ITEM# 23
DATE: 7-25-17

COUNCIL ACTION FORM

SUBJECT: LINCOLN WAY PEDESTRIAN STUDY (REPORT ON PHASE 1, AUTHORIZE PHASE 2)

BACKGROUND:

Beginning in the spring semester of 2016, the City and Iowa State University started a joint effort to study the safety and operations of the Lincoln Way corridor on the segment of roadway between the main ISU Campus and the Campustown Business District. The study focused on pedestrian safety and operations for those users traveling north-south across Lincoln Way between ISU campus and the City of Ames. It also evaluated the interactions between those pedestrians and all other modes, such as vehicles, bikes, and transit buses. City and ISU Staff, along with SRF (the project consultant), led a multidisciplinary and multijurisdictional technical working group that guided the project team. This working group was comprised of planners, engineers, housing administrators, police, and fire staff from both the City of Ames and ISU.

The project team has completed Phase 1 of the study (Attachment A). Phase 1 tasks were to evaluate and summarize the existing safety and operational conditions of the Lincoln Way corridor through Campustown, and to report these findings such that the City Council and ISU administration could decide whether the project should be authorized to move into Phase 2. Tasks under Phase 2 was intended to take the findings of Phase 1 and further develop specific alternatives for areas along Lincoln Way that the study determined to be performing below acceptable or desired safety and operational targets.

Findings of Phase 1 (from the SRF report):

Over the course of completing Phase 1 of the Lincoln Way Multimodal Crossing study, a broad range of analyses were completed for the purposes of characterizing current conditions along the active corridor. Combined with the technical assessment, the project partners of Iowa State University and the City of Ames organized the following to expand input and discussion of conditions in the corridor:

- Conducted a community-wide survey asking interested stakeholders to identify their issues/concerns in the corridor and to provide input to possible actions to address those issues.

- Organized a Working Group of university and city staff tasked with reviewing the information gathered and reviewed and providing their input regarding conditions in the corridor.

Through the technical and community outreach a number of perceived issues and concerns were identified along the corridor, which principally focused on traveler behavior rather than current design conditions. It was found that the geometrics, sight distance, and lighting analyses of the corridor reflect conditions that comply with current design guidelines for the various element areas. Additionally, traffic operations in the peak hours are also within acceptable ranges for the type of facility. **Therefore, it was determined that any issues in the corridor are related to pedestrian behavior rather than street design or the physical environment.**

There are a number of areas where the results of the data collection and review identify conditions that warrant additional analysis of potential mitigation measures through Phase II of the study. These include:

- Stanton Avenue pedestrians crossing Lincoln Way: The pedestrian crossing volume at this intersection was likely the most surprising finding of the data collection effort. The pedestrian volume at this uncontrolled/unmarked location is similar to other controlled intersections warrants review of alternatives to either reduce the crossing or establish a controlled pedestrian crossing.

- Welch Avenue and Stanton Avenue Safety: The elevated crash rate at Stanton Avenue and the higher incidence of severe crashes at Welch Avenue, and the number of pedestrian involved crashes likely warrants identification and analysis of mitigation alternatives.

- Signal timing through the corridor: The signal timing and level of service was found to be performing very well. However, an analysis will be performed to determine if any small changes can be made to the timing to enhance the pedestrian experience.

A key observation in the corridor was confirmation of the level of pedestrian non-compliance with walk indications for persons crossing Lincoln Way. Except for Sheldon Avenue, compliance with pedestrian crossing indications is below 50 percent of the persons approaching intersections. To provide an organized summary of the findings of the range of analyses, a matrix of findings was developed and is presented in Table 1 (Attachment B).

Below is cost summary for the overall project; it should be noted that the agreement between ISU and the City of Ames is to split these costs equally.

Phase	Reimbursable Expense	Base Fee	Total Not to Exceed
Phase 1	$1,085	$30,660	$31,745
Phase 2 (revised)	$1,224	$48,525	*$49,749
TOTAL	**$2,309**	**$79,185**	**$81,494**

* This cost has been reduced from $68,948 under a more focused scope.

ALTERNATIVES:

1. Direct staff to initiate Phase II of the Lincoln Way Pedestrian Study with the more narrow scope as recommend by SRF.

2. Direct staff conclude the Lincoln Way Pedestrian Study with Phase I, and do not authorize any tasks under Phase II.

CITY MANAGER'S RECOMMEND ACTION:

In general, Phase I of the study concluded that there are not significant safety issues for pedestrians crossing Lincoln Way. In addition, it was determined that any safety issues in the corridor are related to pedestrian behavior rather than street design or the physical environment.

The study did find that there was operational capacity in the traffic signal timings that could be better optimized to provide a higher priority level for pedestrians (shorter wait times). Phase I also found two intersections along Lincoln Way, at Stanton Avenue and Welch Avenue respectively, to have lower than desired safety performance such that alternatives should be developed under Phase II of the study that would mitigate issues at those intersections.

Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1.

Attachment A

Lincoln Way Multimodal Crossing Data Collection and Analysis

Phase 1 – Discovery and Findings

Final Draft

Prepared For:

Iowa State University

City of Ames

April 2017

SRF Consulting Group, Inc. | Engineers Planners Designers | Snyder & Associates

Lincoln Highway

Lincoln Way Multimodal Crossing Data Collection and Analysis

Phase 1 – Discovery and Findings

FINAL DRAFT

Iowa State University and City of Ames, Iowa

Prepared by:

SRF Consulting Group, Inc. | Engineers Planners Designers

Snyder & Associates

April 2017

SRF No. 9386

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Findings of the Existing Conditions Analysis

Over the course of completing Phase 1 of the Lincoln Way Multimodal Crossing study, a broad range of analyses were completed for the purposes of characterizing current conditions along the active corridor. Combined with the technical assessment, the project partners of Iowa State University and the City of Ames organized the following to expand input and discussion of conditions in the corridor:

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There are a number of areas where the results of the data collection and review identify conditions that warrant additional analysis of potential mitigation measures. These include:

- Stanton Avenue pedestrians crossing Lincoln Way: The pedestrian crossing volume at this intersection was likely the most surprising finding of the data collection effort. The pedestrian volume at this uncontrolled/unmarked location is similar to other controlled intersections warrants review of alternatives to either reduce the crossing or establish a controlled pedestrian crossing.
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A key observation in the corridor was confirmation of the level of pedestrian compliance with walk indications for persons crossing Lincoln Way. Except for Sheldon Avenue, compliance with pedestrian crossing indications is below 50 percent of the persons approaching intersections. To provide an organized summary of the findings of the range of analyses, a matrix of findings was developed and is presented in Table 1.

Table 1. Lincoln Way Corridor Existing Conditions Assessment

Assessment/Review	Basis of Analysis		Findings
	Recommended Practice	Compliance with Rules (Behavior)	
Peak Hour Traffic Operations	Current Peak Hour Level-of-Service (delay) Relative to Goal of LOS D		All Intersections LOS D or Better in Peak Hours
Safety	Crashes/Crash Rate Relative to Average for Similar Facilities Crash Severity Rate Relative to Average for Similar Facilities		Crash Rates – Intersections of Lincoln Way/Sheldon and Lincoln Way/Stanton exceed the critical crash rate (experiencing more crashes than comparable locations). Throughout the corridor – 50% of severe crashes involved pedestrian. Severity – Lincoln Way/Welch Avenue – Higher than similar intersections.
Sight Distance	Reaction + Stopping Sight Distance – Relative to Guideline Reflecting Speed and Grade (Profile) Presence of Obstructions for Cross Route Drivers (Buildings, Parked Vehicles, Vegetation, Signs, etc.)		All intersections/segments meet recommended practice guidelines On street parking on south side west of Stanton Avenue has potential to create sight distance obstacle.
Overhead Lighting	Illumination Thresholds Established based on Facility Type and Pedestrian Activity (1.7 candle feet) Uniformity Threshold for Consistency in Level Under and Between Fixtures (3.0 candle feet)		Average for Each Segment Exceeds Threshold Variation through corridor is greater than desire.
Pedestrian Crossings		Acceptable Conditions are Defined as - High Percentage of Pedestrians Cross at Crosswalk and with WALK Indicator	Low level of compliance with WALK indication (Lincoln Way and Cross Routes). 35% Compliance in peak pedestrian hour and 46% in the peak vehicle hour. Few people approaching Lincoln Way or Cross Routes press WALK button.
Bicycle Operations		Follow Rules of Road: • On street act as vehicle • On sidewalk act as pedestrian	On-Street – No/Limited compliance issues On-Sidewalk – Compliance issues consistent with pedestrians

Introduction

Background and Purpose

Lincoln Way is the primary east-west arterial corridor traveling through Ames and over the length there is a wide range of adjacent environments. On the extreme west end of Ames, the corridor serves as an entry/exit and as an access to commercial and residential areas that line the corridor. In the central part of the community, adjacent uses include Iowa State University and the fringe of downtown Ames, both of which draw higher levels of pedestrian travel in addition to the vehicle traffic using the corridor. The east end traverses more industrial areas and serves as an east side entry to Ames.

The focus of this study is the area between Sheldon Avenue and University Boulevard, where Lincoln Way creates the connection between the main core of the university to the north and the mix of commercial and residential uses to the south. Figure 1 displays the corridor stud limits.

The mix of uses on the south side of Lincoln Way in the study area include university housing residence housing (Buchannan Hall 1 and 2) and a limited amount of university office space. Commercial uses (restaurants, copy centers, and specialty shops) on the south side of Lincoln Way draw a substantial amount of their customers from the university campus on the north. Thus, Lincoln Way is a high use corridor for vehicles (autos, trucks and bicycles) and pedestrians traveling along the route. The proximity of the major activity center of the university, the bulk of the commercial uses south of Lincoln Way.

Figure 1. Lincoln Way Study Area

Lincoln Way is functionally classified as a principal arterial, which would suggest the primary function of the corridor is to move people and goods across the city, with property access being a secondary function. The complementary nature of residential, commercial, and university uses on the south side of Lincoln Way and the core of the university on the north adds a complicating function of a pedestrian corridor not long along Lincoln Way, but more so, crossing the corridor. Adding substantial pedestrian volume across the arterial corridor creates the potential for conflicts along the corridor with the potential to impact operations and safety.

Iowa State University and City of Ames officials recognize the multiple, potential competing, functions and modes in the corridor adjacent to the university and have teamed to complete the Lincoln Way Multimodal Crossing Data Collection and Analysis. Through the study, the partners are reviewing/assessing:

- Pedestrian activity along and across Lincoln Way including each intersection and crossing activity at mid-block locations.
- Vehicle traffic and peak hour traffic operations at intersections in the study corridor from Sheldon Avenue through University Boulevard.
- Overhead lighting levels at intersections and along sidewalk sections between intersections relative to design thresholds for the class of facility (principal arterial) and area type (high pedestrian activity).
- Sight distance along the Lincoln Way corridor from the perspective of drivers traveling east-west through the study area and drivers approaching Lincoln Way on a cross route. The analysis covers review of road design geometrics limiting sight distance and potential obstructions blocking a driver's ability to see other vehicles and/or pedestrians with enough time to stop safely.

Study Process

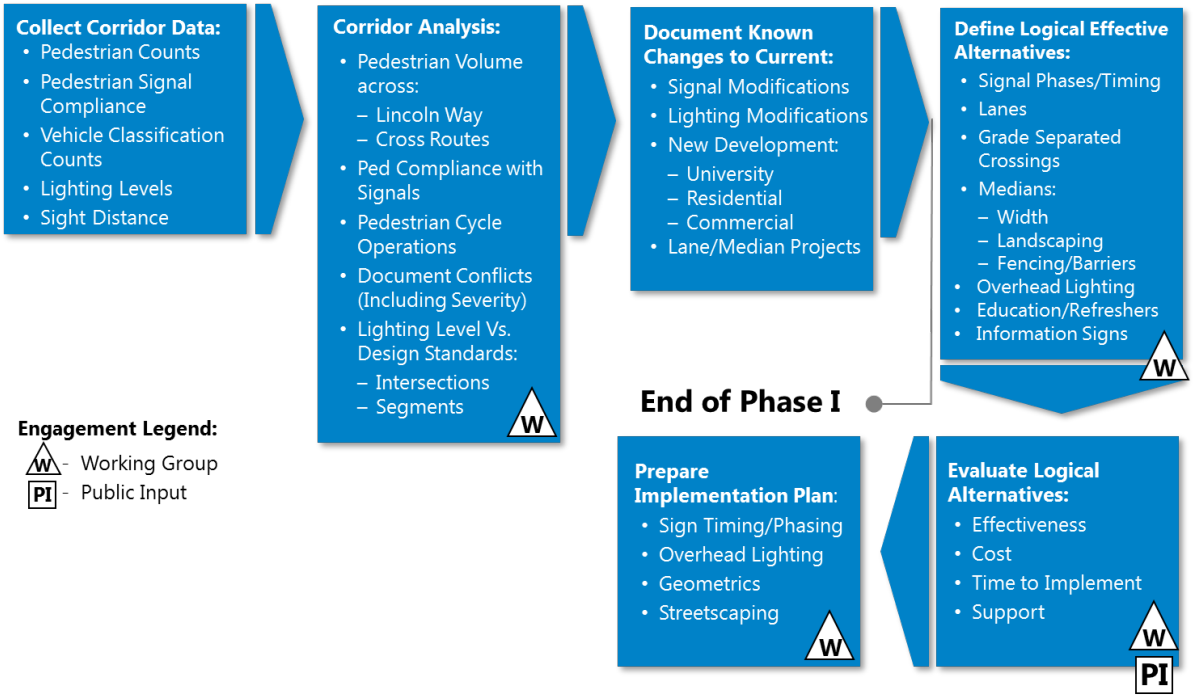
The work plan for the Lincoln Way Multimodal Crossing Data Collection and Analysis was organized into two phases:

- Phase 1: Data Collection and Analysis of Existing Conditions. The focus of this phase was collecting traffic, pedestrian, and bicycle activity data, as well as corridor geometrics and overhead lighting information for the entire corridor. The activity and physical conditions information was collected and evaluated to be able to provide input to answering the question of – Are there issues/concerns/deficiencies in the corridor that warrant further analysis, including assessing physical and/or operations changes?
- Phase 2: Analysis of Alternatives. In the case where operational or physical conditions in the Lincoln Way corridor are defined through Phase 1, the work plan was developed to include a more detailed analysis of alternatives that would

actively address the observed issues/concerns/deficiencies. This phase would include outreach to the community.

The flow of the work plan for the corridor analysis is highlighted in Figure 2.

Figure 2. Lincoln Way Corridor Study Process



The initial phase of the study also included conducting and evaluating the results of a two question survey distributed through university and Ames news outlets, including the Iowa State Daily and the Ames Tribune.

A corridor study Working Group was organized and met twice in Phase 1 of the study. The focus of each meeting is listed below:

- Meeting 1: Overview of the study purpose, discussion of initial data observations in the corridor, and gathering input on personal perceptions of travel conditions in the corridor.
- Meeting 2: Developing a goals of the perceived role and desired conditions in the corridor, continuation of the review and discussion of observed conditions in the corridor.

The remainder of the document is organized to provide summaries of the information gathered and methods employed in assessing the information and generating the findings of the existing conditions. Information presented includes:

- Community Survey Questions and Results.
- Pedestrian Crossing Data Collection and Assessment.
- Bicycle Data Collection and Review.
- Traffic Data and Operations.
- Safety Analysis – Crashes and Sight Distance Assessment
- Overhead Lighting Levels and Review
- Corridor Conditions – Goals and Objectives

Community Survey – Questions and Results

To gain input from drivers, pedestrians, bicyclists traveling in the Lincoln Way corridor and people that have the opportunity to observe the corridor from businesses and residences along the corridor, a two-question survey was conducted in the spring of 2016. The survey, conducted from March 29, 2016 through May 9, 2016 included two open-ended questions:

1. What are issues/concerns that you have traveling across or along the Lincoln Way corridor?
2. What would you suggest to resolve the issue/concerns you have?
3. The survey was distributed throughout the university and Ames through press releases in the Iowa State Daily and in the Ames Tribune and through email contact lists maintained by the university and the Ames Public Relations Officer.

Over the approximately five weeks the survey was open to the public, 295 responses were received, with most people providing more than one response to each of the questions. As the survey allowed people to craft their unique responses, consultant staff reviewed each comment and through an iterative process developed issue/concern categories and potential action categories and grouped responses into each.

Table 2 highlights the categories developed through reviewing the responses and summarizes the numbers received in each group throughout the survey period. Key takeaways from the survey responses are:

Issues/Concerns	Suggested Actions
Pedestrians not following lights – By far this is the predominant issue noted	Provide a walkway over Lincoln Way – Represents the most noted response
Do not feel safe (general comment)	Ticket jaywalkers/Enforce pedestrian and traffic rules
Inattentive drivers and/or pedestrians	Improve crosswalk visibility
High traffic volume	Provide a walkway under Lincoln Way
No bicycle facilities	Provide mid-block barriers

Table 2. Summary of Responses to Issue/Concerns and Ideas for Improvement Survey

	Responses							
Question	Peds Not Following Light	Long traffic Lights/ Delay	Low Overhead Lighting Level	Inattentive Drivers	Does Not Feel Safe	Vehicle Speeds are Too High	Other	
No. 1 – Issues/Concerns	152	27	11	53	57	30	110	

		Responses							
Question	Walkway Over/ Under Lincoln Way	Improve Crosswalk Visibility	Enforce Traffic Rules (Pedestrians)	Provide Midblock Barriers	Provide Faster Response after Press Ped Button	Education Programs on Rules	Lower Speed on Lincoln Way	Other	
No. 2 – Actions to Improve	131	38	52	27	17	25	22	115	

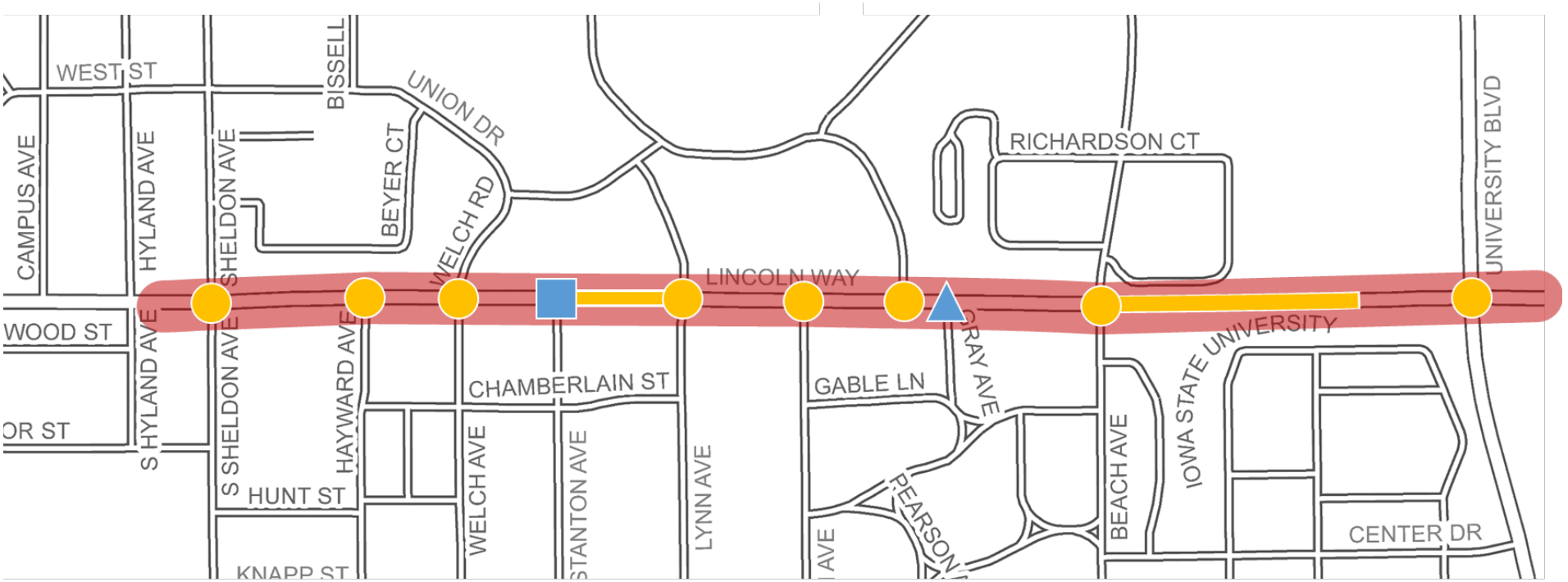
Pedestrian and Bicycle Activity and Compliance

Establishing a defensible purpose and need for action in the corridor requires reliable information about recurring activity and the physical conditions at locations where drives, bicyclists, and pedestrians interact. For the Lincoln Way corridor, the initial concern is the potential for conflicts between vehicles and pedestrians and vehicles and bicyclists crossing Lincoln Way in the north-south direction and crossing streets intersecting Lincoln Way. The purpose of this chapter is to document:

- Pedestrian activity and compliance with walk indicators crossing Lincoln Way and intersecting street with marked pedestrian crossings.
- Bicycle traffic traveling along and across Lincoln Way and the level of compliance with traffic control devices.

Information about each of these modes was collected using video cameras placed at intersections and along key segments of the corridor the week of March 9, 2016. Locations along the corridor are displayed in Figure 3. At each signalized crossing 24 hours of data was collected and the following pedestrian activity information was extracted from the collected video:

- Number of people approaching each crossing location while the walk indicator for the Lincoln Way or cross route crossing they intended to use was WALK.
- Number of people approaching a crossing on the DON'T WALK signal.
- A breakout of the people approaching on the Don't Walk into the following categories describing whether they pressed the activation button and followed the Walk indicator light:
    - Pressed the activation button and waited for the Walk signal.
    - Pressed the activation button, crossed after traffic cleared, but before the Walk signal appeared.
    - Pressed the activation button, and proceeded to cross as there was not traffic.
    - Did not press the activation button, but waited for Walk indicator light.
    - Did not press the activation button, and crossed after traffic cleared.
    - Did not press the activation button and proceeded to cross as there was not traffic.



Legend

- Data Collection Intersection
- Data Collection Segment
- No Data Collected – Not Marked Crosswalk
- No Data Collection – Construction Impacts
- Study Limits

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Video Data Collection Locations

Figure 2

Lincoln Way Multimodal Crossing Data Collection and Analysis

Bicycle traveler information was also extracted from the video files including:

- Total bicyclist counts by intersection and approach summarized by 15-minute period.
- Split of bicyclist counts by whether they used to cross walk or the vehicle lane to cross either Lincoln Way or the cross street.
- Percentage of bicyclists using the street that followed the traffic rules such as stopping on the red for through movements and/or left turns. Bicyclists using the crosswalk were included in the pedestrian data.

Pedestrian Counts

Figure 4 displays the hourly pedestrian counts for the collection period at each intersection in the study area with a crosswalk. Not included in the data are the intersections of Stanton Avenue and Gray Avenue. Gray Avenue was not included in the data collection efforts due to Buchannan Hall II construction impacts affecting access. Stanton Avenue data was collected and will be address in a separate memo. Count data in the chart represents the total volume by intersection for all approaches and crossing directions. The following are drawn from reviewing the information:

- Of the intersections in the Lincoln Way study area, Lynn Avenue/Morrill Road serves the highest pedestrian activity across each hour of the day. Lynn Avenue/Morrill Road provides a continuous corridor between the higher density residential areas south of Lincoln Way and the highest educational activity area of Central Campus north of Lincoln Way.
- An interesting finding of the data is the competition between Welch Avenue and Ash Avenue for the second highest pedestrian crossing volume intersections. While the two north-south streets provide access to different parts of the university to the north and Campustown and residential areas to the south of Lincoln Way, hourly crossing volumes reflect very similar patterns.
- Hourly activity at the core intersections of Ash Avenue, Welch Avenue, and Lynn Avenue reflect similar patterns over the course of the day. Both Ash Avenue and Lynn Avenue see their peak in the 12 PM hour. While the Welch Avenue intersection does not see the same noon hour peak, the similar peaks in the 11 AM and 1 PM hours likely reflects a similar purpose for pedestrian travel.
- The remainder of intersections in the study area experience significantly lower levels of pedestrian crossing activity.

Figure 5 displays pedestrian counts by intersection and approach for the peak pedestrian hour and the peak vehicle hour. Including the peak vehicle hour will become important as compliance with crossing rules is included in the review.

Figure 4. Hourly Pedestrian Counts for Crosswalk Intersections

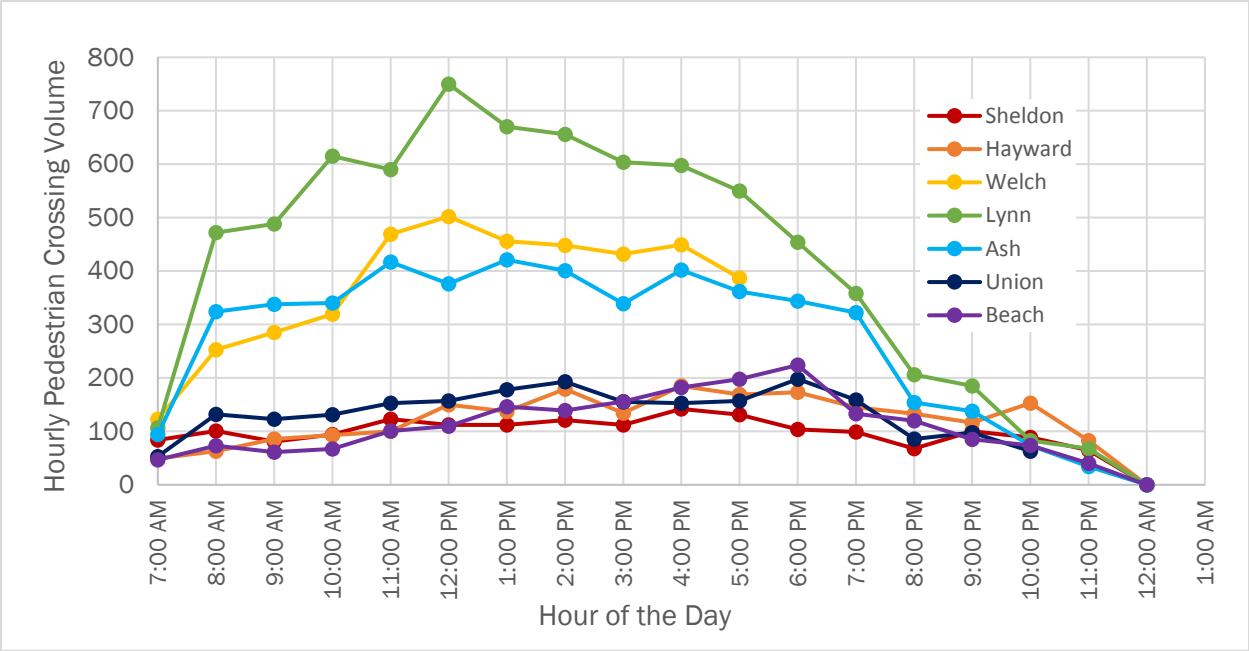
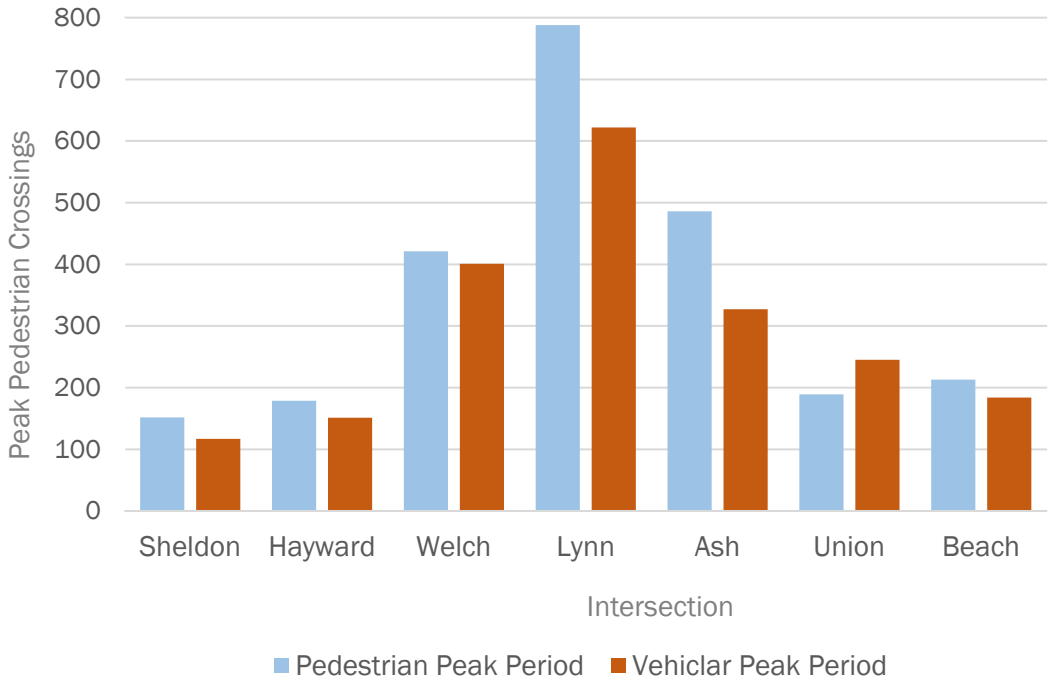


Figure 5. Pedestrian Crossing Volume – Pedestrian Peak Hour and Vehicle Peak Hour



Pedestrian Compliance Data

Evaluation of the current conditions in the corridor includes looking at both vehicle/driver behavior and pedestrian behavior at points where the two interact, as these are the locations for conflicts. Relative to pedestrian behavior a key behavior to evaluate is whether people are complying with Walk and Don't Walk indicators as they cross Lincoln Way and/or streets that intersect with Lincoln Way. For each intersection, video data was reviewed and pedestrian activity was cataloged into groups that reflected complying with and not complying with pedestrian indicator lights.

Defining Compliance with Crossing Rules

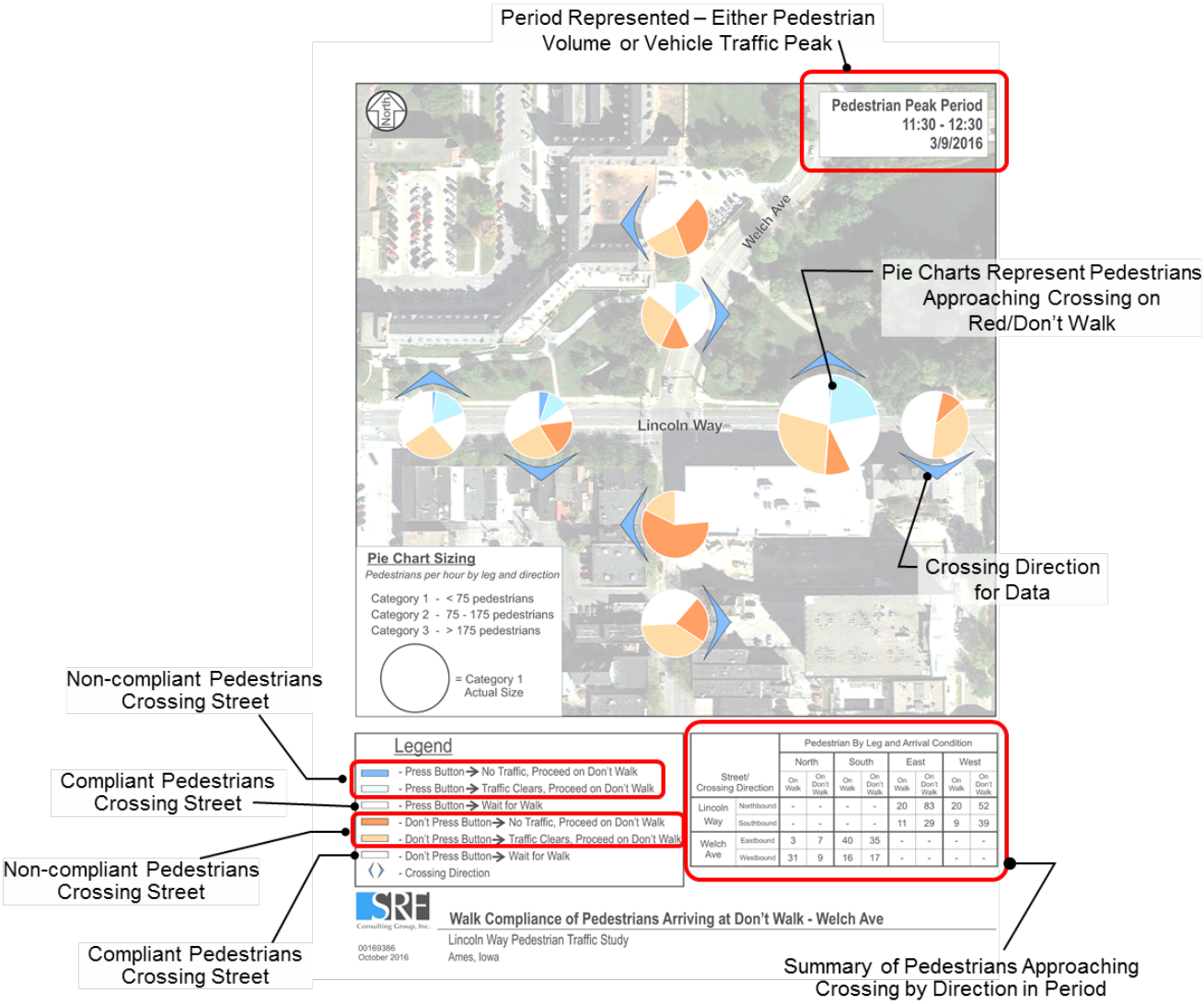
Table 3 describes behaviors considered to represent compliance and non-compliance with pedestrian signals for people that approach the intersection on the red and intend to cross the street.

Table 3. Compliance and Non-Compliance Behavior

Pedestrian Actions Reflecting Compliance	Pedestrian Actions Reflecting Non-Compliance
Arrive at Crossing on Walk and Proceed	Arrive at Crossing on Don't Walk, Press Activator Button, Wait for Traffic to Clear and Cross
Arrive at Crossing on Don't Walk (flashing or steady), Press Activator Button and Wait for Walk	Arrive at Crossing on Don't Walk, Press Activator Button and Cross if No Traffic
	Arrive at Crossing, Wait for Traffic to Clear and Cross
	Arrive at Crossing, Cross if No Traffic

For each crosswalk location, pedestrian crossing activity was recorded for each of the compliance and non-compliance conditions listed above. Information was prepared for both the pedestrian volume peak and the vehicle hour peak. The peaks for each mode were not the same hour. The purpose of gathering information for each of the hours and comparing the results is to identify whether pedestrian behavior relative to complying with traffic control indicators was different based on the level of traffic encountered during the crossing. Figure 6 displays a key of the information presented for each intersection for both the vehicle and pedestrian peaks. A figure consistent with the key has been prepared for each signalized intersection for both the peak pedestrian hour and the peak traffic hour for the intersection. Data included in the figure is information on compliance and non-compliance with pedestrian indicator lights at each signalized intersection between Sheldon Avenue and Beach Avenue along Lincoln Way.

Figure 6. Pedestrian Compliance Figure Key



Pedestrian Behavior by Intersection and Movement

A behavioral hypothesis evaluated in the study is vehicle traffic volume in the Lincoln Way corridor influences pedestrian behavior relative to complying with Walk indicator lights. The hypothesis states, when vehicle traffic is lighter on Lincoln Way, pedestrians arriving on the Don't Walk will tend to proceed against the indicator light more often than in heavier vehicle periods. Thus, data regarding pedestrian behavior was collected for the peak vehicle period and an off-peak vehicle period. The off-peak was defined as a period where vehicle counts were less than 75 percent of the peak hour. To reduce the periods of analysis, the off-peak vehicle period selected for each intersection also reflected the pedestrian peak (at no intersection was the pedestrian peak the same period as the vehicle peak).

Figures 7 through 13 display pedestrian activity for each crosswalk marked intersection by direction for the pedestrian peak hour at the intersection. Each of the pie charts highlight each of the conditions described in Table 2 above as being compliant or non-compliant with traffic rules associated with street crossings.

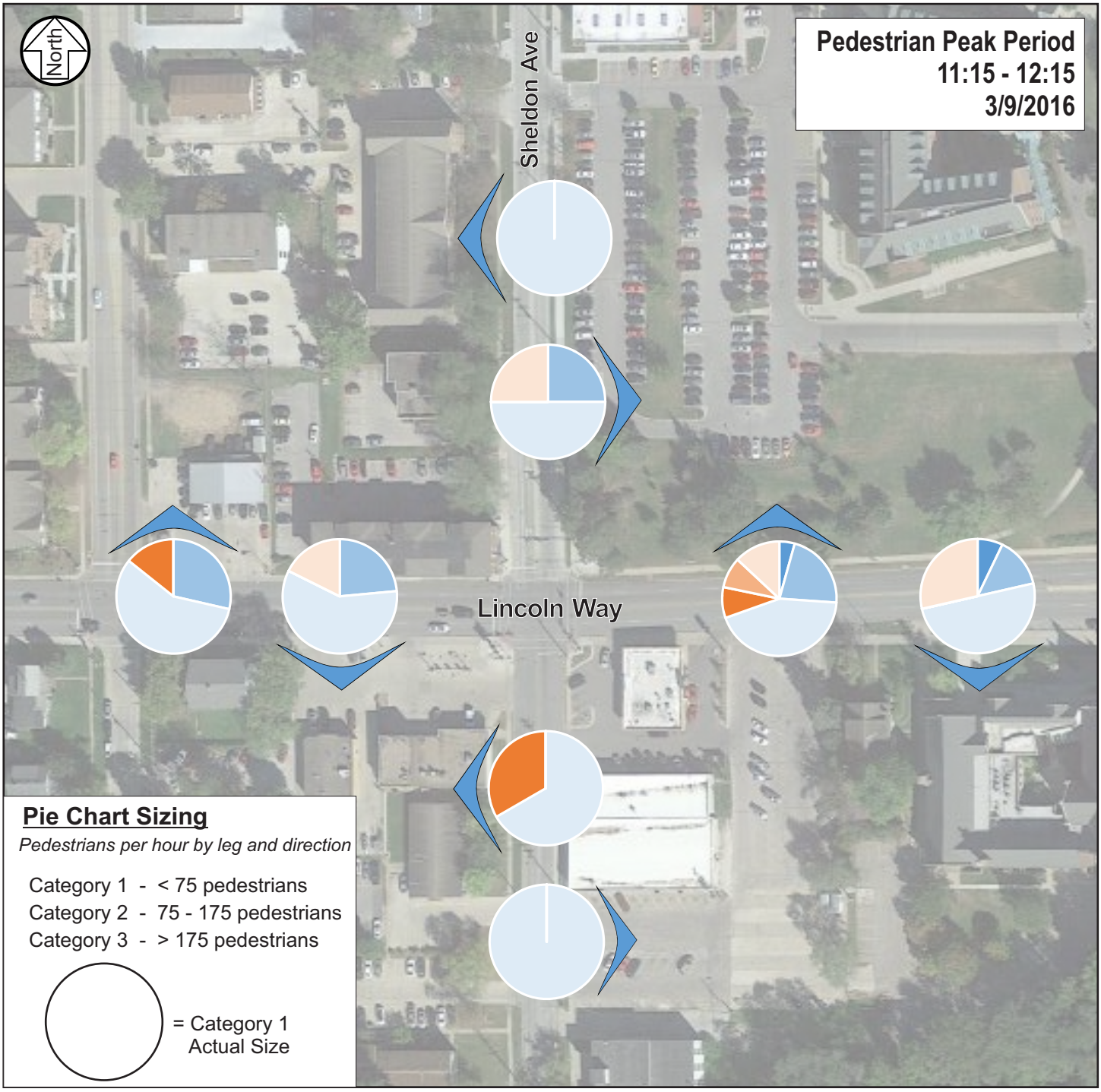
Figures 14 through 20 display crossing behavior for pedestrians arriving on the Don't Walk/red light for each signalized intersection in the study area for the **vehicle peak hour**. By comparing the actions of pedestrians in this hour relative to the pedestrian peak hour, which reflects an off-peak vehicle hour, the potential impacts of more continuous traffic on Lincoln Way can be isolated.

Figure 21 and Figure 22 display the summed pedestrian crossing data for all of the corridor Lincoln Way and cross streets for the peak pedestrian and peak vehicle hours, respectively.

Below are the general findings of the accumulated crossing information:

- Listed below are the compliance percentage of persons/pedestrians arriving on the Don't Walk/red phase for the direction of their desired crossing:
- Lincoln Way – Pedestrian peak hour – 35 percent; Vehicle peak hour 46 percent.
- Cross Streets intersecting Lincoln Way – Pedestrian peak hour 22 percent; Vehicle peak hour – 68 percent. Compliance includes the following actions:
  - Press the walk activation button and wait for the Walk indicator to appear.
  - Do not press the walk activation button and wait for the Walk indicator to appear.

  All other combinations of actions are categorized as non-compliant with traffic rules.
- Overall through the corridor, a greater percentage of pedestrians crossing Lincoln Way or one of the cross routes complied with Walk indicator in the vehicle peak relative to the off-peak (or pedestrian peak). Thus, traffic conditions on Lincoln Way influenced behavior.
- For Lincoln Way crossings, less than 1/3 of the pedestrians arriving on the red pressed the Walk activation button before crossing Lincoln Way. For cross streets, which are primarily two lane streets, the percentage pressing the Walk activation button was less than 25 percent.
- Compliance with Walk indicators on Lincoln Way crossings were less than 50 percent throughout the corridor. For the highest pedestrian volume north-south crossing intersections of Welch Avenue, Lynn Avenue and Ash Avenue, the compliance percentage is in the 60 percent range. The highest volume intersection, Ash Avenue, compliance with Walk indicators was less than 20 percent in both the pedestrian and vehicle peaks.



Legend

- Press Button → No Traffic, Proceed on Don't Walk
- Press Button → Traffic Clears, Proceed on Don't Walk
- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	19	25	7	7
	Southbound	-	-	-	-	6	14	7	17
Sheldon Ave	Eastbound	5	4	19	1	-	-	-	-
	Westbound	11	1	6	3	-	-	-	-

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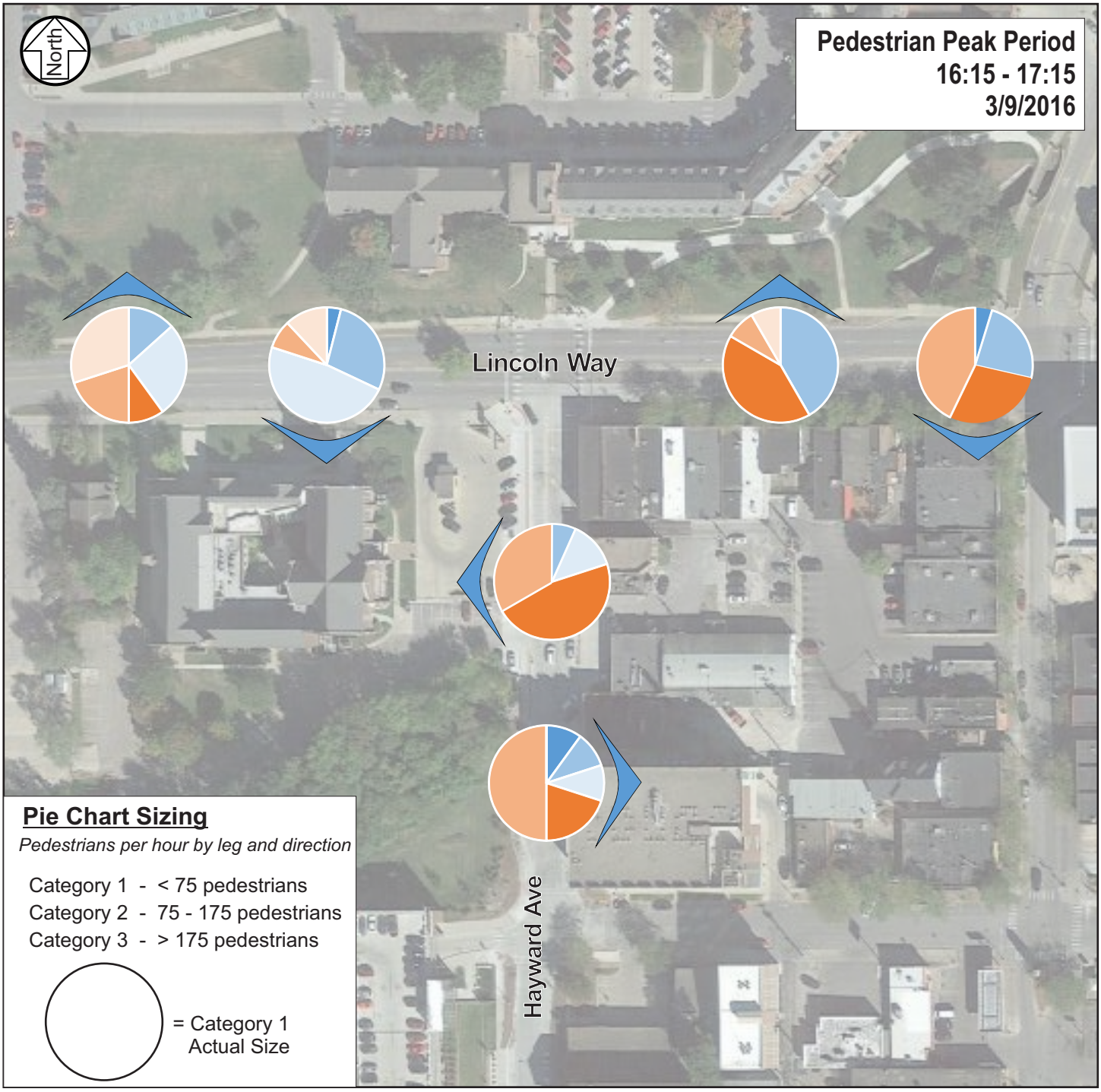
00169386
November 2016

Walk Compliance of Pedestrians Arriving at Don't Walk - Sheldon Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 7



Legend

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- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	9	31	2	12
	Southbound	-	-	-	-	11	26	8	21
Hayward Ave	Eastbound	-	-	14	10	-	-	-	-
	Westbound	-	-	20	15	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Hayward Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 8

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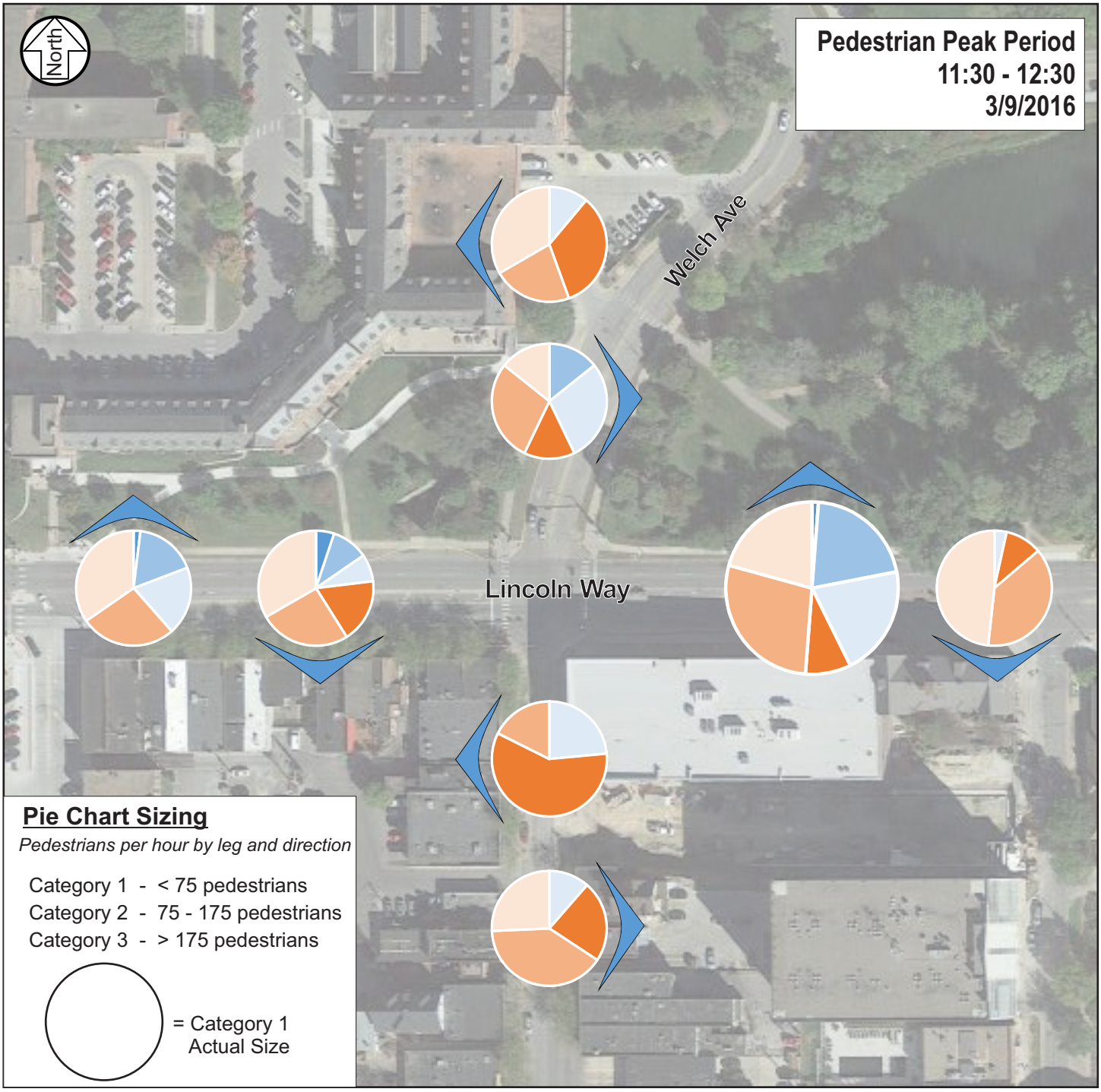
November 2016



Legend

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- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	20	83	20	52
	Southbound	-	-	-	-	11	29	9	39
Welch Ave	Eastbound	3	7	40	35	-	-	-	-
	Westbound	31	9	16	17	-	-	-	-

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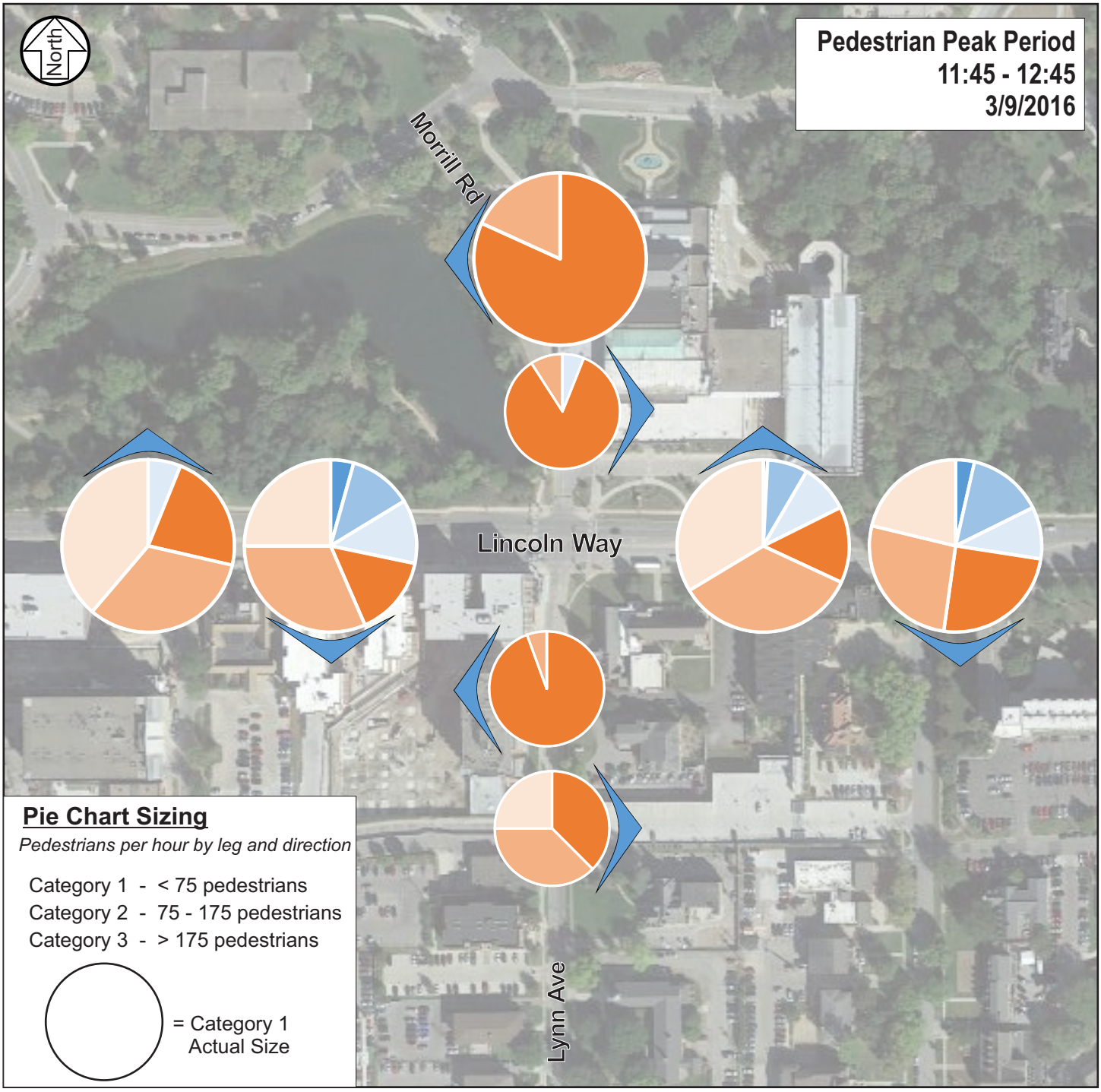
Walk Compliance of Pedestrians Arriving at Don't Walk - Welch Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 9

00169386
October 2016



Legend

- Press Button → No Traffic, Proceed on Don't Walk
- Press Button → Traffic Clears, Proceed on Don't Walk
- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	39	120	50	51
	Southbound	-	-	-	-	61	113	32	92
Lynn Ave (Morrill Rd)	Eastbound	20	33	55	8	-	-	-	-
	Westbound	68	11	10	18	-	-	-	-

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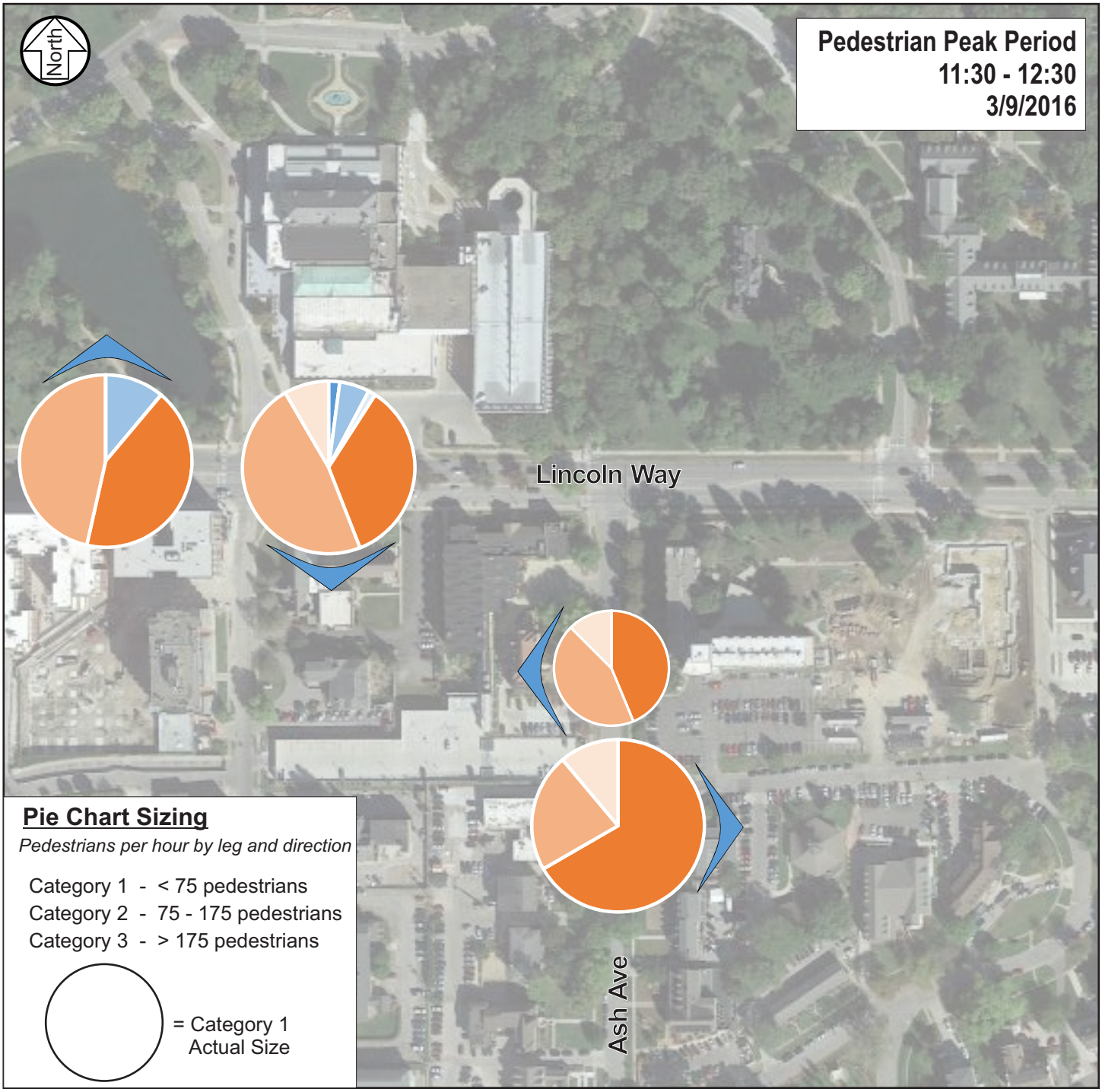
November 2016

Walk Compliance of Pedestrians Arriving at Don't Walk - Lynn Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 10



Legend

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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	-	-	42	99
	Southbound	-	-	-	-	-	-	46	143
Ash Ave	Eastbound	-	-	47	27	-	-	-	-
	Westbound	-	-	66	16	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Ash Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 11

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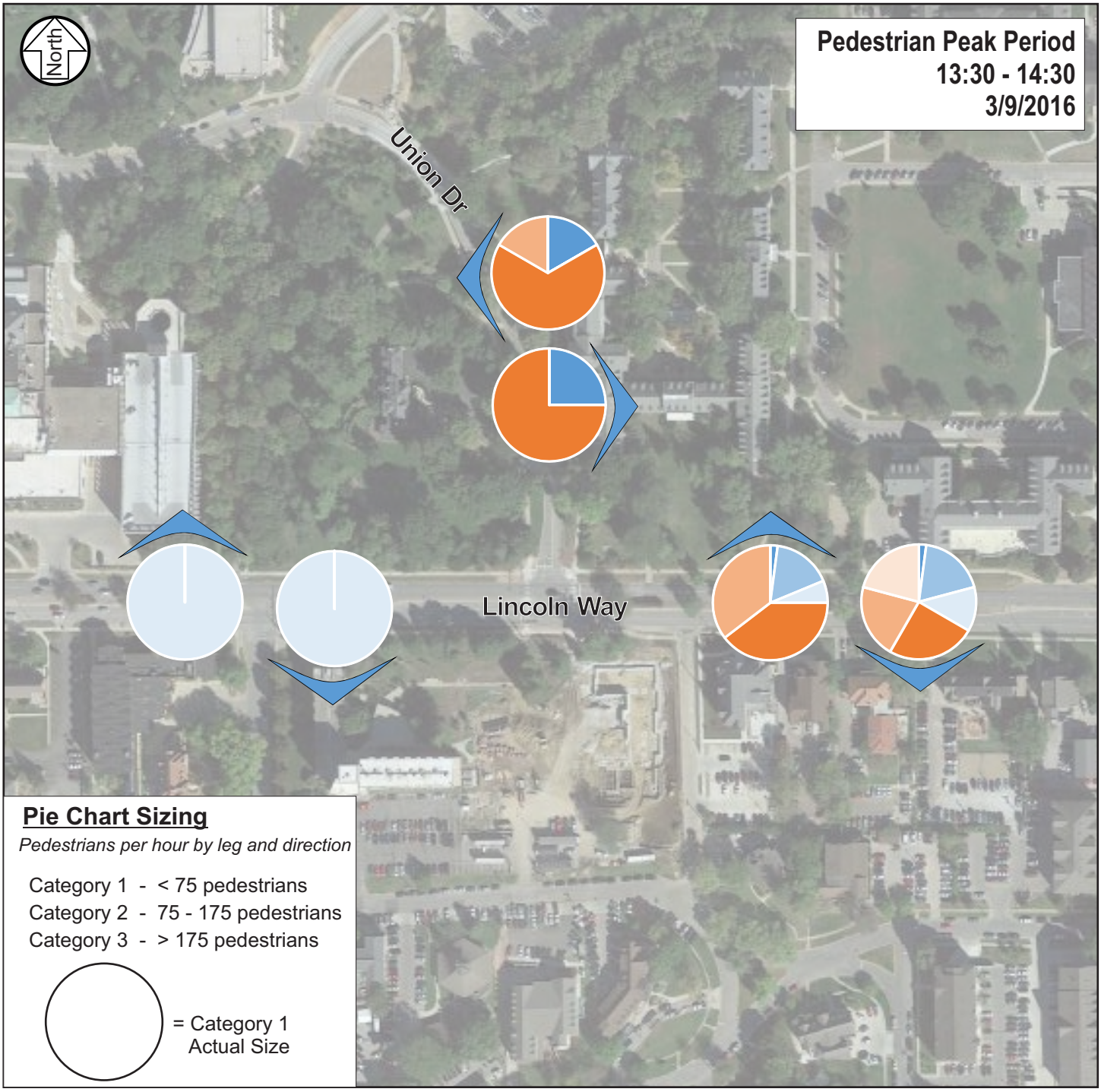
November 2016



Legend

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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	16	49	0	1
	Southbound	-	-	-	-	18	48	0	1
Union Dr	Eastbound	-	-	22	8	-	-	-	-
	Westbound	-	-	20	6	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Union Dr

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 12

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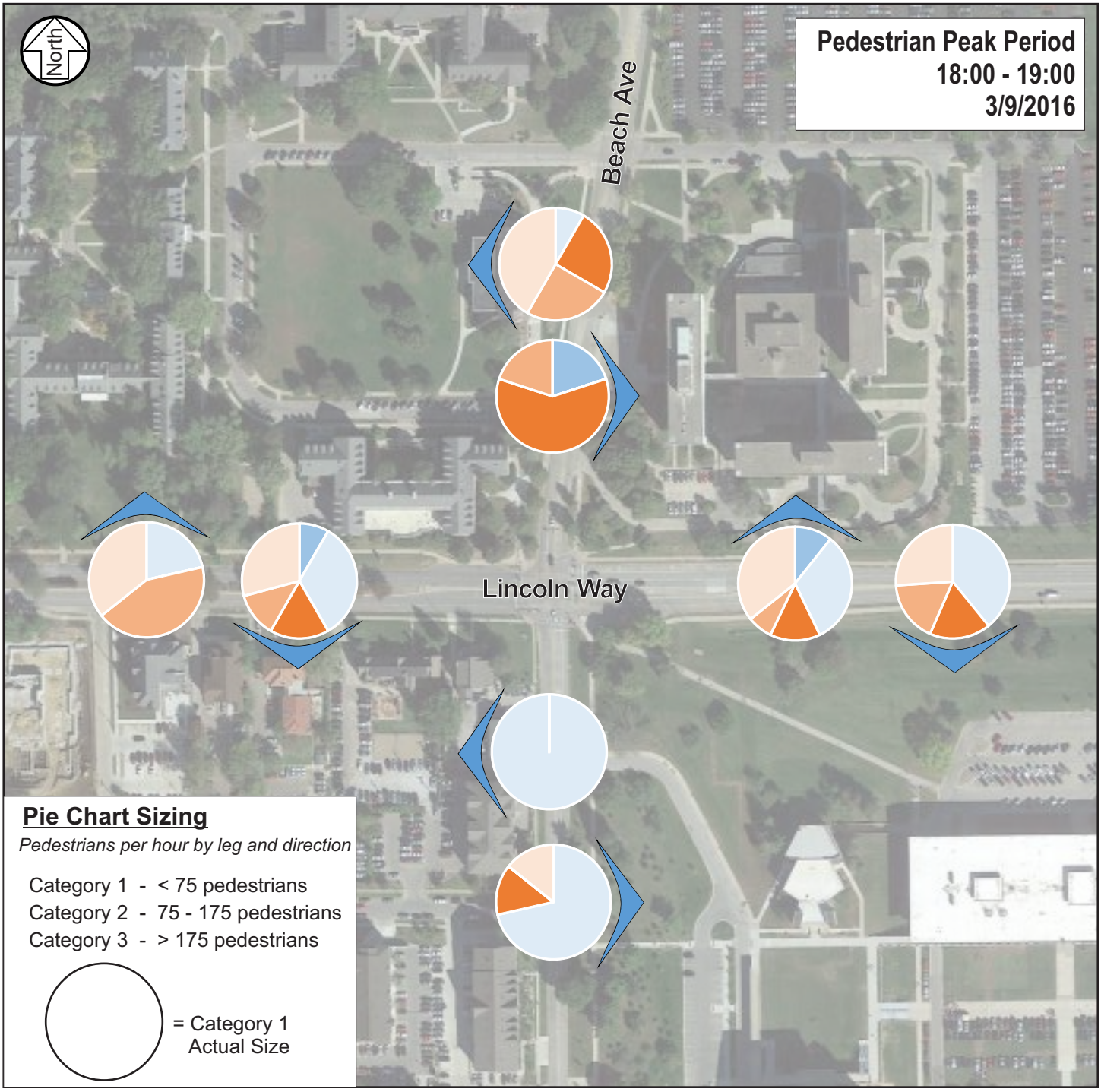
November 2016



Legend

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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	10	28	19	14
	Southbound	-	-	-	-	3	23	6	24
Beach Ave	Eastbound	21	5	17	7	-	-	-	-
	Westbound	16	12	7	1	-	-	-	-

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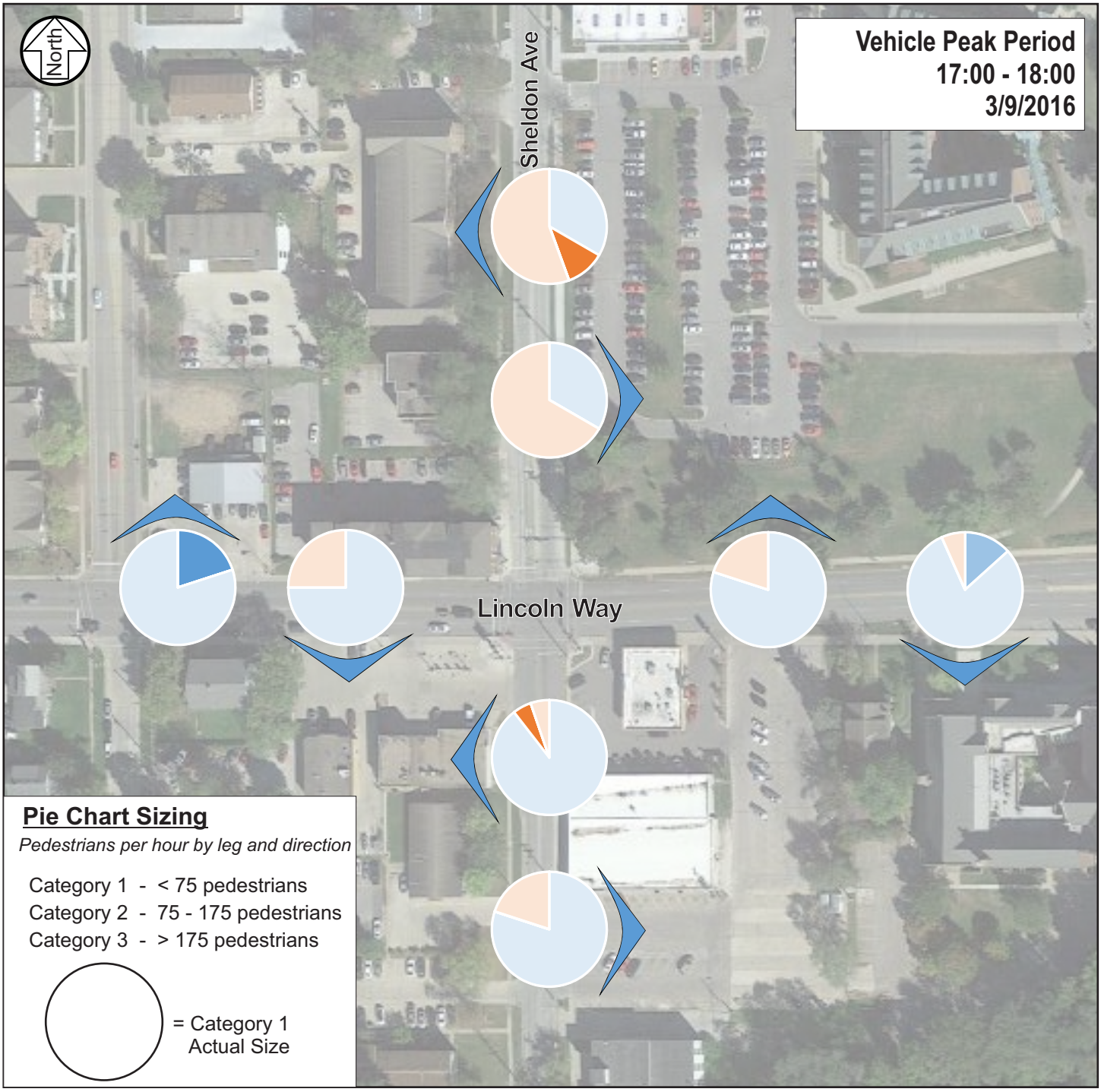
Walk Compliance of Pedestrians Arriving at Don't Walk - Beach Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 13



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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	7	5	16	5
	Southbound	-	-	-	-	4	16	9	4
Sheldon Ave	Eastbound	7	3	3	5	-	-	-	-
	Westbound	9	10	5	19	-	-	-	-

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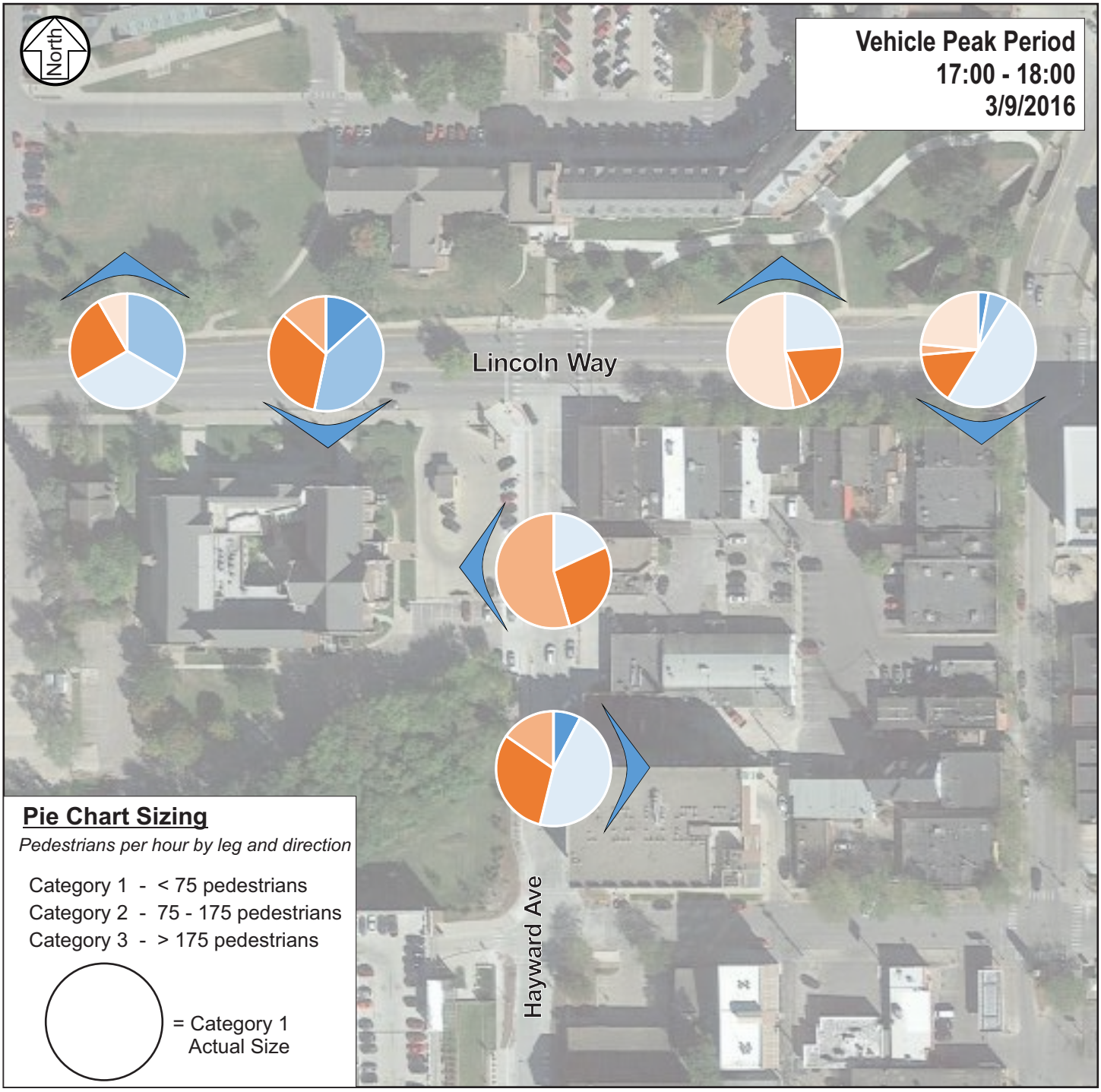
Walk Compliance of Pedestrians Arriving at Don't Walk - Sheldon Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 14



Legend

- Press Button → No Traffic, Proceed on Don't Walk
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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	10	21	3	12
	Southbound	-	-	-	-	8	34	6	15
Hayward Ave	Eastbound	-	-	14	13	-	-	-	-
	Westbound	-	-	21	11	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Hayward Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

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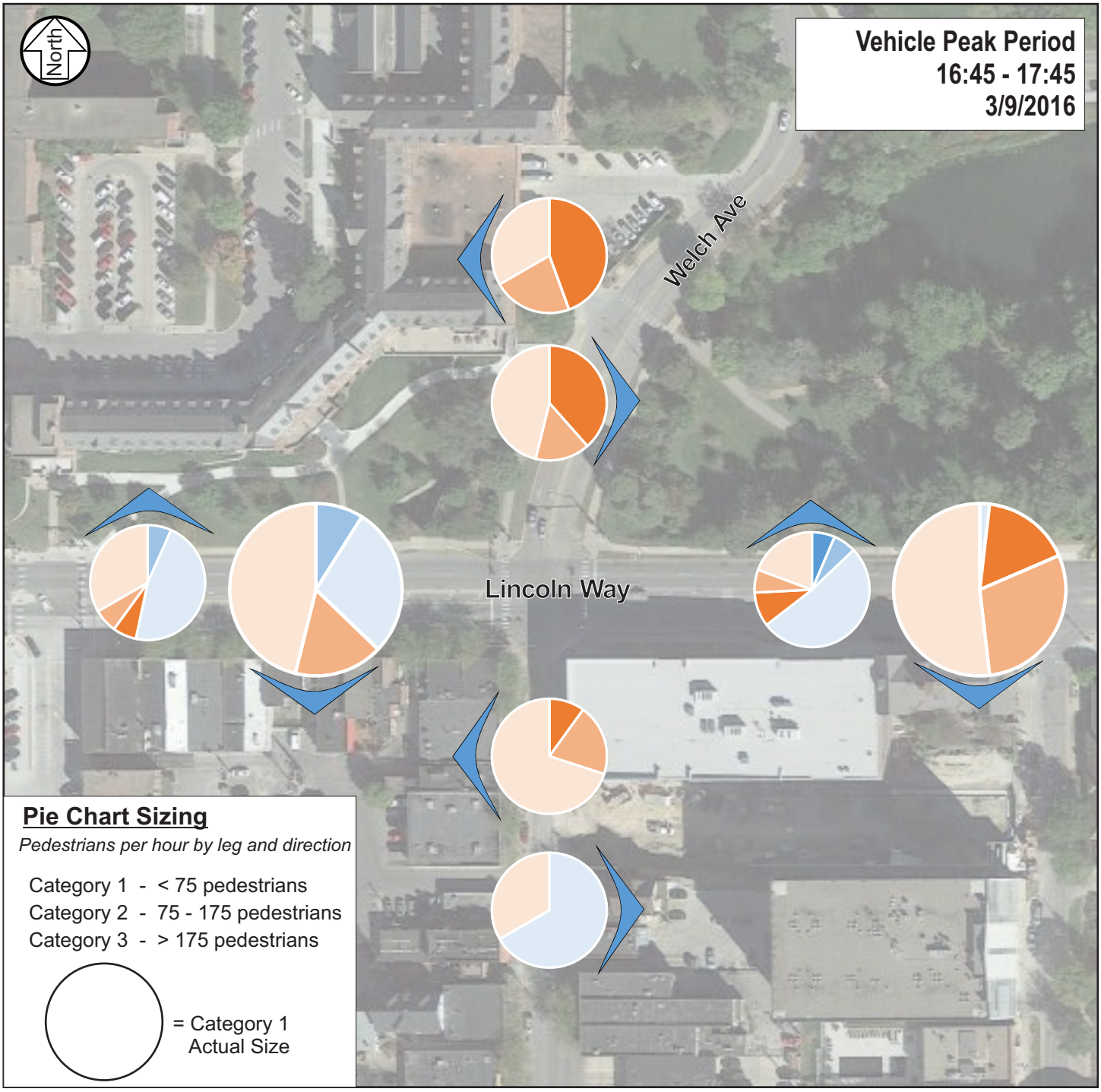
November 2016

Figure 15



Legend

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- Press Button → Traffic Clears, Proceed on Don't Walk
- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	9	31	9	30
	Southbound	-	-	-	-	27	54	33	80
Welch Ave	Eastbound	28	13	10	9	-	-	-	-
	Westbound	32	9	31	10	-	-	-	-

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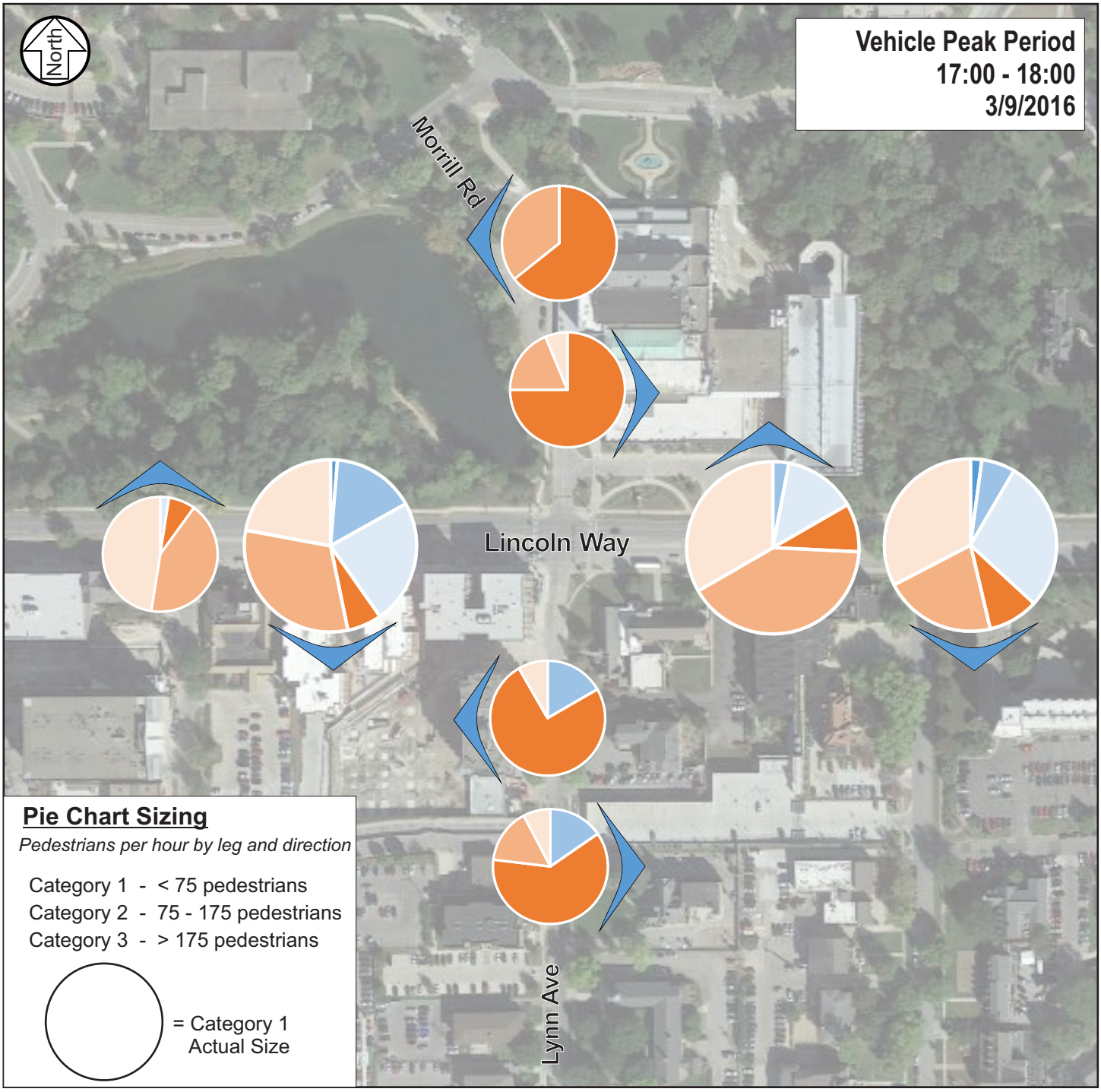
Walk Compliance of Pedestrians Arriving at Don't Walk - Welch Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

00169386
November 2016

Figure 16



Legend

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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	20	66	14	40
	Southbound	-	-	-	-	49	95	22	77
Lynn Ave (Morrill Rd)	Eastbound	20	16	38	13	-	-	-	-
	Westbound	44	14	12	12	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Lynn Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

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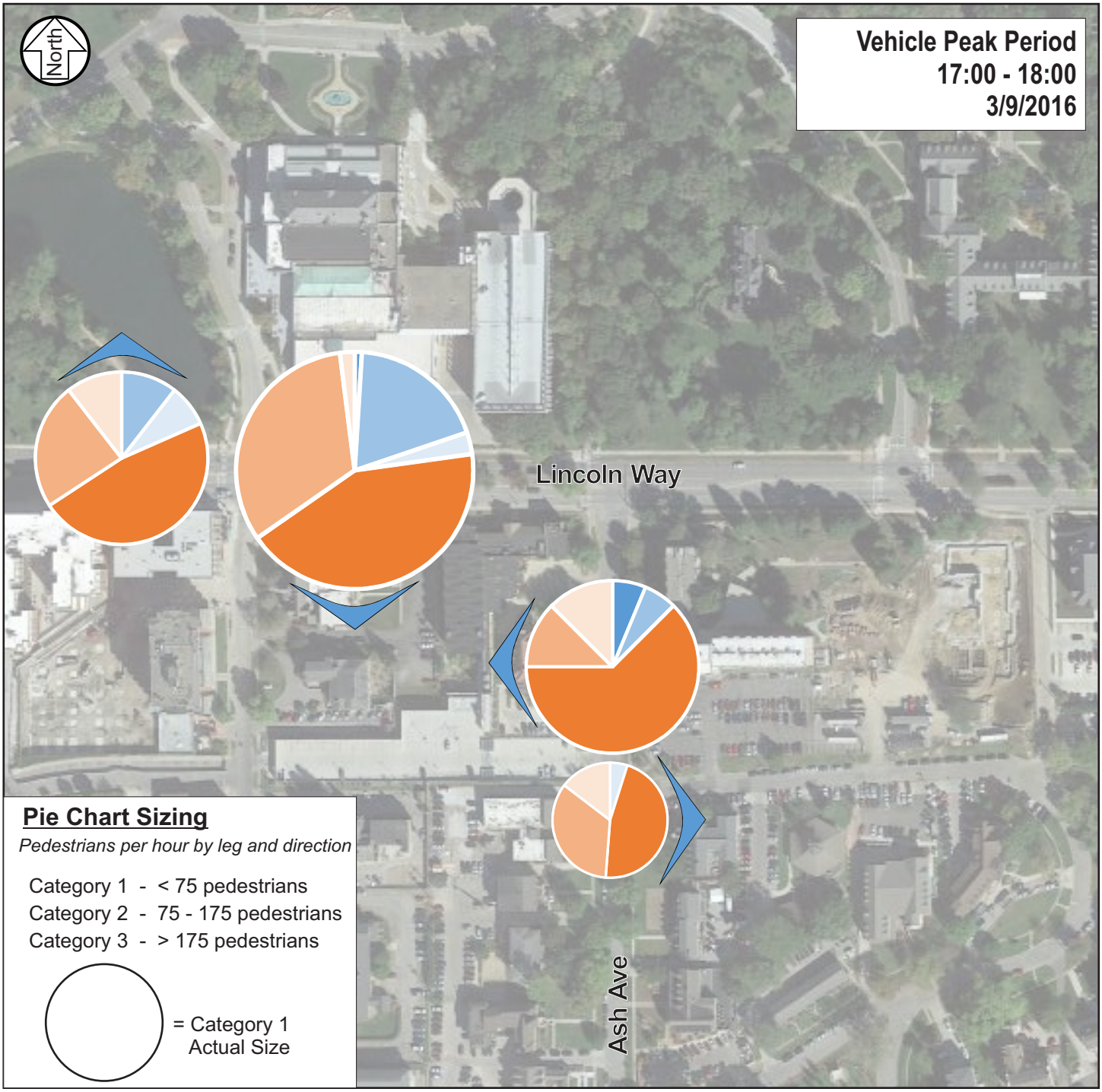
November 2016

Figure 17



Legend

- Press Button → No Traffic, Proceed on Don't Walk
- Press Button → Traffic Clears, Proceed on Don't Walk
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- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	-	-	42	38
	Southbound	-	-	-	-	-	-	46	102
Ash Ave	Eastbound	-	-	4	41	-	-	-	-
	Westbound	-	-	32	16	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Ash Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

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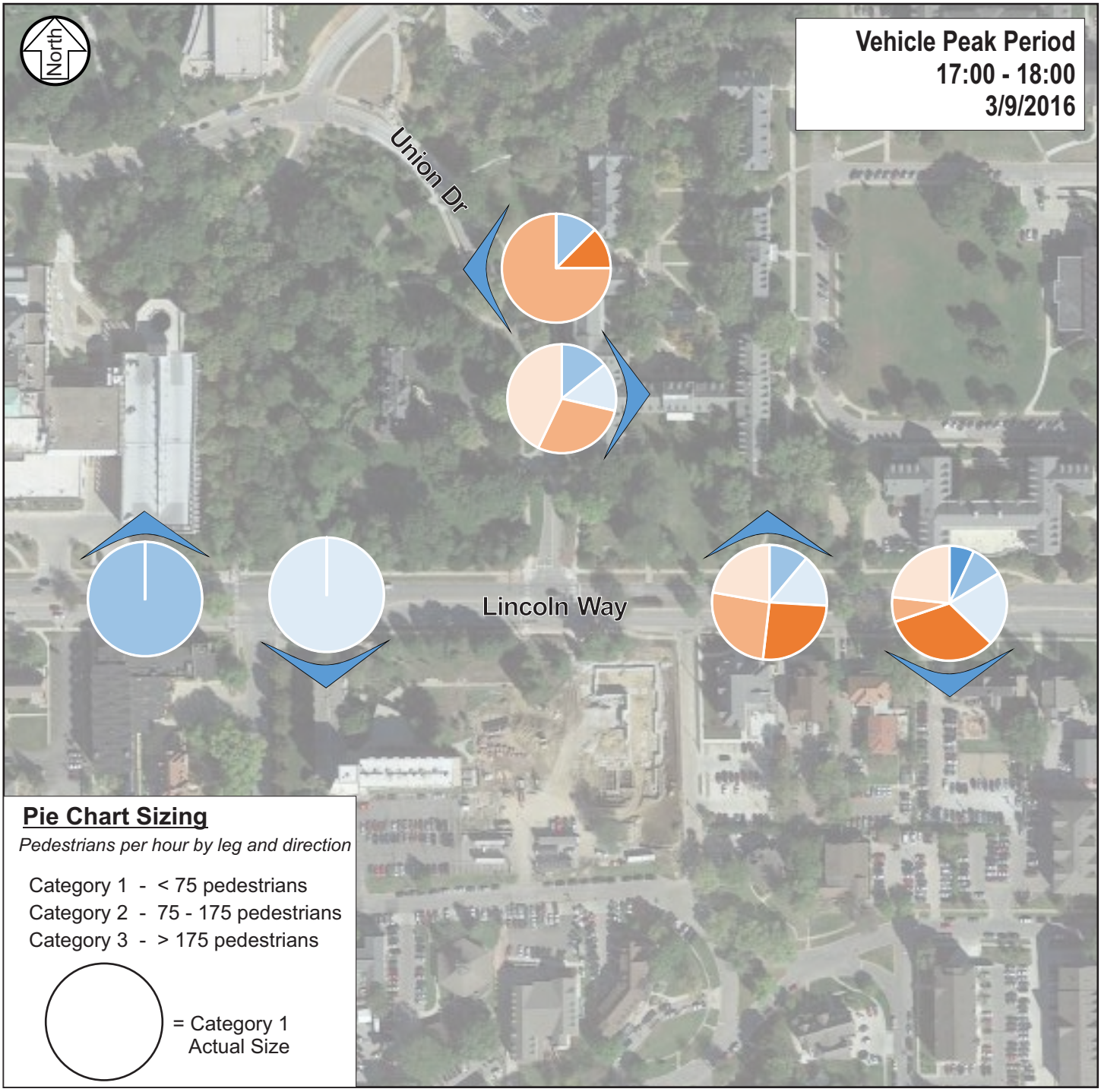
November 2016

Figure18



Legend

- Press Button → No Traffic, Proceed on Don't Walk
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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	15	27	1	1
	Southbound	-	-	-	-	19	43	2	2
Union Dr	Eastbound	-	-	30	7	-	-	-	-
	Westbound	-	-	9	8	-	-	-	-

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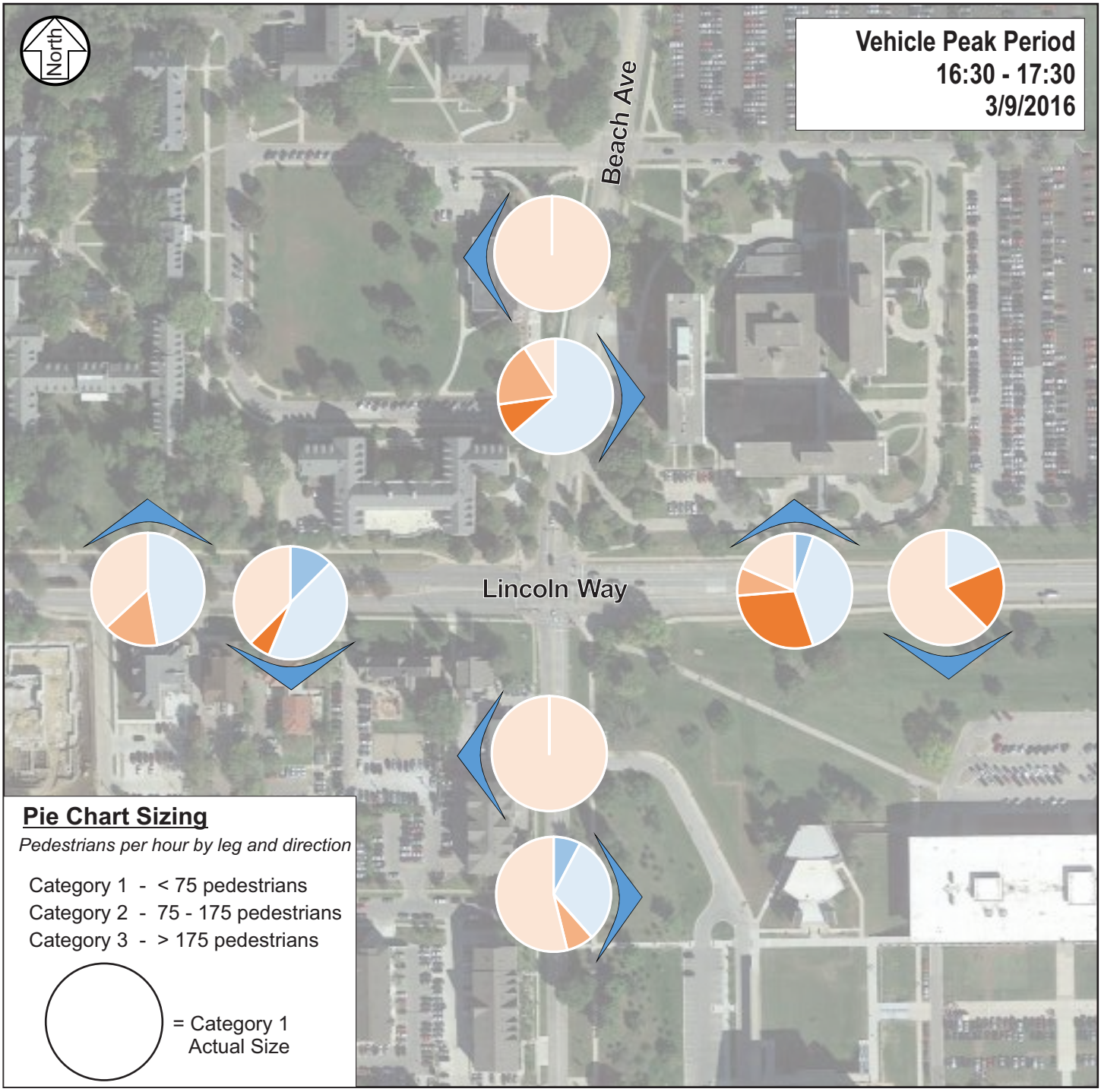
Walk Compliance of Pedestrians Arriving at Don't Walk - Union Dr

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

Figure 19



Legend

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- Press Button → Wait for Walk
- Don't Press Button → No Traffic, Proceed on Don't Walk
- Don't Press Button → Traffic Clears, Proceed on Don't Walk
- Don't Press Button → Wait for Walk
- Crossing Direction

Street/ Crossing Direction		Pedestrian By Leg and Arrival Condition							
		North		South		East		West	
		On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk	On Walk	On Don't Walk
Lincoln Way	Northbound	-	-	-	-	7	38	16	19
	Southbound	-	-	-	-	16	16	5	16
Beach Ave	Eastbound	12	11	18	13	-	-	-	-
	Westbound	10	3	13	2	-	-	-	-

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Walk Compliance of Pedestrians Arriving at Don't Walk - Beach Ave

Lincoln Way Pedestrian Traffic Study
Ames, Iowa

00169386
November 2016

Figure 20

Figure 21. Corridor-wide Pedestrian Crossing Compliance – Pedestrian Volume Peak

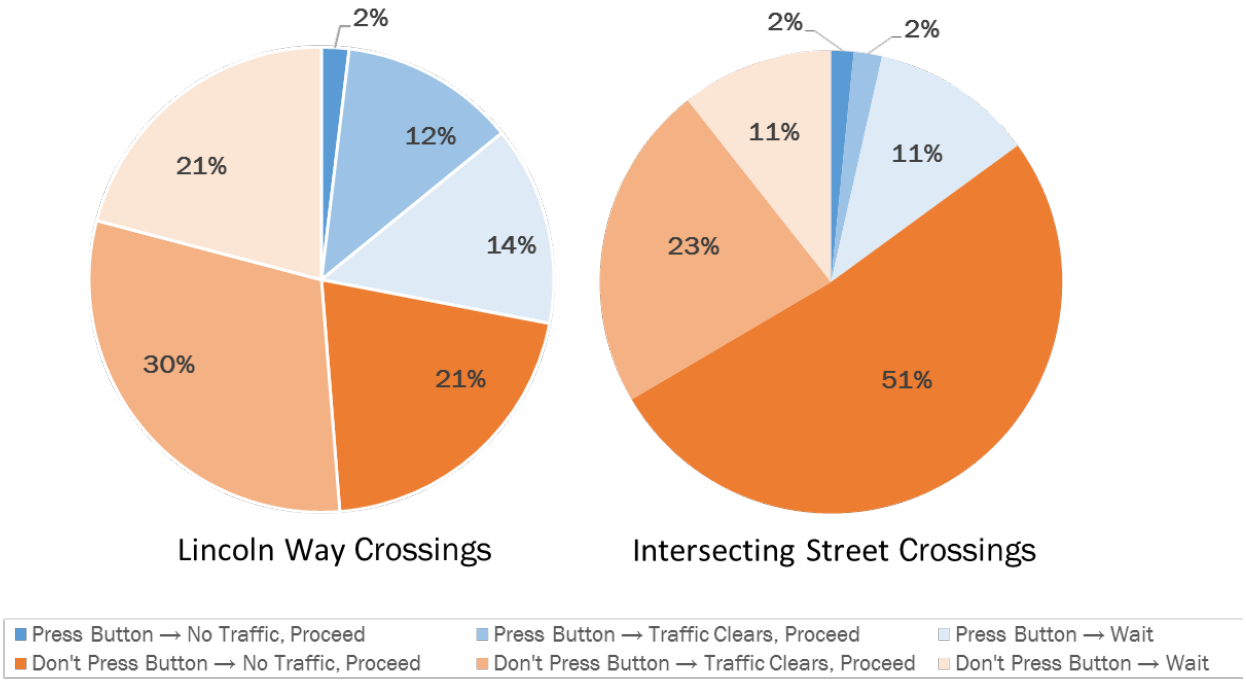
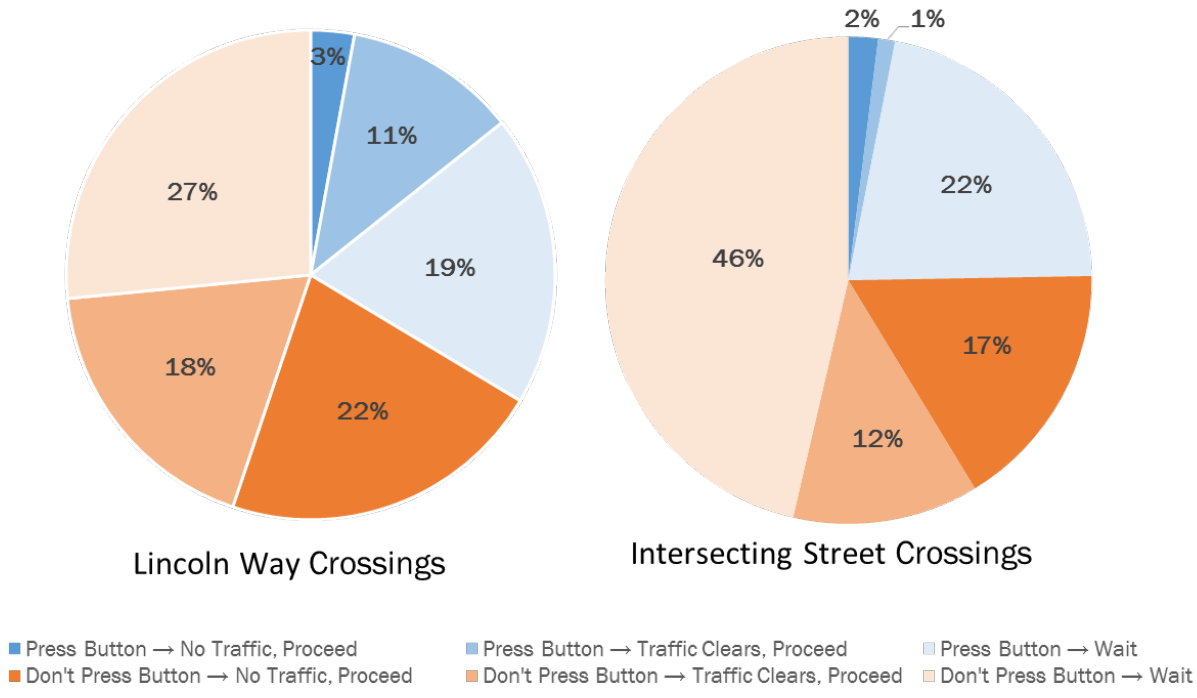
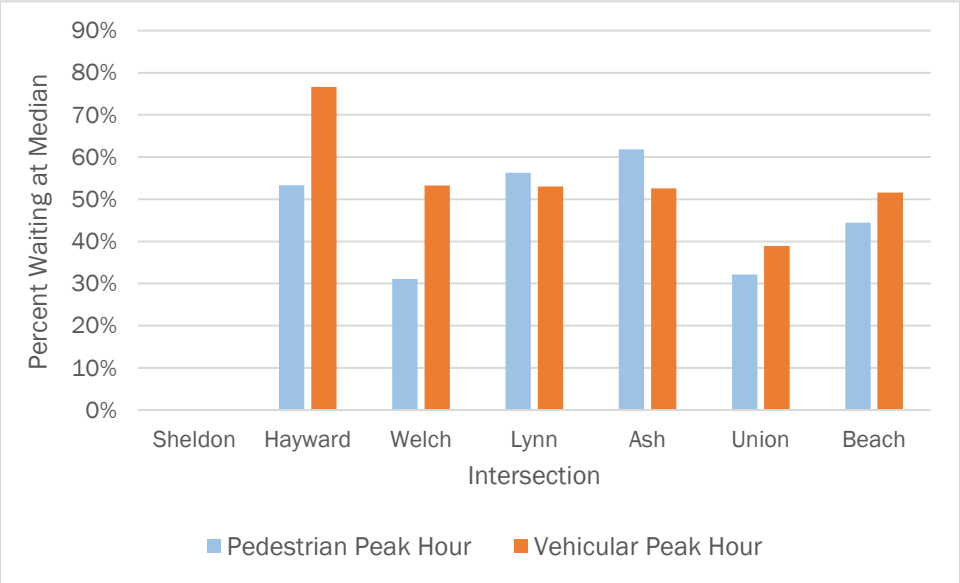


Figure 22. Corridor-wide Pedestrian Crossing Compliance – Vehicle Volume Peak



- Sheldon Avenue data reflected the highest percentage of pedestrians pressing the Walk activation button (>75 percent), however, approximately 1/3 of the people pressing the activation button cross against the light.
- Traffic volume (peak relative to off-peak) on Lincoln Way did not substantially influence whether people pressed the pedestrian activation button, however, there was a marginal impact on the cross routes.
- Compliance with the Walk indicator lights was greater for crosswalks where there was not a raised median island for "refuge". There is no median island at Sheldon Avenue and at the west approach to Welch Avenue (the median island stops before the cross walk). During the peak vehicle hour, compliance with the Walk indicator at these locations is substantially higher than intersections with a median island. Greater compliance with the Walk indicator at the west approach to Welch Avenue does not extend to the vehicle off-peak period, nor is there a substantially different percentage of people pressing the Walk activation button at Welch Avenue.
- On average, of the pedestrians that start crossing Lincoln Way on the Don't Walk indicator (no matter whether they pressed the pedestrian activator light or not, make the entire crossing without stopping at the median until they can find a gap in traffic. Thus, at times, there may be five or more people waiting on the relatively narrow median island waiting for a gap in vehicle traffic. Sheldon Avenue does not have a raised median island and no pedestrians wait in the street for a gap. The results of reviewing the percent of pedestrians waiting on the island are displayed in Figure 23.

Figure 23. Percent Pedestrians Waiting at Median (Crossing on Don't Walk)



Bicycle Counts and Behavior

Data collection efforts completed in March 2016 included bicycle counts at each intersection on both Lincoln Way and the intersecting cross street. Table 2 documents hourly bicycle counts at each intersection for both the vehicle peak hour and the pedestrian peak hour. At each intersection bicycle counts were parsed into two categories:

- On-street: Those bicyclists traveling through the intersection in the travel lane.
- Crosswalk: Bicyclists entering the street from the sidewalk and using the crosswalk area to traverse either Lincoln Way or one of the intersecting cross routes.

Of primary interest in evaluating the bicycle user data is the level of compliance with traffic rules as there is not enough bike traffic to influence traffic operations at any of the intersections. Highlighted in Table 4 is the breakout of bicyclists traveling through an intersection and complying with traffic rules (i.e. stop on the red) and those that do not comply. From the information in the table, it can be concluded a majority of bicyclists travel along and across Lincoln Way comply with traffic rules.

Table 4. Bicycle County and Traffic Rules Compliance – Peak Pedestrian and Vehicle Hours

	North Approach			East Approach			South Approach			West Approach		
Intersection	Total	Compliant	Percent Compliant	Total	Compliant	Percent Compliant	Total	Compliant	Percent Compliant	Total	Compliant	Percent Compliant
Sheldon	5	3	60%	7	7	100%	9	9	100%	5	3	60%
Hayward				4	4	100%	5	4	80%	1	0	0%
Welch	12	12	100%	5	5	100%	9	8	89%	4	4	100%
Lynn/Morrill	6	6	100%	1	1	100%	5	5	100%	4	3	75%
Ash				0	0	NA	6	5	83%	9	5	56%
Union	4	4	100%	3	2	67%				2	1	50%
Beach	5	4	80%	10	9	90%	10	10	100%	1	0	0%

Intersection	Total	Compliant	Percent Compliant	Total	Compliant	Percent Compliant	Total	Compliant	Percent Compliant	Total	Compliant	Percent Compliant
Sheldon	0	0	NA	7	7	100%	4	4	100%	5	3	60%
Hayward				4	4	100%	5	4	80%	1	0	0%
Welch	1	1	100%	5	5	100%	6	5	83%	4	4	100%
Lynn/Morrill	1	1	100%	1	1	100%	5	5	100%	4	3	75%
Ash				0	0	NA	6	5	83%	9	5	56%
Union	4	4	100%	3	2	67%				2	1	50%
Beach	5	4	80%	10	9	90%	8	8	100%	1	0	0%

Traffic Data and Hourly Intersection Operations

This chapter documents the traffic data collection, existing traffic operations, crash history, and sight distance at the intersections along Lincoln Way through Iowa State from Sheldon Avenue to Beach Avenue.

- Lincoln Way/Sheldon Avenue
- Lincoln Way/Hayward Avenue
- Lincoln Way/Welch Avenue
- Lincoln Way/Lynn Avenue
- Lincoln Way/Ash Avenue
- Lincoln Way/Union Drive
- Lincoln Way/Beach Avenue.

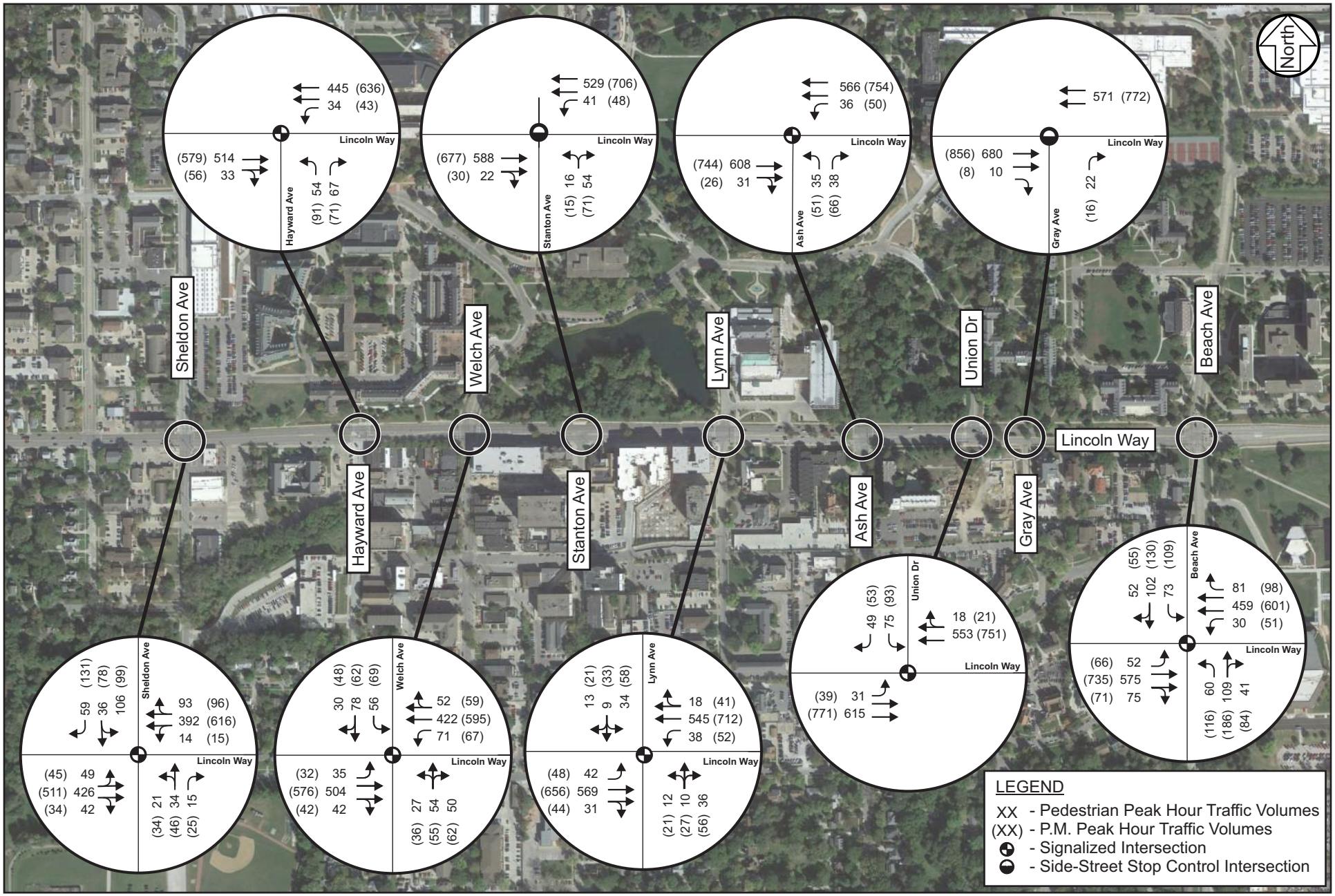
The City of Ames provided additional turning movement counts that were collected on November 10, 2015 at the Lincoln Way/Stanton Avenue intersection. Turning movement counts were not provided for the Lincoln Way/Gray Avenue intersection; engineering judgement was used to develop counts at this intersection based on the land uses adjacent to Gray Avenue. Existing traffic volumes, intersection geometry, and traffic controls at the study intersections are shown in Figure 24.

Existing Traffic Operations

A traffic operations analysis was conducted to determine how traffic operates at the study intersections under existing conditions. Synchro/SimTraffic was used to perform the operations analysis. Intersection operations analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are ranked from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 5. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. Overall, intersections with LOS A through LOS D are considered acceptable since the intersection is operating under capacity.

Table 5. Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50



Existing Intersection Traffic/Lane Geometrics

Lincoln Way Multimodal Crossing Data Collection and Analysis

Figure 24

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February 2017

Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service. This considers the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approaches. Since the mainline does not have to stop, a majority of delay is attributed to the minor approaches. It is typical of intersections with higher mainline traffic volumes to experience increased levels of delay (i.e. poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

Quantification of the intersection operations was completed for two periods using existing conditions data:

- The pedestrian peak hour (11:15 a.m. to 12:15 p.m.).
- The peak vehicle traffic hour (4:15 p.m. to 5:15 p.m.).

Table 6 documents the results of the existing operations analysis and all study intersections currently operate at an acceptable LOS B or better during the pedestrian and p.m. peak hours. There may be times during the peak hours when congestion and delay reflect worse conditions, but over the entire hour, all intersections operate at LOS B or better. Detailed results are included in Appendix A.

Table 6. Existing Traffic Operations Results

	Pedestrian Peak (11:15 a.m. - 12:15 p.m.)		Vehicle Peak (4:15 - 5:15 p.m.)	
Intersection	Delay (Sec)	LOS	Delay (Sec)	LOS
Lincoln Way/Sheldon Avenue	13	B	17	B
Lincoln Way/Hayward Avenue	7	A	7	A
Lincoln Way/Welch Road	19	B	16	B
Lincoln Way/Stanton Avenue	2/8	A/A	2/9	A/A
Lincoln Way/Lynn Avenue	9	A	10	B
Lincoln Way/Ash Avenue	10	B	9	A
Lincoln Way/Union Drive	7	A	8	A
Lincoln Way/Gray Avenue	2/8	A/A	3/6	A/A
Lincoln Way/Beach Road	15	B	19	B

Note:

1) Intersection is side-street stop control. The delay/LOS is shown for the intersection followed by the delay/LOS of the worst approach.

A review of the signal timing and coordination indicates that there may be opportunities to improve the operations along the corridor, while also better accommodating pedestrians and reducing their delay.

Corridor Safety Assessment

Introduction

Review of the Lincoln Way corridor relative to metrics associated with associated with characterizing how safe the corridor is for travelers in all modes typically entails:

- Evaluation of five to ten years of crash records to determine whether crashes observed in the corridor occur at a rate and are of a severity that is lower, higher or about average for similar corridors.
- Review of the sight distance for drivers approaching the mainline corridor (Lincoln Way) to identify potential obstructions and/or roadway design conditions limiting driver's view of pedestrians and/or vehicles.
- Review of the sight distance for drivers along Lincoln Way to determine whether there are roadway design conditions or obstructions (such as median trees, median berms, etc.) that block the driver's ability to see pedestrians and/or other vehicles with enough time to react and come to a stop.

Crash Data Evaluation

Crash data for a ten year period from 2007 through 2016 were obtained from Iowa's DOT Saver Program, which is a database containing critical information for every reported crash. The typical crash analysis separates intersections from roadway segments because intersections have many more conflict points, which generally results in more crashes. A 200 foot radius around each intersection was used to define the influence area of the intersection, which is needed in the analysis to prevent double counting crashes. Table 7 provided a summary of the crash data, which is also displayed in Figure 25. Intersection crash reports are provided in Attachment B.

Findings of the consultant's review of the crash data indicate the following:

- There were a total of 459 crashes at the nine study intersections.
- Lincoln Way/Sheldon Avenue and Lincoln Way/Beach Avenue had the most crashes with 88.
- Lincoln Way/Welch Avenue had the second most crashes with 76:
    - Approximately seven percent of these crashes included incapacitating injuries.

Table 7. Crash Data Summary (2007-2016)

Intersection	Fatal	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	PDO[1]	Total Crashes	Crashes Involving Pedestrians	Crash Rate	Critical Crash Rate[2]
Lincoln Way/Sheldon Avenue	0	2	8	19	59	88	5	**1.08**	0.96
Lincoln Way/Hayward Avenue	0	0	2	6	35	43	0	0.62	0.98
Lincoln Way/Welch Avenue	0	5	10	9	52	76	10	0.93	0.96
Lincoln Way/Stanton Avenue	0	1	4	6	42	53	4	**0.73**	0.33
Lincoln Way/Lynn Avenue	0	0	3	6	44	53	1	0.65	0.96
Lincoln Way/Ash Avenue	1	0	2	8	22	33	3	0.41	0.96
Lincoln Way/Union Drive	0	0	0	3	11	14	1	0.17	0.96
Lincoln Way/Gray Avenue	0	1	1	3	6	11	1	0.14	0.32
Lincoln Way/Beach Road	0	2	9	18	59	88	3	0.85	0.93

Notes:

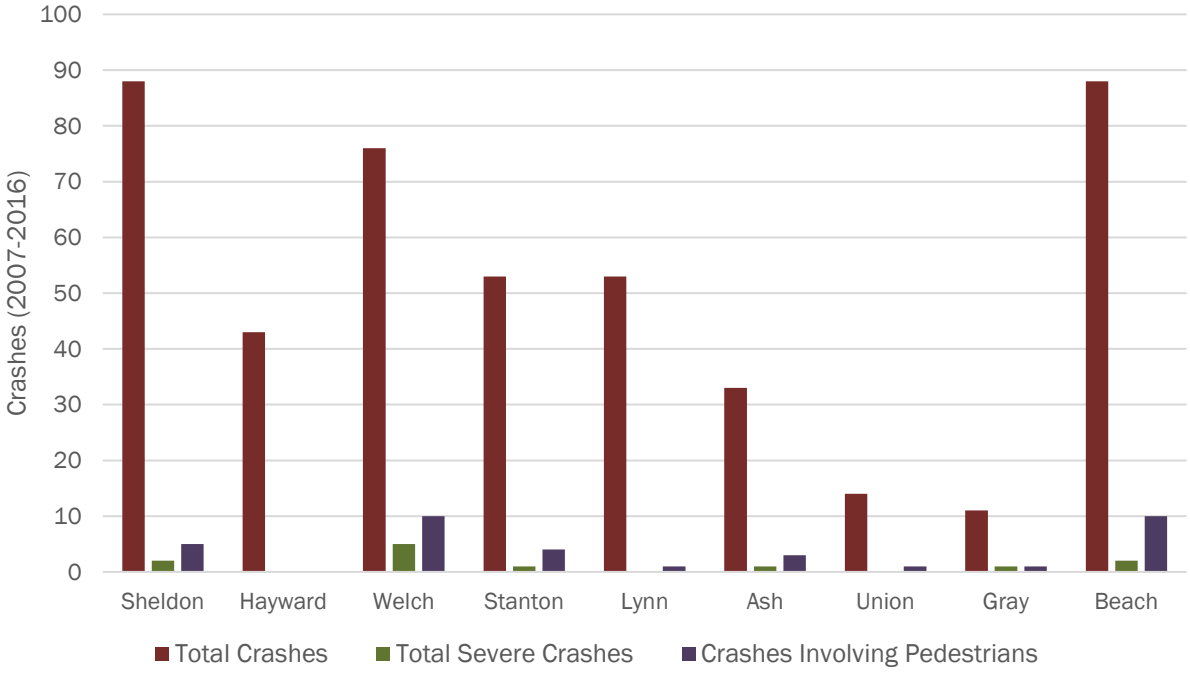
1) Property damage only (PDO)
2) Critical crash rate calculated using expected crash rates from Minnesota Department of Transportation's (MnDOT) 2015 Intersection Green Sheets

- Lincoln Way/Sheldon Avenue and Lincoln Way/Stanton Avenue are above the critical crash rate, indicating that these intersections are experiencing more crashes than expected.
- Lincoln Way/Sheldon Avenue and Lincoln Way/Beach Avenue have experienced more crashes in 2015 and 2016 than previous years. Conditions at these intersections should be monitored over the next year or so and an analysis completed to assess whether there is a shifting trend or whether 2015/16 conditions were an anomaly.
- There was one fatal crash at Lincoln Way/Ash Avenue.
- A total of 39 crashes resulted in non-incapacitating injuries, with 10 occurring at Lincoln Way/Welch Avenue.
- A total of 28 crashes involved pedestrians (approximately six percent of all crashes):

- Ten crashes were at Lincoln Way/Welch Avenue
- Five crashes were at Lincoln Way/Sheldon Avenue

- 50 percent of severe crashes (i.e. fatal and incapacitating injury) involved pedestrians.

Figure 25. Number of Crashed by Severity Category and Location (2007-2016)



Sight Distance Assessment

Sight Distance Triangles

Sight distance triangles were drawn for all study intersections to determine if there are any existing sight distance deficiencies that could potentially lead to safety issues. The following sight triangles were drawn:

- Signalized intersections
  - Left-turn from major approach
  - Right-turn from major approach, unless Right Turn on Red (RTOR) prohibited
  - Right-turn from minor approach, unless Right Turn on Red (RTOR) prohibited
- Side-street stop controlled intersections

- Left-turn from major approach
- Left-turn from minor approach

The left-turn from the major approach applies to both side-street stop controlled and signalized intersections if the movement is permissive. The sight distance triangles for this movement were drawn since there are medians along Lincoln Way with vegetation that could limit sight distance. The sight distance triangles for the left-turn from the minor approach at the signalized intersections were not drawn since a preliminary review of the approaches indicates that there are not any medians that could have vegetation that could potentially reduce sight distance.

The right-turn sight triangle applies to both side-street stop controlled and signalized intersections since vehicles are able to make an unprotected right-turn, unless RTOR is prohibited. For side-street stop controlled intersections, the minor approach is controlled by the left-turns since drivers need adequate sight distance to accept gaps in both directions of travel and cross the near-side direction. However, the right-turn from the minor approach for the Lincoln Way/Gray Avenue intersection was evaluated since this intersection is right-in/right-out only (RIRO).

Based on guidance from the *AASHTO Green Book: A Policy on Geometric Design of Highway and Streets*, the vertex of the sight triangles for turns from a stop (i.e. left/right-turn from the minor approach or right-turn from the major approach at a signalized intersection) were drawn 18 feet from the travel way. This allows 10 feet from the edge of the travel way to the front of the stopped vehicle. This may result in the sight triangle being located in front of the stop bar; this replicates drivers getting closer to the intersection when determining if there is an acceptable gap to make their respective movement.

Based on the sight distance triangles, the following are areas where available sight distance may be less than the design sight distance:

- **Lincoln Way/Hayward Avenue**: The right-turn from the minor approach may have limited sight distance if a vehicle is parallel parked in any of the four eastern parking spaces on Lincoln Way to the west of Hayward Avenue.
- **Lincoln Way/Stanton Avenue**:
  - A tree is located in the median to the east of Stanton Avenue; however, the canopy of the tree is higher than the sight line, so only the tree trunk is in the sight line. This is not deemed to be a concern at this point since this would be similar to a light pole or utility pole in the sight triangle; drivers should be able to see a vehicle around the tree trunk.
  - The left- and right-turns form the minor approach may have limited sight distance if a vehicle is parallel parked in any of the nine eastern parking spaces on Lincoln Way to the west of Stanton Avenue.

- **Lincoln Way/Lynn Avenue:**
    - The right-turn from the eastbound approach may have limited sight distance as a result of the curvature of the southbound approach and the vegetation in the northeast quadrant of the intersection.
    - The right-turn from the northbound approach may have limited sight distance if a vehicle is parallel parked in any of the eight eastern parking spaces on Lincoln Way to the west of Lynn Avenue.

The sight triangles are provided in Appendix B.

Vertical Sight Distance

A cursory review of the vertical profile of Lincoln Way was completed for the entire study corridor. Based on the review, the vertical curve located at the Lincoln Way/Union Drive intersection was identified as possible vertical sight distance issue. Therefore, a more detailed evaluation of the vertical sight distance was completed using roadway surface elevation data extracted from aerial mapping using the *Iowa LiDar Elevation Profiles* tool. The tool incorporates LiDAR data, which allows for estimating grades of the vertical curve. Using the profile derived from the tool data, stopping sight distance for the Lincoln Way vertical curve adjacent to Union Drive is adequate for the operating speed. There is also adequate decision sight distance along Lincoln Way at the location. Furthermore, the eastbound left-turn is protected only and there is no right-turn on red (RTOR) at this intersection. Thus, sight distance along Lincoln Way is adequate for these movements.

The evaluation of the vertical sight distance is provided in Appendix C.

Key Traffic and Safety Analysis Findings

The following summarize the critical findings of the traffic operations and safety assessments of the Lincoln Way corridor and approach cross routes:

- All study intersections are currently operating at LOS B or better during both the pedestrian and p.m. peak hours.
    - There may be times during the peak hours when traffic operations are worse, but over the entire hour, all intersections operate at LOS B or better.
    - A review of the signal operations indicates that there may be the potential to improve operations for both vehicles and pedestrians.
- There were a total of 459 crashes at the nine study intersections from 2007 to 2016
    - One fatal crash occurred at Lincoln Way/Ash Avenue
    - Lincoln Way/Sheldon Avenue and Lincoln Way/Beach Avenue had the most crashes with 88

  - Lincoln Way/Welch Avenue had the second most crashes with 76
  - Lincoln Way/Sheldon Avenue and Lincoln Way/Stanton Avenue are above the critical crash rate, which indicates these intersections are experiencing more crashes than expected.
  - Lincoln Way/Sheldon Avenue and Lincoln Way/Beach Avenue have experienced more crashes in 2015 and 2016 than previous years. There could be a trend of more crashes occurring at these intersections than there previously were.
  - A total of 28 crashes involved pedestrians (~6 percent of all crashes)
    - 50 percent of the severe crashes involved pedestrians

- Intersection sight distance is adequate at all study intersection, except at the following locations:

  - Lincoln Way/Hayward Avenue- Potentially limited sight distance for right-turn from minor approach
  - Lincoln Way/Stanton Avenue
    - Tree trunk located in the median, but drivers should be able to see around the tree trunk and sight lines should not be impacted.
    - Potentially limited sight distance for the left- and right-turns from minor approach
  - Lincoln Way/Lynn Avenue
    - Potentially limited sight distance for the right-turn from the eastbound approach
    - Potentially limited sight distance for the right-turn from the northbound approach

- A cursory review of the vertical profile along Lincoln Way indicates that the profile at the Lincoln Way/Union Drive intersection has the most potential for there to be vertical sight distance issues.

  - A more detailed evaluation of the profile indicates that there is not a sight distance issue; there is adequate stopping sight distance and decision sight distance at this location.

Overhead Lighting Data Collection and Assessment

Inventory of Equipment

Existing overhead lighting levels along Lincoln Way from west of Sheldon Avenue through University Boulevard were collected on the evening of November 20, 2016, utilizing a light meter. Data collection started after sunset and weather conditions for the period reflected a waning gibbous (half) moon and a clear sky.

Measurements were taken underneath each existing street light and midway between adjacent lights, approximately two feet into the street along the outside curb at each location. Additional measurements were taken where obstructions, as in trees or other objects, impacted lighting levels. Figure 26 displays the collection locations.

Additional lighting measurements were collected at each intersection along the stud corridor. For each pedestrian crossing measurements were collected at:

- The estimated step-off the curb location on other side of the cross street.
- Center of the cross street.
- The estimated step-off the curb location on either side of Lincoln Way as well as at the center median.
- Center of the westbound and eastbound travel lanes on Lincoln Way.

For each cross street, lighting levels were collected at three locations, while levels were collected at five locations crossing Lincoln Way.

An inventory of key information about the overhead lighting equipment was also collected, as it plays a role in explaining the results. Throughout the corridor overhead fixtures are high pressure sodium, which over time the city is expecting to replace with LED fixtures. Figure 27 displays the wattage of bulbs in each of the fixtures throughout the corridor. It should be noted that the appropriate wattages deployed along the corridor is determined by a combination spacing between fixtures, fixture height, and type of equipment.

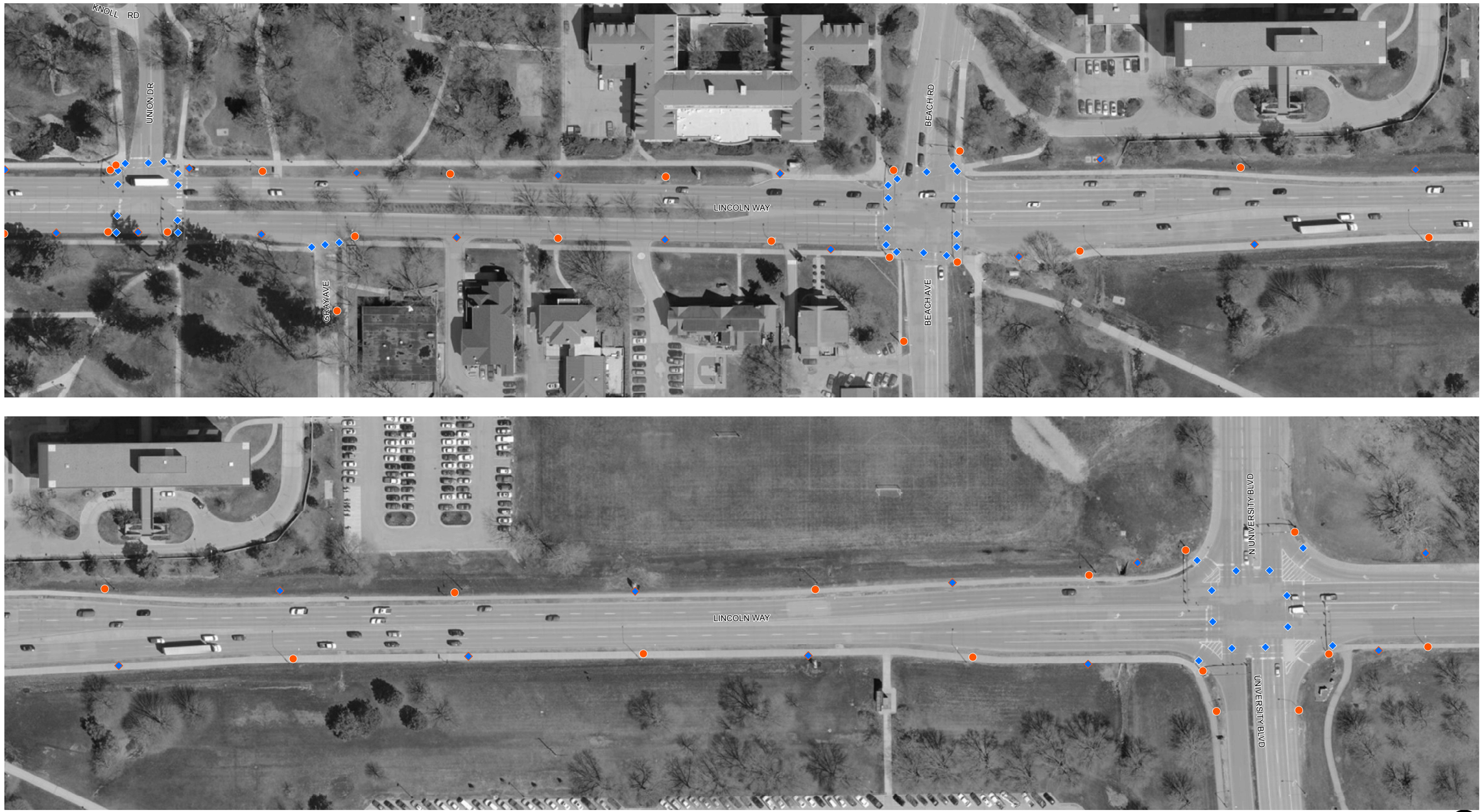
Recorded Lighting Levels

The individual lighting levels recorded throughout the corridor were evaluated by segmenting the corridor by general level of pedestrian and land use activity. The segments are defined below:

- Sheldon Avenue to Hayward: Moderate pedestrian use and lower density commercial and Iowa State University.

Streetlight Coverage - Sheldon to Union Dr

Figure 26



Streetlight Coverage - Union Dr to University Blvd

Figure 26

Streetlight Coverage - Sheldon to Union Dr

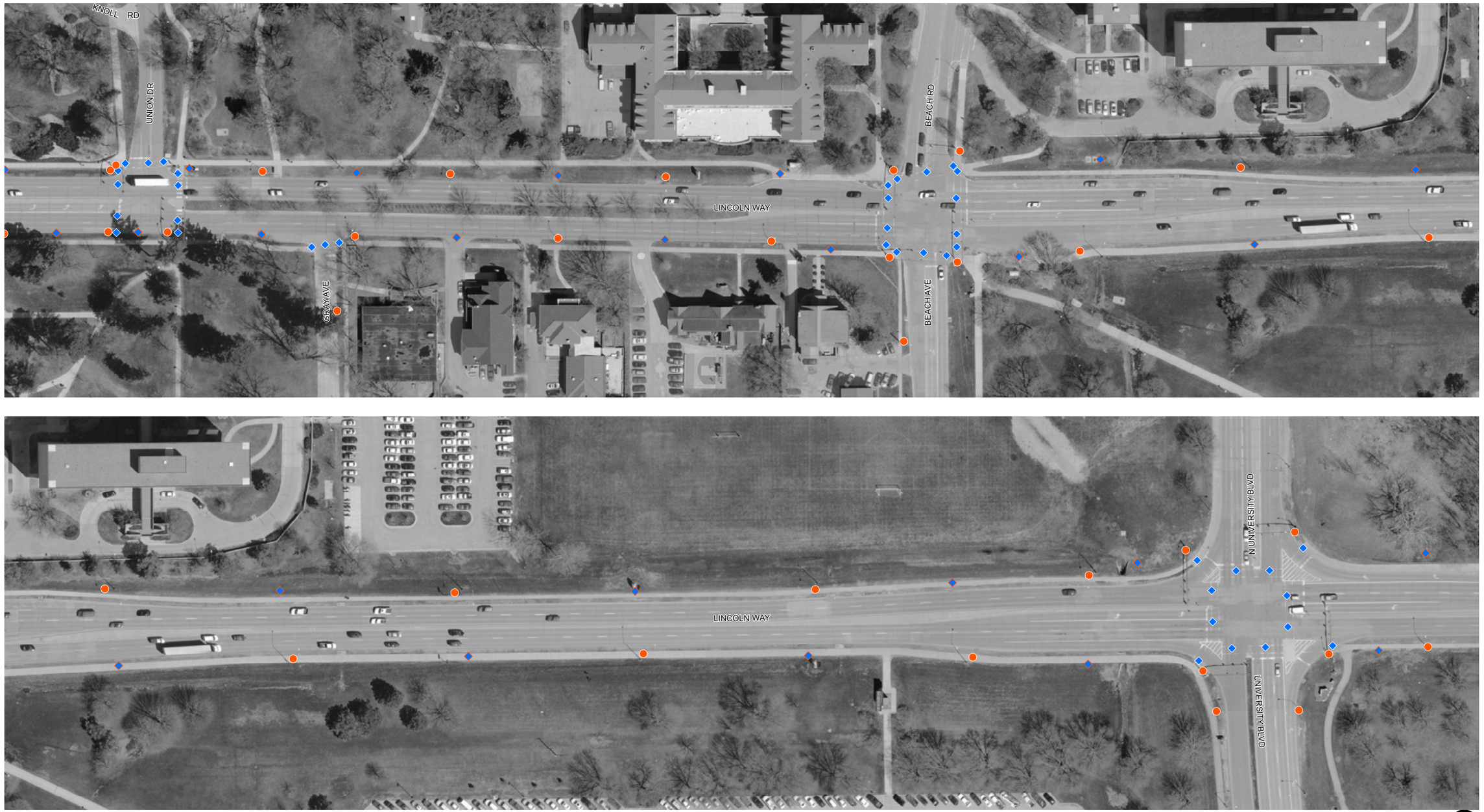
Figure 26

- Hayward Avenue to Lynn Avenue: High pedestrian activity along and across Lincoln Way, with higher density commercial (retail) uses along the south and residence hall and the Iowa State University Union uses on the north side.
- Lynn Avenue to Beach Avenue: Moderate pedestrian activity crossing Lincoln Way and moderate density university and housing uses on either side of Lincoln Way.
- Beach Avenue to University Boulevard: University parking and recreation fields and Iowa State Center uses on either side of the corridor, resulting in lower pedestrian activity in most periods. During or following events at the Iowa state Center, pedestrian volumes rise substantially for short periods.

For each segment the average lighting level was calculated using the individual readings observed in the data collection effort. Additionally, the range of observed levels was also calculated and reported as the uniformity in lighting levels. For the corridor the following evaluation thresholds were used for average level and uniformity measures:

- Average Lighting: 1.2 footcandles for concrete pavement and 1.7 footcandles for asphalt pavement, which are the levels identified in the SUDAS manual for an arterial corridor with a higher level of pedestrian activity.
- Uniformity: A ratio of 3-to-1 for the range along the segment.

Observed lighting levels for all four of the corridor segments exceeds the 1.2 and 1.7 footcandles threshold. Figure 28 displays the average lighting level by segment. Throughout the corridor, however, the uniformity ratio is greater (6:1) than is desirable for the corridor. For lighting, a uniformity level that exceeds 3:1 perceived as a negative.



Streetlight Coverage - Union Dr to University Blvd

Figure 26

Identified Corridor Goals and Objectives

Following presentation and discussion of the range of technical area assessments and with the community input provided through the survey, the Working Group was asked to develop goals and objectives for consideration in the Lincoln Way corridor. The intent of requesting the Working Group to provide input is they represent corridor users and provide input from the perspectives of the university and the city. The intent is to present the goals and objectives as part of the decision-making process on actions and recommendations for the corridor.

Goal for Lincoln Way Corridor

Establish an operational and physical environment along Lincoln Way between Sheldon Avenue and University Boulevard that safely and appropriately reflects/supports the high level of pedestrian activity, while accommodating the vehicular demands of Lincoln Way functioning as an arterial corridor.

Objectives to Address Goal

- Define modal priorities for each unique Lincoln Way and cross route location in the corridor from Sheldon Avenue to University Boulevard.
- Promote pedestrian behavior that improves the level of compliance as to where and when Lincoln Way crossings are made.
- Establish a corridor signal timing plan that reflects modal priorities and positively influences pedestrian and driver behavior.
- Promote geometric changes and/or educational programs that will support corridor goals and as pedestrian and vehicle volume in the corridor increases.

Appendix A: Detailed Traffic Operations

100: Hyland Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.2	2.8	0.5
Total Del/Veh (s)	6.8	10.0	27.2	23.5	11.7

110: Sheldon Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	1.0	1.3	0.3
Total Del/Veh (s)	5.4	12.5	28.5	32.3	13.4

120: Hayward Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.4	0.3
Total Del/Veh (s)	5.4	6.4	15.3	6.9

130: Welch Rd & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.0
Total Del/Veh (s)	14.4	9.6	48.0	37.0	18.5

140: Stanton Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.8	1.7	7.8	2.1

150: Lynn Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	6.1	7.8	17.5	34.3	8.5

160: Ash Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.3	0.1
Total Del/Veh (s)	12.0	7.4	15.9	10.1

170: Lincoln Way & Union Dr Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	1.8	0.2
Total Del/Veh (s)	4.6	4.1	27.9	6.5

180: Gray Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.7	2.5	8.3	2.2

190: Beach Rd & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	2.8	1.5	0.5
Total Del/Veh (s)	5.0	9.6	38.2	39.2	15.1

200: University Blvd & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	1.6	1.0	0.5
Total Del/Veh (s)	14.2	19.3	15.1	15.1	15.7

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	47.0

Intersection: 100: Hyland Ave & Lincoln Way

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LTR	LT	R
Maximum Queue (ft)	175	123	106	122	130	129	58
Average Queue (ft)	72	33	43	56	54	67	21
95th Queue (ft)	138	88	87	104	104	118	50
Link Distance (ft)	642	642	298	298	812		710
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						200	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 110: Sheldon Ave & Lincoln Way

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LT	R	LT	R
Maximum Queue (ft)	127	93	173	191	90	58	201	97
Average Queue (ft)	45	35	84	112	37	12	95	29
95th Queue (ft)	97	78	149	180	73	39	169	66
Link Distance (ft)	298	298	597	597	820		719	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)						125		100
Storage Blk Time (%)							14	0
Queuing Penalty (veh)							8	0

Intersection: 120: Hayward Ave & Lincoln Way

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	102	109	50	118	147	91	91
Average Queue (ft)	46	46	15	35	47	34	34
95th Queue (ft)	92	91	39	93	111	72	68
Link Distance (ft)	597	597		374	374	797	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			175				75
Storage Blk Time (%)						2	0
Queuing Penalty (veh)						1	0

Intersection: 130: Welch Rd & Lincoln Way

Movement	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	108	180	198	89	146	179	209	125	138
Average Queue (ft)	22	104	123	35	53	79	97	48	65
95th Queue (ft)	68	164	186	71	123	163	174	102	123
Link Distance (ft)		374	374		365	365	772		426
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100			170				225	
Storage Blk Time (%)	0	8			0				
Queuing Penalty (veh)	0	3			0				

Intersection: 140: Stanton Ave & Lincoln Way

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	69	78
Average Queue (ft)	0	17	35
95th Queue (ft)	3	50	65
Link Distance (ft)	365		721
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		120	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 150: Lynn Ave & Lincoln Way

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	62	155	172	59	143	152	88	91
Average Queue (ft)	17	57	70	21	58	66	33	37
95th Queue (ft)	43	121	142	49	119	131	69	76
Link Distance (ft)		513	513		475	475	777	591
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	140			95				
Storage Blk Time (%)		0			3			
Queuing Penalty (veh)		0			1			

Intersection: 160: Ash Ave & Lincoln Way

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	225	243	42	130	126	115	62
Average Queue (ft)	112	127	16	45	49	32	30
95th Queue (ft)	197	217	39	106	110	87	62
Link Distance (ft)	475	475		372	372	793	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			130				25
Storage Blk Time (%)				0		17	7
Queuing Penalty (veh)				0		7	2

Intersection: 170: Lincoln Way & Union Dr

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	66	34	44	135	141	177	75
Average Queue (ft)	24	2	6	48	48	60	34
95th Queue (ft)	55	14	23	113	113	126	75
Link Distance (ft)		372	372	132	132	646	
Upstream Blk Time (%)				0	0		
Queuing Penalty (veh)				1	1		
Storage Bay Dist (ft)	175						25
Storage Blk Time (%)						46	6
Queuing Penalty (veh)						22	5

Intersection: 180: Gray Ave & Lincoln Way

Movement	EB	EB	EB	WB	WB	NB
Directions Served	T	T	R	T	T	R
Maximum Queue (ft)	129	134	53	88	116	44
Average Queue (ft)	28	31	2	25	25	15
95th Queue (ft)	91	96	20	69	78	36
Link Distance (ft)	132	132		629	629	392
Upstream Blk Time (%)	0	0				
Queuing Penalty (veh)	1	1				
Storage Bay Dist (ft)			40			
Storage Blk Time (%)		3	0			
Queuing Penalty (veh)		0	0			

Intersection: 190: Beach Rd & Lincoln Way

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	72	94	127	61	145	151	76	131	203	140	172
Average Queue (ft)	19	31	44	18	53	51	25	50	87	58	68
95th Queue (ft)	53	69	94	46	113	115	63	103	162	121	131
Link Distance (ft)		629	629		1584	1584		857			638
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	105			200			240		280	200	
Storage Blk Time (%)	0	0								0	0
Queuing Penalty (veh)	0	0								0	0

Intersection: 200: University Blvd & Lincoln Way

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	T	T	L	T	T	L	T	TR
Maximum Queue (ft)	121	181	203	188	149	92	149	114	112	124	146
Average Queue (ft)	45	85	100	104	71	35	72	33	50	66	34
95th Queue (ft)	93	161	175	166	136	73	125	82	97	115	98
Link Distance (ft)		1584	1584	1122	1122		891	891		684	684
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	210					300			270		
Storage Blk Time (%)		0	0	0							
Queuing Penalty (veh)		0	0	0							

Network Summary

Network wide Queuing Penalty: 54

100: Hyland Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.2	2.5	0.5
Total Del/Veh (s)	9.1	12.8	28.3	24.3	14.3

110: Sheldon Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	1.3	1.8	0.4
Total Del/Veh (s)	6.1	18.7	27.5	27.8	16.5

120: Hayward Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.0	0.2
Total Del/Veh (s)	5.3	4.9	21.6	6.9

130: Welch Rd & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.0
Total Del/Veh (s)	13.0	4.5	54.6	40.3	16.0

140: Stanton Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.8	2.0	8.6	2.3

150: Lynn Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.2	0.0
Total Del/Veh (s)	10.5	4.9	23.3	31.6	10.1

160: Ash Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.4	0.2
Total Del/Veh (s)	7.3	8.0	21.2	8.6

170: Lincoln Way & Union Dr Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	1.7	0.2
Total Del/Veh (s)	8.0	3.9	27.1	7.9

180: Gray Ave & Lincoln Way Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.9	2.2	5.1	1.6

190: Beach Rd & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	2.8	1.7	0.7
Total Del/Veh (s)	10.5	16.3	32.9	33.2	18.9

200: University Blvd & Lincoln Way Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.9	1.9	0.3	0.6
Total Del/Veh (s)	18.1	17.0	15.8	22.0	17.7

Total Network Performance

Denied Del/Veh (s)	1.2
Total Del/Veh (s)	51.1

Intersection: 100: Hyland Ave & Lincoln Way

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LTR	LT	R
Maximum Queue (ft)	215	176	190	217	145	215	155
Average Queue (ft)	91	48	78	99	56	109	45
95th Queue (ft)	172	119	153	179	112	190	104
Link Distance (ft)	642	642	298	298	812		710
Upstream Blk Time (%)			0	0			
Queuing Penalty (veh)			0	0			
Storage Bay Dist (ft)						200	
Storage Blk Time (%)						1	0
Queuing Penalty (veh)						1	0

Intersection: 110: Sheldon Ave & Lincoln Way

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LT	R	LT	R
Maximum Queue (ft)	123	130	239	308	146	57	236	176
Average Queue (ft)	48	46	144	189	60	18	119	58
95th Queue (ft)	92	99	228	275	115	48	208	126
Link Distance (ft)	298	298	597	597	820		719	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)						125		100
Storage Blk Time (%)					1		19	0
Queuing Penalty (veh)					0		25	1

Intersection: 120: Hayward Ave & Lincoln Way

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	123	133	67	129	154	166	98
Average Queue (ft)	45	55	17	35	49	58	43
95th Queue (ft)	101	113	45	102	124	123	90
Link Distance (ft)	597	597		374	374	797	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			175				75
Storage Blk Time (%)				0		10	0
Queuing Penalty (veh)				0		7	0

Intersection: 130: Welch Rd & Lincoln Way

Movement	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	174	217	231	68	143	160	272	154	182
Average Queue (ft)	28	119	131	29	35	46	114	58	77
95th Queue (ft)	87	195	205	64	93	117	227	122	153
Link Distance (ft)		374	374		365	365	772		426
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100			170				225	
Storage Blk Time (%)		9			0				0
Queuing Penalty (veh)		3			0				0

Intersection: 140: Stanton Ave & Lincoln Way

Movement	EB	EB	WB	NB
Directions Served	T	TR	L	LR
Maximum Queue (ft)	4	17	84	83
Average Queue (ft)	0	1	25	40
95th Queue (ft)	0	8	65	71
Link Distance (ft)	365	365		721
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			120	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 150: Lynn Ave & Lincoln Way

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	90	188	213	72	121	121	146	138
Average Queue (ft)	25	93	115	23	38	39	55	66
95th Queue (ft)	66	179	199	58	88	95	116	120
Link Distance (ft)		513	513		475	475	777	591
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	140			95				
Storage Blk Time (%)	0	2		0	0			
Queuing Penalty (veh)	0	1		0	0			

Intersection: 160: Ash Ave & Lincoln Way

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	154	162	115	283	228	136	64
Average Queue (ft)	74	75	24	86	87	54	40
95th Queue (ft)	137	141	69	206	196	110	68
Link Distance (ft)	475	475		372	372	793	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			130				25
Storage Blk Time (%)				2		33	13
Queuing Penalty (veh)				1		22	7

Intersection: 170: Lincoln Way & Union Dr

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	80	198	224	136	139	183	75
Average Queue (ft)	30	71	86	53	53	79	43
95th Queue (ft)	63	166	188	112	118	153	87
Link Distance (ft)		372	372	132	132	646	
Upstream Blk Time (%)				0	0		
Queuing Penalty (veh)				1	1		
Storage Bay Dist (ft)	175						25
Storage Blk Time (%)		0				49	10
Queuing Penalty (veh)		0				26	10

Intersection: 180: Gray Ave & Lincoln Way

Movement	WB	WB	NB
Directions Served	T	T	R
Maximum Queue (ft)	21	65	38
Average Queue (ft)	2	3	10
95th Queue (ft)	18	22	30
Link Distance (ft)	629	629	392
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 190: Beach Rd & Lincoln Way

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	81	272	287	67	202	215	79	208	298	164	192
Average Queue (ft)	32	99	121	25	99	99	34	72	140	74	80
95th Queue (ft)	67	211	233	55	175	180	75	136	233	141	155
Link Distance (ft)		629	629		1584	1584		857			638
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	105			200			240		280	200	
Storage Blk Time (%)	0	4			0	0			1	0	0
Queuing Penalty (veh)	0	3			0	0			1	0	0

Intersection: 200: University Blvd & Lincoln Way

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	L	T	T	L	T
Maximum Queue (ft)	109	263	259	21	93	205	183	128	142	88	52	146
Average Queue (ft)	50	129	145	1	41	118	92	65	64	31	11	76
95th Queue (ft)	87	229	238	12	78	184	168	115	115	71	38	129
Link Distance (ft)		1584	1584			1122	1122		891	891		684
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	210			230	235			300			270	
Storage Blk Time (%)		1	1			0						
Queuing Penalty (veh)		1	1			0						

Intersection: 200: University Blvd & Lincoln Way

Movement	SB
Directions Served	TR
Maximum Queue (ft)	143
Average Queue (ft)	31
95th Queue (ft)	94
Link Distance (ft)	684
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 114

Appendix B: Sight Distance Analysis Triangles

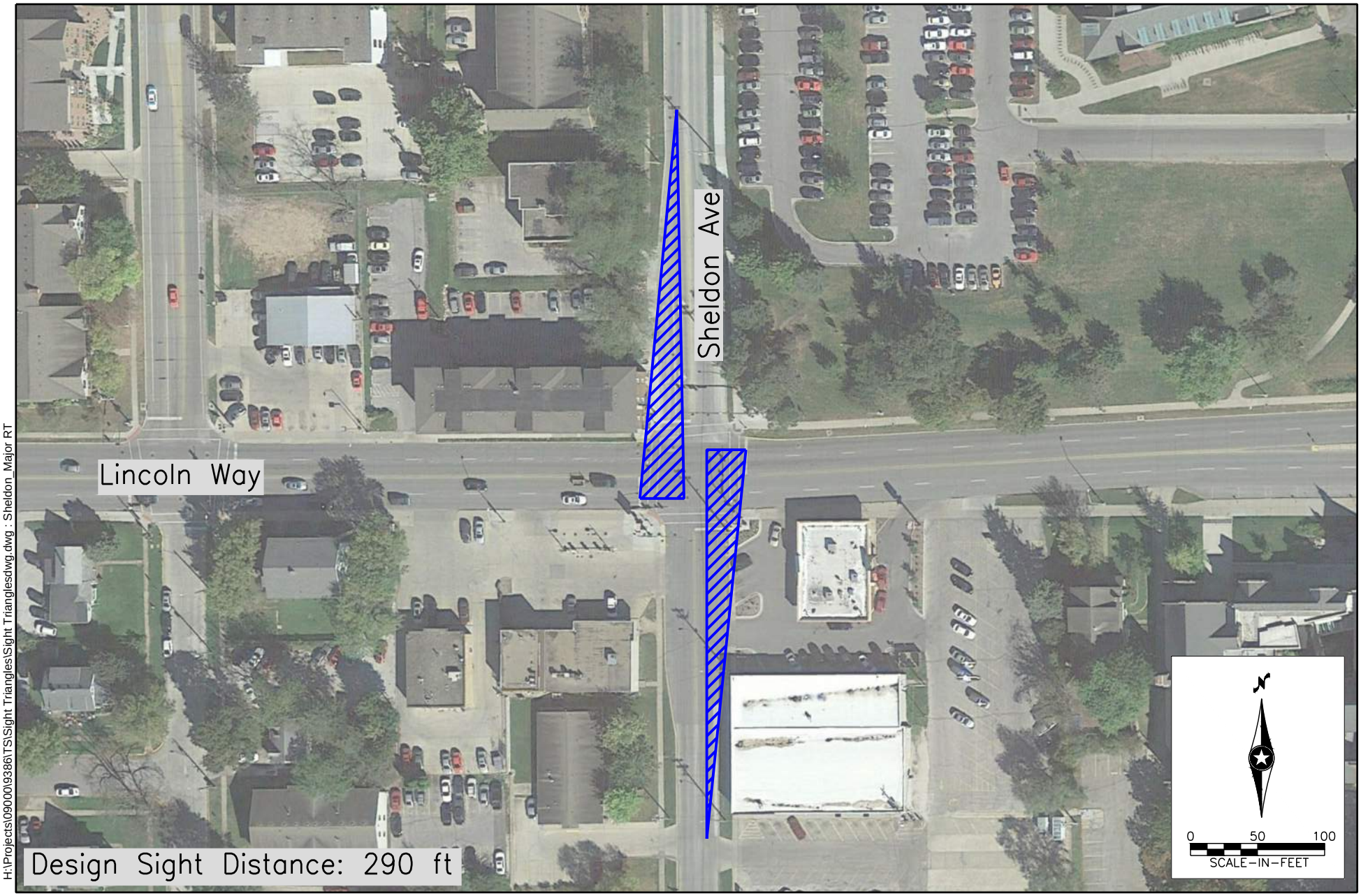
H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Sheldon_LT Major

SRF Consulting Group, Inc.
016 9386
2/6/2017 - 4:26PM

Lincoln Way & Sheldon Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study
Ames, Iowa

Figure 1



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Sheldon_Major RT

Consulting Group, Inc.

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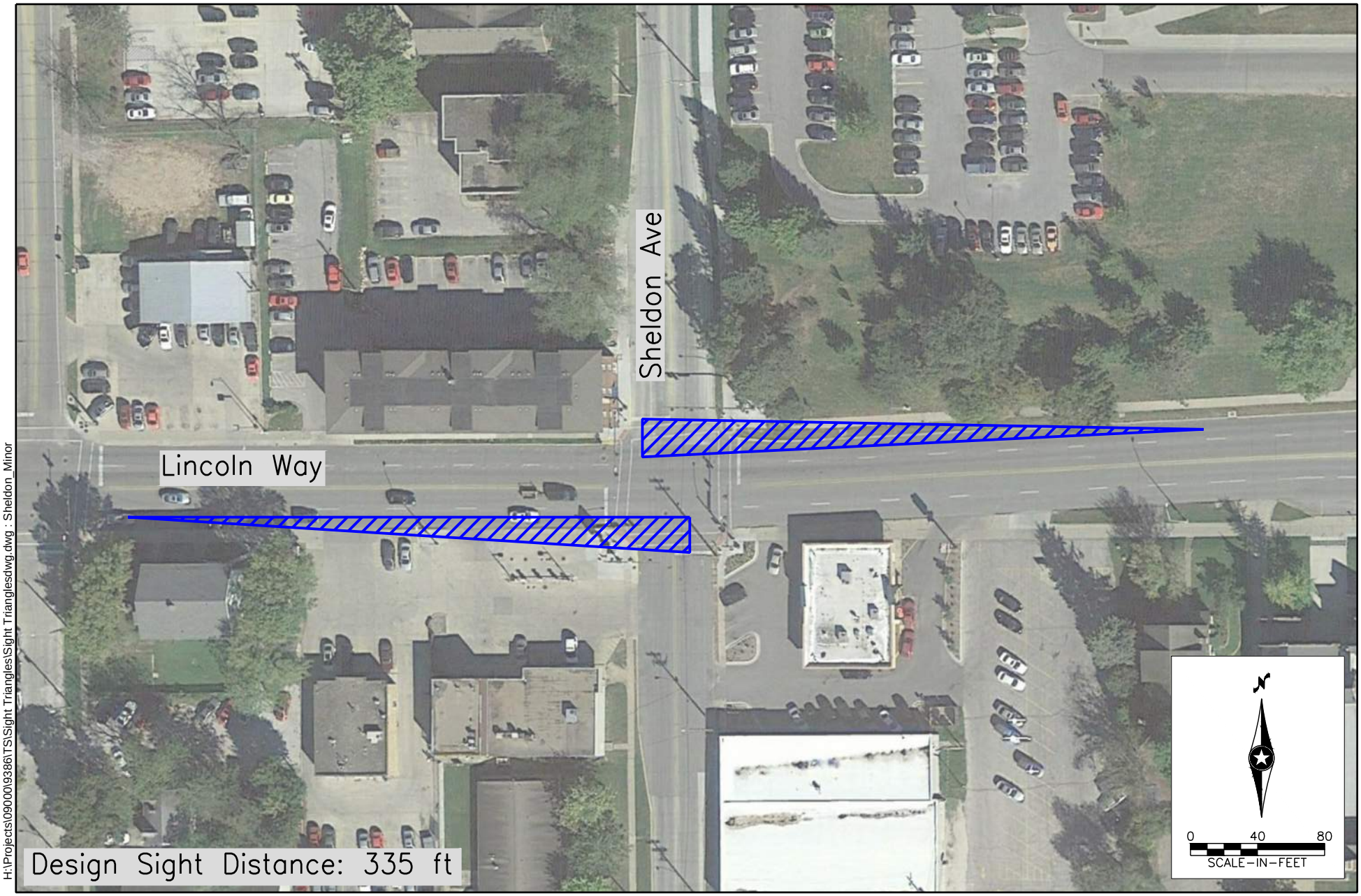
2/6/2017 - 4:26PM

Lincoln Way & Sheldon Ave Sight Triangles: Right-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 2



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Sheldon_Minor

Consulting Group, Inc.

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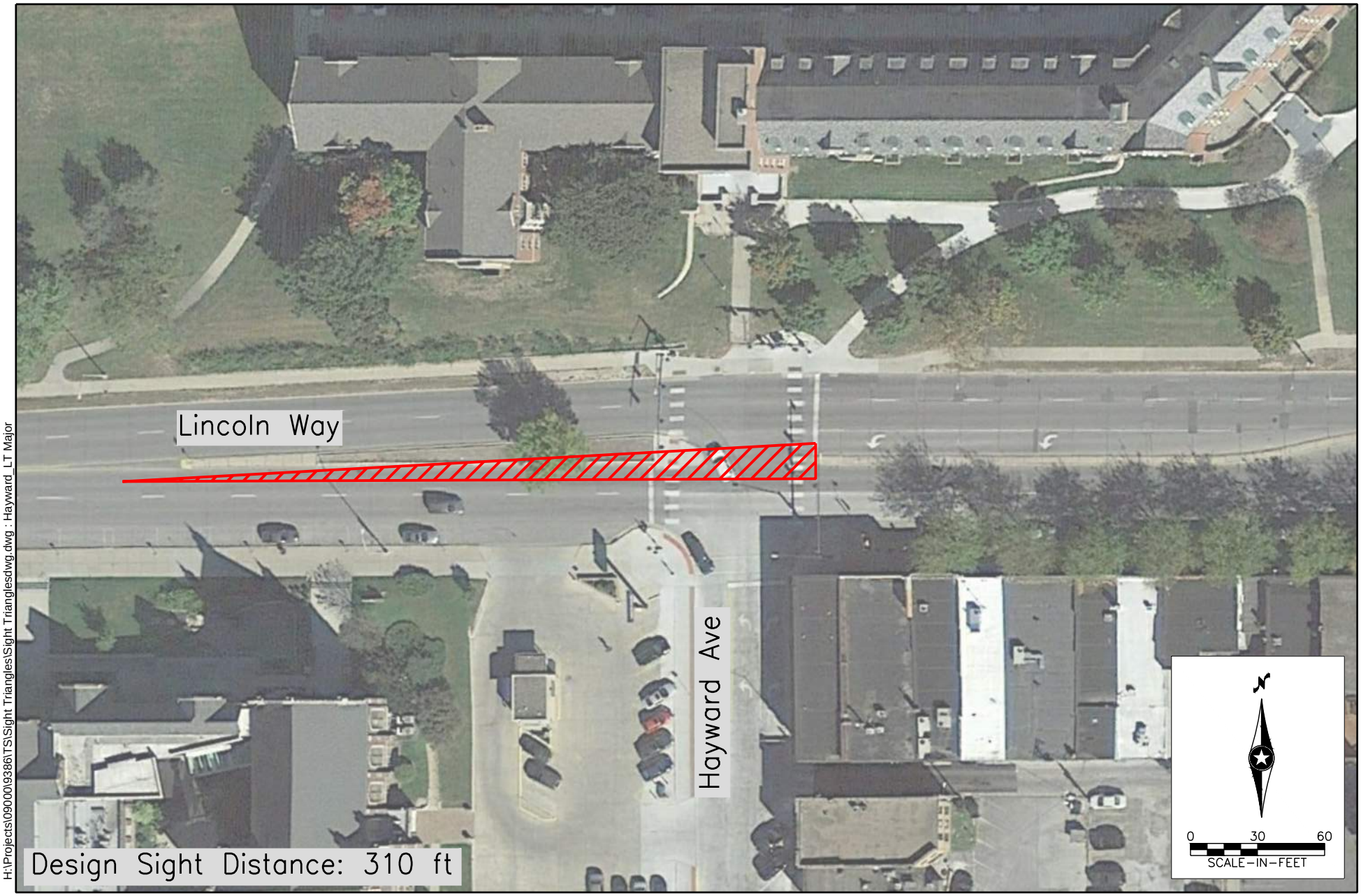
2/6/2017 - 4:26PM

Lincoln Way & Sheldon Ave Sight Triangles:Right-Turn from Minor Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 3



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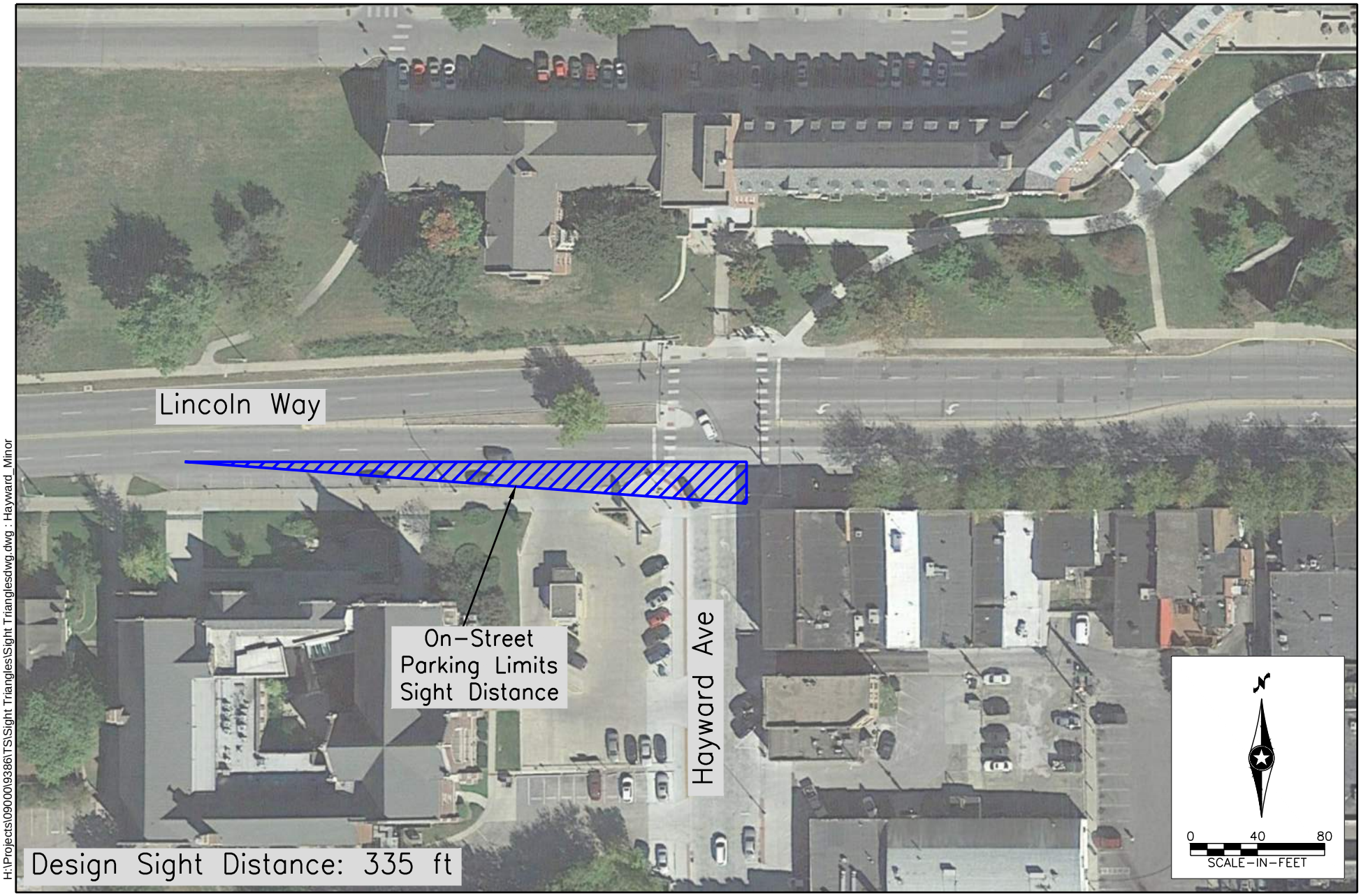
2/6/2017 - 4:26PM

Lincoln Way & Hayward Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study
Ames, Iowa

Figure 4



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Consulting Group, Inc.

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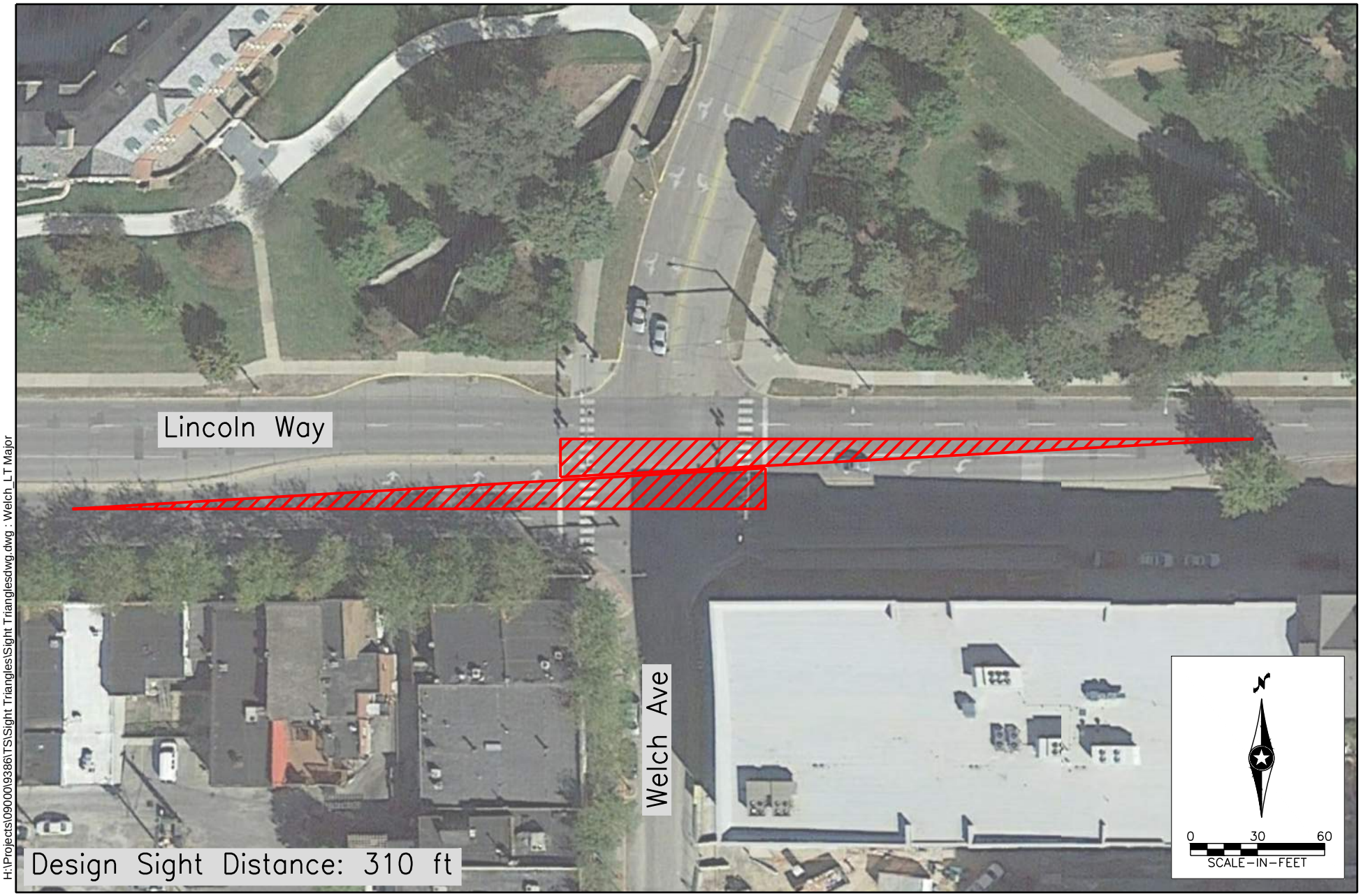
2/6/2017 - 4:26PM

Lincoln Way & Hayward Ave Sight Triangles: Right-Turn from Minor Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 5



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Welch_LT Major

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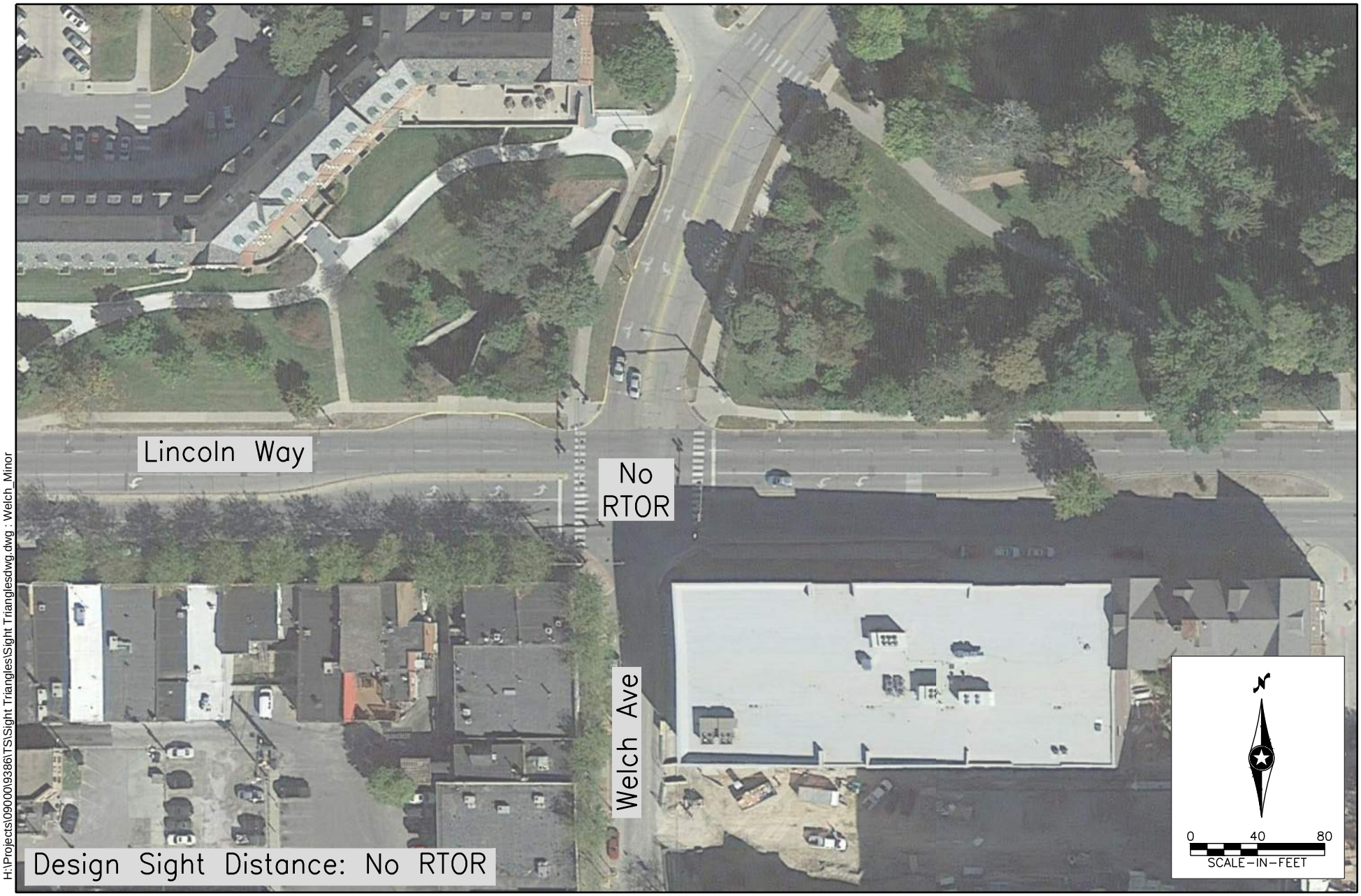
2/6/2017 - 4:26PM

Lincoln Way & Welch Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 6



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Lincoln Way & Welch Ave Sight Triangles: Right-Turn from Minor Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 7

H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Stanton_LT Major

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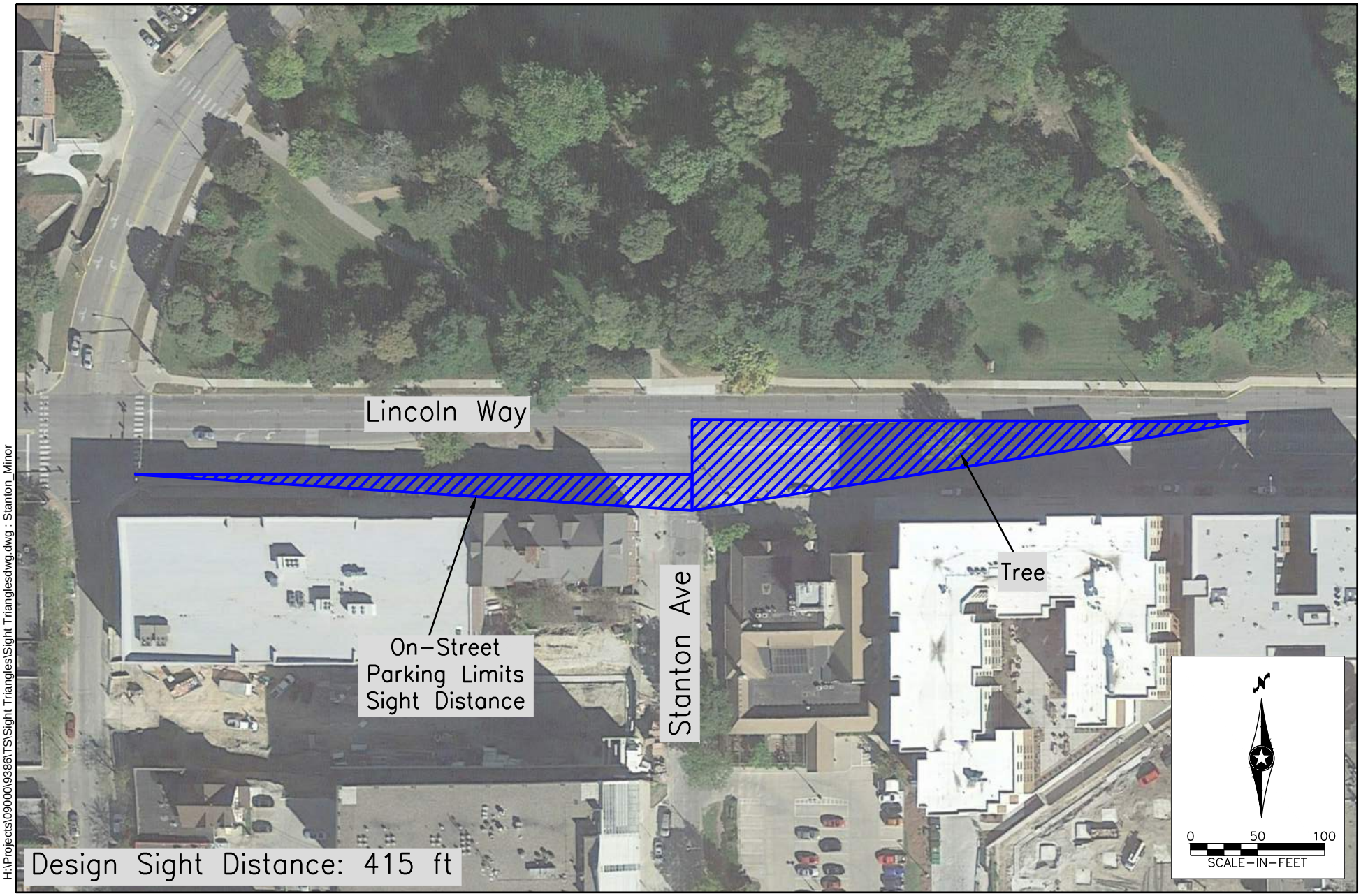
Lincoln Way & Stanton Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study
Ames, Iowa

Figure 8



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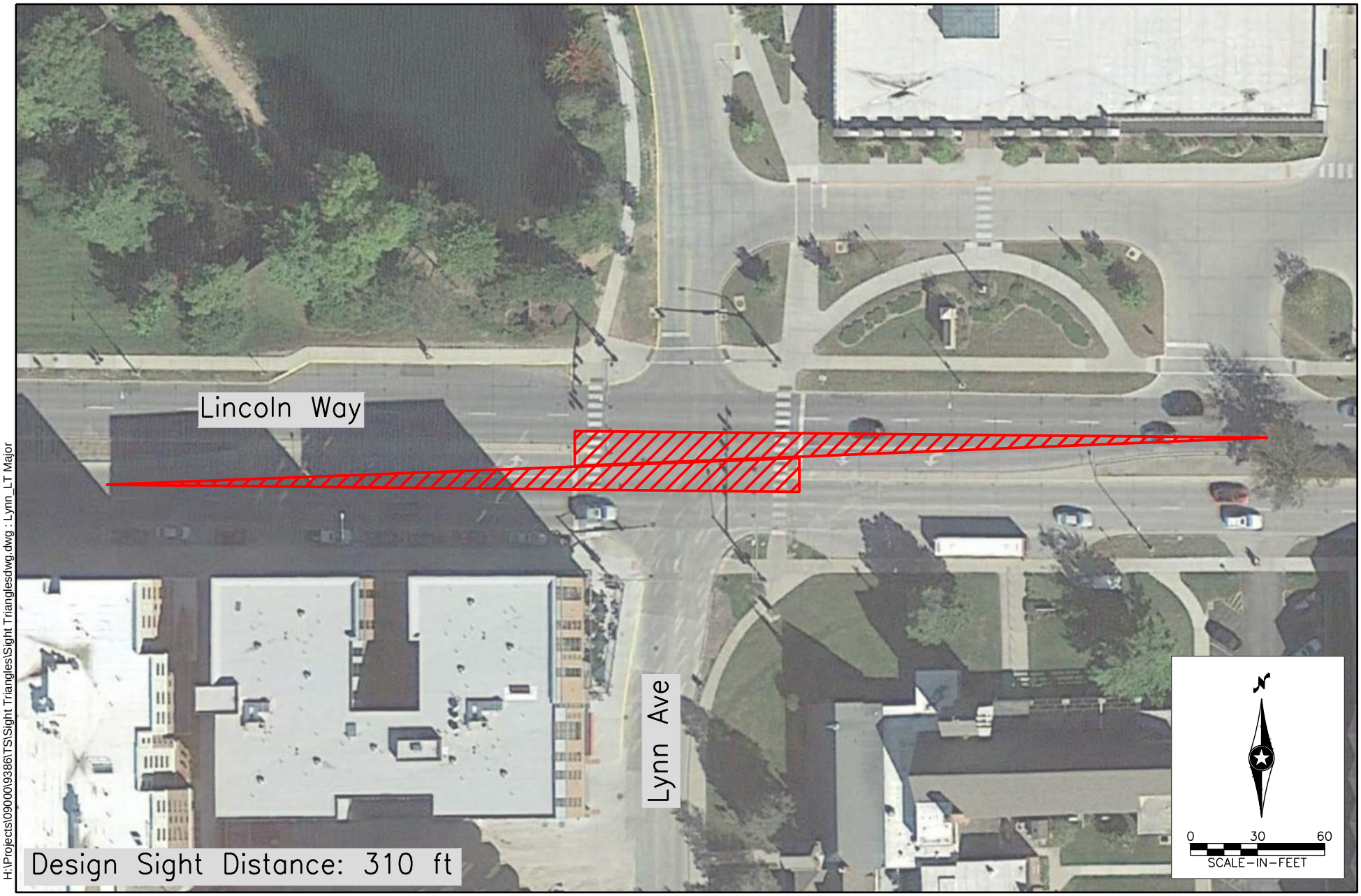
2/6/2017 - 4:26PM

Lincoln Way & Stanton Ave Sight Triangles: Left-Turn from Minor Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 9



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Lynn_LT Major

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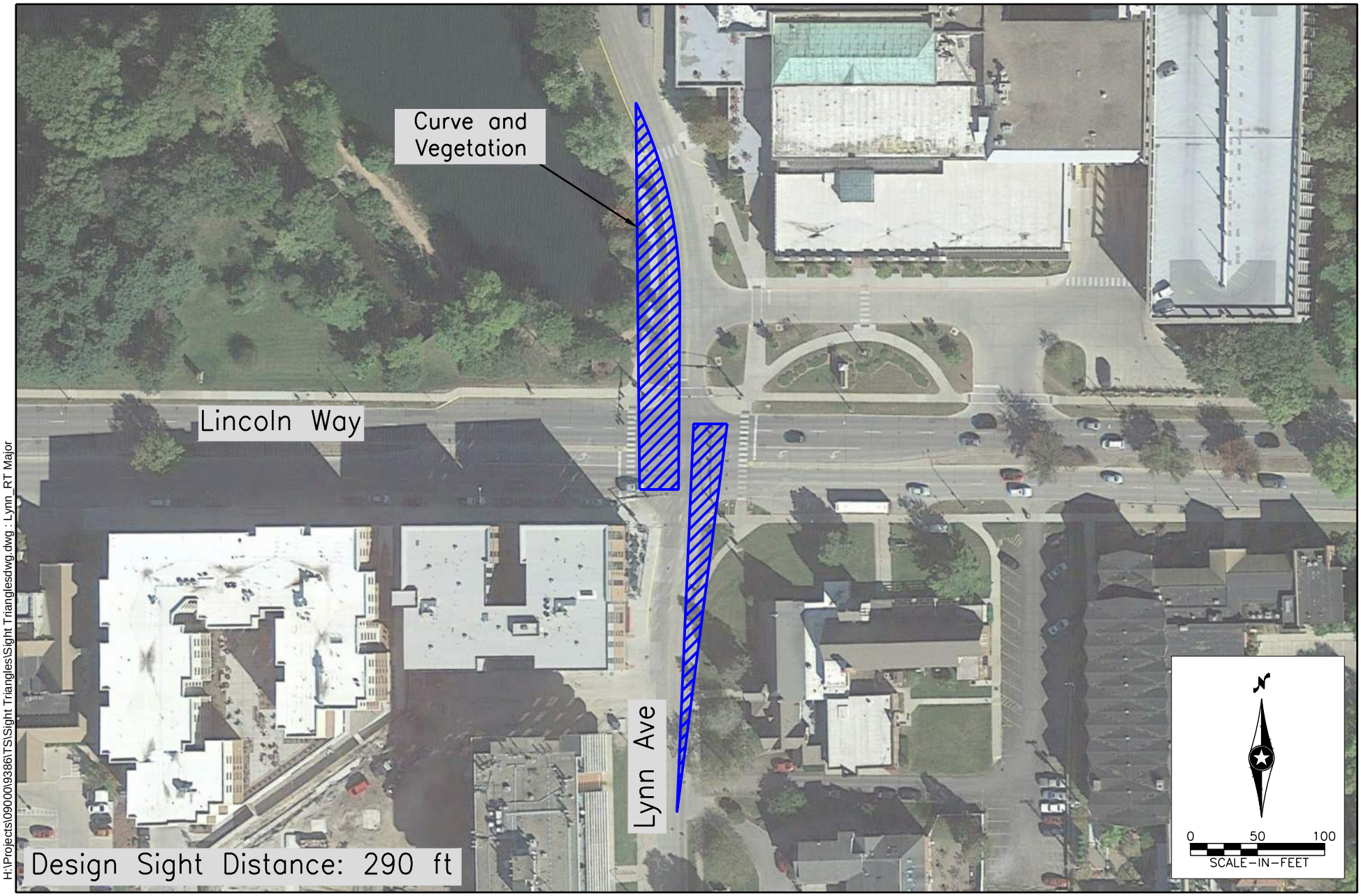
Lincoln Way & Lynn Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 10



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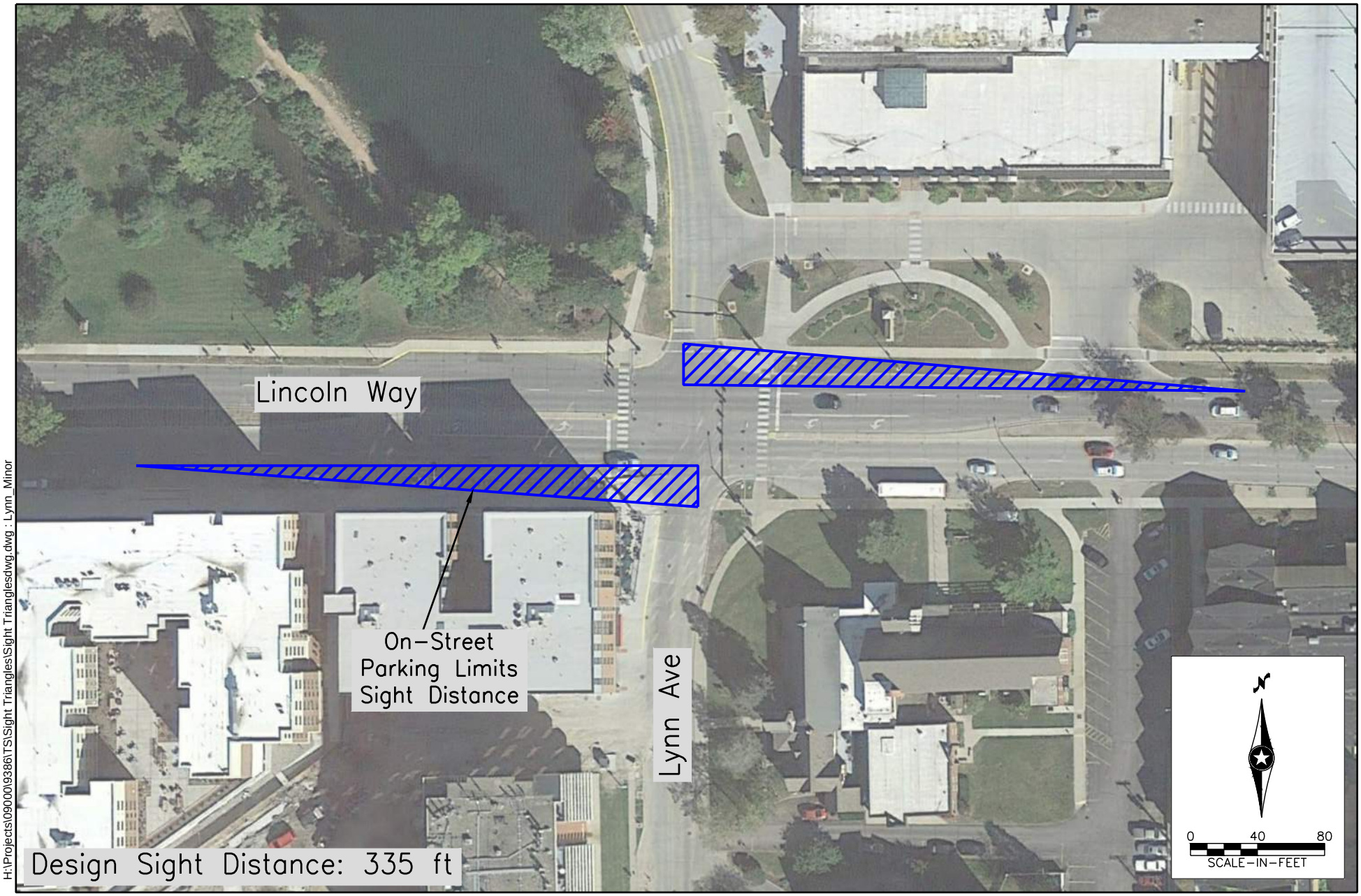
Lincoln Way & Lynn Ave Sight Triangles: Right-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 11



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Consulting Group, Inc.

016 9386

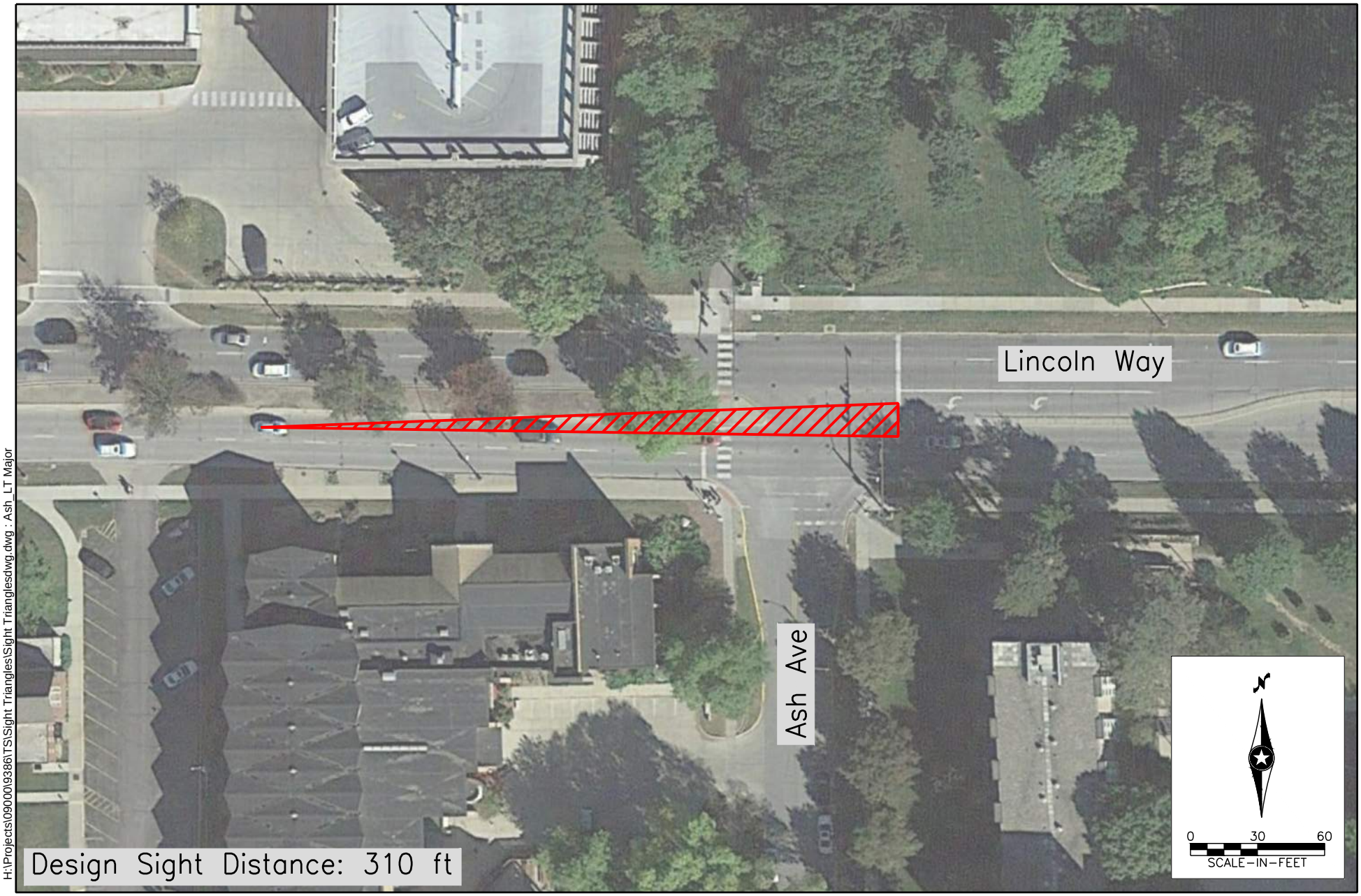
2/6/2017 - 4:27PM

Lincoln Way & Lynn Ave Sight Triangles: Right-Turn from Minor Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 12



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Ash_LT Major

Consulting Group, Inc.

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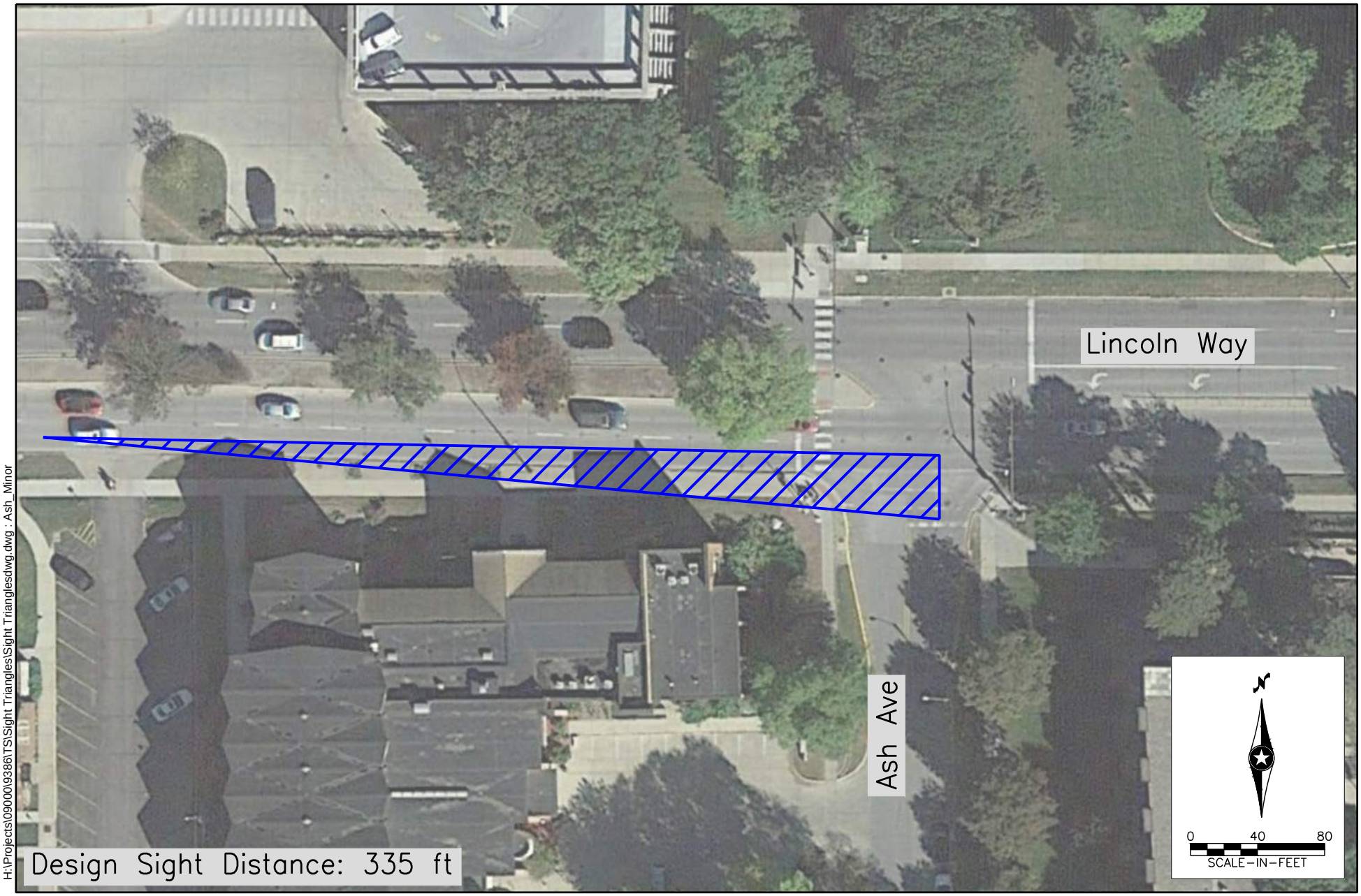
2/6/2017 - 4:27PM

Lincoln Way & Ash Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 13



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Ash_Minor

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Lincoln Way & Ash Ave Sight Triangles: Right-Turn from Minor Approach

Lincoln Way Safety and Operations Study
Ames, Iowa

Figure 14

H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Union_LT Major

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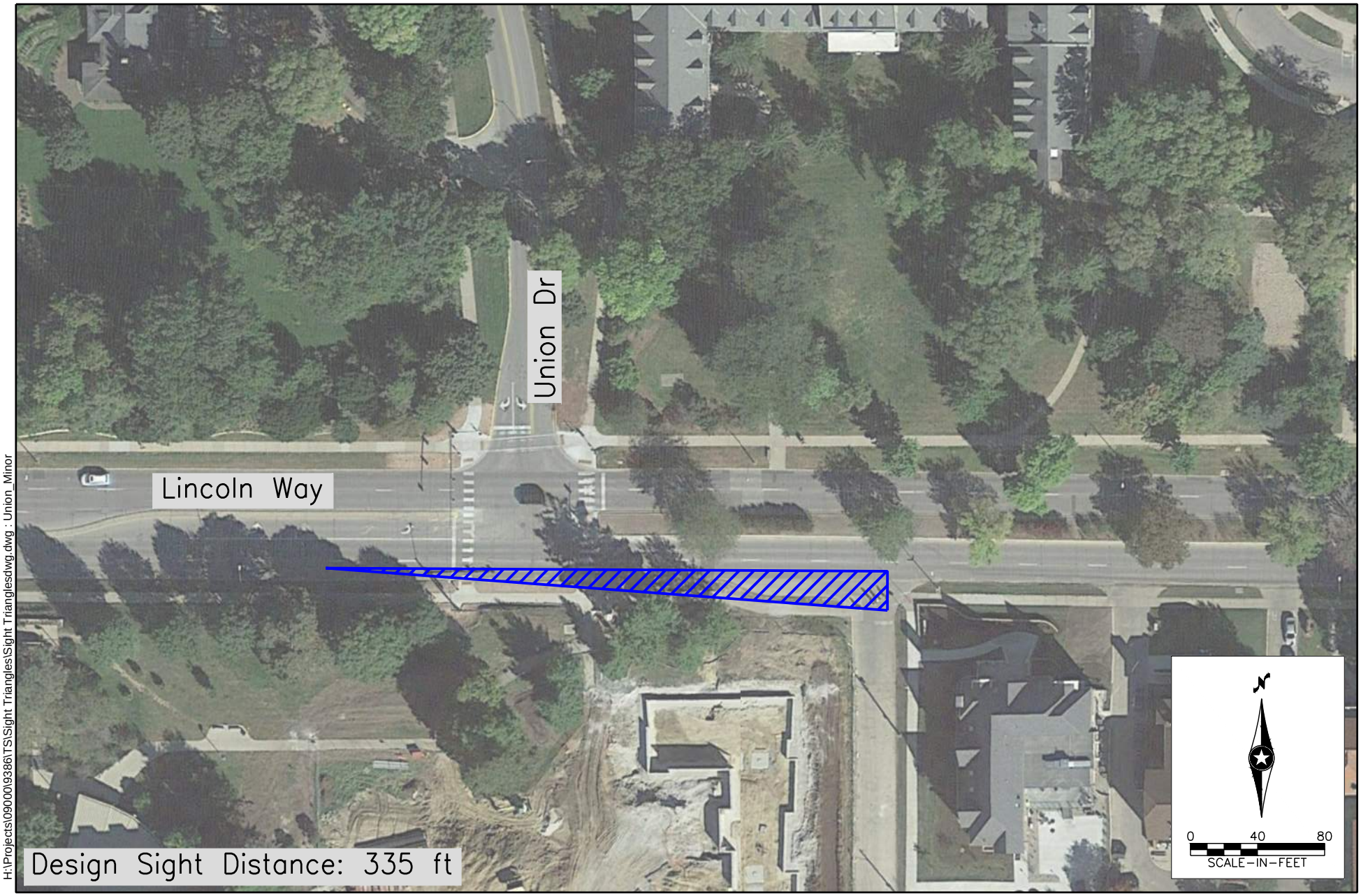
Lincoln Way & Union Dr Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 15



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Union_Minor

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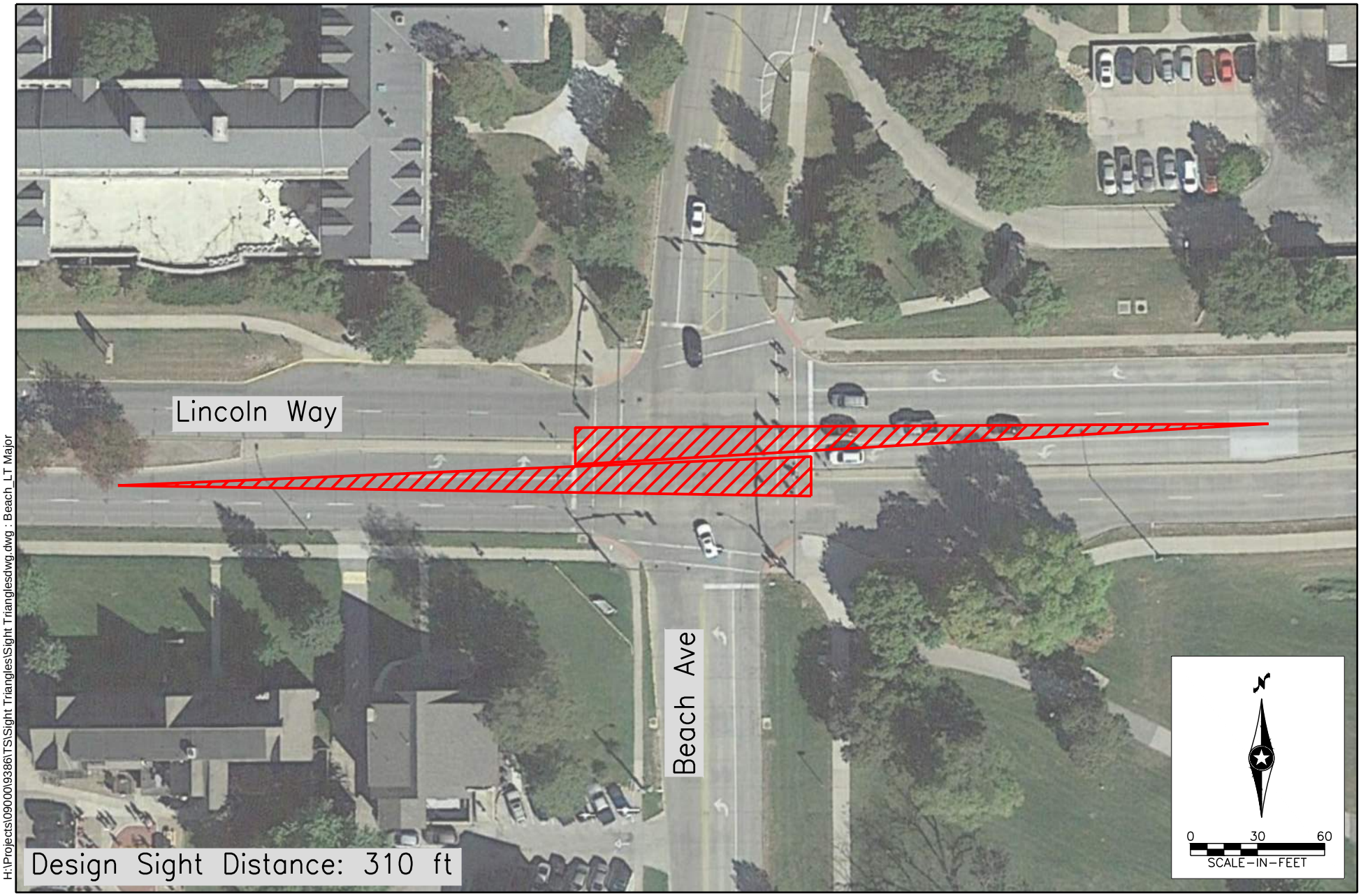
2/6/2017 - 4:27PM

Lincoln Way & Union Dr Sight Triangles: Right-Turn from Minor Approach

Lincoln Way Safety and Operations Study
Ames, Iowa

Figure 16



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Beach_LT Major

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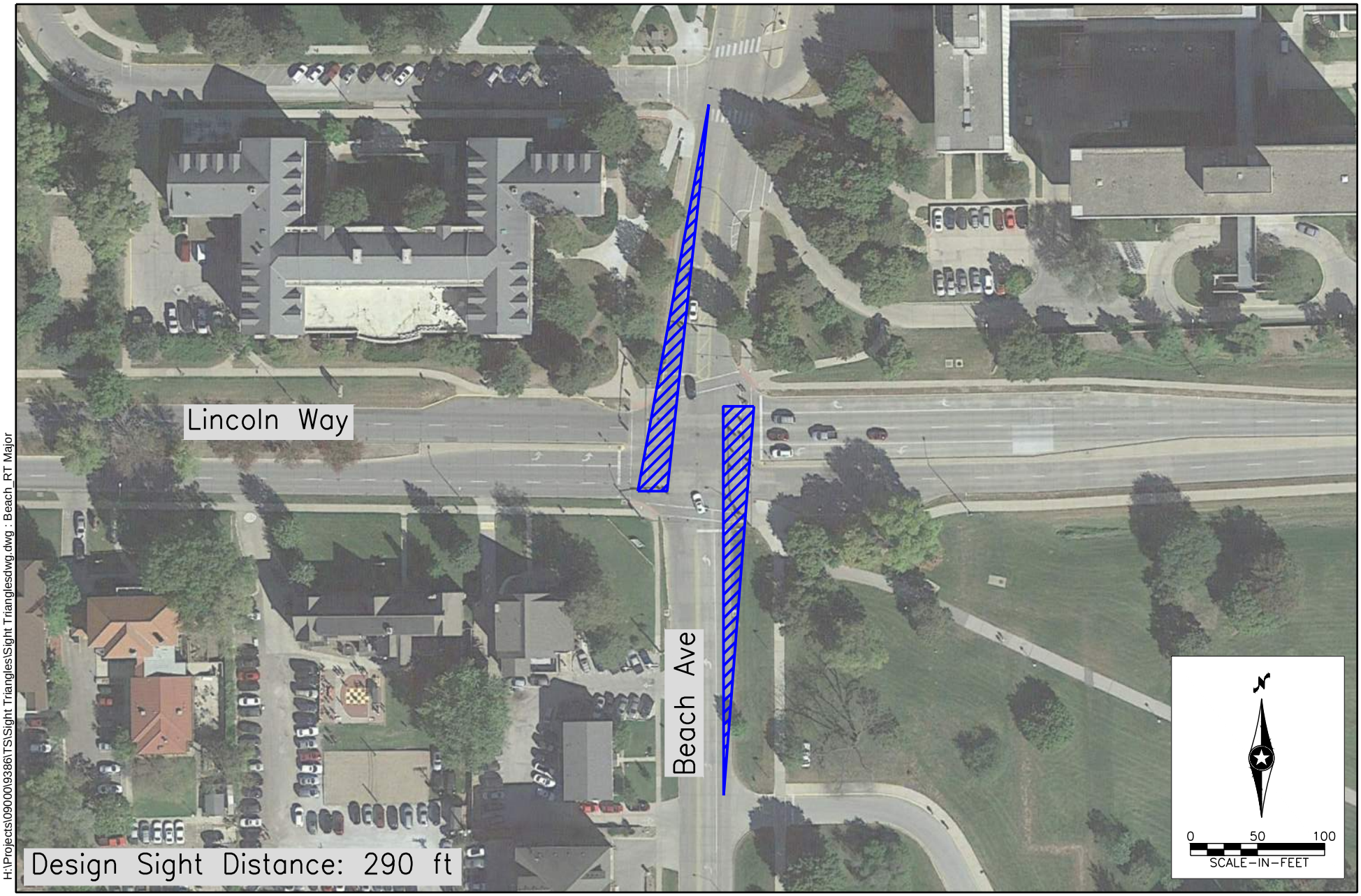
2/6/2017 - 4:27PM

Lincoln Way & Beach Ave Sight Triangles: Left-Turn from Major Approach

Lincoln Way Safety and Operations Study
Ames, Iowa

Figure 17



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Beach_RT Major

Consulting Group, Inc.

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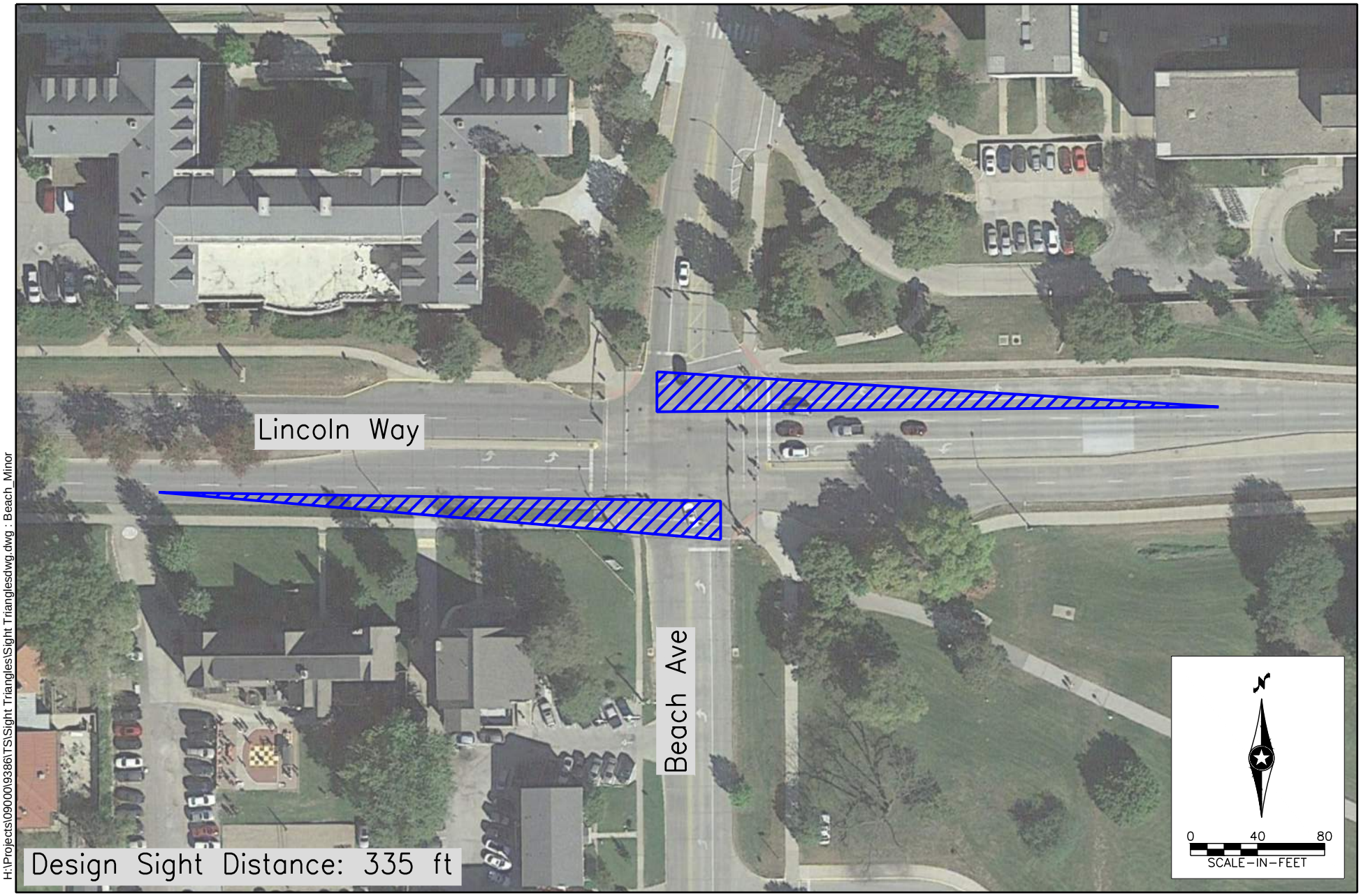
2/6/2017 - 4:27PM

Lincoln Way & Beach Ave Sight Triangles: Right-Turn from Major Approach

Lincoln Way Safety and Operations Study

Ames, Iowa

Figure 18



H:\Projects\09000\9386\TS\Sight Triangles\Sight Trianglesdwg.dwg : Beach_Minor

Consulting Group, Inc.

016 9386

2/6/2017 - 4:27PM

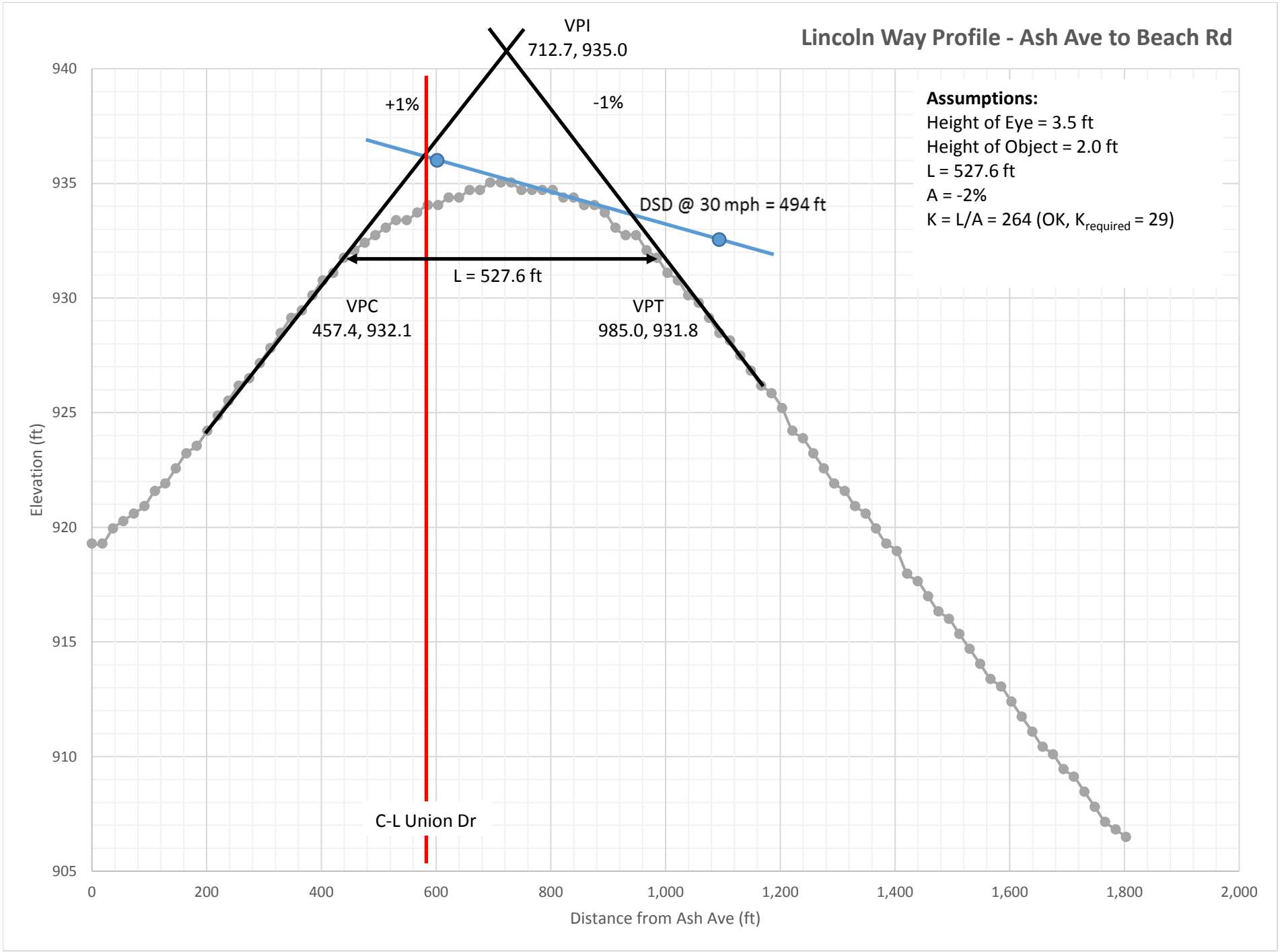
Lincoln Way & Beach Ave Sight Triangles: Right-Turn from Minor

Lincoln Way Pedestrian Traffic Study

Ames, Iowa

Figure 19

Appendix C: Vertical Sight Distance Analysis


Lincoln Way Profile - Ash Ave to Beach Rd
VPI
712.7, 935.0
+1%
-1%
DSD @ 30 mph = 494 ft
L = 527.6 ft
VPC
457.4, 932.1
VPT
985.0, 931.8
C-L Union Dr
Assumptions:
Height of Eye = 3.5 ft
Height of Object = 2.0 ft
L = 527.6 ft
A = -2%
K = L/A = 264 (OK, K required = 29)
Elevation (ft)
940
935
930
925
920
915
910
905
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
Distance from Ash Ave (ft)

Attachment B

Table 1. Lincoln Way Corridor Existing Conditions Assessment

Assessment/Review	Basis of Analysis		Findings
	Recommended Practice	Compliance with Rules (Behavior)	
Peak Hour Traffic Operations	Current Peak Hour Level-of-Service (delay) Relative to Goal of LOS D		All Intersections LOS D or Better in Peak Hours
Safety	Crashes/Crash Rate Relative to Average for Similar Facilities Crash Severity Rate Relative to Average for Similar Facilities		Crash Rates – Intersections of Lincoln Way/Sheldon and Lincoln Way/Stanton exceed the critical crash rate (experiencing more crashes than comparable locations). Throughout the corridor – 50% of severe crashes involved pedestrian. Severity – Lincoln Way/Welch Avenue – Higher than similar intersections.
Sight Distance	Reaction + Stopping Sight Distance – Relative to Guideline Reflecting Speed and Grade (Profile) Presence of Obstructions for Cross Route Drivers (Buildings, Parked Vehicles, Vegetation, Signs, etc.)		All intersections/segments meet recommended practice guidelines On street parking on south side west of Stanton Avenue has potential to create sight distance obstacle.
Overhead Lighting	Illumination Thresholds Established based on Facility Type and Pedestrian Activity (1.7 candle feet) Uniformity Threshold for Consistency in Level Under and Between Fixtures (3.0 candle feet)		Average for Each Segment Exceeds Threshold Variation through corridor is greater than desire.
Pedestrian Crossings		Acceptable Conditions are Defined as - High Percentage of Pedestrians Cross at Crosswalk and with WALK Indicator	Low level of compliance with WALK indication (Lincoln Way and Cross Routes). 35% Compliance in peak pedestrian hour and 46% in the peak vehicle hour. Few people approaching Lincoln Way or Cross Routes press WALK button.
Bicycle Operations		Follow Rules of Road: • On street act as vehicle • On sidewalk act as pedestrian	On-Street – No/Limited compliance issues On-Sidewalk – Compliance issues consistent with pedestrians

ITEM #__24__
DATE: 07-25-17

COUNCIL ACTION FORM

SUBJECT: AMESNET ADVANCED WIRELESS RESEARCH PROPOSAL

BACKGROUND:

Iowa State University is preparing a proposal entitled "AmesNet: Wireless Living Lab for Real-Time Cyber-Physical-Human Systems" for submittal to the national Platforms for Advanced Wireless Research (PAWR) program (https://www.advancedwireless.org/). It is believed this program is, globally, the first of its kind. A one-page overview of the proposal is enclosed. The envisioned network will enable trustworthy, ultra-high reliability, and ultra-low latency (TURL) wireless communication to provide transformative applications in various domains such as public safety, transportation, power grid, municipal services, agriculture, and manufacturing.

The PAWR program is intended for university-city-industry proposals and includes $100,000,000 to award between four projects; two in 2018 and one each subsequent year. The program is sponsored by the National Science Foundation (NSF) and funded equally between NSF and a group of industry partners.

AmesNet would provide a wireless network platform across ISU, Ames, Nevada, and a portion of Des Moines. **It must be emphasized that this network is not intended as an internet service provider for individual customers, but rather to provide a platform for a "living lab" for wireless research related to municipal services.** Potential city-service related research could include projects such as:

- Communication for traffic adaptive signal corridors
- Snow and ice control monitoring and planning for routes and conditions
- Mobile data and communication for public safety
- Continuous data gathering by CyRide and police
- Electric service and usage monitoring
- At-home tele-medicine monitoring and treatment applications

The proposal does not require any financial commitment from the City for the development and deployment of the network. In fact, the proposal requirements prohibit providing any funds. However, the City is being asked to allow the network infrastructure in the right-of-way and cooperate in finding appropriate locations for transmission equipment on electric poles, street lights and traffic signals.

The first five years of installation, development, deployment, operation and management would be entirely funded by the NSF grant. Following that period, the City is being asked to provide representation on an AmesNet Consortium controlling board and on operational working groups. The City would also provide advice to the

Consortium on developing strategies for the long-term viability for the AmesNet system. Additionally, a portion of the bandwidth of the network would be dedicated to the City as a living lab for providing municipal services.

The proposal submission is due by July 31, 2017. As part of the submittal, a support letter from the City has been requested and is attached. A small group of proposals will be selected as finalists by October 2017. NSF will then conduct site visits of those locations by the end of 2017. The winning projects will be announced during the early part of 2018.

ALTERNATIVES:

1. The City Council can decide to authorize the Mayor to submit the attached letter of support and commit to the five points outlined in the letter.

2. The City Council can decide to decline City to support the proposal and not participate in any research associated with the "living lab."

MANAGER'S RECOMMENDED ACTION:

The AmesNet proposal is an exciting opportunity for the City, ISU, and the region. It provides a platform for cutting edge research and applications in many different domains such as public safety, transportation, power grid, municipal services, agriculture, and manufacturing. Specifically, as a local government, it provides opportunities to test and refine innovative approaches to city services utilizing wireless applications. It also provides the potential to engage in on-going demonstration projects on this innovative platform.

Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1, as noted above.

AmesNet hØŜŃØíŜø

As pioneer Internet entrepreneur Steve Case argued in his 2016 New York Times bestselling book "The Third Wave", we are entering the era of Internet of Everything, and the innovation ecosystem is expected to become distributed and embedded into centers of excellence in industries such as public safety, agriculture, transportation, power grid, and manufacturing. Being a leader in the aforementioned industries, with Iowa State University (ISU) leading cutting-edge research in Internet of Things (IoT), and with a strong in-state financial industry, the State of Iowa and the greater Des Moines and Ames region have a strong potential to become a leader in the third wave of Internet evolution, i.e., the era of Internet of Everything. In this context, one exciting opportunity is the *Platform for Advanced Wireless Research (PAWR) program*[1] of the National Science Foundation, which intends to invest $100 million to four university-city-industry partnerships to create at-scale infrastructures of next-generation wireless networking technologies and applications.

Towards establishing Iowa as a leader in the third wave of Internet evolution and addressing grand technological and societal challenges, we propose to establish *AmesNet*, a large-scale wireless networking infrastructure spanning the greater Des Moines, Ames, and Nevada region as shown in Figure 1. In addition to supporting research and education in wireless networking, AmesNet is expected to enable transformative applications in domains such as mixed-reality (MR), public safety, agriculture, transportation, power grid, and manufacturing. Therefore, AmesNet is expected to contribute to the innovation ecosystem and economy of the greater Des Moines, Ames, and Nevada region and the State of Iowa.

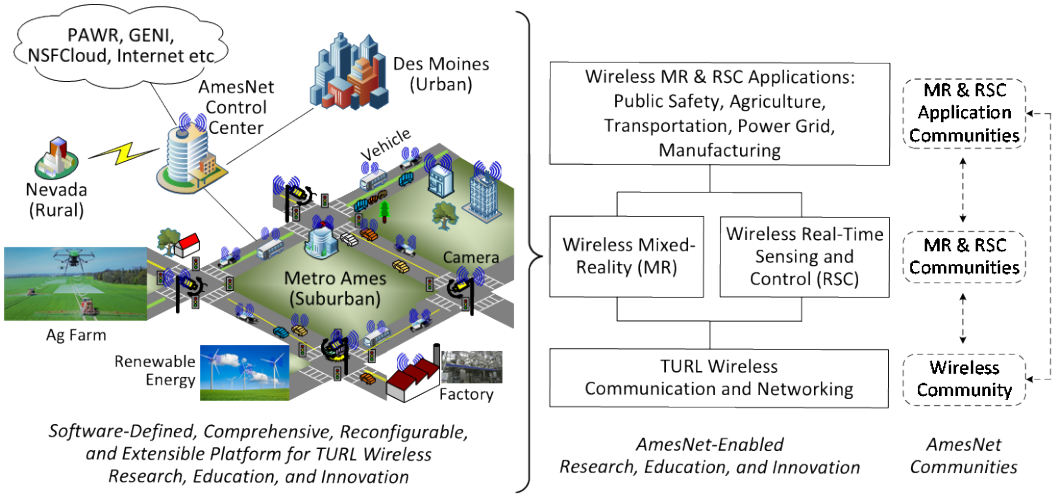


Figure 1: AmesNet Vision
(note: *TURL Wireless* stands for "trustworthy, ultra-high reliability, and ultra-low latency wireless")

Example benefits of the AmesNet project include but are not limited to the following:

- IP and first-to-market advantages for companies pioneering mixed-reality (MR) and real-time-sensing-and-control (RSC) systems in public safety, agriculture, transportation, power grid, and manufacturing
- Millions of dollars of direct investment in the economy of the Des Moines, Ames, and Nevada region
- Recurring economic benefits from attached industry- and government-funded IoT research on AmesNet
- Potential for new job creation as AmesNet attracts "impact investment" funding for IoT startups and as AmesNet attracts wireless companies to locate or maintain a base of operations around the Des Moines, Ames, and Nevada region
- Opportunity to test and refine innovative approaches to city and community services utilizing wireless applications
- National visibility as a leader in wireless innovation and in the third wave of Internet evolution in general

AmesNet Contact:

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[1] NSF PAWR program: https://www.advancedwireless.org/

CITY OF
Ames
Smart Choice

July 26, 2017

PAWR Project Office (PPO)
NSF Platforms for Advanced Wireless Research Program

RE: AmesNet: Wireless Living Lab for Real-Time Cyber-Physical-Human Systems

Dear Colleagues of the PPO and Proposal Review Panel:

The City of Ames is pleased to support the enclosed proposal to establish the advanced wireless network living lab, AmesNet. The City of Ames, Iowa, located in Story County, is a progressive, urban community situated between denser urban/suburban populations (e.g., Des Moines, Iowa, metro area) and rural communities and small towns (e.g., Nevada, Iowa).

Ames is the home of the Iowa State University of Science and Technology; a regional office of the Federal Highway Administration; the National Animal Disease Center of the USDA; the Department of Energy's Ames National Lab and Critical Materials Institute; the State of Iowa's Department of Transportation; a large, regional, city-owned hospital; and a regional, physician-owned, multi-specialty clinic. Furthermore, we have a rich history of successful partnerships among these various governmental entities within our community which will assure the ongoing success of the AmesNet.

What is particularly exciting to the City of Ames is the opportunity to apply the findings from the research developed in the living lab to ongoing demonstration projects related to our city services. In this way, the City of Ames can show to the world how the research findings can be practically implemented by governmental organizations to improve services to their citizens.

If the AmesNet proposal is selected for funding, the City of Ames is committed to:

- Cooperate with ISU and the other governmental agencies involved to form an administrative board (Consortium) and to develop a framework for the deployment, operation, and management of the AmesNet network. This includes providing active representation to the AmesNet Consortium and working groups;

- Make various city departments (e.g., Police, Public Works, Electric Services, Finance/IT) available to advise the AmesNet team regarding the design and execution of applied research derived from AmesNet that is consistent with City Council goals (i.e., innovative applications in public safety, transportation, and non-critical power services);

Mayor's Office

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Ames, IA 50010
www.CityofAmes.org

- Make available city right-of-way and infrastructure, such as power supply, poles, street lights, and traffic signals to deploy and operate the AmesNet infrastructure;

- Expedite any city permitting processes necessary for the AmesNet infrastructure;

- Work with the AmesNet to facilitate community stakeholder involvement in projects: for instance, public safety, smart agriculture, smart transportation, smart grid, and advanced manufacturing; and,

- Assist the AmesNet Consortium in its attempt to develop strategies for the long-term viability of the AmesNet living lab after the five-year NSF funding period.

Good luck with your selection process, and thank you very much for considering the AmesNet proposal.

Sincerely,

Ann H. Campbell

Ann H. Campbell, Mayor
City of Ames, Iowa

ITEM # ___25__
Date: 07-25-17

COUNCIL ACTION FORM

SUBJECT: EXTENSION OF MUNICIPAL POOL AGREEMENT WITH THE AMES COMMUNITY SCHOOL DISTRICT

BACKGROUND:

In May 2015, the City and Ames School District extended the existing agreement to manage and finance the Municipal Pool which is a city-owned building situated on Ames School District property. This unique intergovernmental partnership has served the citizens of Ames and the students of the school district well for almost 50 years.

Now that the facility has reached the end of its useful life, both parties are exploring options for accommodating their aquatic needs into the future. The City is focused on recreational opportunities (lap swimming, swim classes, water aerobics, free swim, water walking, etc.), while the Ames School District is committed to providing a new competitive venue for its athletic teams. **Since it is highly unlikely that a new aquatic facility can be completed any sooner than FY 2019/20, it is imperative that the existing agreement (see attached) be extended.**

On July 17, 2017, the Ames Community School District approved the amendment to the existing agreement as proposed by the City staff.

ALTERNATIVES:

1. The City Council can decide to approve the attached amendment to the Municipal Pool agreement with the Ames School District which extends the existing terms and conditions until June 30, 2020.

2. The City Council can decide to not approve the attached amendment to the Municipal Pool agreement with the Ames School District and thereby not extend the existing agreement.

   Support of this alternative begs the question regarding how to proceed until a new aquatic facility or facilities are completed. Lacking permission to enter onto school property to occupy the Municipal Pool, the City could close the facility or turn the facility over to the School District. Either option would require more in depth legal analysis before any final action is taken.

MANAGER'S RECOMMENDED ACTION:

The partnership with the Ames School District regarding the operation of the City's indoor pool which is situated on school district property is one of many cooperative intergovernmental ventures that benefit the citizens of Ames. Until a final strategy is adopted by the City and Ames School District regarding how to proceed in the future to address their unique aquatic needs, it would seem preferable to maintain the status quo. **Therefore, it is the recommendation of the City Manager that the City Council approve the attached amendment and extend the existing Municipal Pool agreement with the Ames Community School District until June 30, 2020.**

It should be noted that under Section 9 of the existing agreement, either party may opt out of the agreement by giving a three month notice, if that party begins operation of a new pool facility.

MUNICIPAL POOL
JOINT USE AGREEMENT
May 1, 2015 to June 30, 2017

This Agreement, made and entered into effective the 1st day of May, 2015, by and between the CITY OF AMES, IOWA, hereinafter called "City" and the AMES COMMUNITY SCHOOL DISTRICT; hereinafter called "School".

WITNESSETH:

WHEREAS, the City has previously constructed, and is the owner of, an indoor swimming pool and building on land owned by the School (see attached lease) and used as the site of the Ames Senior High School, pursuant to the provisions of a prior agreement between the City and School under date of May 4, 1965; and

WHEREAS, the 1965 agreement was rescinded and superseded by agreements dated February 6, 1984, and May 24, 1994, May 25, 2009: and,

WHEREAS, it is now desired that the said 2009 agreement be rescinded and superseded by a new agreement for joint and cooperative efforts in operating the City's indoor swimming pool on the aforesaid School land;

NOW, THEREFORE, the parties hereto, pursuant to and in accordance with the provisions of Chapter 28E Code for joint exercise of governmental powers, have agreed and do agree as follows:

1. **Site-Access Parking:** The School will provide the site on the High School campus that is the location of the subject pool, together with rights of access for ingress and egress thereto for the duration of this agreement. The persons employed at the swimming pool and persons using the swimming pool shall have the right to use the High School parking lot.

2. **Pool Programs:** The task of planning and executing a mutually agreeable program for the joint and cooperative use of the subject pool and pool building by the City and School shall be and is hereby delegated to the administrative personnel that each shall designate, provided that the City's programs and use thereof shall be subject to the general and specific powers and responsibilities of the Ames Park and Recreation Commission as now or hereafter provided by ordinance.

3. **Administration:** The Superintendent of Schools or designee shall be responsible for administering the joint and cooperative undertaking represented by this agreement. By way of specification but not limitation the same person shall have sole responsibility for

operation and maintenance of the physical plant of the subject pool and pool building. The responsibility for operation and maintenance shall include water quality, filtration, chlorination, and recirculation, with all attendant monitoring and record-keeping. In the discharge of the said administrative responsibility there shall be maintained and made available for inspection, detailed cost accounting records of all expenditures.

4. **Pool Staff:** The School will provide and pay for instructional staff and lifeguards when the School is using the pool, and the City will provide and pay for such staff and lifeguards when the City is using the pool.

5. **Time Sharing:** It is expressly agreed that in the scheduling and programming of the facilities the School shall have the exclusive use of the facilities during the school hours, until 5:15 PM, while school is in session. The City will be responsible for scheduling the programming the pool from 5:15 PM until 12:00 midnight on weekdays, all day on weekends, holidays and during vacation periods. During evening hours and vacation periods the School shall have the right to occasional use of the facilities on a schedule agreed to by both parties. Interscholastic swimming competition events shall preempt scheduled City recreation programs. The Superintendent of Schools or designee shall give a two-week notice to the City Manager or designee for any interscholastic swimming events that were not anticipated or planned at the time of said schedule. However, reasonable efforts to schedule events in advance will be made in order to allow for efficient operations on the part of the City.

   The pool will be made available exclusively to the City for its daytime lap swimming program for a minimum of 1.5 hours each day, Monday through Friday, for a time and duration as agreed upon in writing by both parties.

6. **Cost Sharing:** All costs of capital improvements, operations, repair, replacement and maintenance at the subject pool and building, including by way of specification but not limitation, all costs of electricity, water, heat, chemicals, and custodial personnel, shall be shared on a basis of one-half (1/2) by the School and one-half (1/2) by the City. Capital items which are built-in or affixed to the pool or pool building in a manner intended to be permanent shall be shared unless used only by one party hereto. Costs for capital items which are used exclusively by one party for its programs only shall not be shared. The School, in conjunction with City staff, shall prepare a proposed operating budget and capital improvement plan and submit

the same to the City not later than October 1 of each year for review and consideration. Should the City and the School be unable to agree on the amounts to be budgeted for the pool, they will utilize the service of an arbitrator. The decision of the arbitrator will be final and binding on the City and School.

Unbudgeted capital improvements and repairs pertaining to the swimming pool which are estimated to cost $5,000 or more shall not be done without the prior written approval of duly authorized representatives of both the City and the School.

When agreed upon by both parties, the School shall engage an appropriate consultant to inspect and report on the condition of: a) the pool building roof, b) the structural support members of the pool building, c) the electrical system pertaining to the municipal pool, d) the mechanical HVAC systems pertaining to the municipal pool and, e) the plumbing pertaining to the municipal pool to aid in planning and budgeting for proper maintenance and renewal expenditures pertaining to the pool facility. The cost of this consultant will be shared equally by the City and School.

Any and all building and construction work pertaining to the subject pool which is estimated to cost the City $25,000 or more shall, by virtue of the statutory requirements, be done by the City in accordance with the contracting provisions and procedures of Sections 384.95 – 384.103 Code of Iowa. This shall include the emergency repair procedure of Subsection 384.103 (2). However, the City shall not proceed with any emergency repair or any other building or construction work pertaining to the pool facility without the prior written approval of the School.

7. **Insurance:** Each party shall purchase at their own expense such policies of insurance with respect to the subject pool and its use as they shall each deem prudent for their needs and interests. Insurance premiums shall not be a shared cost. In this regard it is expressly understood and agreed that the pool building, the pool, the pool heating boilers, the mechanical and electric system and all other built-in or attached fixtures pertaining to the pool facility are the property of the City.

8. **Fee and Rules:** The City may establish charge and retain reasonable fees and admission charges for use of the pool and pool building as a City recreation facility. The School may establish charge and retain reasonable fees and admission charges while the pool and pool building is in use by the School. The City shall establish written rules and policies for use of the pool as a City recreation facility,

which shall be posted in a conspicuous place at the pool and otherwise made available to the public at all times. The School may establish and promulgate such pool rules for school programs as it deems appropriate.

9. **Duration:** This agreement shall be in full force and effect for a period of two (2) years and two months from and after the date first above written to June 30, 2017.

   If either party begins operation of a new pool facility, that party may opt out of this agreement given a written notice three months prior to the opt out date.

10. **Public Telephone:** The City may maintain a telephone for use by the public participating in the City swimming programs.

11. **Fiber Optic Line:** The City will, at their expense, maintain the existing fiber optic line between the ICN FOTS room located within Ames High School and the Municipal Pool. It is understood that in the event the School requests this line to be relocated the City will, at their expense, relocate and continue the ongoing maintenance of said line.

12. **Amendments:** During its term, the provisions of this agreement may be amended or made more specific by means of a signed and dated written addenda approved and executed by mutual agreement of the parties in the same manner as the basic agreement.

AMES COMMUNITY SCHOOL DISTRICT

Board President

Board Secretary

CITY OF AMES, IOWA

Mayor

City Clerk

1/21/15; 5:00 p.m.

Email to Keith, approving agreement.

Keith,

To follow up on our telephone conversation this afternoon, I have reviewed the agreement with the Ames Community School District regarding the pool, and I am fine with the wording, have no issues with the substance, and see no problems with it.

The agreement is approved by the Legal Department.

Mark

AMENDMENT TO THE MUNICIPAL POOL JOINT USE AGREEMENT

On May 1, 2015, the City of Ames and the Ames Community School District entered into a Joint Use Agreement regarding the Municipal Pool. Section 9 states that the Agreement shall remain in full force and effect until June 30, 2017.

Realizing that this facility has reached the end of its useful life, both parties have been exploring options for replacing this structure. It is now apparent the neither party will have a replacement pool constructed before the expiration date of this Agreement. Therefore, the parties agree to amend the Agreement as follows:

1. Strike in the first paragraph of Section 9: Duration, "This agreement shall be in full force and effect for a period of two (2) years and two months from and after the date first above written to June 30, 2017" and replace with "This agreement shall remain in full force and effect until June 30, 2020."

2. Except as specifically modified in this Amendment, the remaining provisions of the Agreement shall remain in full force and effect.

Dated this 17th day of July, 2017.

AMES COMMUNITY SCHOOL DISTRICT

Board President

Board Secretary

CITY OF AMES, IOWA

Mayor

City Clerk