★ **Roll Call Number**

Agenda Item Number
27

Date August 3, 2020

APPROVING FISCAL YEAR 2022 TRAFFIC SAFETY FUND APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION (IOWA DOT)

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF DES MOINES, IOWA: That the City Manager is hereby authorized to submit an application to the Iowa DOT for Traffic Safety Funds to cover a portion of the construction costs for the E University Avenue and E 30th Street Intersection Improvements project.

The City further agrees that if this project is funded and constructed, the City of Des Moines will provide adequate resources to maintain the improvements for their useful life.

(Council Letter Number 20-339 attached)

Moved by _____ to adopt.

FORM APPROVED: s/Kathleen Vanderpool
Kathleen Vanderpool
Deputy City Attorney

SLN

Funding Source: Traffic Safety Funds in the amount of $357,000 are requested for this project. $643,000 (remaining amount pending funding award) 2020-2021 CIP, Page Street Improvements – 10, E 30th Street and University Avenue, C038EG99 S.

COUNCIL ACTION	YEAS	NAYS	PASS	ABSENT
COWNIE				
BOESEN				
GATTO				
GRAY				
MANDELBAUM				
VOSS				
WESTERGAARD				
TOTAL				

MOTION CARRIED APPROVED

_____ Mayor

CERTIFICATE

I, P. Kay Cmelik, City Clerk of said City hereby certify that at a meeting of the City Council of said City of Des Moines, held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal the day and year first above written.

_____ City Clerk

Application for FY2022 Traffic Safety Funds
Iowa Department of Transportation

(Site Specific)

E University Avenue and E 30th Street

Intersection Improvements

CITY OF DES MOINES

Division of Traffic and Transportation
Corey Bogenreif, P.E.
Principal Traffic Engineer

August 15, 2020

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Rev. 5/18

Application for SITE-SPECIFIC TSIP FUNDS

GENERAL INFORMATION **DATE:** _____

Location / Title of Project E University Avenue and E 30th Street

Applicant City of Des Moines

Contact Person Calvin Miller Title Engineering Administrative Manager

Complete Mailing Address 400 Robert D. Ray Drive

Des Moines, IA 50309-1891

Phone 515-283-4748 (Area Code) E-Mail cbmiller@dmgov.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) N/A

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Funding Amount

Total Safety Cost	$ 357,000
Total Project Cost	$ 1,000,000
Safety Funds Requested	$ 357,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

☒ Yes – Explain This intersection is #12 on the SICL developed on 10/5/18

☐ No

Rev. 5/18

APPLICATION CERTIFICATION FOR PUBLIC AGENCY

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating public agency(ies). I understand the attached resolution(s), where applicable, binds the participating public agency(ies) to assume responsibility for any additional funds, if required, to complete the project. In addition, the participating public agency(ies) agrees to maintain any new or improved public streets or roadways for a minimum of five years.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Des Moines

Signed: _____

Signature Date Signed

T.M. Franklin Cownie, Mayor

Printed Name

Attest: _____

Signature Date Signed

P. Kay Cmelik, City Clerk

Printed Name

NARRATIVE

Project Description

This project includes capacity, safety, and traffic signal improvements at E University Avenue and E 30th Street in Des Moines. Traffic signal improvements include equipment upgrades, traffic signal retiming including the yellow change and red clearance intervals, and the addition of protected/permissive southbound left phase with flashing yellow arrow. Geometric improvements include the offset of all left turn lanes to create positive offset, removal of right-turn channelizing islands and removal of fixed object in islands, addition of a signal controlled, dedicated northbound right turn-lane, and pedestrian crossing improvements.

The total project cost is estimated to be approximately $1,000,000. The portion of the project that is anticipated to improve safety is estimated to be approximately $357,000. A total of $357,000 is being requested from State Traffic Safety Improvement Program funds.

Existing Conditions

E University Avenue (IA Highway 163) is classified as a Principal Arterial roadway with a posted speed limit of 35 mph. Within the project limits, E University Avenue is a four-lane divided cross-section with left turn-lanes. The eastbound approach has a dedicated left turn lane, two through lanes, and a dedicated right turn lane with a channelizing island at the intersection of E 30th Street. The westbound approach has a dedicated left turn lane and two through lanes. The 2016 Average Daily Traffic for E University was 25,400 vehicles per day (vpd) west of E 30th Street and 24,800 vpd east of E 30th Street.

E 30th Street south of E University Avenue is a four-lane undivided roadway and is classified as a Minor Arterial roadway with a posted speed limit of 35 mph. North of E University Avenue, E 30th Street is a two-lane roadway and is classified as a Collector roadway with a posted speed limit of 25 mph. The northbound approach includes a dedicated left turn lane, one through lane, and a yield-controlled right turn slip lane. The southbound approach includes a dedicated left turn lane, a through lane, and a shared through/right lane. The 2016 Average Daily Traffic for E 30th Street was 5,300 north of E University Avenue and 11,700 south of E University Avenue.

Project Justification

The intersection of E University Avenue and E 30th Street was ranked 12th overall on the Statewide Improvement Candidate List (SICL) developed on October 5, 2018. Crash history was reviewed using the Iowa Crash Analysis Tool (ICAT) for a three-year period from 2017-2019. The leading manner of crashes identified were rear-end and angle/broadside due to left turning vehicles.

Rear-end crashes can be reduced by adjusting the traffic signal timing including the yellow change and red clearance intervals. Traffic signal green time is proposed to be retimed to provide adequate green time for each movement. A review of the traffic signal timings showed that the yellow change and red clearance intervals did not meet current best practices. Based on the ITE's Guidelines for Determining Traffic Signal Change and Clearance Intervals the following signal timing changes are proposed:

		Southbound	Westbound	Northbound	Eastbound
Yellow Change (sec)	**Existing**	3.50	4.00	3.50	4.00
	Proposed	4.10	4.10	4.10	4.10
Red Clearance (sec)	**Existing**	1.00	1.00	1.00	1.00
	Proposed	2.50	2.00	2.50	2.00

Angle/broadside crashes due to left turning vehicles can be reduced by providing positive offset to allow turning vehicles better sight lines to oncoming traffic. This project proposes to modify/remove existing medians for east and westbound traffic and modified pavement markings for north and south bound traffic to allow for positive offset for left turn lanes at all approaches.

Crash reduction factors (CRF) for the proposed intersection improvements were obtained from the Crash Modification Factors Clearinghouse. A CRF of 35.7 for rear-end crashes only was selected for increasing the total change interval (yellow + red). A CRF of 38 for left-turn crashes only was selected for improving the left-turn lane offset to create positive offset.

The traffic signal equipment at the intersection needs updated to meet current City standards. The traffic signal poles in the southwest and southeast quadrants of the intersection are currently in channelizing medians and have been struck on multiple occasions. Moving these poles behind the back of curb will remove two fixed objects within the roadway. The relocation of these signal poles to behind the sidewalk cannot be quantified using CRF; however, it is the City of Des Moines' opinion that this is a significant safety improvement related to the replacement of the traffic signal equipment.

Lastly, this project is proposed to improve pedestrian crossings on all approaches with improved, ADA-compliant curb ramps and pedestrian pushbutton placement as well as pedestrian countdown indications. This improvement cannot be quantified using CRF; however, it is the City of Des Moines' opinion that this is a significant safety improvement for pedestrians.

Based on current Iowa DOT value factors, the total estimated loss from crashes during the described three-year period is $305,600 for rear-end crashes and $1.29 million for angle/broadside crashes (See Exhibit "L"). The request of $357,000 for traffic safety relates benefit-to-cost ratios of 1.31 for the traffic signal improvements and 50.46 for the left turn lane improvements.

ITEMIZED BREAKDOWN OF ALL COSTS

PRELIMINARY ESTIMATE

E UNIVERSITY AVE AND E 30TH ST INTERSECTION IMPROVEMENTS

DATE: 7-15-20

ITEM NO.	DESCRIPTION	UNIT	ESTIMATED UNITS	UNIT PRICE	TOTAL AMOUNT
1	MODIFIED SUBBASE	CY	135	$55.00	$7,425.00
2	EXCAVATION, CLASS 10	LS	1	$10,000.00	$10,000.00
3	BASE WIDENING, PCC	SY	600	$105.00	$63,000.00
4	PAVEMENT SCARIFICATION	SY	8,000	$6.00	$48,000.00
5	HMA OVERLAY	TON	2,000	$130.00	$260,000.00
6	HMA BINDER	TON	100	$750.00	$75,000.00
7	PCC MEDIAN	SY	50	$105.00	$5,250.00
8	REMOVAL OF PCC MEDIAN	SY	160	$50.00	$8,000.00
9	HMA PATCH FOR PCC MEDIAN REMOVAL	SY	110	$50.00	$5,500.00
10	REMOVAL OF PAVEMENT	SY	490	$25.00	$12,250.00
11	REMOVE AND REPLACE CURB	LF	80	$100.00	$8,000.00
12	SUBDRAIN, LONGITUDINAL	LF	220	$50.00	$11,000.00
13	STORM SEWER, 15" RCP	LF	8	$150.00	$1,200.00
14	CONVERT INTAKE TO MANHOLE	EACH	1	$2,500.00	$2,500.00
15	INTAKE	EACH	1	$5,000.00	$5,000.00
16	ADJUST MANHOLE	EACH	1	$2,000.00	$2,000.00
17	SIDEWALK, PCC, 4 IN.	SY	200	$60.00	$12,000.00
18	SIDEWALK, PCC, 6 IN.	SY	60	$70.00	$4,200.00
19	SIDEWALK, BRICK	SY	120	$80.00	$9,600.00
20	DETECTABLE WARNINGS	SF	96	$40.00	$3,840.00
21	REMOVAL OF SIDEWALK	SY	300	$20.00	$6,000.00
22	PAVEMENT MARKINGS REMOVED	STA	15	$200.00	$3,000.00
23	PAVEMENT MARKINGS SYMBOLS REMOVED	EACH	3	$150.00	$450.00
24	DURABLE PAVEMENT MARKINGS (EPOXY)	STA	60	$350.00	$21,000.00
25	DURABLE PAVEMENT MARKING SYMBOLS (EPOXY)	EACH	12	$150.00	$1,800.00
26	REMOVAL OF TRAFFIC SIGNALIZATION	LS	1	$15,000.00	$15,000.00
27	TEMPORARY TRAFFIC SIGNALS	LS	1	$7,000.00	$7,000.00
28	TRAFFIC SIGNALIZATION	LS	1	$290,000.00	$290,000.00
29	TRAFFIC CONTROL	LS	1	$30,000.00	$30,000.00
30	MOBILIZATION	LS	1	$61,985.00	$61,985.00
				TOTAL CONSTRUCTION COST	$990,000.00
				RIGHT-OF-WAY COSTS	$10,000.00
				ESTIMATED TOTAL PROJECT COST	**$1,000,000.00**

PREPARED BY: Gary Hlavka

LEFT TURN LANE COSTS	$45,000.00
TRAFFIC SIGNAL COSTS	$312,000.00

Anticipated Funding Sources

Total Project Cost	$1,000,000
Safety Related Improvements	$357,000 (TSF Funding Request)
Local	$643,000 (Remaining Amount)

TIME SCHEDULE

Preliminary Plan Design ..... January 2021 – July 2021

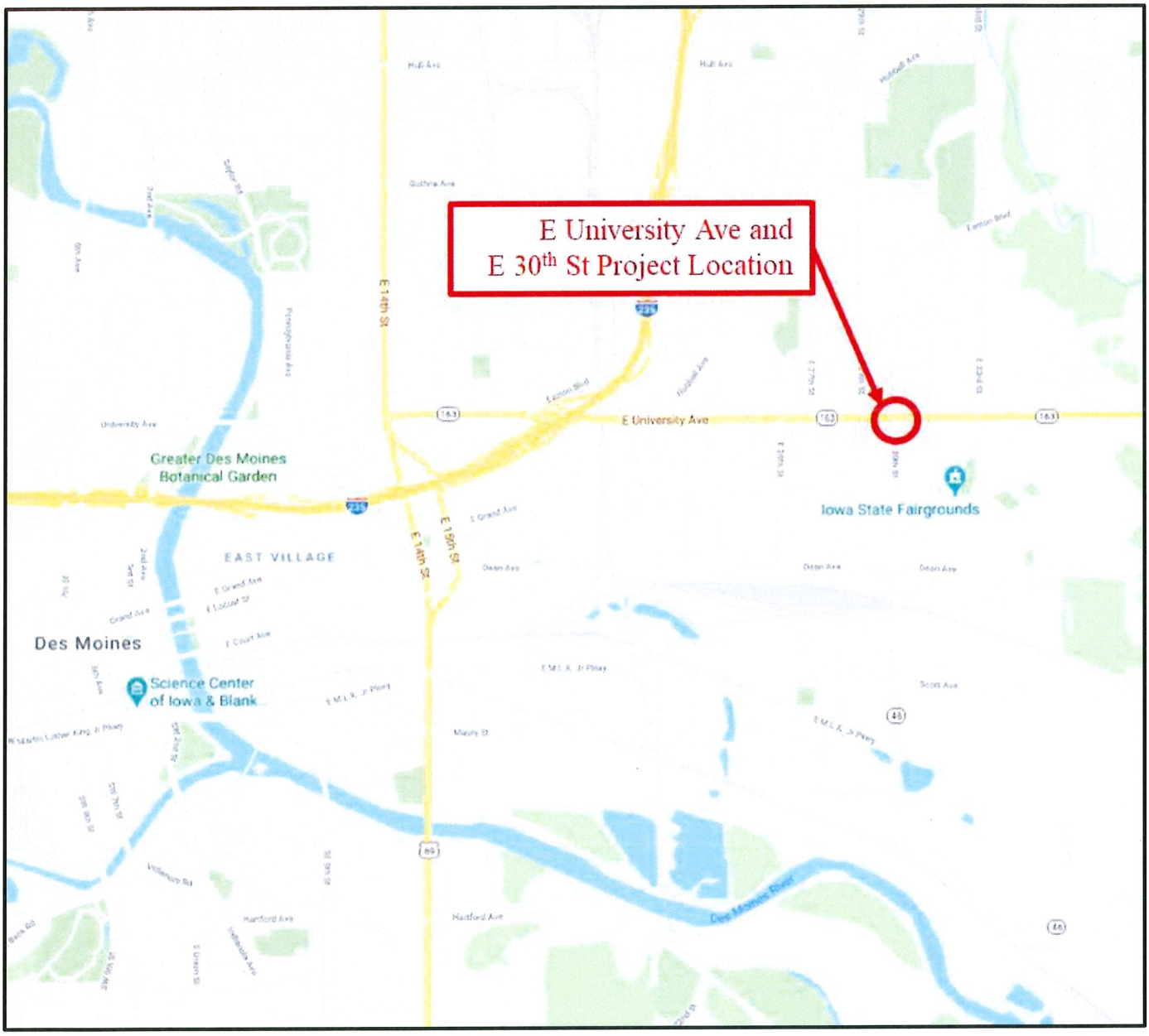
Property Acquisitions (if necessary) ..... July 2021 – December 2021

Final Plan Preparation ..... July 2021 – December 2021

Plan Approval & Project Letting ..... January 2022 – March 2022

Construction ..... August 2022 (after State Fair) – July 2022

MAP


E University Ave and
E 30th St Project Location
E University Ave
E 14th St
E 15th St
Greater Des Moines
Botanical Garden
Iowa State Fairgrounds
EAST VILLAGE
Des Moines
Science Center
of Iowa & Blank
Des Moines River

COLOR PICTURES


SOUTHBOUND APPROACH
07/14/2020


WESTBOUND APPROACH
07/14/2020

EXHIBIT G

PLAN VIEW
E UNIVERSITY AVENUE AND E 30TH STREET

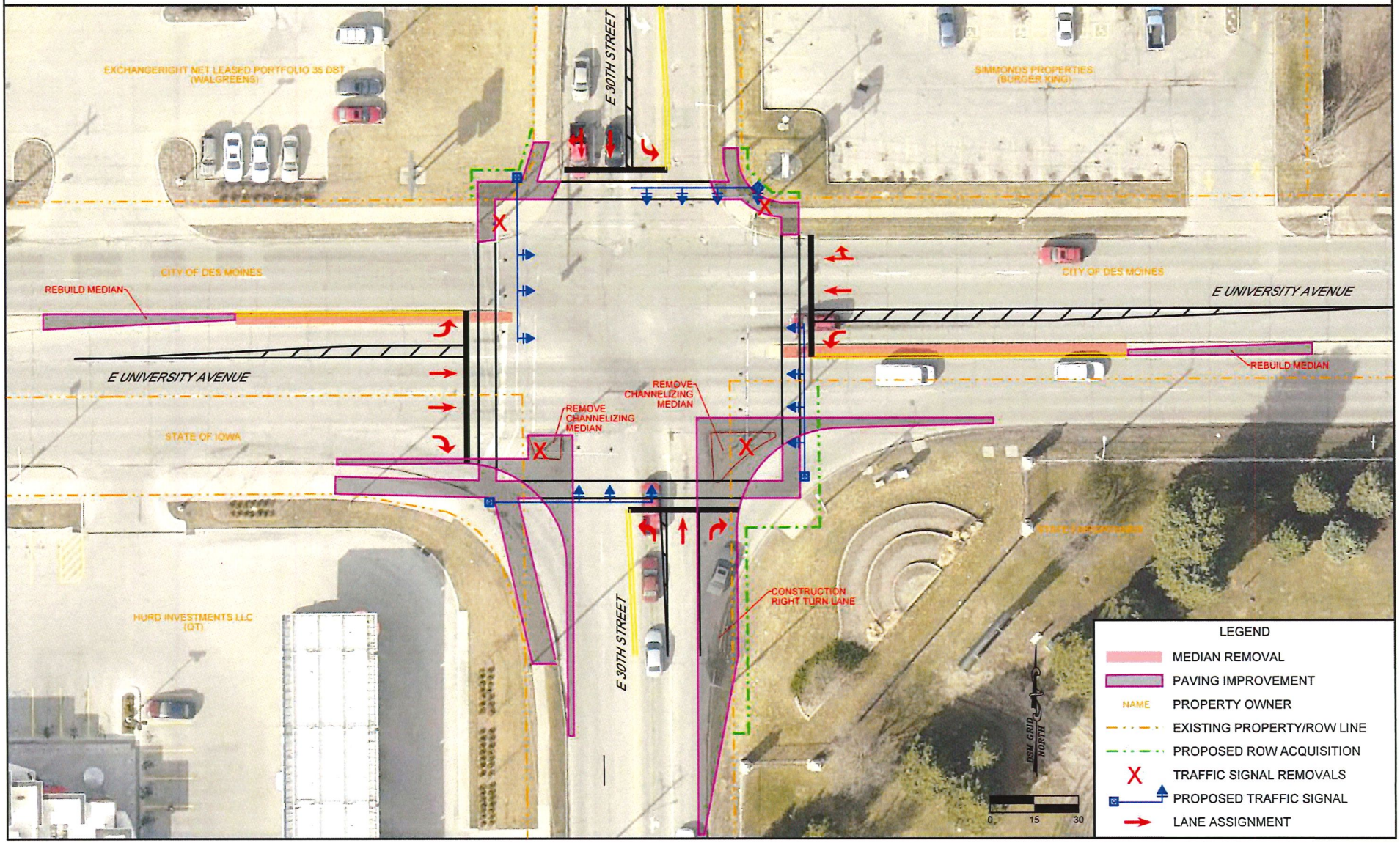
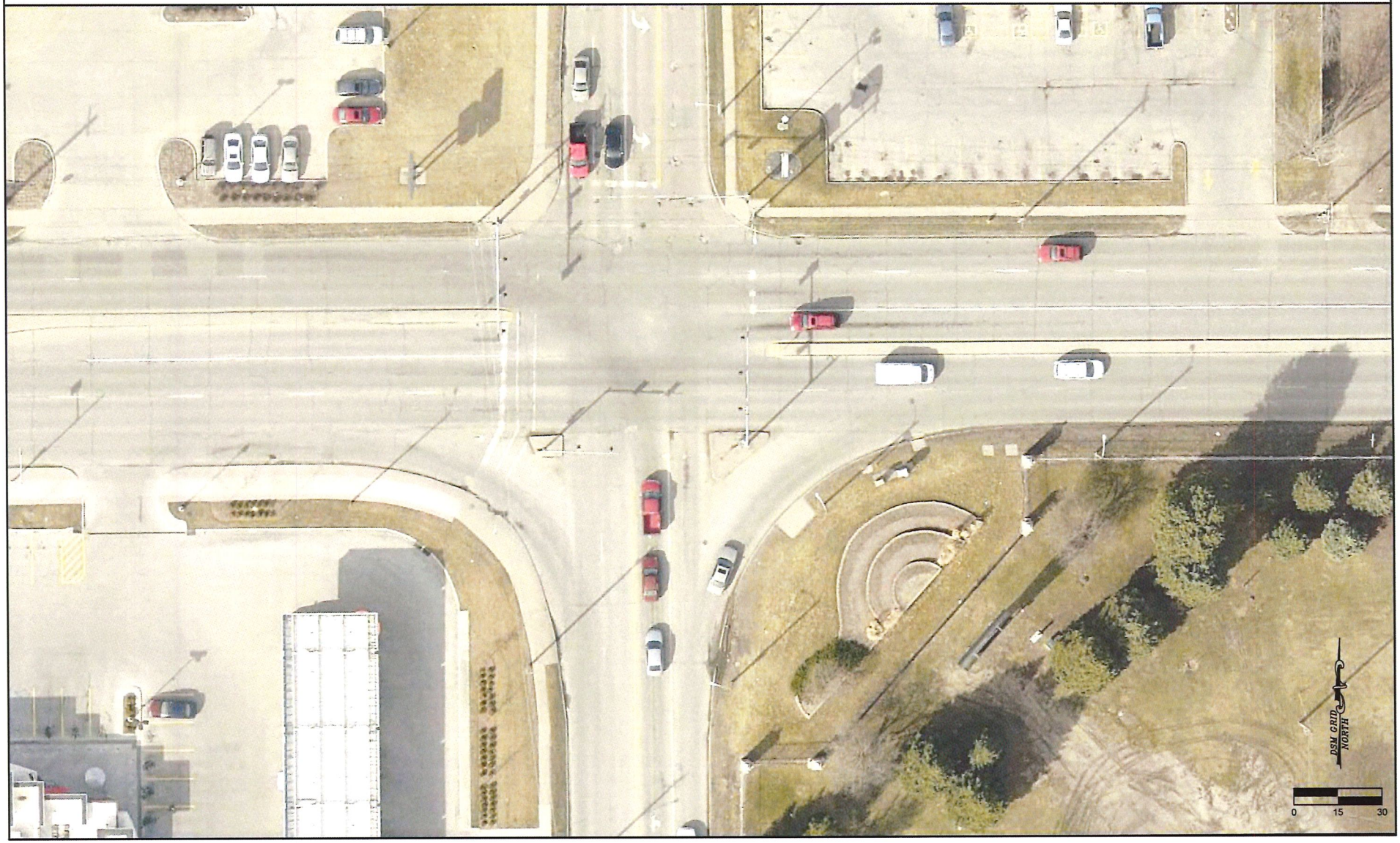


EXHIBIT H

AERIAL PHOTOGRAPHY
E UNIVERSITY AVENUE AND E 30TH STREET



ICAT CRASH SUMMARY OF MOTOR VEHICLE ACCIDENTS

Iowa Crash Analysis Tool
Quick Report
2017-2019

Crash Severity	68
Fatal Crash	0
Suspected Serious Injury Crash	4
Suspected Minor Injury Crash	8
Possible/Unknown Injury Crash	11
Property Damage Only	45

Injury Status Summary	35
Fatalities	0
Suspected serious/incapacitating	4
Suspected minor/non-incapacitating	9
Possible (complaint of pain/injury)	14
Unknown	8

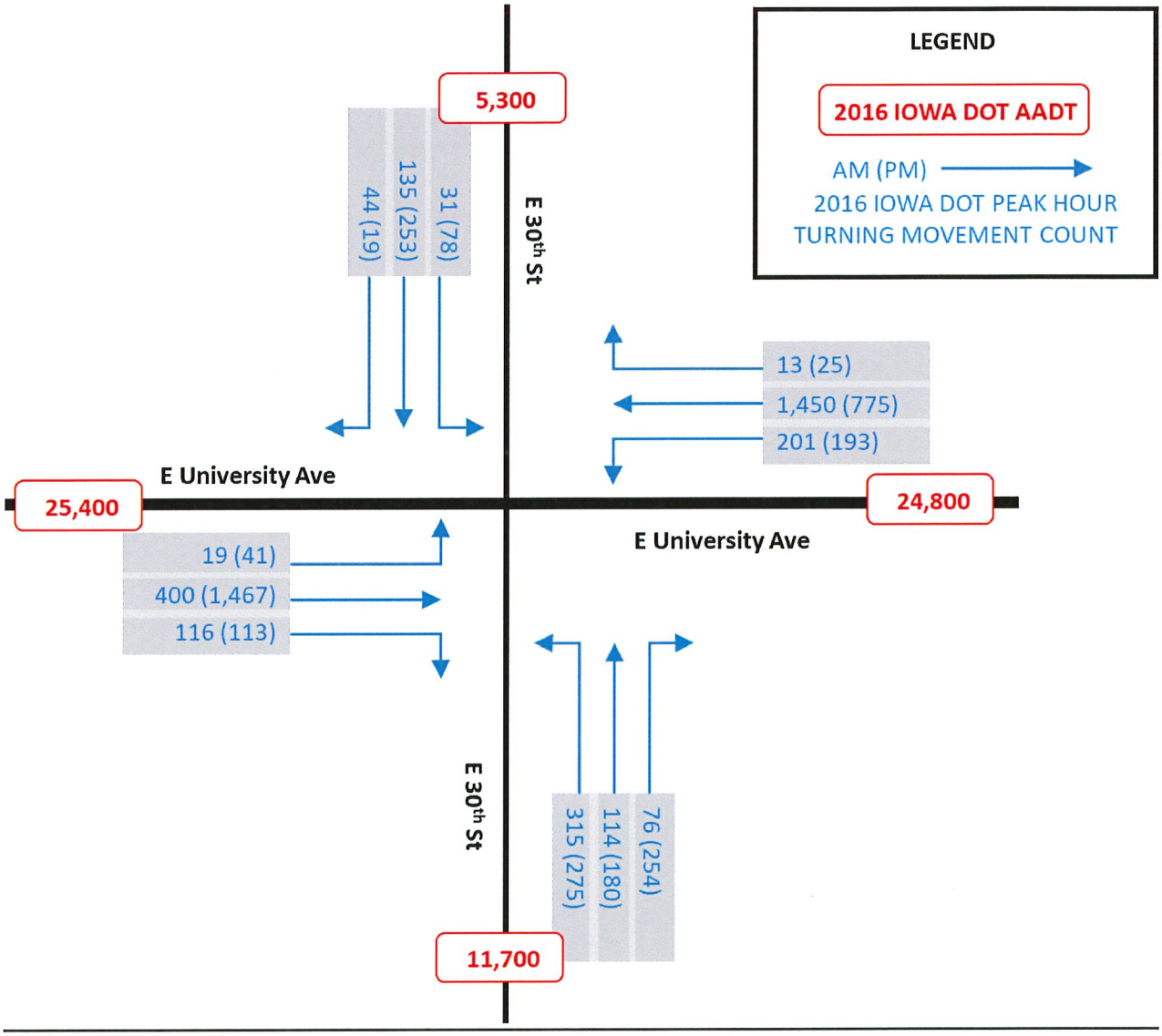
Property/Vehicles/Occupants	
Property Damage Total (dollars):	363,115.00
Average (per crash dollars):	5,339.93
Total Vehicles:	139.00
Average (per crash):	2.04
Total Occupants:	202.00
Average (per crash):	2.97

Average Severity	
Fatalities/Fatal Crash:	0.00
Fatalities/Crash:	0.00
Injuries/Crash:	0.40
Major Injuries/Crash:	0.06
Minor Injuries/Crash:	0.13
Possible/Unknown Injuries/Crash:	0.21

Major Cause			68
Animal	0	Ran traffic signal	6
Ran stop sign	0	Failed to yield to emergency vehicle	0
FTYROW: At uncontrolled intersection	0	FTYROW: Making right turn on red signal	1
FTYROW: From stop sign	0	FTYROW: From yield sign	1
FTYROW: Making left turn	16	FTYROW: From driveway	0
FTYROW: From parked position	0	FTYROW: To pedestrian	0
FTYROW: Other	0	Drove around RR grade crossing gates	0
Disregarded RR Signal	0	Crossed centerline (undivided)	0
Crossed median (divided)	0	Traveling wrong way or on wrong side of road	0
Aggressive driving/road rage	0	Driving too fast for conditions	0
Exceeded authorized speed	2	Improper or erratic lane changing	4
Operating vehicle in an reckless, erratic, ca...	2	Followed too close	13
Passing: On wrong side	0	Passing: Where prohibited by signs/markings	0
Passing: With insufficient distance/inadequa...	0	Passing: Through/around barrier	0
Passing: Other passing	0	Made improper turn	3
Driver Distraction: Manual operation of an e...	0	Driver Distraction: Talking on a hand-held d...	0
Driver Distraction: Talking on a hands free ...	0	Driver Distraction: Adjusting devices (radio...	0
Driver Distraction: Other electronic device ...	0	Driver Distraction: Passenger	0
Driver Distraction: Unrestrained animal	0	Driver Distraction: Reaching for object(s)/f...	0
Driver Distraction: Inattentive/lost in thou...	0	Driver Distraction: Other interior distracti...	0
Driver Distraction: Exterior distraction	0	Ran off road - right	1
Ran off road - straight	0	Ran off road - left	0
Lost control	2	Swerving/Evasive Action	0
Over correcting/over steering	0	Failed to keep in proper lane	1
Failure to signal intentions	1	Traveling on prohibited traffic way	0
Vehicle stopped on railroad tracks	0	Other: Vision obstructed	0
Other: Improper operation	0	Other: Disregarded warning sign	0
Other: Disregarded signs/road markings	0	Other: Illegal off-road driving	0
Downhill runaway	0	Separation of units	0
Towing improperly	0	Cargo/equipment loss or shift	0
Equipment failure	0	Oversized load/vehicle	0
Other: Getting off/out of vehicle	0	Failure to dim lights/have lights on	0
Improper backing	0	Improper starting	0
Illegally parked/unattended	1	Driving less than the posted speed limit	0
Operator inexperience	0	Other	2
Unknown	12	Not reported	0
Other: No improper action	0		

Manner of Crash Collision	68
Non-collision (single vehicle)	4
Head-on (front to front)	2
Rear-end (front to rear)	19
Angle, oncoming left turn	15
Broadside (front to side)	13
Sideswipe, same direction	11
Sideswipe, opposite direction	1
Rear to rear	0
Rear to side	0
Not reported	0
Other	2
Unknown	1

TRAFFIC VOLUMES AND TURNING MOVEMENTS

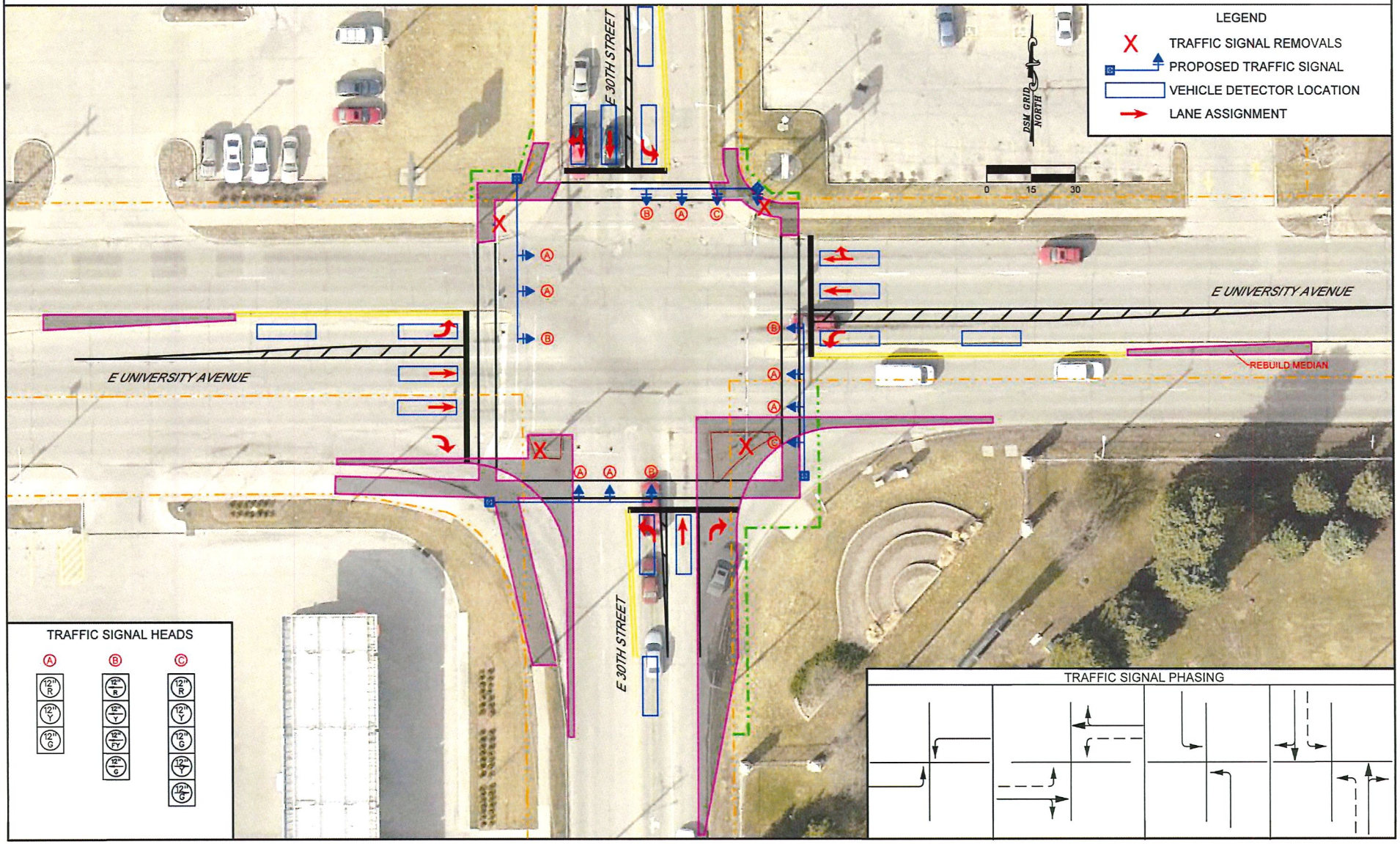


Traffic Volume Notes:

- Source: Iowa DOT 2016 Turning Movement Count Summary
- Date Collected: September 1, 2016
- Recent and accurate traffic data could not be collected due to COVID-19 traffic reductions.

EXHIBIT K

TRAFFIC SIGNAL LAYOUT
E UNIVERSITY AVENUE AND E 30TH STREET



BENEFIT/COST

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/18

Iowa DOT Office of Traffic & Safety

County: Polk Prepared by: City of Des Moines Date Prepared: Jul 16, 2020

Intersection: E University Avenue & E 30th Street

Improvement

Proposed Improvement(s): Retime traffic signal and increase yellow change and red clearance intervals

$ 312,000 Estimated Improvement Cost, **EC**

$ 100 Other Annual Cost (after initial year), **AC**

$ 1,112 Present Value Other Annual Costs, **OC**

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

15 Estimated Service Life, years, **Y**

36 Crash Reduction Factor (integer), **CRF**

4.0% Discount Rate (time value of $), **INT**

$ 313,112 Present Value Cost, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT 2016 Turning Movement Traffic Count 9/1/2016 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

3,045 (↓)

11,653 (→) (←) 12,407

(↑) 6,489

12,261,810 Current Annual Entering Veh., **AEV** = DEV * 365

34,876 veh / day, Final Year DEV, **FDEV**

187.18 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

0.3% Projected Traffic Growth (0%-10%), **G**

33,594 Current Daily Entering Vehicles, **DEV**

Crash Data

2017 First full year --> 2019 Last full year 3.0 years, Time Period, T

Additional months

0	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		0	Major Injuries @	$325,000	$ -
3	Injury Crashes	2	Minor Injuries @	$65,000	$ 130,000
		1	Possible Injuries @	$35,000	$ 35,000
16	Property Damage Only		(assumed cost per crash)	$7,400	$ 140,600
		-OR-	enter all Property Costs of all crashes:		
19	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 305,600

6.33 Current Crashes / Year, **AA** = TA / T

$ 16,084 Cost per Crash, **AVC** = LOSS / TA

96.7 Total Expected Crashes, **TECR** = CR x TMEV

2.26 Crashes Avoided First Year **AAR** = AA x CRF / 100

$ 36,366 Crash Costs Avoided In First Year, AAR x AVC

34.5 Total Avoided Crashes, TECR x CRF/ 100

0.52 Crashes / MEV, Crash Rate, **CR**
CR = TA x 10^6 / (DEV x 365 x T)

$ 410,741 Present Value of Avoided Crashes, **BENEFIT**

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $410,741 : $313,112 = **1.31** : 1

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/18

Iowa DOT Office of Traffic & Safety

County: Polk Prepared by: City of Des Moines Date Prepared: Jul 16, 2020

Intersection: E University Avenue & E 30th Street

Improvement

Proposed Improvement(s): Modify/Remove Median and Pavement Markings to allow for positive offset for left turn lanes at all approaches

$ 45,000	Estimated Improvement Cost, **EC**	20	Estimated Service Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	38	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
	$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$	$ 45,000	Present Value Cost, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT 2016 Turning Movement Traffic Count 9/1/2016 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

3,045 (N) / 11,653 (W) / 12,407 (E) / 6,489 (S)

12,261,810 Current Annual Entering Veh., **AEV** = DEV * 365

35,314 veh / day, Final Year DEV, **FDEV**

251.15 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

$$TMEV = \frac{AEV}{G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

0.3% Projected Traffic Growth (0%-10%), **G**

33,594 Current Daily Entering Vehicles, **DEV**

Crash Data

2017 First full year --> 2019 Last full year 3.0 years, Time Period, **T**

Additional months

0	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		2	Major Injuries @	$325,000	$ 650,000
11	Injury Crashes	4	Minor Injuries @	$65,000	$ 260,000
		5	Possible Injuries @	$35,000	$ 175,000
17	Property Damage Only		(assumed cost per crash)	$7,400	$ 207,200
		-OR-	enter all Property Costs of all crashes:		
28	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 1,292,200

9.33	Current Crashes / Year, **AA** = TA / T	0.76	Crashes / MEV, Crash Rate, **CR**
$ 46,150	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
191.2	Total Expected Crashes, **TECR** = CR x TMEV	$ 2,270,740	Present Value of Avoided
3.55	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 163,679	Crash Costs Avoided in First Year, AAR x AVC		
72.6	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $2,270,740 : $45,000 = **50.46** : 1