

Appendix A

Technical Memorandums

SRF No. 005 5370

**DRAFT TECHNICAL
MEMORANDUM 1**

To: Earl Haugen, Grand Forks – East Grand Forks Metropolitan Planning Organization
Executive Director

From: Richard Lane P.E.
SRF Consulting Group Inc.

Peggy Harter
SRF Consulting Group Inc.

Date: June 22, 2005

SUBJECT: 42ND STREET EVENT TRAFFIC MANAGEMENT PLAN UPDATE

STUDY REVIEW COMMITTEE MEETING

The first Study Review Committee (SRC) meeting was held at the Alerus Center on April 28, 2005, at 8:00 a.m. Part of the agenda for the meeting was to collect project related data from the associated parties. The meeting attendees and the agency they represent include:

SRF Consulting Group Inc. (SRF): Richard Lane – Senior Associate
Peggy Harter – Engineer

Grand Forks – East Grand Forks Metropolitan Planning Organization (GF-EGF MPO):
Earl Haugen – Executive Director

Alerus Center: Jeremy Linstad
Ray Tozer

Grand Forks Engineering Department: Gary Uruess – Engineer
Dan Jonasson – Engineer

Grand Forks Police Department: Mark Nelson
Keith Schroeder

DATA COLLECTION

The first task to the 42nd Street Event Traffic Management Plan Update is to collect all of the needed data. The following data collection items will be discussed as part of this memo:

- Existing Background Mapping
- Proposed Site Improvements
- Existing and Future Land Uses
- Existing Roadway Network Data
- Traffic Signal Timing Data
- Existing Background Traffic Counts
- Large Event Traffic Counts
- Forecasted Daily Traffic Volumes
- Alternate Mode Transportation Plan
- Proposed Hotel/Entertainment Complex

BACKGROUND MAPPING & PROPOSED SITE IMPROVEMENTS

The existing background mapping was provided to SRF in the form of an aerial photo. The existing Alerus Center site plan has not been provided as an individual document but is included as part of the proposed site plan. The proposed site plan improvements have been provided in paper form but have been requested in electronic format. A copy of the existing parking layout was provided by Jeremy Linstad at the SRC meeting. The layout includes the number of available parking spaces, handicap spaces and square footage of each parking lot. As part of this information the Alerus Center Traffic Management Team indicated that the area east of Lot "N" and north of Lot "E" is already being used for overflow parking at large events. The unpaved area can hold approximately 500 vehicles and it is estimated that it will be able to hold approximately 700 vehicles after it is paved and marked. The Traffic Management Team also indicated that the overflow lot south of Lot "S" is used for snow/dirt piles and can not be relied on for overflow parking. The proposed site improvement plans and existing parking layout drawing are included as Attachment 1 and 2 respectively.

EXISTING & FUTURE LAND USES

The Existing 2002 and Future 2025 Land Use Maps for the project area were taken from the GF-EGF Long Range Transportation Plan Update. The existing and future land use within the project area is summarized below. The figures are included as Attachment 3.

<u>Existing Land Use:</u>	The Alerus Center Property	Public/Open
	Land surrounding Alerus Center	Vacant
	Land East of 42nd Street from Alerus	Vacant
<u>Future Land Use:</u>	Land surrounding Alerus Center	Commercial
	Land East of 42nd Street from Alerus	Commercial

EXISTING ROADWAY NETWORK DATA

The major roadways being studied as part of this project include I29, South 42nd Street, South 34th Street, 32nd Avenue South, 17th Avenue South, 11th Avenue South and Demers Avenue. The functional classification of the roadways within the project area was taken from the approved 2003 Functional Classification map provided by the GF-EGF MPO. Attachment 4 includes a figure showing the classifications of the roadways in the study area. The classifications are as follows:

- Interstate - I-29
- Principal Arterial - Demers Avenue & 32nd Avenue South
- Minor Arterial - 42nd Street & 17th Avenue South
- Collector - 34th Street & 11th Avenue South

The lane configuration, traffic control data and speed limit information were taken from the Traffic Count and Synchro files provided in electronic format by the GF-EGF MPO and additional data provided by the City of Grand Forks Engineering Department. A data collection spreadsheet is included as Attachment 5 listing the key intersections and the information needed to analyze them.

TRAFFIC SIGNAL TIMING DATA

Traffic signal timing data was provided as part of the electronic copy of Synchro data files provided by the GF-EGF MPO and the City of Grand Forks Engineering Department. Attachment 5 shows which intersections we received data for.

EXISTING BACKGROUND TRAFFIC COUNTS

The existing background traffic counts were provided in electronic form by the GF-EGF MPO. The background counts that were received are indicated on the data collection spreadsheet in Attachment 5. The following background counts were provided:

- Fall 2003
- Spring 2003
- Summer 2003
- February 24, 2005 (Day before Montgomery Gentry concert)
- April 7, 2005 (Day before Motley Crue concert)

LARGE EVENT TRAFFIC COUNTS

The large event traffic counts were provided in electronic form by the GF-EGF MPO. The large event counts that were received are indicated on the data collection spreadsheet in Attachment 5. The following large event traffic counts were provided:

- Montgomery Gentry Concert (February 25, 2005)
- Motley Crue Concert (April 8, 2005)

The City of Grand Forks has a practice of video taping the in bound and out bound traffic during large events. Copies of the videos for several large events were provided to supplement the traffic count information.

EXISTING & FORECASTED DAILY TRAFFIC VOLUMES

The 2000 Average Daily Traffic and 2030 Forecasted Average Daily Traffic Volumes were taken from the GF-EGF MPO Long Range Transportation Plan Update. The 2000 ADT and 2030 Forecasted ADT maps for the study area are included as Attachment 6.

The 2030 projections show a considerable increase in traffic volumes within the study area. Although this study will not be conducting a 2030 traffic operation analysis, these increases support the concept of considering future signalization to facilitate daily operations at the Canad Complex and Alerus Center.

ALTERNATE MODE TRANSPORTATION PLAN

An electronic copy of The Alternate Mode Transportation Plan which addresses transit & bike/pedestrian transportation was provided by the GF-EGF MPO.

GF-EGF ITS AND REGIONAL ITS ARCHITECTURE

The GF-EGF MPO provided copies of the Intelligent Transportation System (ITS) and Regional ITS Architecture reports for the GF-EGF planning area. The ITS plan identifies appropriate ITS system improvements for the GF-EGF region including enhanced traveler safety, effective traffic and transit management, coordinated incident management, and enhanced traveler information. The ITS Regional Architecture was developed to guide the implementation of ITS systems in the GF-EGF region through coordination of funding, deployment opportunities, and information sharing.

ALERUS CENTER EVENT INFORMATION

Jeremy Linstad with the Alerus Center provided a copy of the 2001-2004 Alerus Center Attendance Report. This report lists the type of events, how many of each type of event were held and the total attendance for each type of event. A copy of the attendance report is included as Attachment 7.

PROPOSED HOTEL/ENTERTAINMENT COMPLEX

The Canad Inn Hotel and Entertainment Complex is currently proposed to be built just north of and attached to the Alerus Center. Information regarding the hotel and entertainment complex was collected through meetings with Alerus Center/City Staff and from a review of the draft lease agreement.

The following information has been obtained about the Canad Inn Hotel and Entertainment Complex:

Size and Usage – The current information below was obtained from the draft lease agreement and was updated by Lonnie Laffen at a meeting held on May 11, 2005.

- Hotel – 11 stories, 192 rooms
- Wellness Center – 10,000 square feet
- Day Spa – 6,000 square feet
- Restaurant – Seats 250 persons
- Restaurant – Seats 200 persons
- Restaurant – Seats 150 persons
- Cocktail Lounge – Seats 100 persons
- Aquatic Center – 50,000 square feet
- Cinema Complex – 40,000 square feet, 10 screens
- Unfinished Space (Possibly for office/retail) – 10,000 square feet

Parking and Access

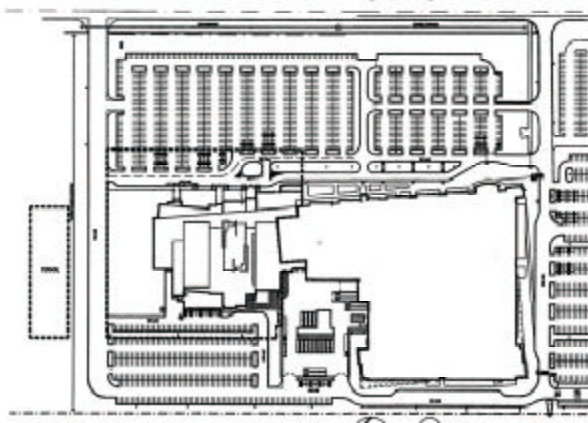
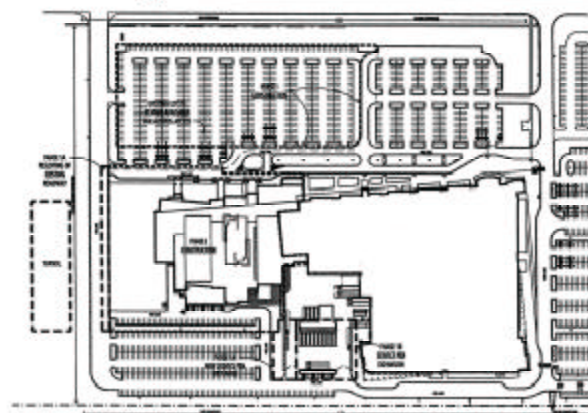
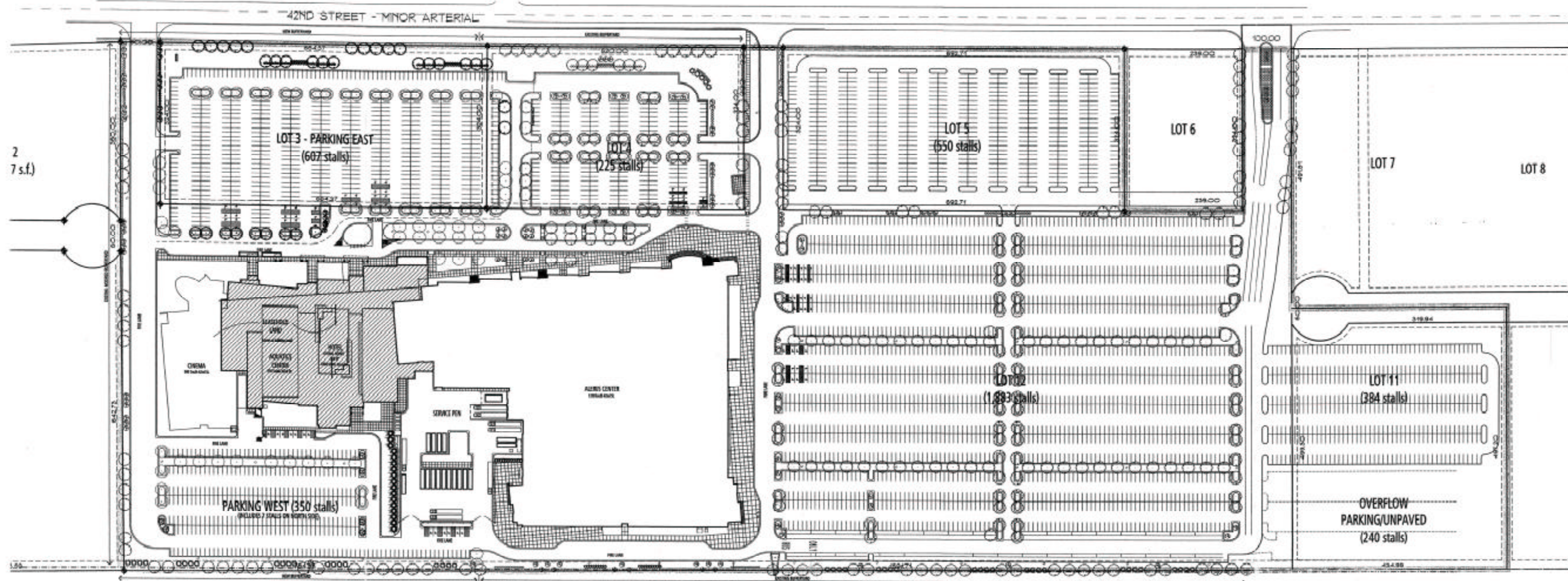
- Tenants Parking will be provided in the lots referred to as “Parking East” and “Parking West”
- Construction Fence – The contractor will be required to erect a construction fence around the perimeter of construction area. The location of this fence will determine the impacts to the parking operations during constructions (interim traffic plan).
- Priority Parking – Landlord agrees to provide parking stalls for a minimum of 1,016 vehicles within “Parking East” and “Parking West”. The priority parking area is intended primarily for the use by the Tenant and shall be available for shared use only with the guests and patrons of the Alerus Center during an event.
- Dedicated Parking Option – The Tenant shall have the right to provide a “Dedicated Parking Notice” that all or any portion of the parking stall in “Parking East” and “Parking West” shall be solely for use by the Tenant and shall not be intended for use by the Landlord unless the Landlord provides a written request to the Tenant to use a portion of the parking stalls in “Parking East” for a specific event at the Alerus Center.
- Priority vs. Dedicated Parking – It needs to be determined how many parking stalls will be available to the Alerus Center in “Parking East” and “Parking West” for event parking.
- Existing Parking – Approximately 4,211 parking spaces are currently available for an event. This includes bus and handicap parking (an addition 500 unpaved spaces located at the site of the proposed Parking East lot have been used for large events).
- Interim Parking – After meeting with the Alerus and City staff it is recommended that we assume 3,498 on site spaces are available for an interim event. This includes bus and handicap parking.

- Final Parking Plan – It is undecided how many of the stalls in the Parking East lot will be available for event parking. If all of the lot is designated parking for the Canad Center 3,148 spaces will be available for event parking. If all of the lot is available for event parking then 3,755 parking spaces will be available. A decision from the City/Alerus Commission will be needed to determine how many stalls in the Parking East lot to use for this analysis.
- An additional access to 42nd Street at 11th Avenue has been discussed to benefit the daily operation of the Canad and the Alerus. This option would affect the traffic and parking analysis. More analysis is needed to determine if this access option should be recommended.

Project Schedule

- As of the date of this memorandum construction has not started on the Canad facilities. An updated schedule for constructions is needed to determine the duration of impacts associated with the construction of the Canad facilities.

Attachment 1



Canad Inns Destination Center Alerus Center Detailed Development Plan Amendment No. 3

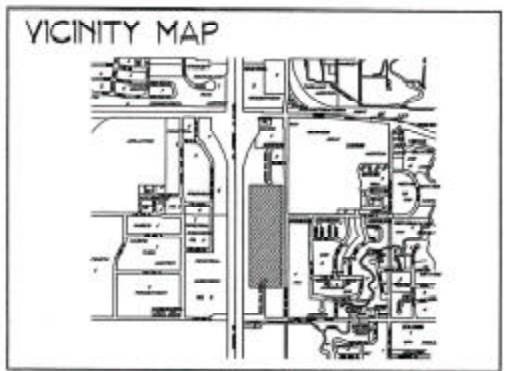
NEW SITE PLAN
1" = 100'

ADDRESS

CANAD INNS HOTEL, 1000 SOUTH 4TH ST. GRAND FORKS, ND	ALERUS CENTER 1000 SOUTH 4TH ST. GRAND FORKS, ND	WATER PARK 800 SOUTH 4TH ST. GRAND FORKS, ND	FUTURE CHINA 800 SOUTH 4TH ST. GRAND FORKS, ND
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LEGEND

- PROPERTY LINE
- UTILITY EASEMENT LINE
- LOP BOUNDARY



LOT DESCRIPTION

- LOTS 3&4, 5, AND 11, BLOCK 1 OF SUBDIVISION TO THE CITY OF GRAND FORKS, ND
- ZONING INFORMATION DAVIS PLANNED UNIT DEVELOPMENT, S-S TYPE USES

PLANTING SCHEDULE

HOODED BUFFER YARDS ARE USED PER ORIGINAL P.U.D. SEE SITE PLAN FOR LAYOUT

DETAILED DEVELOPMENT PLAN APPROVALS

ORIGINAL DCP	APPROVED BY THE PLANNING AND ZONING COMMISSION ON FEB. 8, 1997 AND THE CITY COUNCIL ON FEB. 17, 1997.
AMENDMENT #1	APPROVED BY THE PLANNING DEPARTMENT ON APR. 3, 1998.
AMENDMENT #2	APPROVED BY THE PLANNING DEPARTMENT ON OCT. 9, 2008.
AMENDMENT #3	APPROVED BY THE PLANNING DEPARTMENT ON _____, 2008.

- GENERAL NOTES**
- PAVING THICKNESS LEADING TO REUSE COLLECTIONS SITES SHALL MEET CITY SPECIFICATIONS.
 - DETAILED PLANS FOR ALL BUSINESS SIGNS SHALL BE SUBMITTED TO AND APPROVED BY THE PLANNING DEPARTMENT PRIOR TO THE ISSUANCE OF 90% PERMITS.
 - ALL EXTERIOR MECHANICAL SYSTEMS SHALL BE ADEQUATELY SCREENED.
 - ALL LANDSCAPING SHALL CONFORM TO SECTION 9-0309 UNLESS OTHERWISE SHOWN HEREOF.
 - PAVING THICKNESS FOR ALL HEAVY TRUCK ROUTES AND ROUTES LEADING TO REUSE COLLECTION SITES SHALL MEET CITY SPECIFICATIONS. MINIMUM OF 8-INCH CONCRETE PAVEMENT ON COMPACTED SUBGRADE OTHERWISE SHOWN HEREOF.
 - DETAILED PLANS FOR ALL BUSINESS SIGNS SHALL BE SUBMITTED TO AND APPROVED BY THE PLANNING DEPARTMENT PRIOR TO THE ISSUANCE OF 90% PERMITS.
 - ALL EXTERIOR MECHANICAL SYSTEMS SHALL BE ADEQUATELY SCREENED.
 - ALL LANDSCAPING SHALL CONFORM TO SECTION 9-0309 OF THE LAND DEVELOPMENT CODE UNLESS OTHERWISE SHOWN HEREOF.
 - THE RELOCATION OF EXISTING UTILITY SYSTEMS NEED TO BE COORDINATED WITH THE ALERUS CENTER STAFF. IT SHALL NOT DISRUPT THE DAILY OPERATIONS OF THE ALERUS CENTER. UTILITY SYSTEMS INCLUDE IRRIGATOR, PARKING LOT LIGHTING, PORTABLE WATER, FIRE PROTECTION, STORM WATER, AND VARIOUS COMPONENTS LOCATED WITHIN THE ALERUS CENTER SERVICE PEN.
 - PARKING EAST SHALL BE CONSTRUCTED AND IN OPERATION NO LATER THAN AUGUST 1, 2008.
 - LOCATION OF TOPSOIL SALVAGE WILL NEED TO BE AGREED UPON BETWEEN THE CITY AND CANAD INN. LOT 11 IS AVAILABLE FOR STOCKPILE.

DEVELOPMENT DATA

	AREA	ACRES	PERCENT
TOTAL SITE AREA:	247,279 SQ. FT.	5.678 ACRES	100%
ALERUS FOOTPRINT:	27,175 SQ. FT.	0.23 ACRES	0.09%
CANAD INN FOOTPRINT:	80,870 SQ. FT.	1.87 ACRES	0.76%
WATER PARK FOOTPRINT:	43,490 SQ. FT.	1.00 ACRES	0.41%
THEATER FOOTPRINT:	38,524 SQ. FT.	0.88 ACRES	0.36%
PAVING AND SIDEWALKS:	148,274 SQ. FT.	3.37 ACRES	13.6%
TOTAL IMPERVIOUS SURFACE:	198,691 SQ. FT.	4.52 ACRES	17.8%
MAXIMUM IMPERVIOUS SURFACE:	230,442 SQ. FT.	5.25 ACRES	21.2%
OVERLAY SPACE:	79,995 SQ. FT.	1.83 ACRES	0.74%
MINIMUM OVERLAY SPACE:	37,037 SQ. FT.	0.85 ACRES	0.34%

PARKING DATA

	ALERUS CENTER	CANAD INN
CAR STALLS PROVIDED	---	3,992
ACCESSIBLE STALLS PROVIDED	---	89
ACCESSIBLE STALLS REQUIRED	---	---
UNPAVED/OVERFLOW	---	240
TOTAL STALLS PROVIDED	---	4,221
MIN STALLS PROVIDED	---	80

RECEIVED JUN 16 2005

JLG architects

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REVISION DATE

Canad Inns Destination Center:
Alerus Center Detailed Development Amend. No. 3
Grand Forks, North Dakota

DATE
04.05

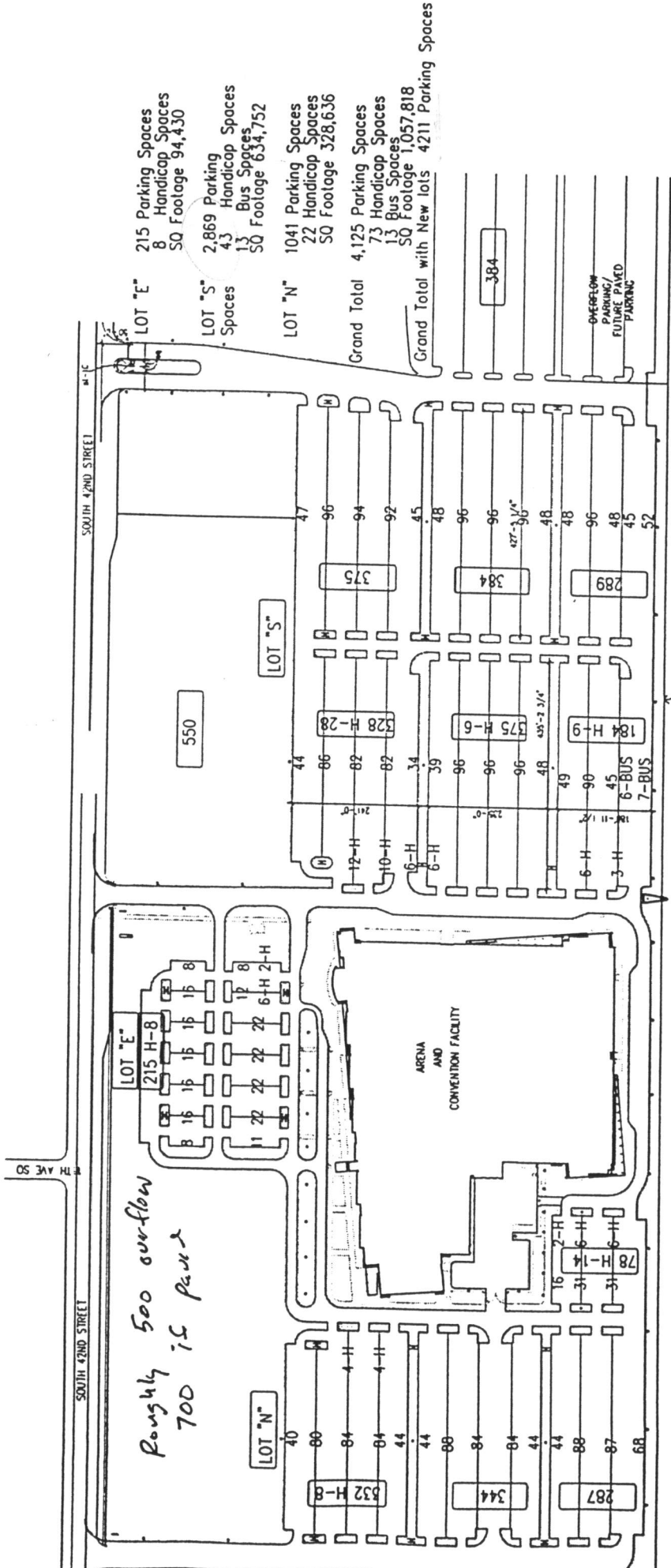
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JLG 0437

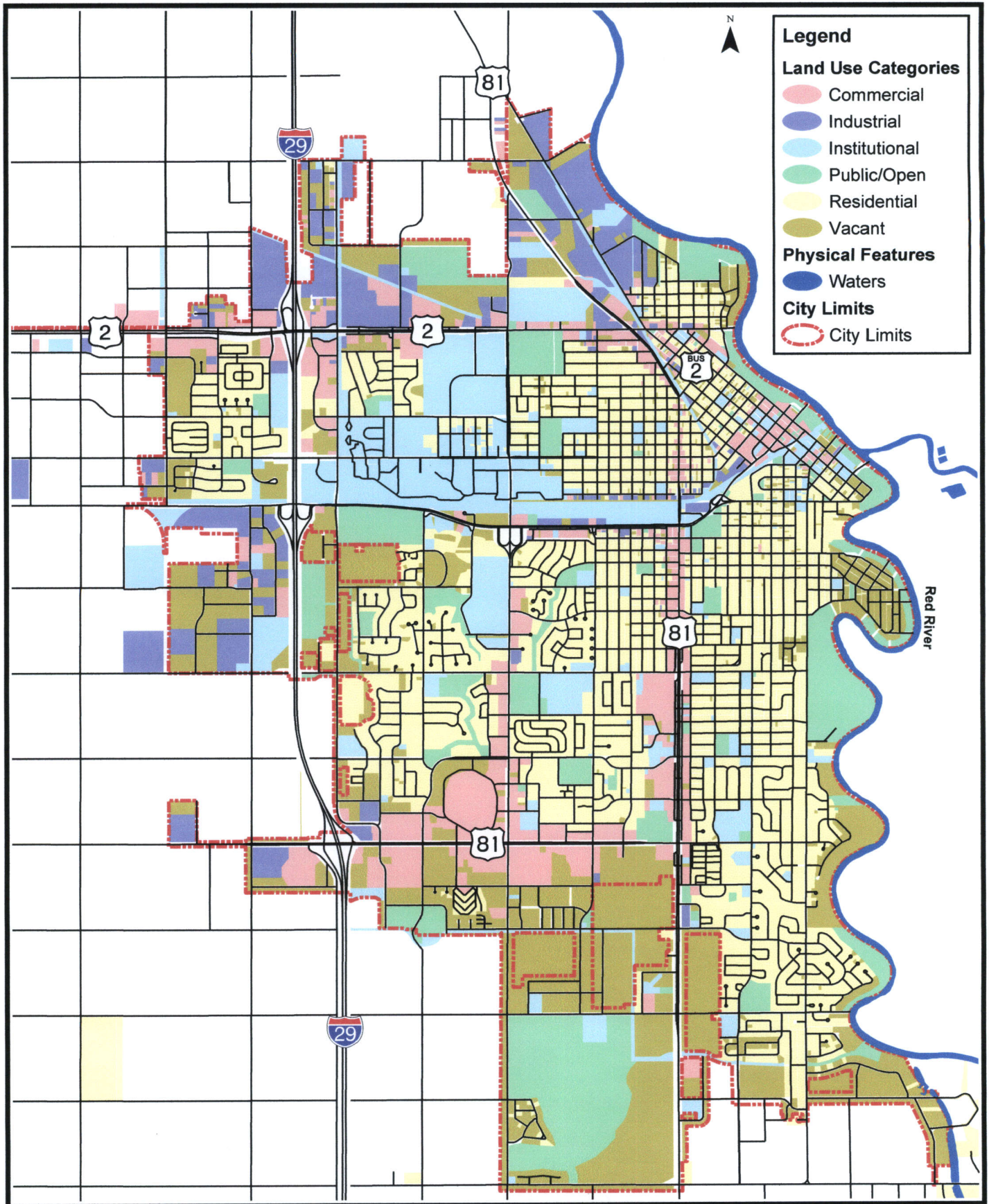
SHEET
DDPI
City Site Plan

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Attachment 2



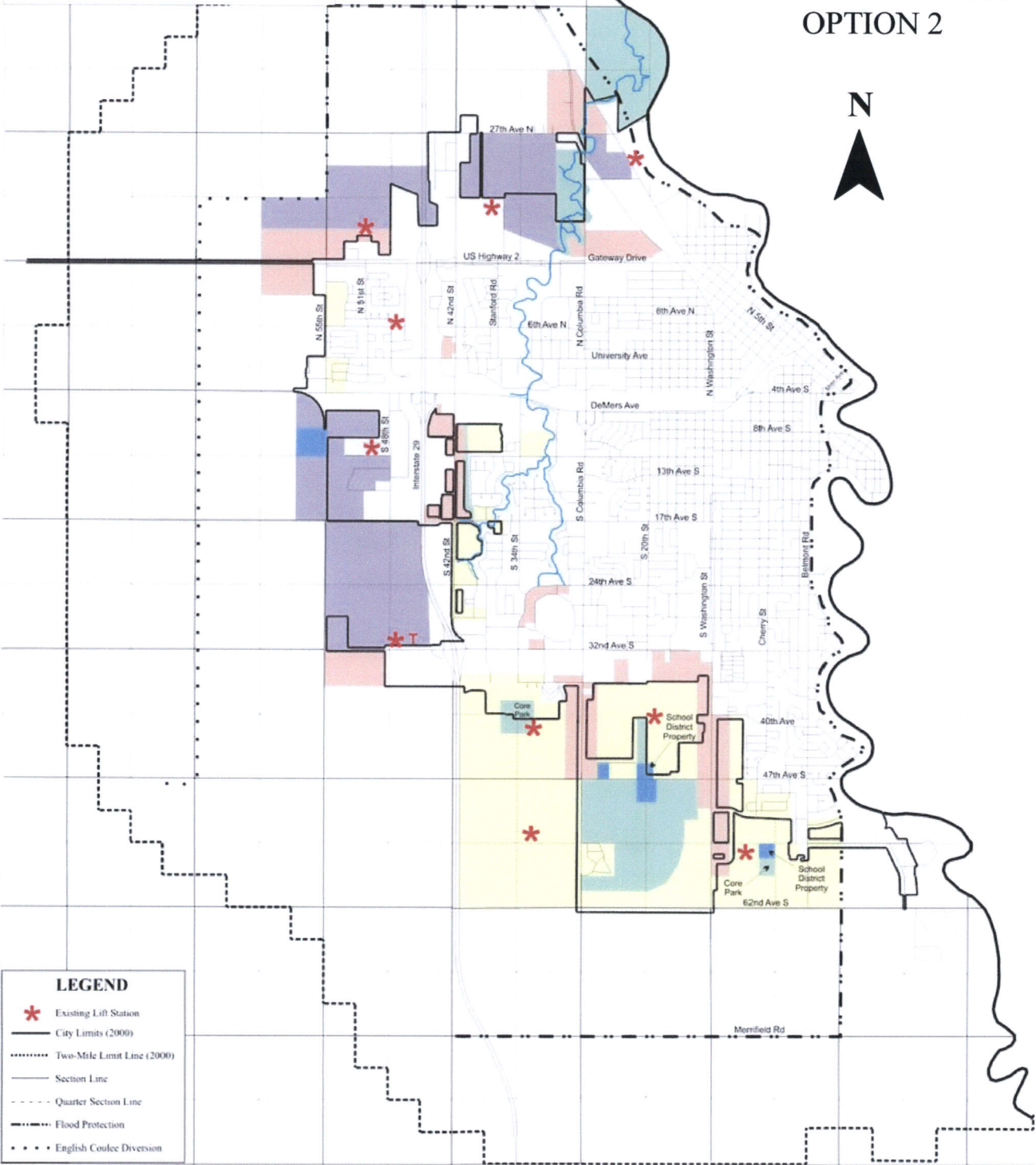
Attachment 3










LEGEND

 RESIDENTIAL	 INDUSTRIAL
 PARKS / OPEN SPACE	 PUBLIC / SEMI-PUBLIC
 COMMERCIAL	 AGRICULTURE / VACANT
 CENTRAL BUSINESS DISTRICT (Mixed Use)	

PROPOSED FUTURE LAND USE OPTION 2



LEGEND

	Existing Lift Station
	City Limits (2000)
	Two-Mile Limit Line (2000)
	Section Line
	Quarter Section Line
	Flood Protection
	English Coulee Diversion

Attachment F

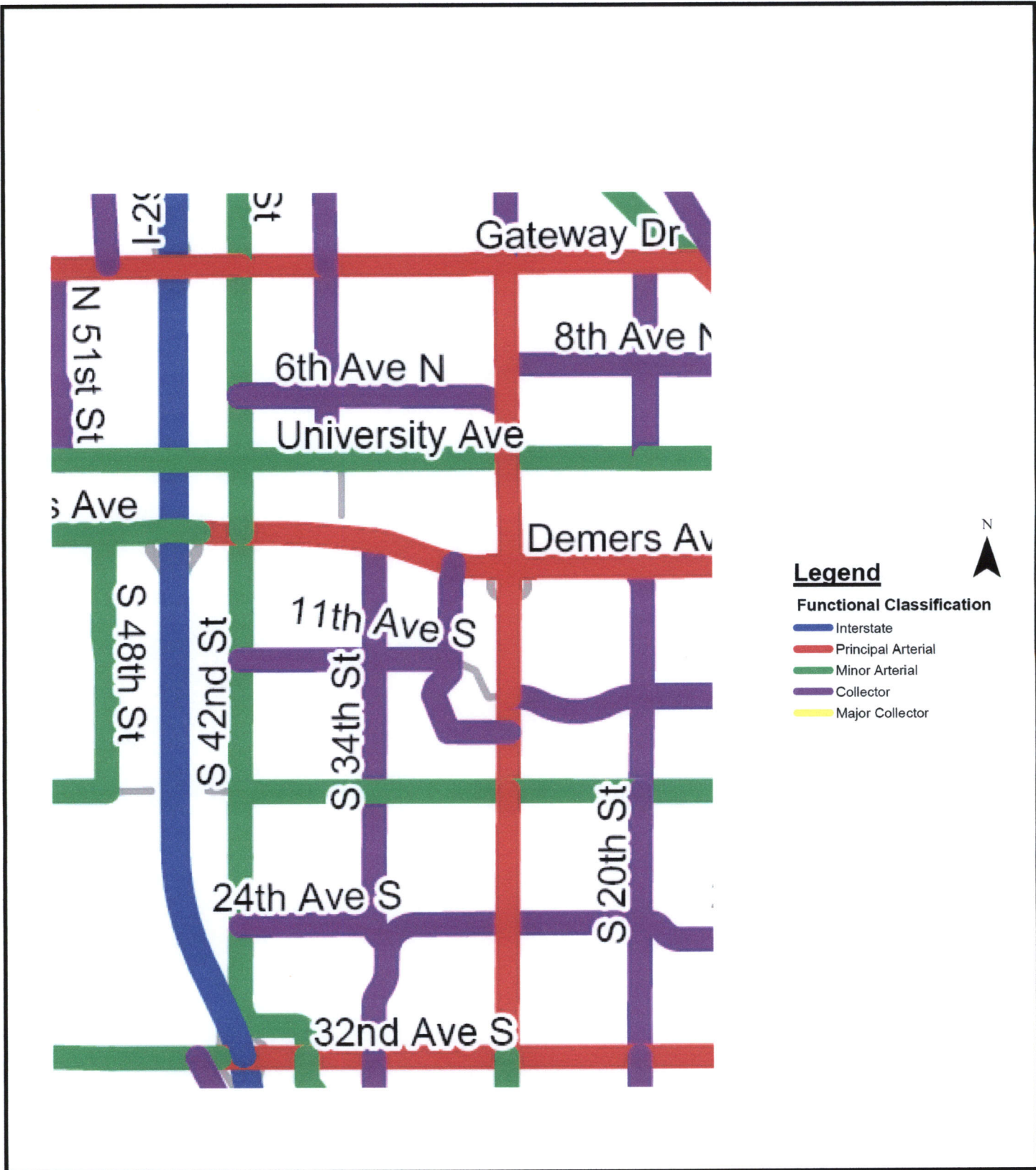
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LONG RANGE TRANSPORTATION PLAN UPDATE
Grand Forks - East Grand Forks Metropolitan Planning Organization

Grand Forks, ND
2025 Land Use Plan
Figure 4.4

Attachment 4



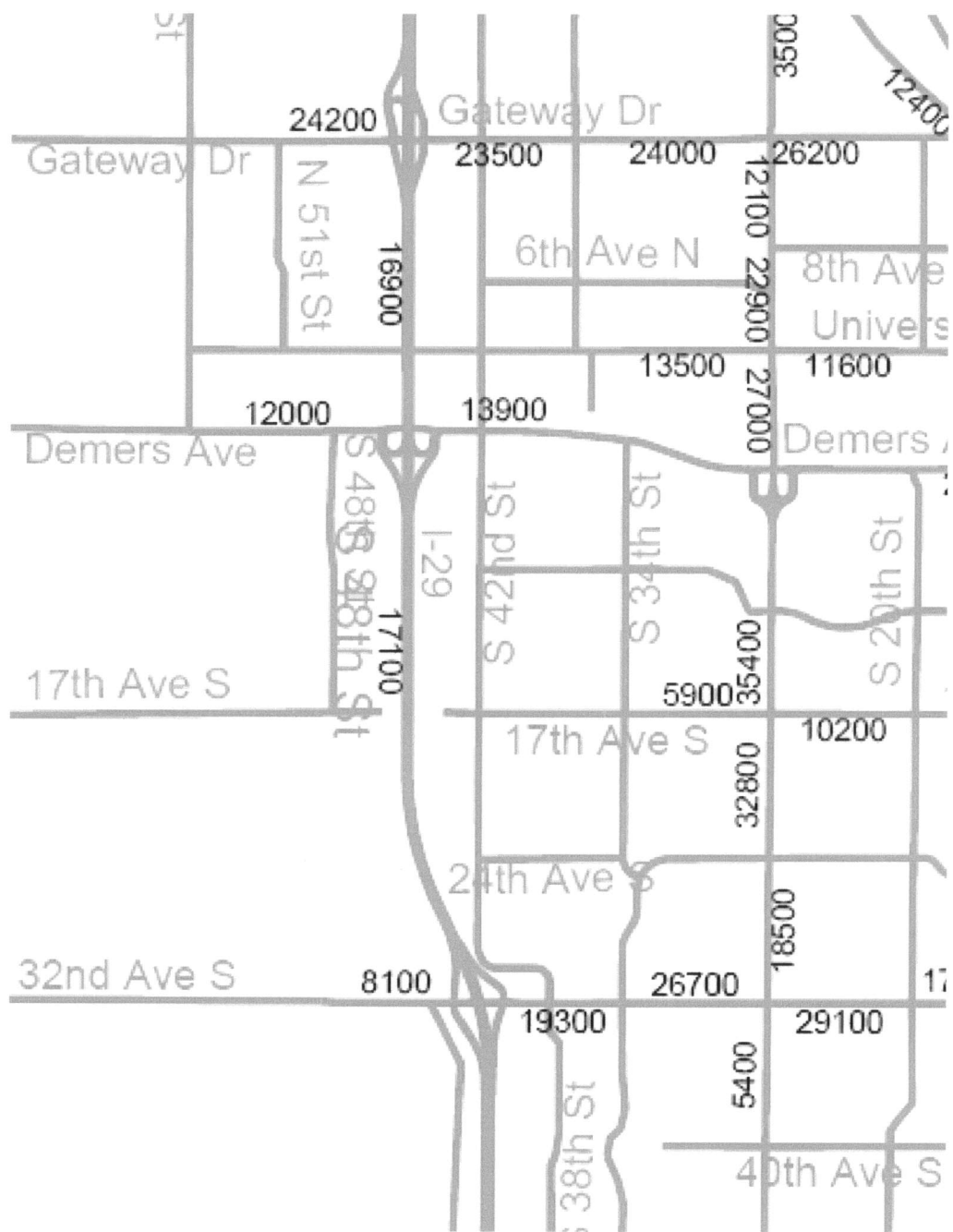
Study Area 2003 Functional Classification System

Attachment 5

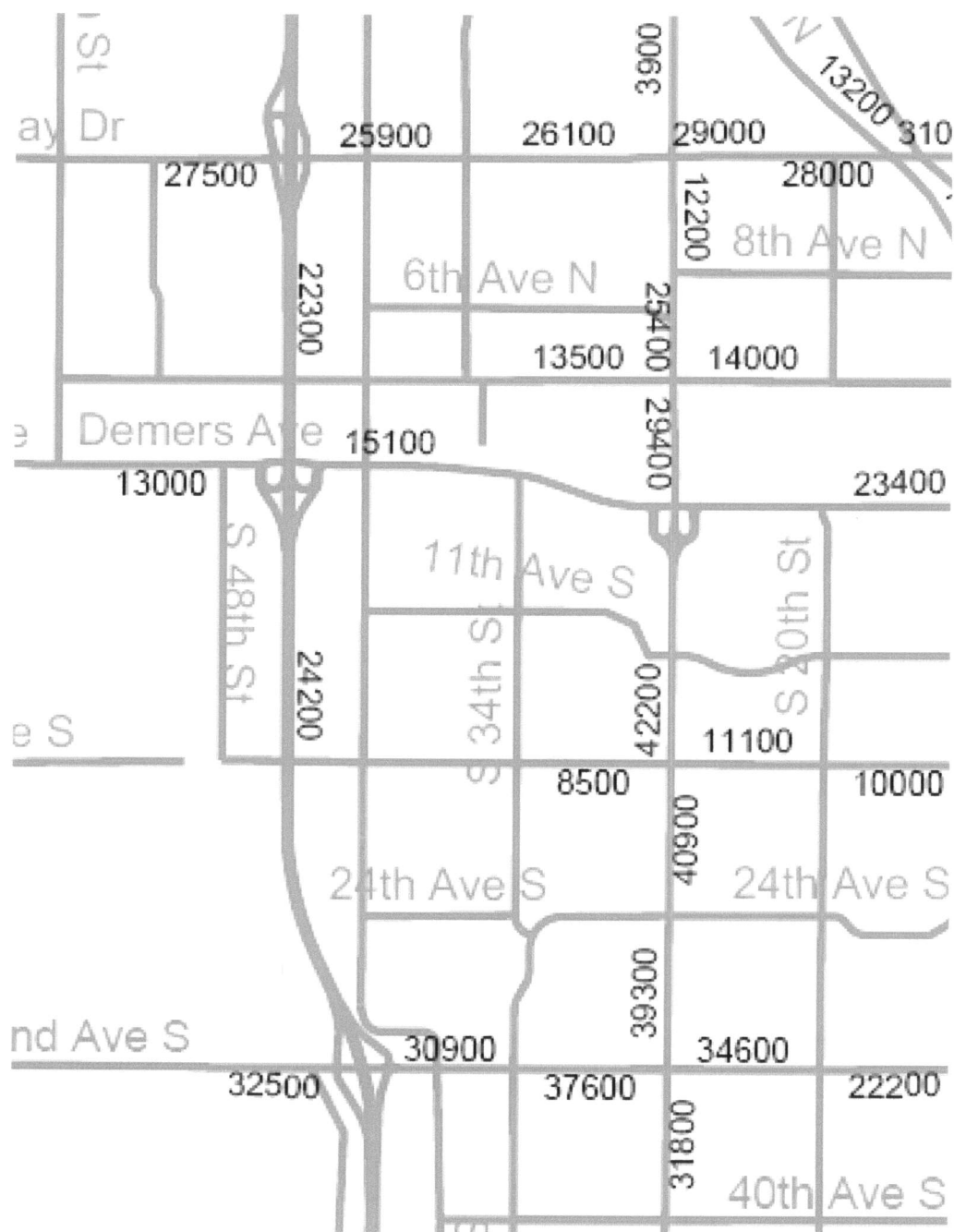
Intersection	Background Turning Movement Counts	Event Turning Movement Counts	Road Tube Counts	Lane Config	Stop or Signal Control	Signal Timing	Stop Control (allway, 2-way, etc)	Speed Limit
Gateway Drive & I-29 East Ramp	*	*		X	Signal	X	n/a	40/na
Gateway Drive & I-29 West Ramp	*	*		X	Signal	X	n/a	40/na
42nd Street & 17th Avenue	X	X		X	Signal	X	n/a	40/25
42nd Street & 11th Avenue	X	**		X	Stop	n/a	WB Stop	40/25
42nd Street & Demers Avenue	X	X		X	Signal	X	n/a	40/40
42nd Street & University Drive	X	X		X	Signal	X	n/a	40/25
42nd Street & 6th Avenue	X	n/a		n/a	Signal	n/a	n/a	40/25
42nd Street & Gateway Drive	X	n/a		n/a	Signal	n/a	n/a	40/40
42nd Street & Alerus North Access	**	**		**	Stop	n/a	EB Stop	40/20
42nd Street & Alerus Drive (Main Access)	**	**	X	**	Stop	n/a	EB Stop	40/20
42nd Street & Alerus South Access	**	**		**	Stop	n/a	EB Stop	40/20
38th Street & 32nd Avenue	X	X		X	Signal	X	n/a	25/40
34th Street & 32nd Avenue	*	X		X	Signal	X	n/a	30/40
34th Street & 17th Avenue	X	X		X	Signal	X	n/a	25/25
34th Street & 11th Avenue	X	X		X	Stop	n/a	E-W 2-Way	30/25
34th Street & Demers Avenue	X	X		X	Signal	X	n/a	30/40
32nd Avenue & I-29 East Ramp	X	X		X	Signal	X	n/a	40/n/a
32nd Avenue & I-29 West Ramp	X	X		X	Signal	X	n/a	40/n/a
Demers & I-29 NB Ramp	X	X		X	Stop	n/a	NB Stop	40/n/a
Demers & I-29 SB Ramp	X	X		X	Stop	n/a	NB Stop	40/n/a
	=Intersections that will not be included in the analysis							
X	=Information that we have							
need	=Information needed							
*	=Information obtained from background traffic in the provided synchro model							
**	=Information estimated from other data and video tapes							
n/a	=Not Applicable							

Updated 6-22-05 by PDH

Attachment 6



Study Area 2000 Average Daily Traffic



Study Area 2030 Forecasted Average Daily Traffic
(Approved Network)

Attachment 7

**Alerus Center
Attendance Report
2001 - 2004**

2001

Event Type	Events	Attendance
Banquets	54	29,320
Conferences & Conventions	18	10,649
Consumer Show	8	51,956
Facility Use	103	44,204
Meetings	171	27,083
Other	12	21,768
Sporting Events	60	177,453
Ticketed Events	17	131,386
Trade Shows	7	41,838
Tours	13	20,306
Weddings	12	4,249
2001 ANNUAL TOTAL	475	560,212

2002

Event Type	Events	Attendance
Banquets	98	17,298
Conferences & Conventions	7	2,219
Consumer Show	9	29,035
Facility Use	49	1,597
Meetings	134	27,657
Other	8	19,321
Sporting Events	29	91,932
Ticketed Events	14	121,930
Trade Shows	7	28,732
Tours	11	935
Weddings	11	3,903
2002 ANNUAL TOTAL	377	344,559

2003

Event Type	Events	Attendance
Banquets	102	24,897
Concert	10	59,489
Broadway/Theatrical-Commercial	0	-
Community/Educational Theatrical	5	6,471
Family Shows	8	43,259
Convention	9	12,177
Meeting/Conf	216	18,627
Consumer Show	13	15,558
Trade Show	16	36,769
Wedding Reception	14	3,427
Community/Civic	47	22,790
Sporting	46	104,561
Recreational Sports	5	13,177
Film/Movie	0	-
Internal Use	52	558
2003 ANNUAL TOTAL	543	361,760

2004

Event Type	Events	Attendance
Banquets	107	24,545
Concert	10	46,330
Broadway/Theatrical-Commercial	2	981
Community/Educational Theatrical	2	3,188
Family Shows	2	23,335
Convention	3	12,317
Meeting/Conf	104	11,273
Consumer Show	15	26,931
Trade Show	13	21,055
Wedding Reception	24	3,017
Community/Civic	36	22,654
Sporting	44	133,711
Recreational Sports	2	13,277
Film/Movie	0	-
Internal Use	105	2,252
2004 ANNUAL TOTAL	469	344,866



DRAFT TECHNICAL MEMORANDUM 2

To: Earl Haugen, Grand Forks – East Grand Forks Metropolitan Planning Organization Executive Director

From: Richard G. Lane P.E. SRF Consulting Group Inc.

Peggy Harter SRF Consulting Group Inc.

Date: June 22, 2005

SUBJECT: 42ND STREET EVENT TRAFFIC MANAGEMENT PLAN UPDATE

The purpose of this technical memorandum is to compare the existing event traffic management plan developed in December of 2000 with current management practices. The first Study Review Committee (SRC) meeting was held at the Alerus Center on April 28, 2005, at 8:00 a.m. Agencies represented at the meeting include the Grand Forks – East Grand Forks Metropolitan Planning Organization, Alerus Center Traffic Management Team, Grand Forks Engineering Department, Grand Forks Police Department and SRF Consulting Group Inc. Part of the agenda for the meeting was to discuss the current traffic management practices for Alerus Center events. Table 1 compares the existing traffic management plan to the current practices.

Table 1 Comparison of Current Event Management Plan to Current Practices and Assumptions

Table with 2 columns: Existing Traffic Management Plan and Current Practices. The table compares the 'Traffic Management Team' (including Grand Forks Engineering Dept, Police Dept, UND, Alerus Facilities Management, Emergency Services Team, and Traffic Engineering Team) with the 'Active Traffic Management Team' (including Grand Forks Police Dept, Alerus Facilities Management, Grand Forks Traffic Engineering Dept, and a monthly meeting to review upcoming events).

Table 1 Cont'd

EVENT SIZE	
Existing Traffic Management Plan	Current Practices
<u>Assumes three Event Sizes</u> <ul style="list-style-type: none"> • Moderate 1-6,000 • Major 6,000-12,000 • Max 12,000-15,000 	<u>Two Event Sizes</u> <ul style="list-style-type: none"> • Under 3,000 – No specific plan • 3,000 and up – Full plan goes into effect

ASSUMPTIONS	
Existing Traffic Management Plan	Current Practices
<u>Event Assumptions</u> <ul style="list-style-type: none"> • Weekday or Concert Arrival – 7:00 p.m. to 8:00 p.m. • Weekend Arrival – 11:00 a.m. to noon • Weekday Departure – 11:00 p.m. to midnight • Weekend Departure – 3:00 p.m. to 4:00 p.m. • 85 Percent Arrival Hour • 95 Percent Departure Hour • Modal Split – 90 Percent passenger car – 10 Percent bus or walk • Vehicle Occupancy – 3.0 • Arrival Direction – 69 Percent from north on 42nd Street and 31 Percent from south on 42nd Street • Gates closed on 11th Avenue during all events • General parking on site will be accessed by the north and south entrances. The center access will be reserved for VIP parking, handicapped vehicles, emergency vehicles and buses. 	<u>Event Experience</u> <ul style="list-style-type: none"> • Weekday or Concert Arrival – 6:30 p.m. to 7:30 p.m. • Weekend Arrival – Tailgating start at 8:00 a.m. (Kick-off at 1 p.m.) • Weekday or Concert Departure – 11:00 p.m. to midnight • Weekend Departure – 4:00 p.m. to 5:00 p.m. (1 hour after game ends) • 85 Percent Arrival Hour • 95 Percent Departure Hour • Modal Split – 95 Percent passenger car – 5 Percent bus or walk • Vehicle Occupancy – 1.7 to 2.0 • Arrival Direction – 50 Percent from south, 25 Percent from northeast and 25 Percent from northwest • Have closed gates at 11th Avenue only once or twice • General parking has been accessed by Alerus Drive or center access, especially after north parking lot is filled.

Table 1 Cont'd

EVENT MANAGEMENT IMPLEMENTATION	
Existing Traffic Management Plan	Current Practices
<p style="text-align: center;"><u>Site Access/Circulation</u></p> <ul style="list-style-type: none"> • Arrival – General parking on site will be accessed by the north and south entrances. The center access will be reserved for VIP parking, handicapped vehicles, emergency vehicles and buses. • Departure – General parking should depart via the north and south accesses only. Alerus Drive or the center/main access shall be for VIP, buses, handicap and vehicles picking up. 	<p style="text-align: center;"><u>Site Access/Circulation</u></p> <ul style="list-style-type: none"> • Arrival - General parking on the south side of the Alerus has been accessed by Alerus Drive or center access, especially after north parking lot is filled. VIP parking, handicapped vehicles, emergency vehicles and buses also use Alerus Drive access. • The North Lot is accessed from the north entrance and most of the south lot is filled from the south entrance. • Departure – General parking exits out of the Lot five exit and uses the Alerus Drive access for departure and are sent north on 42nd Street. Limos and cabs park on the east side of building and pick up at the east doors. VIP, buses, handicapped vehicles and pick ups also use the Alerus Drive access. • The remainder of the south lot depart through the south entrance and are sent south on 42nd Street. <p>All of the north lot departs via the north entrance and are sent north on 42nd Street.</p>
<p style="text-align: center;"><u>Off-Site Parking</u></p> <ul style="list-style-type: none"> • UND • Altru Hospital • Apollo Softball Field • Red River High School • Long term parking agreements are recommended • Develop a contact list for off-site parking 	<p style="text-align: center;"><u>Off-Site Parking</u></p> <ul style="list-style-type: none"> • Altru Hospital – Has been used for very large events but may not be available during daytime events • UND Lot 10 across from the football stadium – Used for games, however UND may start to charge for parking which may reduce the usage • No current long term parking agreements for off-site parking • No contact list

Table 1 Cont'd

EVENT MANAGEMENT IMPLEMENTATION (Cont'd)	
Existing Traffic Management Plan	Current Practices
<p style="text-align: center;"><u>Neighborhood Parking Issues</u></p> <ul style="list-style-type: none"> • Put up gate at 11th Avenue. • Put up extra signing to discourage on street parking. 	<p style="text-align: center;"><u>Neighborhood Parking Issues</u></p> <ul style="list-style-type: none"> • Have only used gate at 11th Avenue once or twice and haven't been having problems • The additional signs have been placed to discourage on street parking.
<p style="text-align: center;"><u>Shuttle Bus Use</u></p> <ul style="list-style-type: none"> • Three routes recommended <ol style="list-style-type: none"> 1. North on Columbia Road from Apollo lot to Altru Hospital, then west on University Avenue to 42nd Street to the site. 2. Uses the Columbia Road overpass from UND to Altru lot as necessary. Go west on DeMers Avenue to 42nd Street south to the site. 3. Goes south on Columbia Road stopping at the Hospital and Softball lots to 17th Avenue South. Go west on 17th Avenue to northbound 42nd Street. Go north on 42nd Street to the site. 	<p style="text-align: center;"><u>Shuttle Bus Use</u></p> <ul style="list-style-type: none"> • Shuttle buses are available for large events, but are sponsored by business owners (bars/restaurants). • Very few events have required Alerus sponsored shuttle bus service. • Shuttle bus has worked well with drop offs but have had trouble after events with shuttle bus pick ups taking a long time. • Dietrich Shuttle Service is only available with 22 buses total. Sometimes multiple events on the same day cause fewer shuttles to be available. • UND provides shuttle for UND games. (Partial use of route 1) • Will need a plan for off-site parking during construction. • If on-site parking stalls are reduced due to new construction, a long term off-site parking agreement will be needed. • City buses can only be used if private transit providers sign a release.
<p style="text-align: center;"><u>BNSF – Tracks crossing 42nd Street</u></p> <ul style="list-style-type: none"> • Develop a contact with BNSF to coordinate events with train schedule. 	<p style="text-align: center;"><u>BNSF – Tracks crossing 42nd Street</u></p> <ul style="list-style-type: none"> • Have not had success developing a regular contact to coordinate with BNSF.

Table 1 Cont'd

EVENT MANAGEMENT IMPLEMENTATION (Cont'd)	
Existing Traffic Management Plan	Current Practices
<p style="text-align: center;"><u>Fee Parking</u></p> <ul style="list-style-type: none"> • Currently not being used. • Appendix “A” of Current plan reviews possible fee parking options. • Additional personnel will be required (18 or more for major event). 	<p style="text-align: center;"><u>Fee Parking</u></p> <ul style="list-style-type: none"> • Currently not being used but considering fee parking options and fee per vehicle. • Estimate 14 to 16 additional personnel. • Estimate \$100,000 capital to set up for fee parking.

TRAFFIC CONTROL	
Existing Traffic Management Plan	Current Practices
<p style="text-align: center;"><u>Arrival</u></p> <ul style="list-style-type: none"> • One signing layout for the center entrance for all events, intended use is for buses, limos, drop off and VIP parking only – no general parking. • Moderate >6,000 – no off-site traffic controls except gate at 11th Avenue and residential neighborhood signage. Two traffic control personnel at north and south entrance and one person at center entrance. • Major 6,000 to 12,000 – close 11th Avenue gate, neighborhood signage, officers at the north and south entrances and 42nd/Demers intersection, double lefts at north and south accesses, no general parking at center access, double westbound lefts at Demers and 42nd Street and traffic signal modifications. 	<p style="text-align: center;"><u>Arrival</u></p> <ul style="list-style-type: none"> • Full plan for more than 3,000 attendance– approximately six police officers, eight Alerus staff, one City staff • 10,000 plus – approx. six police officers, 12 Alerus staff and three City staff. • Approx. eight additional UND staff for football games. (Provide traffic control for UND VIP area and tailgating – approximately 900 stalls.) • From 17th Avenue to the south access it has been very difficult to get the traffic to form two lanes as suggested in the plan even with the use of cones. • South of 17th Avenue traffic will not form two lanes even with the use of cones.

Table 1 (Continued)

TRAFFIC CONTROL (Continued)	
Existing Traffic Management Plan	Current Practices
<ul style="list-style-type: none"> • Max. >12,000 – Same as major event plus capture three southbound lanes at the north entrance, officer at University/42nd Street intersection, add portable CMS, more signs and barricades <p style="text-align: center;"><u>Departure</u></p> <ul style="list-style-type: none"> • Moderate – officer at north and south access, close 11th Avenue gate. • Major – capture three southbound lanes to 17th Avenue, provide two southbound lefts on to 17th Avenue, use CMS north of 17th Avenue for southbound, officers at north, south and center access, officers at 42nd Street/17th Avenue intersection, officers at 17th Avenue/34th Street intersection. No special traffic control for northbound on 42nd Street. • Max. – same as major plus provide two eastbound lanes on 17th Avenue to 34th Street 	<ul style="list-style-type: none"> • Traffic control plan for max event has not been used. <p style="text-align: center;"><u>Departure</u></p> <ul style="list-style-type: none"> • Special traffic signal timing at 42nd Street and Demers Avenue, 32nd Avenue and 38th Street, 42nd Street and 17th Avenue, 32nd Avenue and I-29 west ramp and 32nd Avenue and I-29 east ramp. • Police officer control at all three entrances and 17th Avenue and 42nd Street. • Type III barricades are set on 11th Avenue instead of using the gate. • Southbound double lefts not used at 17th Avenue. • 17th Avenue is coned to allow for two eastbound lanes, but the extra lane is used very little. • Portable CMS have only been used twice for max events
GUIDE SIGNS	
Existing Traffic Management Plan	Current Practices
<ul style="list-style-type: none"> • Send all I-29 traffic to 32nd Avenue. • ITS/CMS signs recommended at Demers Avenue east of 34th Street and 42nd Street north of 17th Avenue. 	<ul style="list-style-type: none"> • I-29 guide signs located north of Demers exit for southbound and south of 32nd Avenue exit for northbound. • Guide signs are also located on Gateway Drive east and west of 42nd Street and on 32nd Avenue both east and west of 38th Street. • Two ITS/CMS signs used on I-29 for max events – one south of 32nd Avenue and one north of Gateway Drive. (No remote communication available.) • Limited availability of portable VMS signs in the state.

EVENT OBSERVATIONS

As part of the contract, SRF observed traffic management of an event from the roof of the Alerus Center for the Motley Crue concert on April 8, 2005. The concert was held on a Friday night with a scheduled start time of 8:00 p.m. with an actual start time of approximately 8:15 p.m. The attendance was estimated at 7,000 prior to the event but the actual attendance was 5,692.

Our observation of inbound traffic started at 6:00 p.m. from the roof of the Alerus Center. For this event, directional signing was placed prior to the event and some coning was done on 42nd Street, south of the south entrance to try and capture two northbound left turn lanes into the site. Coning was also done on site at all three access points to direct traffic to the appropriate parking areas. Traffic signal timings were adjusted at 42nd Street and Demers Avenue, 42nd Street and 17th Avenue South, and 38th Street and 32nd Avenue South. The gates on 11th Avenue were not closed but type III barricades were set up at the entrances to the residential neighborhood east of 42nd Street and between 11th Avenue South and 17th Avenue South.

During the inbound traffic period Alerus traffic management personnel (six to eight total) were directing traffic on site but no officer control was required at the three access points. The busiest time period was from 7:25 p.m. to 7:45 p.m. The longest queue of traffic occurred at the south entrance at approximately 7:40 pm with traffic backed up to 17th Avenue South for approximately five minutes. A train blocked the north leg of 42nd Street and Demers Avenue intersection for approximately five minutes at 7:40 p.m. which backed up traffic beyond University Avenue. It took three cycles of the traffic signal to clear the back up.

Approximately 900 southbound vehicles used the north entrance to park in the north lots, while approximately 500 vehicles (approximately 200 southbound and 300 northbound) used the center entrance to park in either the VIP lot (approximately 100 vehicles) or the general parking in the south lots. One suggestion based on observations is to avoid the loading of the VIP lot from Alerus Drive (center entrance road) because many of the VIP vehicles stop at that point for the attendant. Loading of the VIP lot should be moved to one of the access openings on the west side of the lot. Between 20 and 30 shuttle buses from off site business made drop offs (includes buses that made more than one round) utilizing the center entrance. Some of the shuttles followed the signing that directed them to circle the building and exit through the center entrance but most exited through the north or south entrance. Approximately 1,100 vehicles used the south entrance to park in the south lots. It was estimated that approximately 2,300 vehicles were parked on site for this event.

At the end of the concert officers were used at all three entrances along with Alerus traffic management personnel. The officers parked their squad cars on 42nd Street with their flashing lights on to call attention to the use of traffic control personnel. Two traffic control persons were stationed at the south entrance, three at the center entrance and two at the north entrance. Traffic signal timings were adjusted at 42nd Street and Demers Avenue (four-way split phase with an 80-second northbound split), 42nd Street and 17th Avenue South (max II splits), 38th Street and

32nd Avenue South (max II splits), and the east and west I-29 ramp intersections at 32nd Avenue South (max II splits). The gates on 11th Avenue were not closed but type III barricades were set up at the entrances to the residential neighborhood east of 42nd Street and between 11th Avenue South and 17th Avenue South. No traffic was directed to the east on 11th Avenue.

Type I barricades were set up on Alerus Drive which allowed lot five to exit through the center entrance, but required all other south parking lot traffic to exit through the south entrance. Buses and limos were staged along Alerus Drive to the west of the main building entrance and were allowed to circle the building and exit at either the north entrance or the center entrance. The barricades provided a safe pedestrian path to the south lots for patrons exiting the building. The only traffic allowed through the barricades was shuttle buses and limos.

All traffic exiting the north entrance was sent to the north in two lanes. Southbound background traffic and northbound traffic from the center entrance were required to stop while the north lot was emptied. Officers alternated between the north-south traffic and vehicles exiting the north lot. At the intersection of 42nd Street and Demers Avenue the event signal timing worked very well and discharged the standing queue each cycle. The only noticeable delay at the north entrance was for northbound traffic that came from the center entrance that was being held to empty the north lot. If traffic exiting the center entrance was required to go east on 11th Avenue South this delay would be avoided and the north lot could be emptied more quickly.

All traffic exiting the center entrance was sent north on 42nd Street in two lanes. The limiting factor at this entrance was that northbound traffic was being held at the north entrance. As noted above, if this traffic exiting the center entrance was sent east on 11th Avenue South there would be less delay at the north lot exit point.

All traffic exiting the south entrance was sent south on 42nd Street in two lanes. Traffic flowed well with some of the traffic going east on 17th Avenue South but it appeared that most of the traffic continued south on 42nd Street towards 32nd Avenue South. Traffic did slow to a stop a few times which appeared to be due to the lack of southbound capacity south of 17th Avenue South. If more traffic was required to go east on 17th Avenue South some of this delay may be avoided.

The event was over at approximately 10:50 p.m. and the lots were emptied by approximately 11:10 p.m. The south lots emptied a few minutes earlier than then the north lots. Traffic coming from the middle entrance and not being able to get traffic to form two outbound lanes appeared to contribute to the slightly longer time to empty the north lots. Based on the estimated 2,300 vehicles on site and 20 min to empty the lots 115 cars exited per minute.



**DRAFT TECHNICAL
MEMORANDUM 3**

**TO: Earl Haugen, Grand Forks – East Grand Forks Metropolitan Planning
Organization, Executive Director**

**FROM: Rick Lane, P.E., Senior Associate
Renaë Cornelius, P.E., Senior Engineer**

DATE: JANUARY 23, 2006

**SUBJECT: ALERUS CENTER EVENT TRAFFIC STUDY
EXISTING CONDITIONS AND EVENT DEPARTURE ANALYSIS**

Introduction

The purpose of this memorandum is to document the analysis completed for existing p.m. peak hour conditions and the Motley Crue concert departure (April 8, 2005 at 11 pm), and to analyze the operation of the preferred alternative recommendations.

Existing Conditions

To determine how traffic is currently operating in the study area, traffic operations for existing conditions were analyzed at the following key intersections:

- 42nd Street & 17th Avenue
- 42nd Street & 11th Avenue
- 42nd Street & Demers Avenue
- 42nd Street & University Drive
- 42nd Street & Alerus North Access
- 42nd Street & Alerus Drive (Main Access)
- 42nd Street & Alerus South Access
- 38th Street & 32nd Avenue
- 34th Street & 32nd Avenue
- 34th Street & 17th Avenue
- 34th Street & 11th Avenue

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- 34th Street & Demers Avenue
- I-29 West Ramp & 32nd Avenue
- I-29 East Ramp & 32nd Avenue
- I-29 West Ramp & Demers Avenue
- I-29 East Ramp & Demers Avenue

Current p.m. peak hour turning movement counts for the key intersections were counted in year 2003 and provided by the East Grand Forks Metropolitan Planning Organization. Existing geometrics, traffic controls and peak hour traffic volumes for the key intersections are shown in the attached Synchro print out.

An operations analysis was conducted for the p.m. peak hour at the key intersections to determine how traffic currently operates in the study area. All intersections were analyzed using the Synchro/SimTraffic software. Capacity analysis results identify a Level of Service (LOS) which indicates the quality of traffic flow through an intersection. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS F indicates an intersection where demand exceeds capacity, or a breakdown of traffic flow. LOS A through C are generally considered acceptable by drivers. LOS D indicates that an intersection is near its capacity and that vehicles experience moderate delays.

Table 1
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Level of Service
	P.M. Peak Hour
42nd Street & 17th Avenue	A
42nd Street & 11th Avenue*	A/A
42nd Street & Demers Avenue	C
42nd Street & University Drive	C
42nd Street & Alerus North Access*	A/A
42nd Street & Alerus Drive (Main Access)*	A/A
42nd Street & Alerus South Access*	A/A
38th Street & 32nd Avenue	C
34th Street & 32nd Avenue	C
34th Street & 17th Avenue	B
34th Street & 11th Avenue*	A/B
34th Street & Demers Avenue	A
I-29 West Ramp & 32nd Avenue	B
I-29 East Ramp & 32nd Avenue	A
I-29 West Ramp & Demers Avenue*	A/A
I-29 East Ramp & Demers Avenue*	A/A

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS

Results of the analysis shown in Table 1 indicate that all key intersections currently operate at an acceptable LOS C or better during the p.m. peak hour, with existing traffic controls and geometric layout.

Current Event Departure Conditions

To determine how traffic currently operates during an event departure, traffic operations for existing concert departure conditions were analyzed at the following key intersections:

- 42nd Street & 17th Avenue
- 42nd Street & 11th Avenue
- 42nd Street & Demers Avenue
- 42nd Street & Alerus North Access
- 42nd Street & Alerus Drive (Main Access)
- 42nd Street & Alerus South Access
- 38th Street & 32nd Avenue
- I-29 West Ramp & 32nd Avenue
- I-29 East Ramp & 32nd Avenue
- I-29 West Ramp & Demers Avenue
- I-29 East Ramp & Demers Avenue

Turning movement counts were conducted by the East Grand Forks Metropolitan Planning Organization for an event departure during the Motley Crue concert on April 8, 2005. Concert attendance was 5,692 with an estimated 2,300 vehicles parking on site at the Alerus Center. Event observations noted in the *42nd Street Event Traffic Management Plan Update - Technical Memorandum 2* by SRF Consulting Group dated June 9, 2005 state that the event ended at 10:50pm and the parking lot was emptied in approximately 20 minutes.

In order to model the event departure, the peak 15 minute volumes were used and multiplied by four to determine the hourly equivalent. This volume represents the maximum volume that can leave the Alerus Center site from the current two exit points (i.e. four-lanes of traffic for the entire hour). The analysis assumes that all driveways to the Alerus Center are controlled by police officers and traffic signal timings at adjacent intersections are adjusted to accommodate the heavy directional traffic. All traffic exiting from the north driveway was sent north on 42nd Street via dual left-turn lanes and all traffic exiting from the south driveway was sent south via dual right-turn lanes.

Results of the analysis shown in Table 2 indicate that all key intersections, with the exception of the Alerus Center driveways on 42nd Street and the intersections of 38th street/32nd Avenue, currently operate at an acceptable overall LOS C or better, during the event departure.

Table 2
Current Event Departure Hour Conditions - Capacity Analysis
Level of Service Results

Intersection	Level of Service
	P.M. Peak Hour
42nd Street & 17th Avenue	B
42nd Street & 11th Avenue*	A/A
42nd Street & Demers Avenue	C
42nd Street & Alerus North Access*	D/F
42nd Street & Alerus Drive (Main Access)*	D/F
42nd Street & Alerus South Access*	D/F
38th Street & 32nd Avenue	D
I-29 West Ramp & 32nd Avenue	A
I-29 East Ramp & 32nd Avenue	A
I-29 West Ramp & Demers Avenue*	A/A
I-29 East Ramp & Demers Avenue*	A/A

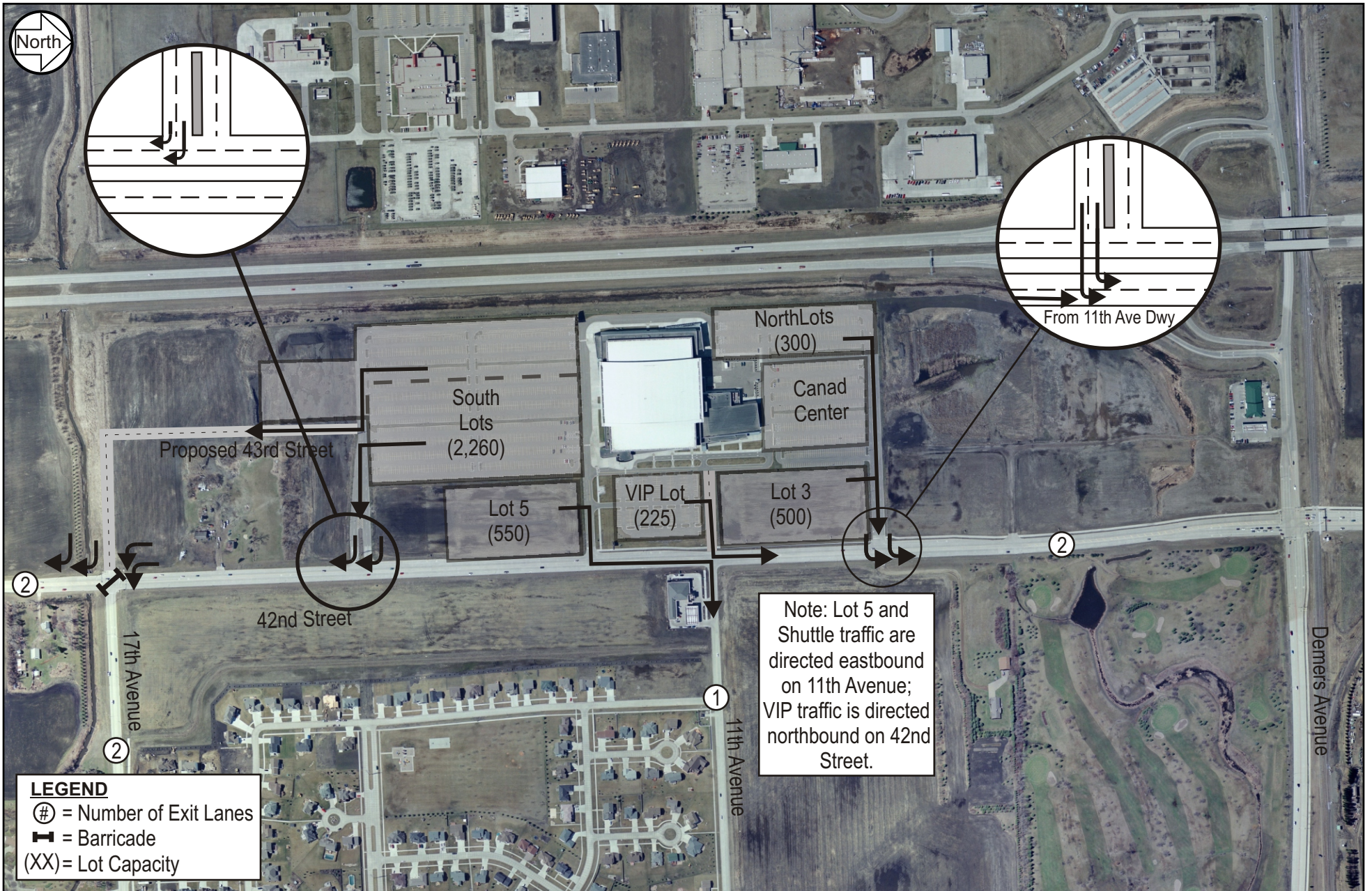
* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS

The Alerus Center driveways operate at poor levels of service due to capacity constraints at these intersections. The capacity of a single lane of traffic is approximately 900 vehicles per lane per hour, which limits the number of vehicles that can exit the site. The driveways from the parking lots meter vehicles that exit onto 42nd Street and adjacent intersections. Queuing develops mainly within the parking lot areas, minimal queuing exists on the local roadways. Alternatives that increase the volume exiting the site will result in greater volumes at downstream intersections. The intersection of 38th Street and 32nd Avenue operates poorly due to the high volume of southbound event traffic. Recommended geometric improvements for this intersection are provided in Technical Memorandum Four.

Alternative Analysis

Additional analysis was conducted to determine how traffic will operate during an event departure under the preferred Alternative Two conditions. Alternative Two includes seven exit lanes with four lanes to the south and two lane to the north on 42nd Street, one lane to the east on 11th Avenue (see Figure 1). This analysis was completed assuming a full capacity event (3,800 vehicles). Assumptions for Alternative two are as follows:

- All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue.
- Construct a fourth leg to the west at the intersection of 42nd Street/17th Avenue, and 43rd street from 17th Avenue to the south lot. Dual right-turn lanes exiting the new driveway, via 17th Avenue west leg, would be forced south on 42nd Street. Two lanes of traffic



ALTERNATIVE 2 -SEVEN LANES OUTBOUND

ALERUS CENTER EVENT TRAFFIC STUDY
 Grand Forks -East Grand Forks Metropolitan Planning Organization

Figure 1

could be accommodated with the continuation of the three-lane section on 42nd Street between 24th Avenue and 32nd Avenue. The width of the road for this segment is wide enough to accommodate a three-lane section, but it would require restriping of this roadway for the southern portion between 24th Avenue and 32nd Avenue. The center left-turn lane would need to be coned as a southbound through lane for each event departure.

- The VIP lot (225 vehicles) will exit via the new driveway located opposite 11th Avenue South. This traffic will be sent north on 42nd Street to Demers Avenue. This new access point will also be used for shuttle bus access to/from the site during departure. Shuttle busses traveling between the Alerus Center and offsite parking at Altru Hospital and other private parking facilities will be directed to use 11th Avenue South and 34th Street for ingress and egress to the Alerus Center.
- Traffic exiting the Alerus Center's current south driveway would be forced south on 42nd Street and left on 17th Avenue. In order to maximize capacity, dual right-turn lanes out of the south entrance with dual left-turn lanes onto 17th Avenue are recommended with the center left-turn lane on 17th Avenue to be coned as an eastbound through lane from 42nd Street to 34th Street. The intersection of 17th Avenue/34th Street would require police control.
- The intersection of 38th Street and 32nd Avenue South would become the critical intersection with twice as much traffic traveling southbound on 42nd Street. Geometrics for southbound traffic at this intersection would need to be modified for event departure to include a left turn lane, a center shared left-thru-right turn lane and a right turn lane. The signal timing for this intersection would need to be split-phased.
- This alternative would require additional changeable message signs to lead drivers to the correct lane.
- This alternative will also require the addition of an illuminated lane channelization sign at 38th Street and 32nd Avenue South to direct motorists to the correct lanes.

Results of the analysis shown in Table 3 indicate that all key intersections, with the exception of the Alerus Center driveways on 42nd Street and the intersections of 42nd Street and Demers Avenue will operate at an acceptable overall LOS C or better, during the event departure, under Alternative Two conditions.

Table 3
Proposed Event Departure Hour Conditions - Capacity Analysis
Level of Service Results

Intersection	Level of Service
	P.M. Peak Hour
42nd Street & 17th Avenue	B
42nd Street & 11th Avenue*	C/E
42nd Street & Demers Avenue	D
42nd Street & Alerus North Access*	C/E
42nd Street & Alerus Drive (Main Access)*	D/E
42nd Street & Alerus South Access*	C/F
38th Street & 32nd Avenue ⁽¹⁾	C
I-29 West Ramp & 32nd Avenue	B
I-29 East Ramp & 32nd Avenue	A
I-29 West Ramp & Demers Avenue*	B/C
I-29 East Ramp & Demers Avenue*	B/C

* indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS

⁽¹⁾ Analysis results assume recommended improvements listed above.

Unacceptable LOS at the side-street approaches are expected due to the high volume of vehicles attempting to exit the parking lots at the same time. Review of the modeling results for the intersection of 42nd Street and Demers Avenue indicates that the overall delay is approximately 38 seconds per vehicle, which is just above the LOS C threshold of 35 seconds per vehicle. Analysis results for current event departure conditions indicate that this intersection operates within the LOS C delay range. However, under Alternative Two conditions, additional traffic will be traveling north on 42nd Street and a portion of the traffic that exits east on 11th Avenue South will travel north on 34th Street and back west on Demers Avenue to access the I-29 interchange. As a result of the redirected traffic flow, a portion of the available green time at the intersection of 42nd Street and Demers Avenue will be used to serve westbound traffic, resulting in a slight increase in overall delay and the associated decrease in the Level of Service. The use of a traffic control officer at this location should be considered (optional). This intersection should be monitored and a traffic control officer used if the delays become excessive.

cc: David Montebello, P.E., Principal



**DRAFT TECHNICAL
MEMORANDUM 4**

**TO: Earl Haugen, Grand Forks – East Grand Forks Metropolitan Planning
Organization, Executive Director**

**FROM: Rick Lane, P.E., Senior Associate
Renaë Cornelius, P.E., Senior Engineer**

DATE: NOVEMBER 14, 2005

**SUBJECT: ALERUS CENTER EVENT TRAFFIC STUDY
EVENT DEPARTURE ALTERNATIVES AND RECOMMENDED IMPROVEMENTS**

Introduction

The purpose of this technical memorandum is to identify alternatives for an event departure scenario as well as the necessary improvements for each alternative. As part of this memorandum, we have identified key Event Management Principles that help form the basics for identifying the alternatives, as well as a simple way to compare event departure times.

Principles

- 1) The exit time (departure) of the Alerus Center parking lots is a function of:
 - Number of exit points
 - Amount of conflicting traffic at exit points
 - Bottlenecks or choke points at downstream intersections
 - Amount of field staff to control flow at key points
- 2) The number of lanes traveling away from the site must be equal to or greater than the number of lanes exiting the site, or there will be potential queues or back-ups.
- 3) Traffic volumes will become more dispersed the further you are from the site, making intersections further from the site less likely to experience congestion or failure.
- 4) Background traffic during an evening event departure is very low which reduces conflicts with exiting traffic.

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Another key element is the site discharge rate. This rate is dependent on many factors. A reasonable discharge rate assumption is 900 vehicles per lane per hour. This rate was confirmed by traffic counts collected for the peak 15 minutes of departure at the Alerus Center exits for the Motley Crue concert. For example, if there are four lanes exiting the site, 4 lanes x 900 vehicles per lane per hour = 3,600 vehicles per hour. An event at capacity under existing conditions can hold 4,125 vehicles on site. The expected time for all vehicles to exit the site will be 69 minutes (4,125 vehicles/3,600vehicles/hour), assuming equal use of each exit lane.

Event Departure Alternatives

Based on the above principles and discharge rate, the departure times for the site will not be reduced unless more exit points are added and/or the discharge rates increased. It is unlikely that the discharge rate can be significantly improved, therefore the focus of the alternatives was to obtain more exit points.

Figures 1-4 show the current exit configuration and three potential alternative exit configurations. A planning-level analysis of these alternatives is shown in Table 1, with the estimated time for exiting the Alerus Center. These alternatives assume all available parking spaces on site are used and that the Canad Center will be fully constructed, which reduces the number of parking spaces in the north lot from 1,285 to 1,025 parking spaces (this includes the remaining 300 spaces in the north lot, the newly constructed 500 spaces in Lot 3 and the VIP lot), a net loss of 260 spaces. In addition, it is assumed that a full-access, signalized intersection will be in place at 42nd Street and 11th Avenue for all alternatives.

Additional Alternatives

Three additional alternatives were developed, but dropped from consideration due to cost. These alternatives are discussed below.

- Construction of an additional on-site parking lot to the north of the Canad Center. The cost to construct a lot similar in size to lot three (550 spaces) was calculated at \$2.2 million. This cost includes land acquisition and construction. Due to cost, this alternative was dropped from consideration
- Construction of an I-29 overpass at 17th Avenue South. A review of the operations at the existing I-29 interchanges and grade separations shows that the volume of traffic bound for and/or west of I-29 represented a small portion of the overall flow (less than fifteen percent). Based on the event departure traffic analysis, the existing interchanges operate at a LOS A, therefore, the addition of the overpass is not justified base on existing travel shed.
- Construction of direct on/off-ramps from I-29 into the Alerus Center parking lots. The volume of traffic leaving the site and destined to I-29 for most events is relatively low (two to six percent). Therefore little benefit would be realized with this improvement. Also, based on our knowledge of FHWA's interstate access policy ant our experience in requesting interstate access changes, is it very unlikely that FHWA would approve this type of interstate access. Therefore construction of direct on/off-ramps from I-29 was dropped from further consideration.

Table 1
Event Departure Alternatives ^A

	Exit Direction	Number of Parking Spaces	Number of Outbound Lanes	Rate/Lane (veh/hour) ⁽²⁾	Rate/Hour (veh/hour)	Longest Exit Time (mins.)	Percent reduction from Present condition ^B	Weighted Average Exit Time (mins.) ^C
Present Condition 4-lane Exit	SB on 42nd St.	2,640 ⁽¹⁾	2	900 (2)	1,800	88 ⁽³⁾	N/A	37
	NB on 42nd St.	1,448 ⁽¹⁾	2	900 (2)	1,800	48	N/A	
Alternative 1 6-lane Exit (3-lanes South)	SB on 42nd St.	2,260	3	900 (2) 600 (1)	2,400	57	35	24
	EB on 11th Ave.	550	1	900 (1)	900	36		
	NB on 42nd St.	1,025	2	900 (2)	1,800	34	29 ⁽⁴⁾	
Alternative 2 7-lane Exit (4-lanes South)	SB 42nd St. to EB 17th Ave.	1,130	2	900 (1) 600 (1)	1,500	45	49	20
	SB 42nd St. via 43rd St.	1,130	2	900 (1) 600 (1)	1,500	45		
	EB on 11th Ave.	550	1	900 (1)	900	36		
	NB on 42nd St.	1,025	2	900 (2)	1,800	34	29 ⁽⁴⁾	
Alternative 3 8-lane Exit (4-lanes South, 3-lanes North)	SB 42nd St. to EB 17th Ave.	955	2	900 (1) 600 (1)	1,500	38	57	18
	SB 42nd St. via 43rd St.	955	2	900 (1) 600 (1)	1,500	38		
	EB on 11th Ave.	550	1	900 (1)	900	37		
	NB on 42nd St. via North Dwy	800	2	900 (1) 600 (1)	1,500	32	21	
	NB on 42nd St. via 11th Ave.	575 ⁽⁵⁾	1	900 (1)	900	38		

^A All alternatives are also represented in Figures 1-4.

^B The percent reduction is calculated separately for the exit direction and is the time reduction for the direction using the highest exit times.

^C The weighted average exit time is calculated weighting the number of vehicles and the average time it takes each to exit, assuming the average departure time per vehicle is half of the longest exit time.

⁽¹⁾ Typically, during an event that is at capacity, traffic departing from Lot 3 and the VIP lot are directed half to the north and half to the south on 42nd Street.

⁽²⁾ Assumes that the center left-turn lane that is temporarily used as a thru lane will only achieve 600 vph, thru lanes achieve 900 vph. Number of lanes per rate is shown in parenthesis.

⁽³⁾ Relates to actual observations or testimony (Backstreet Boys 71 minutes)

⁽⁴⁾ This reduction in exit time is a function of the reduced number of spaces in the north lot. It is not due to increased efficiency.

⁽⁵⁾ Assumes 225 vehicles from the VIP lot and 350 vehicles from the south parking lot (see Figure 4)

Recommended Improvements

The following improvements are recommended based on the alternatives listed in the table above.

- **Present condition - Four-lane exit**
 - No improvements required. Event departure will operate as is today under current conditions.

- **Alternative 1 - Six-lane exit (three lanes south and two lanes north on 42nd Street)**
 - Consistent with Interim Plan
 - All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue.
 - Three right-turn exit lanes will be coned at the south exit, leading the rightmost lane south on 42nd Street and remaining two lanes east on 17th Avenue. This requires the center left turn lane on 17th Avenue to be coned as an eastbound through lane from 42nd Street to 34th Street. The intersection of 17th Avenue/34th Street would require police control.
 - This alternative would require additional changeable message signs to lead drivers to the correct lane.

- **Alternative 2 - Seven-lane exit (four lanes south and two lanes north on 42nd Street)**
 - All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue.
 - Construct a fourth leg to the west at the intersection of 42nd Street/17th Avenue, and 43rd street from 17th Avenue to the south lot (see Figure 3). Dual right-turn lanes exiting the new driveway, via 17th Avenue west leg, would be forced south on 42nd Street. Two lanes of traffic could be accommodated with the continuation of the three-lane section on 42nd Street between 24th Avenue and 32nd Avenue. The width of the road for this segment is wide enough to accommodate a three-lane section, but it would require restriping of this roadway for the southern portion between 24th Avenue and 32nd Avenue. The center left turn lane would need to be coned as a southbound through lane for each event
 - Traffic exiting the Alerus Center's current south driveway would be forced south on 42nd Street and left on 17th Avenue. In order to maximize capacity, dual right-turn lanes out of the south entrance with dual left-turn lanes onto 17th Avenue are recommended with the center left-turn lane on 17th Avenue to be

coned as an eastbound through lane from 42nd Street to 34th Street. The intersection of 17th Avenue/34th Street would require police control.

- The intersection of 38th Street and 32nd Avenue would become the critical intersection with twice as much traffic traveling southbound on 42nd Street. A more detailed analysis will be completed to determine the impacts and potential modifications needed at this intersection.
- This alternative would require additional changeable message signs to lead drivers to the correct lane.
- **Alternative 3 - Eight-lane exit (four lanes south and three lanes north on 42nd Street)**
 - All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue.
 - All vehicles parking in the VIP lot (225 vehicles) and 350 vehicles from the north end of the south lot will exit via 11th Avenue and will be forced north in the rightmost lane on 42nd Avenue.
 - Vehicles will exit the north lot via dual left-turn lanes and will be forced north on 42nd Street. The continuous center left-turn lane on 42nd Street will be coned off as a temporary northbound through lane from the north driveway to Demers Avenue. Vehicles exiting the north lot will travel northbound on 42nd Street in the center left-turn lane and the leftmost through lane.
 - Operations for vehicles exiting the south lot and traveling south on 42nd Avenue or east on 17th Street will be the same as stated in Alternative 2.
 - This alternative would require additional changeable message signs to lead drivers to the correct lane.

These three alternatives would provide reduced departure times from the Alerus Center parking lots to the surrounding street system. Other recommended improvements that will help communicate and/or facilitate traffic movements to and from the site will be addressed in Technical Memorandum Three. These include such things as changeable message signs, pre-assigned parking and specific intersection improvements away from the site.

Of the three alternatives listed above, Alternative 2 is recommended as the preferred alternative to move forward with for the final plan. Reasoning for this recommendation is as follows:

- The cost and Alerus staff required to provide additional coning and traffic control on 42nd Street does not provide a beneficial gain in departure time (weighted average of 2 minutes).

- The north driveway is likely to operate better than estimated due to overlapping uses at the Canad Center which may further reduce the total number of vehicles exiting during the departure hour.
- Alternative 3 may experience difficulty directing on site traffic from the south parking lot to the 11th Avenue exit due to pedestrian conflicts.

cc: David Montebello, P.E., Principal



PRESENT CONDITION - FOUR LANES OUTBOUND

ALERUS CENTER EVENT TRAFFIC STUDY
 Grand Forks -East Grand Forks Metropolitan Planning Organization

Figure 1

