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Transportation • Civil • Structural • Environmental • Planning • Traffic • Landscape Architecture • Parking • Right of Way

SRF No. 0055383

SUPPLEMENT ONE TO:
THE UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
TRANSPORTATION ANALYSIS TECHNICAL MEMORANDUM
DATED SEPTEMBER 7, 2005

TO: Brian Swanson
University of Minnesota

FROM: Patrick Corkle, Senior Associate, P.E., P.T.O.E.
Renae Cornelius, Senior Engineer, P.E.

DATE: February 1, 2006

SUBJECT: UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM
SUPPLEMENT ONE – ADDITIONAL TRAFFIC ANALYSIS

INTRODUCTION

Additional analysis was conducted to determine how traffic would operate assuming a Minor Event (as defined in the University of Minnesota On-Campus Football Stadium Final EIS) at the Stadium, with the proposed roadways. Minor Event conditions assume 15,000 attendees (non-football event). This analysis was conducted under Year 2009 conditions for a Saturday afternoon and weekday evening event, for arrival and departure conditions.

In addition, this supplement reports previous analysis was conducted for a 2030 weekday evening football game under arrival conditions.

Year 2009 Saturday Minor Event

Analysis of a Minor Event on a Saturday, with the proposed roadways, was conducted to determine the impacts to the local roadway system. The volumes used for Saturday afternoon Minor Event conditions are included in the Appendix (Figures B-1 and B-2). Signal timing was optimized as described on page 18 of the University of Minnesota On-Campus Football Stadium Draft Environmental Impact Statement (DEIS) Transportation Analysis Technical Memorandum, dated September 7, 2005. The analysis results for a Saturday afternoon Minor Event are summarized in Table 1.

Table 1
Year 2009 Saturday Afternoon Minor Event – Arrival and Departure Hour Conditions
Level of Service Results

Int #	Intersection	2009 Minor Event Arrival	2009 Minor Event Departure
1	15th Ave. / Como Ave.	B	B
2	15th Ave. / Rollins		
3	15th Ave. / 5th St.		B
4	17th Ave. / 5th St.		
5	I-35W SB Off-Ramp / 4th Street (CSAH 37)	A	C
6	I-35W NB On-Ramp / 4th Street (CSAH 37)		B
7	10th Ave. / 4th Street (CSAH 37)		**E**
8	13th Ave. / 4th Street (CSAH 37)		C
9	14th Ave. / 4th Street (CSAH 37)		C
10	15th Ave. / 4th Street (CSAH 37)		C
11	17th Ave. / 4th Street (CSAH 37)	B	C
13	Oak St. / 4th Street (CSAH 37)	B	C
14	25th Ave. / 4th Street (CSAH 37)		
15	I-35W SB On-Ramp / University Avenue (CSAH 36)	C	D
16	I-35W NB Off-Ramp / University Avenue (CSAH 36)	C	
17	10th Ave. / University Avenue (CSAH 36)	C	
18	11th Ave. / University Avenue (CSAH 36)	C	
19	14th Ave. / University Avenue (CSAH 36)	C	
20	15th Ave. / University Avenue (CSAH 36)	B	
21	17th Ave. / University Avenue (CSAH 36)	C	
23	Oak St. / University Avenue (CSAH 36)	D	**F**
24	Huron Blvd. / University Avenue (CSAH 36)	C	**F**
25	Washington Avenue (CSAH 122) / University Avenue (CSAH 36)	A	C
26	25th Ave. / University Avenue (CSAH 36)		C
27	27th Ave. / University Avenue (CSAH 36)	C	B
28	Malcolm Ave. / University Avenue (CSAH 36)		
29	Bedford Rd. / University Avenue (CSAH 36)		
30	TH 280 SB Off-Ramp / University Avenue (CSAH 36)	B	B
31	TH 280 NB On-Ramp / University Avenue (CSAH 36)	B	C
32	TH 280 SB On-Ramp / Franklin Ave.		B
33	TH 280 NB Off-Ramp / Franklin Ave.	B	
34	Church St. / Washington Avenue (CSAH 122)	C	C
35	Union St. / Washington Avenue (CSAH 122)		B
36	Harvard St. / Washington Avenue (CSAH 122)	C	
37	Oak St. / Washington Avenue (CSAH 122)	C	D
38	Huron Blvd. / Washington Avenue (CSAH 122)	C	D
39	Oak St. / Delaware / St.		
40	25th Ave. / Delaware St.		
41	Huron Blvd. / Essex St.	A	B
42	Fulton St. / Oak St.		
43	Erie St. / Fulton St.		

Table 1 Continued
Year 2009 Saturday Afternoon Minor Event – Arrival and Departure Hour Conditions
Level of Service Results

Int #	Intersection	2009 Minor Event Arrival	2009 Minor Event Departure
44	Fulton St. / Huron Blvd.	A	A
45	27th Ave. / Essex St.		
46	27th Ave. / East River Road / Franklin Ave.	C	C
47	5th St. / Oak St.		
48	Huron Blvd. / U of M Parking Entrance		
49	23rd Ave. / University Avenue (CSAH 36)		

These intersections not analyzed under this scenario, but are included here to facilitate comparison with intersection analysis under other scenarios analyzed.
Bold items indicate poor levels of service.
[1] X/X indicates "Overall Level of Service / Worst Approach to Intersection"

Year 2009 Build Roadway Saturday Minor Event: Arrival Hour

All of the intersections analyzed are expected to operate at acceptable levels during the arrival peak hour for a Saturday Minor Event in 2009.

Year 2009 Build Roadway Saturday Minor Event: Departure Hour

Three of the intersections analyzed are expected to operate poorly (LOS E or F) during the departure peak hour for a Saturday minor non-football event in 2009. The intersection at 4th Street (CSAH 37)/10th Avenue is expected to operate poorly due to vehicles trying to access I-35W. The intersection of Oak Street / University Avenue (CSAH 36) is expected to operate poorly (LOS F) during the departure peak hour due to conflicts between the high volume of pedestrians and vehicles, as well as the addition of the westbound approach for the proposed configuration. The intersection of University Avenue/Huron Boulevard/23rd Avenue is expected to operate at LOS F due to the high volume of southbound rights as well as queuing from the upstream intersection of Oak Street / University Avenue. It should be noted that for a football event, vehicles exiting the Stadium parking lot will not be routed southbound on 23rd Avenue due to the shuttle bus staging area. There will be no shuttling for Minor Events, therefore vehicles were permitted to exit at this location for this analysis. To improve operations, vehicles should not be permitted to make a southbound right at this location during an event departure. They should be forced to go through at this intersection, along Huron Boulevard to the I-94 Interchange or routed to the north and exit at 6th Street.

Year 2009 Weekday Evening Minor Event

Analysis of a Minor Event on a Weekday, with the proposed roadways, was conducted to determine the impacts to the local roadway system. The volumes used for Weekday evening Minor Event conditions are included in the Appendix (Figures B-3 and B-4). The analysis results for a Weekday Evening Minor Event are summarized in Table 2.

Table 2
Year 2009 Weekday Evening Minor Event – Arrival and Departure Hour Conditions Level of Service Results

Int #	Intersection	2009 Minor Event Arrival	2009 Minor Event Departure
1	15th Ave. / Como Ave.	B	B
2	15th Ave. / Rollins		
3	15th Ave. / 5th St.		A
4	17th Ave. / 5th St.		
5	I-35W SB Off-Ramp / 4th Street (CSAH 37)	B	B
6	I-35W NB On-Ramp / 4th Street (CSAH 37)		A
7	10th Ave. / 4th Street (CSAH 37)		D
8	13th Ave. / 4th Street (CSAH 37)		B
9	14th Ave. / 4th Street (CSAH 37)		C
10	15th Ave. / 4th Street (CSAH 37)		C
11	17th Ave. / 4th Street (CSAH 37)	C	D
13	Oak St. / 4th Street (CSAH 37)	C	C
14	25th Ave. / 4th Street (CSAH 37)		
15	I-35W SB On-Ramp / University Avenue (CSAH 36)	D	B
16	I-35W NB Off-Ramp / University Avenue (CSAH 36)	**E**	
17	10th Ave. / University Avenue (CSAH 36)	C	
18	11th Ave. / University Avenue (CSAH 36)	C	
19	14th Ave. / University Avenue (CSAH 36)	C	
20	15th Ave. / University Avenue (CSAH 36)	B	
21	17th Ave. / University Avenue (CSAH 36)	C	
23	Oak St. / University Avenue (CSAH 36)	D	**F**
24	Huron Blvd. / University Avenue (CSAH 36)	C	C
25	Washington Avenue (CSAH 122) / University Avenue (CSAH 36)	A	A
26	25th Ave. / University Avenue (CSAH 36)		B
27	27th Ave. / University Avenue (CSAH 36)	C	B
28	Malcolm Ave. / University Avenue (CSAH 36)		
29	Bedford Rd. / University Avenue (CSAH 36)		
30	TH 280 SB Off-Ramp / University Avenue (CSAH 36)	C	C
31	TH 280 NB On-Ramp / University Avenue (CSAH 36)	C	C
32	TH 280 SB On-Ramp / Franklin Ave.		B
33	TH 280 NB Off-Ramp / Franklin Ave.	B	
34	Church St. / Washington Avenue (CSAH 122)	C	B
35	Union St. / Washington Avenue (CSAH 122)		B

Table 2 Continued
Year 2009 Weekday Evening Minor Event – Arrival and Departure Hour Conditions
Level of Service Results

Int #	Intersection	2009 Minor Event Arrival	2009 Minor Event Departure
36	Harvard St. / Washington Avenue (CSAH 122)	C	
37	Oak St. / Washington Avenue (CSAH 122)	D	C
38	Huron Blvd. / Washington Avenue (CSAH 122)	D	B
39	Oak St. / Delaware / St.		
40	25th Ave. / Delaware St.		
41	Huron Blvd. / Essex St.	B	A
42	Fulton St. / Oak St.		
43	Erie St. / Fulton St.		
44	Fulton St. / Huron Blvd.	B	B
45	27th Ave. / Essex St.		
46	27th Ave. / East River Road / Franklin Ave.	D	B
47	5th St. / Oak St.		
48	Huron Blvd. / U of M Parking Entrance		
49	23rd Ave. / University Avenue (CSAH 36).		

These intersections not analyzed under this scenario, but are included here to facilitate comparison with intersection analysis under other scenarios analyzed.
Bold items indicate poor levels of service.
[1] X/X indicates "Overall Level of Service / Worst Approach to Intersection"

Year 2009 Build Roadway Weekday Minor Event: Arrival Hour

The intersection of I-35W NB Off-Ramp / University Avenue (CSAH 36) is expected to operate poorly (LOS E) during the arrival peak hour due to the high volume of northbound right-turn vehicles exiting I-35W.

Year 2009 Build Roadway Saturday Minor Event: Departure Hour

The intersection of Oak Street / University Avenue (CSAH 36) is expected to operate poorly (LOS F) during the departure peak hour due to conflicts between the high volume of pedestrians and vehicles, as well as the addition of the westbound approach for the proposed configuration.

Mitigation Measures for a Minor Event

The following mitigation measures are recommended for a Minor Event:

To improve operations at the intersection of University Avenue and Huron Boulevard during weekday departure conditions, vehicles should not be permitted to make a southbound right. They should be forced to go through at this intersection, along Huron Boulevard to the I-94 Interchange or routed to the north and exit at 6th Street.

2030 Weekday Evening Major Event Conditions

The University of Minnesota has determined that Major Events on a weekday evening are reasonably unforeseeable, analysis was conducted to understand the potential traffic affects of a Major Event on a weekday evening. For this event, the volumes for the arrival peak hour for a football game are considered the worst-case condition, due to the high background volumes that will be in-place. The assumptions for a weekday event include a 7:00 p.m. start time and a 10:00 p.m. ending time. Results of the analysis are reported in Table 3.

Table 3
Year 2030 Weekday Evening Major Event – Arrival Hour Conditions
Level of Service Results

Int #	Intersection	2030 Major Event Arrival
1	15th Ave. / Como Ave.	**F**
2	15th Ave. / Rollins	**F/F**
3	15th Ave. / 5th St.	**F**
4	17th Ave. / 5th St.	C
5	I-35W SB Off Ramp / 4th St.	**F**
6	I-35W NB On Ramp / 4th St.	B
7	10th Ave. / 4th St.	**F**
8	13th Ave. / 4th St.	D
9	14th Ave. / 4th St.	**F**
10	15th Ave. / 4th St.	**E**
11	17th Ave. / 4th St.	D
13	Oak St. / 4th St.	B
14	25th Ave. / 4th St.	D/**E**
15	I-35W SB On Ramp / University Ave.	**F**
16	I-35W NB Off Ramp / University Ave.	**F**
17	10th Ave. / University Ave.	**F**
18	11th Ave. / University Ave.	**E**
19	14th Ave. / University Ave.	**F**
20	15th Ave. / University Ave.	**F**
21	17th Ave. / University Ave.	**F**
23	Oak St. / University Ave.	**F**
24	Huron Blvd. / University Ave.	B
25	Washington / University Ave.	A
26	25th Ave. / University Ave.	**F**
27	27th Ave. / University Ave.	**F**
28	Malcolm Ave. / University Ave.	**F**
29	Bedford Rd. / University Ave.	**E**
30	TH 280 SB Off Ramp / University Ave.	C
31	TH 280 NB On Ramp / University Ave.	C
32	TH 280 SB On Ramp / Franklin Ave.	B
33	TH 280 NB Off Ramp / Franklin Ave.	B
34	Church St. / Washington Ave.	D
35	Union St. / Washington Ave.	C
36	Harvard St. / Washington Ave.	D
37	Oak St. / Washington Ave.	C
38	Huron Blvd. / Washington Ave.	B

Table 3 continued
Year 2030 Weekday Evening Major Event – Arrival Hour Conditions
Level of Service Results

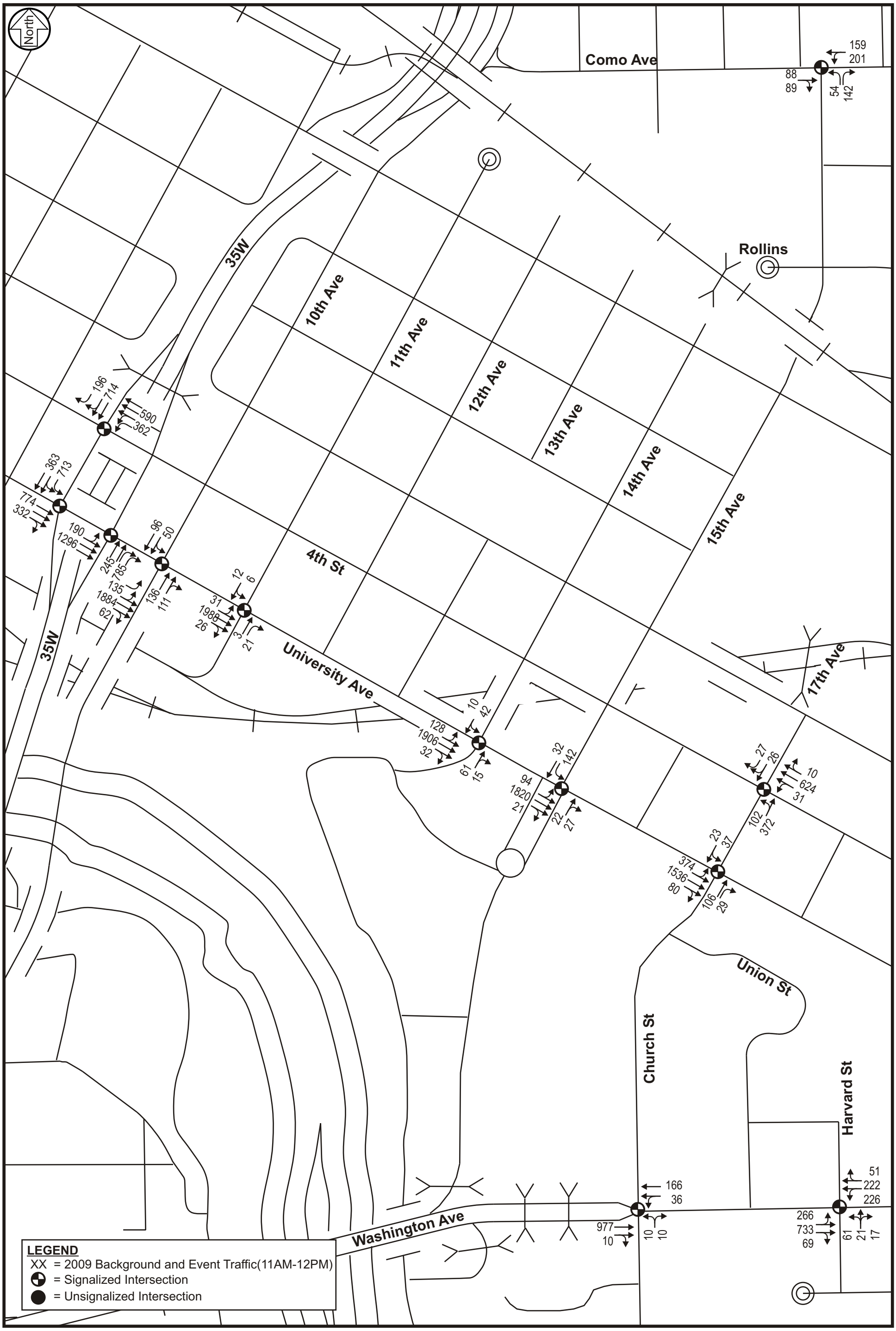
Int #	Intersection	2030 Major Event Arrival
39	Oak St. / Delaware / St.	B
40	25th Ave. / Delaware St.	A
41	Huron Blvd. / Essex St.	B
42	Fulton St. / Oak St.	B
43	Erie St. / Fulton St.	C
44	Fulton St. / Huron Blvd.	**F**
45	27th Ave. / Essex St.	B
46	27th Ave. / East River Road / Franklin Ave.	**F**
47	5th St. / Oak St.	A
48	Huron Blvd. / U of M Parking Entrance	n/a
49	23rd Ave. / University Ave.	n/a
50	Cleveland Ave. / Larpenteur Ave.	**F**
51	Snelling Ave. / Larpenteur Ave.	**F**
52	Hoyt Ave. / Snelling Ave.	A
53	Buford Ave. / Cleveland Ave.	**F**
54	Commonwealth Ave. / Cleveland Ave.	**F/F**
55	Dan Patch Ave. / Snelling Ave.	A
56	Como Ave. / Snelling SB Off Ramp	A/A
57	Como Ave. / Snelling NB Off Ramp	**F/F**
58	Gortner Ave. / Larpenteur Ave.	C
59	Stevens St. / Como Ave.	A/A

Higher background for year 2030 traffic will slightly increase delays on all roadways, with westbound traffic on University Avenue approaching the Stadium from the east experiencing increased queuing.

The main points of congestion that impact the East Bank Campus intersections are the University Avenue/4th Street/I-35W interchange area, the University Avenue/Oak Street intersection, the Huron Boulevard/Fulton Street intersection, intersections along University Avenue and individual parking ramps with large turning movement volumes and pedestrian conflicts.

For the St. Paul Campus/State Fairgrounds, the main points of congestion are the intersections of Snelling Avenue/Larpenteur Avenue, Como Avenue/Snelling Avenue northbound off-ramp, Larpenteur Avenue/Cleveland Avenue, in addition to some internal roadway intersections. Currently, the Snelling Avenue/Larpenteur Avenue intersection experiences heavy peak hour volumes.

APPENDIX B



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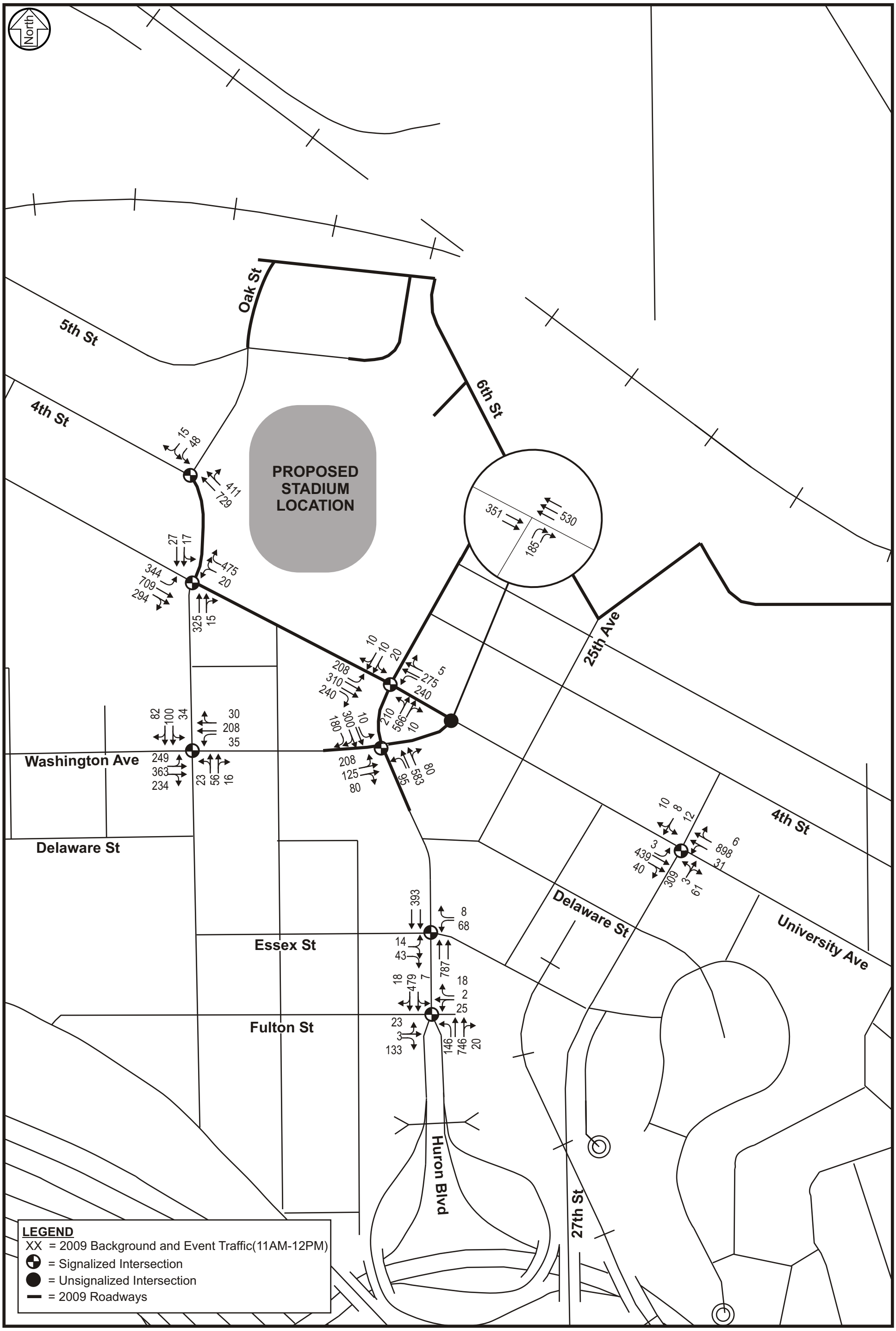
YEAR 2009 BUILD ROADWAYS SATURDAY MINOR EVENT ARRIVAL -EAST BANK(1 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-1a



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YEAR 2009 BUILD ROADWAYS SATURDAY MINOR EVENT ARRIVAL -EAST BANK(2 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
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Figure B-1b

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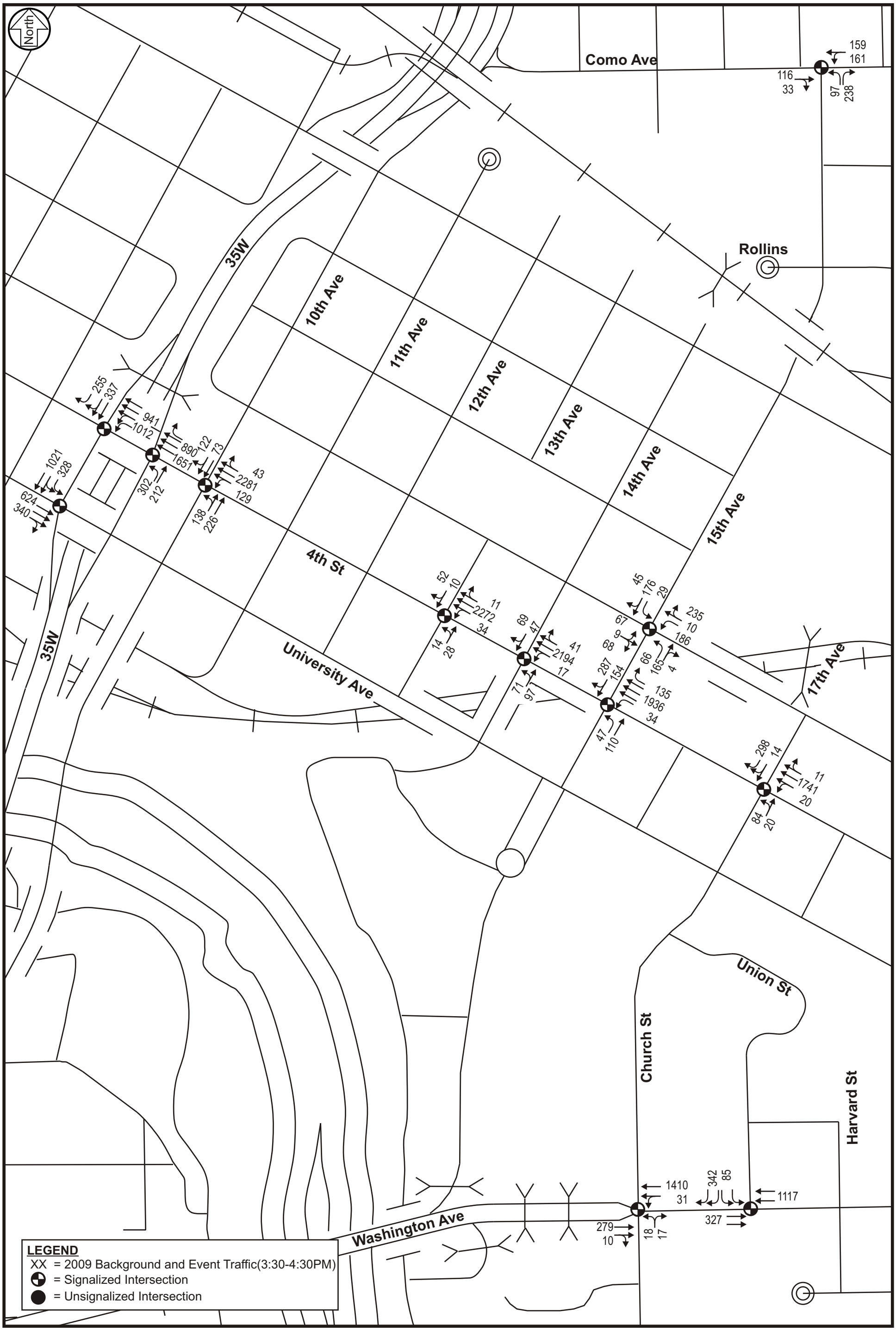
YEAR 2009 BUILD ROADWAYS SATURDAY MINOR EVENT ARRIVAL -EAST BANK(3 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-1c



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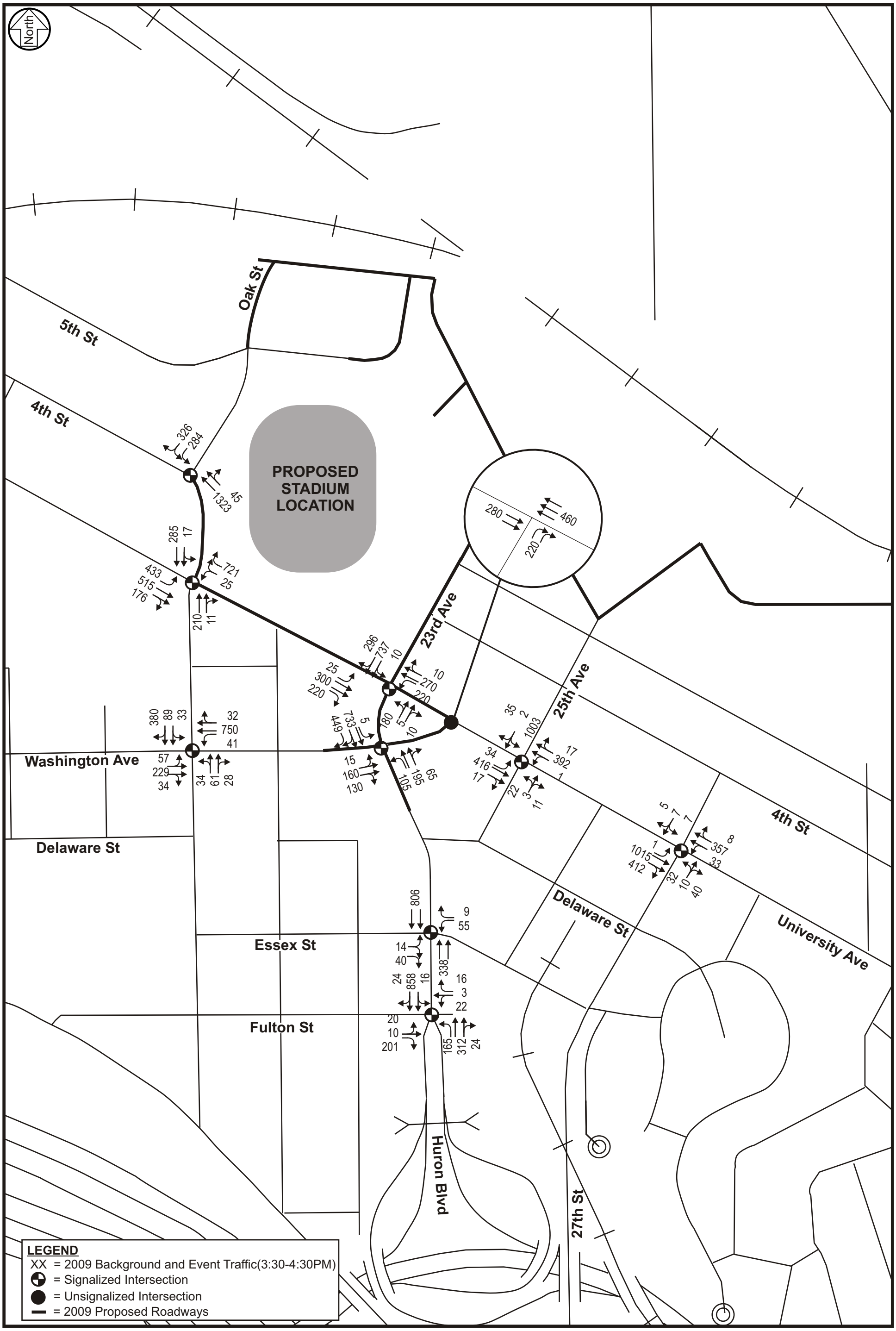
YEAR 2009 BUILD ROADWAYS SATURDAY MINOR EVENT DEPARTURE -EAST BANK(1 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-2a



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YEAR 2009 BUILD ROADWAYS SATURDAY MINOR EVENT DEPARTURE -EAST BANK(2 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
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Figure B-2b

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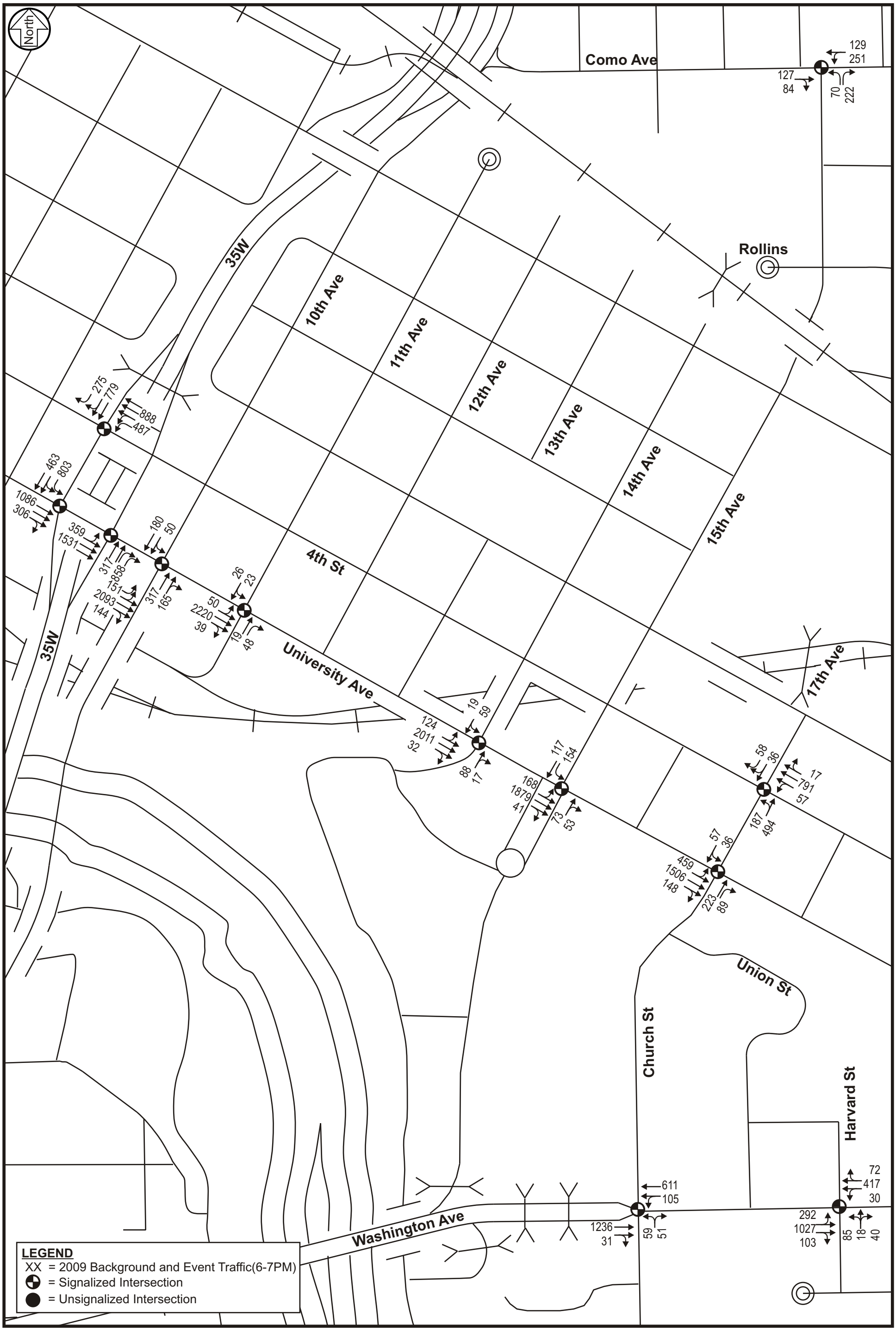
YEAR 2009 BUILD ROADWAYS SATURDAY MINOR EVENT DEPARTURE -EAST BANK(3 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-2c



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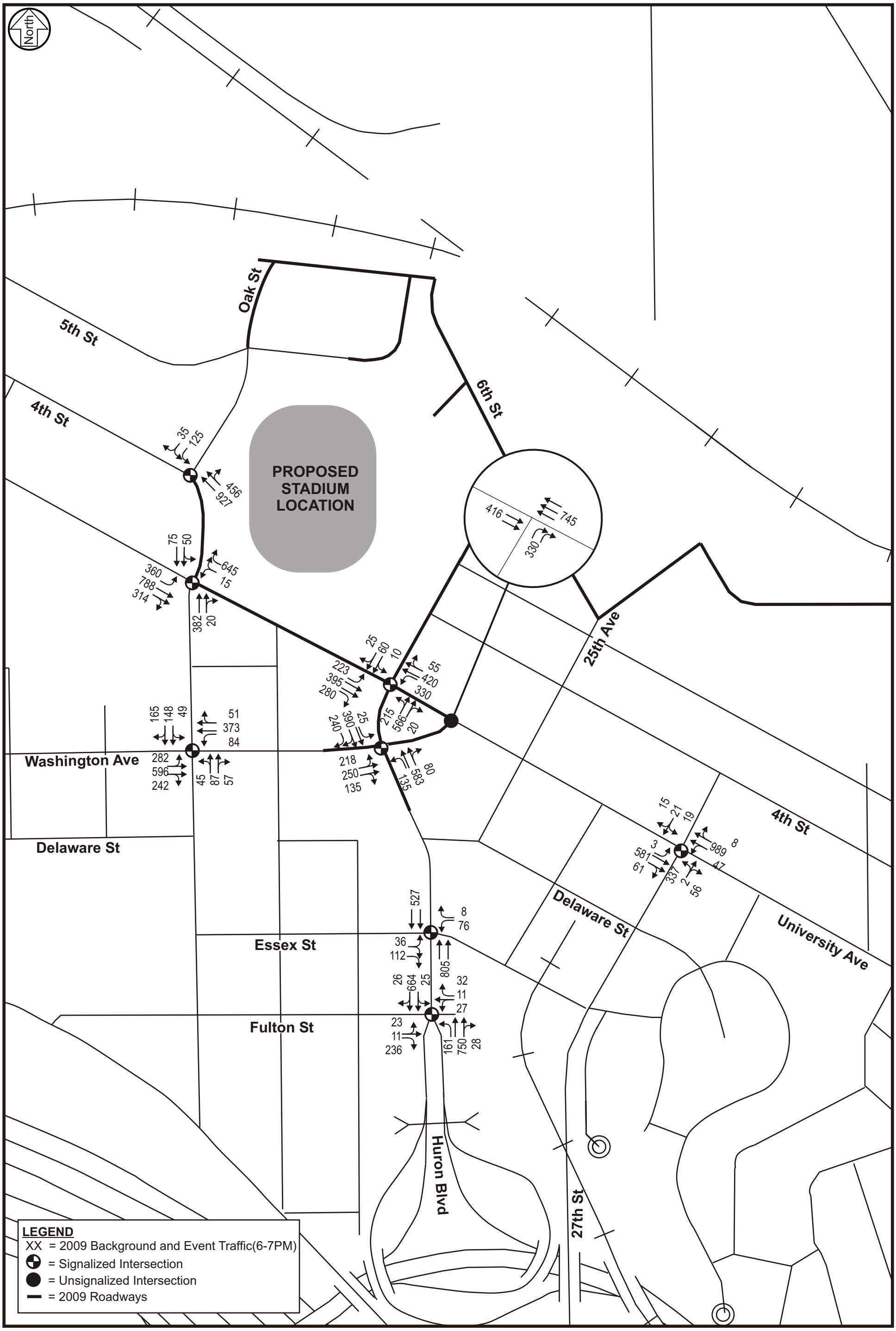
YEAR 2009 BUILD ROADWAYS WEEKDAY MINOR EVENT ARRIVAL -EAST BANK(1 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-3a



LEGEND

XX = 2009 Background and Event Traffic(6-7PM)

= Signalized Intersection

= Unsignalized Intersection

= 2009 Roadways

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YEAR 2009 BUILD ROADWAYS WEEKDAY MINOR EVENT ARRIVAL -EAST BANK(2 of 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES

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Figure B-3b

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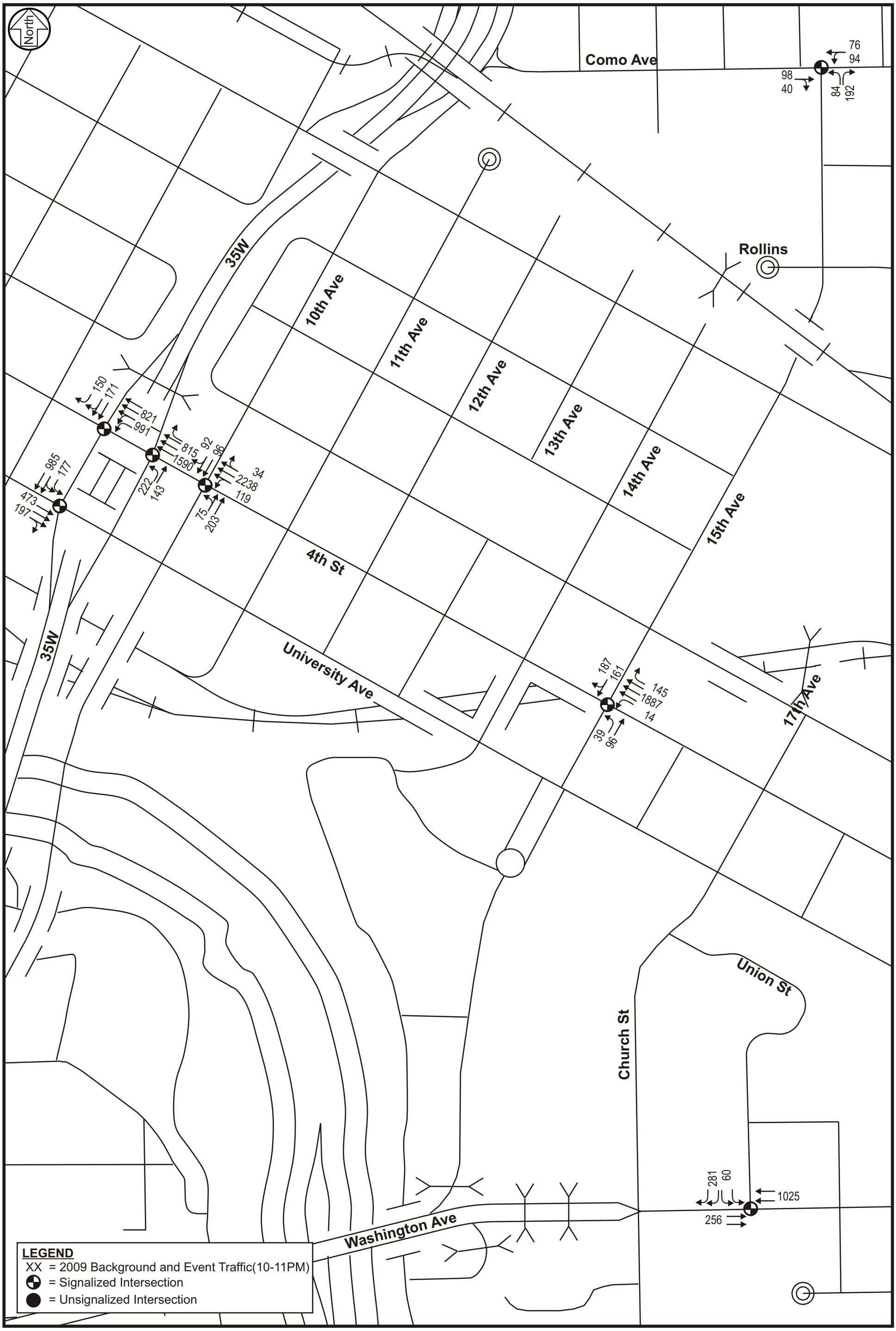
YEAR 2009 BUILD WEEKDAY MINOR EVENT ARRIVAL -EAST BANK(3 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-3c



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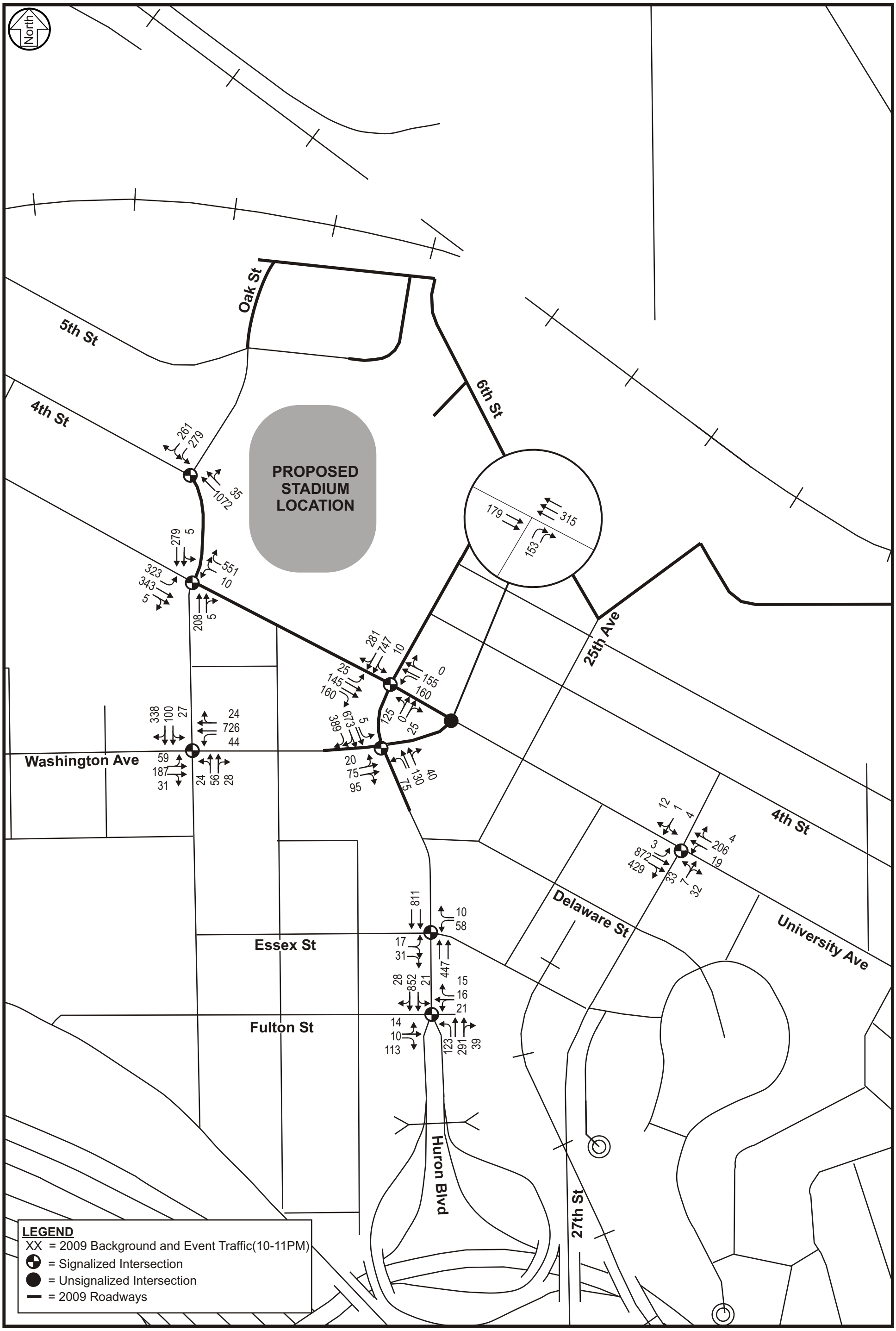
YEAR 2009 BUILD ROADWAYS WEEKDAY MINOR EVENT DEPARTURE -EAST BANK(1 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-4a



LEGEND

XX = 2009 Background and Event Traffic(10-11PM)

= Signalized Intersection

= Unsignalized Intersection

= 2009 Roadways

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YEAR 2009 BUILD ROADWAYS WEEKDAY MINOR EVENT DEPARTURE -EAST BANK(2 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
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Figure B-4b

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YEAR 2009 BUILD ROADWAYS WEEKDAY MINOR EVENT DEPARTURE -EAST BANK(3 OF 3)

UNIVERSITY OF MINNESOTA ON-CAMPUS FOOTBALL STADIUM DRAFT EIS TRANSPORTATION ISSUES
University of Minnesota

Figure B-4c