Travel Demand Management Plan

Minneapolis-Hennepin Environmental Center
Minneapolis, MN

Prepared for:

Minneapolis
City of Lakes

Hennepin

Hennepin County

Prepared By:

Alliant Engineering, Inc.
233 Park Avenue S, Suite 300
Minneapolis, MN 55415

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1 Introduction

The City of Minneapolis manages collection of residential household debris at its South Transfer facility. Hennepin County currently manages Household Hazardous Wastes (HHW) at locations outside the City. City and County staff have been discussing a partnership and the potential for services that could be provided at a common site in Minneapolis. By combining efforts and resources, the City and County will have the ability to cost-effectively provide convenient services to households of Minneapolis for all types of solid waste materials.

Consequently, the City of Minneapolis and Hennepin County are proposing the development of a new household hazardous waste drop-off facility in Minneapolis, expanding the County's program for collection of household hazardous waste and problem materials in conjunction with the City's voucher program for collection of residential household debris.

The proposed facility will be focused on the collection and temporary storage of problem materials, electronics, and household hazardous wastes such as paints, flammable liquids, aerosol cans, oil, pesticides, and other materials brought to the facility by residents. These materials are then transported to other facilities around the Country for proper recycling and disposal. The intent is to insure that household hazardous wastes are prevented from going directly to landfills, or entering our air and water, and eventually harming the environment.

A facility providing this type of service does not currently exist in Minneapolis. Although numerous household hazardous waste collection events are held each year, and are well attended, overall participation by Minneapolis residents is less than 5%. Conversely, Hennepin County collection data shows that proximity to a permanent HHW Facility results in significant increases in resident participation.

A site search and feasibility analysis completed in early 2010 identified the property located at 340 27th Ave. N.E. in Minneapolis as the preferred location for a new HHW Facility. The propose location of the facility is in the Holland neighborhood of Minneapolis. The Project is expected to begin construction in the spring of 2012 and be fully operational by spring 2013.

Upon completion of the development, the proposed project will include two buildings housing separate functions. The first building is approximately 26,000 square feet in size and will contain Hennepin County's Household Hazardous Waste Drop-Off Center (HHDC) and support offices. The primary function of the HHDC is to collect materials from residents that cannot be traditionally recycled by curb services. Once the materials are collected, they will be sorted and transported to processing destinations (processing of materials is not done on site). However, some of the collected household products are still usable; these reusable household products are shelved and made available for residents to take free of charge.

The second building, termed Voucher Program Building (VPB), is approximately 22,800 square feet in size and operates as a drop-off point for construction & demolition (C&D) materials using the City of Minneapolis voucher program. Every Minneapolis residential property receives six vouchers per year for C&D wastes, with one voucher used per load of drop-off. Once the materials are collected, the VPB will function as a point for the materials to be transferred to a disposal or processing site. The VPB will be a relocation of the existing South Transfer Facility located at 2850 20th Avenue South in Minneapolis. It is noted that the VPB will serve only City of Minneapolis property owners and proof of residency will be required.

As part of the proposed project, the City of Minneapolis has required a Travel Demand Management (TDM) plan. The goal of the TDM plan is to accomplish the following:

- Document the existing and proposed conditions with respect to transit, parking, bicycle and pedestrian facilities;
- Identify any traffic operations issues;
- Document the parking impacts with the redevelopment;
- Recommend measures to encourage the pedestrian friendliness of the site and to identify measures to improve traffic flow and intersection safety.

An in depth review of traffic operations was undertaken to address concerns previously heard through the neighborhood engagement process. The following major concerns were investigated and addressed in this TDM plan:

1. The intensity of traffic volumes predicted to be generated by the proposed site.
2. Safety at the University Avenue NE/Lowry Avenue NE intersection, University Avenue NE/27th Avenue NE intersection and along University Avenue NE.
3. Compatibility of the proposed site with Bicycle Plans.

1.1 Site and Development Characteristics

Site Location

The proposed project is located in the Holland Neighborhood, south of 27th Avenue NE, north of 26th Avenue NE, and east of University Avenue NE. The site address is 340 27th Avenue NE. Figure 1 illustrates the project location with respect to the surrounding roadway system.

Existing Site Characteristics

Currently, the site is an 80,000 SF vacant medium industrial building with a large paved parking lot. The previous industrial business (Wheeling Corrugated) closed in 2003 and the site has been vacant since.

When the previous site was operational, there was only one access point on 27th Avenue NE to the parking lot and pick-up/delivery area.

The site is part of one zoning district, I2, Medium Industrial District, in the Holland Neighborhood in Northeast Minneapolis. This district is detailed in the Minneapolis City Code as follows:

> **I2, Medium Industrial District,** "The I2 Medium Industrial District is established to provide locations for medium industrial uses and other specific uses which have the potential to produce greater amounts of noise, odor, vibration, glare or other objectionable influences than uses allowed in the I1 District and which may have an adverse effect on surrounding properties. "

Examples of alternative types of land uses permissible by the City of Minneapolis Zoning Code under the I2 district include a packaging plant, automobile rental, development and testing laboratories, bus garage/maintenance facility and community correctional facility.

Proposed Site Characteristics

The proposed project involves the demolition of the existing vacant 80,000 SF industrial building and the construction of two buildings; the 26,000 SF HHDC and the 22,800 SF VPB. Table 1 summarizes the proposed land use characteristics. The proposed project concept site plan is illustrated in Figure 2.

Table 1. Proposed Land Use Characteristics Summary

Estimated Schedule	Land Use Changes	Parking Changes
Spring 2012 - Fall 2012	-Demolition of existing building -Removal of existing bituminous parking lot -Construct 26,000 SF HHDC -Construct 22,800 SF VPB	-Removal of existing parking lot -Construct 25 stall HHDC parking area -Construct 16 stall VPB parking area

Proposed Site Access

The proposed HHDC and VPB will be accessed via only 27th Avenue NE. The location of the easterly proposed access, for HHDC operations, will be roughly in the same location as the previous access to Wheeling Corrugated. The location of the second proposed access to the VPB will be approximately 300 feet west of the easterly access. The proposed access point locations are consistent with City of Minneapolis access spacing guidelines.

1.2 Existing Neighborhood Redevelopment and Bicycle Plans

The proposed site plan was reviewed in context with other area plans and traffic studies conducted within the area. The documents of closest proximity include the Upper River Master Plan and Upper Harbor Terminal Redevelopment Study. Both of these plans were reviewed to evaluate potential conflicts and or compatibility with the proposed project. The proposed site area was not included in either of these plans.

The City of Minneapolis Public Works recently completed planning and design plans for the 5th Street Bicycle Boulevard, which is scheduled for construction in the Spring of 2011. In the current plans, the bike route will run adjacent to the site along the University Avenue NE eastside sidewalk and curve to the east at the 26th ½ Avenue alley connection and then connect to 5th Street NE via 26th Avenue NE. The proposed site boundaries do not interfere with any of these current plans. As part of the site plan development process, it was recommended that a 10-foot off-street bituminous shared use pedestrian/bicycle path be constructed on the west side of the property. The bicycle path will provide a direct and exclusive pedestrian/bicycle connection between 26th Avenue and 27th Avenue (as opposed to using the alley or University Avenue), will provide an enhanced green space environment, and will provide an improved bicycle boulevard connection to the University Avenue Trail (located at 27th Avenue). The recommended off-street bicycle path connection and its connection to the 5th Street Bicycle Boulevard and the University Avenue Trail are illustrated in Figure 3.

Additionally, 27th Avenue NE is a planned (but unfunded) bikeway from Marshall Street NE to Stinson Boulevard. In the area of the proposed site accesses, bicycle traffic is expected to be accommodated by the existing street widths and unaffected by the proposed site access points.

1.3 Parking Characteristics

The existing bituminous parking lot will be demolished with the reconstruction of the site. Off-street parking will be provided near each proposed building for patrons and employees. For the HHDC, 25 parking stalls are proposed on the north side of the building. 16 parking stalls are proposed on the north side of the building for the VPB. Section 3, later in this report, provides a parking impact analysis that provides an assessment of the adequacy of the proposed parking.

1.4 Pedestrian, Bicycle and Transit Characteristics

The function of the proposed site is geared mainly to vehicle travel due to the fact that materials are being dropped-off and picked-up. For employee travel and small material transport, use of pedestrian, bicycle and transit transportation modes are viable options.

The proposed development is located less than one block away from the bicycle/pedestrian trail that runs on the east side of University Avenue NE to the north from 27th Avenue NE and connects to St. Anthony Parkway. Additionally, the site is located adjacent to a bus corridor, University Avenue NE. These amenities, along with the fact that the site is located approximately 2½ miles northeast of Downtown Minneapolis, support the assertion that the site is ideally situated to facilitate alternative modes of transportation.

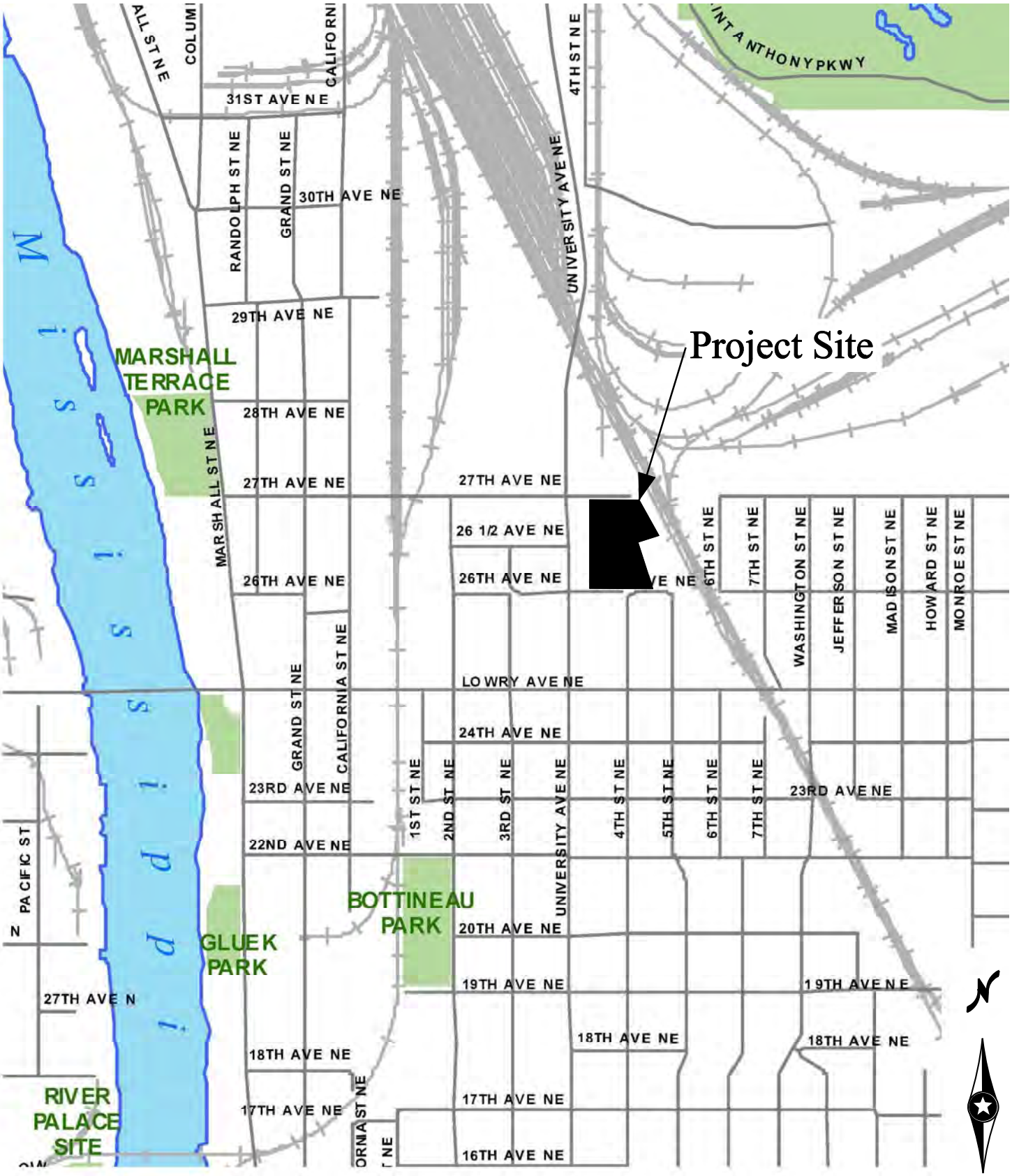
Pedestrian traffic is encouraged on the existing sidewalk system that connects the site to the surrounding neighborhood and nearby businesses.

Figure 4, Bicycle Route Network, shows the connectivity of the nearby existing and planned bicycle and pedestrian network. This system would enable employees to travel to/from Downtown, Uptown, St. Paul, north suburbs via St. Anthony Parkway and western suburbs via the Southwest Corridor. In addition to existing bicycle routes, the 5th Street NE Bicycle Boulevard is planned and funded and construction will begin in Spring of 2011. The 5th Street NE Bicycle Boulevard will run adjacent to the site connecting to the trail on the east side of University Avenue to Dinkytown.

Figure 5 illustrates the bus route (Route 824) running adjacent to the site on University Avenue NE. Two blocks south of the site Route 32 runs on Lowry Avenue. The site is approximately 2½ mile northeast of Downtown Minneapolis where many route transfers can be made. Table 2 provides a more detailed summary of the two transit routes serving the site.

Table 2. Transit Routes Serving the Site

Route	Service Type	Service Areas	Frequency
824	Local/Limited	Blaine Spring Lake Park Columbia Heights Minneapolis Downtown Minneapolis	Rush Hour: 30 Minute Headway * This route is a limited route and only runs on weekdays during the AM and PM peak hours.
32	Local	Roseville St. Anthony Minneapolis Robbinsdale	Rush Hour: 30 Minute Headway Midday: 30-60 Minute Headway Evening: No Service Saturday: No Service Sunday/Holiday: No Service



*Not To Scale

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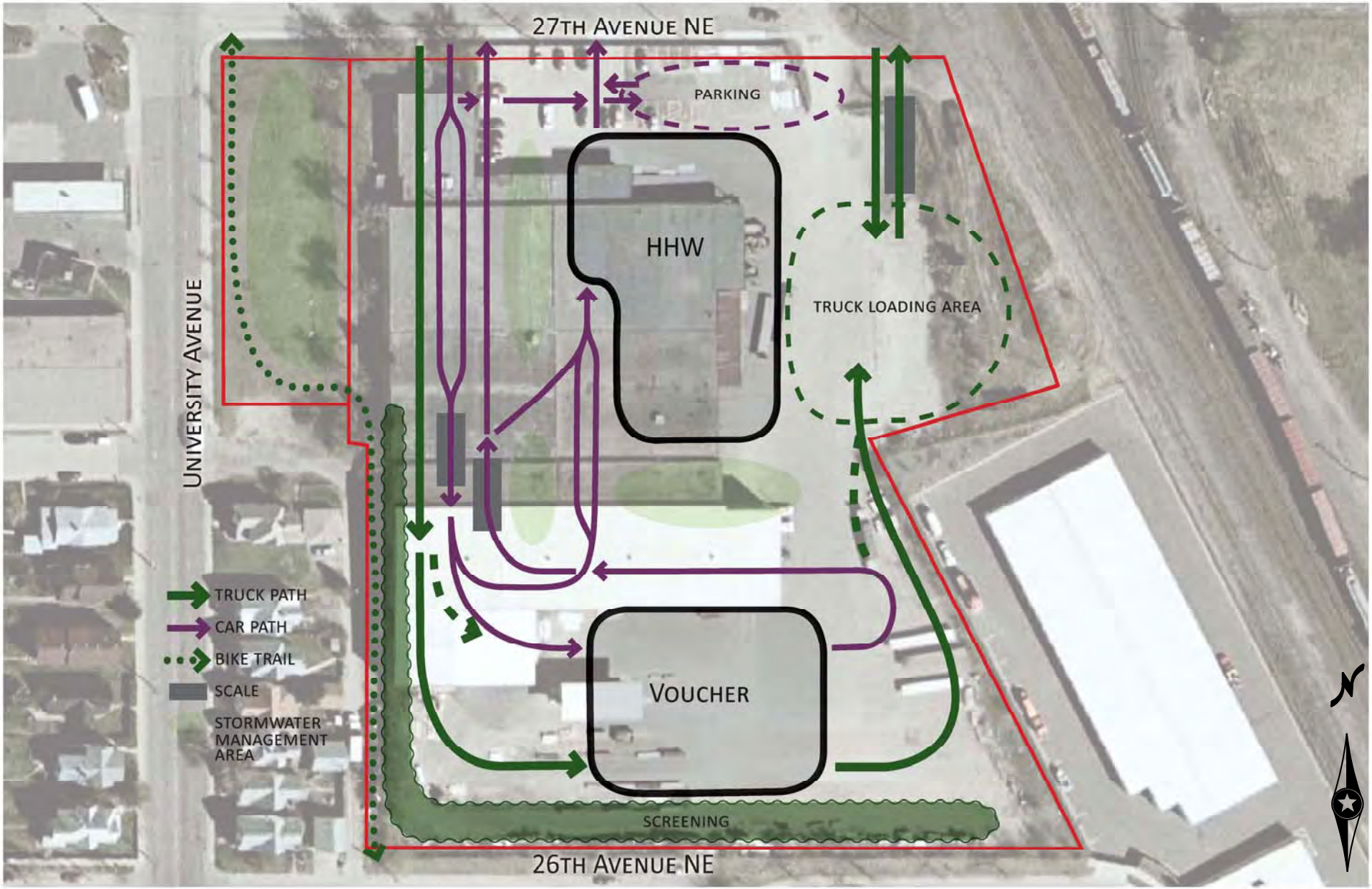
Travel Demand Management Plan

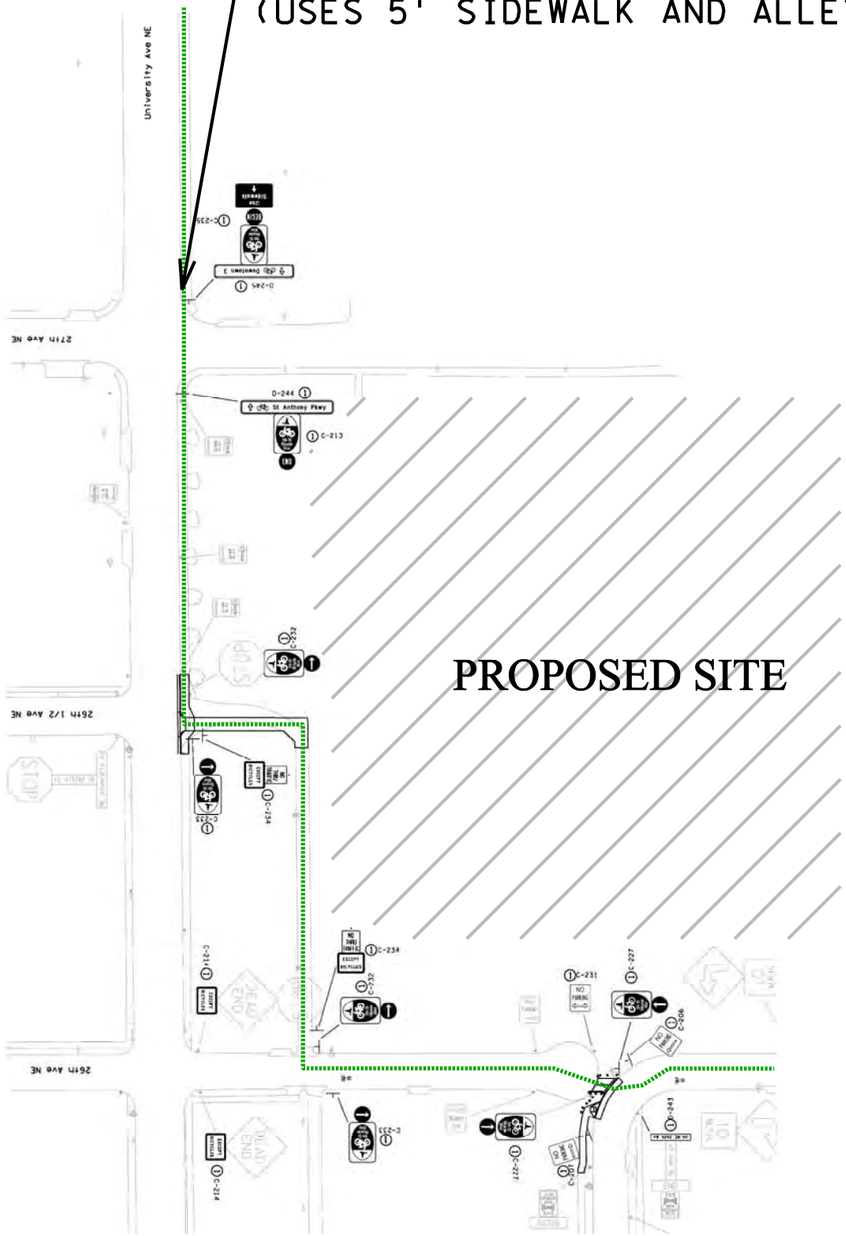
Figure 1
Project Location

ALLIANT
ENGINEERING, INC.


27TH AVENUE NE
PARKING
HHW
TRUCK LOADING AREA
UNIVERSITY AVENUE
TRUCK PATH
CAR PATH
BIKE TRAIL
SCALE
STORMWATER MANAGEMENT AREA
VOUCHER
SCREENING
26TH AVENUE NE
N

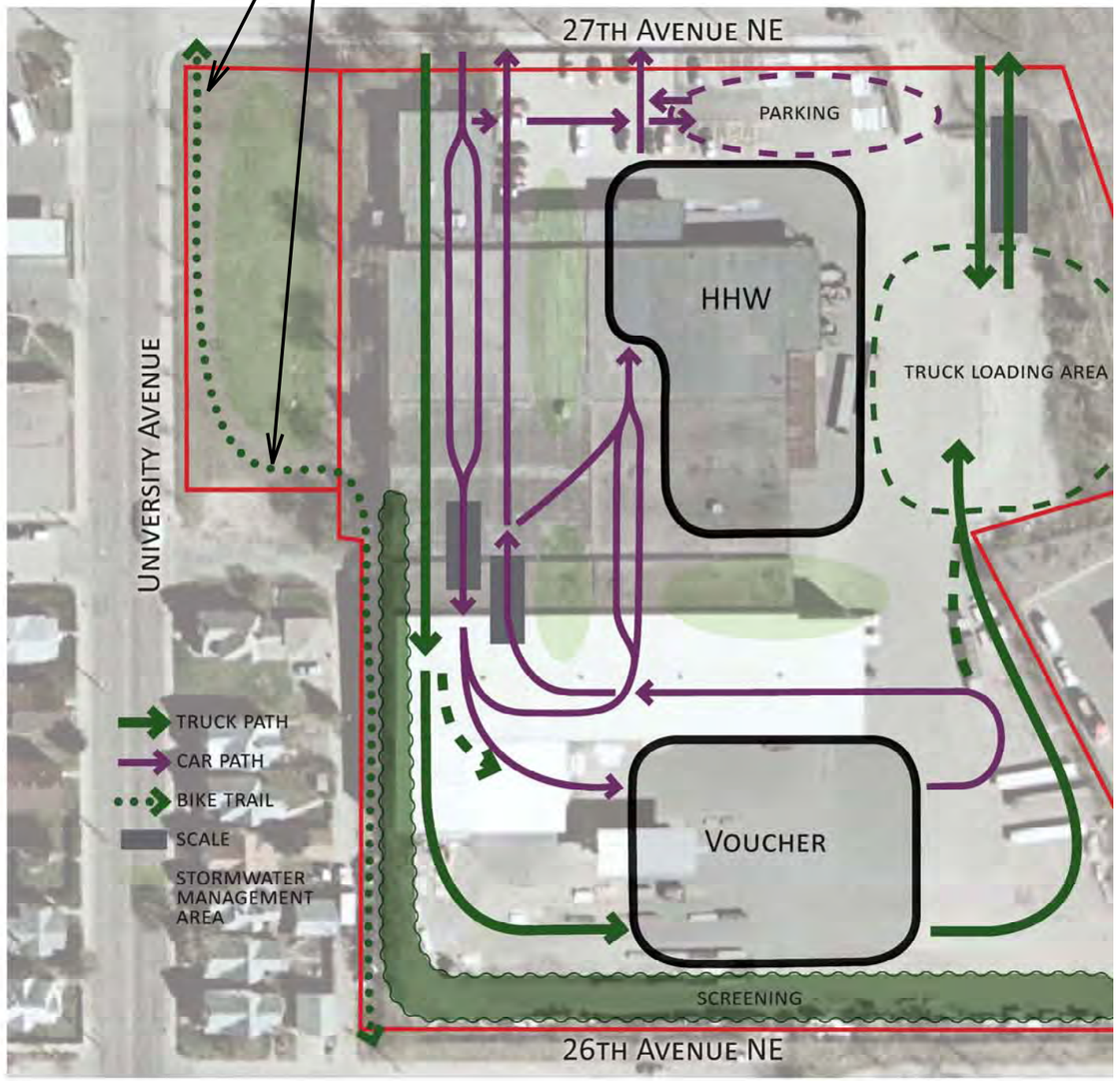
*Not To Scale

CURRENT ROUTE ALIGNMENT
(USES 5' SIDEWALK AND ALLEY)



*Not To Scale

RECOMMENDED TRAIL ALIGNMENT
(10' OFF-STEET PATH WITH LIGHTING)



CURRENT PLANNED BICYCLE/PEDESTRIAN ROUTE

RECOMMENDED BICYCLE/PEDESTRIAN ROUTE

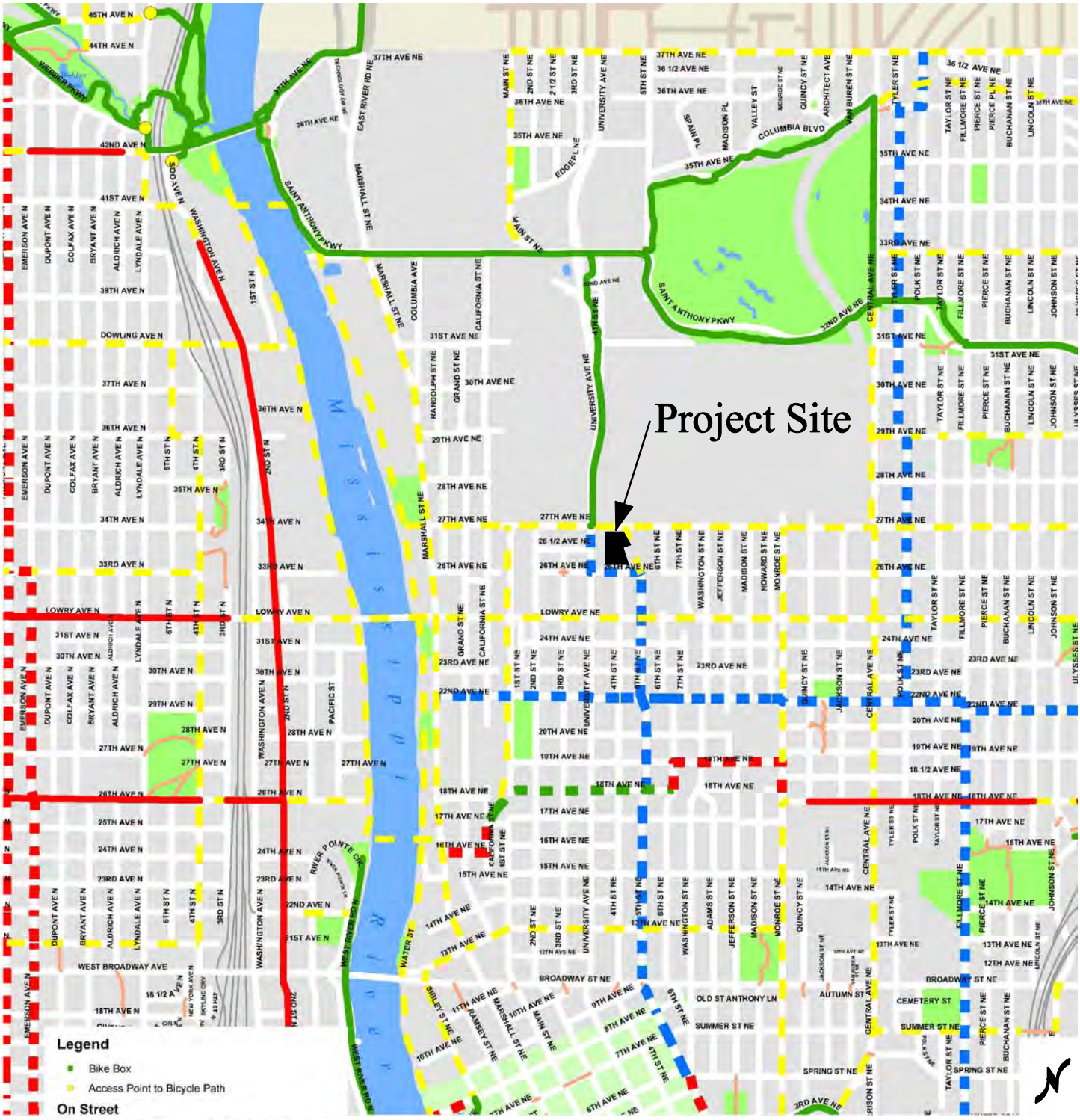


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Figure 4
Bicycle Routes

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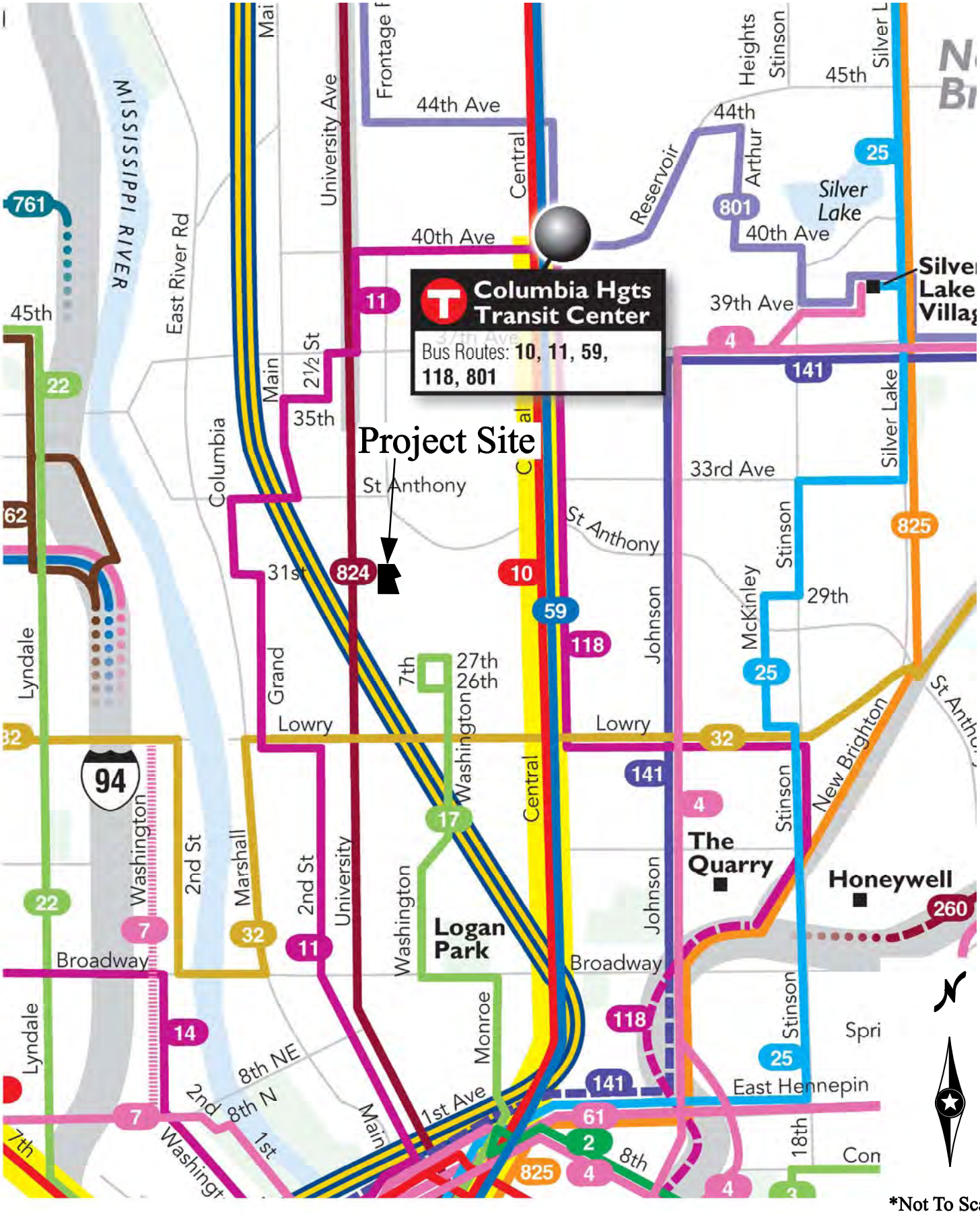

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Figure 5
Bus Routes

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2 Transportation Impact Analysis

This section of the TDM describes impacts to the transportation system resulting from the development of the proposed project. The intersections of University Avenue NE/Lowry Avenue NE and University Avenue NE/27th Avenue NE were identified as the key intersections in the project area. A traffic study was conducted that included a review of the existing conditions, an intersection safety analysis, development of forecast volumes based on the proposed development characteristics, and an operations analysis of the key intersections.

2.1 Existing Traffic Characteristics

University Avenue NE (State Highway 47) is a two-way north-south undivided roadway which is located directly west of the proposed project site. University Avenue NE serves traffic from St. Paul, University of Minnesota, Northeast Minneapolis and the northern suburbs. In the vicinity of the site, University Avenue NE is four-lanes (two-lanes in each direction) with a speed limit of 30 mph and parking is not allowed. Left and right turn lanes share the existing through lanes at both the Lowry Avenue NE and 27th Avenue NE intersections. The average daily traffic (ADT) measured by the City of Minneapolis in 2009 on University Avenue (near 26th Avenue NE) is 16,000 vehicles/day.

Lowry Avenue NE (County Road 153) is a two-way east-west undivided roadway which is located two blocks south of the site. Lowry Avenue NE connects north and northeast Minneapolis. In the vicinity of the site, Lowry Avenue NE is four-lanes (two-lanes in each direction) with a speed limit of 30 mph and parking is not allowed. Left and right turn lanes share the existing through lanes at the University Avenue intersection. The ADT, just west of University Avenue NE measured in 2007 before the bridge construction on Lowry Avenue, is 13,800 vehicles/day.

27th Avenue NE is two-way east-west undivided roadway which is located on the north side of the proposed site. 27th Avenue NE serves traffic from the local neighborhoods and begins at Marshall Avenue on the west and dead ends just east of the proposed site at the railroad tracks. On the east side of University Avenue NE, 27th Avenue NE only serves industrial land uses. 27th Avenue NE consists of one through lane in either direction with parallel parking in both directions. Left and right turn lanes share the existing through lanes. The 2009 ADT on 27th Avenue NE between California Street NE and 2nd Street NE is 2,060 vehicles/day.

The intersection of University Avenue NE and Lowry Avenue NE is signalized. Northbound, southbound and westbound left turn movements are all permitted (no designated arrow, just green ball) and must yield to oncoming through traffic. The eastbound left turn movement receives a designated arrow for a portion for the signal cycle and is permitted for another portion of the cycle. The existing signal timing for this signal has been obtained from the City of Minneapolis.

The intersection of University Avenue NE and 27th Avenue NE is side-street stop controlled. 27th Avenue NE is stopped while University Avenue NE is free-flowing. The existing roadway geometrics are documented on Figure 6.

2.2 Existing Traffic Volumes

Traffic operations were analyzed at the following key intersections:

- University Avenue NE and Lowry Avenue NE (Signalized)
- University Avenue NE and 27th Avenue NE (Side-street stop-controlled)

To analyze traffic operations, hourly traffic volumes at these intersections need to be determined. Based on the peak operating times of the proposed facility (midday during weekdays and Saturdays) and the existing traffic peaking times at the study area intersections, the traffic operational analysis was conducted for three critical hourly time period scenarios. The determination of these time periods is based on empirical data from similar existing sites and is described further in this section. The three analysis scenarios are as follow:

- **Scenario 1** - Weekday peak hour of the proposed site operations (12:00 PM to 1:00 PM)
- **Scenario 2** - Weekday peak hour of the existing traffic volumes at the study area intersections (4:00 PM to 5:00 PM)
- **Scenario 3** - Saturday peak hour of the proposed site operations (11:00 AM to 12:00 PM)

The existing 2010 study area traffic volumes for these three scenarios were obtained. For the weekday traffic volumes (Scenarios 1 and 2) at the University Avenue NE/Lowry Avenue signalized intersection, June 2007 traffic volumes were obtained from the City of Minneapolis. These volumes were collected before the closure of the Lowry Bridge over the Mississippi River and are assumed to represent conditions after the bridge is open (the bridge is scheduled for completion in 2011). To account for background growth, a 1% annual background growth rate was applied to the 2007 volumes to grow them up to 2010 conditions. Weekday August 2010 traffic volumes were obtained from the City of Minneapolis for the University Avenue NE/27th Avenue NE intersection. Saturday September 2010 traffic volumes (Scenario 3) were collected by Alliant Engineering, Inc. at the University Avenue NE/Lowry Avenue NE and University Avenue NE/27th Avenue NE intersections.

Figure 7 illustrates the 2010 peak hour traffic volumes for the three critical time periods for the two key intersections.

2.3 Overview Forecast Traffic Volumes

Two future forecast volume scenarios are included in the traffic analysis as follows:

- Forecast year 2013 No-Build traffic volumes
- Forecast year 2013 Build traffic volumes

The year 2013 forecast horizon was chosen to represent the year of the completed construction of the proposed site. The forecast 2013 No-Build scenario traffic volumes assume no land use changes on the current site (the No-Build scenario assumes the site is vacant). The Build scenario considers the additional impact of the proposed site upon completion. The difference in results between the No-Build and Build scenarios is the traffic impact associated with the proposed project. A comparison to the previous industrial site use and potential other land uses that could

be built on the site in accordance with the I2 District and Minneapolis Zoning Code is made in section 2.7.

Forecast Year 2013 No-Build traffic Volumes

Background traffic volume growth is usually expected in the future due to other regional developments and changes in local employment. For sites in fully developed areas, these background growth rates can be minimal or even exhibit a decrease in traffic volumes. To be conservative, an overall annual background growth rate of one percent (1%) was applied to the existing 2010 traffic volumes. Based on discussions with City staff, no major nearby development projects are planned in the near future. Therefore, no additional traffic beyond the annual background growth rate was added to the existing traffic volumes. The resulting year 2013 no-build volumes for the three analysis scenarios are presented in Figure 7.

Forecast Year 2013 Build Traffic Volumes

The traffic characteristics of the proposed site are very unique as they do not correspond to a typical retail, residential or office development and there are two separate buildings with different functions. To accurately detail the traffic characteristics of the proposed development, the two buildings were treated separately and empirical data from existing similar sites was used. The following sections detail the empirical data from the entire 2009 year for the HHDC and VPB operations. Daily 2009 transaction data was provided by Hennepin County and the City of Minneapolis. It is noted that one transaction is equal to two vehicle trips, one entering the site and one exiting the site.

2.4 Forecast Traffic Volumes for the HHDC

The proposed 26,000 SF HHDC will operate similarly to the existing South Hennepin Recycling Center located at 1400 W 96th Street in Bloomington, MN. The following details the key operating characteristics of the existing site based on discussions with site employees, website information and daily transaction data provided by Hennepin County:

- The size of the existing South Hennepin Recycling Center is 25,000 SF.
- The purpose of the site is to collect and transfer problem materials and recyclables from residents.
- Inside the drop-off facility there is a free product center that features products that were previously dropped off by residents that are still useable.
- The site is not open Sundays, Mondays or Holidays. Tuesday, Thursday and Friday hours are 10:00 AM to 6:00 PM. Wednesday hours are 10:00 AM to 8:00 PM. Saturday Hours are 8:00 AM to 5:00 PM.
- Saturdays are the busiest day of the week with 11:00 AM to 12:00 PM being the busiest hour. Tuesdays are the second busiest day of the week with 10:00 AM to 11:00 being the busiest hour.
- There is an average of less than two trucks entering/exiting the HHDC per day.

In 2009, 65,729 vehicles used the South Hennepin Recycling Center. To conduct a traffic analysis, this number needs to be broken down to daily, then to hourly vehicles. Based on the actual hour by hour transaction data provided by Hennepin County, and the facilities business hours, the peak traffic condition can be determined. Table 3, below, provides an overview of the average daily trips for all of 2009 at the existing South Hennepin Recycling Center.

Table 3. Average of 2009 Daily Traffic – South Hennepin Recycling Center

Day of the Week	Hours of Operation	Vehicle Trips[1.,2.]	Truck Trips[1.,2.]	Total Daily Trips
Tuesday	10:00 AM - 6:00 PM	**576**	**4**	**580**
Wednesday	10:00 AM - 8:00 PM	466	4	470
Thursday	10:00 AM - 6:00 PM	398	4	402
Friday	10:00 AM - 6:00 PM	446	4	450
Satruday	8:00 AM - 5:00 PM	**652**	**4**	**656**
Weekly Totals				**2558**

[1.] Base on 2009 daily tranaction data from Hennepin County.

[2.] One transaction or one truck results in two trips, one inbound trip and one outbound trip.

Saturday is the busiest day for this type of operation with 656 total daily trips (326 transactions and two trucks). The busiest weekday is Tuesday with 580 total daily trips (288 transactions and two trucks).

As mentioned previously, to conduct the operational analysis, the daily traffic volumes need to be broken down into hourly traffic volumes. Table 4 shows a summary of the average hourly transactions on a Tuesday and a Saturday, the two busiest days of the week, at the existing South Hennepin Recycling Center.

Table 4. Average of 2009 Hourly Operations – South Hennepin Recycling Center

Hours	Vehicle Trips[1.,2.]		Truck Trips[1.,2.]		Total Weekday Hourly Trips	Total Saturday Hourly Trips
	Tues	Sat	Tues	Sat		
8:00 AM to 9:00 AM	-	24	-	0	-	24
9:00 AM to 10:00 AM	-	56	-	0	-	56
10:00 AM to 11:00 AM	108	93	0	2	**108**	95
11:00 AM to 12:00 PM	96	104	0	2	96	**106**
12:00 PM to 1:00 PM	88	91	2	0	90	91
1:00 PM to 2:00 PM	82	89	0	0	82	89
2:00 PM to 3:00 PM	74	81	0	0	74	81
3:00 PM to 4:00 PM	62	71	0	0	62	71
4:00 PM to 5:00 PM	42	45	2	0	**44**	45
5:00 PM to 6:00 PM	24	-	0	-	24	-
Totals	**576**	**652**	**4**	**4**	**580**	**656**

[1.] Based on 2009 daily tranaction data from the City of Minneapolis.

[2.] One transaction or one truck results in two trips, one inbound trip and one outbound trip.

The busiest hour on a Tuesday is 10:00 AM to 11:00 AM with a total of 108 hourly trips. The total number of trips during the PM traffic peak of 4:00 PM to 5:00 PM is 44 trips. The busiest hour on a Saturday is11:00 AM to 12:00 PM with a total of 106 hourly trips.

2.5 Forecast Traffic Volumes for the Voucher Program Building

The proposed 22,800 SF VPB will be a relocation of the existing VPB located at 2850 20th Avenue South in South Minneapolis. The website for this operation is http://www.ci.minneapolis.mn.us/solid-waste/voucher-program.asp. The following details the key operating characteristics of the existing site based on website and daily transaction data provided by the City of Minneapolis:

- The size of the existing VPB is 22,000 SF (approximately the same size as the proposed site).
- Only C & D materials from properties within the City of Minneapolis can be dropped off at this location.
- Items that can be dropped off include everyday garbage, scrap metal, appliances, tires and construction and paving materials.
- No Asbestos, dirt, liquids, railroad tires, yard waste or hazardous materials are allowed.
- The site is not open Sundays, Mondays or Holidays. Tuesday through Friday hours are 12:30 PM to 7:30 PM. Saturday Hours are 8:30 AM to 3:30 PM.
- Tuesdays are the busiest day of the week. And 1:00 PM to 2:00 PM is the busiest hour of the day.
- There is an average of 13 trucks entering/exiting the VPB per day.
- Truck pick-up times can also be scheduled.

Based on 2009 data provided by the City of Minneapolis, 19,228 C&D vouchers and 1,126 tire vouchers (20,354 total vouchers) were redeemed at the VPB. Table 5, below, provides an overview of the average daily transactions for all of 2009 at the existing VPB.

Table 5. Average of 2009 Daily Traffic – Voucher Program Building

Day of the Week	Hours of Operation	Vehicle Trips[1.,2.]	Truck Trips[1.,2.]	Total Daily Trips
Tuesday	12:30 PM to 7:30 PM	**192**	**26**	**218**
Wednesday	12:30 PM to 7:30 PM	156	26	182
Thursday	12:30 PM to 7:30 PM	152	26	178
Friday	12:30 PM to 7:30 PM	174	26	200
Satruday	8:30 AM to 3:30 PM	160	26	186
Weekly Totals				**964**

[1.] Based on 2009 daily tranaction data from the City of Minneapolis.

[2.] One transaction or one truck results in two trips, one inbound trip and one outbound trip.

The busiest day of the week is Tuesday with 218 total daily trips.
Table 6 shows a summary of the average hourly transactions on a Tuesday and a Saturday at the VPB.

Table 6. Average of 2009 Hourly Tuesday Operations – Voucher Program Building

Hours	Vehicle Trips[1.,2.]		Truck Trips[1.,2.]		Total Weekday Hourly Trips	Total Saturday Hourly Trips
	Tues	Sat	Tues	Sat		
8:00 AM to 9:00 AM	-	15	4	0	-	15
9:00 AM to 10:00 AM	-	18	4	2	-	20
10:00 AM to 11:00 AM	-	22	4	2	-	24
11:00 AM to 12:00 PM	-	23	4	4	-	27
12:00 PM to 1:00 PM	26	23	4	6	30	**29**
1:00 PM to 2:00 PM	34	22	4	4	**38**	26
2:00 PM to 3:00 PM	30	23	4	4	34	27
3:00 PM to 4:00 PM	28	14	4	4	32	18
4:00 PM to 5:00 PM	24	-	2	-	**26**	-
5:00 PM to 6:00 PM	24	-	2	-	26	-
6:00 PM to 7:00 PM	20	-	2	-	22	-
7:00 PM to 8:00 PM	6	-	4	-	10	-
Totals	**192**	**82**	**26**	**26**	**218**	**186**

[1] Based on 2009 daily tranaction data from the City of Minneapolis.

[2] One transaction or one truck results in two trips, one inbound trip and one outbound trip.

The busiest hour on a Tuesday is 1:00 PM to 2:00 PM with a total of 38 hourly trips. The total number of trips during the PM peak of 4:00 PM to 5:00 PM is 26 trips. The busiest hour on a Saturday is12:00 PM to 1:00 PM with a total of 29 hourly trips.

2.6 Total Forecast Traffic Volumes

To obtain the total trip generation estimates for the proposed development (both buildings), the hourly trips for both existing sites were combined. Table 7 presents a summary of the combined hourly trips.

Table 7. Combined Hourly Trips – Tuesday and Saturday

Hours	Total Tuesday Hourly Trips[1.,2.]	Total Saturday Hourly Trips[1.,2.]
8:00 AM to 9:00 AM	-	38
9:00 AM to 10:00 AM	-	76
10:00 AM to 11:00 AM	108	119
11:00 AM to 12:00 PM	96	**133**
12:00 PM to 1:00 PM	**120**	120
1:00 PM to 2:00 PM	120	115
2:00 PM to 3:00 PM	108	108
3:00 PM to 4:00 PM	94	89
4:00 PM to 5:00 PM	**70**	45
5:00 PM to 6:00 PM	50	-
6:00 PM to 7:00 PM	22	-
7:00 PM to 8:00 PM	10	-
Totals	**798**	**842**

[1] Based on 2009 daily tranaction data from the City of Minneapolis.

[2.] One transaction or one truck results in two trips, one inbound trip and one outbound trip.

The raw hourly totals for the three critical time periods are as follows:

- **Scenario 1** - 120 trips during the weekday peak hour of the proposed site (12:00 PM to 1:00 PM).
- **Scenario 2** - 70 trips during the weekday peak hour of the study area intersections (4:00 PM to 5:00 PM).
- **Scenario 3** - 133 trips during the Saturday peak hour of the proposed site (11:00 AM to 12:00 PM).
- The yearly trip totals were combined for a total of 186,732 trips (133,016 trips from the South Hennepin Recycling Center and 50,128 trips from the VPB).

Based on user data projections completed by Hennepin County and the City of Minneapolis, it is expected that 20% of the patrons will utilize both functions of the proposed site (household recycling and C & D material drop-off) during the same visit. Therefore, the estimated total hourly trips were reduced by 20%.

Table 8 details the expected peak hour trip generation from the proposed site for the three critical time periods. The proposed trip generation includes the 20% trip reduction for shared trips.

Table 8. Expected Peak Hour Trips for Each Critical Time Period

Land Use	Size (SF)	Vehicles Trips		Truck Trips		Total Trips	
		Entering	Exiting	Entering	Exiting	Entering	Exiting
Scenario 1 - Weekday Midday Peak Hour of Site (12:00 PM - 1:00 PM)							
VPB	22,800	13	13	2	2	15	15
HHDC	26,000	44	44	1	1	45	45
TOTAL NEW SCENARIO 1 TRIPS		57	57	3	3	60	60
		114		6		120	
TOTAL NEW SCENARIO 1 EXTERNAL		46	46	2	2	**48**	**48**
TRIPS - 20% Reduction		91		5		**96**	
Sceanrio 2 - Weekday PM Peak Hour of Street Traffic (4:00 PM - 5:00 PM)							
VPB	22,800	12	12	1	1	13	13
HHDC	26,000	21	21	1	1	22	22
TOTAL NEW SCENARIO 2 EXTERNAL		33	33	2	2	35	35
TRIPS		66		4		70	
TOTAL NEW SCENARIO 2 EXTERNAL		26	26	2	2	**28**	**28**
TRIPS - 20% Reduction		53		3		**56**	
Sceanrio 3 - Saturday Peak Hour of Site (11:00 AM - 12:00 PM)							
VPB	22,800	12	12	2	2	14	14
HHDC	26,000	52	52	1	1	53	53
TOTAL NEW SCENARIO 3 EXTERNAL		63	63	3	3	66	66
TRIPS		127		6		133	
TOTAL NEW SCENARIO 3 EXTERNAL		51	51	2	2	**53**	**53**
TRIPS - 20% Reduction		102		5		**106**	

Based on the operations of the proposed site, the expected hourly totals for the three critical time periods assuming a 20% reduction due to shared trips are as follows:

- **Scenario 1** - 96 trips (48 entering and 48 exiting) during the weekday peak hour of the proposed site (12:00 PM to 1:00 PM).
- **Scenario 2** - 56 trips (28 entering and 28 exiting) during the weekday peak hour of the study area intersections (4:00 PM to 5:00 PM).
- **Scenario 3** - 106 trips (53 entering and 53 exiting) during the Saturday peak hour of the proposed site (11:00 AM to 12:00 PM).
- The yearly trip total is 146,515 trips (183,144 reduced by 20%).

Conversations with Hennepin County indicated that full participation at the recycling site is expected to take about 15 years as indicated by operations of other existing facilities. Rough projections by Hennepin County estimate 20,000 to 25,000 transactions per year (40,000 to 50,000 trips per year) for the first couple years of operation. This is less than half of the full operations evaluated in this study. The traffic analysis conducted is conservative and presents the worst case analysis as the analysis assumes the HHDC and VPB are operating at full capacity.

The estimated new external trips were distributed to the roadway network based on existing traffic patterns and the expected origins and destinations of motorists traveling to and from the proposed development. The majority of the trips (70%) are expected to travel to/from University Avenue NE to the south due to the location of major highway interchanges and arterial roads.

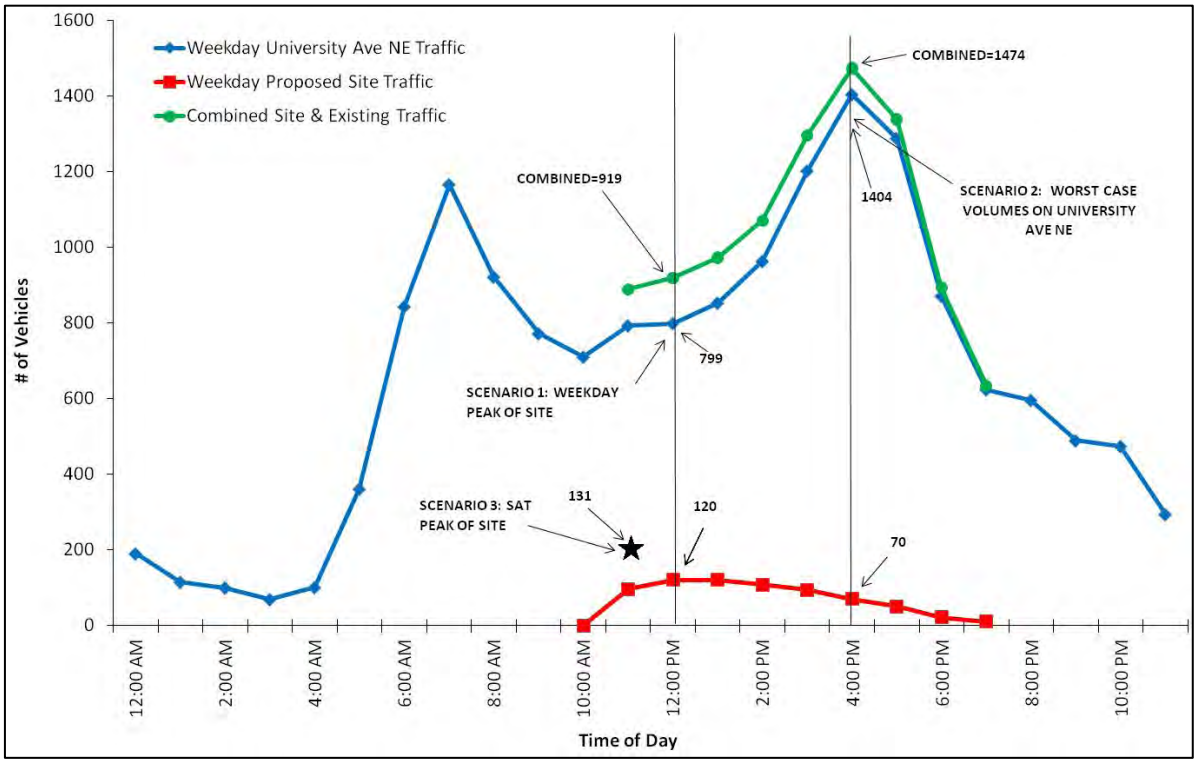
15% of the trips are expected to travel to/from University Avenue NE to the north. A small amount of trips (5%) are expected to begin/end in the surrounding neighborhood and travel to/from the site vie 27th Avenue NE.

The estimated distribution percentages detailed above and change in volume on the study area intersections due to site-generated traffic expected as result of the proposed development for each scenario is illustrated on Figure 9. It is noted that the PM peak hour site-generated traffic is less than 1.5% of the total traffic traveling through the University Avenue NE/Lowry Avenue NE intersection during the PM peak hour (the busiest hour based on current traffic conditions).

The site-generated traffic volumes added to the No-Build scenario traffic volumes result in the Build scenario traffic volumes, shown on Figure 10 for the 2013 design year.

Chart 1 was prepared to show the hourly Tuesday peaking characteristics of the proposed site with the University Avenue NE corridor traffic. The proposed site volume line is the total a combined trips for the two buildings. Scenario 1 (peak weekday volumes of the site from 12:00 PM to 1:00 PM) occurs at medium level of traffic on University Avenue NE. Scenario 2 (peak weekday University Avenue NE traffic volumes from 4:00 PM to 5:00 PM) represents the worst case analysis for the study area intersections due to the high existing traffic volumes on the roadways. The proposed site generated traffic for Scenario 3(peak Saturday volumes of the site from 11:00 AM to 12:00 PM) is also indicated on the chart. It should be noted the Saturday volume on University Avenue is approximately 30% less than the weekday 12:00 PM to 1:00 PM time period. The combined site and existing traffic represents the proposed traffic on University Avenue NE, which is similar to the existing traffic.

Chart 1. Hourly Breakdown of Total Tuesday Traffic



2.7 Other Possible and Previous Land Uses for the Site

As detailed earlier, the proposed 6.65-acre site is zoned I2, Medium Industrial. Per floor area ratios detailed in the Minneapolis Zoning Code, a 106,480 SF (maximum size) industrial land use would be allowed on this site. Trip generation rates for this possible land use were obtained from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition.* The manual is a compilation of daily and peak hour trip generation rates based on data collected from similar development sites. Table 9 illustrates the number of trips that could be generated by a 106,480 SF industrial building. The number of trips from the previously existing 80,000 SF industrial building was also estimated to provide information on how the site previously operated.

Table 9. Trip Generation Volumes from Alternative Developments

Land Use	Size (SF)	Rate	Vehicles Trips		Total Hourly Trips		Total Daily Trips	
			Entering %	Exiting %	Entering	Exiting	Rate	Total
Weekday PM Peak Hour							Daily	
Industrial Building (Possible Land Use)	106,480	0.97	14%	86%	14	89	6.97	742
					103			
Industrial Building (Previous Land Use)	80,000	0.97	14%	86%	11	67	6.97	558
					78			

1. Trip Generation Manual, 8th Edition, Institute of Transportation Engineers for light industrial land uses.

742 daily and 103 PM peak hour trips could be generated from the possible 106,480 SF industrial building and 558 daily and 78 PM peak hour trips were generated by the previous land use. Both of these options are more intense traffic generators during the PM peak hour than the proposed HHDC and Voucher Program Building (the proposed site generates 56 PM peak hour trips). In summary, the use of the proposed site for the Minneapolis-Hennepin Environmental Center is in accordance with the I2 zoning and is expected to generate less PM peak hourly traffic than the previous land use (80,000 SF industrial building) and other possible land uses for the site.

It is also noted that due to changing economic conditions, this site may not be vacant forever. Industrial land uses that could be constructed on this site per the zoning regulations may have more intense physical operations such as operating 24-hours a day, multiple shift changes, high truck traffic, holiday operations, industrial noise and visible operations.

2.8 Traffic Operations Analysis

An analysis of the daily traffic volumes was performed to determine it the addition of site-generated traffic would affect the daily capacity of University Avenue NE. A typical weekday was assumed for the analysis due to higher daily traffic volumes than the weekends. The proposed site is expected to generate 639 daily trips (798 daily trips reduced by 20% to account for shared facility trips). 70% of these trips are estimated to be traveling to/from the south on University Avenue NE, resulting in approximately 447 daily trips between Lowry Avenue and 27th Avenue. The 447 new daily vehicle trips added to University Avenue is less than 3% of the existing daily traffic volumes (16,000 vehicles/day). A typical four-lane undivided roadway has a capacity of approximately 25,000 vehicles/day. With the addition of these new trips, the corridor (from a daily traffic perspective) is expected to operate will under the typical daily capacity.

A more detailed traffic operations analysis was performed for the two key intersections for the three scenarios for No-Build and Build conditions following the methods set forth in the *Highway*

Capacity Manual (HCM), 2000 Edition. The Level of Service (LOS) and overall intersection vehicle delay were documented for the intersections. LOS is a measure used to quantify the traffic operations at an intersection or on a roadway segment. LOS ranges from LOS A to LOS F, with LOS A being non-congested, free-flowing conditions, and LOS F being very congested, at capacity conditions. The LOS D/E boundary is typically used as the indicator of congestion in an urban area and sometimes very busy urban intersections operate at LOS F. Because through-stopped controlled intersections do not exhibit delay for the through movements, it is common to report the LOS for the minor street left turning movements. This is an indicator of the delay experienced by the vehicle seeking an acceptable gap in both conflicting directions. Table 10 documents the results of the LOS analysis.

Table 10. LOS Results Summary

Scenario 1 - Weekday Midday Peak Hour of Site (12:00 PM - 1:00 PM)			
UNSIGNALIZED INTERSECTION			
Intersection	**Time period**	**LOS[1.]**	**Delay[2.]**
University Avenue NE at 27th Avenue NE	Year 2010 Existing	A/C	2.1 s
	Year 2013 No-Build	A/C	2.2 s
	Year 2013 Build	A/C	2.9 s
SIGNALIZED INTERSECTION			
Intersection	**Time period**	**Existing Timing[3.]**	
		LOS	**Delay**
University Avenue NE at Lowry Avenue NE	Year 2010 Existing	C	24.4 s
	Year 2013 No-Build	C	25.2
	Year 2013 Build	C	25.5

Sceanrio 2 - Weekday PM Peak Hour of Street Traffic (4:00 PM - 5:00 PM)					
UNSIGNALIZED INTERSECTION					
Intersection	**Time period**	**LOS[1.]**		**Delay[2.]**	
University Avenue NE at 27th Avenue NE	Year 2010 Existing	B/F		14.1 s	
	Year 2013 No-Build	C/F		20.6 s	
	Year 2013 Build	C/F		21.5 s	
SIGNALIZED INTERSECTION					
Intersection	**Time period**	**Existing Timing[3.]**		**Future Timing[4.]**	
		LOS	**Delay**	**LOS**	**Delay**
University Avenue NE at Lowry Avenue NE	Year 2010 Existing	F	97.5 s	E	78.9 s
	Year 2013 No-Build	F	108.6 s	F	81.0 s
	Year 2013 Build	F	114.8 s	F	85.7 s

Sceanrio 3 - Saturday Peak Hour of Site (11:00 AM - 12:00 PM)			
UNSIGNALIZED INTERSECTION			
Intersection	**Time period**	**LOS[1.]**	**Delay[2.]**
University Avenue NE at 27th Avenue NE	Year 2010 Existing	A/B	1.5 s
	Year 2013 No-Build	A/B	1.5 s
	Year 2013 Build	A/B	2.4 s
SIGNALIZED INTERSECTION			
Intersection	**Time period**	**Existing Timing[3.]**	
		LOS	**Delay**
University Avenue NE at Lowry Avenue NE	Year 2010 Existing	B	17.6 s
	Year 2013 No-Build	B	17.8 s
	Year 2013 Build	B	17.9 s

1. Overall intersection LOS followed by worst movement LOS.
2. Overall intersection Delay (sec/vehicle).
3. Existing signal timing from the City of Minneapolis (90 sec signal cycle length).
4. Assumes optimized timing with a 120 sec. cycle length.

The side-street stop controlled intersection of University Avenue NE and 27th Avenue NE is predicted to operate acceptably for all scenarios. The overall intersection LOS ranges from A to C. The side-street left turning movement operates at LOS F during the weekday PM peak hour (Scenario 2), but this is typical for left turn movements onto a major roadway. Based on peak hour observations, the signal to the south at Lowry Avenue NE and the signal to the north at 32nd Avenue NE meter the traffic and create sufficient gaps for the left/through movements.

The signalized intersection of University Avenue NE and Lowry Avenue NE operates under congested conditions during the PM peak hour for the No-Build and Build conditions. The addition of the small amount of site-generated traffic is not predicted to deteriorate operations further. The signal operated acceptably during the Tuesday Midday and Saturday peak conditions.

2.9 Crash History

Crash data from 2004 to 2008 (5 years) for the two study area intersections was obtained using Mn-CMAT, MnDOT's crash mapping tool. Table 11 reports the number of each type of critical crash. It is noted that both University Avenue NE and Lowry Avenue NE are heavily traveled urban roadways with transit stops, pedestrian sidewalks and multiple parking lot and business access locations. These factors increase vehicle crash statistics.

Table 11. Crash Summary Between 2004 to 2008

Intersection	Type of Crash				Fatalities	Total Crashes	Crash Rate[1.]	City Average Crash Rate[1.]
	Rear End	Left Turn	Right Angle	Other				
University Ave NE & Lowry Ave NE	15	23	39	16	0	**93**	**1.3**	**1.06**
University Ave NE & 27th Ave NE	4	3	5	15	0	**27**	**0.5**	**0.36**

1. Crash Rate per Million Entering Vehicles

The study area intersections experience a slightly higher number of crashes than the City average for similar intersections. The crash rate is 1.3 crashes per million entering vehicles for the signalized University Avenue NE/Lowry Avenue NE intersection. The crash rate for the University Avenue NE/27th Avenue NE is 0.5 crashes per million entering vehicles. Typically intersections of four-lane undivided roadways, such as University Avenue NE/Lowry Avenue NE, will statistically result in higher crash rates. This is due to the lack of exclusive turn lanes and medians, which are common features employed to reduce rear-end, left turn and right angle type crashes.

To determine if any existing conditions contribute to the safety, a field observation for the study area intersections and University Avenue NE was conducted. The following existing conditions are noted:

- Pavement markings were found to be recently applied and in very good condition.
- All intersection and roadway signage is accordance with current standards.
- Pedestrian ramps and sidewalks are highly visible and are in accordance with ADA (Americans with Disabilities Act) standards.
- Signal indications are visible.
- The lines of sight for drivers are adequate at the intersections and along University Avenue NE.

Based on these observations, there are no forthright factors that could affect the safety of these intersections and roadways.

In speculation, the rear end crashes could be attributable to signal operations or fact that there are no right/left turn lanes. The number of this type of crash could be reduced by implementing improved signal coordination along the University Avenue NE corridor. Adding right or left turn lanes is not currently a viable option due to limited right-of-way on all corners of this intersection.

Crashes resulting from left turns into oncoming traffic are also high. This could be due the lack of designated left turn phasing operations of the signal and/or the lack of left turn lanes. The northbound, southbound and westbound approaches do not have designated phases for left turns. These left turns have to yield to oncoming through traffic. Adding designated left turn phasing for these approaches could improve the safety of the left turn movements. It is noted that only two approaches can have left turn phasing without designated turn lanes. Therefore, left turn phasing could only be added to one additional approach. This provision should be carefully considered as the addition of turn arrows will often degrade traffic operations (i.e., increase congestion on the opposing direction) at intersections without turn lanes. An unintended consequence of increasing congestion may lead to additional rear-end crashes.

The right angle crashes are a result of vehicles failing to yield to the vehicle with the right-of – way. Higher right angle crashes are typical in an urban/city setting where vehicle have to compete with buses and pedestrians. Many right angle crashes are a result of vehicles entering signalized intersections during the yellow and start of red signal indication.

The addition of the proposed site generated traffic is not anticipated to exacerbate any existing safety issues at these study area intersections. The majority of the site-generated traffic is traveling on the surrounding roadway network during non-peak traffic times. The amount of PM peak hour site-generated traffic on University Avenue NE is less than 1.5% of the total PM peak traffic volume traveling through the University Avenue NE and Lowry Avenue NE intersection, and is inconsequential.

2.10 Potential Intersection Improvements

The following details potential improvements that were investigated:

- The need for a traffic signal at the University Avenue NE and 27th Avenue NE intersection was analyzed. The PM peak hour volumes were compared with the peak hour signal warrant thresholds (warrant 3) outlined in the *Minnesota Manual on Uniform Traffic Control Devices (MMUTCD)*. With the existing 2010 PM peak hour volumes a traffic signal is warranted as the side-street volumes are just above the threshold. Additionally, the 8-hour warrant (warrant 1) is also satisfied. The installation of a traffic signal would improve traffic operations to an acceptable LOS A/B operation. The installation of a coordinated traffic signal (coordinated with the Lowry Avenue NE and 32nd Avenue NE signals) would improve intersection operations, especially for vehicles using 27th Avenue.

- Currently the City of Minneapolis has plans to retime all the traffic signals in Northeast Minneapolis in 2011. Based on anticipated timing improvements to the University Avenue NE and Lowry Avenue intersection the operations will improve as indicated by the reported intersection delay (see Table 10). The reported delay for the 2013 Build conditions with the updated timing (85.7 s) is less than the reported delay for existing

conditions (97.5 s). With the inclusion of the vehicles generated by the proposed project and the future signal timing improvements, the Lowry Avenue/University Avenue intersection is expected to operate better than it currently does. An additional benefit of providing optimized signal timing is rear end type crashes are often reduced.

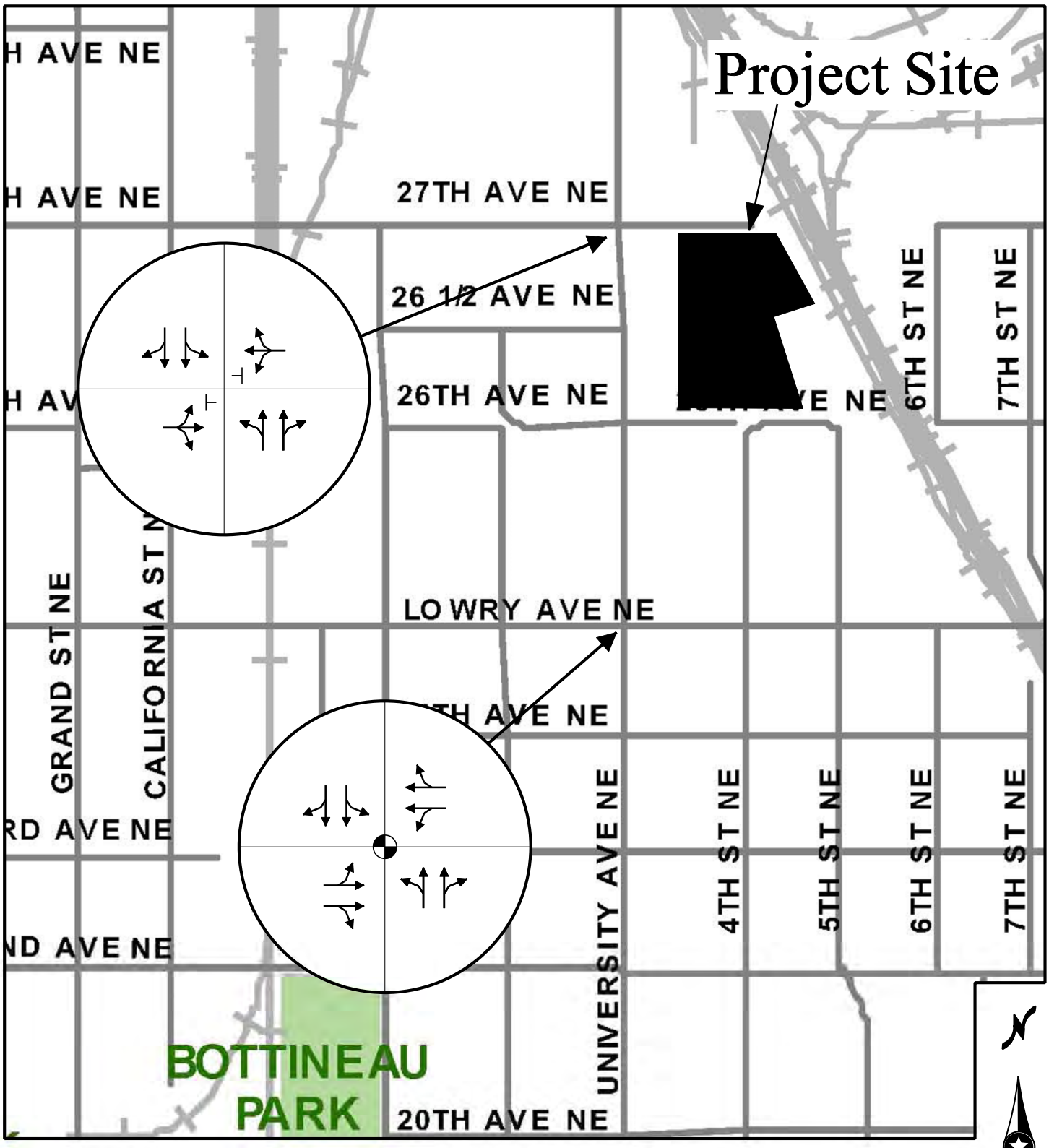
- To further improve intersection efficiency at the Lowry Avenue/University Avenue, another option is to remove the no right turn on red signs. It is suggested that Minneapolis Public Works review the intersection for the removal of these signs.

- An inventory of existing August 2010 conditions indicate that ADA pedestrian ramps were recently constructed both the University Avenue NE/Lowry Avenue NE and University Avenue NE/27th Avenue NE intersections. The new ramps and curbs provide an improvement to pedestrians at the intersections.

To address safety along University Avenue and to address the left turn and right angle related crashes the following cost-effective options may be considered:

- Countdown pedestrian crossing timers should be installed for all crossings at the University Avenue NE/Lowry Avenue NE intersection. It is anticipated that the countdown timers will reduce right angle crashes and pedestrian conflicts by showing how many seconds remain for the crossing phase. Anecdotal data and observations conducted throughout the industry are finding significant reductions in right angle crashes. Statistical research is currently underway to validate the finding; however, by providing the time remaining until the traffic signal turns yellow will reduce the number of vehicles entering the intersection during yellow and red signal phases and in turn, improve safety.

- To further improve visibility at the intersection, it is recommended that the red indications (lights) on the signal at the University Avenue NE/Lowry Avenue NE intersection be re-lamped. The new red indications will be brighter and more visible, especially when the sun is shining directly into them during the morning and evening hours. This improvement is anticipated to improve the safety of the intersection by making the red (stop) lights more visible.



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Travel Demand Management Plan

Figure 6
Existing Lane Geometrics & Intersection Control

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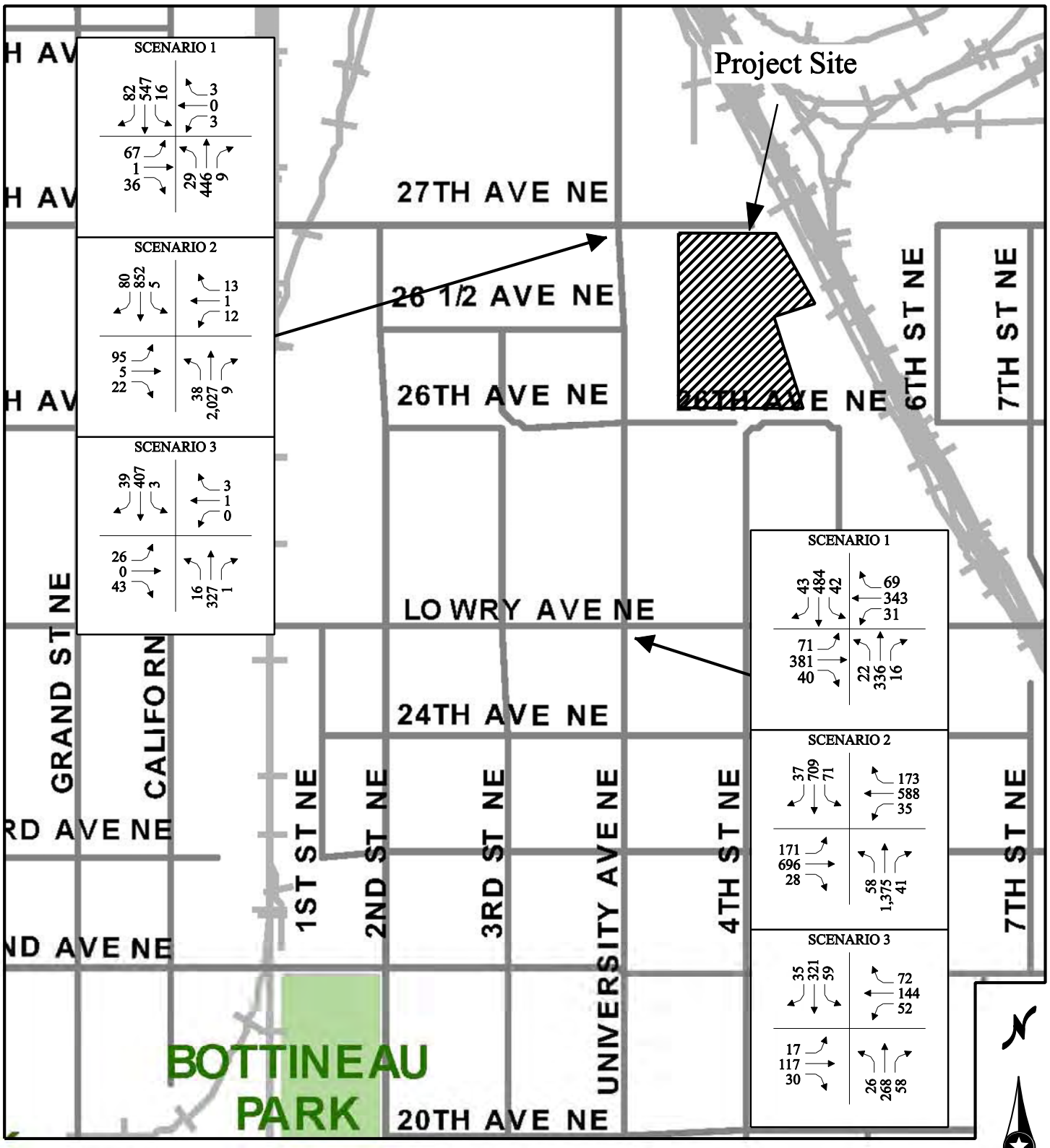

SCENARIO 1 - WEEDAYS FROM 12:00 PM TO 1:00 PM
SCENARIO 2 - WEEDAYS FROM 4:00 PM TO 5:00 PM
SCENARIO 3 - SATURDAYS FROM 11:00 AM TO 12:00 PM

*Not To Scale

Minneapolis - Hennepin Environmental Center
Travel Demand Management Plan

Figure 7
Year 2010 Existing Turning Movement Volumes
Mid-Day Peak Hour / PM Peak Hour / Saturday Peak Hour

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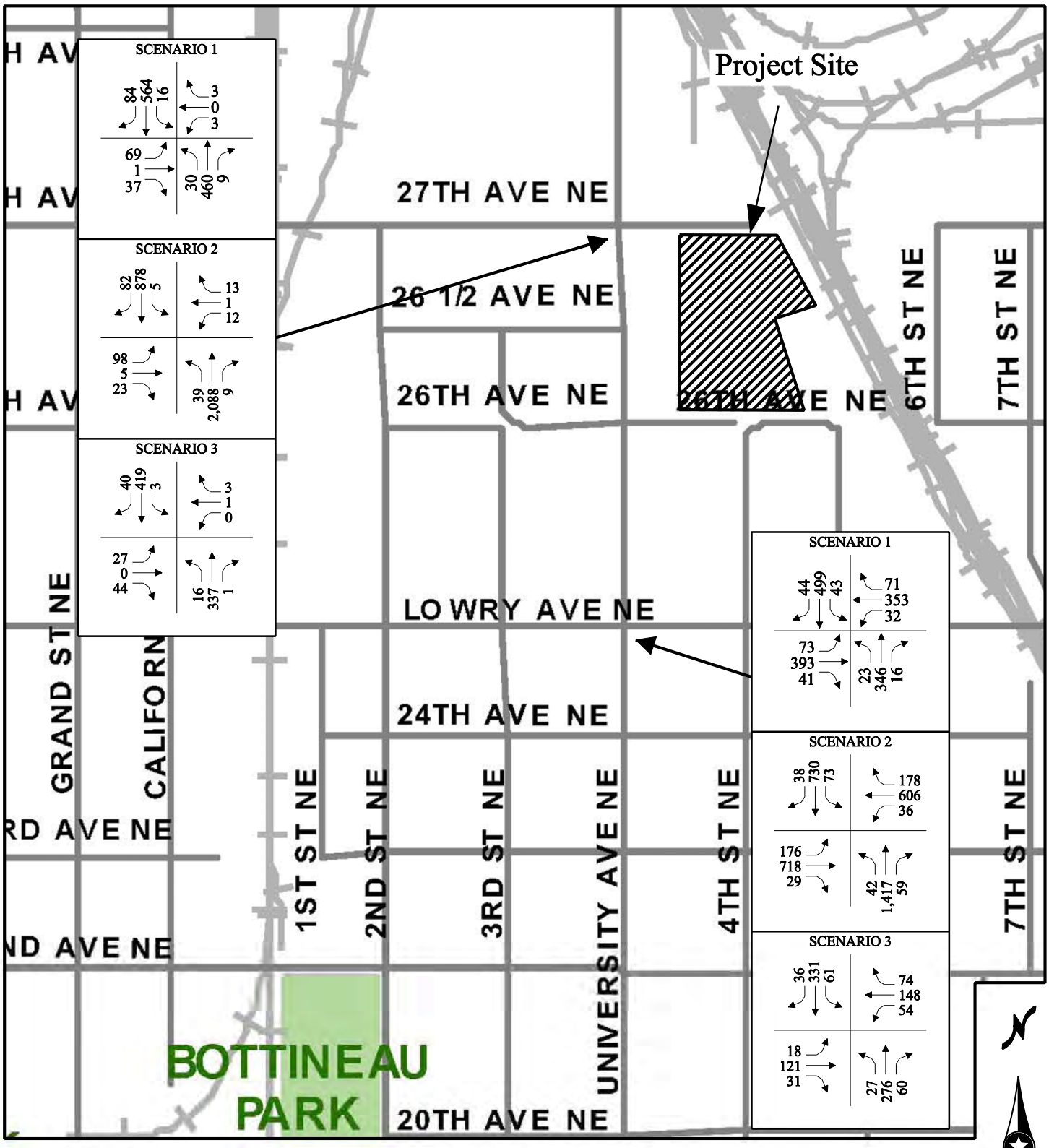

SCENARIO 1 - WEEDAYS FROM 12:00 PM TO 1:00 PM
SCENARIO 2 - WEEDAYS FROM 4:00 PM TO 5:00 PM
SCENARIO 3 - SATURDAYS FROM 11:00 AM TO 12:00 PM

*Not To Scale

Minneapolis - Hennepin Environmental Center
Travel Demand Management Plan

Figure 8
Year 2013 No-Build Turning Movement Volumes
Mid-Day Peak Hour / PM Peak Hour / Saturday Peak Hour

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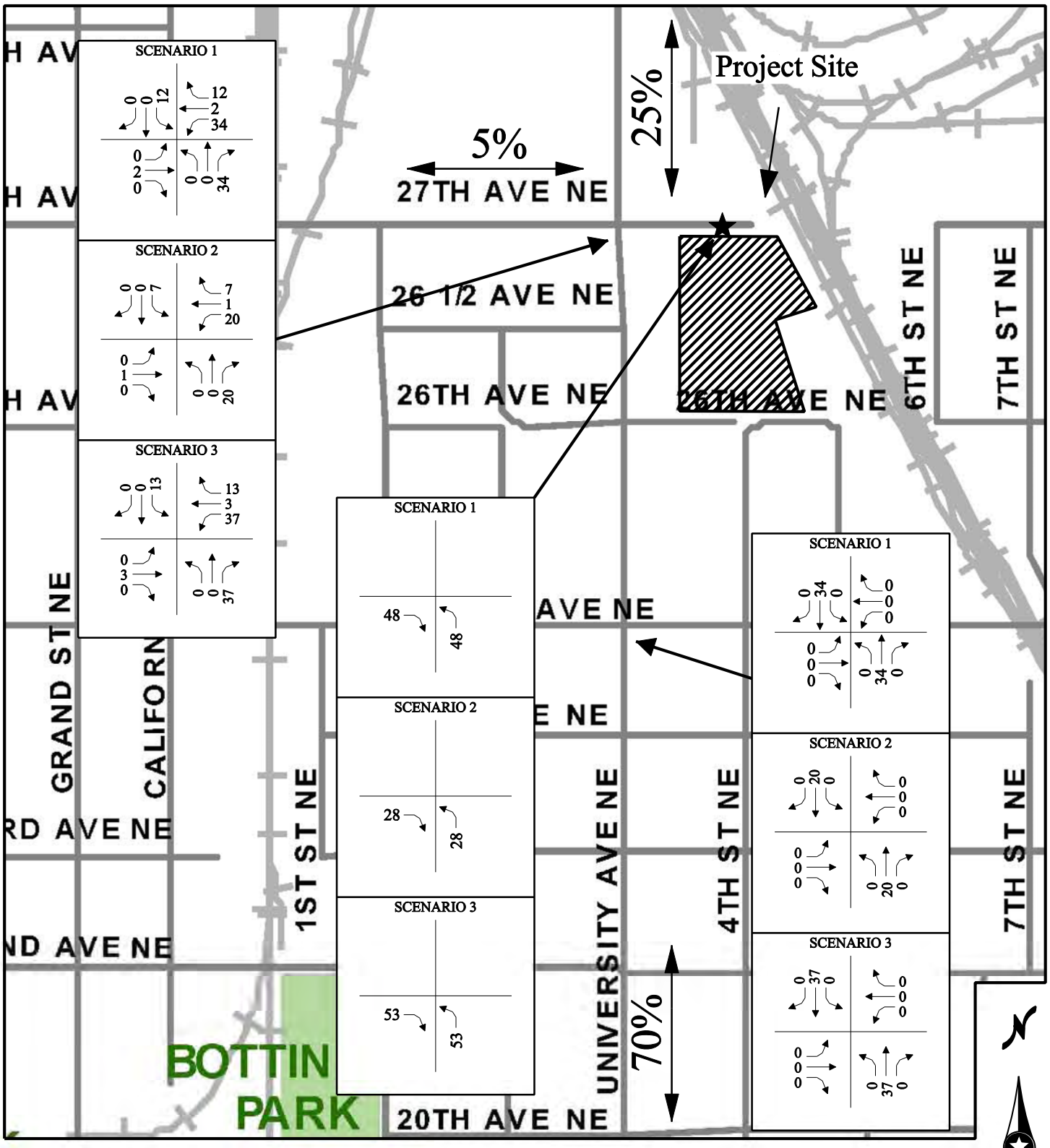

SCENARIO 1 - WEEDAYS FROM 12:00 PM TO 1:00 PM
SCENARIO 2 - WEEDAYS FROM 4:00 PM TO 5:00 PM
SCENARIO 3 - SATURDAYS FROM 11:00 AM TO 12:00 PM

*Not To Scale

Minneapolis - Hennepin Environmental Center
Travel Demand Management Plan

Figure 9
Directional Trip Distribution & Assignment
Mid-Day Peak Hour / PM Peak Hour / Saturday Peak Hour

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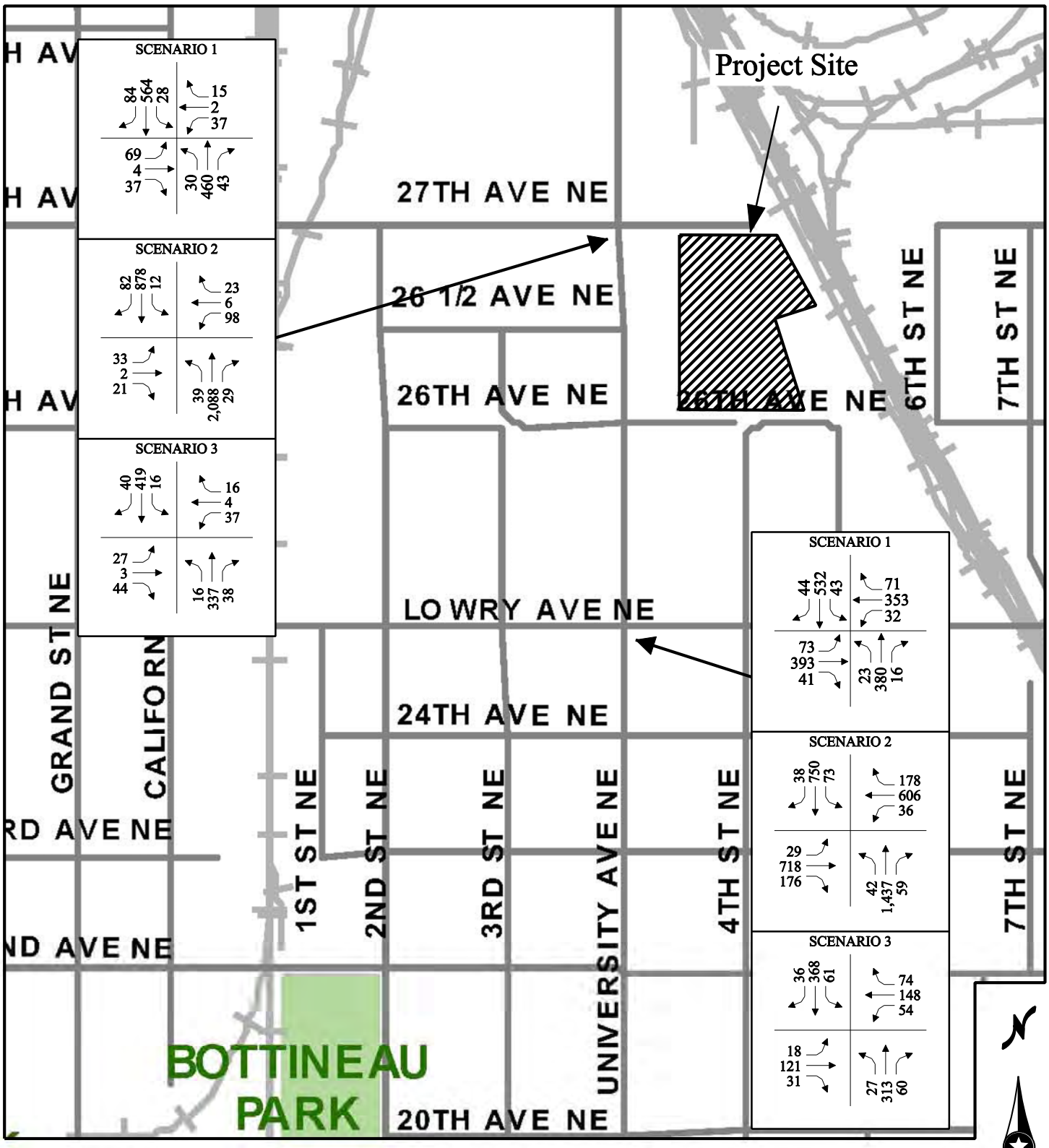

SCENARIO 1 - WEEDAYS FROM 12:00 PM TO 1:00 PM
SCENARIO 2 - WEEDAYS FROM 4:00 PM TO 5:00 PM
SCENARIO 3 - SATURDAYS FROM 11:00 AM TO 12:00 PM

*Not To Scale

Minneapolis - Hennepin Environmental Center
Travel Demand Management Plan

Figure 10
Year 2013 Build Turning Movement Volumes
Mid-Day Peak Hour / PM Peak Hour / Saturday Peak Hour

ALLIANT ENGINEERING, INC.

3 Parking Impact Analysis

As documented previously, the existing site has a large bituminous parking lot with 34 striped parking stalls. With the redevelopment of the site these existing parking stalls will be removed and a total of 41 parking stalls will be constructed. 25 parking stalls will be constructed for the HHDC and 16 parking stalls will be constructed for the VPB. The parking demand for the proposed site is not anticipated to be very high as most of the patrons will drive-thru the scale area and drop-off or recycle items directly from their vehicle.

The parking demand for the Project was analyzed to determine if adequate parking is provided for each building. The parking demand expected with the Project was estimated based on two methodologies – a survey of the parking demand at existing similar facilities and the City of Minneapolis Zoning Code.

3.1 Parking Survey of Existing Similar Sites

HHDC

The proposed HHDC will operate similarly to the existing South Hennepin Recycling Center located at 1400 W 96th Street in Bloomington, MN. Based on information provided by Hennepin County, the busiest time of the week is weekday mornings (Tuesday through Friday) from 10:00 AM to 11:00 AM. The site was observed by Alliant Engineering on a Wednesday morning during the peak time. The following describes the existing parking conditions:

- There are 21 existing parking stalls for patrons and an un-striped parking area behind the building for employees.
- A maximum of 3 occupied patron parking stalls and 4 employee vehicles (7 total parked vehicles) were observed during the busiest hour.

VPB

The proposed Voucher Program Building will be a relocation of the existing Voucher Program Building located at 2850 20th Avenue South in South Minneapolis. Data provided by the City of Minneapolis indicates the busiest time of the week is weekday afternoons (Tuesday through Friday) from 1:00 PM to 2:00 PM. The site was observed on a Wednesday afternoon by Alliant Engineering during this the peak time. The existing parking conditions area as follows:

- There currently are not any designated (striped) existing parking stalls for the site. Cars were observed to park along the curb edge of the truck loading/service area or over the curb on top gravel next to the building.
- A maximum of 8 parking vehicles in these locations were observed during the busiest hour of the day.

3.2 Minneapolis Zoning Code

The computations for off-street parking are found in Article III of Chapter 541 of the Minneapolis Zoning Code. The proposed project is classified as a Waste Disposal/Transfer Facility. There is no defined parking requirement for this type of facility, but the number of stall needs to be

approved by a Conditional Use Permit (C.U.P.) Table 12 provides a summary of the parking provided verses the parking required by the Minneapolis Zoning Code and a comparison to the peak parking demand at similar existing sites.

Table 12. Number of Parking Stalls Required

Land Use	Total GFA (SF)	Max Occupied Stalls at Similar Site[1]	Requirement[2]	Provided Spaces
HHDC	26,000	7	As Approved by C.U.P.	25
VPB	22,800	8	As Approved by C.U.P.	16
Totals	**48,800**			**41**

1. Base on a survey done by Alliant Engineering at similar sites during peak operation hours.
2. City of Minneapolis Zoning Code

3.3 Parking Conclusions

The majority of the utilized parking stalls will be employees as most of the patrons will pull through the scale area and perform transactions from within the their vehicle. The proposed 41 parking stalls (25 for the HHDC and 16 for the VPB) are expected to adequately serve the site.

4 Conclusions

The following summarizes the key results and conclusions of the traffic and parking analysis:

- Daily traffic projections of the proposed site were compared with the daily traffic volumes on University Avenue NE. The addition of daily site-generated traffic (639 vehicles/day) is less than 3% of the existing daily traffic volumes on University Avenue NE (16,000 vehicles/day). With the addition of the new daily new trips, the corridor is expected to operate under the typical capacity of a four-lane undivided roadway (25,000 vehicles/day).
- Traffic operations of the proposed site were analyzed for the three scenarios corresponding to the worst case time periods assuming the full capacity of the HHDC and VPB. Scenario 1 is the weekday peak hour of the proposed site occurring from 12:00 PM to 1:00 PM. Scenario 2 is the weekday peak hour of the study area intersections occurring from 4:00 PM to 5:00 PM. Scenario 3 is the Saturday peak hour of the proposed site occurring from 11:00 AM to 12:00 PM.
- The estimated trip generation for Scenario 1, the weekday peak hour of the proposed site, is 96 trips (48 entering the site and 48 exiting the site). The estimated trip generation for Scenario 2, the weekday peak hour of study area intersections, is 56 trips (28 entering the site and 28 leaving the site). The estimated trip generation for Scenario 3, the Saturday peak hour of the proposed site, is 106 trips (53 entering the site and 53 exiting the site).
- Based upon the future full capacity vehicle trip estimates, the proposed project is expected to generate less weekday PM peak hour trips than the previous land use and less than an equivalent land use allowed by ordinance and the Minneapolis Zoning Code on this site. The previous land use in operation previous to 2003 generated 78 PM peak hour trips.
- The addition of proposed site generated traffic for the three scenarios is not anticipated to deteriorate traffic operations or safety of the study area intersections, as the trip generation results in a less than 1.5% increase in vehicles on University Avenue and Lowry Avenue.
- The proposed parking layout is adequate based on a comparison with existing sites.
- Based upon a review of available area plans and previous studies, the proposed site is not expected to conflict with any master plans. In contrast, the proposed site will provide a positive enhancement to the bicycle network, pedestrian system and green space environment with the proposed 10-foot shared use bicycle path on the westerly side of the proposed site.
- Based on the origin/destination of trips, neighborhood cut-through traffic is not expected unless it is a local resident using the site. Access to the site will be provided on 27th Avenue NE, which dead ends directly to the east of the site and 26th Avenue dead ends to the south of the site. University Avenue and Lowry Avenue provide the only logical directions of approach for motorists accessing the site from outside the neighborhood. It is also noted that there are no residential driveways or alleys on this segment of 27th Avenue NE where the site accesses are proposed.

To address specific operation concerns and safety issues identified through the traffic study, several improvements are recommended, as will be itemized in the following Section 5. With the implementation of the recommended improvements, the proposed project is expected to be accommodated at a traffic and safety level that is equivalent to or better than the existing conditions. It can be concluded from the results of the traffic and parking analysis, that the area transportation network can accommodate the proposed project.

5 Recommendations

To improve the quality of traffic operations and intersection safety, the following measures are recommended:

Intersection Safety

- Install countdown pedestrian crossing timers for all crosswalks at the University Avenue NE/Lowry Avenue NE intersection. In addition to improving conditions for pedestrians, it is anticipated that the countdown timers will reduce right angle crashes and pedestrian conflicts by showing how many seconds remain for the crossing phase. Anecdotal data and observations conducted throughout the industry are finding significant reductions in right angle crashes. Statistical research is currently underway to validate the finding; however, by providing the time remaining until the traffic signal turns yellow will reduce the number of vehicles entering the intersection during yellow and red signal phases and in turn, improve safety.

- Re-lamp the red signal indications (lights) at the University Avenue NE/Lowry Avenue NE intersection. The new red indications will be brighter and more visible, especially when the sun is shining directly into them during the morning and evening hours. This improvement is anticipated to improve the safety of the intersection by making the red (stop) lights more visible.

Traffic and Intersection Operations

- Install a traffic signal at the intersection of University Avenue NE and 27th Avenue NE. The provision of a traffic signal is expected to improve operation and reduce intersection delay. Existing daily and PM peak hour traffic volumes warrant the installation of a traffic signal. This signal should be vehicle actuated and be coordinated with the existing signals on the University Avenue NE corridor. Countdown pedestrian timers should be provided.
- Minneapolis public works should review the intersection of University Avenue NE and Lowry Avenue NE for the removal of the no right turn on red signs.
- Provide new signal timing for University Avenue and Lowry Avenue corridors. Improved signal timing will reduce the delay at the University Avenue NE and Lowry Avenue NE intersection. With optimized signal timing and including the proposed project traffic generation, the operation at the University Avenue/Lowry Avenue intersection is expected to operate at a lower delay than the existing conditions. In addition, improved signal timing often results in reduced rear end crashes, improving the safety of the intersection. The City of Minneapolis Public Works has a signal re-timing project for these corridors programmed for 2011.

Site Circulation and Wayfinding

- The management team for the proposed site should work with the truck operators to schedules pick-ups outside the AM and PM peak traffic periods.
- Minneapolis Public Works should install appropriate directional signage for the site on University Avenue NE and Lowry Avenue NE. Installation of directional signage will

reduce the potential for patrons to incorrectly turn down residential streets (looking for the entrance) by indicating the desired routes (University Avenue NE and Lowry Avenue NE) and the location of the site access.

- General public parking should not be allowed on the site. It is recommended that the management team sign parking stalls for patrons and employees only.

Bicycle and Pedestrian Accommodations

- It is recommended that the design of the proposed site contain green space (undeveloped landscape) to improve aesthetics and increase pedestrian and neighborhood friendliness of the proposed site
- In combination with the green space, a 10-foot paved shared use bicycle/pedestrian trail should be constructed along the west side of the property connecting the existing University Avenue NE bike trail to the planned 2011 5th Street NE Bike Boulevard. This recommended trail would be a great improvement over the current Bike Boulevard plans where the bike route travels on the exiting sidewalk. The proposed shared use trail was previously illustrated in Figure 3.
- Provide low level pedestrian lighting along the shared use bicycle path and provide adequate lighting on the property for site operations.
- The sidewalk along 27th Avenue NE should be reconstructed in the location of the proposed accesses per City of Minneapolis standards.
- The HHDC and VPB should provide bicycle racks on site for use by employees to help reduce vehicle traffic.