm events.

D. Water Quantity and Quality Mitigation Plan

- Each new development within the AUAR area will need to incorporate BMPs to meet the applicable water quantity and water quality regulatory requirements. These policies are outlined in the local stormwater management requirements section. The soils within the AUAR area are primarily comprised of Hydrologic Soil Group A and B soils; therefore, it is likely that these policies will be met using infiltration.
- Infiltration to the Rosemount or Empire Township's standards will be provided on each development site or in a regional infiltration system that is created to serve a defined drainage area. The selection of a development-specific or regional system will be based on identifying feasible areas that take into consideration soils, drainage patterns, existing and past land use, and other factors. Areas where infiltration is not feasible or where contamination is possible will not be used for infiltration practices.
- To protect adjacent structures, an overflow from the Lake 2162 will be developed that would allow water to overflow either to the northeast toward pond 2246 or to the south toward the Vermillion River. This overflow could potentially occur if a rainfall event occurs that exceeds a 100-year 24-hour event, and/or water elevations reach extremely high levels. Based on this analysis and the installation of the proposed BMP'S, the volume of runoff generated within the AUAR area will be significantly reduced in the future, and the corresponding probability of this overflow occurring will be also reduced from that which exists today.
- If any storm water in the study area within Empire Township is to be directed to the City of Rosemount, the Rosemount infiltration standard will be applied to the development.
- Design considerations for comprehensive stormwater management should include regional ponding.
- Approved TMDL load reductions and implementation plans shall be addressed by a development's stormwater management plan. These will need to be addressed per the schedule identified in the current version the MS4 permit. The proposed language states

“For TMDLs approved prior to the effective date of the MS4 permit the Waste Load Allocation (WLA) discharge requirement will become a requirement of the permittee”.

- In the City of Rosemount, post-development discharge rates will be limited to 0.05 cfs/acre of the 100-year, 24-hour event.
- In Empire Township, it will be required that post-development discharge rates will not be greater than pre-development discharge rates for the 1-year and 10-year, 24-hour storm critical duration events to reduce erosion impacts downstream of the site.
- The developer will be responsible for grading the site appropriately to provide adequate stormwater management to the extent necessary and will be required to obtain the necessary permits for stormwater management and grading, to preserve the existing natural features, and to provide water quality protection to meet MPCA Construction General Permit requirements in addition to City of Rosemount, Empire Township, and VRWJPO requirements.
- Stormwater will be required to be pretreated prior to discharge to wetlands and Lake 2162.
- A SWPPP as required by the NPDES regulations will be needed for any development in the study area. Review of the SWPPP for each development will be required by the City and Township.

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.**
- i) Existing Conditions**

Within the City of Rosemount, there are approximately 6,484 connections to regional sewer. The City has approximately 752 residential units that are served by on-site septic systems. Of the 6,484 connections to regional sewer, most are single family residential with some multi-family residential, commercial/industrial, and institutional connections.

Based on the City's Sewer Rate Study, the average daily wastewater flow is 1,875,886 gallons per day (GPD). Within the study area there are a few rural residential homes that are served by on-site septic systems.

Since the wastewater generated from the City of Rosemount is primarily from residential units, the wastewater characteristics are assumed to be of typical domestic strength. **Table 18-1** is a summary of the estimated wastewater characteristics for Rosemount.

Table 18-1. Estimated Wastewater Characteristics and Total Average Daily Wastewater Loading for the City of Rosemount

Parameter	Estimated Wastewater Characteristics and Average Daily Loading	
	mg/l	lbs/day
Biochemical Oxygen Demand	220	3,442
Total Suspended Solids	220	3,442
Ammonia –Nitrogen	25	391
Total Phosphorous	8	125

Wastewater generated from the City is collected by a series of lift stations, laterals, and trunk sewer mains, and is then directed to one of two interceptor sewers that are owned, operated and maintained by the Metropolitan Council Environmental Services (MCES). These two interceptors include the Apple Valley Interceptor and the Rosemount Interceptor. **Figure 18-1** shows existing MCES interceptor sewers and lift stations that serve the City of Rosemount. The Rosemount Interceptor sewer consists of two lift stations, forcemains and gravity sewer that extends west along 140th Street from the decommissioned Rosemount Wastewater Treatment Facility (WWTF). The interceptor is located east of State Highway 52, along the north side of 140th Street, crossing Highway 52, then flows south to County State Aid Highway (CSAH) 42, where it turns west and flows along CSAH 42 to Biscayne Avenue. At Biscayne Avenue the interceptor line flows south following Biscayne Avenue to the Empire WWTF. The Rosemount Interceptor sewer is primarily gravity sewer, increasing in size from 36-inch to 48-inch at the intersection of Akron Avenue/CSAH 42. The Apple Valley Interceptor carries approximately ¼ of the wastewater flow generated from the City south to the Empire WWTF.

All of the flow generated from within the study area will be directed to MCES's Rosemount Interceptor sewer that discharges to the Empire WWTF. The Empire WWTF has an average day treatment capacity of 24 MGD.

Development Scenario 1:

Development within the study area will be connected to the municipal sewer system which ultimately flows to the MCES interceptors. Development within the study area consists of residential with varying densities, office and business park, light industrial, and four community centers composed of residential land uses with varying densities and commercial land use. **Table 18-2** below totals the development plans with

proposed population density assumptions to determine the wastewater flow for the study area. The unit demand summarized below was determined through population, number of units, and wastewater usage. It was assumed that wastewater generation is 80 gallons per day per capita (gpcd) for Low Density and Low-Medium Density Residential, 85 gpcd for Medium Density Residential, and 90 gpcd for High Density Residential. Non-residential demands were estimated based on MCES sewer availability charge (SAC) criteria. Each SAC unit was based on 14 employees where one SAC unit equals 274 gallons per day (GPD). The estimated peak flow factor was developed from MCES's standard peaking factors and was applied to the accumulated flow in each pipe within the sewer network.

Table 18-2. Estimated Average Day Wastewater Flow from Scenario 1

Type	Gross Acres	Net Acres (80% Gross Acres)	Wastewater Flow per Unit (GPAD)	Avg. Day Wastewater Flow (GPD)
Low Density Residential	1014	811	896	727,045
Low-Med Density Residential	739	591	1152	681,315
Medium Density Residential	465	372	2448	910,916
High Density Residential	6	5	3013	14,148
Neighborhood Center				
Low-Med Density Residential	19	15	1,156	17,789
Medium Density Residential	64	51	2,448	125,554
High Density Residential	32	26	3,021	77,465
Retail/Commercial/Office	13	10	854	8,763
Village Center				
Medium Density Residential	44	35	2449	86,194
High Density Residential	50	40	3024	121,651
Retail/Commercial/Office	31	25	1219	30,658
Community Center				
Medium Density Residential	17	14	2446	33,608
High Density Residential	11	9	3039	27,839
Retail/Commercial/Office	86	69	609	41,808
Regional Center				
Medium Density Residential	8	7	2449	16,091
High Density Residential	8	7	3032	19,923
Retail/Commercial	148	118	609	72,044
Office/Business Park				
Office/Business Park	284	227	710	161,399
Light Industrial				
Light Industrial	180	144	294	42,399
Open Space				
Open Space	939	939	NA	NA
Open Water				
Open Water	259	259	NA	NA
ROW (Collectors/Arterials)				
ROW (Collectors/Arterials)	492	492	NA	NA
Local Streets/Neighborhood Parks				
Local Streets/Neighborhood Parks		644	NA	NA
Total	4911	4911		3,216,608

Table 18-3 summarizes the estimated ultimate wastewater flow by MCES connection point. **Figure 18-2** shows the proposed trunk sewer system layout to collect wastewater from the study area and sewer districts at connection locations along the Rosemount Interceptor.

Table 18-3. Estimated Ultimate Regional Wastewater Flow by MCES Connection Point from Scenario 1

MCES Manhole (City of Rosemount ID No.)	Sewer Shed	Gross Acreage	Net Acreage	Ultimate Average Flow (MGD)	Ultimate Peak Flow (MGD)
210	Central	937	750	1.01	3.21
226	East	1152	922	0.95	2.87
633	Northwest	710	568	0.82	2.86
643	Southwest	422	338	0.44	1.55

Table 18-4 summarizes the estimated wastewater characteristics and loading for the wastewater that will be generated under Development Scenario 1.

Table 18-4. Estimated Wastewater Characteristics and Total Average Daily Wastewater Loading from Scenario 1

Parameter	Estimated Wastewater Characteristics and Average Daily Loading	
	mg/l	lbs/day
Biochemical Oxygen Demand	220	5,902
Total Suspended Solids	220	5,902
Ammonia - Nitrogen	25	671
Total Phosphorous	8	215

Under this development scenario all of the flow generated from the study area will be directed south to MCES's Empire WWTF. Average daily flow was estimated to be 3.22 MGD (2,234 gpm).

The proposed trunk sewer system layout was developed consistent with the City's Comprehensive Sanitary Sewer System Plan (CSP) and proposed street locations in the study area.

Sanitary sewer flows were generated for each sewer district based on the net developable acreage and the anticipated land use. The wastewater flow generation rates for the various land use categories discussed in this section were used to project future wastewater flows.

The sanitary sewer system was developed using the existing MCES interceptors as municipal sewer system discharge points. Future trunk sewers were laid out based on ground contours which govern how far the gravity trunk sewers can feasibly be

extended. All trunk sewers were designed to be no deeper than 40 feet, and no shallower than 8 feet from the existing ground surface.

Gravity sewer mains, lift stations, and forcemains needed to accommodate the ultimate service area were then sized for peak sanitary sewer flows from those sub-districts which are tributary to each particular trunk gravity sewer main or lift station.

The proposed trunk sewer system layout to serve development included in Scenario 1 is shown in **Figure 18-3**. With varying ground elevations, three new lift stations will be required to convey the wastewater to the Rosemount Interceptor. The proposed trunk sewer system layout results in the highest future flow to the MCES lift station along CSAH 42. There is potential for alternative sanitary sewer layouts where the flow can be directed downstream of the MCES lift station or west to the Rosemount Interceptor adjacent to Biscayne Avenue.

Development Scenario 2:

This scenario is similar to Scenario 1. The land use area are the same as Scenario 1, however the development densities have been decreased. As discussed in Scenario 1, it was assumed that wastewater usage per capita is 80 gpcd for Low Density and Low-Medium Density Residential, 85 gpcd for Medium Density Residential, and 90gpcd for High Density Residential. Non-residential demands were estimated based on MCES SAC criteria. Each SAC unit was based on 14 employees where one SAC unit equals 274 gallons per day (GPD). The estimated peak flow factor was developed from MCES's standard peaking factors and was applied to the accumulated flow in each pipe within the sewer network. **Table 18-5** summarizes the estimated wastewater flow generated from the study area under Scenario 2.

Table 18-5. Estimated Average Day Wastewater Flow from Scenario 2

Type	Gross Acres	Net Acres (80% Gross Acres)	Wastewater Flow per Unit (GPAD)	Avg. Day Wastewater Flow (GPD)
Low Density Residential	1014	776	576	447,154
Low-Med Density Residential	739	626	912	571,390
Medium Density Residential	465	372	1836	683,187
High Density Residential	6	5	2250	10,566
Neighborhood Center				
Low-Med Density Residential	19	15	911	14,023
Medium Density Residential	64	51	1,837	94,187
High Density Residential	32	26	2,264	58,054
Retail/Commercial/Office	13	10	854	8,763
Village Center				
Medium Density Residential	44	35	1835	64,603
High Density Residential	50	40	2268	91,238
Retail/Commercial/Office	31	25	1219	30,658
Community Center				
Medium Density Residential	17	14	1835	25,206
High Density Residential	11	9	2280	20,879
Retail/Commercial/Office	86	69	609	41,808
Regional Center				
Medium Density Residential	8	7	1840	12,090
High Density Residential	8	7	2277	14,965
Retail/Commercial	148	118	609	72,044
Office/Business Park				
Office/Business Park	284	227	710	161,399
Light Industrial	180	144	294	42,399
Open Space				
Open Space	939	939	NA	NA
Open Water				
Open Water	259	259	NA	NA
ROW (Collectors/Arterials)				
ROW (Collectors/Arterials)	492	492	NA	NA
Local Streets/Neighborhood Parks				
Local Streets/Neighborhood Parks		644	NA	NA
Total	4911	4911		2,464,612

Table 18-6 summarizes the estimated ultimate wastewater flow by MCES connection point.

Table 18-6. Estimated Ultimate Regional Wastewater Flow by MCES Connection Point from Scenario 2

MCES Manhole (City of Rosemount ID No.)	Sewer Shed	Gross Acreage	Net Acreage	Ultimate Average Flow (MGD)	Ultimate Peak Flow (MGD)
210	Central	937	750	0.74	2.46
226	East	1152	922	0.78	2.41
633	Northwest	710	568	0.62	2.24
643	Southwest	422	338	0.32	1.18

Table 18-7 summarizes the estimated wastewater characteristics and loading for the wastewater that will be generated under Development Scenario 2.

Table 18-7. Estimated Wastewater Characteristics and Total Average Daily Wastewater Loading from Development Scenario 2

Parameter	Estimated Wastewater Characteristics and Average Daily Loading	
	mg/l	lbs/day
Biochemical Oxygen Demand	220	4,522
Total Suspended Solids	220	4,522
Ammonia - Nitrogen	25	514
Total Phosphorous	8	164

Consistent with Scenario 1, all of the flow generated from the study area will be directed south to MCES's Empire WWTF. Average daily flow was estimated to be 2.46 MGD (1,712 gpm). The method for design of the trunk sewer system layout is discussed in the Scenario 1 section. The proposed trunk sewer system layout to serve development included in Scenario 2 is shown in **Figure 18-4**, which is the same as the proposed trunk sewer system layout for Scenario 1. With varying ground elevations, three new lift stations will be required to convey the wastewater to the Rosemount Interceptor. The proposed trunk sewer system layout results in the highest future flow to the MCES lift station along CSAH 42. There is potential for alternative sanitary sewer layouts where the flow can be directed downstream of the MCES lift station or west to the Rosemount Interceptor adjacent to Biscayne Avenue.

Development Scenario 3:

Development densities in Scenario 1 and 3 were consistent, but land use areas and locations are different. Land uses in the eastern portion of the study area were changed from lower density residential to higher densities or to industrial or business park. As discussed in the previous scenarios, it was assumed that wastewater usage per capita is 80 gpcd for Low Density and Low-Medium Density Residential, 85 gpcd for Medium

Density Residential, and 90gpcd for High Density Residential. Non-residential demands were estimated based on MCEs SAC criteria. Each SAC unit was based on 14 employees where one SAC unit equals 274 gallons per day (GPD). The estimated peak flow factor was developed from MCEs's standard peaking factors and was applied to the accumulated flow in each pipe within the sewer network. **Table 18-8** summarizes the estimated wastewater flow generated from the study area under Scenario 2.

Table 18-8. Estimated Average Day Wastewater Flow from Scenario 3

Type	Gross Acres	Net Acres (80% Gross Acres)	Wastewater Flow per Unit (GPAD)	Avg. Day Wastewater Flow (GPD)
Low Density Residential	784	645	896	577,541
Low-Med Density Residential	755	587	1152	676,226
Medium Density Residential	412	330	2448	807,373
High Density Residential	6	5	3013	14,148
Neighborhood Center				
Low-Med Density Residential	19	15	1,156	17,789
Medium Density Residential	64	51	2,448	125,554
High Density Residential	32	26	3,021	77,465
Retail/Commercial/Office	13	10	854	8,763
Village Center				
Medium Density Residential	44	35	2449	86,194
High Density Residential	50	40	3024	121,651
Retail/Commercial/Office	31	25	1219	30,658
Community Center				
Medium Density Residential	17	14	2446	33,608
High Density Residential	11	9	3039	27,839
Retail/Commercial/Office	86	69	609	41,808
Regional Center				
Medium Density Residential	8	7	2449	16,091
High Density Residential	8	7	3032	19,923
Retail/Commercial	148	118	609	72,044
Office/Business Park				
Office/Business Park	462	370	710	262,645
Light Industrial	269	215	294	63,277
Open Space				
Open Space	939	939	NA	NA
Open Water				
Open Water	259	259	NA	NA
ROW (Collectors/Arterials)				
ROW (Collectors/Arterials)	492	492	NA	NA
Local Streets/Neighborhood Parks				
Local Streets/Neighborhood Parks		644	NA	NA
Total	4911	4911		3,080,595

Table 18-9 summarizes the estimated ultimate wastewater flow by MCES connection point.

Table 18-9. Estimated Ultimate Regional Wastewater Flow by MCES Connection Point from Scenario 3

MCES Manhole (City of Rosemount ID No.)	Sewer Shed	Gross Acreage	Net Acreage	Ultimate Average Flow (MGD)	Ultimate Peak Flow (MGD)
210	Central	937	750	1.01	3.24
226	East	1152	922	0.82	2.46
633	Northwest	710	568	0.82	2.86
643	Southwest	422	338	0.44	1.55

Table 18-10 summarizes the estimated wastewater characteristics and loading for the wastewater that will be generated under Development Scenario 3.

Table 18-10. Estimated Wastewater Characteristics and Total Average Daily Wastewater Loading from Scenario 3

Parameter	Estimated Wastewater Characteristics and Average Daily Loading	
	mg/l	lbs/day
Biochemical Oxygen Demand	220	5,652
Total Suspended Solids	220	5,652
Ammonia - Nitrogen	25	642
Total Phosphorous	8	206

Consistent with Scenario 1 and Scenario 2, all of the flow generated from the study area will be directed south to MCES's Empire WWTF. Average daily flow was estimated to be 3.08 MGD (2,139 gpm). The method for design of the trunk sewer system layout is discussed in the Scenario 1 section. The proposed trunk sewer system layout to serve development included in Scenario 3 is shown in **Figure 18-5**, which is the same as the proposed trunk sewer system layout for Scenario 1. With varying ground elevations, three new lift stations will be required to convey the wastewater to the Rosemount Interceptor. The proposed trunk sewer system layout results in the highest future flow to the MCES lift station along CSAH 42. There is potential for alternative sanitary sewer layouts where the flow can be directed downstream of the MCES lift station or west to the Rosemount Interceptor adjacent to Biscayne Avenue.

ii) Wastewater Mitigation Plan

- **Figures 18-3, 18-4, and 18-5** show conceptual layout of gravity sewers, lift stations and forcemains to serve the proposed study area under each scenario. All of the scenarios maintain an identical pipe layout network and can be identified by sewer district or Rosemount Interceptor connection points as defined in **Figure 18-2**.

- The East sewer district consists primarily of gravity sewers, and two lift stations and forcemains that convey wastewater north to the Rosemount Interceptor along County Road (CR) 42. The south lift station capacity ranges from 700 gpm to 900 gpm and the north lift station capacity ranges from 1,700 gpm to 2,000 gpm in capacity, depending on the scenario. Sewers within the East sewer district range between 8" and 21" in diameter.
- The Central sewer district consists of primarily gravity sewers, and one lift station and forcemain that convey the wastewater north to the Rosemount Interceptor along CR 42. The lift station ranges in capacity from 1,600 gpm to 2,000 gpm depending on the scenario. Sewers within the Central sewer district range in size from 8" to 24" in diameter.
- The Northwest sewer district consists of all gravity sewers which flows to the north and discharges to the Rosemount Interceptor along CR 42. The gravity sewer ranges in size from 8" to 21" depending on the scenario.
- Similar to the Northwest sewer district, the Southwest sewer district consists of all gravity sewers. Wastewater flows to the west where it discharges to the Rosemount Interceptor along Biscayne Ave. The gravity sewers in the Southwest district range in size from 8" to 15" in diameter.

19) GEOLOGIC HAZARDS AND SOIL CONDITIONS

- A. Approximate depth (in feet) to groundwater: 40' – 50' minimum**
Approximate depth (in feet) to bedrock*: 25' minimum; 150' average

*See Figure 19-4.

- B. 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.**

Information from the MPCA, the Minnesota Geological Survey, and the Department of Geology and Geophysics at the University of Minnesota indicate that the UMore site is not within an active karst area (Figure 19-6). Based on information from the University of Minnesota, the site may be a "Covered Karst" condition where carbonate bedrock exists, but under more than 100 feet of sediment cover. Portions of the site may also be "Transition Karst" with more than 50 feet of sediment cover. These two conditions would be consistent with bedrock depths on the site. More significant limitations based on karst landscapes exist south and east of the study area in Dakota County.

No limestone or sinkholes are known to exist on the site.

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

i) **SOILS**

The soils within the study area are typical of those in the City of Rosemount and Empire Township; generally sandy and conducive to infiltration. Waukegan is the dominant soil type on the UMore property. The NRCS assigns soils to 4 different hydrologic groups A, B, C and D. Most of the area has hydrologic soils in group B with some areas of A and C. Group A soils are characterized as having a high infiltration rate even when wet with low runoff potential. Group B soils have moderate infiltration characteristics with low runoff potential. Group C soils infiltrate at a slower rate resulting in a higher runoff potential. All of the soils present on the site are listed in **Table 19-1** and are also shown on **Figure 19-1**.

Soils on the UMore site are conducive to development. With the exception of a very small area in the northeast corner of the site, they are not hydric (**Figure 19-2**) and very few areas have limitations for basement suitability (**Figure 19-3**).

According to the Dakota County Soil Survey, Waukegan silt loam (0 to 1 percent slopes) is the predominate soil type on the UMore property. Waukegan is a well-drained soil on loamy, mantled outwash plains and stream terraces. Individual areas are typically irregular in shape and range from about 5 to 200 acres in size. Permeability of Waukegan soil is moderate in the silty mantle and rapid in the sandy underlying material. The available water capacity is moderate, and runoff is very slow. The seasonal high water table is below a depth of 6 feet and throughout Dakota County, most areas of this soil are cropland.

The Dakota County Soil Survey further discusses the Urban Land-Waukegan Complex (0 to 1 percent slope) which is the second largest soil type on the subject property. In Rosemount and Empire Townships, these soil types consist of cut and fill land in which the original soil material has been so altered that individual horizons are indistinguishable. Generally, the sandy underlying material has been mixed into the loamy surface layer and subsoil. Construction of the Gopher Ordnance Works was the primary reason for large areas of Waukegan soils being placed into the Urban Land classification.

The Urban Land-Waukegan soils have characteristics that are in many ways identical to those of the undisturbed Waukegan soils. They are well suited to buildings and the construction of roads providing that proper base materials are provided as part of the roadway subgrade.

Table 19-1. Soil Types

Map Symbol	Map Unit Name	Description	Hydrologic Group	Hydric	Drainage	Erosion Hazard	Suitability for Dwellings w/ Basements
1027	Udorthents	Wet		Unknown		Not rated	Not rated
1029	Pits	Gravel		Unknown		Not rated	Not rated
150B	Spencer	Silt-Loam	C	Partially hydric	Moderately well drained	Moderate	Very limited
1816	Kennebec	Variant Silt-Loam	C	Partially hydric	Moderately well drained	Slight	Somewhat limited
250	Kennebec	Silt-Loam	C	Not hydric	Moderately well drained	Slight	Somewhat limited
279B	Otterholt	Silt-Loam	B	Partially hydric	Well drained	Moderate	Not limited
279C	Otterholt	Silt-Loam	B	Partially hydric	Well drained	Severe	Somewhat limited
301B	Lindstrom	Silt-Loam	B	Not hydric	Well drained	Slight	Not limited
342B	Kingsley	Sandy-Loam	C	Partially hydric	Well drained	Moderate	Not limited
39A	Wadena	Loam	B	Not hydric	Well drained	Slight	Not limited
39B	Wadena	Loam	B	Not hydric	Well drained	Slight	Not limited
39B2	Wadena	Loam	B	Not hydric	Well drained	Moderate	Not limited
39C	Wadena	Loam	B	Not hydric	Well drained	Moderate	Not limited
39D	Wadena	Loam	B	Not hydric	Well drained	Moderate	Very limited
411A	Waukegan	Silt-Loam	B	Not hydric	Well drained	Slight	Not limited
411B	Waukegan	Silt-Loam	B	Not hydric	Well drained	Moderate	Not limited
411C	Waukegan	Silt-Loam	B	Not hydric	Well drained	Severe	Somewhat limited
415B	Kanaranzi	Loam	B	Not hydric	Well drained	Slight	Not limited
41B	Estherville	Sandy-Loam	A	Not hydric	Somewhat excessively drained	Slight	Not limited
454B	Mahtomedi	Loamy-Sand	A	Not hydric	Excessively drained	Slight	Not limited
611C	Hawick	Coarse Sandy-Loam	A	Not hydric	Excessively drained	Moderate	Somewhat limited
611D	Hawick	Coarse Sandy-Loam	A	Not hydric	Excessively drained	Moderate	Very limited
611E	Hawick	Loamy-Sand	A	Not hydric	Excessively drained	Severe	Very limited
857A	Urban land- Waukegan	Urban		Not hydric		Not rated	Not rated
857B	Urban land- Waukegan	Urban		Not hydric		Not rated	Not rated
858C	Urban land- Chetek	Urban		Not hydric	Somewhat excessively drained	Not rated	Not rated
865B	Urban land- Hubbard	Urban		Not hydric	Excessively drained	Not rated	Not rated
895B	Kingsley- Mahtomedi- Spencer		C	Not hydric	Moderately well drained	Moderate	Not limited
895C	Kingsley- Mahtomedi- Spencer		C	Not hydric	Moderately well drained	Severe	Somewhat limited

ii) GROUNDWATER

A number of detailed studies have been completed and provide data on the groundwater conditions in the UMore Park AUAR project area. These studies have included using test wells to assess groundwater flow, recharge rates, temperature, and water quality. Data from these and other studies have been used to evaluate the potential impacts of future site uses on groundwater. Two key topics addressed in these studies are groundwater recharge and groundwater quality impacts.

Groundwater Recharge

Surface soil and underlying geologic units in the area are conducive to infiltration, thus little runoff occurs from the property. Potential impacts of future development on groundwater recharge are typical of urban development and include reduced infiltration to groundwater due to soil compaction and construction of impervious ground cover (e.g., pavement and buildings). Through sustainable site planning, storm water management, and construction practices, potential impacts to groundwater recharge caused by urban development can be mitigated.

Groundwater Quality Impacts

Regional agricultural practices have resulted in nitrate concentrations in shallow groundwater above state and federal and drinking water standards at and upgradient of the site. As urban development replaces agriculture land use, it is assumed that less nitrate-based fertilizer will be applied to the ground in the project area and local nitrate contributions to groundwater will decrease. However, nitrate concentrations in shallow groundwater will likely remain above drinking water standards due to agricultural practices in the region.

Historical use on the subject property has resulted in limited impacts to groundwater quality. The former University of Minnesota Rosemount Research Center Burn Pit (UMRRC Burn Pit) was identified as the source of groundwater impacts in the mid-1980s and was mitigated under an agreement between the University and the Minnesota Pollution Control Agency (MPCA). Mitigation measures, which were designed to eliminate human health risks by providing safe drinking water to affected residences, were achieved with the construction of a community rural water supply system and the operation of a groundwater extraction and treatment system. The MPCA approved the shutdown of the groundwater extraction and treatment system in 1991 after groundwater impacts were confirmed to be lower than the applicable health-based drinking water standards. Samples collected during recent studies from existing and newly installed monitoring wells indicate that groundwater impacts associated with the UMRRC Burn Pit continue to decrease. The United States Environmental Protection Agency concluded in 2012 that the groundwater remedy remains protective of human health and the environment and groundwater does not exceed health risk levels.

iii) SCENARIOS 1, 2 AND 3

Proposed land uses within the study area will include a mix of residential, commercial, industrial and park and open space uses. All development will be served by municipal water and sanitary sewer systems. Commercial and industrial uses are anticipated to be

clean uses; a mix of offices, warehouses, light assembly operations, and research and development. The Concept Master Plan prepared by the University of Minnesota advocates the establishment of an eco-industrial park that would include uses that would typically have a symbiotic relationship, using the by-products of one operation as a resource for another. The nature of the full complement of future land uses on the UMore property is not expected to present a hazard to groundwater contamination since contaminants are either not expected to be present within the area or will be properly addressed in full accordance with State and Federal requirements.

In order to meet the daily needs of future residents and businesses, the study area is expected to see development of typical urban commercial services uses, some of which will have limited potential for groundwater contamination. Gas stations and convenience stores with gas are the most common uses with some contamination potential. These developments will be required to adhere to State regulations for containment of underground petroleum tanks thereby limiting the risk potential.

Based on the proposed land uses depicted in Scenarios 1, 2 and 3, the potential for groundwater contamination and/or adjacent drinking well contamination should be no greater than, and is expected to be less than, the potential that exists with the existing agricultural land use. The pesticides and fertilizers that are used in agricultural uses currently are allowed to run off the site and/or infiltrate into the ground, thus having the potential to contaminate existing wells.

iv) GEOLOGIC HAZARDS AND SOIL CONDITIONS MITIGATION MEASURES

- The NPDES Phase II Construction Site permit will be required for development within the study area. This permit requires a site specific Storm Water Pollution Prevention Plan (SWPPP) to be completed for construction. This SWPPP is required to include pollution prevention management measures for solid waste and hazardous material spills that occur during construction.
- Development or construction work will require conformance with the City spill response plan. Spills will be reported to the Minnesota State Duty Office and 911, along with applicable City staff. Those authorities will in turn notify any other appropriate officials depending on the nature of the incident.
- For all gas stations with underground tanks, annual licensing from the MPCA will be needed.
- The area of partially hydric soils in the northeast corner of the site is proposed to remain as a natural open space area.
- Should any other conditions be identified during site redevelopment activities that have the potential to materially impact either groundwater recharge or groundwater quality, investigations will be conducted and mitigation measures will be identified to address the impact consistent with applicable State and Federal requirements.

- The City requests project proposers prepare and submit to the MPCA Construction Contingency Plans (“CCPs”) to help identify and address any potential releases of hazardous substances that may be encountered during construction activities. Phase I Environmental Site Assessments should also be completed for the proposed project area and submitted to MPCA along with the CCPs.
- Any business or institutional uses that use or store petroleum or other hazardous products will be subject to local and state rules regulating such uses.

v) GEOLOGIC HAZARDS AND SOIL CONDITIONS MITIGATION MEASURES

- The NPDES Phase II Construction Site permit will be required for development within the study area. This permit requires a site specific Storm Water Pollution Prevention Plan (SWPPP) to be completed for construction. This SWPPP is required to include pollution prevention management measures for solid waste and hazardous material spills that occur during construction.
- Development or construction work will require conformance with the City spill response plan. Spills will be reported to the Minnesota State Duty Office and 911, along with applicable City staff. Those authorities will in turn notify any other appropriate officials depending on the nature of the incident.
- For all gas stations with underground tanks, annual licensing from the MPCA will be needed.
- The area of partially hydric soils in the northeast corner of the site is proposed to remain as a natural open space area.
- Should any other conditions be identified during site redevelopment activities that have the potential to materially impact either groundwater recharge or groundwater quality, investigations will be conducted and mitigation measures will be identified to address the impact consistent with applicable State and Federal requirements.
- The City requests project proposers prepare and submit to the MPCA Construction Contingency Plans (“CCPs”) to help identify and address any potential releases of hazardous substances that may be encountered during construction activities. Phase I Environmental Site Assessments should also be completed for the proposed project area and submitted to MPCA along with the CCPs.
- Any business or institutional uses that use or store petroleum or other hazardous products will be subject to local and state rules regulating such uses.

20) SOLID WASTES, HAZARDOUS WASTES, STORAGE TANKS

For an AUAR, generally 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. No response is necessary for b. For c, potential locations of storage tanks associated with commercial uses in the AUAR should be identified (e.g., gasoline tanks at service stations).

- 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.

No hazardous wastes, solid animal manure, sludge and/or ash are anticipated to be produced by the development scenarios. Municipal solid waste (MSW) that is generated by future urban development under scenarios 1, 2, and 3 will be hauled away by the municipal garbage service. Residents and businesses within the community will be encouraged to reduce generation of municipal solid waste through both traditional recycling initiatives but also through innovative development and programmatic strategies. Dakota County Solid Waste Management Ordinance (No. 110) and Hazardous Waste Ordinance (No. 111) will apply to the study area.

The University is a generator of new knowledge and ideas. The development of UMore Park presents an unprecedented opportunity to accommodate future growth in a manner that can become a model for sustainability. UMore Park has the potential to help transform the regional economy by providing new employment opportunities and a stronger connection between locally sourced and produced goods and nearby populations. Forward-looking strategies and aspirational goals have been explored through various master planning and research that examine how UMore Park inhabitants can achieve principals of sustainability including zero waste (see **Appendix B**). Scenario 4, which is the scenario that assumes continued use and operations of UMore Park in its current state, will have no additional generation waste beyond its current use for the site.

The following table represents estimated quantities of municipal solid waste and recycling that will be generated annually for the 4 development scenarios.

Table 20.1 Estimated MSW Quantities

Development Scenario	Estimated Employment	Estimated Population	Annual Gross MSW in Tons	MSW Recycled in Tons	Annual Net MSW
Scenario 1	18,242	34,518	43,172	21,586	21,586
Scenario 2	18,242	25,278	36,240	18,120	18,120
Scenario 3	24,483	31,422	46,760	23,380	23,380
Scenario 4	NA	NA	NA	NA	NA

Quantities were based on the population and employment projections as outlined in responses to **Section 6** (see **Tables 6.1, 6.2** and **6.3**). The following methodology and assumptions were used to calculate estimated MSW quantities.

- Annual tons per capita for residential uses 0.75
- Annual tons per employee for commercial uses 0.95
- Annual per capita and per employee rates were generated based on the following data:
 - Dakota County Population 398,552
 - Dakota County Jobs 170,000
 - 2010 Dakota County MSW Tonnage 460,000
 - Percent Residential/Commercial 65/35
- Fifty percent of solid waste generated is recycled and removed from the MSW stream. The Dakota County Solid Waste Master Plan 2012-2030 cited an actual reduction in MSW in Dakota County as a result of recycling was 44% in 2008 and 45% in 2010. The MPCA cites in its Report on 2011 SCORE Programs, a reduction of 45% in 2011 due to recycling state wide, which reflects of an upward trend in recycling. Long term goals in Dakota County for recycling are to reduce the MSW stream by 54-60% by 2030. These percentages do not include yard waste recycling material. The 50% figure is arrived at for use in the AUAR based on a projection that progress will be made towards achieving the county goals and as a result of the University's vision for sustainability and zero waste for UMore Park.

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 or 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: No response is necessary for AUAR 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: For AUAR Item 20.c, potential locations of storage

tanks associated with commercial uses in the AUAR should be identified (e.g. gasoline tanks or service stations)

Scenarios 1-3 propose various nodes of commercial development that will likely have small quantities of petroleum products or other materials typical of urban retail commercial development. In some cases gas stations or service stations will exist and will likely have underground storage tanks associated with the businesses. These locations can be seen on each of the Scenario Land Use Maps (**Figure 6-1 to 6-3**) labeled as: Neighborhood Center, Village Center, Community Center, Regional Center, Business Park, and Industrial.

i) Solid Waste, Hazardous Waste, and Storage Tank Mitigation Plan

Any business or institutional uses that use or store petroleum or other hazardous products will be subject to local and state rules regulating such uses.

21) TRAFFIC

Parking spaces added Not Necessary for AUAR . **Existing spaces (if project involves expansion)** NA .

Estimated maximum peak hour traffic generated (if known) and time of occurrence See information below .

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.

A. Background

As part of Item #21 – Traffic, the following items have been addressed as summarized below:

- The anticipated estimated daily, AM, and PM peak hour traffic generated from the UMore property under each development scenario.
- The anticipated traffic impact on the area roadways as a result of the proposed development of the UMore property.
- The anticipated impact on the regional transportation system as a result of the proposed development of the UMore property.
- Determination of anticipated transportation improvements to mitigate identified impacts from traffic generated by the proposed UMore property.

The existing conditions were analyzed as the baseline for the future year analysis. Four development scenarios were analyzed including the no-build and three build scenarios. Each build scenario contains a mixture of uses including, residential, light industrial, office, retail and open space.

Future land development will have an impact on the operations of roadways and intersections in the project area. Increased trips from future development scenarios will be used to forecast future traffic volumes and evaluate traffic operations on the roadway system within the study area.

The year 2030 was assumed for the traffic analysis of each scenario for the full build of the site. The year was selected to represent the current transportation system analysis time

horizon used by the City of Rosemount, Empire Township, Dakota County, and Metropolitan Council. Full build out in the study area is likely to occur beyond the analysis time horizon. In addition, although concept planning has occurred within the study area, anticipated phasing of the planned development has not yet been finalized. It is anticipated that this analysis will be ~~updated~~ evaluated based on one or more of the following potential triggers:

- With each proposed development proposal
- With the City of Rosemount's, Empire Township and/or Dakota County's Comprehensive Plan updates
- With the 5-year AUAR ~~update~~ evaluation process

This study was developed with consideration of the transportation and land use elements of the following documents:

- *Rosemount / Empire / UMore Area Transportation System Study*
- *Highway 52/42/55 Interchange and Highway 55 Regional Corridor Study*
- *Dakota County CSAH 42 Access Plan*
- *Highway 52 IRC Management Plan*
- *CSAH 42 / Akron Avenue AUAR*
- *Empire Mining EIS*
- *UMore Gravel Mine EIS*
- *City of Rosemount Transportation Plan*
- *Dakota County 2030 Transportation Plan*
- *Empire Township 2030 Transportation Plan*

B. Existing (2012) Conditions

In order to evaluate the existing conditions, key roadway segments and intersections were selected that are expected to provide the primary access to the regional roadway system when the area develops. This section documents the geometry, traffic volumes, and functional class at these locations, and uses these traffic characteristics to estimate their existing traffic operations.

i) Key Roadways and Intersections

The following existing and future roadways were selected as the key roadway segments for the development site:

- CSAH 42 - TH 3 to US 52
- Boulder Trail (extension) – Biscayne Ave to Blaine Ave
- CSAH 46 - TH 3 to US 52
- Biscayne Ave – CSAH 42 to 170th St
- Akron Ave (CR 73) – CSAH 42 to 170th St
- Audrey Ave – CSAH 42 to 170th St
- Blaine Ave (CSAH 71) – CSAH 42 to CSAH 46

The transportation characteristics for the roadways are displayed in **Table 21-1**. The existing roadway section is documented, along with the existing functional classification.

The following existing and future intersections were selected because they provide primary access to the regional roadway system from the development site:

- CSAH 42 at TH 3
- CSAH 42 at Biscayne Ave
- CSAH 42 at 145th St
- CSAH 42 at CR 73 (Akron Ave)
- CSAH 42 at Audrey Ave
- CSAH 42 at CSAH 71 (Blaine Ave)
- CSAH 42 at US 52 SB Ramps
- CSAH 42 at US 52 NB Ramps
- Boulder Tr (extension) at Biscayne Ave
- Boulder Tr (extension) at Akron Ave
- Boulder Trail (extension) at Audrey Ave
- Boulder Tr (extension) at Blaine Ave
- CSAH 46 at TH 3
- CSAH 46 at Biscayne Ave
- CSAH 46 at Akron Ave
- CSAH 46 at Audrey Ave
- CSAH 46 at Blaine Ave
- CSAH 46 at US 52 SB Ramps/Frontage Rd W
- CSAH 46 at US 52 NB Ramps/Frontage Rd E

Table 21-1: Characteristics of Key Roadways

Roadway	Location	Facility Type	Functional Class
CSAH 42	TH 3 to US 52	4 Lane w/Turn Lanes	Principal Arterial
Boulder Trail (extension)	Biscayne Ave to Blaine Ave	(Future)	Future Major Collector
CSAH 46	TH 3 to Biscayne Ave	4 Lane w/Turn Lanes	Minor Arterial
CSAH 46	Biscayne Ave to US 52	2 Lane w/Turn Lanes	Minor Arterial
TH 3	CSAH 42 to CSAH 46	2 Lane w/Turn Lanes	Minor Arterial
Biscayne Ave	North of CSAH 42	2 Lane w/Turn Lanes	Major Collector
Biscayne Ave	CSAH 42 to 170 th St	Gravel	Local (Future Major Collector)
Akron Ave (CR 73)	North of CSAH 42	2 Lane w/ Turn Lanes	Major Collector (Future Minor Arterial)
Akron Ave	CSAH 42 to 170 th St	(Future)	Future Minor Arterial
Audrey Ave	CSAH 42 to 170 th St	(Future)	Future Major Collector
Blaine Ave (CSAH 71)	CSAH 42 to CSAH 46	2 Lane w/Turn Lanes	Minor Arterial
US 52	CSAH 42 to CSAH 46	4 Lane Freeway	Principal Arterial

Source: WSB & Associates, Inc. and City of Rosemount Transportation Plan (2008)

The existing (2012) AM and PM peak hour turn movement traffic volumes, lane geometry, traffic control and Average Daily Traffic (ADT) volumes for the existing key roadways are illustrated on **Figures 21-1A and 21-1B**. The traffic volumes were obtained from “Year 2011 MnDOT Traffic Flow Maps” and the “UMore Gravel Mine EIS”.

C. Existing (2012) Operations Analysis

Traffic operations were evaluated for the existing key roadway segments and intersections. This section describes the methodology used to assess the operations and provides a summary of how traffic is operating today. The detailed peak hour analysis is included in the **Appendix C**.

i) Analysis Methodology

The traffic operations analysis is derived from established methodologies documented in the “Highway Capacity Manual 2010” (HCM). The HCM provides a series of analysis techniques that are used to evaluate traffic operations.

The analysis techniques defined in the HCM is different for roadways and intersections. Roadway segment analysis focuses on the average daily volume to capacity ratio, while intersection analysis focuses on delay caused by the peak hour critical movements. It is

therefore possible to have an efficient intersection located along a poorly operating roadway segment, or a poorly operating intersection along an otherwise free-flowing arterial.

For purposes of this study, the roadway segment analysis was conducted at a planning level. The planning level analysis consists of comparing the average daily flow rates on a roadway segment to the ADT roadway segment traffic capacity threshold volumes for that facility type, as displayed in **Table 21-2**.

Table 21- 2: Roadway Segment Traffic Capacity Thresholds

Roadway Section	Capacity (vehicles per day)		
	Uncongested (LOS A – C)	Approaching Congestion (LOS D)	Congestion (LOS E – F)
Two-lane undivided urban	< 6,000	6,000 – 10,000	> 10,000
Two-lane undivided rural	< 11,000	11,000 – 15,000	> 15,000
Three-lane urban (two-lane with turn lanes)	< 12,000	12,000 – 17,000	> 17,000
Four-lane undivided urban	< 18,000	18,000 – 22,000	> 22,000
Five-lane urban (four-lane with turn lanes)	< 26,000	26,000 – 32,000	> 32,000
Four-lane divided rural	< 32,000	32,000 – 38,000	> 38,000
Six-lane divided urban	< 40,000	40,000 – 47,000	> 47,000
Eight-lane divided urban	< 53,000	53,000 – 63,000	> 63,000
Four-lane freeway	< 60,000	60,000 – 80,000	> 80,000
Six-lane freeway	< 90,000	90,000 – 120,000	> 120,000

Source: Derived from the Highway Capacity Manual

The intersection peak hour analysis utilizes micro-simulation computer modeling software (Synchro/SimTraffic). The methodology and results of this analysis are included in the **Appendix C**.

ii) Existing (2012) Level of Service Summary

The existing roadway segment traffic operations are displayed on **Table 21-3**. For purposes of this study, segments are classified as either uncongested, approaching congestion, or congested based on the ADT and estimated LOS. As shown on the table, no segments are classified as congested when using the LOS D/E boundary as the index of congestion. TH 3 and CSAH 46 are at LOS C conditions.

Table 21-3: Existing (2012) Roadway Segment Level of Congestion

Roadway	Location	ADT	LOS
CSAH 42	TH 3 to US 52	12,100	A
Boulder Trail (extension)	Biscayne Ave to Blaine Ave	(Future)	---
CSAH 46	TH 3 to Biscayne Ave	11,000	A
CSAH 46	Biscayne Ave to US 52	9,800	C
TH 3	CSAH 42 to CSAH 46	10,400	C
Biscayne Ave	North of CSAH 42	2,350	A
Biscayne Ave	CSAH 42 to 170 th St	760	A
Akron Ave (CR 73)	North of CSAH 42	365	A
Akron Ave	CSAH 42 to 170 th St	(Future)	---
Audrey Ave	CSAH 42 to 170 th St	(Future)	---
Blaine Ave (CSAH 71)	CSAH 42 to CSAH 46	800	A
US 52	CSAH 42 to CSAH 46	30,000	B

Source: Year 2011 MnDOT Traffic Flow Maps and WSB & Associates, Inc.

A summary of the existing (2012) peak hour traffic operations at the key intersections was completed and is included in the **Appendix C**. Based on the analysis the existing roadway network generally performs at acceptable conditions (LOS D or better) in the AM and PM peak hours. The only exception is the CSAH 42/US 52 NB Ramps intersection which operates at LOS E in the AM peak hour. This is due to high traffic volumes on CSAH 42 and a lack of traffic signals at the intersection to allow vehicles to clear the northbound approach.

D. Future 2030 Conditions

The purpose of this section is to identify the traffic impacts associated with the future development within the project area. For the UMore development, the no-build (existing land use and general traffic growth) and three full-build land use scenarios were evaluated. A detailed description of the scenarios can be found in **Item 6 Land Use**.

The analysis year of 2030 was selected based on the current time horizon for the City of Rosemount, Empire Township and Dakota County's Comprehensive plans. It is acknowledged that the full build out of the UMore site **will not** occur until much later possibly 2040/2050. However, this assumption does provide a worst case condition for 2030. The assumptions and analysis can be [reviewed and compared to the results in the AUAR updated](#) with each required 5 year AUAR [updateevaluation](#).

i) Future Roadway System and Functional Classification

The functional classification system is the creation of a roadway and street network which collects and distributes traffic from neighborhood streets to collector roadways to arterials and ultimately, the Metropolitan Highway System. Roads are placed into categories based on the degree to which they provide access to adjacent land versus

provide higher-speed mobility for “through” traffic. Functional classification is a cornerstone of transportation planning. Within this approach, roads are located and designed to perform their designated function.

The functional classification system used in the City of Rosemount and UMore development area conforms to the Metropolitan Council standards. The Metropolitan Council has published these criteria in the *Transportation Development Guide/Policy Plan*. This guide separates roadways into four main street classifications, including principal arterials, minor arterials, collectors, and local streets. These classifications address the function of state, county, and city streets from a standpoint of the safe and efficient movement of traffic while providing satisfactory access to residents and businesses located within the UMore development area and the City. The attached **Figure 21-2** illustrates the anticipated future functional classification system in the UMore development area. Although these locations are shown on the figure as conceptual, the functional classifications will be for the appropriate design and access configurations.

Under the following headings, information is provided for each of the respective functional classes, as well the roadways that fall under those classes in the study area. The descriptions of the characteristics of the functional classes provided below are based on Metropolitan Council information. It may be noted that these descriptions represent the “ideal conditions” and that not all roadways within that functional class will fit the specific description due to unique local conditions, history of the roadway, or other factors.

Principal Arterial Roadways: The metropolitan highway system is made up of the principal arterials in the region. Principal arterials include all Interstate freeways. Interstate freeways connect the region with other areas in the state and other states. They also connect the metro centers to regional business concentrations. The emphasis is on mobility as opposed to land access. They connect only with other Interstate freeways, other principal arterials, and select minor arterials and collectors. The principal arterials through or adjacent to UMore are:

- CSAH 42
- US 52

Minor Arterials: The emphasis of minor arterials is on mobility as opposed to access in the urban area; only concentrations of commercial or industrial land uses should have direct access to them. The minor arterial should connect to principal arterials, other minor arterials, and collectors. Connection to some local streets is acceptable. The Metropolitan Council has identified “A” minor arterials as streets that are of regional importance because they relieve, expand, or complement the principal arterial system. The minor arterials in the UMore development area are:

- CSAH 46
- CSAH 71 (Blaine Avenue)
- TH 3

- CR 73 (Akron Avenue) upgraded from Major Collector

Collector Streets: The collector system provides connection between neighborhoods and from neighborhoods to minor business concentrations. It also provides supplementary interconnections of major traffic generators within the metro centers and regional business concentrations. Mobility and land access are equally important. Direct land access should predominantly be to development concentrations. In order to preserve the amenities of neighborhoods while still providing direct access to business areas, these streets are usually spaced at one-half mile intervals in developed areas. Refer to **Figure 21-2** for proposed collector roadways (major and minor) within the UMore development area. The major collector roadways in the UMore development area are:

- Audrey Avenue
- Biscayne Avenue
- Boulder Trail (proposed east-west roadway extension)

Local Streets: Local streets provide the most access and the least mobility within the overall functional classification system. They allow access to individual homes, shops, and similar traffic destinations. Through traffic should be discouraged by using appropriate geometric designs and traffic control devices. Local streets in the in the UMore development area will be identified as detailed development plans are completed.

ii) Future 2030 No-Build Planned Roadway Improvements

Several roadway improvements were identified in the previous planning efforts / studies listed in the background section of this document. These improvements, listed below, were assumed to be in place as part of the future 2030 conditions traffic analysis.

1. Installation of traffic signals at the following CSAH 42 intersections:
 - Biscayne Ave
 - 145th St
 - Akron Ave
 - Audrey Ave
 - Blaine Ave
2. Interim improvements at CSAH 42 and US 52 SB and NB Ramps including signalization, bridge replacement and addition of turn lanes. These improvements would be in preparation of the future system interchange.
3. Installation of traffic signals at the following CSAH 46 intersections:
 - Biscayne Ave
 - US 52 SB and NB Ramps
4. Addition of turn lanes at the following intersections:
 - CSAH 42 and Biscayne Ave

- CSAH 46 and Biscayne Ave
 - CSAH 46 and Akron Ave
5. Lengthening of the eastbound left-turn lane at the CSAH 42/Biscayne Ave intersection
 6. Realignment of Akron Avenue to meet Biscayne Avenue south of 170th Street. Akron Avenue will act as a parallel reliever to TH 3.

These improvements are in accordance with the mitigation measures proposed in the “City of Rosemount Transportation Plan”, “Dakota County Transportation Plan”, “CSAH 42 / Akron Avenue AUAR”, and the “UMore Gravel Mine EIS”.

iii) Future 2030 No Build Traffic Conditions

The future 2030 No Build traffic volumes were based on the projected 2030 conditions from the Dakota County Transportation Plan Model which reflected the most recent comprehensive plan updates from the surrounding communities. A sub-area model for the study area was developed that incorporated the detailed Traffic Analysis Zones (TAZ) and data from the traffic demand model used by Dakota County. The results from the sub-area model were used for the 2030 No Build ADT forecasts. No other growth was assumed with the future 2030 No Build condition.

iv) Study Area Traffic Generation

Traffic Analysis Zones (TAZ) were developed for the study area in order to accurately assign traffic to the roadway network. **Figure 21-3** illustrates the TAZ’s in relationship to the primary roadway system.

Trip generation estimates were developed for each scenario using the “*Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Ed.*”, based on the anticipated land uses summarized in **Table 21-4**. Trips generated by the proposed development area are shown for average daily traffic (ADT), AM peak hour, and PM peak hour.

The trip generation rates were adjusted to reflect both pass by trips, those trips already on the roadway that would use the proposed development, and internal dual purpose trips, those trips that would travel between uses within each specific TAZ in the proposed development. It assumed that 15% to 20% of the trips used by retail/commercial/service uses would be pass-by and 10% of the development travel would be internal dual purpose trips within each TAZ.

Even with these adjustments the numbers of trips assumed to be generated by the study area is conservative. Future development of the UMore Park property will be a reflection of the University’s Concept Master Plan and is likely to provide land uses patterns that stress the inclusion of housing and employment, linked by convenient non-motorized vehicle and roadway connections. Development in such a manner has the potential to reduce motorized vehicle trips with the development as well as to destinations outside of UMore.

v) Site Traffic Trip Distribution

Trip distribution refers to the geographic orientation of vehicles approaching or departing a site. Analysis of the site's proposed land use alternatives and the intensity of the anticipated development indicates that some of the trips destined for the site will originate from within the development itself and include short trips, while other trips will originate outside the immediate UMore development area. Thus, it can be expected that those trips originating outside of the City will approach via TH 3, TH 52/55, CSAH 42 and CSAH 46. Trip distribution percentages based on the anticipated demographics and traffic characteristics of the area are shown in **Figure 21-4**.

Each land use within the study area also produces a directional trip distribution according to the time of day. The ITE trip generation manual provides directional trip distribution data that gives the percentage of vehicles entering and exiting the site for each land use type. For example, it can be expected that a large majority of the trips in the residential location would be leaving the area in the AM peak; similarly, most of the trips in the office and/or commercial area would be arrivals in the AM and departing during the PM peak.

Study Area Traffic Assignment

The future 2030 traffic volume estimates for each scenario were developed based on the trip generation estimates in **Table 21-4** and assigned to the roadway system based on the trip distribution shown in **Figure 21-4**. The projected 2030 traffic volumes were then added to the 2030 No Build (background) traffic to estimate the 2030 build traffic volumes.

The estimated AM and PM peak hour turning movements for both the No Build and Build conditions are shown in **Figures 21-5 to 21-8**. The estimated average daily traffic volumes for the No Build and Build scenarios are shown on **Figure 21-9**.

Table 21-4: Development Area Traffic Generation

Land Use	Time of Day	Scenario 1				Scenario 2				Scenario 3			
		Net Trips Generated			Total Land Use Units	Net Trips Generated			Total Land Use Units	Net Trips Generated			Total Land Use Units
		Total	In	Out		Total	In	Out		Total	In	Out	
Low Density Residential (ITE Code: 210)	Daily	27,040	13,520	13,520	811.4 acres	17,384	8,692	8,692	811.4 acres	20,908	10,454	10,454	627.4 acres
	AM Peak Hour	2,132	540	1,592		1,368	346	1,022		1,646	418	1,228	
	PM Peak Hour	2,840	1,788	1,052		1,827	1,152	675		2,199	1,385	814	
Low-Medium Density Residential (ITE Codes: 210, 231)	Daily	30,654	15,327	15,327	591.4 acres	24,268	12,134	12,134	591.4 acres	31,320	15,660	15,660	604.2 acres
	AM Peak Hour	2,554	673	1,881		2,021	534	1,487		2,607	687	1,920	
	PM Peak Hour	3,159	1,953	1,206		2,500	1,544	956		3,227	1,994	1,233	
Medium Density Residential (ITE Code: 231)	Daily	34,600	17,300	17,300	372.1 acres	25,960	12,980	12,980	372.1 acres	30,680	15,340	15,340	329.8 acres
	AM Peak Hour	2,994	760	2,234		2,240	567	1,673		2,653	673	1,980	
	PM Peak Hour	3,480	2,007	1,473		2,613	1,507	1,106		3,086	1,780	1,306	
High Density Residential (ITE Code: 223, 232)	Daily	424	212	212	4.7 acres	320	160	160	4.7 acres	424	212	212	4.7 acres
	AM Peak Hour	36	9	27		27	7	20		36	9	27	
	PM Peak Hour	44	27	17		33	20	13		44	27	17	
Light Industrial (ITE Codes: 110, 130, 150)	Daily	14,540	7,270	7,270	144.2 acres	14,540	7,270	7,270	144.2 acres	21,700	10,850	10,850	215.2 acres
	AM Peak Hour	1,708	1,438	270		1,708	1,438	270		2,548	2,146	402	
	PM Peak Hour	1,792	316	1,476		1,792	316	1,476		2,676	472	2,204	
Neighborhood Center (ITE Codes: 210, 223, 231, 232, 710, 820, 826)	Daily	11,589	5,795	5,794	102.6 acres	9,865	4,932	4,933	102.6 acres	11,589	5,795	5,794	102.6 acres
	AM Peak Hour	847	299	548		698	261	437		847	299	548	
	PM Peak Hour	1,190	647	543		1,016	546	470		1,190	647	543	
Village Center (ITE Codes: 223, 231, 232, 710, 820, 826)	Daily	21,678	10,838	10,840	100.5 acres	20,169	10,085	10,084	100.5 acres	21,678	10,838	10,840	100.5 acres
	AM Peak Hour	1,355	634	721		1,228	603	625		1,355	634	721	
	PM Peak Hour	2,244	1,141	1,103		2,090	1,052	1,038		2,244	1,141	1,103	
Community Center (ITE Codes: 223, 231, 232, 710, 720, 813, 820, 854, 881, 912, 932)	Daily	29,255	14,240	15,015	91.6 acres	28,811	14,023	14,788	91.6 acres	29,255	14,240	15,015	91.6 acres
	AM Peak Hour	1,327	793	534		1,285	784	501		1,325	796	529	
	PM Peak Hour	2,753	1,238	1,515		2,708	1,213	1,495		2,757	1,234	1,523	
Regional Center (ITE Codes: 223, 231, 232, 813, 820, 854, 862, 863, 875, 881, 912, 932, 936, 945)	Daily	60,752	30,376	30,376	131.5 acres	60,518	30,258	30,260	131.5 acres	60,752	30,376	30,376	131.5 acres
	AM Peak Hour	2,866	1,554	1,312		2,842	1,546	1,296		2,866	1,554	1,312	
	PM Peak Hour	5,306	2,672	2,634		5,282	2,660	2,622		5,306	2,672	2,634	
Office/Business Park (ITE Codes: 750, 770)	Daily	11,758	5,879	5,879	227.2 acres	11,758	5,879	5,879	227.2 acres	19,124	9,562	9,562	369.7 acres
	AM Peak Hour	1,519	1,351	168		1,519	1,351	168		2,470	2,200	270	
	PM Peak Hour	1,539	261	1,278		1,539	261	1,278		2,506	427	2,079	
Open Space (ITE Codes: 411)	Daily	1,776	888	888	938.5 acres	1,776	888	888	938.5 acres	1,776	888	888	938.5 acres
	AM Peak Hour	192	100	92		192	100	92		192	100	92	
	PM Peak Hour	200	100	100		200	100	100		200	100	100	
TOTAL TRIPS GENERATED:	Daily	244,066	121,645	122,421		215,369	107,301	108,068		249,206	124,215	124,991	
	AM Peak Hour	17,530	8,151	9,379		15,128	7,537	7,591		18,545	9,516	9,029	
	PM Peak Hour	24,547	12,150	12,397		21,600	10,371	11,229		25,435	11,879	13,556	

Source: ITE Trip Generation 9th Addition

vi) Future 2030 No-Build and Build Operations Analysis and Deficiencies

A summary of the expected traffic operations for the key roadway segments is illustrated in **Table 21-5** for the 2030 No Build and Build Scenarios 1, 2 and 3. As noted previously, the LOS D/E boundary was used as the index of congestion. Based on the results shown in **Table 21-5**, no segments of roadway are congested in the No Build scenario. Those segments congested in the Build scenarios include:

- CSAH 42 from TH 3 to US 52 with all scenarios as 4-lane and with scenarios 1 and 3 as 6-lane.
- TH 3 from CSAH 42 to CSAH 46 with all scenarios
- Blaine Avenue from CSAH 42 to CSAH 46 with scenarios 1 and 3

A summary of the expected future 2030 peak hour traffic operations at the key intersections is included in the **Appendix C**. The analysis of the peak hour 2030 No Build Condition shows the following roadway deficiencies:

- The intersection of TH 3 and CSAH 42 operates poorly, especially in the PM peak hour, due to a lack of lanes to handle the projected traffic volumes. The intersection operates at LOS F in the PM peak hour.
- The high southbound traffic volumes at the Blaine Avenue and CSAH 42 intersection, coupled with a single left-through-right lane, cause traffic to queue resulting in unacceptable LOS operations at the intersection in the PM peak hour.
- Even with signals installed at the CSAH 42/US 52 Ramp intersections, the lack of available turn lanes on the SB off-ramp and through lanes under the bridge severely degrade the operations at the intersection in both peak hours.

The analyses of the Full Build Scenarios show that most key intersections will operate at LOS F conditions in either the AM and/or PM peak hours without addition of turn lanes or additional through lanes.

vii) Future 2030 Highway Expansion Needs

Lane Needs: The County has identified anticipated 2030 highway expansion needs in the *"Dakota County 2030 Transportation Plan"*. These improvements would be considered completed with the no-build scenario. The plan is shown in **Figure 21-10A** and include the following in the study area:

- Expansion of CSAH 42 from 4 lanes to 6 lanes west of Biscayne Avenue
- Expansion of CSAH 42 from 2 lanes to 4 lanes east of TH 52
- Expansion of CSAH 46 from 4 lanes to 6 lanes west of Biscayne Avenue
- Expansion of CSAH 46 from 2 lanes to 4 lanes from Biscayne Avenue to TH 52
- Extension of CR 73 (Akron Ave) from CSAH 42 south as a 2 lane roadway
- Extension of CSAH 71 (Blaine Ave) south as a 2 lane roadway

Table 21-5: Future 2030 Roadway Segment Level of Congestion

Roadway	Location	2030 No Build		Full-Build Scenario 1		Full-Build Scenario 2		Full-Build Scenario 3	
		AADT	LOS	AADT	LOS	AADT	LOS	AADT	LOS
CSAH 42	TH 3 to US 52	27,000 - 28,000	D/B	48,000 - 52,000	F/F	42,000 - 45,000	F/D	49,000 - 53,000	F/F
Future E/W Collector	Biscayne Ave to Blaine Ave	(Future)	---	2,000 - 15,000	B	2,000 - 12,000	B	2,000 - 16,000	B
CSAH 46	TH 3 to US 52	14,000 - 25,000	B	28,000 - 32,000	D	28,000 - 31,000	D	28,000 - 33,000	D
TH 3	CSAH 42 to CSAH 46	21,000	E	25,000	F	24,000	F	25,000	F
Biscayne Ave	North of CSAH 42	4,500	B	11,000	C	9,000	C	11,000	C
Biscayne Ave	CSAH 42 to 170 th St	7,100	B	6,000 - 10,000	C	5,000 - 9,000	C	6,000 - 10,000	C
Akron Ave (CR 73)	North of CSAH 42	10,000	C	18,000	E	16,000	D	18,000	E
Akron Ave	CSAH 42 to 170 th St	1,000 - 2,200	A	9,000 - 22,000	C/D	8,000 - 19,000	C/D	9,000 - 22,000	C/D
Audrey Ave	CSAH 42 to 170 th St	(Future)	---	5,000 - 17,000	B/D	4,500 - 15,000	B/D	5,000 - 17,000	B/D
Blaine Ave (CR 71)	CSAH 42 to CSAH 46	1,200	A	15,000 - 18,000	E	13,000 - 16,000	D	17,000 - 20,000	E
US 52	CSAH 42 to CSAH 46	40,600	C	47,000	C	45,000	C	48,000	C

Source: WSB & Associates, Inc., D/B = 4-lane/6-lane

Based on the proposed development scenarios and the analysis included in this traffic study, potential additional roadway expansion would be needed to accommodate the study area traffic. The anticipated lanes needs are shown in **Figure 21-10B**. The additional lane needs over those identified in by the County include:

- Expansion of CSAH 42 from 4 lanes to 6 lanes Biscayne Ave to TH 52
- Expansion of CSAH 46 from 2 lanes to 4 lanes east of TH 52
- Expansion of CR 73 (Akron Ave) from 2 lanes to 4 lanes south of CSAH 42 to the new east/west Major Collector
- Expansion of CR 71 (Blaine Ave) from 2 lanes to 4 lanes south of CSAH 42 to the new east/west Major Collector
- Development of the UMore development internal Major and Minor Collector roadway system

Access and Intersection Control: Access spacing and type of intersection (i.e. full or partial access) will follow either the County or City/Township access spacing guidelines depending on roadway jurisdiction. The CSAH 42 access spacing is based on the “[CSAH 42 Corridor Study Updated Recommendations for Segment 15 Adopted by the County Board](#)” and the “[Rosemount Transportation Plan](#)”.

The type of intersection control (i.e. side street stop, signalization, [roundabout](#), or interchange) can be assessed at a planning level based on traffic volume thresholds. The criteria found in the “[Dakota County Transportation Plan](#)” and the Institute of Transportation Engineers indicates that: an interchange should be considered at a location where the total intersection volume is more than 70,000 vehicles per day, and; a signalized intersection [or roundabout](#) should be considered where the total intersection volume is more than 12,000 vehicles per day. Based on these criteria, **Figures 21-10A and 21-10B** show the anticipated Future 2030 No-Build and Build intersection access and control on the Major Collector and Arterial roadways. [Installation of intersection control will be documented in an Intersection Control Evaluation \(ICE\) report as traffic conditions dictate.](#)

Right-of-Way Needs: Additional right-of-way will be required with the expansion of existing roadways and development of new alignments. Based on the City of Rosemount, Empire Township and Dakota County guidelines the following right-of-way would be anticipated on roadways adjacent to or in the UMore development area.

Local City Street (urban/rural).....	60ft/80ft
2 lane City Street (urban/rural).....	80ft/100ft
2 lane County Road (urban/rural).....	100ft/110ft
4 lane City Street.....	100ft
4 lane County Road (undivided/divided).....	120ft/150ft
6 lane County Road.....	200ft

E. Transportation Mitigation Plan

Mitigation measures have been developed to address the future potential traffic demands on the local and regional roadway system with any of the build scenarios for the study area. These measures may include at the appropriate time the following:

- ~~Update-Evaluate and compare~~ the traffic analysis prepared as part of the AUAR in coordination with the City of Rosemount, Empire Township and Dakota County with detailed roadway mitigation. ~~Updates-Evaluation~~ will occur with each large scale development plan submitted for approval, the City, Township and County Comprehensive Plan updates and/or with each five year AUAR review-update.
- Expansion of CSAH 42 from Biscayne Avenue to US 52 from 4 lanes to 6 lanes when warranted by traffic volumes.
- Construction of an interchange to replace the existing TH 3/CSAH 42 intersection. Interchange geometry will be proposed with future studies.
- Reconstruction of the existing interchange at CSAH 42 and US 52 as a system interchange to accommodate higher turning movements. The City of Rosemount's and Dakota County's 2030 Comprehensive Plans have identified this interchange as potentially serving a rerouted alignment of TH 55 in the future. Interchange configuration and lane geometry will be determined in future studies.
- Addition of ~~signalized~~-intersections control (signal, roundabout, etc), documented in an Intersection Control Evaluation report, at locations that meet the required traffic warrants and intersection spacing guidelines in accordance with City, County, and Township guidelines including the updated CSAH 42 Segment 15 recommendations adopted by the County Board.
- Provide right-of-way required for future roadway expansion adjacent ~~to~~ to and within the UMore property.
- Design and construction of the internal roadway system within the UMore development providing adequate service to each zone of development with turn lanes and traffic control as needed for safe and efficient traffic flow.
- Preparation of a Travel Demand Management (TDM) plan for the site, or portions thereof, prior to the first large scale development proposal. This would include, but is not limited to, action items for: transit (both bus and rail), non-motorized, and new technologies.
- Preparation of an Access Management Plan for the affected arterial and collector roadways prior to the first development proposal.

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.

A. Background

Each of the proposed study area development scenarios is anticipated to generate additional traffic, which will result in potential air quality impacts. This memorandum will discuss the potential air quality impacts associated with each of the development scenarios.

In addition to controlling air pollutants for which there are National Ambient Air Quality Standards, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories).

Controlling air toxic emissions became a national priority with the passage of the 1990 Clean Air Act Amendments, whereby Congress mandated that the U.S. Environmental Protection Agency regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System. In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers. These are acrolein, benzene, 1,3-butadiene, diesel particulate matter, plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act. The FHWA will continue to monitor the developing research in this emerging field.

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the study scenarios and MSAT concentrations or exposures created by each of the study scenarios cannot be predicted with enough accuracy to be useful in estimating health impacts.

Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the scenarios would have "significant adverse impacts on the human environment."

B. Methodology

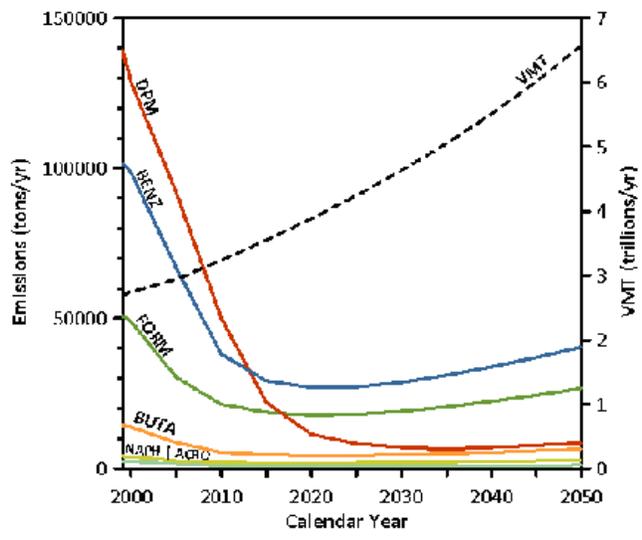
This document acknowledges that the build scenarios may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various scenarios. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*.

For each scenario in this AUAR, the amount of MSAT emitted would be proportional to the average daily traffic (ADT) assuming that other variables such as fleet mix are the same for each scenario. The ADT estimated for each of the build scenarios is higher than that for the no build condition, because of the new development that attracts trips that would not otherwise occur in the area. This increase in ADT means MSAT under the build scenarios would probably be higher than the no build condition in the study area. There could also be localized differences in MSAT from indirect effects of the project such as associated access traffic, emissions of evaporative MSAT (e.g., benzene) from parked cars, and emissions of diesel particulate matter from delivery trucks. Travel to other destinations would be reduced with subsequent decreases in emissions at those locations.

For all scenarios, emissions are virtually certain to be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent from 1999 to 2050, as shown in the following graph. The magnitude of the EPA-projected reductions is so great (even after accounting for ADT growth) that MSAT emissions in the study area are likely to be lower in the future than they are today.

**NATIONAL MSAT EMISSION TRENDS 1999 - 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA'S MOBILE6.2 MODEL**



Note:

(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.

(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

The U.S. Environmental Protection Agency has designated all of Hennepin, Ramsey, Anoka and portions of Carver, Scott, Dakota, Washington and Wright counties as a maintenance area for carbon monoxide. The UMore Park AUAR study area is in that portion of Dakota County that is in this carbon monoxide maintenance area.

The EPA has approved a screening method to determine which intersections need a hotspot analysis. A hot spot analysis is required if the intersection is above the benchmark average annual daily traffic (AADT) threshold or listed as one of the "Top Ten" intersections. All of the top ten intersections are within the Twin Cities carbon monoxide maintenance area. Below is a list of the top ten intersections and their 2007 AADT.

1. TH 169 at CSAH 81 – 79,400
2. TH 7 at CSAH 101 – 66,600
3. TH 252 at 85th Avenue – 66,800
4. University Avenue at Snelling Avenue – 59,700
5. TH 252 at Brookdale Drive – 61,300
6. Cedar Avenue at County Road 42 – 75,100
7. TH 7 at Williston Road – 54,900
8. University Avenue at Lexington Avenue – 59,700
9. TH 252 at 66th Avenue – 72,500
10. Hennepin Avenue at Lake Street – 37,000

The screening method demonstrates that because this project has less than the benchmark AADT's and does not involve or affect the "Top Ten Intersections," a hotspot analysis is not needed.

In summary, under all build scenarios in the design year it is expected there would be slightly higher MSAT emissions in the study area relative to the no build condition due to increased ADT. There also could be increases in MSAT levels in a few localized areas where ADT increases. However, EPA's vehicle and fuel regulations will bring about significantly lower MSAT levels for the area in the future when compared to today.

As demonstrated by the above information, this project conforms to the requirements of the Clean Air Act Amendments and the Conformity Rules, 40 CFR 93.

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), any greenhouse gases (such as carbon dioxide, methane, and nitrous oxides), and ozone-depleting chemicals (chlorofluorocarbons, 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 Guidance: This item is not applicable to an AUAR. Any stationary air emission source large enough to merit environmental review requires individual review. These types of uses are not anticipated by this project.

24) ODORS, NOISE, AND DUST

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.)

A. Background

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 represent the logarithmic measure of sound energy relative to a reference energy level. A sound increase of three dBA is barely perceptible to the human ear, a five dBA increase is clearly noticeable, and a 10 dBA increase 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 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 L10 and L50 levels.

Table 24-1 provides a rough comparison of the noise levels of some common noise sources.

Table 24-1. Decibel Levels of Common Noise Sources

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

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>

Along with the volume of traffic and other factors (i.e. topography of the area and vehicle speed) that contribute to the loudness of traffic noise, the distance of a receptor from a sound's source is also an important factor. Sound levels decrease as distance from a source increases. The following rule of thumb regarding sound decreases due to distance is commonly used: Beyond approximately 50 feet, each time the distance between a line source (such as a road) and a receptor is doubled, sound levels decrease by three decibels over hard ground, such as pavement or water, and by 4.5 decibels over vegetated areas.

B. State of Minnesota Noise Standards

The State of Minnesota has enacted noise standards that regulate the traffic noise levels on surrounding properties. Noise standards vary based on the intended use of the impacted property, known as Noise Area Classifications (NAC), as well as the time of day (daytime and nighttime). The noise standards regulate hourly L₁₀ and L₅₀ noise levels, the noise levels exceeded 10 percent and 50 percent of the hour, respectively. The State noise standards are shown in **Table 24-2**.

Table 24-2: MPCA State Noise Standards – Hourly A-Weighted Sound Levels

Noise Area Classification	General Land Use	Sound Pressure Level (dBA)			
		Daytime (7:00 AM - 10:00 PM)		Nighttime (10:00 PM - 7:00 AM)	
		L ₁₀	L ₅₀	L ₁₀	L ₅₀
NAC-1	Residential	65	60	55	50
NAC-2	Commercial	70	65	same as daytime	
NAC-3	Industrial	80	75	same as daytime	

City and County roadways are often exempt from State noise standards as per Minnesota Statutes Section 116.07, Subd. 2a. Under this statute, City and County roadways are generally exempt from State noise standards unless “full control of access has been acquired.” Full control of access has not been acquired for any of the study area roadways. Because of this exemption, exceeding the State noise standards on the roadways within the study area does not require noise mitigation.

C. Methodology

Existing and future traffic noise levels were estimated using a quantitative model. Noise modeling was completed using the noise prediction program MINNOISE, a version of the FHWA STAMINA 2.0 model adapted by MN/DOT and approved by the Minnesota Pollution Control Agency (MPCA). This model uses peak hour vehicle volume, speed, vehicle class, and the typical characteristics of the roadway to estimate traffic noise levels. In all MINNOISE models, an alpha factor of 0.5 was used to represent the soft ground in the area, and no shielding factors were used.

The model was used to estimate PM peak hour traffic noise for five scenarios: Existing (2011), No Build (2030), Land Use Scenario 1 (2030), Land Use Scenario 2 (2030), and Land Use Scenario 3 (2030). Vehicle class percentages throughout the study area were assumed to be 96% cars, 2% medium trucks, and 2% trucks/buses in all scenarios. The PM peak hour traffic volumes were assumed to be 10% of the existing and projected daily traffic volumes.

The traffic noise impacts associated with each scenario were assessed by modeling noise levels at 19 receptor sites. The receptor sites were chosen to represent a mixture of existing sensitive receptors surrounding the UMore Park area as well as representative sites throughout the UMore Park area. **Table 24-3** provides a general description of the modeled receptors. The receptor locations are shown on **Figure 24-1**.

Table 24-3. General Description of Modeled Receptor Locations.

Receptor Number	General Description of Receptor Location
1, 2, 4, 6, 8, 9, 11	existing single family home adjacent to the study area
3	Dakota County Technical College
5	St. Johns Cemetery & Lutheran Church
7	Dog Park
10, 12, 13, 14, 15, 16, 17, 18, 19	area within study area with potential for high noise impact

D. Results

The results of the PM Peak Hour sound level models are shown in **Table 24-4**. The model results indicate that the project will have a traffic noise impact on surrounding properties. The model predicts that State noise standards will be exceeded during daytime hours at many of the receptor locations. Anticipated L₁₀ sound levels in each of the three development scenarios increases from 2 to 5 dBA over the No Build scenario at most receptor locations. Larger increases in sound levels are anticipated at some receptor locations within the project area where there is little or no existing traffic. However, these standards do not apply to the study area roadways.

Table 24-4. Traffic Noise Modeling Results

Receiver	Future Land Use	Existing		2030 No Build		2030 Scenario 1		2030 Scenario 2		2030 Scenario 3	
		L ₁₀	L ₅₀								
1	NAC-1	66.2	60.6	68.3	63.6	71.3	68.1	70.9	67.6	71.4	68.2
2	NAC-1	67.4	61.1	70.5	65.5	73.3	69.5	72.7	68.7	73.5	69.7
3	NAC-1	63.8	58.2	66.7	62.4	69.9	67.0	69.3	66.2	70.0	67.2
4	NAC-1	60.1	55.5	62.6	59.1	65.6	63.1	65.0	62.4	65.7	63.3
5	NAC-1	67.9	61.4	71.4	66.3	74.2	70.4	73.6	69.6	74.3	70.6
6	NAC-1	52.1	50.6	53.2	51.9	56.2	54.9	56.0	54.6	56.6	55.2
7	NAC-1	49.0	46.5	52.5	47.8	58.8	55.4	58.4	54.9	59.8	56.7
8	NAC-1	44.6	35.7	52.6	42.8	56.6	48.3	56.5	48.1	56.6	48.3
9	NAC-1	55.6	44.2	61.9	52.4	65.2	56.9	64.4	55.7	65.2	56.9
10	NAC-1	62.0	56.6	63.4	58.6	67.1	63.9	66.5	63.1	67.3	64.1
11	NAC-1	56.7	46.4	64.5	56.6	67.9	61.8	67.4	61.0	67.9	61.7
12	NAC-2	67.2	60.2	68.7	62.3	73.4	69.1	72.8	68.3	73.5	69.3
13	NAC-1	60.5	55.3	61.7	57.0	66.5	63.8	66.1	63.2	66.6	63.9
14	NAC-2	64.3	58.2	65.6	60.1	70.4	67.1	70.0	66.5	70.6	67.4
15	varies*	52.5	41.9	60.0	51.3	69.7	64.4	69.0	63.4	70.4	65.4
16	NAC-2	49.6	40.9	53.5	42.4	69.9	64.6	69.3	63.6	69.8	64.5
17	NAC-1	48.0	40.7	58.7	50.4	68.8	64.5	68.0	63.4	68.6	64.2
18	NAC-2	49.4	48.1	50.7	49.6	60.2	54.2	60.0	54.0	61.1	55.4
19	NAC-2	62.3	56.8	63.4	58.4	67.7	64.5	67.4	64.1	67.9	64.8

*Receptor site 15 is projected to be NAC-1 in 2030 Scenario 1 and 2030 Scenario 2, and NAC-2 in Scenario 3. Shaded cells represent an exceedance of the applicable noise standard.

i) Odors and Dust

Dust typical of construction activities would occur as a result of the UMore Park development scenarios. Dust generated through construction would be minimized through standard dust control measures such as watering. After construction is complete and final ground cover is in place, dust generation is not anticipated. Construction activities are not anticipated to generate any unusual odors, and future land use has not been determined to a level that it is possible to know if individual properties will generate unusual odors. Mitigation of any particular property that is anticipated to generate odors will occur through the normal city development and permitting process.

E. Mitigation Measures

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. The site plans developed for specific projects should show the proposed locations and types of mitigation, with the estimated noise reductions for all areas projected to exceed noise standards.

25) NEARBY RESOURCES

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

Archaeological, historical, or architectural resources? Yes No

Prime or unique farmlands or land within an agricultural preserve? Yes No

Designated parks, recreation areas, or trails? Yes No

Scenic views and vistas? Yes No

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.

A. Archaeological, historical or architectural resources

A search of the Minnesota Archaeological Inventory and Historic Structures Inventory revealed no archaeological sites on the UMore property. Historic properties were identified; all are linked to the Gopher Ordinance Works. The following is the list of Previously Inventoried Architectural History Properties. The property locations are shown on **Figure 25-1**.

Table 25-1 Nearby Resources – Previously Inventoried Architectural History Properties

PROPNAME	ADDRESS	PROPCAT	PROPTYPE	HISTCONTX	DATESURVEY	Label
Building 260-D	Rosemount Research Center	Industry	manufacturing facility		5/3/1993	0
Gopher Ordnance Works Buildings 223-A, 223-B	163xx Asher Ave.	Industry	manufacturing facility		5/3/1993	1
Gopher Ordnance Works Building 401-B	158xx Angus Ave.	Industry	manufacturing facility		5/3/1993	2
Gopher Ordnance Works 214 Buildings	off Barabara & Blaine Aves.	Industry	manufacturing facility		5/3/1993	3
Gopher Ordnance Works 214 Buildings	off Barabara & Blaine Aves.	Industry	manufacturing facility		5/3/1993	4
Gopher Ordnance Works Buildings 402-B, 412-B	157xx Angus Ave.	Industry	manufacturing facility		5/3/1993	5
Chicago, Milwaukee, St. Paul & Pacific Railway (inactive)					1899,1230	6
Gopher Ordnance Works Buildings 301-B	Rosemount Research Center	Industry	manufacturing facility		5/3/1993	7
Gopher Ordnance Works Building 208-B		Industry	manufacturing facility		5/3/1993	8
Gopher Ordnance Works Building 208-B		Industry	manufacturing facility		5/3/1993	9
Chicago Great Western Railway (inactive)					1899,1230	10
Gopher Ordnance Works Building 446-C	21xx 155nd St. E.	Industry	manufacturing facility		5/3/1993	11
Gopher Ordnance Works Building 446-C	21xx 155nd St. E.	Industry	manufacturing facility		5/3/1993	12
Gopher Ordnance Works Building 401-A	155xx Blaine Ave.	Industry	manufacturing facility		5/3/1993	13
Gopher Ordnance Works Building 401-A	155xx Blaine Ave.	Industry	manufacturing facility		5/3/1993	14
Gopher Ordnance Works Buildings 412-A, 402-A	154xx Blaine Ave.	Industry	manufacturing facility		5/3/1993	15
Gopher Ordnance Works Buildings 412-A, 402-A	154xx Blaine Ave.	Industry	manufacturing facility		5/3/1993	16
Gopher Ordnance Works Building 108-B	ca. 22560 153rd St.	Industry	manufacturing facility	World War II Manufacturing	5/3/1993	17
Gopher Ordnance Works Building 108-B	ca. 22560 153rd St.	Industry	manufacturing facility	World War II Manufacturing	5/3/1993	18
Gopher Ordnance Works Building 704-W	15225 Babcock Ave.	Industry	office building		5/3/1993	19
Gopher Ordnance Works Building 704-W	15225 Babcock Ave.	Industry	office building		5/3/1993	20
Gopher Ordnance Works Building 717-A	ca. 15290 Babcock Ave.	Industry	manufacturing facility		5/3/1993	21
Gopher Ordnance Works Building 717-A	ca. 15290 Babcock Ave.	Industry	manufacturing facility		5/3/1993	22
Gopher Ordnance Works Building 303-A	Rosemount Research Center	Industry	manufacturing facility		5/3/1993	23
Gopher Ordnance Works Building 303-A	Rosemount Research Center	Industry	manufacturing facility		5/3/1993	24
Gopher Ordnance Works Building 706-B	ca. 15250 Blaine Ave.	Industry	manufacturing facility		5/3/1993	25
Gopher Ordnance Works Building 706-B	ca. 15250 Blaine Ave.	Industry	manufacturing facility		5/3/1993	26
Gopher Ordnance Works Buildings 102-A, 102-B, 102-C	ca. 2200 152nd St. E.	Industry	manufacturing facility		5/3/1993	27
Gopher Ordnance Works Buildings 707-FFF, 707-J, 707-LL	ca. 1900 152nd St. E.	Industry	manufacturing facility		5/2/1993	28
Gopher Ordnance Works Buildings 707-FFF, 707-J, 707-LL	ca. 1900 152nd St. E.	Industry	manufacturing facility		5/2/1993	29
Gopher Ordnance Works Building 718A	ca. 2000 152nd St. E.	Industry	manufacturing facility		5/3/1993	30
Gopher Ordnance Works Building 718A	ca. 2000 152nd St. E.	Industry	manufacturing facility		5/3/1993	31
Gopher Ordnance Works Building 411-B	ca. 1959 152nd St. E.	Industry	water tower		5/3/1993	32
Gopher Ordnance Works Building 411-B	ca. 1959 152nd St. E.	Industry	water tower		5/3/1993	33
house	ca. 2500 151st St. E.	Domestic	residence		5/3/1993	34
house and garage	14600 Blaine Ave.	Domestic	single dwelling		9/27/2010	35

In 1942 and 1943, the U.S. War Department acquired about 12,000 acres of farmland in Dakota County for the construction of the Gopher Ordnance Works (GOW). The GOW facility was designed to manufacture smokeless gunpowder and related products, assisting the war effort by producing a propellant for American military ordnance. Production began in January 1945, and ceased in October 1945.

Title to 8,000 acres of the property was transferred to the University of Minnesota in two stages: Approximately 4,700 acres in August 1947 and another 3,320 acres in March 1948. The 1947 parcel includes the land south of 170th Street and the western third of the land north of 170th Street. The 1948 parcel includes the eastern two-thirds of the land north of 170th Street.

University research, including aeronautical, medical and agricultural projects, began on sections of the land immediately, frequently making use of some of the remaining 298 GOW buildings for studies and storage. Very few of the original World War II buildings remain today.

In recent years, the University of Minnesota has undertaken studies which further address archeological, historical and architectural resources. A brief summary of these initiatives follows:

March, 2011 – Final Environmental Assessment for the University of Minnesota Wind Energy Research Consortium Project – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Golden Field Office

This study included an examination of cultural resources as part of a proposal for a wind turbine on a 212 acre section of land in the northeastern corner of the UMore property. The permanent construction footprint of the turbine facility occupies .6 acres. The wind turbine project was completed and began operation in 2012.

The report can be found at:

http://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/EA-1791-FEA-2011.pdf

September, 2009 – Phase 1A Archaeological Survey for the UMore Park Sand and Gravel Mining Environmental Review Services, Dakota County, Minnesota

In October and November of 2008 and in September of 2009, a Phase IA archaeological survey of the UMORE site was conducted as part of the Sand and Gravel Mining Environmental Review (EIS). Since there was no federal involvement in the project, the investigation was compliant with applicable state mandates governing cultural resources such as the Minnesota Historic Sites Act, the Minnesota Field Archaeology Act, and the Minnesota Private Cemeteries Act. The report presents the methodology, previous cultural resources investigations in the project area, results of the Phase IA archaeological survey and recommendations regarding archaeological resources.

The report can be found at:

http://conservancy.umn.edu/bitstream/93303/1/UMorePhIAFinalReport_September2009.pdf

April, 2006 - A Historical Interpretation and Preservation Plan for UMore Park

As a part of a broader comprehensive planning process that began in 2003, a historical plan was assembled for the UMore property in 2006. The plan included:

- A literature search to trace the history and evolution of the site;
- The identification of themes in the history of the site that may form the basis for possible future interpretative programs;
- Development of a historic context narrative that addresses factors that have affected development and utilization of the site over time;
- A baseline field survey to identify and inventory extant buildings, objects and structures on the site;
- Evaluation of extant structures; and
 - Recommendations

The report can be found at:

https://conservancy.umn.edu/bitstream/60998/1/Lauber%2c%20John_AHistoricalInterpretationandPreservationPlanforUMorePark.pdf

B. Prime or Unique Farmlands

According to the Dakota County Soil Survey, many of the soils within the study area are listed as prime farmland soils. Prime farmland soils in Dakota County include the following map units:

Chetek, Garwin, Kennebec Variant, Joy, Kennebec, Otterholt, Dickinson, Port Byron, Rockton, Lindstrom, Spillville, Tallula, Kingsley, Wadena, Waukegan, Kanaranzi, Estherville, Mahtomedi, Antigo, Harwick, and Bold.

Figure 25-2 shows the distribution of dominant soil types on the UMore property. Waukegan silt loam covers 54 percent of the UMore Park property. Although this soil formed on a sandy outwash plain, Waukegan silt loam is very dark brown, silty, and rich in organic matter from centuries of growth of prairie plants. The initial 13 inches of topsoil below the ground level provides for moderate drainage, but within the sandy subsoil, drainage proceeds at rates of as high as 6 to 20 inches per hour. Because of the high drainage rates, irrigation is required during normal crop years to mitigate drought impacts. The Waukegan soils at UMore Park are highly suitable for building foundations; however, maintaining adequate vegetation on the site is required to control soil erosion.

Prior to construction of the Gopher Ordinance Works (GOW), the soils beneath the site of the plant (24% of the property) also primarily consisted of Waukegan silt loam. However, the construction of the GOW, coupled with soil movement and other disturbances changed the topsoil in this area of the UMore Park site. Correspondingly, the soils within the footprint of the GOW were reclassified as Urban Land Waukegan Complex soils, although residual amounts of Waukegan loam and other higher quality soils exist inside of the former GOW boundaries as well.

C. Designated parks, recreation areas, or trails

A number of park, trail and open space areas are identified in plans by the City of Rosemount, Empire Township and Dakota County as well as within the University of Minnesota's Concept Master Plan for the development of UMore Park. Existing and proposed facilities include the following:

Greenways

Dakota County has an extensive network of existing and planned greenways that meander throughout the County. Segments of the planned greenway network pass from north to south through UMore Park starting just west of the DCTC campus. Another planned greenway passes through UMore Park near Blaine Avenue on the east. In Empire Township, a north/south segment of the planned greenway connects to the Vermillion Highlands MWMA and points further south. Greenways will need to be accommodated as UMore Park develops in the future.

Whitetail Woods Regional Park

Whitetail Woods Regional Park is a new 460 acre park owned and operated by Dakota County. Planning efforts for the park are ongoing.

Vermillion Highlands

Vermillion Highlands is a 2,822 acre modified research, recreation and wildlife management area (MWMA) jointly managed by the University of Minnesota and the Minnesota DNR in conjunction with Empire Township and Dakota County. The facility includes research; education and public engagement; public access for diverse, high-quality recreation; and wildlife management and hunting. In the future, trails from the UMore Park development may connect to trails in Vermillion Highlands. Existing facilities in Vermillion Highlands also include equestrian trails and the Dakota County Gun Club.

Another wildlife management area (WMA) lies in Empire Township just to the west of Vermillion Highlands, immediately south of Whitetail Woods Regional Park. An aquatic management area lies south of Vermillion Highlands on the north side of the Vermillion River.

Dakota Woods Dog Park

Dakota Woods Dog Park is a 16 acre, wooded off-leash dog park located in Empire Township.

Ames Soccer Complex at DCTC

The Ames Soccer Complex is the City of Rosemount's newest park. The facility sits on approximately 13 acres of land just southwest of DCTC on land formerly owned by the University of Minnesota.

D. Scenic views and vistas

There are no significant views or vistas within the study area. Areas within Vermillion Highlands, just south of the UMore site have views to the Vermillion River. Planned greenway corridors by Dakota County as well as trail networks through UMore Park will provide recreational and viewing opportunities for the natural areas within the study area.

The eventual and long-term change from agriculture to urban development forms will change the look of the area but is not expected to impact any significant views or vistas. Sightlines into the adjacent Vermillion Highland MWMA will be preserved through the retention of open space and as a result of the expected pattern of low-density residential uses in the area in the future.

E. Nearby Resources Mitigation Plan

- Currently, UMore Park is not receiving federal funding or permitting. Should federal funding or permitting be required in the future, the project:
 - Must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106);
 - The lead federal agency will be required to initiate consultation with applicable Native American Tribes; and
 - Additional architectural surveys may be required.
- Erosion control measures will be required during construction to control the loss of Waukegan soils and other soil types susceptible to erosion. All disturbed areas will be required to be re-seeded and mulched as needed.
- As appropriate, site and building plans will reflect and enhance any significant views of natural features.
- Park dedication will be in conformance to the codes and requirements of the City of Rosemount and Empire Township.

26) VISUAL IMPACTS

Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? Yes No
If yes, explain.

Development within the study area is anticipated to occur in a manner similar to the surrounding area in Rosemount and accordingly, no adverse impacts are anticipated resulting from implementation of the development scenarios. At the present time, the City of Rosemount is developing an active athletic park adjacent to the Dakota County Technical College that may include lighting. Should facilities be lighted, light spillage to adjacent properties can be controlled through screening and fixtures with appropriate cut-offs.

The UMore Park Mining Area is located in the western portion of the UMore site. Gravel mining in the area is anticipated to occur for the next 25+ years. During that time, berms and landscape screening will buffer visual impacts from adjacent properties.

A. VISUAL IMPACTS MITIGATION MEASURES

- Through the development review process, the City will require appropriate screening of development in the study area to control adverse visual impacts.

27) COMPATIBILITY WITH PLANS AND LAND USE REGULATIONS

Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? Yes No

If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

A. City of Rosemount Comprehensive Plan

The City of Rosemount has an existing Comprehensive Plan in place that was completed in November, 2009. This Plan is consistent with the requirements of the Metropolitan Land Planning Act for plan updates. The plan was 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 Future Land Use Plan as shown in the City’s Comprehensive Plan designates the UMore Park Property as “AGR – Agricultural Research”. While the three development scenarios represent interpretations of the University’s Concept Master Plan for UMore Park that was adopted by the Board of Regents on December 12, 2008, Scenarios 1, 2 and 3 would require modifications to the Comprehensive Plan to allow the land uses that are being proposed. The AUAR area is designated as an “Ultimate Residential” area as shown on the Potential Ultimate Service Area Map in the Comprehensive Sanitary Sewer System Plan. This indicates that municipal sanitary sewer service is anticipated for the AUAR area at some point and future development would follow. Scenario 4 is consistent with the Comprehensive Plan as proposed and does not require an amendment.

B. Empire Township Comprehensive Plan

The AUAR area discussed in this document includes approximately 1800 acres within Empire Township. The Township has an existing Comprehensive Plan that was completed in August, 2009. The Township’s Comprehensive Plan is consistent with the requirements of the Metropolitan Land Planning Act for plan updates, and was also reviewed by the Metropolitan Council and found to be consistent with the regional policies and with the Metropolitan Council’s regional system plans. The Township’s plan complies with the requirements set out in Minnesota Rules 4410.3610, Subpart 1.

The 2030 Future Land Use Plan designates the majority of the property within the AUAR area as “University of Minnesota (UMORE),” including a “Mining Overlay Area,” and approximately 120 acres of “Public Park, Recreation and Open Space”. A “Regional Trail Search Corridor” is also identified within the study area. Modifications to the Comprehensive Plan will be required to permit the land uses that are included in Scenarios

1, 2 and 3. Scenario 4 is consistent with the Empire Township 2030 Comprehensive Plan as proposed and will not require an amendment.

C. City of Rosemount Zoning Ordinance

In an effort to ensure the compatibility of land uses, prevent urban blight, and enhance the quality of life for its residents by protecting public health, safety, convenience and general welfare, the City of Rosemount has adopted a zoning ordinance. The AUAR area is currently zoned “AG – Agricultural”.

The “AG – Agricultural” Zoning District is primarily established to encourage the long term continuation of agricultural and related uses in the City in areas which are both suitable for agricultural and are not planned for urban development. In the AG Zoning District, permitted uses include agriculture; commercial greenhouses and landscape nurseries; commercial livestock, furbearing animals and fowl, dairy farming, and commercial horse stables; essential service facilities; keeping of horses; and single-family detached dwellings (1 unit per 40 acres).

If the components of the land uses proposed in Scenarios 1, 2, or 3 are adopted through a subsequent amendment to the Comprehensive Plan, amendments to the Zoning Ordinance (Zoning Map) will need to occur in order to be consistent with any amendments to the Comprehensive Plan. New zoning districts may need to be adopted to accommodate the AUAR Low-Medium Residential, Neighborhood Center, Village Center, and Community Center land uses and innovative measures referenced in **Appendix B**. A small lot single family zoning district may be considered to implement the Low-Medium Density Residential land use. An evaluation will be needed to determine if the existing DT-Downtown zoning district can implement the various Center land use districts or if a new mixed use zoning district would need to be adopted. Use of planned development techniques is anticipated, as well. Scenario 4 is consistent with the Zoning Ordinance and will not require an amendment.

D. Empire Township Zoning Ordinance

To ensure compatibility with the Comprehensive Plan, comply with statutory requirements, and to protect the public health, safety and welfare, Empire Township has enacted a zoning ordinance. The entire AUAR area is currently zoned “AG – Agricultural Preservation”. The AG Zoning District is intended primarily for application to those areas of the Township where it is necessary and desirable, because of the high quality of soils, availability of ground water, and/or highly productive agricultural capability and the use of land, to preserve, promote, maintain, and enhance the use of land for commercial agriculture purposes and to protect such land from encroachment by non-agricultural related uses, structures or activities.

Permitted uses within the AG Zoning District include any and all forms of commercial agricultural and commercial horticulture; feedlots and poultry operations; farm buildings and accessory uses; farm drainage and irrigation systems; forestry and grazing; single-family dwelling units (1 unit per 40 acres) ; historic sites; home occupations; agricultural preserves; and publicly owned and operated wastewater treatment plants.

If the components of the land uses included in Scenarios 1, 2 or 3 are considered through a subsequent amendment to the Empire Township 2030 Comprehensive Plan, amendments to the Empire Township Zoning Ordinance (including the Zoning Map) will need to occur for compatibility and consistency. Scenario 4 is consistent with the Zoning Ordinance and does not require an amendment.

E. Metropolitan Council – 2030 Regional Development Framework

Portions of the City of Rosemount and Empire Township are designated as a “Developing Community” while other portions are designated as “Agricultural” in the 2030 Regional Development Framework. These designations indicate that the Metropolitan Council anticipates growth and development in these communities. Although the AUAR area is not designated as a “Developing Community”, rather an “Agricultural” area, the Regional Wastewater System Long Term Service Area does identify this area as “potentially serviceable”.

Being designated as “Agricultural”, the portions of both communities that are within the AUAR area are currently anticipated by the Metropolitan Council to preserve high-quality soils for existing or future agricultural use. The Metropolitan Council currently anticipates that investments in regional infrastructure such as roads, wastewater treatment, and park and open space will be for rural levels of service consistent with the intent to maintain agriculture.

As the Council updates its system plans, the feasibility of providing regional services in response to potential development of agricultural areas both pre- and post-2030 will need to be further examined. As the Council’s System Plan is currently written, the 2030 Regional Development Framework does not recognize development consistent with Scenarios 1, 2 and 3. The City of Rosemount and Empire Township will need to partner with the Council to identify potential community and regional infrastructure improvements and timeframes necessary to accommodate the UMore development scenarios as identified.

Scenario 4 is compatible with regional policies including, but not limited to, working with local and regional partners to conserve, protect and enhance the regions vital natural resources; planning and investing in multi-modal transportation choices based on the full range of costs and benefits, to slow the growth of congestion and serve the region’s economic needs; and working with communities to accommodate growth in a flexible, connected and efficient manner.

F. Compatibility with Land Use Regulations Mitigation Plan

- If the AUAR area develops as shown in Scenarios 1, 2 or 3, changes will be needed to the City of Rosemount’s Comprehensive Plan, Empire Township’s Comprehensive Plan, the Metropolitan Council’s 2030 Regional Development Framework, and both the City’s and Township’s zoning ordinances through the respective amendment processes.

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.)

A. Municipal Water System Improvements

Municipal water service will be provided to development in the study area. Water demand was estimated for each scenario based on proposed land uses. Impacts to the existing water system and water system improvements necessary to serve proposed land uses for each scenario were evaluated. With appropriate mitigation, the municipal water system can accommodate the development. Item 13 within the AUAR provides detailed analysis and specific mitigation.

B. Storm Water Management Improvements

Due to the conceptual nature of the development scenarios, the amount of impervious surfaces for each land use was estimated based on the estimates in the City of Rosemount's Nondegradation Report Dated December 20, 2007 and by characterizing the impervious surface amounts of existing developments in the City and Empire Township.

The existing conditions and three proposed land use scenarios were evaluated. All three of the land use scenarios represent a similar amount of proposed impervious surface. Storm water management for any scenario can be provided through a combination of wet detention ponds and infiltration features. The soils within the study area will likely provide suitable conditions for achieving volume reduction and pollutant reduction through the use of infiltration. Item 17 within the AUAR provides detailed analysis and specific mitigation measures.

C. Sanitary Sewer Improvements

Sanitary sewer will be provided to the study area as it is developed. Wastewater generated from the study area will be directed to the MCES's Rosemount Interceptor sewer that discharges to the Empire Wastewater Treatment Facility (WWTF). With varying ground elevations, three new lift stations will be required to convey the wastewater to the Rosemount Interceptor under Scenarios 1, 2, and 3. There is potential for alternative sanitary sewer layouts where the flow can be directed downstream of the MCES lift station or west to the Rosemount Interceptor adjacent to Biscayne Avenue. Item 18 within the AUAR provides detailed analysis and specific mitigation measures.

D. Traffic and Transportation

The existing conditions were analyzed as the baseline for the future year analysis. Four development scenarios were analyzed including the no-build and three build scenarios. Future land development will have an impact on the operations of roadways and intersections in the project area. Increased trips from future development scenarios were used to forecast future traffic volumes and evaluate traffic operations on the roadway system within the study area.

The year 2030 was assumed for the traffic analysis of each scenario for the full build of the site. The year was selected to represent the current transportation system analysis time horizon used by the City of Rosemount, Empire Township, Dakota County and Metropolitan Council. Full build out of the study area is highly likely to occur after the analysis time horizon. In addition, although concept planning has occurred on the UMore site, anticipated phasing of the planned development has not yet been finalized. It is anticipated that this analysis will be ~~updated~~reviewed based on one of the following potential triggers, if deemed necessary:

- With each proposed development proposal
- With the City of Rosemount's, Empire Township and/or Dakota County's Comprehensive Plan updates
- With the 5-year AUAR ~~update~~evaluation process

Based on this analysis, the transportation improvements are outlined as mitigation measures. However, these represent a worse-case scenario and will be further refined with future ~~five-year~~ AUAR ~~updates~~evolution as Comprehensive Planning for the City, Township, County, and Met Council are completed.

E. Police and Fire Department

Development will also have an impact on social services such as police, fire, and community activities. The City has its own police and fire department. The City has approximately 40 paid-on-call firefighters and approximately 18 police officers. These services will be provided to the study area. The City uses a ratio of residents to police officers to estimate the need for additional police service. At the 2010 US Census, the population for the City of Rosemount was 21,874. The UMore Park development calls for an increase of 20,000 to 30,000 people over the next 25-30 years. Keeping the same ratio of residents to police officers, the City will need to increase the number of police officers by 100%-150% by the time the area is fully developed. The City will evaluate the need for additional officers and will provide additional officers as needed. Similar increases for fire department staff and other community services may also be necessary. The City currently has two fire stations. Fire Station 1 is located on the west side of the city near Dodd Boulevard and Shannon Parkway. Fire Station 2 is on the eastern side of the city off Connemara Trail near Meadows Park. It is likely that the study area would be serviced by Fire Station 2 but a need for a third fire station will likely arise as the area develops.

While Empire Township contracts with the City of Farmington for police and fire protection, the City and Township have an agreement that the UMore area is to be served by the City of Rosemount. It is anticipated the two entities will continue these services within the existing boundaries of the agreements as they currently do.

Additional municipal staff would be anticipated to be needed and the increased demands for staff are expected to be commensurate with the level and density of the development.

F. School System

The study area is located within Independent School District #196. There are four elementary schools in or nearby the study area. Rosemount also has one middle school and one high school. For the 2012 school year, enrollment at Rosemount area schools is as follows:

Rosemount Elementary – 664
Shannon Park Elementary – 804
Diamond Path Elementary – 759
Rosemount Area Learning Center - 153
Rosemount Middle – 1,185
Rosemount Senior High – 2,174

There are also two nonpublic schools located in Rosemount: First Baptist School which offers Pre K – 12 and The Church of St. Joseph Catholic School which offers K – 8.

The Concept Master Plan was reviewed with the School District during the U of M's development of that plan. As the UMore site develops and population increases, the School District may need to explore building an additional high school as well as additional middle and elementary schools in viable locations.

29) CUMULATIVE IMPACTS

Minn. R. 4410.1700, subp. 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).

The UMore Park study area encompasses approximately 4,900 acres in southern Rosemount and northern Empire Township. The AUAR itself analyzed cumulative impacts of development in this area and identified impact to infrastructure. Guidance for the AUAR states that because an AUAR by its nature is intended to deal with cumulative potential effects from future development within the AUAR, the AUAR should focus on influence of the development by past, present, or reasonably foreseeable future projects outside of the study area. Cumulative impacts related to these interactions are discussed below:

A. Past and Present Development

In 2007, the City of Rosemount completed an AUAR for the CSAH 42/Akron study area which is a 1,500 acre area immediately north of CSAH 42 across from the Dakota County Technical College campus. That AUAR was subsequently updated in 2012. The analysis of infrastructure impacts as well as the City's Comprehensive Plan within the UMore AUAR takes into account development occurring within the CSAH 42/Akron study area.

In 2010, the UMore Sand and Gravel Resources Environmental Impact Statement (EIS) was completed that analyzed impacts associated with sand and gravel mining in the western

third of the UMore AUAR study area that encompasses approximately 1,700 acres. The environmental impacts of the sand and gravel mining have been addressed in the EIS and the land use end point of the gravel mining in this area has been assumed to be the starting point for the AUAR analysis.

In 2012, the Rosemount City Council approved the Large Scale Mineral Extraction permit for Dakota Aggregates to mine gravel on approximately 600 acres of land north of County Road 46 and east of Biscayne Avenue over the next 25 years. The permit includes the use of an additional 170 acres of land north of County Road 46 and west of Akron Avenue for mining ancillary uses (aggregate processing, concrete production, asphalt production, etc.) over the next 40 years. The mining is permitted to use Akron Avenue or Biscayne Avenue to access County Road 42 through 2028. After 2028, mining traffic will only be allowed to access County Road 46.

Dakota Aggregates anticipates mining an additional 600 acres of land within Empire Township after the majority of the mining in Rosemount has been completed. Empire Township will need to review and approve that request before the mining in Empire Township can commence.

There are two active gravel mining operations within Empire Township located south of the study area.

B. Reasonably Foreseeable Future Projects

Neither the City nor the Township is aware of any reasonably foreseeable future projects.

The AUAR itself is a cumulative impact analysis. The UMore study area represents a large development. Through this environmental review process and the City of Rosemount Comprehensive Plan and Empire Township planning efforts, these cumulative impacts can be addressed and mitigation provided through infrastructure improvements, zoning regulations, and mitigation outlined in the environmental review documents.

30) OTHER POTENTIAL ENVIRONMENTAL IMPACTS

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

There are no other potential environmental impacts known at this time.