Kimley»Horn

May 4, 2015

Mr. David Hagan
HI Land, LLC
Via email

Re: Traffic Analysis Letter – Highlands Gateway Building
        Southeast Corner of 32nd Avenue and Irving Street
        Denver, Colorado

Dear Mr. Hagan:

At the request of the City and County of Denver, this study presents a trip generation, trip distribution, and traffic assignment for the proposed Highlands Gateway Building project to be located on the southeast corner of the 32nd Avenue and Irving Street intersection in Denver, Colorado. The site is proposed to be redeveloped with an approximate 25,000 square foot medical office building. With the completion of the project, the existing Emmaus Lutheran Elementary School will be removed. The Emmaus Lutheran Elementary School currently has enrollment of approximately 90 students, with a full capacity previously of 125 students. Along with this analysis, this letter provides a trip generation comparison between the existing Emmaus Lutheran Elementary School and proposed Highlands Gateway Office Building project to identify a true possible impact of this proposed project.

The Highlands Gateway Building redevelopment project is proposed at the existing site of the Emmaus Lutheran Elementary School, just north of the existing Emmaus Lutheran Church. The building is proposed along the south side of 32nd Avenue, east of Irving Street. It is proposed with this project that the Emmaus Lutheran Church will remain. The Highlands Gateway Building is proposed on the northern portion of the property along 32nd Avenue with a surface parking lot to the south. The parking lot provides 90 degree parking spaces with circulation from the east to and from the alley and west along Irving Street.

Regional access to the site is provided by Interstate 25. Primary access to the site will be provided by Speer Boulevard, 32nd Avenue, and Irving Street. Adjacent to the site, Speer Boulevard provides one through lane of travel each direction, northbound and southbound, with a posted speed limit of 30 miles per hour. To the north of the site, 32nd Avenue provides one through lane of travel each direction, eastbound and westbound, with a posted speed limit of 25 miles per hour. Directly adjacent to the site, 32nd Avenue is designated with a school zone that limits the speed to 20 miles per hour with school signage. 32nd Avenue provides on street parking west of Irving Street. To the west of the site, Irving Street provides one through lane of travel in each direction, northbound and southbound, with a posted speed limit of 25 miles per hour. In addition, Irving Street is restricted to 20 miles per hour with school signage adjacent to the site. On street parking is permitted along the west side of the roadway. To the south of the site, 31st Avenue provides one through lane of travel each direction, eastbound and westbound, with a posted speed limit of 25 miles per hour. Directly adjacent to the site, 31st Avenue allows on street parking. 31st Avenue also includes school zone signage with a 20 miles per hour speed limit.

The intersection of 32nd Avenue and Speer Boulevard is a signalized intersection. The northbound and southbound approaches contain designated left turn lanes with the left turn movements operating with permitted only left turn phasing. The eastbound approach consists of a shared left turn/through lane and a designated right turn lane, while the westbound approach consists of a shared left turn/through/right turn lane. The intersection of 32nd Avenue and Irving Street is also a signalized intersection. All approaches consist of a single shared left turn/through/right turn lane. The north and south legs of Irving Street are slightly (35 feet) misaligned. The intersections of 31st Avenue with

Irving Street are misaligned unsignalized "T"-intersections with stop control on the 31st Avenue approaches. These legs of 31st Avenue are misaligned by approximately 130 feet. **Figure 1** illustrates the existing lane configuration and traffic control.

Direct access will be provided by two driveways, one proposed along Irving Street and one along the one-way northbound alley adjacent to the site to the east. Currently, access to Emmaus Lutheran Elementary School is solely provided by the eastern alley with vehicles entering northbound from 31st Avenue and exiting to 32nd Avenue. Providing direct access to Irving Street will reduce the traffic volume along the alley which is anticipated to improve operations of the surrounding street network. Especially since the northbound exiting alley intersection is in close proximity to the 32nd Avenue and Speer Boulevard intersection (approximately 45 feet measured edge to edge). Both access driveways are proposed to allow full turning movements.

To identify the potential increase of traffic that the Highlands Gateway Office Building project will generate, trip generation fitted curve equations and average rates were used based on the ITE Trip Generation, 9th Edition (most current edition), for Private School (K-8) (ITE Land Use Code 534) and Medical-Dental Office Building (ITE Land Use Code 720). The trip generation for the existing Emmaus Lutheran Elementary School and proposed Highlands Gateway Building medical office project where compared to determine the difference in anticipated trips. As previously identified, the site is proposed to be redeveloped with an approximate 25,000 square foot medical office building with the elimination of the Emmaus Lutheran Elementary School. Previously the elementary school had approximately 125 students. The following table summarizes the trip generation comparison for the existing and proposed uses. Trip generation calculations are attached.

Trip Generation Comparison
Highlands Gateway Medical Office Building

Use and Size	Weekday Vehicle Trips					
	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Existing Elementary School Private School K-8, 125 Students	64	52	116	34	38	72
Proposed Highlands Gateway Building Medical-Dental, 25,000 SF	47	13	60	24	60	84
Net New Trips	-17	-39	-56	-10	+22	+12

As summarized in the table, the proposed Highlands Gateway Medical Office Building project is anticipated to generate 60 trips during the weekday morning peak hour and 84 trips during the weekday afternoon peak hour. Based on the existing Emmaus Lutheran elementary school, the proposed Highland Gateway Building project is anticipated to generate 56 less trips during the weekday morning peak hour and 12 greater trips during the afternoon peak hour than the previous school. In other words, this project is anticipated to fairly significantly decrease the morning peak hour traffic. During the midday afternoon peak hour, the traffic generation will be slightly greater with more traffic anticipated during the afternoon/evening rush hour than previously generated with the school day being completed already.

Distribution of site traffic on the adjacent roadways and through the key intersections and proposed project accesses was based on the area street system characteristics, adjacent roadway network, surrounding area development information, and the proposed access system for the project. The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that

approaches the site from a given direction and departs the site back to the original source. It is believed that a majority of Highlands Gateway Building project traffic will be accessing the project from 32nd Avenue to the west, from Speer Boulevard to the northwest, and from Speer Boulevard (I-25) to the southeast. It is anticipated that 25 percent of the site generated traffic will enter and exit to the north along Speer Boulevard, 35 percent of the site generated traffic will enter and exit to the south on Speer Boulevard to Interstate 25, 25 percent of the site generated traffic will enter and exit to the west on 32nd Avenue, 5 percent of the site generated traffic will enter and exit to the east on Green Court, 5 percent of the site generated traffic will enter and exit to the east on 31st Avenue, and 10 percent of the site generated traffic will enter and exit to the south on Irving Street. **Figure 2** illustrates the expected project trip distribution for Highlands Gateway Building project.

Traffic assignment was obtained by applying the distribution of **Figure 2** to the estimated traffic generation of the project shown in the previous table. Highlands Gateway Building project traffic assignment is shown in **Figure 3**.
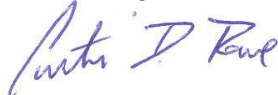
Based on these results, the Highlands Gateway Building project is anticipated to decrease the weekday morning peak hour trips generated with an increase expected during the afternoon peak hour. Overall, traffic patterns will remain similar with some traffic shifting from the Alley to Irving Street with the improved access. It is believed that this redevelopment will result in acceptable traffic operations. The proposed project development and expected traffic volumes resulted in the following recommendations:

- It is recommended that the project access approaches to Irving Street and the eastern Alley be stop controlled and allow full turning movements. It is recommended that R1-1 "STOP" signs be installed for the westbound approach to Irving Street and eastbound approach to the Alley exiting the property.

- For the eastbound approach exiting the property at the alley, it is recommended that a R3-1 No Right Turn sign be installed due to the alley serving one-way northbound traffic only. In addition, R6-1L "ONE WAY" signs could be installed above the STOP sign and advance to the access.

- It is recommended that a R1-1 "STOP" sign be installed for the northbound Alley street approach to 32nd Avenue.

- With completion of the Highlands Gateway Building project and the elimination of the Emmaus Lutheran Elementary School, it is recommended that all school related signage be removed. This includes the school zone sign assemblies and advanced school warning signs along 32nd Avenue, 31st Avenue, and Irving Street.

If you have any questions relating to this analysis, or require anything further please call me at (303) 228-2300.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Curtis D. Rowe, P.E., PTOE
Vice President

NORTH
NTS 096438000

PROJECT SITE

IRVING STREET
32ND AVENUE
ALLEY
31ST AVENUE
ALLEY
31ST AVENUE
IRVING STREET
GREEN COURT
SPEER BOULEVARD

SPEED LIMIT 25
SPEED LIMIT 20
SPEED LIMIT 20
SPEED LIMIT 30
SPEED LIMIT 20
SPEED LIMIT 20
SPEED LIMIT 25

STOP

175'
50'
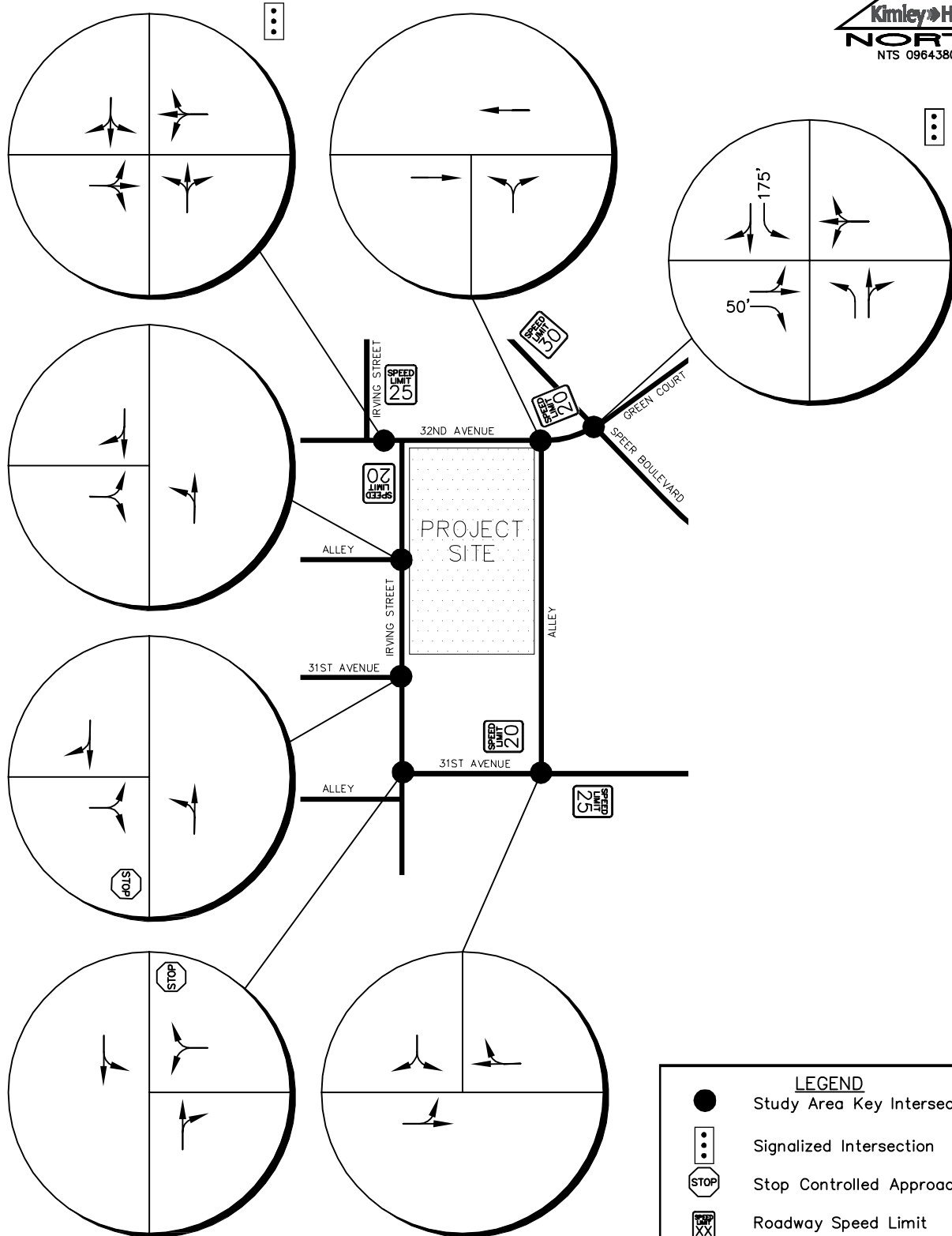
LEGEND
● Study Area Key Intersection
Signalized Intersection
STOP Stop Controlled Approach
SPEED LIMIT XX Roadway Speed Limit
100' Turn Lane Length (feet)

HIGHLANDS GATEWAY BUILDING
(SEC 32ND AVE & IRVING ST)
EXISTING LANE CONFIGURATIONS

FIGURE 1

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NORTH
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60%
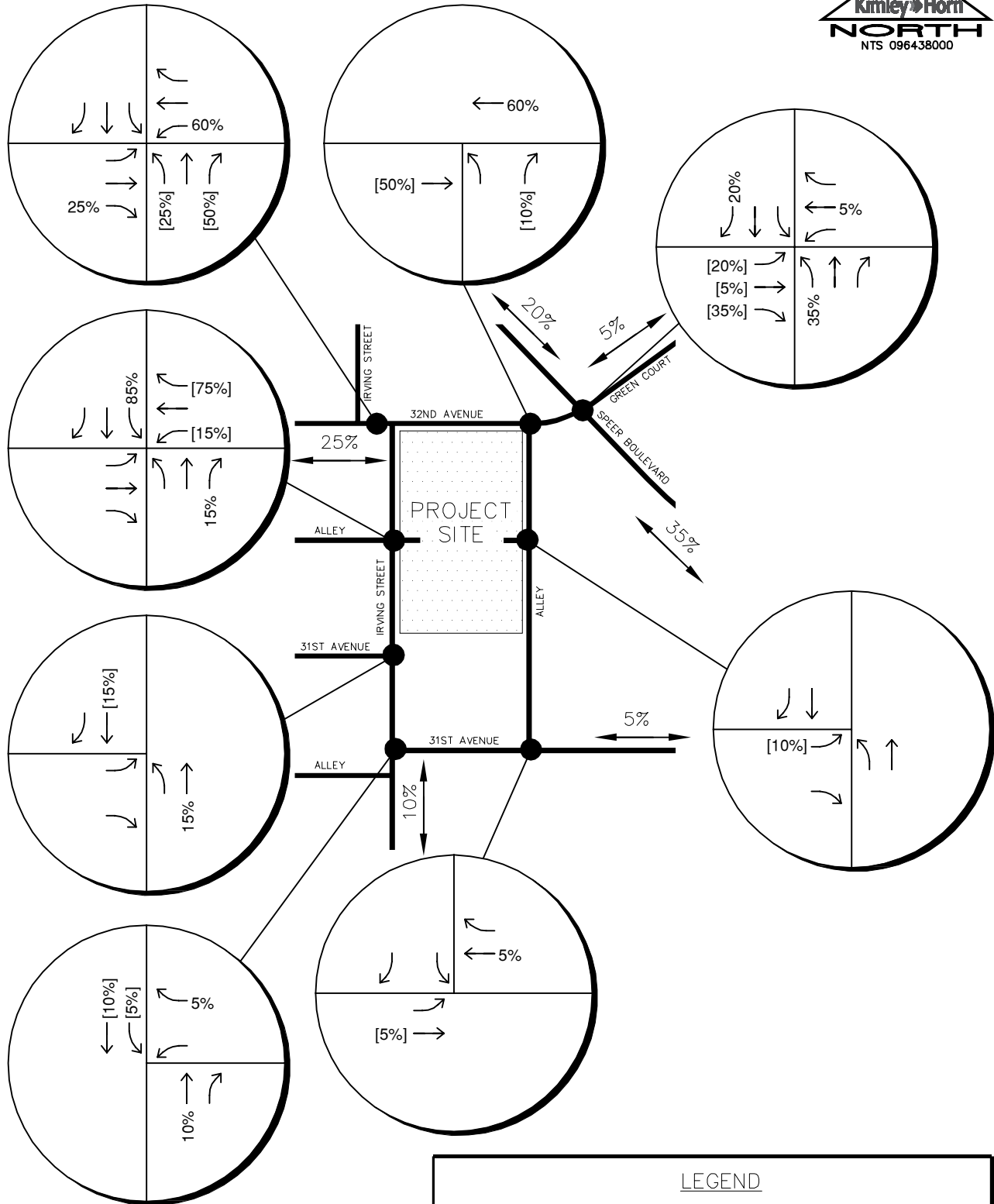
[25%] [50%]

25%

←60%

[50%]→

[10%]

20%
[20%]→
[5%]→
[35%]

5%
35%

85% [75%]
[15%]

15%

IRVING STREET

20%

GREEN COURT

SPEER BOULEVARD

32ND AVENUE

25%

PROJECT SITE

ALLEY

5%

35%

IRVING STREET

ALLEY

[15%]

15%

31ST AVENUE

ALLEY

31ST AVENUE

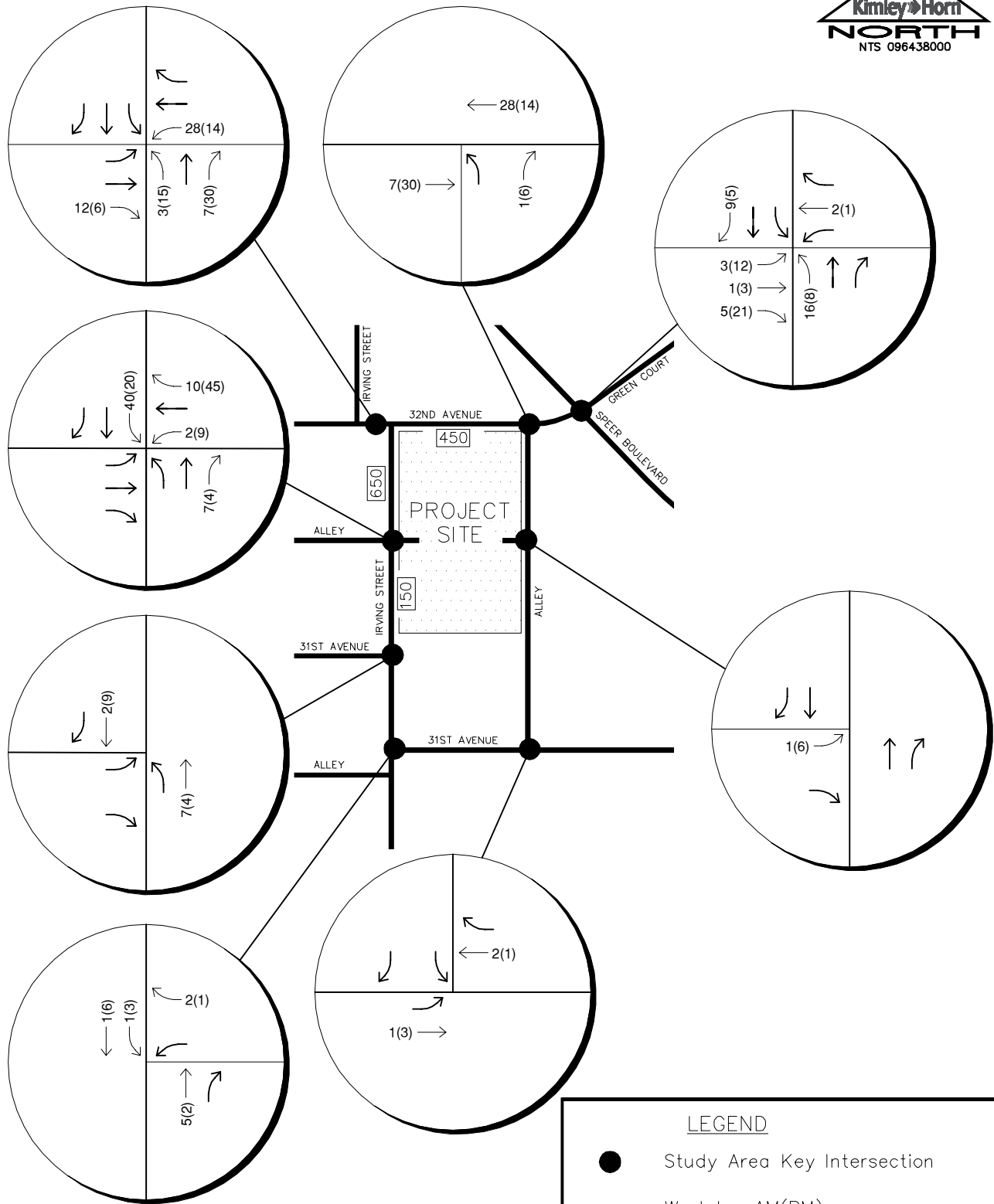5%

10%

↓↓ [10%] ↑

[10%] [5%] 5%

10%

←5%

[5%]→

LEGEND

● Study Area Key Intersection

XX%[XX%] Entering[Exiting] Trip Distribution Percentage

HIGHLANDS GATEWAY BUILDING
(SEC 32ND AVE & IRVING ST)
TRIP DISTRIBUTION

FIGURE 2

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28(14)

28(14)
7(30) →
1(6)

9(5)
2(1)
3(12)
1(3) →
5(21)
16(8)

12(6)
3(15)
7(30)

40(20)
10(45)
2(9)
7(4)

IRVING STREET
32ND AVENUE
450
650
PROJECT SITE
ALLEY
IRVING STREET
150
31ST AVENUE
ALLEY
31ST AVENUE
GREEN COURT
SPEER BOULEVARD

2(9)
7(4)

1(6)

1(6)
1(3)
2(1)
5(2)

2(1)
1(3) →

LEGEND

●   Study Area Key Intersection

XX(XX)   Weekday AM(PM)
Peak Hour Traffic Volumes

XX,X00   Estimated Daily Traffic Volume

HIGHLANDS GATEWAY BUILDING
(SEC 32ND AVE & IRVING ST)
TRAFFIC ASSIGNMENT

FIGURE 3

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Project	Highlands Gateway Building					
Subject	Trip Generation for Medical-Dental Office					
Designed by	Matt Farmen	*Date*	May 04, 2015	*Job No.*	096438000	
Checked by	Curtis Rowe	*Date*	May 04, 2015	*Sheet No.*	1 *of* 1	

TRIP GENERATION MANUAL TECHNIQUES

ITE <u>Trip Generation Manual</u> 9th Edition - Fitted Curve and Average Rate Equations
Land Use Code - Medical-Dental Office Building (720)

Independent Variable - 1000 Sq Feet Gross Floor Area
   SF = 25,000
   X = 25.000
   T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Page 1295)

Directional Distribution: 79% ent. 21% exit.

Average Rate (R) = 2.39   T = 60   Average Vehicle Trip Ends
T = R * X   47   entering   13   exiting
T = 2.39 * 25.000

                                 47 + 13 = 60

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (Page 1296)

Directional Distribution: 28% ent. 72% exit.
T = 84   Average Vehicle Trip Ends

Ln(T) = 0.90 Ln(X) + 1.53   24   entering   60   exiting
T = 0.900   Ln(25.000)   + 1.53

                                 24 + 60 = 84

Weekday (page 1294)

Average Weekday   Directional Distribution: 50% entering, 50% exiting
                                   T = 808   Average Vehicle Trip Ends
T = 40.89(X) - 214.97   404   entering   404   exiting
T = 40.89 * 25.000 - 214.97

                                 404 + 404 = 808

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TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 9th Edition

Land Use Code - Private School (K-8), (534)

Independant Variable - Students (X)

   X = 125
   T = Average Vehicle Trip Ends

A. M. Peak Hour (page 1030), Regression Equation

	Directional Distribution: 55% ent. 45% exit.
T = 0.90 (X) + 3.01	T = 116 Average Vehicle Trip Ends
T = 0.90 * 125 + 3.01	64 entering 52 exiting
	64 + 52 = 116

P.M. Peak Hour of Generator (page 1031), Regression Equation

	Directional Distribution: 47% ent. 53% exit.
T = 0.61 (X) - 4.70	T = 72 Average Vehicle Trip Ends
T = 0.61 * 125 - 4.70	34 entering 38 exiting
	34 + 38 = 72