MASTER PLAN

THE EASTERN IOWA AIRPORT CEDAR RAPIDS

Appendices

MASTER PLAN

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Appendix A

Eastern Iowa Airport – Expanded Terminal Traffic Operations Analyses

Eastern Iowa Airport – Expanded Terminal Traffic Operations Analyses

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RE: Project I.D. 3-19-0012-043-2011
Eastern Iowa Airport
Expanded Terminal
Traffic Analysis
Linn County

1. Introduction

The Eastern Iowa Airport (CID) is owned by the City of Cedar Rapids and operated by the Cedar Rapids Airport Commission. Airmail service into Cedar Rapids began on July 10, 1928. Due to inoperable conditions during bad weather, the old airport was phased out and in 1947 a new airport was dedicated in Cedar Rapids, which is the present location. The terminal has been modernized and the highway access has been reconstructed and made more convenient.

The airport has two runways that are grooved concrete, precision instrument landing procedures to both runways for all weather operations, an air traffic control tower and all the other amenities of a twenty-first century airport. Three airlines provide an average of 30 flights per day, Sunday-Friday and an average of 20 flights on Saturdays. Those flights connect in Denver, Dallas, Chicago, Atlanta and several other cities. The number of enplanements in 2011 reached 439,025, down from a historical high of 531,000 in 2007.

Mead & Hunt, Inc. has been working with the Airport Commission to develop a Master Plan which assesses facility needs over a 20-year period.

This memorandum summarizes the traffic study, part of the Master Plan, which assesses quality of service at the intersections and roads that provide access to the terminal, for

the years 2012, 2022 and 2032. It also summarizes the capacity at the curbside pickup/drop off area for the same years.

The traffic study area encompasses the access to the existing terminal (in and out), the intersection with 6th Street SW and the I-380 interchange ramp terminals, as listed below.

- STH 84 (Wright Brother Boulevard W SW) with Arthur Collins Parkway SW
- STH 84 (Wright Brother Boulevard W SW) with 18th Street SW
- Lippisch Place with 18th Street SW
- STH 84 (Wright Brother Boulevard W SW) with I-380 SB Ramp Terminal
- STH 84 (Wright Brother Boulevard W SW) with I-380 NB Ramp Terminal

The traffic analysis was conducted at a planning level, where the main goal is determine the overall quality of service and improvements needed. Therefore, the analysis outputs should not be employed to provide detailed information for design purposes, such as length of turning bay lanes, signal phasing and times, queue lengths, among others.

The traffic study aims to determine existing capacity and future improvements required to keep the level of services (LOS) at or above desirable levels.

The capacity study at the pickup/drop off area aims to assess terminal LOS and required expansion, if any, to attend future demand.

2. Traffic Data Collection

No data collection was conducted. Annual Average Daily Traffic (AADTs) for USH 84 and I-380 were obtained through Iowa Department of Transportation's web page. Turning movements at the intersections of USH 84 with both I-380 ramp terminals were provided by the Airport. These data can be found in Appendix 1.

Annual number of enplanements and daily number of flights for peak day of the peak month were obtained from the Easter Iowa Airport Master Plan, prepared by Mead & Hunt in January 2013, as part of the same project.

3. Airport Traffic Demand

The number of trips generated by the terminal was calculated using the Trip Generation, 8th Edition, published by the Institute of Transportation Engineers (ITE), based on daily number of flights for the peak day of the peak month. The ITE tables used in this study can be found in Appendix 2.

Available data concerning daily number of flights included only historical series. Therefore, daily number of flights was updated for the study year, 10 years after study and design year assuming the same growth rate as the annual number of enplanements, whose forecast has been previously developed by Mead & Hunt. That previous forecast was originally developed for 2011, 2021 and 2031 and was updated for 2012, 2022 and 2032 using the same growth rate.

The ITE study that generated the trip rates involved few airports with diverse operational characteristics and of different sizes. In that study, the average daily number of flights is 349, which is significantly higher than the average observed at CID. Therefore, a number of assumptions were made, considering that:

- CID is a regional airport, connecting to major airports nationwide. At CID, the peak of the demand may not occur at the periods observed at the major regional and national airports.
- Also, it is widely accepted that trips to/from small airports are generally made by personal cars and that transit is almost non-existent.

Accordingly, a higher than average trip rate, although within the acceptable range, was used to calculate the number of trips. Specifically, the peak hours of the generator, instead of the street, was utilized.

The number of trips was calculated for the peak day of the month in AM and PM peak hours for the years 2012 (current), 2022 (10 years after study) and 2032 (design year), as shown in Table 1.

Table 1 – Trip Generation

Study Year		2012		2022		2032	
Peak Hour		AM	PM	AM	PM	AM	PM
Number of daily Flights		66		83		107	
Number of trips Generated	Total	625	554	852	755	1041	922
	In	288	266	393	362	479	443
	Out	337	288	459	393	562	479

4. Base Year and Future Years Network Development

While establishing the scope of this project, three study years were designated for traffic projection and analysis within the study area, following the planning study being prepared by Mead & Hunt, Inc. Therefore, traffic forecasts were developed for the years 2012 (current), 2022 and 2032 (this one as the Design Year).

Forecasts for the Years of 2012 were developed based solely on historical AADT growth. Forecasts for 2022 and 2032 used both the historical AADT series available plus the projected number of trips generated by the growth in daily number of enplanements.

5. Traffic Analysis

Traffic analysis for 2012, 2022 and 2032 was run for all five (5) intersections previously identified. Traffic turning volumes for all five (5) intersections are listed in Appendix 3.

The primary metric by which transportation professionals assess quality of operations is level of service (LOS). The Transportation Research Board's *Highway Capacity Manual* (HCM 2000) contains the specific methodologies used to determine this metric for various facility types (freeway sections, weaving areas, ramps, signalized intersections, and unsignalized intersections). Chapter 2 includes the following definition:

> *Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.*

Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions. Safety is not included in the measures that establish service levels.

Most design or planning efforts typically use service flow rates of LOS C or D to ensure an acceptable operating service for facility users.

The quantitative measures for LOS vary amongst various facility types. For unsignalized and signalized intersections, LOS declines as the vehicle delay increases. In all cases, LOS C has been established as the minimum benchmark of acceptability. Any location falling below that threshold would require some type of corrective action (such as added turn lanes, signalization, or added travel lanes) to return to acceptable operations.

The term Level of Service (LOS) is used as a measure of a roadway's operational performance. National guidelines for appropriate LOS on different types of roadways have been developed by the Transportation Research Board and adopted by the American Association of State Highway and Transportation Officials. In turn, these national guidelines have been adopted by state transportation agencies, including Iowa DOT.

LOS designations range from A to F, with LOS A exhibiting free-flow traffic, and LOS F exhibiting severe congestion that approaches gridlock. LOS designations for intersections are related to the average delay each vehicle experiences while passing through in intersection. Iowa DOT typically designates LOS D as the minimum acceptable LOS for intersection traffic operations. Table 2 summarizes LOS designations for signalized and unsignalized intersections.

Table 2 – Intersection LOS Designations

LOS	Signalized Intersections	Unsignalized Intersections (Two-Way Stop Controlled)
	Average Delay per Vehicle (s/veh) for All Entering Traffic	*Average Delay per Vehicle (s/veh) for Each Minor Movement*
A	< 10.0	< 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

For this study, the road network was built using Synchro 8.0. Level of Service (LOS) was assessed only for the intersection movements that are included in the routes from the airport terminal to the cities of Cedar Rapids and Iowa City, via STH 84 and I-380, and to the east and west directions, via STH 84.

6. Intersections Operational Analysis Results

For all signalized intersections, an overall LOS could be taken from the HCM analyses. However, for unsignalized intersections, where LOS is reported for both Minor and Major Street Approaches, results are summarized only in tabular format in the following sections.

The results and comments have been separated into the two following sections for analysis under current conditions and analysis after geometric improvements.

a. Traffic Analysis – Current Geometry and Control

Intersection analyses were performed for all five intersections previously listed using Synchro 8.0 and optimal traffic signal timings at the signalized intersections. Basic levels of service for all intersection movements along the routes Airport – Cedar Rapids, Airport – Iowa City, Airport to both East and West via STH 84 are shown in Tables 1 through 7 along with comments on results. The LOS tables do not include the movements that are not part of these main routes. The outputs to the models can be found in Appendix 4.

Note for all the LOS tables:

LT, TH and RT men left turn, through, and right turn, respectively.

NB, SB, EB and WB mean northbound, southbound, eastbound and westbound, respectively.

Unsignalized Intersections

Table 3 – LOS at the Intersection of STH 84 with Lippisch Place (Airport Entrance)

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
EB	TH	--	--	--	--	--	--
	RT	--	--	--	--	--	--
WB	LT	A	A	A	A	A	A
	TH	--	--	--	--	--	--

The intersection of STH 84 with Lippisch Place currently operates under a two-way stop control (TWSC), where the north-south directions are free-flow. As the results in Table 3 show, the LOS on the WB LT movement (the only one subject to control) will operate at LOS equal to A until 2032 and, therefore, no improvements are being recommended.

Table 4 – LOS at the Intersection of Lippisch Place (Airport Exit) with 18th St SW

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
EB	LT	B	B	C	C	E	F
	RT	A	A	A	A	A	A
NB	TH	--	--	--	--	--	--
SB	TH	--	--	--	--	--	--

Shaded areas denote the occurrences of unacceptable levels of service reported by the analyses.

The intersection of Lippisch Place with 18th St SW currently operates under a two-way stop control (TWSC), where the east-west directions are free-flow. As the results in Table 4 show, the intersection will operate under acceptable LOS until the year 2022. In 2032, the EB LT will operate at unacceptable LOS of E and F in the AM and PM peak hours, respectively. Further analysis, under either all-way stop control (AWSC) or traffic signal operation is recommended.

Table 5 – LOS at the Intersection of STH 84 with 18th St SW (Airport Exit)

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	LT	A	A	A	A	A	A
EB	TH/RT	--	--	--	--	--	--
	LT	A	A	A	A	A	A
WB	TH/RT	--	--	--	--	--	--
	LT	C	B	C	C	E	D
NB	TH	B	B	C	C	F	C
	RT	--	--	--	--	--	--
	LT	E	D	F	F	F	F
SB	TH/RT	B	B	C	C	C	C

Shaded areas denote the occurrences of unacceptable levels of service reported by the analyses.

The intersection of STH 84 with 18th St SW currently operates under a two-way stop control (TWSC), where the east-west directions are free-flow. According to the results in Table 5, the intersection will operate under acceptable LOS until the year 2022. In 2032, the NB LT will operate at unacceptable LOS of D in the AM peak hours. LOS of D, although not desirable, may be acceptable, since that LOS occurs at only one movement. However, further analysis, under traffic signal operations is recommended.

Another problem that appears at this point is the exiting short distance between this intersection and the one immediately south, which causes the NB queues to extend beyond the upstream intersection. This is shown in the outputs of the model, which can be found in Appendix 4. Analysis under signal control is recommended.

Signalized Intersections

Table 6 – LOS at the Intersection of STH 84 with the I-380 Southbound Ramp Terminal

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
EB	TH	A	C	A	C	A	B
	RT	A	C	A	C	A	A
WB	LT	B	A	A	B	C	B
	TH	B	A	A	B	A	B
SB	LT	B	A	C	A	C	B
	RT	B	A	C	A	C	B
Intersection		B	B	A	B	B	B

This intersection of STH 84 with the I-380 Southbound Ramp Terminal is currently signalized. According to the results depicted in Table 6, the LOS on all movements will operate at acceptable LOS during all study years. Therefore, no improvements are being recommended.

Table 7 – LOS at the Intersection of STH 84 with the I-380 Northbound Ramp Terminal

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
EB	LT	C	B	E	B	F	C
	TH	A	A	A	B	A	B
WB	TH	C	B	A	B	E	A
NB	LT	B	A	D	B	D	B
	RT	B	A	C	B	C	B
Intersection		C	B	C	B	E	B

Shaded areas denote the occurrences of unacceptable levels of service reported by the analyses.

This intersection of STH 84 with the I-380 Northbound Ramp Terminal is currently signalized. The results in Table 7 show that the intersection will operate at desirable LOS until the year 2022, although the EB LT and NB LT in the AM peak hour will operate at LOS of E and D, respectively. In year 2032, several movements will operate at undesirable LOS in the AM peak hour. Further analysis, under an improved geometry, is recommended.

b. Traffic Analysis – Improved Geometry and Control

Intersection analyses were performed only for the intersections that showed undesirable LOS in one or more of the study years. The analyses were done using Synchro 8.0 and optimal traffic signal timings at the signalized intersections. Basic levels of service for all intersection movements along the routes Airport – Cedar Rapids, Airport –Iowa City, Airport to both East and West via STH 84 s are shown in Tables 8 through 12 along with comments on results. As previously explained, only movements included in the detours have their LOS depicted in the tables.

Table 8 – LOS at the Intersection of Lippisch Place (Airport Exit) with 18th St SW (AWSC Installed on/before 2032)

		2032 AWSC	
Approach	**Movement**	**AM**	**PM**
EB	LT	F	F
	RT		
WB	TH	B	B
SB	TH	B	B
Intersection		F	F

Shaded areas denote the occurrences of unacceptable levels of service reported by the analyses.

Under AWSC, the intersection of Lippisch Place with 18th St SW will still operate at LOS F. Therefore, changing the existing TWSC to AWSC is not recommended.

Table 9 – LOS at the Intersection of Lippisch Place (Airport Exit) with 18th St SW (Traffic Signal Installation on/before 2032)

		2032 Signal	
Approach	**Movement**	**AM**	**PM**
EB	LT	B	B
	RT	A	A
WB	TH	B	B
SB	TH	B	B
Intersection		B	B

Under signalized operation, the intersection of Lippisch Place with 18th St SW as well as all intersection movements will operate at LOS equal to B or better. No geometric improvements will be required.

Table 10 – LOS at the Intersection of STH 84 with 18th St SW (Airport Exit) (Traffic Signal Installation on/before 2022)

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
	LT	A	A	B	A
EB	TH	A	A	A	A
	RT	--	--	--	
	LT	A	A	A	A
WB	TH	A	A	B	B
	RT	A	A	A	A
	LT	A	A	B	B
NB	TH	A	A	B	B
	RT	C	C	B	B
	LT	A	A	B	B
SB	TH	A	A	B	A
	RT	--	--	--	--
Intersection		B	B	C	C

Under signalized operation, the intersection of STH 84 with 18th St SW, as well as all movements will operate at LOS of C or better in both 2022 and 2032. Geometric improvements, such as additional right turn bay lanes on the EB, WB and SB approaches, will be required.

An additional problem that appears at this point is the exiting short distance between this intersection and the one immediately south, which is also being studied as signalized. That short distance may cause the NB queues to extend beyond the upstream signal. This is shown in the outputs to the model, which can be found in Appendix 4. Installing traffic signals alone will not resolve this problem. To resolve this problem, it is necessary to reconstruct the intersection of 18th St with Lippisch Place further south. Before making such a recommendation, however, a more detailed analysis, at the design level, must be developed.

Table 11 – LOS at the Intersection of STH 84 with the I-380 Southbound Ramp Terminal (Additional Turning Lanes at the WB and EB Approaches)

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
EB	TH	B	C	B	C
	RT	A	C	A	C
WB	LT	B	A	B	A
	TH	B	A	B	B
SB	LT	B	B	C	A
	RT	B	B	C	A
Intersection		B	B	B	B

The intersection of STH 84 with the I-380 Southbound Ramp Terminal is currently signalized and no change in control is being proposed. However, an improved geometry with the addition of turning lanes at both the WB and EB approaches has been proposed, which results in improved traffic operations. The summary results in Table 11 shows that the intersection will operate at desirable LOS equal to B in both peak hours, in both 2022 and 2032. The individual movements will also operate at LOS equal or greater than C, which is usually within the acceptable threshold for rural intersections.

Table 12 – LOS at the Intersection of STH 84 with the I-380 Northbound Ramp Terminal (Additional Turning Lanes at the WB Approach)

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
EB	LT	B	A	D	B
	TH	A	A	A	A
WB	TH	B	B	C	B
	RT	A	B	A	A
NB	LT	B	B	C	A
	RT	B	B	C	A
Intersection		B	A	C	B

The intersection of STH 84 with the I-380 North Ramp Terminal is currently signalized and no change in control is being proposed. However, analogous to the previous intersection, an improved geometry with the addition of turning lanes at the WB approach has been proposed, which results in improved operations. The summary results in Table 12 shows that the intersection will operate at desirable LOS equal to or greater to B in both peak hours, in both 2022 and 2032. The individual movements will also operate at LOS equal TO or greater than C, which is usually within the acceptable threshold for rural intersections.

7. Curbside Pickup and Drop off Area

7.1 Analysis

The terminal future demand and improvements were calculated using the estimated growth in daily enplanements, the existing facility capacity and the tables and methodologies from Airport Cooperative Research Report (ACRP) 25 and National Cooperative Highway Research Report (NCHRP) 40.

The length of each vehicle type was obtained from the terminal spreadsheet of ACRP 25. The curbside length for pickup/drop off was measure on Google map as 535 feet.

The percent of vehicles that will go to the parking lot, or that will go to the drop off/pickup area or both is not known. The classification of vehicles that uses the curbside drop off/pickup is not known, as well. However, these values were estimated using the Methodology in Chapter 3 of ACRP 40 and by extrapolating the values on Tables 3-1 and 3-2 in this chapter. Therefore, the values found are 90% private vehicles and 10% commercial vehicles. Out of the total, 35% private vehicles going to/coming from the parking lot, 35% private vehicles going to/coming from the curbside pickup/drop off area, 20% rental cars and 10% commercial vehicles (mostly taxicabs). Out of the 35% of vehicles going to/coming from the parking area, 20% go to/come from park and 15% go to/come from the pickup/drop off area and then, park. All taxicabs go to/come from the drop off/pickup area. Therefore, the total percent of vehicles using the curbside pickup/drop off area is 60%.

The number of peak hour trips generated by the airport was previously calculated for the years 2012, 2022 and 2032, and shown in Table 1.

Vehicle length and vehicle dwell time were obtained from the Terminal Planning spreadsheet of ACRP 25.

These values were input to the Terminal Planning spreadsheet and the following results were found:

Table 13 – Level of Service at the Curbside Pickup/Drop off Area – Year 2012

Number of Trips	**Peak Hour**			
	AM Peak		**PM Peak**	
	In	**Out**	**In**	**Out**
Total	288	337	266	288
Private Vehicles Frontcurb	101	(*)	93	(*)
Private Vehicles Frontcurb/Parking	43	51	40	43
Taxicabs	29	(*)	27	(*)
From Terminal Planning Spreadsheet				
Existing Capacity Ratio	0.26		0.23	
LOS	A		A	
Curbside Length for LOS C (Feet)	213 through 251		192 through 227	

(*) These vehicles have already been accounted for in the inbound direction.

Table 14 – Level of Service at the Curbside Pickup/Drop off Area – Year 2022

Number of Trips	Peak Hour			
	AM Peak		PM Peak	
	In	Out	In	Out
Total	393	459	362	393
Private Vehicles Frontcurb	138	(*)	127	(*)
Private Vehicles Frontcurb/Parking	59	69	54	59
Taxicabs	39	(*)	36	(*)
From Terminal Planning Spreadsheet				
Existing Capacity Ratio	0.35		0.32	
LOS	A		A	
Curbside Length for LOS C (Feet)	290 through 343		262 through 310	

(*) These vehicles have already been accounted for in the inbound direction.

Table 15 – Level of Service at the Curbside Pickup/Drop off Area – Year 2022

Number of Trips	Peak Hour			
	AM Peak		PM Peak	
	In	Out	In	Out
Total	479	562	443	479
Private Vehicles Frontcurb	168	(*)	155	(*)
Private Vehicles Frontcurb/Parking	72	84	66	72
Taxicabs	48	(*)	44	(*)
From Terminal Planning Spreadsheet				
Existing Capacity Ratio	0.43		0.39	
LOS	A		A	
Curbside Length for LOS C (Feet)	353 through 418		320 through 378	

(*) These vehicles have already been accounted for in the inbound direction.

7.2 Conclusions

Based on the results from Tables 13-15, the curbside pickup/drop off area will operate at LOS A from now until 2032 in both AM and PM peak hours. The maximum required length for the curbside pickup/drop off area will be 418 feet, which is below the current length. Therefore, no expansion is required.

Appendix 1: Traffic Data

Turning Movements without Airport Expansion

Table 1 – Intersection of Lippisch Place (Airport Entrance) with STH 84

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	TH	160	100	215	135	250	155
EB	RT	28	26	38	35	45	40
	LT	260	240	350	320	405	375
WB	TH	100	160	135	215	155	250

Table 2 – LOS at the Intersection of Lippisch Place (Airport Exit) with 18th St SW

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	LT	364	313	445	445	515	490
EB	RT	5	5	10	10	10	10
NB	TH	75	75	100	100	115	115
SB	TH	100	85	140	120	160	135

Table 3 – Intersection of LOS at the Intersection of STH 84 with 18th St SW (Airport Exit)

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	LT	50	25	70	35	80	40
EB	TH	85	65	115	90	130	100
	RT	25	10	35	15	40	15
	LT	50	50	70	70	80	80
WB	TH	301	315	405	420	470	490
	RT	13	13	20	20	20	20
	LT	34	28	45	35	55	45
NB	TH	100	100	135	135	155	155
	RT	305	260	410	350	475	405
	LT	50	50	70	70	80	80
SB	TH	25	25	35	35	40	40
	RT	25	25	35	35	40	40

Table 4 – Intersection of STH 84 with I-90 SB Ramps

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
EB	TH	415	285	555	380	645	445
	RT	40	40	55	45	60	60
	LT	216	79	290	105	335	125
WB	TH	228	230	305	310	355	360
SB	LT	30	31	40	40	45	50
	RT	146	159	195	215	225	245

Table 5 – Intersection of STH 84 with I-90 NB Ramps

		2012		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
	LT	255	125	340	170	395	195
EB	TH	118	199	160	270	185	310
WB	TH	491	277	660	370	765	430
	RT	50	50	70	70	80	80
NB	LT	102	78	135	105	160	120
	RT	32	68	40	90	50	105

Turning Movements with Airport Expansion

Table 6 – Intersection of Lippisch Place (Airport Entrance) with STH 84

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
	TH	215	135	250	155
EB	RT	40	35	51	45
	LT	370	340	460	425
WB	TH	135	215	155	250

Table 7 – LOS at the Intersection of Lippisch Place (Airport Exit) with 18th St SW

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
	LT	470	445	585	555
EB	RT	10	10	10	10
NB	TH	100	100	115	115
SB	TH	140	120	160	135

Table 8 – Intersection of LOS at the Intersection of STH 84 with 18th St SW (Airport Exit)

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
	LT	70	35	80	40
EB	TH	115	90	130	100
	RT	35	15	40	15
	LT	70	70	80	80
WB	TH	425	440	525	540
	RT	20	20	20	20
	LT	45	35	60	50
NB	TH	135	135	155	155
	RT	435	370	540	465
	LT	70	70	80	80
SB	TH	35	35	40	40
	RT	35	35	40	40

Table 9 – Intersection of STH 84 with I-90 SB Ramps

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
EB	TH	570	390	680	480
	RT	65	55	90	85
	LT	290	105	335	125
WB	TH	315	320	385	385
SB	LT	40	40	45	50
	RT	205	225	250	270

Table 10 – Intersection of STH 84 with I-90 NB Ramps

		2022		2032	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**
	LT	350	180	425	225
EB	TH	165	270	190	315
WB	TH	660	370	770	435
	RT	70	70	80	80
NB	LT	145	115	185	140
	RT	45	90	50	105

Appendix 2: ITE Trip Rate Tables

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

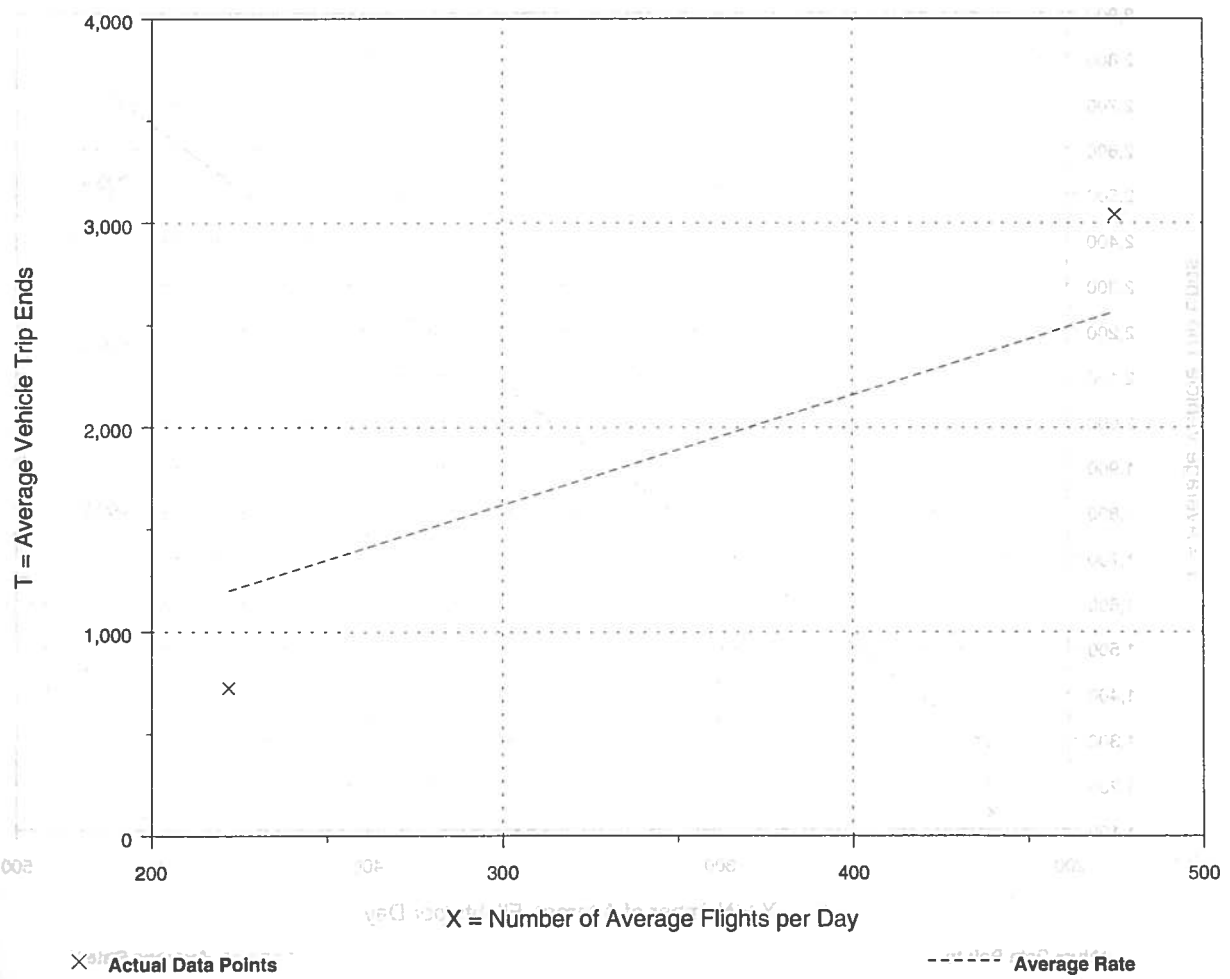
Number of Studies: 2
Average Number of Flights per Day: 349
Directional Distribution: 54% entering, 46% exiting

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
5.40	3.27 - 6.40	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday,
P.M. Peak Hour of Generator

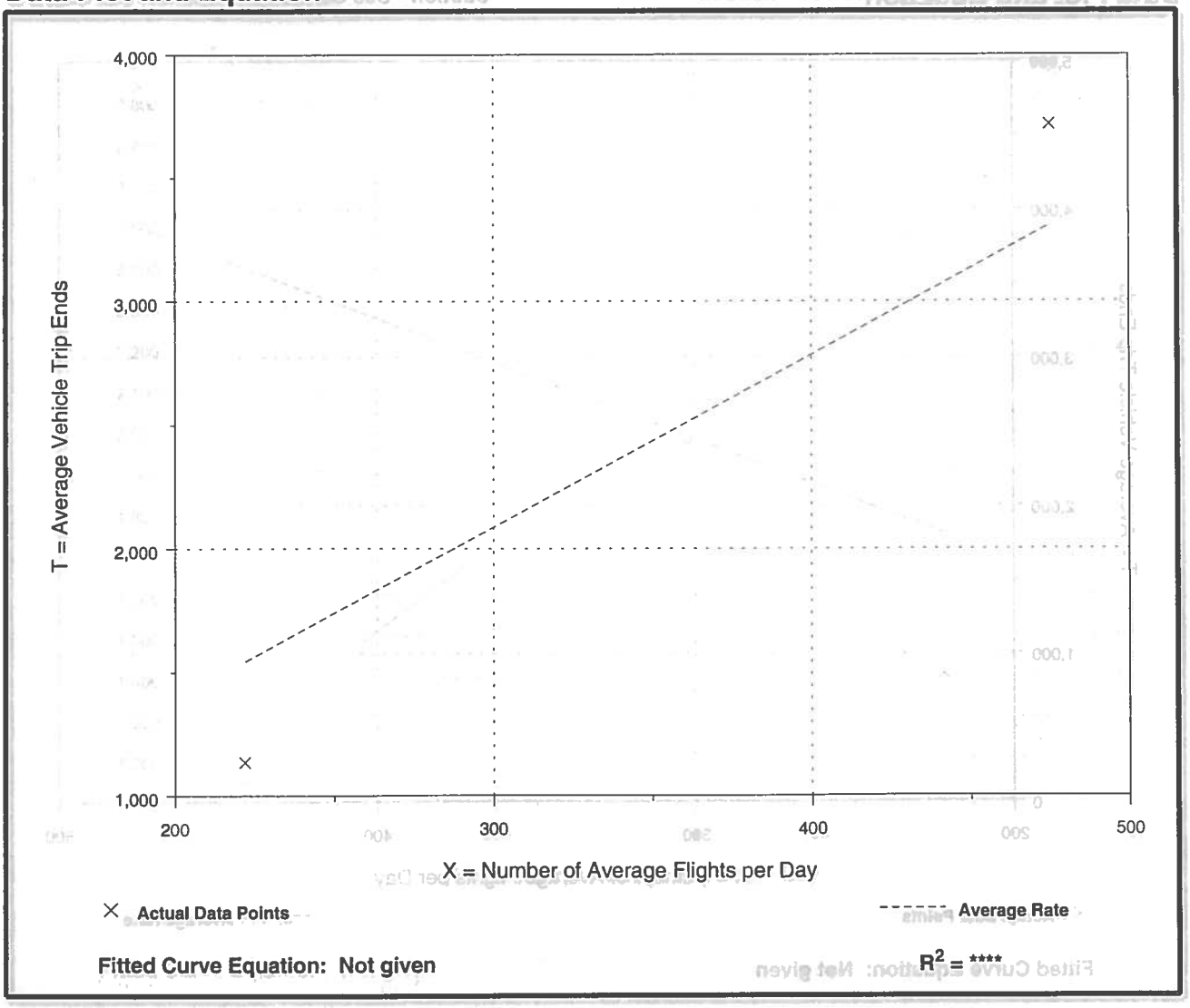
Number of Studies: 2
Average Number of Flights per Day: 349
Directional Distribution: 49% entering, 51% exiting

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
6.96	5.12 - 7.82	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Commercial Flights per Day
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

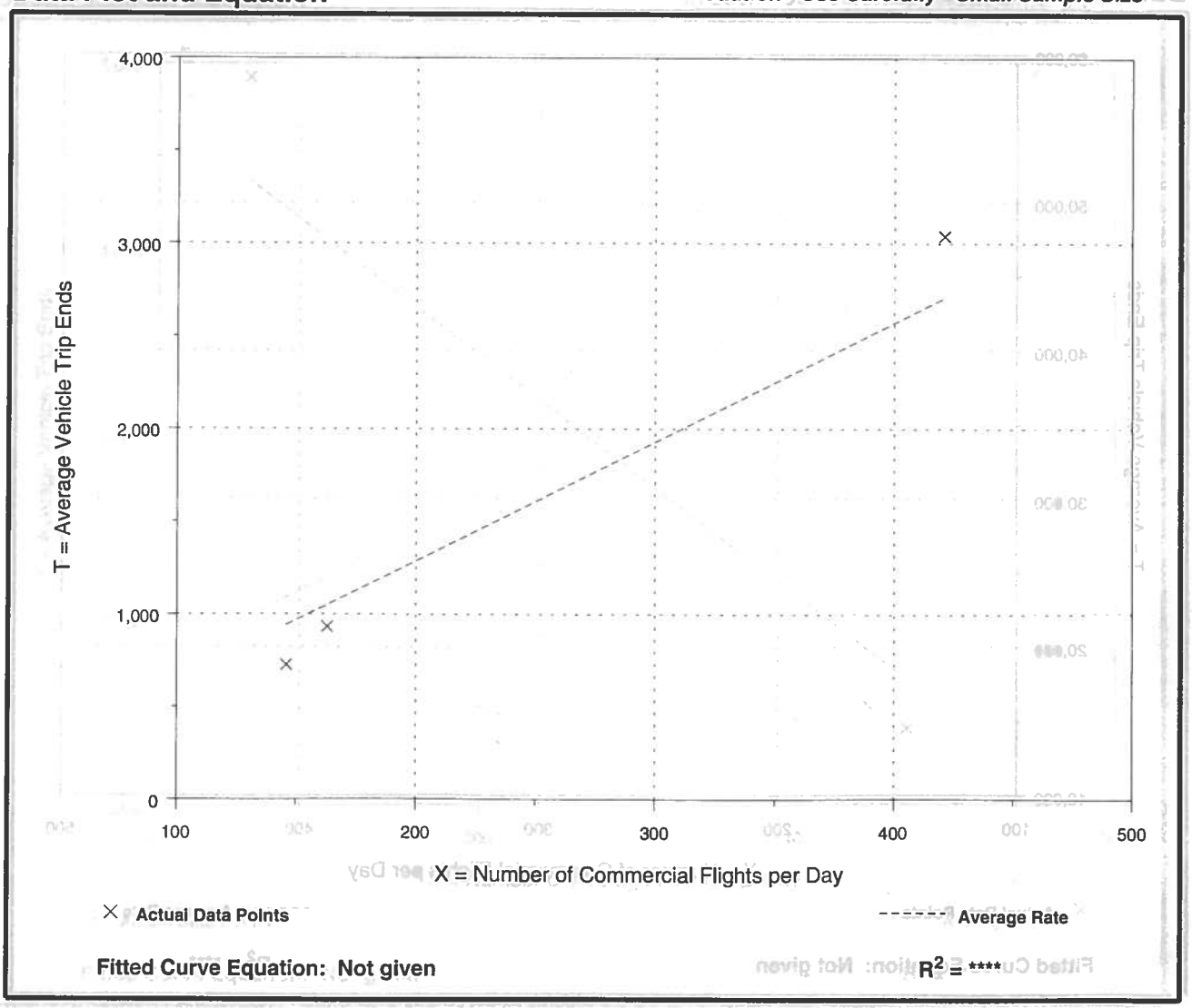
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
6.43	4.97 - 7.22	2.71

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: **Commercial Flights per Day**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

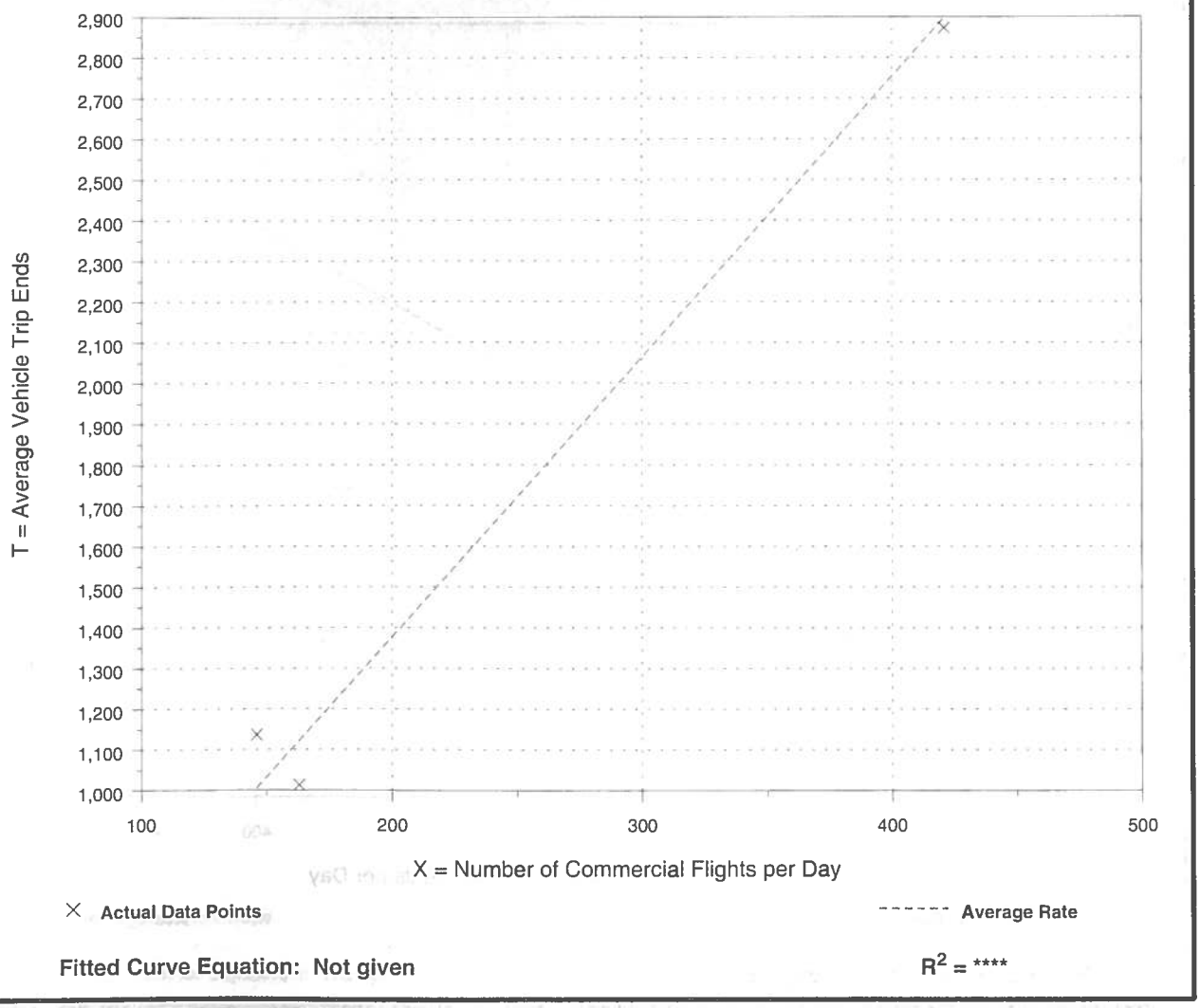
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 54% entering, 46% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
6.88	6.22 - 7.79	2.67

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Commercial Flights per Day
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

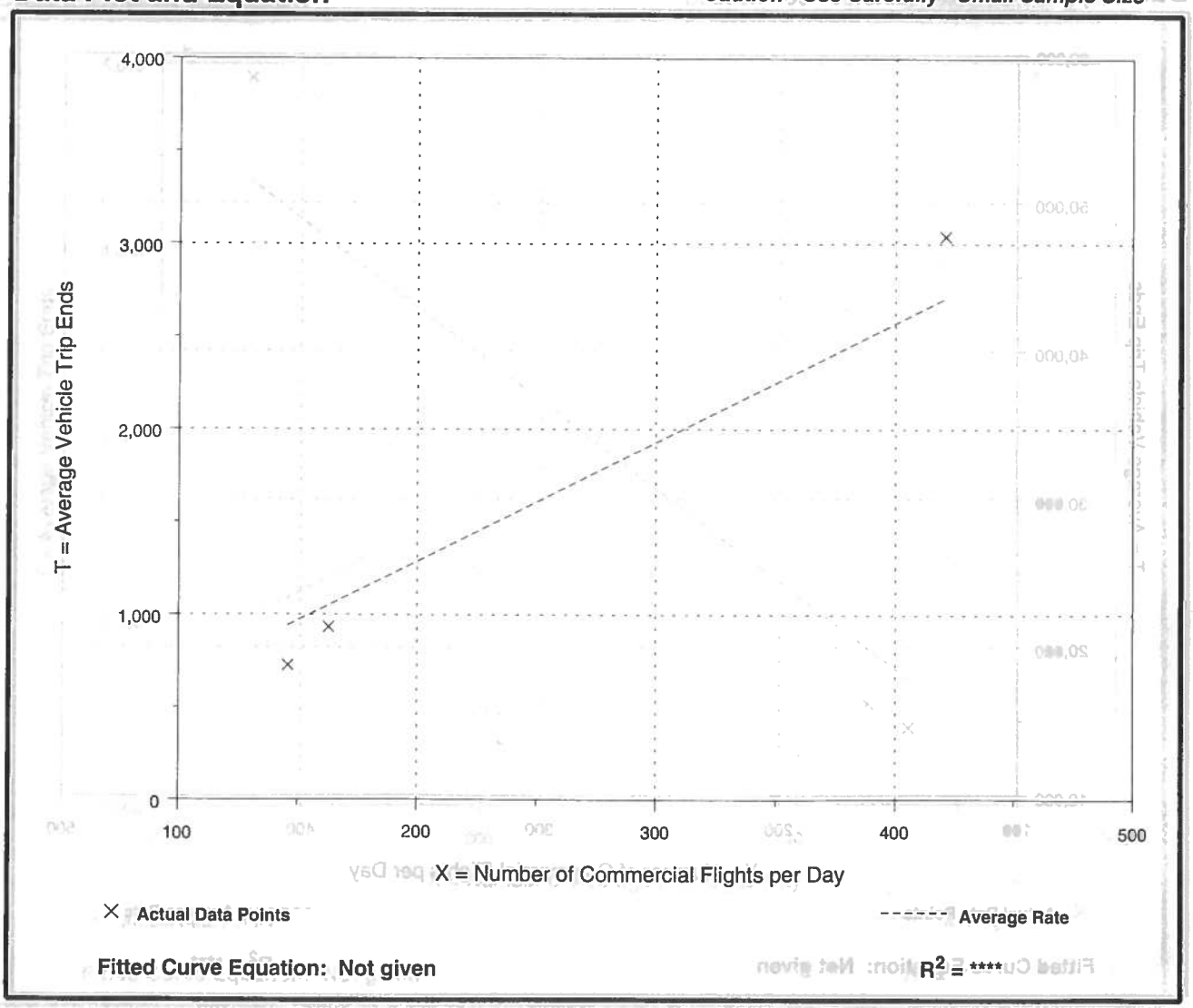
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
6.43	4.97 - 7.22	2.71

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Commercial Flights per Day
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

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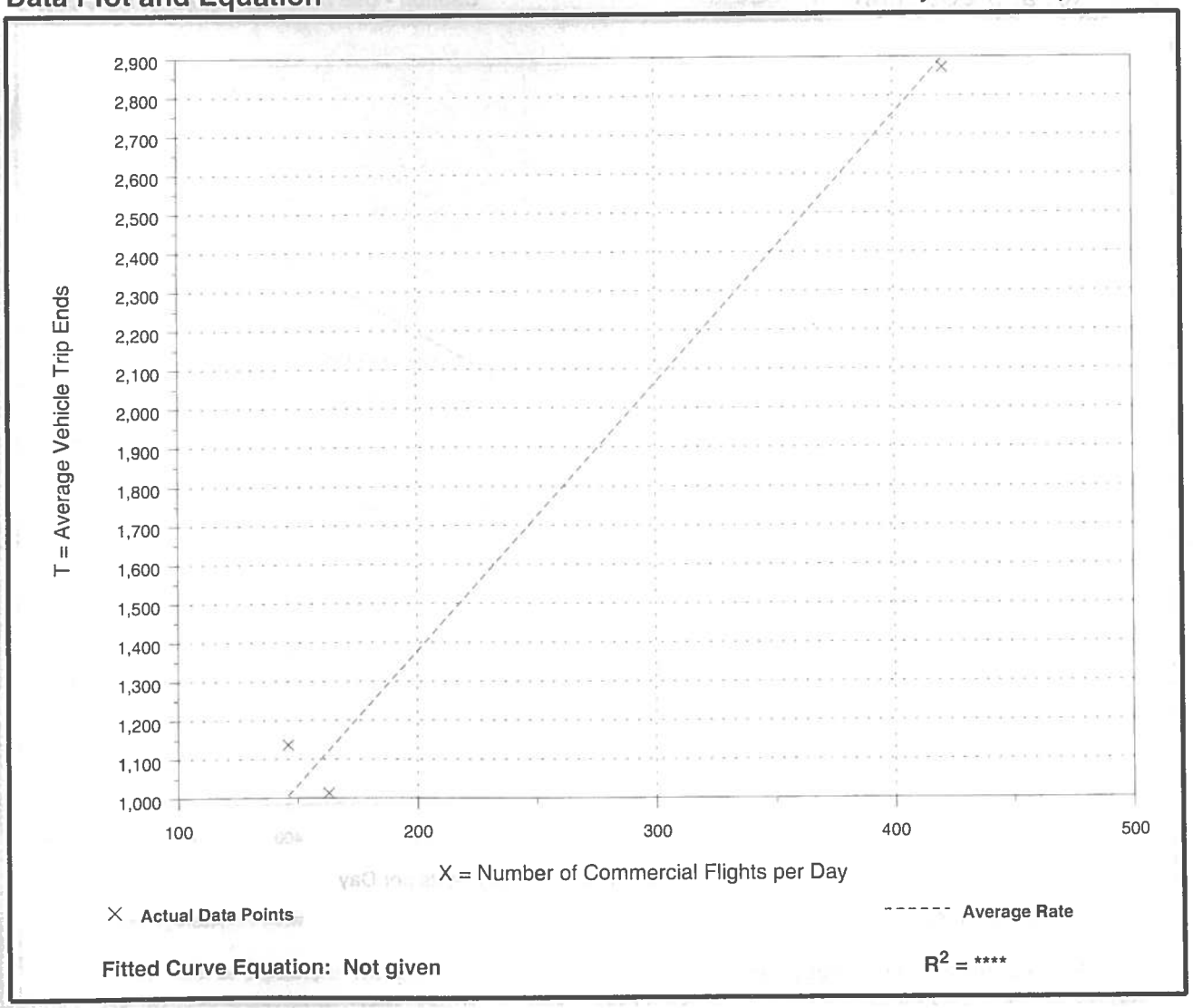
Directional Distribution: 54% entering, 46% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
6.88	6.22 - 7.79	2.67

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Commercial Flights per Day
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

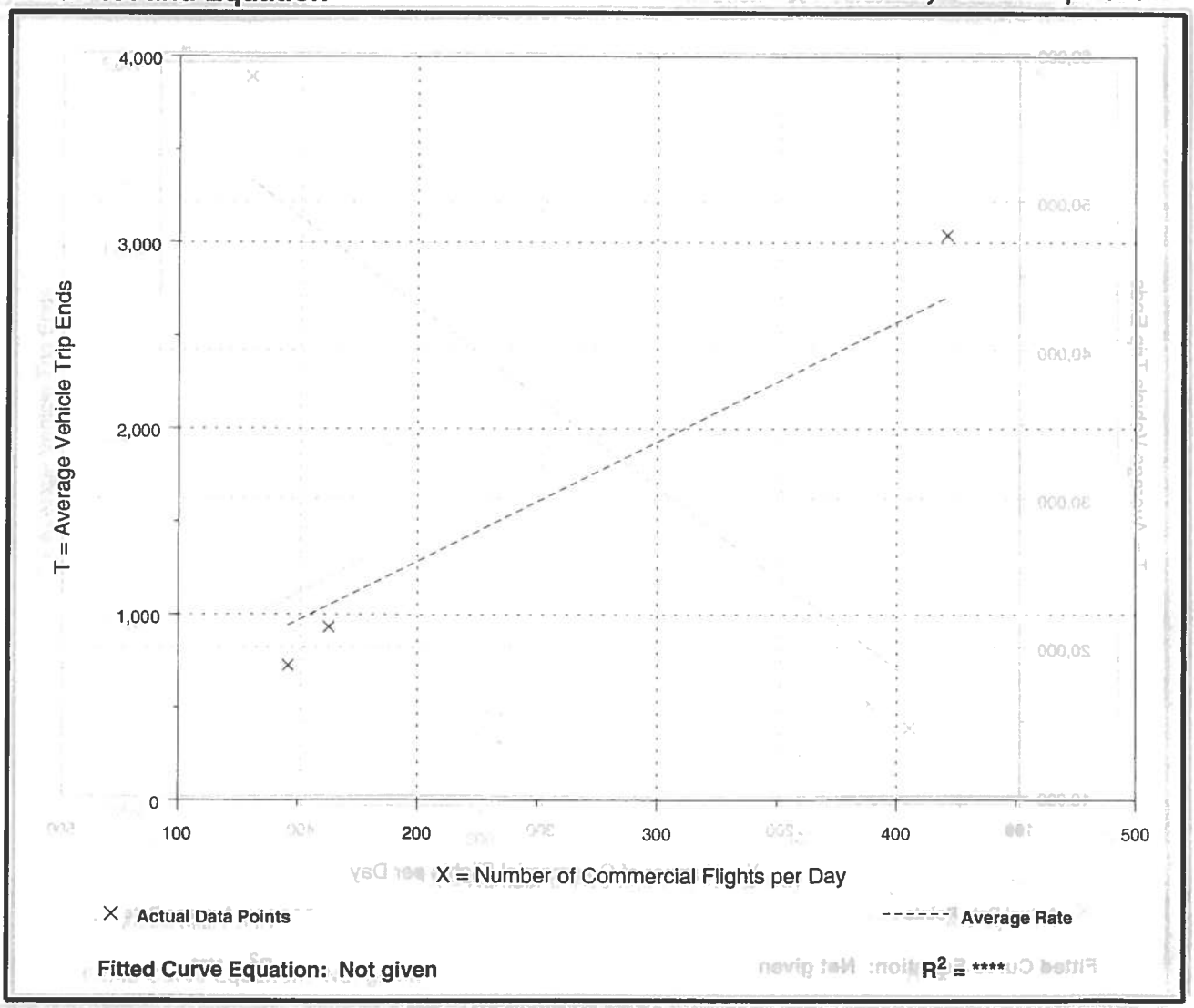
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
6.43	4.97 - 7.22	2.71

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: **Commercial Flights per Day**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

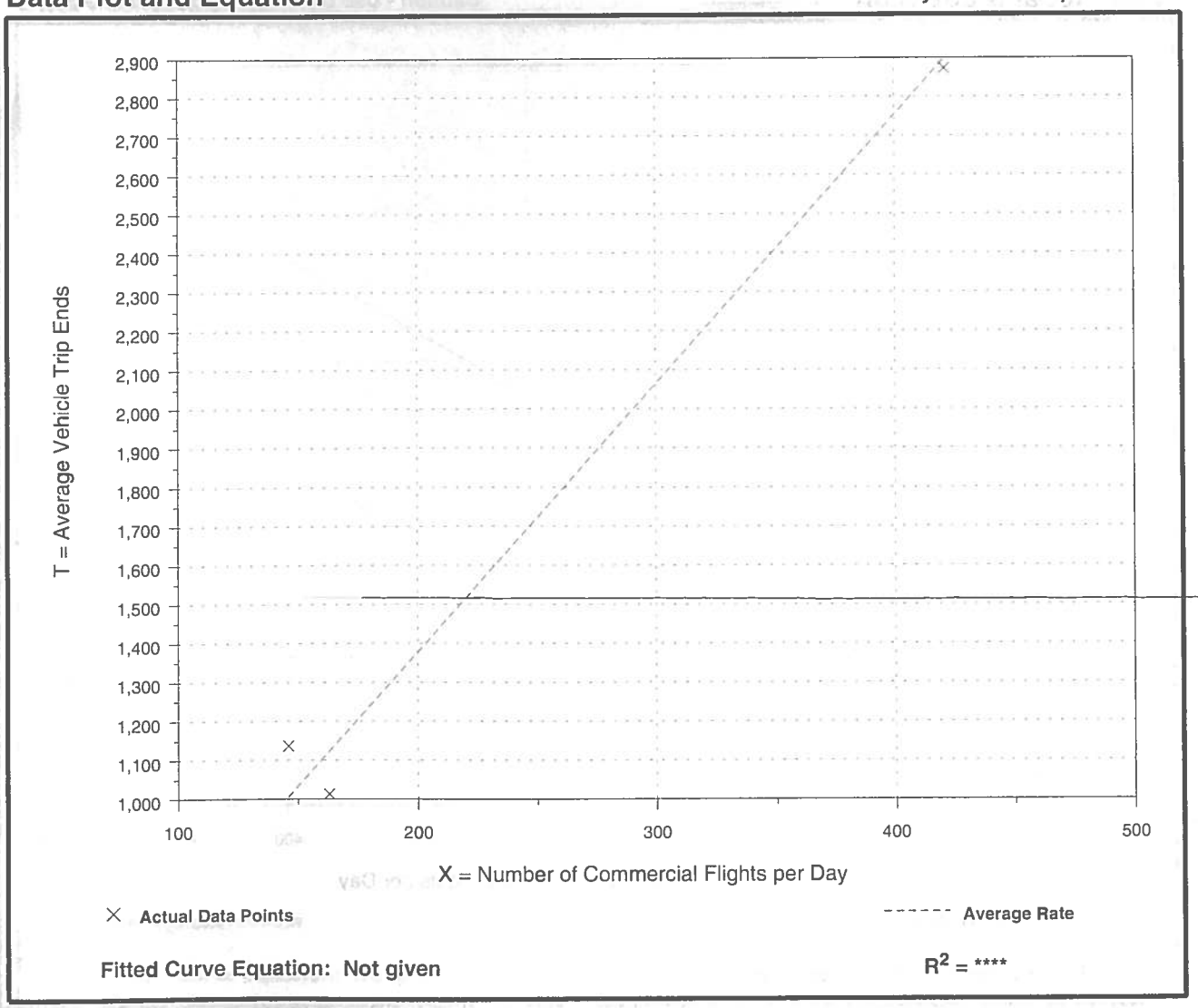
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 54% entering, 46% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
6.88	6.22 - 7.79	2.67

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: Commercial Flights per Day
On a: Weekday,
A.M. Peak Hour of Generator

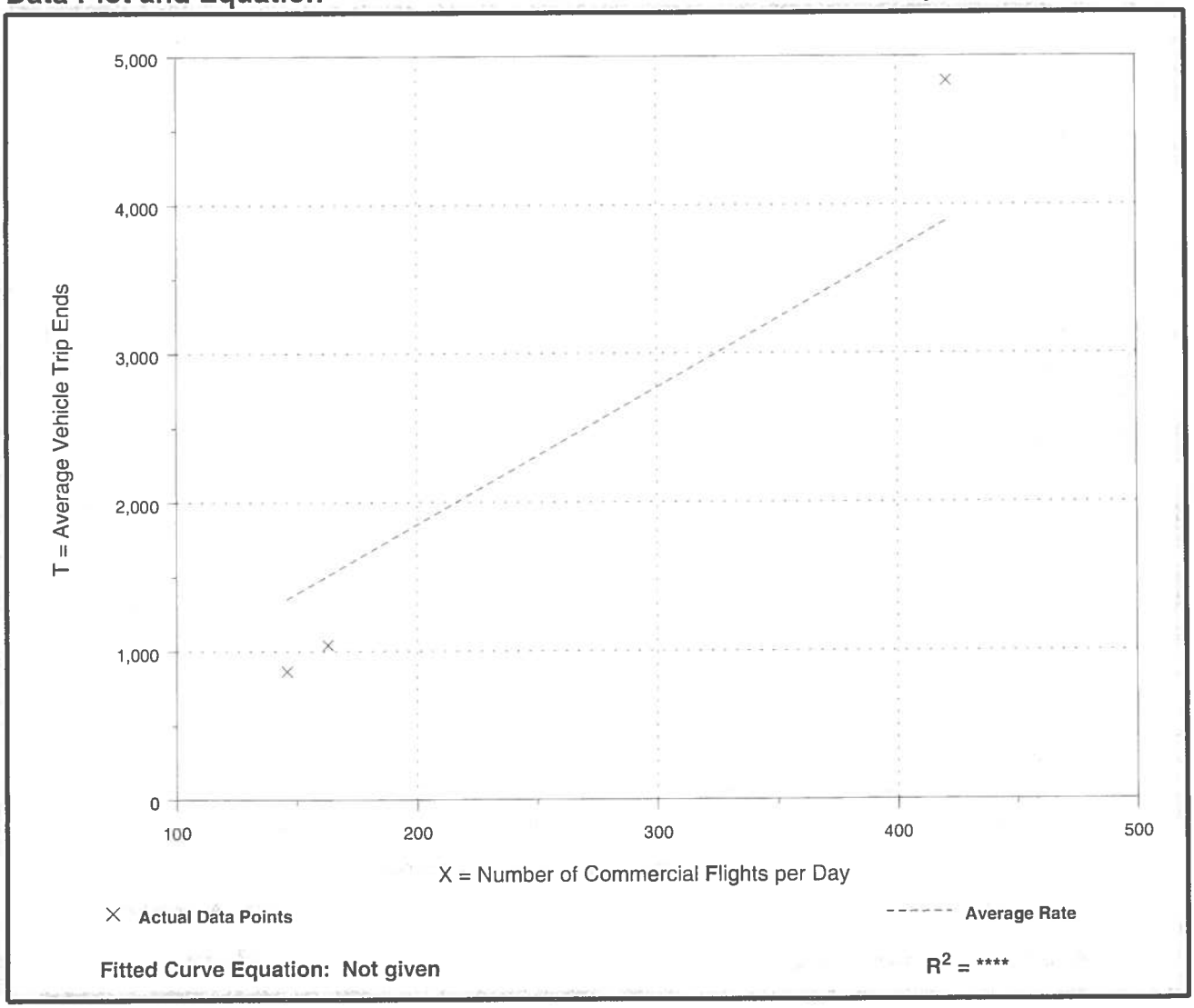
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 46% entering, 54% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
9.24	5.92 - 11.48	4.01

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Commercial Airport
(021)

Average Vehicle Trip Ends vs: **Commercial Flights per Day**
On a: **Weekday,**
P.M. Peak Hour of Generator

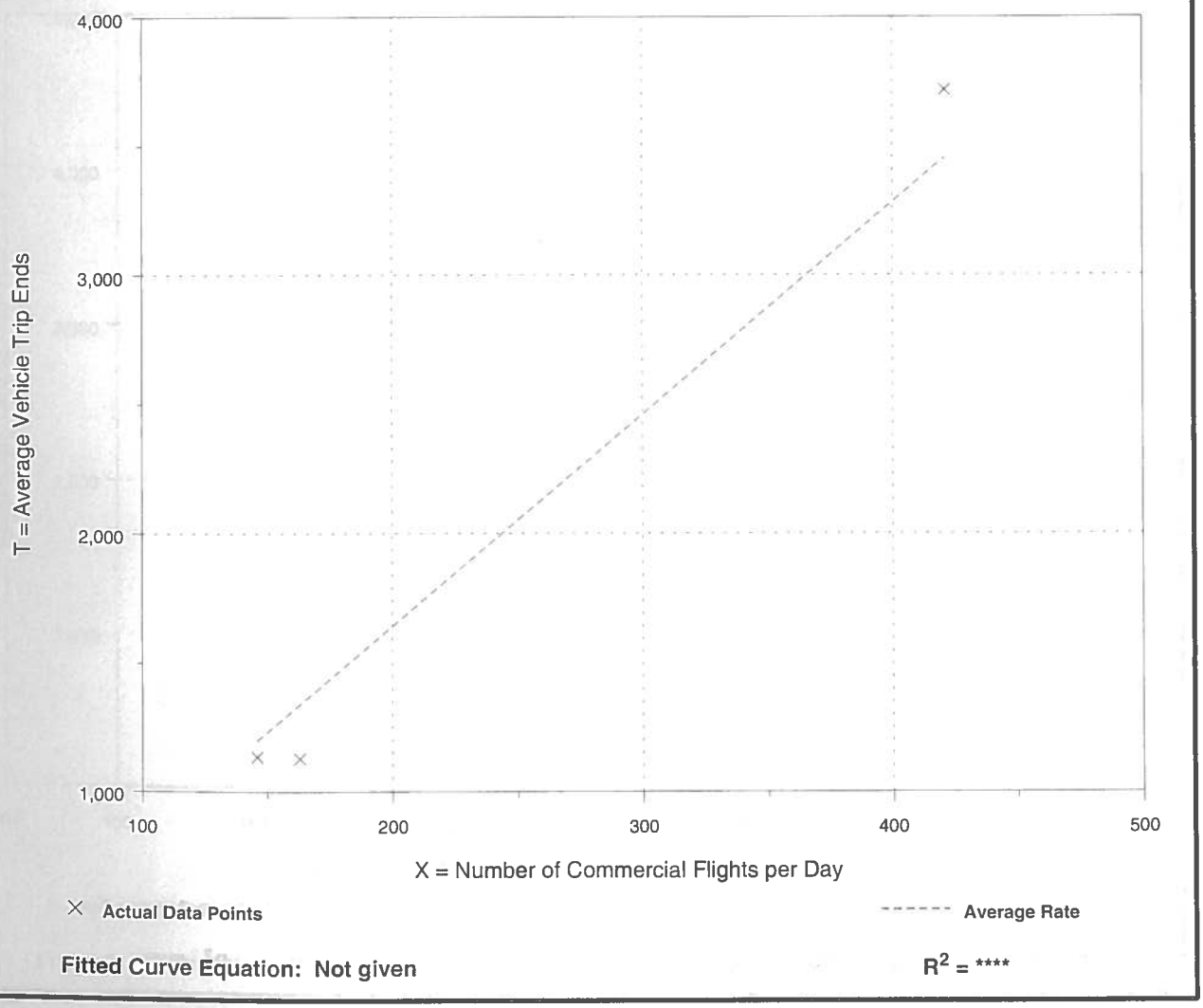
Number of Studies: 3
Avg. Num. of Comm. Flights per Day: 243
Directional Distribution: 48% entering, 52% exiting

Trip Generation per Commercial Flight

Average Rate	Range of Rates	Standard Deviation
8.20	6.93 - 8.83	2.97

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday,
A.M. Peak Hour of Generator

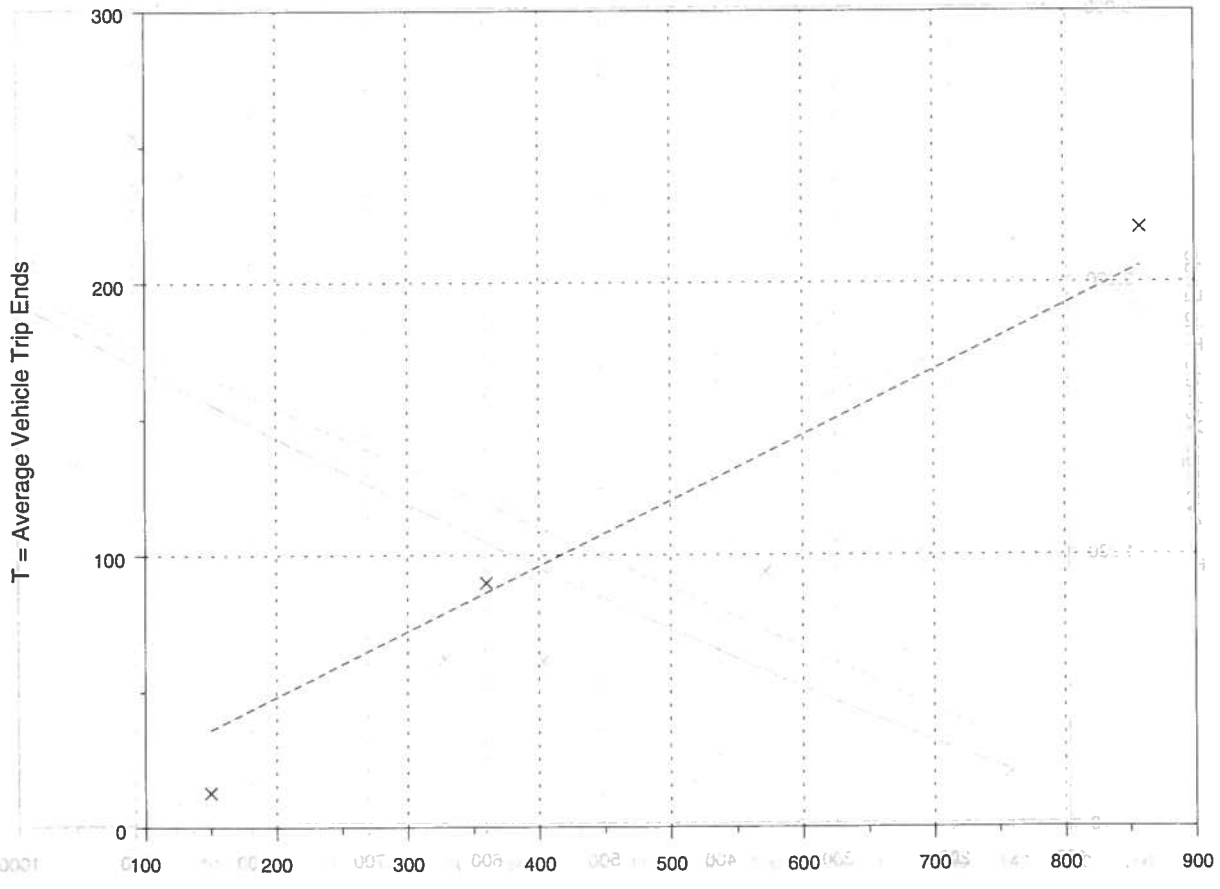
Number of Studies: 3
Average Number of Flights per Day: 456
Directional Distribution: Not available

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
0.24	0.09 - 0.26	0.49

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday,
P.M. Peak Hour of Generator

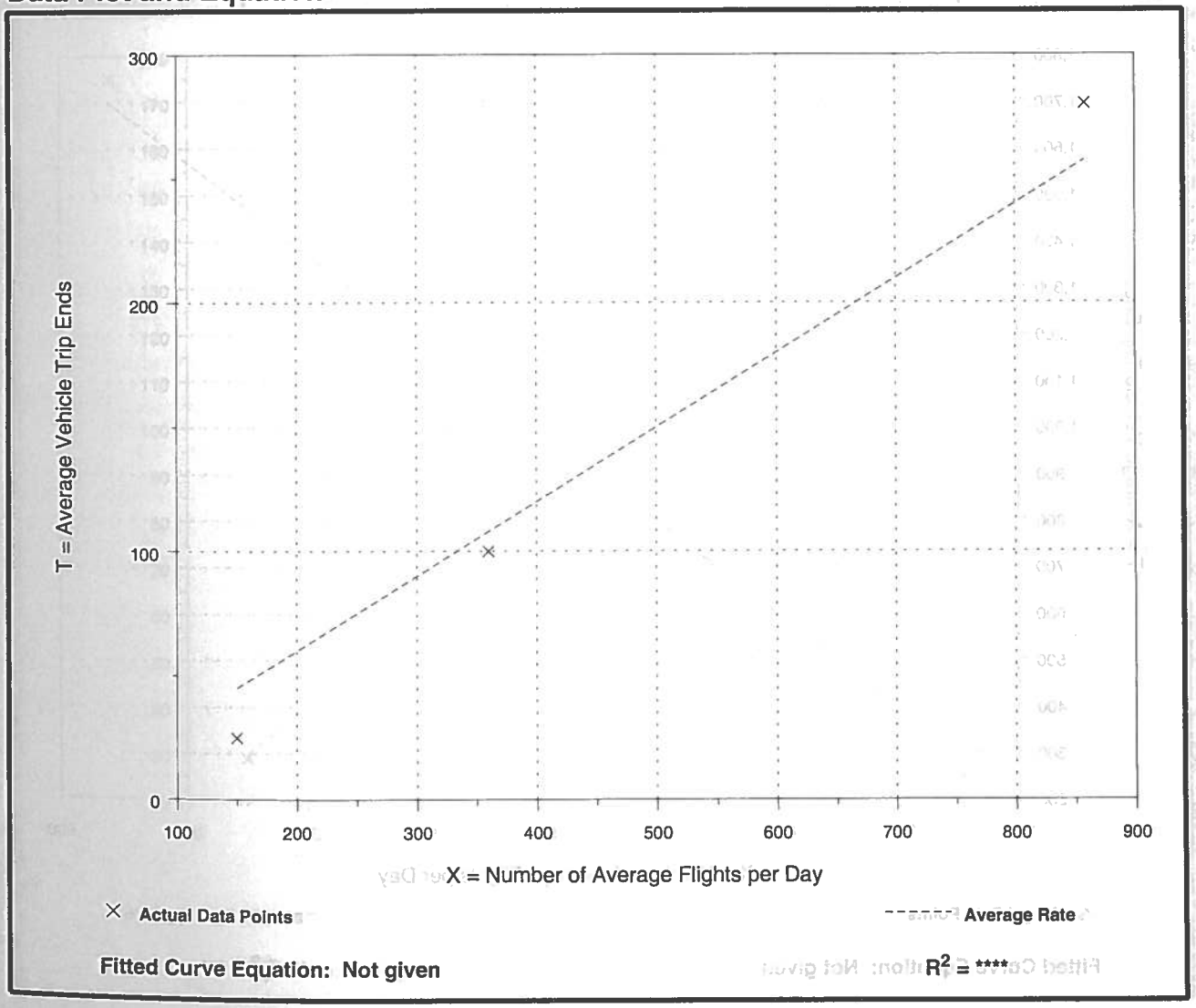
Number of Studies: 3
Average Number of Flights per Day: 456
Directional Distribution: Not available

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.33	0.55

Data Plot and Equation

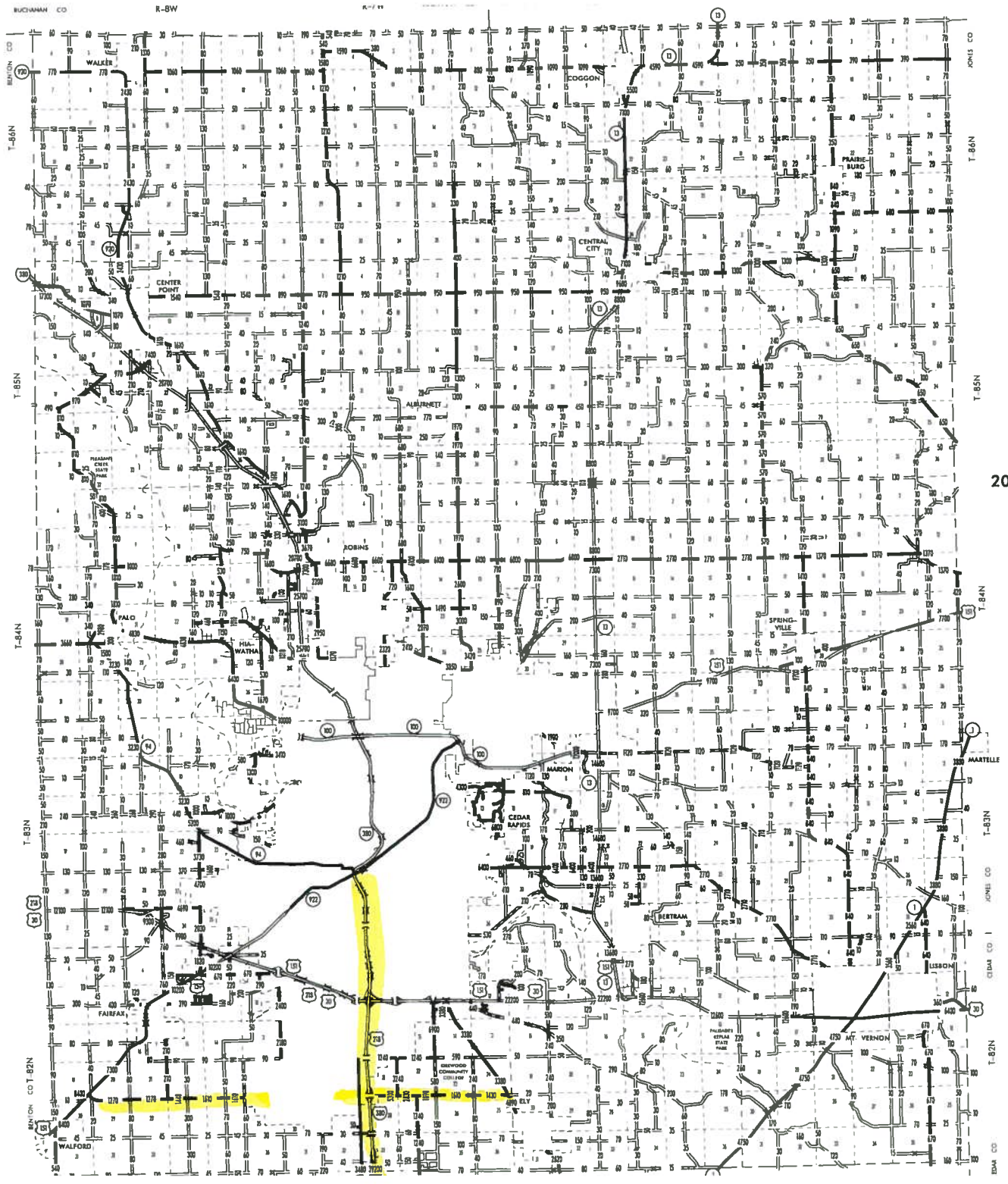
Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Appendix 3: Traffic Volumes



TRAFFIC FLOW MAP OF
LINN COUNTY
IOWA

Prepared By

Iowa Department of Transportation

Phone (515) 239-1282

In Cooperation With

United States Department of Transportation

SCALE IN MILES

SCALE IN KILOMETERS

JANUARY 1, 2002

PRODUCED WITH CADD 02 18 02 CARTOGRAPHIC SECTION

LEGEND

DIVIDED HIGHWAY

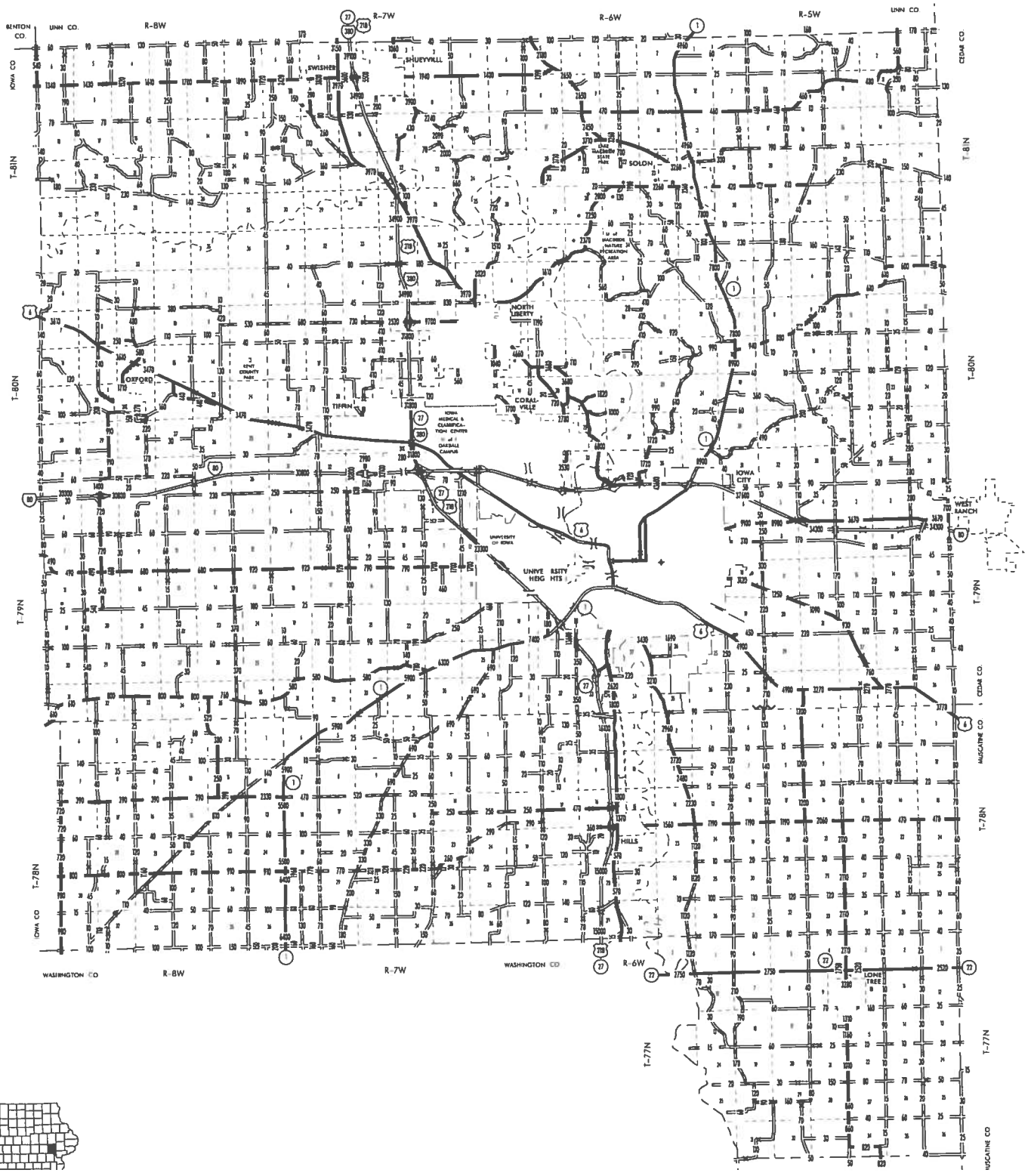
PAVED ROAD

BITUMINOUS ROAD

GRAVEL ROAD

EARTH ROAD

2001 ANNUAL AVERAGE DAILY TRAFFIC



TRAFFIC FLOW MAP OF
JOHNSON COUNTY
IOWA

Prepared By
Iowa Department of Transportation
Phone (515) 239-1282
In Cooperation With
United States Department of Transportation

SCALE IN MILES
SCALE IN KILOMETERS

JANUARY 1, 2004

PRODUCED WITH CADD 08 21 04 CARTOGRAPHIC SECTION

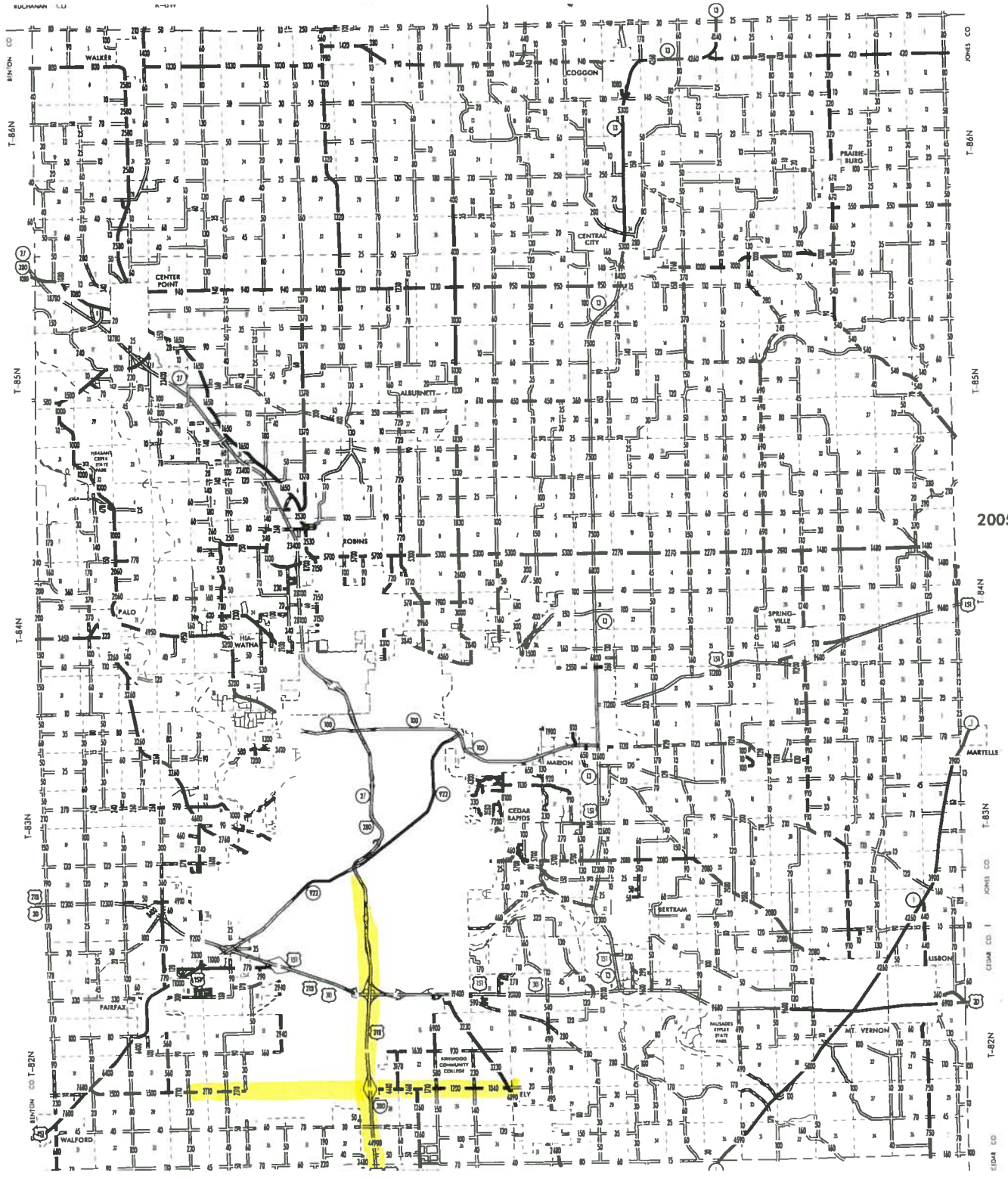
LEGEND

DIVIDED HIGHWAY
PAVED ROAD
BITUMINOUS ROAD
GRAVEL ROAD
EARTH ROAD

2002 ANNUAL AVERAGE DAILY TRAFFIC

* Revised 7/2003
** Revised 1/2005

2002
52



TRAFFIC FLOW MAP OF
LINN COUNTY
IOWA

Prepared By

Iowa Department of Transportation

Phone (515) 239-1282

In Cooperation With

United States Department of Transportation

SCALE IN MILES

SCALE IN KILOMETERS

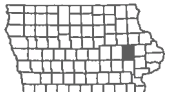
JANUARY 1, 2005

04 - 13 - 06

LEGEND

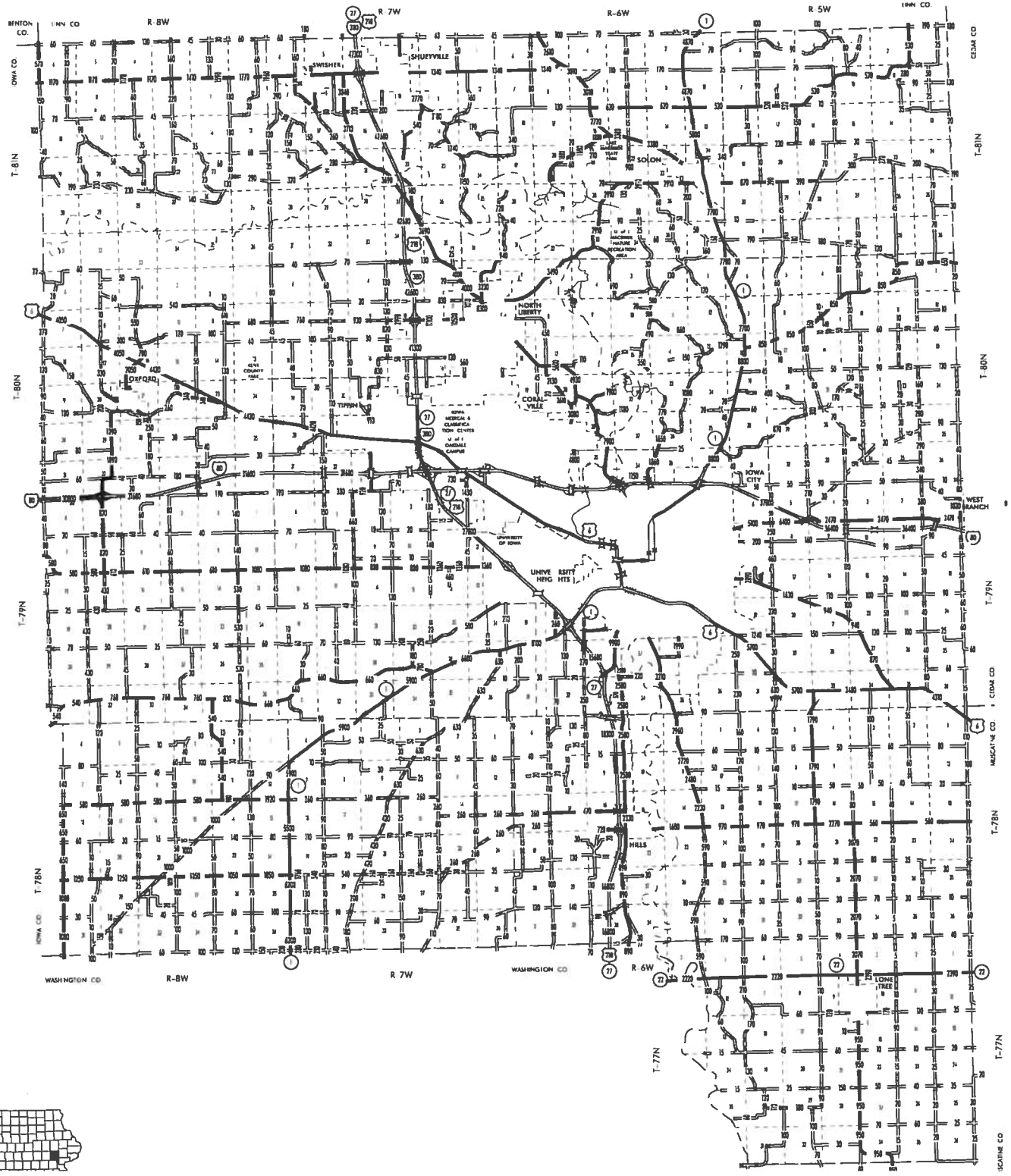
DIVIDED HIGHWAY
PAVED ROAD
BITUMINOUS ROAD
GRAVEL ROAD
EARTH ROAD
LEGAL NOT OPEN ROAD

2005 ANNUAL AVERAGE DAILY TRAFFIC



2005

57



TRAFFIC FLOW MAP OF
JOHNSON COUNTY
IOWA

Prepared By
Iowa Department of Transportation
Phone (515) 239-1287
In Cooperation With
United States Department of Transportation

SCALE IN MILES

SCALE IN KILOMETERS

JANUARY 1, 2009

TRANSPORTATION DATA
10 - 15 - 09

LEGEND

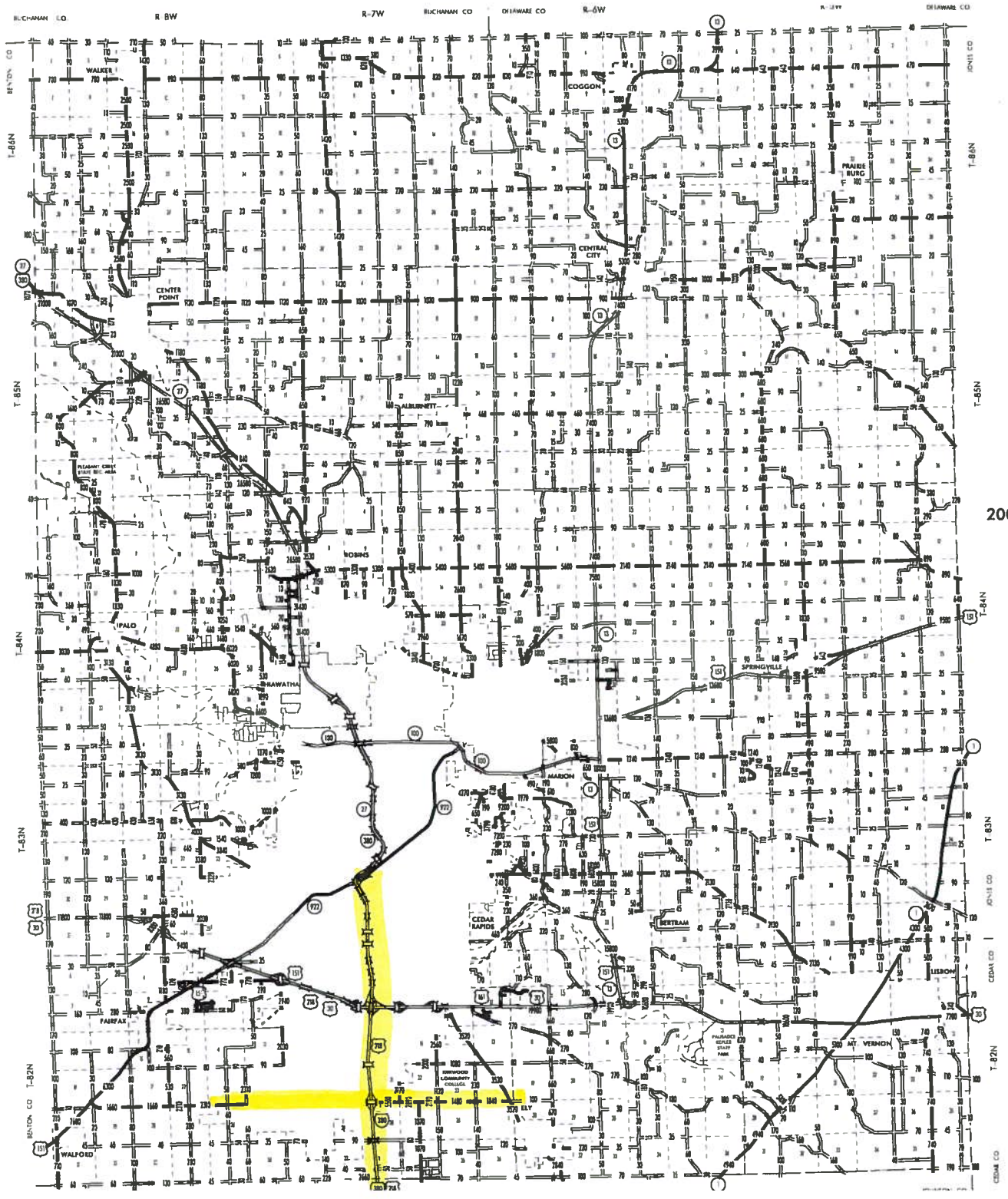
DIVIDED HIGHWAY
PAVED ROAD
BITUMINOUS ROAD
GRAVEL ROAD
EARTH ROAD
LEGAL NOT OPEN ROAD

2006 ANNUAL AVERAGE DAILY TRAFFIC

* REVISED 11/2009

2006

52



TRAFFIC FLOW MAP OF
LINN COUNTY
IOWA

Prepared By

Iowa Department of Transportation
Phone (515) 239-1282
In Cooperation With
United States Department of Transportation

SCALE IN MILES

SCALE IN KILOMETERS

JANUARY 1, 2009

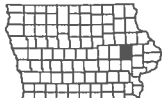
TRANSPORTATION DATA

10 - 15 - 09

LEGEND

DIVIDED HIGHWAY
PAVED ROAD
INTERMITTENT ROAD
GRAVEL ROAD
EARTH ROAD
LEGAL NOT OPEN ROAD

2009 ANNUAL AVERAGE DAILY TRAFFIC



Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: 6TH ST NORTH OF WALFORD ROAD

A study of vehicle traffic was conducted with HI-STAR unit number 3415. The study was done in the SB lane at 6TH ST NORTH OF WALFORD ROAD in CEDAR RAPIDS, IA in LINN county. The study began on Jul/07/10 at 00:00 and concluded on Jul/08/10 at 00:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2161 vehicles passed through the location with a peak volume of 56 on Jul/07/10 at [16:45-17:00] and a minimum volume of 0 on Jul/07/10 at [00:00-00:15]. The AADT count for this study was 1,979.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 55 - 60 MPH range or lower. The average speed for all classifed vehicles was 55 MPH with 27.53% vehicles exceeding the posted speed of 55 MPH. The HI-STAR found 27.53 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 55MPH and the 85th percentile was 63.04 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	8	7	10	11	14	51	111	221	370	674	419	112	28	2					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 1842 which represents 90 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 196 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
1842	134	27	10	18	5	2	0												

CHART 2

HEADWAY

During the peak traffic period, on Jul/07/10 at [16:45-17:00] the average headway between vehicles was 15.789 seconds. During the slowest traffic period, on Jul/07/10 at [00:00-00:15] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 76.00 and 109.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

[Raw] Volume Report

HI-Star ID: 3415
Street: 6TH ST NORTH OF WALFORD RO/
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: SB
Oper: CAL
Posted: 55
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 2161
AADT Count: 1,979

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[00:00-00:15]	0	0 MPH	78 F	Dry		0
[00:15-00:30]	5	52 MPH	78 F	Dry		0
[00:30-00:45]	0	0 MPH	78 F	Dry		0
[00:45-01:00]	3	53 MPH	78 F	Dry		0
[01:00-01:15]	1	58 MPH	76 F	Dry		0
[01:15-01:30]	4	49 MPH	76 F	Dry		0
[01:30-01:45]	4	50 MPH	76 F	Dry		0
[01:45-02:00]	1	62 MPH	78 F	Dry		0
[02:00-02:15]	1	58 MPH	78 F	Dry		0
[02:15-02:30]	0	0 MPH	78 F	Dry		0
[02:30-02:45]	4	59 MPH	76 F	Dry		0
[02:45-03:00]	1	62 MPH	76 F	Dry		0
[03:00-03:15]	3	67 MPH	76 F	Dry		0
[03:15-03:30]	1	62 MPH	76 F	Dry		0
[03:30-03:45]	2	68 MPH	76 F	Dry		0
[03:45-04:00]	2	60 MPH	76 F	Dry		0
[04:00-04:15]	1	32 MPH	76 F	Dry		0
[04:15-04:30]	4	53 MPH	76 F	Dry		0
[04:30-04:45]	6	57 MPH	76 F	Dry		0
[04:45-05:00]	9	54 MPH	76 F	Dry		0
[05:00-05:15]	3	57 MPH	76 F	Dry		0
[05:15-05:30]	10	60 MPH	76 F	Dry		0
[05:30-05:45]	13	49 MPH	76 F	Dry		0
[05:45-06:00]	30	53 MPH	76 F	Dry		0
[06:00-06:15]	14	59 MPH	76 F	Dry		0
[06:15-06:30]	25	56 MPH	76 F	Dry		0
[06:30-06:45]	24	57 MPH	76 F	Dry		0
[06:45-07:00]	33	54 MPH	76 F	Dry		0
[07:00-07:15]	31	51 MPH	78 F	Dry		0
[07:15-07:30]	38	51 MPH	78 F	Dry		0
[07:30-07:45]	16	57 MPH	78 F	Dry		0
[07:45-08:00]	34	55 MPH	78 F	Dry		0
[08:00-08:15]	20	58 MPH	80 F	Dry		0
[08:15-08:30]	24	57 MPH	80 F	Dry		0
[08:30-08:45]	20	53 MPH	80 F	Dry		0
[08:45-09:00]	27	54 MPH	80 F	Dry		0
[09:00-09:15]	19	54 MPH	82 F	Dry		0
[09:15-09:30]	32	53 MPH	83 F	Dry		0
[09:30-09:45]	27	56 MPH	83 F	Dry		0
[09:45-10:00]	28	55 MPH	85 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3415
Street: 6TH ST NORTH OF WALFORD RO/
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: SB
Oper: CAL
Posted: 55
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 2161
AADT Count: 1,979

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[10:00-10:15]	22	54 MPH	87 F	Dry		0
[10:15-10:30]	26	57 MPH	89 F	Dry		0
[10:30-10:45]	32	54 MPH	91 F	Dry		0
[10:45-11:00]	29	54 MPH	93 F	Dry		0
[11:00-11:15]	26	56 MPH	95 F	Dry		0
[11:15-11:30]	34	57 MPH	97 F	Dry		0
[11:30-11:45]	33	57 MPH	103 F	Dry		0
[11:45-12:00]	33	56 MPH	103 F	Dry		0
[12:00-12:15]	36	57 MPH	101 F	Dry		0
[12:15-12:30]	45	52 MPH	99 F	Dry		0
[12:30-12:45]	39	55 MPH	101 F	Dry		0
[12:45-13:00]	40	56 MPH	99 F	Dry		0
[13:00-13:15]	34	54 MPH	97 F	Dry		0
[13:15-13:30]	25	54 MPH	97 F	Dry		0
[13:30-13:45]	29	57 MPH	97 F	Dry		0
[13:45-14:00]	36	53 MPH	97 F	Dry		0
[14:00-14:15]	30	54 MPH	101 F	Dry		0
[14:15-14:30]	40	56 MPH	99 F	Dry		0
[14:30-14:45]	46	56 MPH	99 F	Dry		0
[14:45-15:00]	44	55 MPH	97 F	Dry		1
[15:00-15:15]	38	57 MPH	97 F	Dry		0
[15:15-15:30]	43	56 MPH	99 F	Dry		0
[15:30-15:45]	53	57 MPH	103 F	Dry		0
[15:45-16:00]	49	56 MPH	107 F	Dry		0
[16:00-16:15]	43	57 MPH	109 F	Dry		0
[16:15-16:30]	45	56 MPH	107 F	Dry		0
[16:30-16:45]	47	56 MPH	101 F	Dry		0
[16:45-17:00]	56	54 MPH	99 F	Dry		1
[17:00-17:15]	52	57 MPH	99 F	Dry		0
[17:15-17:30]	53	57 MPH	97 F	Dry		0
[17:30-17:45]	48	55 MPH	97 F	Dry		0
[17:45-18:00]	37	57 MPH	97 F	Dry		0
[18:00-18:15]	45	52 MPH	97 F	Dry		0
[18:15-18:30]	29	55 MPH	97 F	Dry		0
[18:30-18:45]	22	57 MPH	95 F	Dry		0
[18:45-19:00]	30	56 MPH	95 F	Dry		1
[19:00-19:15]	29	54 MPH	93 F	Dry		0
[19:15-19:30]	24	54 MPH	91 F	Dry		0
[19:30-19:45]	24	57 MPH	89 F	Dry		0
[19:45-20:00]	24	56 MPH	89 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3415
Street: 6TH ST NORTH OF WALFORD RO/
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: SB
Oper: CAL
Posted: 55
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 2161
AADT Count: 1,979

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[20:00-20:15]	20	55 MPH	87 F	Dry		0
[20:15-20:30]	23	54 MPH	85 F	Dry		0
[20:30-20:45]	13	57 MPH	85 F	Dry		0
[20:45-21:00]	19	56 MPH	85 F	Dry		0
[21:00-21:15]	15	55 MPH	83 F	Dry		0
[21:15-21:30]	15	56 MPH	83 F	Dry		0
[21:30-21:45]	8	58 MPH	83 F	Dry		0
[21:45-22:00]	10	48 MPH	80 F	Dry		0
[22:00-22:15]	9	57 MPH	80 F	Dry		0
[22:15-22:30]	6	55 MPH	80 F	Dry		0
[22:30-22:45]	5	54 MPH	78 F	Dry		0
[22:45-23:00]	7	52 MPH	78 F	Dry		0
[23:00-23:15]	5	51 MPH	78 F	Dry		0
[23:15-23:30]	6	52 MPH	78 F	Dry		0
[23:30-23:45]	4	59 MPH	78 F	Dry		0
[23:45-00:00]	6	53 MPH	76 F	Dry		0
	2161	56 MPH	87 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: 6TH ST SOUTH OF WALFORD ROAD

A study of vehicle traffic was conducted with HI-STAR unit number 3408. The study was done in the NB lane at 6TH ST SOUTH OF WALFORD ROAD in CEDAR RAPIDS, IA in LINN county. The study began on Jul/07/10 at 00:00 and concluded on Jul/08/10 at 00:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3142 vehicles passed through the location with a peak volume of 100 on Jul/07/10 at [07:30-07:45] and a minimum volume of 0 on Jul/07/10 at [03:45-04:00]. The AADT count for this study was 2,878.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 55 - 60 MPH range or lower. The average speed for all classifed vehicles was 56 MPH with 24.42% vehicles exceeding the posted speed of 55 MPH. The HI-STAR found 24.42 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 55MPH and the 85th percentile was 62.55 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	5	6	3	4	8	62	157	290	679	1117	568	152	26	7					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 2903 which represents 94 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 181 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
2903	101	30	16	26	8	0	0												

CHART 2

HEADWAY

During the peak traffic period, on Jul/07/10 at [07:30-07:45] the average headway between vehicles was 8.911 seconds. During the slowest traffic period, on Jul/07/10 at [03:45-04:00] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 76.00 and 107.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

[Raw] Volume Report

HI-Star ID: 3408
Street: 6TH ST SOUTH OF WALFORD RO/
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: NB
Oper: CAL
Posted: 55
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 3142
AADT Count: 2,878

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[00:00-00:15]	4	55 MPH	80 F	Dry		0
[00:15-00:30]	8	53 MPH	80 F	Dry		0
[00:30-00:45]	5	54 MPH	78 F	Dry		0
[00:45-01:00]	4	56 MPH	78 F	Dry		0
[01:00-01:15]	3	57 MPH	78 F	Dry		0
[01:15-01:30]	3	53 MPH	78 F	Dry		0
[01:30-01:45]	4	54 MPH	78 F	Dry		0
[01:45-02:00]	1	72 MPH	78 F	Dry		0
[02:00-02:15]	2	55 MPH	78 F	Dry		0
[02:15-02:30]	1	58 MPH	78 F	Dry		0
[02:30-02:45]	3	61 MPH	78 F	Dry		0
[02:45-03:00]	4	54 MPH	78 F	Dry		0
[03:00-03:15]	1	52 MPH	78 F	Dry		0
[03:15-03:30]	1	52 MPH	78 F	Dry		0
[03:30-03:45]	4	54 MPH	78 F	Dry		0
[03:45-04:00]	0	0 MPH	78 F	Dry		0
[04:00-04:15]	2	60 MPH	78 F	Dry		0
[04:15-04:30]	3	51 MPH	78 F	Dry		0
[04:30-04:45]	10	57 MPH	76 F	Dry		0
[04:45-05:00]	7	55 MPH	76 F	Dry		0
[05:00-05:15]	9	54 MPH	76 F	Dry		0
[05:15-05:30]	13	58 MPH	76 F	Dry		0
[05:30-05:45]	26	56 MPH	76 F	Dry		0
[05:45-06:00]	25	56 MPH	76 F	Dry		0
[06:00-06:15]	32	54 MPH	76 F	Dry		0
[06:15-06:30]	50	58 MPH	76 F	Dry		0
[06:30-06:45]	61	57 MPH	78 F	Dry		0
[06:45-07:00]	65	56 MPH	78 F	Dry		0
[07:00-07:15]	65	55 MPH	78 F	Dry		0
[07:15-07:30]	94	57 MPH	78 F	Dry		1
[07:30-07:45]	100	55 MPH	78 F	Dry		1
[07:45-08:00]	100	56 MPH	80 F	Dry		1
[08:00-08:15]	63	58 MPH	80 F	Dry		0
[08:15-08:30]	57	56 MPH	80 F	Dry		0
[08:30-08:45]	47	55 MPH	80 F	Dry		0
[08:45-09:00]	44	57 MPH	80 F	Dry		0
[09:00-09:15]	41	54 MPH	82 F	Dry		0
[09:15-09:30]	45	57 MPH	83 F	Dry		0
[09:30-09:45]	31	56 MPH	83 F	Dry		0
[09:45-10:00]	45	55 MPH	85 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3408
Street: 6TH ST SOUTH OF WALFORD RO/
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: NB
Oper: CAL
Posted: 55
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 3142
AADT Count: 2,878

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[10:00-10:15]	34	57 MPH	85 F	Dry		8
[10:15-10:30]	44	54 MPH	87 F	Dry		0
[10:30-10:45]	33	55 MPH	91 F	Dry		0
[10:45-11:00]	39	53 MPH	91 F	Dry		0
[11:00-11:15]	33	56 MPH	95 F	Dry		0
[11:15-11:30]	48	52 MPH	95 F	Dry		0
[11:30-11:45]	49	56 MPH	99 F	Dry		0
[11:45-12:00]	39	53 MPH	99 F	Dry		0
[12:00-12:15]	51	56 MPH	99 F	Dry		0
[12:15-12:30]	45	56 MPH	97 F	Dry		0
[12:30-12:45]	36	58 MPH	97 F	Dry		0
[12:45-13:00]	44	54 MPH	97 F	Dry		0
[13:00-13:15]	42	56 MPH	97 F	Dry		0
[13:15-13:30]	46	55 MPH	95 F	Dry		0
[13:30-13:45]	51	56 MPH	97 F	Dry		0
[13:45-14:00]	47	53 MPH	97 F	Dry		0
[14:00-14:15]	39	55 MPH	97 F	Dry		0
[14:15-14:30]	61	56 MPH	97 F	Dry		0
[14:30-14:45]	54	56 MPH	97 F	Dry		0
[14:45-15:00]	54	57 MPH	97 F	Dry		0
[15:00-15:15]	47	53 MPH	97 F	Dry		0
[15:15-15:30]	48	58 MPH	97 F	Dry		0
[15:30-15:45]	54	55 MPH	101 F	Dry		0
[15:45-16:00]	57	56 MPH	103 F	Dry		0
[16:00-16:15]	63	56 MPH	107 F	Dry		0
[16:15-16:30]	54	56 MPH	103 F	Dry		0
[16:30-16:45]	44	54 MPH	101 F	Dry		0
[16:45-17:00]	73	56 MPH	99 F	Dry		1
[17:00-17:15]	50	55 MPH	99 F	Dry		0
[17:15-17:30]	64	57 MPH	97 F	Dry		0
[17:30-17:45]	50	56 MPH	97 F	Dry		0
[17:45-18:00]	51	58 MPH	97 F	Dry		0
[18:00-18:15]	48	57 MPH	97 F	Dry		0
[18:15-18:30]	45	55 MPH	97 F	Dry		0
[18:30-18:45]	42	56 MPH	95 F	Dry		0
[18:45-19:00]	29	55 MPH	95 F	Dry		0
[19:00-19:15]	27	55 MPH	93 F	Dry		0
[19:15-19:30]	24	55 MPH	91 F	Dry		0
[19:30-19:45]	22	58 MPH	91 F	Dry		0
[19:45-20:00]	22	54 MPH	89 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3408
Street: 6TH ST SOUTH OF WALFORD RO/
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: NB
Oper: CAL
Posted: 55
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 3142
AADT Count: 2,878

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[20:00-20:15]	25	54 MPH	87 F	Dry		0
[20:15-20:30]	29	53 MPH	87 F	Dry		0
[20:30-20:45]	18	57 MPH	85 F	Dry		0
[20:45-21:00]	36	55 MPH	85 F	Dry		0
[21:00-21:15]	25	53 MPH	85 F	Dry		0
[21:15-21:30]	20	50 MPH	85 F	Dry		0
[21:30-21:45]	15	57 MPH	83 F	Dry		0
[21:45-22:00]	13	53 MPH	83 F	Dry		0
[22:00-22:15]	7	54 MPH	82 F	Dry		0
[22:15-22:30]	8	56 MPH	82 F	Dry		0
[22:30-22:45]	7	55 MPH	80 F	Dry		0
[22:45-23:00]	5	50 MPH	80 F	Dry		0
[23:00-23:15]	9	48 MPH	80 F	Dry		0
[23:15-23:30]	11	57 MPH	78 F	Dry		0
[23:30-23:45]	16	52 MPH	78 F	Dry		0
[23:45-00:00]	12	56 MPH	78 F	Dry		0
	3142	55 MPH	87 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WALFORD RD EAST OF 6TH ST

A study of vehicle traffic was conducted with HI-STAR unit number 3424. The study was done in the WB lane at WALFORD RD EAST OF 6TH ST in CEDAR RAPIDS, IA in LINN county. The study began on Jul/07/10 at 00:00 and concluded on Jul/08/10 at 00:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 87 vehicles passed through the location with a peak volume of 4 on Jul/07/10 at [10:45-11:00] and a minimum volume of 0 on Jul/07/10 at [12:15-12:30]. The AADT count for this study was 80.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 35 - 40 MPH range or lower. The average speed for all classifed vehicles was 37 MPH with 7.41% vehicles exceeding the posted speed of 45 MPH. The HI-STAR found 0.00 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 35MPH and the 85th percentile was 46.11 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	1	1	7	12	13	19	13	9	4	2	0	0	0	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 74 which represents 91 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 7 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
74	7	0	0	0	0	0	0												

CHART 2

HEADWAY

During the peak traffic period, on Jul/07/10 at [10:45-11:00] the average headway between vehicles was 180 seconds. During the slowest traffic period, on Jul/07/10 at [12:15-12:30] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 76.00 and 107.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

[Raw] Volume Report

HI-Star ID: 3424
Street: WALFORD RD EAST OF 6TH ST
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: WB
Oper: CAL
Posted: 45
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 87
AADT Count: 80

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[00:00-00:15]	0	0 MPH	78 F	Dry		0
[00:15-00:30]	0	0 MPH	78 F	Dry		0
[00:30-00:45]	0	0 MPH	78 F	Dry		0
[00:45-01:00]	1	48 MPH	76 F	Dry		0
[01:00-01:15]	0	0 MPH	76 F	Dry		0
[01:15-01:30]	0	0 MPH	76 F	Dry		0
[01:30-01:45]	0	0 MPH	76 F	Dry		0
[01:45-02:00]	1	28 MPH	76 F	Dry		0
[02:00-02:15]	0	0 MPH	76 F	Dry		0
[02:15-02:30]	0	0 MPH	76 F	Dry		0
[02:30-02:45]	0	0 MPH	76 F	Dry		0
[02:45-03:00]	0	0 MPH	76 F	Dry		0
[03:00-03:15]	0	0 MPH	76 F	Dry		0
[03:15-03:30]	1	52 MPH	76 F	Dry		0
[03:30-03:45]	0	0 MPH	76 F	Dry		0
[03:45-04:00]	0	0 MPH	76 F	Dry		0
[04:00-04:15]	0	0 MPH	76 F	Dry		0
[04:15-04:30]	0	0 MPH	76 F	Dry		0
[04:30-04:45]	0	0 MPH	76 F	Dry		0
[04:45-05:00]	2	43 MPH	76 F	Dry		0
[05:00-05:15]	0	0 MPH	76 F	Dry		0
[05:15-05:30]	1	52 MPH	76 F	Dry		0
[05:30-05:45]	0	0 MPH	76 F	Dry		0
[05:45-06:00]	0	0 MPH	76 F	Dry		0
[06:00-06:15]	1	38 MPH	76 F	Dry		0
[06:15-06:30]	0	0 MPH	76 F	Dry		6
[06:30-06:45]	3	40 MPH	76 F	Dry		0
[06:45-07:00]	0	0 MPH	76 F	Dry		0
[07:00-07:15]	1	52 MPH	76 F	Dry		0
[07:15-07:30]	1	28 MPH	76 F	Dry		0
[07:30-07:45]	1	42 MPH	76 F	Dry		0
[07:45-08:00]	0	0 MPH	76 F	Dry		0
[08:00-08:15]	2	33 MPH	78 F	Dry		0
[08:15-08:30]	3	25 MPH	78 F	Dry		0
[08:30-08:45]	3	45 MPH	78 F	Dry		0
[08:45-09:00]	3	32 MPH	78 F	Dry		0
[09:00-09:15]	0	0 MPH	78 F	Dry		0
[09:15-09:30]	2	40 MPH	80 F	Dry		0
[09:30-09:45]	2	35 MPH	80 F	Dry		0
[09:45-10:00]	1	32 MPH	83 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3424
Street: WALFORD RD EAST OF 6TH ST
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: WB
Oper: CAL
Posted: 45
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 87
AADT Count: 80

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[10:00-10:15]	0	0 MPH	85 F	Dry		0
[10:15-10:30]	0	0 MPH	85 F	Dry		0
[10:30-10:45]	2	30 MPH	89 F	Dry		0
[10:45-11:00]	4	27 MPH	91 F	Dry		0
[11:00-11:15]	0	0 MPH	93 F	Dry		0
[11:15-11:30]	0	0 MPH	95 F	Dry		0
[11:30-11:45]	2	33 MPH	99 F	Dry		0
[11:45-12:00]	3	47 MPH	97 F	Dry		0
[12:00-12:15]	2	43 MPH	97 F	Dry		0
[12:15-12:30]	0	0 MPH	97 F	Dry		0
[12:30-12:45]	2	25 MPH	97 F	Dry		0
[12:45-13:00]	0	0 MPH	97 F	Dry		0
[13:00-13:15]	3	37 MPH	95 F	Dry		0
[13:15-13:30]	0	0 MPH	93 F	Dry		0
[13:30-13:45]	1	0 MPH	95 F	Dry		0
[13:45-14:00]	1	38 MPH	97 F	Dry		0
[14:00-14:15]	1	22 MPH	97 F	Dry		0
[14:15-14:30]	1	22 MPH	97 F	Dry		0
[14:30-14:45]	2	33 MPH	97 F	Dry		0
[14:45-15:00]	2	38 MPH	97 F	Dry		0
[15:00-15:15]	0	0 MPH	97 F	Dry		0
[15:15-15:30]	3	38 MPH	97 F	Dry		0
[15:30-15:45]	3	36 MPH	101 F	Dry		0
[15:45-16:00]	1	42 MPH	103 F	Dry		0
[16:00-16:15]	0	0 MPH	107 F	Dry		0
[16:15-16:30]	2	38 MPH	103 F	Dry		0
[16:30-16:45]	2	32 MPH	99 F	Dry		0
[16:45-17:00]	0	0 MPH	97 F	Dry		0
[17:00-17:15]	2	43 MPH	97 F	Dry		0
[17:15-17:30]	1	28 MPH	97 F	Dry		0
[17:30-17:45]	1	22 MPH	97 F	Dry		0
[17:45-18:00]	0	0 MPH	97 F	Dry		0
[18:00-18:15]	3	36 MPH	97 F	Dry		0
[18:15-18:30]	1	38 MPH	95 F	Dry		0
[18:30-18:45]	0	0 MPH	95 F	Dry		0
[18:45-19:00]	0	0 MPH	93 F	Dry		0
[19:00-19:15]	2	33 MPH	91 F	Dry		0
[19:15-19:30]	1	0 MPH	89 F	Dry		0
[19:30-19:45]	2	43 MPH	89 F	Dry		0
[19:45-20:00]	2	40 MPH	87 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3424
Street: WALFORD RD EAST OF 6TH ST
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: WB
Oper: CAL
Posted: 45
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 87
AADT Count: 80

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[20:00-20:15]	0	0 MPH	85 F	Dry		0
[20:15-20:30]	0	0 MPH	85 F	Dry		0
[20:30-20:45]	1	42 MPH	85 F	Dry		0
[20:45-21:00]	0	0 MPH	83 F	Dry		0
[21:00-21:15]	0	0 MPH	83 F	Dry		0
[21:15-21:30]	0	0 MPH	83 F	Dry		0
[21:30-21:45]	1	28 MPH	83 F	Dry		0
[21:45-22:00]	0	0 MPH	80 F	Dry		0
[22:00-22:15]	0	0 MPH	80 F	Dry		0
[22:15-22:30]	0	0 MPH	78 F	Dry		0
[22:30-22:45]	2	40 MPH	78 F	Dry		0
[22:45-23:00]	2	37 MPH	78 F	Dry		0
[23:00-23:15]	0	0 MPH	78 F	Dry		0
[23:15-23:30]	0	0 MPH	78 F	Dry		0
[23:30-23:45]	0	0 MPH	76 F	Dry		0
[23:45-00:00]	0	0 MPH	76 F	Dry		0
	87	0 MPH	85 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WALFORD RD WEST OF 6TH ST

A study of vehicle traffic was conducted with HI-STAR unit number 3409. The study was done in the EB lane at WALFORD RD WEST OF 6TH ST in CEDAR RAPIDS, IA in LINN county. The study began on Jul/07/10 at 00:00 and concluded on Jul/08/10 at 00:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 198 vehicles passed through the location with a peak volume of 12 on Jul/07/10 at [15:30-15:45] and a minimum volume of 0 on Jul/07/10 at [13:45-14:00]. The AADT count for this study was 181.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 25 - 30 MPH range or lower. The average speed for all classifed vehicles was 28 MPH with 0.54% vehicles exceeding the posted speed of 45 MPH. The HI-STAR found 0.54 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 25MPH and the 85th percentile was 33.30 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	4	10	40	69	50	8	2	0	0	0	0	0	1	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 172 which represents 93 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 12 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
172	10	1	0	1	0	0	0												

CHART 2

HEADWAY

During the peak traffic period, on Jul/07/10 at [15:30-15:45] the average headway between vehicles was 69.231 seconds. During the slowest traffic period, on Jul/07/10 at [13:45-14:00] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 78.00 and 113.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

[Raw] Volume Report

HI-Star ID: 3409	Begin: Jul/07/10 00:00	End: Jul/08/10 00:00
Street: WALFORD RD WEST OF 6TH ST	Lane: EB	Hours: 24.00
State: IA	Oper: CAL	Period: 15
City: CEDAR RAPIDS	Posted: 45	Raw Count: 198
County: LINN	AADT Factor: 0.916	AADT Count: 181

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[00:00-00:15]	0	0 MPH	80 F	Dry		0
[00:15-00:30]	0	0 MPH	80 F	Dry		0
[00:30-00:45]	1	12 MPH	80 F	Dry		0
[00:45-01:00]	0	0 MPH	80 F	Dry		0
[01:00-01:15]	0	0 MPH	80 F	Dry		0
[01:15-01:30]	2	27 MPH	80 F	Dry		0
[01:30-01:45]	1	0 MPH	80 F	Dry		0
[01:45-02:00]	2	30 MPH	80 F	Dry		0
[02:00-02:15]	0	0 MPH	80 F	Dry		0
[02:15-02:30]	0	0 MPH	80 F	Dry		0
[02:30-02:45]	0	0 MPH	80 F	Dry		0
[02:45-03:00]	0	0 MPH	80 F	Dry		0
[03:00-03:15]	1	28 MPH	78 F	Dry		0
[03:15-03:30]	1	28 MPH	78 F	Dry		0
[03:30-03:45]	0	0 MPH	78 F	Dry		0
[03:45-04:00]	2	25 MPH	78 F	Dry		0
[04:00-04:15]	0	0 MPH	78 F	Dry		0
[04:15-04:30]	0	0 MPH	78 F	Dry		0
[04:30-04:45]	0	0 MPH	78 F	Dry		0
[04:45-05:00]	0	0 MPH	78 F	Dry		0
[05:00-05:15]	1	38 MPH	78 F	Dry		0
[05:15-05:30]	0	0 MPH	78 F	Dry		0
[05:30-05:45]	0	0 MPH	78 F	Dry		0
[05:45-06:00]	0	0 MPH	78 F	Dry		0
[06:00-06:15]	2	23 MPH	78 F	Dry		0
[06:15-06:30]	0	0 MPH	78 F	Dry		0
[06:30-06:45]	2	25 MPH	78 F	Dry		0
[06:45-07:00]	0	0 MPH	78 F	Dry		0
[07:00-07:15]	2	25 MPH	80 F	Dry		0
[07:15-07:30]	1	32 MPH	80 F	Dry		0
[07:30-07:45]	6	29 MPH	80 F	Dry		0
[07:45-08:00]	2	17 MPH	82 F	Dry		0
[08:00-08:15]	3	27 MPH	82 F	Dry		0
[08:15-08:30]	1	38 MPH	83 F	Dry		0
[08:30-08:45]	3	27 MPH	82 F	Dry		0
[08:45-09:00]	1	28 MPH	83 F	Dry		0
[09:00-09:15]	4	32 MPH	83 F	Dry		0
[09:15-09:30]	3	29 MPH	85 F	Dry		0
[09:30-09:45]	0	0 MPH	85 F	Dry		0
[09:45-10:00]	3	26 MPH	89 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3409
Street: WALFORD RD WEST OF 6TH ST
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: EB
Oper: CAL
Posted: 45
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 198
AADT Count: 181

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[10:00-10:15]	4	29 MPH	89 F	Dry		0
[10:15-10:30]	2	23 MPH	91 F	Dry		0
[10:30-10:45]	3	28 MPH	95 F	Dry		0
[10:45-11:00]	4	24 MPH	95 F	Dry		0
[11:00-11:15]	5	25 MPH	97 F	Dry		0
[11:15-11:30]	3	27 MPH	101 F	Dry		0
[11:30-11:45]	3	29 MPH	107 F	Dry		0
[11:45-12:00]	2	25 MPH	107 F	Dry		0
[12:00-12:15]	5	29 MPH	107 F	Dry		0
[12:15-12:30]	1	32 MPH	103 F	Dry		0
[12:30-12:45]	5	30 MPH	103 F	Dry		0
[12:45-13:00]	2	18 MPH	103 F	Dry		0
[13:00-13:15]	4	34 MPH	101 F	Dry		0
[13:15-13:30]	5	28 MPH	97 F	Dry		0
[13:30-13:45]	1	28 MPH	101 F	Dry		0
[13:45-14:00]	0	0 MPH	101 F	Dry		0
[14:00-14:15]	4	28 MPH	103 F	Dry		0
[14:15-14:30]	1	38 MPH	101 F	Dry		0
[14:30-14:45]	6	27 MPH	101 F	Dry		0
[14:45-15:00]	2	35 MPH	101 F	Dry		0
[15:00-15:15]	4	27 MPH	101 F	Dry		0
[15:15-15:30]	6	30 MPH	101 F	Dry		0
[15:30-15:45]	12	25 MPH	107 F	Dry		0
[15:45-16:00]	9	28 MPH	109 F	Dry		0
[16:00-16:15]	3	29 MPH	113 F	Dry		0
[16:15-16:30]	1	32 MPH	109 F	Dry		0
[16:30-16:45]	7	26 MPH	105 F	Dry		0
[16:45-17:00]	6	28 MPH	101 F	Dry		0
[17:00-17:15]	1	32 MPH	101 F	Dry		0
[17:15-17:30]	1	22 MPH	101 F	Dry		0
[17:30-17:45]	7	27 MPH	99 F	Dry		0
[17:45-18:00]	2	32 MPH	101 F	Dry		0
[18:00-18:15]	4	31 MPH	99 F	Dry		0
[18:15-18:30]	3	25 MPH	97 F	Dry		0
[18:30-18:45]	2	25 MPH	97 F	Dry		0
[18:45-19:00]	2	28 MPH	97 F	Dry		0
[19:00-19:15]	0	0 MPH	95 F	Dry		0
[19:15-19:30]	0	0 MPH	93 F	Dry		0
[19:30-19:45]	5	38 MPH	91 F	Dry		0
[19:45-20:00]	1	22 MPH	89 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3409
Street: WALFORD RD WEST OF 6TH ST
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Jul/07/10 00:00
Lane: EB
Oper: CAL
Posted: 45
AADT Factor: 0.916

End: Jul/08/10 00:00
Hours: 24.00
Period: 15
Raw Count: 198
AADT Count: 181

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Jul/07/10						
[20:00-20:15]	1	28 MPH	89 F	Dry		0
[20:15-20:30]	0	0 MPH	87 F	Dry		0
[20:30-20:45]	0	0 MPH	87 F	Dry		0
[20:45-21:00]	0	0 MPH	85 F	Dry		0
[21:00-21:15]	1	12 MPH	85 F	Dry		0
[21:15-21:30]	0	0 MPH	85 F	Dry		0
[21:30-21:45]	2	30 MPH	85 F	Dry		0
[21:45-22:00]	2	30 MPH	83 F	Dry		0
[22:00-22:15]	1	28 MPH	82 F	Dry		0
[22:15-22:30]	1	22 MPH	80 F	Dry		0
[22:30-22:45]	3	24 MPH	80 F	Dry		0
[22:45-23:00]	1	38 MPH	80 F	Dry		0
[23:00-23:15]	4	26 MPH	80 F	Dry		0
[23:15-23:30]	0	0 MPH	80 F	Dry		0
[23:30-23:45]	0	0 MPH	80 F	Dry		0
[23:45-00:00]	0	0 MPH	80 F	Dry		0
	198	25 MPH	89 F			

[Raw] Volume Report

HI-Star ID: 3418
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EB RT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/24/10 13:45
Hours: 1.75
Period: 15
Raw Count: 199
AADT Count: 2,729

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	34	34 MPH	35 F	Dry		25
[12:15-12:30]	32	32 MPH	35 F	Dry		17
[12:30-12:45]	34	31 MPH	35 F	Dry		0
[12:45-13:00]	18	34 MPH	37 F	Dry		20
[13:00-13:15]	13	0 MPH	39 F	Dry		55
[13:15-13:30]	33	31 MPH	39 F	Dry		29
[13:30-13:45]	35	0 MPH	39 F	Dry		16
	199	31 MPH	37 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3612. The study was done in the EAST BOUND lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3842 vehicles passed through the location with a peak volume of 117 on Feb/24/10 at [15:30-15:45] and a minimum volume of 2 on Feb/25/10 at [11:45-12:00]. The AADT count for this study was 3,842.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 10 - 15 MPH range or lower. The average speed for all classifed vehicles was 32 MPH with 27.27% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 18.18 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 10MPH and the 85th percentile was greater than 75.00 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	4	2	0	1	0	1	0	1	0	0	0	0	0	2					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 11 which represents 100 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 0 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
11	0	0	0	0	0	0	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [15:30-15:45] the average headway between vehicles was 7.627 seconds. During the slowest traffic period, on Feb/25/10 at [11:45-12:00] the average headway between vehicles was 300 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 5.00 and 39.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

[Raw] Volume Report

HI-Star ID: 3612
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EAST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3842
AADT Count: 3,842

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	57	57 MPH	35 F	Dry		1
[12:15-12:30]	69	44 MPH	35 F	Dry		1
[12:30-12:45]	61	0 MPH	37 F	Dry		7
[12:45-13:00]	67	12 MPH	39 F	Dry		15
[13:00-13:15]	71	0 MPH	39 F	Dry		1
[13:15-13:30]	49	48 MPH	39 F	Dry		1
[13:30-13:45]	58	0 MPH	39 F	Dry		1
[13:45-14:00]	43	0 MPH	39 F	Dry		0
[14:00-14:15]	54	0 MPH	39 F	Dry		1
[14:15-14:30]	76	0 MPH	39 F	Dry		6
[14:30-14:45]	81	0 MPH	39 F	Dry		6
[14:45-15:00]	59	0 MPH	37 F	Dry		4
[15:00-15:15]	59	0 MPH	37 F	Dry		6
[15:15-15:30]	73	0 MPH	35 F	Dry		1
[15:30-15:45]	117	0 MPH	35 F	Dry		4
[15:45-16:00]	89	0 MPH	35 F	Dry		2
[16:00-16:15]	112	0 MPH	33 F	Dry		9
[16:15-16:30]	97	0 MPH	31 F	Dry		2
[16:30-16:45]	104	0 MPH	31 F	Dry		3
[16:45-17:00]	72	0 MPH	29 F	Dry		4
[17:00-17:15]	78	0 MPH	29 F	Dry		1
[17:15-17:30]	66	0 MPH	27 F	Dry		1
[17:30-17:45]	74	0 MPH	27 F	Dry		15
[17:45-18:00]	50	0 MPH	25 F	Dry		0
[18:00-18:15]	48	0 MPH	23 F	Dry		1
[18:15-18:30]	56	0 MPH	21 F	Dry		1
[18:30-18:45]	46	0 MPH	21 F	Dry		1
[18:45-19:00]	28	0 MPH	21 F	Dry		16
[19:00-19:15]	55	0 MPH	19 F	Dry		1
[19:15-19:30]	38	0 MPH	19 F	Dry		0
[19:30-19:45]	24	0 MPH	19 F	Dry		0
[19:45-20:00]	29	0 MPH	17 F	Dry		1
[20:00-20:15]	21	0 MPH	17 F	Dry		7
[20:15-20:30]	15	0 MPH	17 F	Dry		0
[20:30-20:45]	20	0 MPH	17 F	Dry		0
[20:45-21:00]	35	0 MPH	15 F	Dry		0
[21:00-21:15]	32	0 MPH	15 F	Dry		0
[21:15-21:30]	42	0 MPH	15 F	Dry		0
[21:30-21:45]	26	0 MPH	15 F	Dry		0
[21:45-22:00]	25	0 MPH	15 F	Dry		7

[Raw] Volume Report

HI-Star ID: 3612
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EAST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3842
AADT Count: 3,842

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	34	0 MPH	15 F	Dry		0
[22:15-22:30]	32	0 MPH	13 F	Dry		4
[22:30-22:45]	23	0 MPH	13 F	Dry		0
[22:45-23:00]	27	0 MPH	13 F	Dry		0
[23:00-23:15]	20	0 MPH	13 F	Dry		6
[23:15-23:30]	14	0 MPH	13 F	Dry		0
[23:30-23:45]	9	0 MPH	13 F	Dry		9
[23:45-00:00]	20	0 MPH	13 F	Dry		0
Thu,Feb/25/10						
[00:00-00:15]	18	0 MPH	11 F	Dry		0
[00:15-00:30]	20	0 MPH	11 F	Dry		0
[00:30-00:45]	21	0 MPH	11 F	Dry		0
[00:45-01:00]	10	0 MPH	11 F	Dry		0
[01:00-01:15]	16	0 MPH	9 F	Dry		0
[01:15-01:30]	8	0 MPH	9 F	Dry		0
[01:30-01:45]	4	0 MPH	9 F	Dry		0
[01:45-02:00]	7	0 MPH	9 F	Dry		0
[02:00-02:15]	13	0 MPH	9 F	Dry		0
[02:15-02:30]	8	0 MPH	9 F	Dry		0
[02:30-02:45]	6	0 MPH	9 F	Dry		0
[02:45-03:00]	8	0 MPH	9 F	Dry		0
[03:00-03:15]	5	0 MPH	9 F	Dry		0
[03:15-03:30]	3	0 MPH	9 F	Dry		0
[03:30-03:45]	4	0 MPH	9 F	Dry		0
[03:45-04:00]	8	0 MPH	7 F	Dry		8
[04:00-04:15]	3	0 MPH	7 F	Dry		0
[04:15-04:30]	9	0 MPH	7 F	Dry		0
[04:30-04:45]	10	0 MPH	7 F	Dry		0
[04:45-05:00]	6	0 MPH	7 F	Dry		0
[05:00-05:15]	18	0 MPH	7 F	Dry		0
[05:15-05:30]	24	0 MPH	5 F	Dry		0
[05:30-05:45]	27	0 MPH	5 F	Dry		0
[05:45-06:00]	29	0 MPH	5 F	Dry		0
[06:00-06:15]	20	0 MPH	5 F	Dry		11
[06:15-06:30]	31	0 MPH	5 F	Dry		0
[06:30-06:45]	51	0 MPH	5 F	Dry		7
[06:45-07:00]	51	0 MPH	5 F	Dry		8
[07:00-07:15]	51	0 MPH	5 F	Dry		1
[07:15-07:30]	86	0 MPH	5 F	Dry		2
[07:30-07:45]	73	0 MPH	7 F	Dry		1

[Raw] Volume Report

HI-Star ID: 3612
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EAST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3842
AADT Count: 3,842

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	75	0 MPH	9 F	Dry		5
[08:00-08:15]	44	0 MPH	11 F	Dry		1
[08:15-08:30]	59	28 MPH	13 F	Dry		1
[08:30-08:45]	65	0 MPH	15 F	Dry		10
[08:45-09:00]	51	0 MPH	17 F	Dry		1
[09:00-09:15]	54	18 MPH	19 F	Dry		1
[09:15-09:30]	40	12 MPH	21 F	Dry		1
[09:30-09:45]	44	0 MPH	23 F	Dry		1
[09:45-10:00]	35	0 MPH	27 F	Dry		1
[10:00-10:15]	53	18 MPH	29 F	Dry		7
[10:15-10:30]	65	12 MPH	29 F	Dry		5
[10:30-10:45]	57	0 MPH	31 F	Dry		8
[10:45-11:00]	43	0 MPH	35 F	Dry		4
[11:00-11:15]	45	0 MPH	35 F	Dry		12
[11:15-11:30]	4	0 MPH	35 F	Dry		26
[11:30-11:45]	3	0 MPH	35 F	Dry		14
[11:45-12:00]	2	0 MPH	35 F	Dry		8
	3842	0 MPH	20 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3418. The study was done in the EB RT lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/24/10 at 13:45, lasting a total of 1.75 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 199 vehicles passed through the location with a peak volume of 35 on Feb/24/10 at [13:30-13:45] and a minimum volume of 13 on Feb/24/10 at [13:00-13:15]. The AADT count for this study was 2,729.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 30 - 35 MPH range or lower. The average speed for all classifed vehicles was 32 MPH with 2.70% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 1.80 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 30MPH and the 85th percentile was 38.64 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	1	9	7	21	40	22	8	1	0	0	1	0	1	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 94 which represents 85 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 17 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
94	10	2	2	1	1	1	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [13:30-13:45] the average headway between vehicles was 25 seconds. During the slowest traffic period, on Feb/24/10 at [13:00-13:15] the average headway between vehicles was 64.286 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 35.00 and 39.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3418. The study was done in the EB RT lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/24/10 at 13:45, lasting a total of 1.75 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 199 vehicles passed through the location with a peak volume of 35 on Feb/24/10 at [13:30-13:45] and a minimum volume of 13 on Feb/24/10 at [13:00-13:15]. The AADT count for this study was 2,729.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 30 - 35 MPH range or lower. The average speed for all classifed vehicles was 32 MPH with 2.70% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 1.80 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 30MPH and the 85th percentile was 38.64 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	1	9	7	21	40	22	8	1	0	0	1	0	1	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 94 which represents 85 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 17 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
94	10	2	2	1	1	1	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [13:30-13:45] the average headway between vehicles was 25 seconds. During the slowest traffic period, on Feb/24/10 at [13:00-13:15] the average headway between vehicles was 64.286 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 35.00 and 39.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

[Raw] Volume Report

HI-Star ID: 3413
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: SB RT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 2712
AADT Count: 2,712

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	35	23 MPH	35 F	Dry		9
[12:15-12:30]	44	18 MPH	35 F	Dry		44
[12:30-12:45]	51	20 MPH	35 F	Dry		16
[12:45-13:00]	38	20 MPH	37 F	Dry		4
[13:00-13:15]	34	19 MPH	37 F	Dry		19
[13:15-13:30]	47	15 MPH	37 F	Dry		8
[13:30-13:45]	28	21 MPH	37 F	Dry		7
[13:45-14:00]	58	17 MPH	37 F	Dry		13
[14:00-14:15]	42	21 MPH	37 F	Dry		20
[14:15-14:30]	40	22 MPH	35 F	Dry		41
[14:30-14:45]	35	19 MPH	35 F	Dry		3
[14:45-15:00]	61	20 MPH	35 F	Dry		15
[15:00-15:15]	47	17 MPH	33 F	Dry		6
[15:15-15:30]	38	27 MPH	33 F	Dry		10
[15:30-15:45]	48	21 MPH	31 F	Dry		12
[15:45-16:00]	35	20 MPH	31 F	Dry		3
[16:00-16:15]	37	20 MPH	29 F	Dry		9
[16:15-16:30]	26	23 MPH	29 F	Dry		3
[16:30-16:45]	38	18 MPH	29 F	Dry		19
[16:45-17:00]	41	20 MPH	29 F	Dry		36
[17:00-17:15]	46	18 MPH	27 F	Dry		6
[17:15-17:30]	41	26 MPH	25 F	Dry		4
[17:30-17:45]	22	28 MPH	25 F	Dry		3
[17:45-18:00]	34	28 MPH	23 F	Dry		6
[18:00-18:15]	34	21 MPH	21 F	Dry		6
[18:15-18:30]	37	21 MPH	21 F	Dry		9
[18:30-18:45]	31	21 MPH	21 F	Dry		26
[18:45-19:00]	23	17 MPH	19 F	Dry		3
[19:00-19:15]	27	26 MPH	19 F	Dry		5
[19:15-19:30]	26	25 MPH	19 F	Dry		3
[19:30-19:45]	23	17 MPH	19 F	Dry		11
[19:45-20:00]	25	19 MPH	17 F	Dry		1
[20:00-20:15]	28	21 MPH	17 F	Dry		3
[20:15-20:30]	27	19 MPH	17 F	Dry		9
[20:30-20:45]	21	16 MPH	17 F	Dry		2
[20:45-21:00]	12	20 MPH	15 F	Dry		8
[21:00-21:15]	18	29 MPH	15 F	Dry		0
[21:15-21:30]	18	19 MPH	15 F	Dry		3
[21:30-21:45]	16	20 MPH	15 F	Dry		1
[21:45-22:00]	8	18 MPH	15 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3413
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: SB RT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 2712
AADT Count: 2,712

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	8	13 MPH	15 F	Dry		7
[22:15-22:30]	11	31 MPH	13 F	Dry		0
[22:30-22:45]	5	17 MPH	13 F	Dry		0
[22:45-23:00]	9	24 MPH	13 F	Dry		8
[23:00-23:15]	7	23 MPH	13 F	Dry		9
[23:15-23:30]	4	68 MPH	13 F	Dry		0
[23:30-23:45]	2	12 MPH	13 F	Dry		10
[23:45-00:00]	5	0 MPH	13 F	Dry		10
Thu,Feb/25/10						
[00:00-00:15]	9	24 MPH	11 F	Dry		7
[00:15-00:30]	7	31 MPH	11 F	Dry		5
[00:30-00:45]	5	20 MPH	11 F	Dry		1
[00:45-01:00]	14	20 MPH	11 F	Dry		1
[01:00-01:15]	7	12 MPH	11 F	Dry		0
[01:15-01:30]	5	22 MPH	9 F	Dry		0
[01:30-01:45]	3	12 MPH	9 F	Dry		0
[01:45-02:00]	2	20 MPH	9 F	Dry		0
[02:00-02:15]	3	0 MPH	9 F	Dry		0
[02:15-02:30]	6	14 MPH	9 F	Dry		0
[02:30-02:45]	3	0 MPH	9 F	Dry		5
[02:45-03:00]	9	19 MPH	9 F	Dry		0
[03:00-03:15]	6	35 MPH	9 F	Dry		0
[03:15-03:30]	13	18 MPH	9 F	Dry		1
[03:30-03:45]	18	23 MPH	9 F	Dry		1
[03:45-04:00]	12	23 MPH	9 F	Dry		1
[04:00-04:15]	17	13 MPH	9 F	Dry		16
[04:15-04:30]	25	22 MPH	9 F	Dry		3
[04:30-04:45]	37	17 MPH	9 F	Dry		5
[04:45-05:00]	39	27 MPH	9 F	Dry		4
[05:00-05:15]	31	22 MPH	9 F	Dry		14
[05:15-05:30]	38	13 MPH	9 F	Dry		17
[05:30-05:45]	49	18 MPH	9 F	Dry		6
[05:45-06:00]	51	24 MPH	9 F	Dry		6
[06:00-06:15]	26	25 MPH	7 F	Dry		1
[06:15-06:30]	25	20 MPH	7 F	Dry		15
[06:30-06:45]	47	25 MPH	7 F	Dry		7
[06:45-07:00]	49	18 MPH	9 F	Dry		10
[07:00-07:15]	37	18 MPH	9 F	Dry		19
[07:15-07:30]	48	16 MPH	9 F	Dry		12
[07:30-07:45]	28	17 MPH	9 F	Dry		5

[Raw] Volume Report

HI-Star ID: 3413
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: SB RT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 2712
AADT Count: 2,712

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	46	23 MPH	11 F	Dry		12
[08:00-08:15]	38	16 MPH	13 F	Dry		5
[08:15-08:30]	44	23 MPH	15 F	Dry		36
[08:30-08:45]	32	21 MPH	17 F	Dry		4
[08:45-09:00]	45	27 MPH	19 F	Dry		6
[09:00-09:15]	40	22 MPH	21 F	Dry		35
[09:15-09:30]	35	15 MPH	25 F	Dry		18
[09:30-09:45]	34	22 MPH	27 F	Dry		3
[09:45-10:00]	42	27 MPH	29 F	Dry		7
[10:00-10:15]	43	21 MPH	31 F	Dry		10
[10:15-10:30]	47	15 MPH	35 F	Dry		8
[10:30-10:45]	42	23 MPH	35 F	Dry		23
[10:45-11:00]	34	17 MPH	39 F	Dry		3
[11:00-11:15]	44	18 MPH	39 F	Dry		10
[11:15-11:30]	33	23 MPH	42 F	Dry		10
[11:30-11:45]	37	23 MPH	42 F	Dry		44
[11:45-12:00]	16	18 MPH	41 F	Dry		21
	2712	20 MPH	20 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3386. The study was done in the SB LT lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 513 vehicles passed through the location with a peak volume of 31 on Feb/24/10 at [14:30-14:45] and a minimum volume of 0 on Feb/24/10 at [22:00-22:15]. The AADT count for this study was 513.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 15 - 20 MPH range or lower. The average speed for all classifed vehicles was 20 MPH with 5.19% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 1.30 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 15MPH and the 85th percentile was 23.75 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	25	31	12	1	0	2	2	0	0	3	0	0	1	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 72 which represents 94 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 5 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
72	4	1	0	0	0	0	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [14:30-14:45] the average headway between vehicles was 28.125 seconds. During the slowest traffic period, on Feb/24/10 at [22:00-22:15] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 7.00 and 48.00 degrees F. The HI-STAR determined that the roadway surface was Dry 95.83% of the time.

[Raw] Volume Report

HI-Star ID: 3386
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: SB LT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 513
AADT Count: 513

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	5	0 MPH	35 F	Wet		10
[12:15-12:30]	3	0 MPH	37 F	Wet		8
[12:30-12:45]	5	0 MPH	37 F	Wet		4
[12:45-13:00]	5	0 MPH	39 F	Wet		23
[13:00-13:15]	10	0 MPH	39 F	Dry		19
[13:15-13:30]	6	12 MPH	39 F	Dry		11
[13:30-13:45]	8	58 MPH	39 F	Dry		10
[13:45-14:00]	2	0 MPH	39 F	Dry		3
[14:00-14:15]	7	15 MPH	39 F	Dry		6
[14:15-14:30]	8	12 MPH	39 F	Dry		21
[14:30-14:45]	31	58 MPH	37 F	Dry		12
[14:45-15:00]	11	20 MPH	37 F	Dry		19
[15:00-15:15]	7	29 MPH	37 F	Dry		5
[15:15-15:30]	4	18 MPH	35 F	Dry		0
[15:30-15:45]	11	12 MPH	35 F	Dry		38
[15:45-16:00]	4	20 MPH	33 F	Dry		1
[16:00-16:15]	11	0 MPH	33 F	Dry		26
[16:15-16:30]	4	0 MPH	31 F	Dry		6
[16:30-16:45]	6	18 MPH	29 F	Dry		16
[16:45-17:00]	11	16 MPH	29 F	Dry		1
[17:00-17:15]	5	18 MPH	27 F	Dry		1
[17:15-17:30]	11	0 MPH	27 F	Dry		20
[17:30-17:45]	9	17 MPH	25 F	Dry		5
[17:45-18:00]	6	20 MPH	23 F	Dry		26
[18:00-18:15]	13	22 MPH	21 F	Dry		15
[18:15-18:30]	9	26 MPH	21 F	Dry		3
[18:30-18:45]	16	12 MPH	21 F	Dry		25
[18:45-19:00]	5	18 MPH	19 F	Dry		0
[19:00-19:15]	3	12 MPH	19 F	Dry		0
[19:15-19:30]	2	42 MPH	17 F	Dry		1
[19:30-19:45]	5	0 MPH	17 F	Dry		0
[19:45-20:00]	5	0 MPH	17 F	Dry		0
[20:00-20:15]	9	12 MPH	17 F	Dry		8
[20:15-20:30]	3	0 MPH	17 F	Dry		0
[20:30-20:45]	5	12 MPH	17 F	Dry		1
[20:45-21:00]	5	18 MPH	15 F	Dry		14
[21:00-21:15]	7	12 MPH	15 F	Dry		14
[21:15-21:30]	7	18 MPH	15 F	Dry		33
[21:30-21:45]	4	22 MPH	15 F	Dry		13
[21:45-22:00]	4	0 MPH	15 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3386
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: SB LT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 513
AADT Count: 513

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	0	0 MPH	15 F	Dry		0
[22:15-22:30]	7	18 MPH	15 F	Dry		23
[22:30-22:45]	13	15 MPH	15 F	Dry		16
[22:45-23:00]	11	14 MPH	15 F	Dry		19
[23:00-23:15]	5	22 MPH	13 F	Dry		0
[23:15-23:30]	4	12 MPH	13 F	Dry		12
[23:30-23:45]	1	0 MPH	13 F	Dry		3
[23:45-00:00]	0	0 MPH	13 F	Dry		0
Thu,Feb/25/10						
[00:00-00:15]	0	0 MPH	13 F	Dry		0
[00:15-00:30]	0	0 MPH	13 F	Dry		0
[00:30-00:45]	1	0 MPH	11 F	Dry		0
[00:45-01:00]	1	0 MPH	11 F	Dry		2
[01:00-01:15]	4	0 MPH	11 F	Dry		14
[01:15-01:30]	0	0 MPH	11 F	Dry		0
[01:30-01:45]	0	0 MPH	11 F	Dry		0
[01:45-02:00]	0	0 MPH	11 F	Dry		0
[02:00-02:15]	0	0 MPH	9 F	Dry		0
[02:15-02:30]	1	18 MPH	9 F	Dry		0
[02:30-02:45]	0	0 MPH	9 F	Dry		0
[02:45-03:00]	1	0 MPH	9 F	Dry		3
[03:00-03:15]	0	0 MPH	9 F	Dry		0
[03:15-03:30]	0	0 MPH	9 F	Dry		0
[03:30-03:45]	0	0 MPH	9 F	Dry		0
[03:45-04:00]	1	0 MPH	9 F	Dry		0
[04:00-04:15]	2	0 MPH	9 F	Dry		10
[04:15-04:30]	0	0 MPH	9 F	Dry		0
[04:30-04:45]	1	0 MPH	9 F	Dry		3
[04:45-05:00]	2	0 MPH	9 F	Dry		2
[05:00-05:15]	4	0 MPH	9 F	Dry		1
[05:15-05:30]	1	0 MPH	7 F	Dry		14
[05:30-05:45]	1	18 MPH	7 F	Dry		0
[05:45-06:00]	1	0 MPH	7 F	Dry		6
[06:00-06:15]	5	16 MPH	7 F	Dry		12
[06:15-06:30]	8	15 MPH	7 F	Dry		21
[06:30-06:45]	7	13 MPH	7 F	Dry		23
[06:45-07:00]	13	18 MPH	9 F	Dry		16
[07:00-07:15]	2	0 MPH	9 F	Dry		3
[07:15-07:30]	2	38 MPH	9 F	Dry		14
[07:30-07:45]	10	0 MPH	9 F	Dry		16

[Raw] Volume Report

HI-Star ID: 3386
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: SB LT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 513
AADT Count: 513

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	17	21 MPH	13 F	Dry		45
[08:00-08:15]	6	18 MPH	13 F	Dry		19
[08:15-08:30]	12	17 MPH	15 F	Dry		20
[08:30-08:45]	13	23 MPH	17 F	Dry		26
[08:45-09:00]	6	30 MPH	19 F	Dry		15
[09:00-09:15]	9	0 MPH	21 F	Dry		25
[09:15-09:30]	5	0 MPH	25 F	Dry		6
[09:30-09:45]	3	0 MPH	27 F	Dry		10
[09:45-10:00]	5	0 MPH	29 F	Dry		13
[10:00-10:15]	2	0 MPH	31 F	Dry		0
[10:15-10:30]	2	0 MPH	35 F	Dry		10
[10:30-10:45]	5	13 MPH	39 F	Dry		5
[10:45-11:00]	4	0 MPH	39 F	Dry		9
[11:00-11:15]	3	0 MPH	42 F	Dry		15
[11:15-11:30]	8	0 MPH	44 F	Dry		32
[11:30-11:45]	2	0 MPH	46 F	Dry		0
[11:45-12:00]	10	38 MPH	48 F	Dry		33
	513	0 MPH	21 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3413. The study was done in the SB RT lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2712 vehicles passed through the location with a peak volume of 61 on Feb/24/10 at [14:45-15:00] and a minimum volume of 2 on Feb/24/10 at [23:30-23:45]. The AADT count for this study was 2,712.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 15 - 20 MPH range or lower. The average speed for all classifed vehicles was 21 MPH with 4.76% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 2.33 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 15MPH and the 85th percentile was 26.93 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	287	312	183	57	35	17	10	10	8	5	4	3	5	10					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 752 which represents 79 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 194 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
752	159	19	9	4	1	2	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [14:45-15:00] the average headway between vehicles was 14.516 seconds. During the slowest traffic period, on Feb/24/10 at [23:30-23:45] the average headway between vehicles was 300 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 7.00 and 42.00 degrees F. The HI-STAR determined that the roadway surface was Dry 100.00% of the time.

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3417. The study was done in the WEST BOUND lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3190 vehicles passed through the location with a peak volume of 90 on Feb/24/10 at [15:00-15:15] and a minimum volume of 0 on Feb/25/10 at [00:45-01:00]. The AADT count for this study was 3,190.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 35 - 40 MPH range or lower. The average speed for all classifed vehicles was 31 MPH with 4.98% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.36 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 35MPH and the 85th percentile was 39.86 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	89	278	382	432	558	615	259	87	25	15	3	0	6	1					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 2414 which represents 88 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 336 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
2414	224	31	42	27	11	1	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [15:00-15:15] the average headway between vehicles was 9.89 seconds. During the slowest traffic period, on Feb/25/10 at [00:45-01:00] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 7.00 and 42.00 degrees F. The HI-STAR determined that the roadway surface was Dry 96.88% of the time.

Date/Time/Volume/Average Speed/Temperature Report

HI-Star ID: 3417
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WEST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3190
AADT Count: 3,190

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,Feb/24/10				
[12:00-12:15]	42	35 MPH	31 F	Wet
[12:15-12:30]	38	25 MPH	33 F	Wet
[12:30-12:45]	49	36 MPH	33 F	Wet
[12:45-13:00]	57	29 MPH	35 F	Dry
[13:00-13:15]	61	35 MPH	35 F	Dry
[13:15-13:30]	52	31 MPH	35 F	Dry
[13:30-13:45]	42	33 MPH	35 F	Dry
[13:45-14:00]	35	29 MPH	37 F	Dry
[14:00-14:15]	57	24 MPH	35 F	Dry
[14:15-14:30]	49	28 MPH	35 F	Dry
[14:30-14:45]	51	31 MPH	35 F	Dry
[14:45-15:00]	88	29 MPH	35 F	Dry
[15:00-15:15]	90	33 MPH	35 F	Dry
[15:15-15:30]	63	34 MPH	33 F	Dry
[15:30-15:45]	54	33 MPH	33 F	Dry
[15:45-16:00]	61	30 MPH	31 F	Dry
[16:00-16:15]	69	29 MPH	31 F	Dry
[16:15-16:30]	44	33 MPH	29 F	Dry
[16:30-16:45]	52	32 MPH	29 F	Dry
[16:45-17:00]	80	30 MPH	29 F	Dry
[17:00-17:15]	43	33 MPH	29 F	Dry
[17:15-17:30]	41	33 MPH	27 F	Dry
[17:30-17:45]	46	32 MPH	25 F	Dry
[17:45-18:00]	57	29 MPH	25 F	Dry
[18:00-18:15]	45	30 MPH	23 F	Dry
[18:15-18:30]	33	27 MPH	23 F	Dry
[18:30-18:45]	29	27 MPH	21 F	Dry
[18:45-19:00]	27	26 MPH	21 F	Dry
[19:00-19:15]	30	32 MPH	19 F	Dry
[19:15-19:30]	25	31 MPH	19 F	Dry
[19:30-19:45]	20	31 MPH	19 F	Dry
[19:45-20:00]	24	26 MPH	19 F	Dry
[20:00-20:15]	30	30 MPH	17 F	Dry
[20:15-20:30]	24	29 MPH	17 F	Dry
[20:30-20:45]	24	28 MPH	17 F	Dry
[20:45-21:00]	30	31 MPH	17 F	Dry

Date/Time/Volume/Average Speed/Temperature Report

HI-Star ID: 3417
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WEST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3190
AADT Count: 3,190

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,Feb/24/10				
[21:00-21:15]	25	31 MPH	17 F	Dry
[21:15-21:30]	16	30 MPH	15 F	Dry
[21:30-21:45]	12	33 MPH	15 F	Dry
[21:45-22:00]	9	31 MPH	15 F	Dry
[22:00-22:15]	8	37 MPH	15 F	Dry
[22:15-22:30]	15	33 MPH	15 F	Dry
[22:30-22:45]	11	32 MPH	15 F	Dry
[22:45-23:00]	10	30 MPH	13 F	Dry
[23:00-23:15]	20	27 MPH	13 F	Dry
[23:15-23:30]	6	22 MPH	13 F	Dry
[23:30-23:45]	8	30 MPH	13 F	Dry
[23:45-00:00]	6	32 MPH	13 F	Dry
Wed,Feb/24/10	1808	31 MPH	24 F	
Thu,Feb/25/10				
[00:00-00:15]	9	29 MPH	13 F	Dry
[00:15-00:30]	11	28 MPH	11 F	Dry
[00:30-00:45]	3	33 MPH	11 F	Dry
[00:45-01:00]	0	0 MPH	11 F	Dry
[01:00-01:15]	5	29 MPH	11 F	Dry
[01:15-01:30]	1	28 MPH	11 F	Dry
[01:30-01:45]	6	27 MPH	9 F	Dry
[01:45-02:00]	3	37 MPH	9 F	Dry
[02:00-02:15]	1	32 MPH	9 F	Dry
[02:15-02:30]	3	28 MPH	9 F	Dry
[02:30-02:45]	1	28 MPH	9 F	Dry
[02:45-03:00]	6	34 MPH	9 F	Dry
[03:00-03:15]	4	23 MPH	9 F	Dry
[03:15-03:30]	9	32 MPH	9 F	Dry
[03:30-03:45]	9	28 MPH	9 F	Dry
[03:45-04:00]	10	27 MPH	9 F	Dry
[04:00-04:15]	9	39 MPH	9 F	Dry
[04:15-04:30]	16	35 MPH	9 F	Dry
[04:30-04:45]	13	38 MPH	7 F	Dry
[04:45-05:00]	28	30 MPH	7 F	Dry
[05:00-05:15]	23	37 MPH	7 F	Dry
[05:15-05:30]	35	32 MPH	7 F	Dry

Date/Time/Volume/Average Speed/Temperature Report

HI-Star ID: 3417
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WEST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3190
AADT Count: 3,190

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Thu,Feb/25/10				
[05:30-05:45]	32	37 MPH	7 F	Dry
[05:45-06:00]	28	30 MPH	7 F	Dry
[06:00-06:15]	42	26 MPH	7 F	Dry
[06:15-06:30]	50	25 MPH	7 F	Dry
[06:30-06:45]	62	29 MPH	7 F	Dry
[06:45-07:00]	37	34 MPH	7 F	Dry
[07:00-07:15]	47	32 MPH	7 F	Dry
[07:15-07:30]	46	33 MPH	7 F	Dry
[07:30-07:45]	70	32 MPH	9 F	Dry
[07:45-08:00]	67	31 MPH	9 F	Dry
[08:00-08:15]	39	35 MPH	11 F	Dry
[08:15-08:30]	69	31 MPH	13 F	Dry
[08:30-08:45]	48	34 MPH	15 F	Dry
[08:45-09:00]	62	29 MPH	17 F	Dry
[09:00-09:15]	33	32 MPH	19 F	Dry
[09:15-09:30]	37	35 MPH	21 F	Dry
[09:30-09:45]	30	32 MPH	23 F	Dry
[09:45-10:00]	40	35 MPH	25 F	Dry
[10:00-10:15]	44	30 MPH	29 F	Dry
[10:15-10:30]	59	32 MPH	29 F	Dry
[10:30-10:45]	41	34 MPH	31 F	Dry
[10:45-11:00]	42	33 MPH	33 F	Dry
[11:00-11:15]	65	32 MPH	35 F	Dry
[11:15-11:30]	48	32 MPH	37 F	Dry
[11:30-11:45]	38	32 MPH	39 F	Dry
[11:45-12:00]	1	0 MPH	42 F	Dry
Thu,Feb/25/10	1382	32 MPH	15 F	
Feb/24/10 12:00 Feb/25/10 12:00	3190	31 MPH	19 F	

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS & I380 SB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 3424. The study was done in the WB LT lane at WRIGHT BROS & I380 SB RAMP in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1779 vehicles passed through the location with a peak volume of 75 on Feb/24/10 at [15:00-15:15] and a minimum volume of 0 on Feb/24/10 at [23:30-23:45]. The AADT count for this study was 1,779.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 20 - 25 MPH range or lower. The average speed for all classifed vehicles was 24 MPH with 0.78% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.13 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 20MPH and the 85th percentile was 29.31 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
0	98	312	486	484	123	23	7	4	5	1	0	0	1	1					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 1506 which represents 97 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 39 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
1506	36	2	0	1	0	0	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [15:00-15:15] the average headway between vehicles was 11.842 seconds. During the slowest traffic period, on Feb/24/10 at [23:30-23:45] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 5.00 and 42.00 degrees F. The HI-STAR determined that the roadway surface was Dry 96.88% of the time.

[Raw] Volume Report

HI-Star ID: 3424
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WB LT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1779
AADT Count: 1,779

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	35	23 MPH	29 F	Wet		1
[12:15-12:30]	14	25 MPH	31 F	Wet		0
[12:30-12:45]	15	23 MPH	33 F	Wet		0
[12:45-13:00]	30	24 MPH	33 F	Dry		0
[13:00-13:15]	41	24 MPH	33 F	Dry		7
[13:15-13:30]	27	23 MPH	35 F	Dry		6
[13:30-13:45]	22	26 MPH	35 F	Dry		0
[13:45-14:00]	39	24 MPH	35 F	Dry		1
[14:00-14:15]	44	21 MPH	35 F	Dry		2
[14:15-14:30]	26	23 MPH	35 F	Dry		0
[14:30-14:45]	37	24 MPH	35 F	Dry		1
[14:45-15:00]	40	23 MPH	35 F	Dry		1
[15:00-15:15]	75	22 MPH	33 F	Dry		6
[15:15-15:30]	40	24 MPH	33 F	Dry		1
[15:30-15:45]	44	23 MPH	31 F	Dry		1
[15:45-16:00]	67	23 MPH	31 F	Dry		23
[16:00-16:15]	65	22 MPH	29 F	Dry		6
[16:15-16:30]	40	21 MPH	29 F	Dry		2
[16:30-16:45]	39	21 MPH	29 F	Dry		2
[16:45-17:00]	43	24 MPH	29 F	Dry		1
[17:00-17:15]	49	21 MPH	27 F	Dry		4
[17:15-17:30]	43	24 MPH	27 F	Dry		1
[17:30-17:45]	42	24 MPH	25 F	Dry		4
[17:45-18:00]	32	23 MPH	23 F	Dry		1
[18:00-18:15]	18	23 MPH	23 F	Dry		0
[18:15-18:30]	22	24 MPH	21 F	Dry		0
[18:30-18:45]	16	23 MPH	21 F	Dry		0
[18:45-19:00]	36	23 MPH	19 F	Dry		6
[19:00-19:15]	24	24 MPH	19 F	Dry		0
[19:15-19:30]	14	25 MPH	19 F	Dry		0
[19:30-19:45]	20	29 MPH	19 F	Dry		0
[19:45-20:00]	18	29 MPH	17 F	Dry		0
[20:00-20:15]	26	25 MPH	17 F	Dry		0
[20:15-20:30]	24	24 MPH	17 F	Dry		0
[20:30-20:45]	21	24 MPH	17 F	Dry		0
[20:45-21:00]	25	23 MPH	15 F	Dry		0
[21:00-21:15]	18	23 MPH	15 F	Dry		0
[21:15-21:30]	11	25 MPH	15 F	Dry		0
[21:30-21:45]	15	25 MPH	15 F	Dry		0
[21:45-22:00]	8	26 MPH	15 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3424
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WB LT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1779
AADT Count: 1,779

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	4	41 MPH	15 F	Dry		0
[22:15-22:30]	7	29 MPH	13 F	Dry		0
[22:30-22:45]	17	24 MPH	13 F	Dry		0
[22:45-23:00]	7	27 MPH	13 F	Dry		0
[23:00-23:15]	6	24 MPH	13 F	Dry		0
[23:15-23:30]	6	28 MPH	13 F	Dry		7
[23:30-23:45]	0	0 MPH	13 F	Dry		0
[23:45-00:00]	1	38 MPH	13 F	Dry		0
Thu,Feb/25/10						
[00:00-00:15]	2	30 MPH	11 F	Dry		0
[00:15-00:30]	1	28 MPH	11 F	Dry		0
[00:30-00:45]	1	32 MPH	11 F	Dry		0
[00:45-01:00]	0	0 MPH	11 F	Dry		0
[01:00-01:15]	2	23 MPH	11 F	Dry		0
[01:15-01:30]	1	32 MPH	9 F	Dry		0
[01:30-01:45]	5	25 MPH	9 F	Dry		0
[01:45-02:00]	1	32 MPH	9 F	Dry		0
[02:00-02:15]	1	32 MPH	9 F	Dry		0
[02:15-02:30]	1	38 MPH	9 F	Dry		0
[02:30-02:45]	0	0 MPH	9 F	Dry		0
[02:45-03:00]	0	0 MPH	9 F	Dry		0
[03:00-03:15]	0	0 MPH	9 F	Dry		0
[03:15-03:30]	3	30 MPH	9 F	Dry		0
[03:30-03:45]	0	0 MPH	9 F	Dry		0
[03:45-04:00]	0	0 MPH	9 F	Dry		0
[04:00-04:15]	0	0 MPH	9 F	Dry		0
[04:15-04:30]	2	25 MPH	9 F	Dry		0
[04:30-04:45]	2	32 MPH	7 F	Dry		0
[04:45-05:00]	0	0 MPH	7 F	Dry		0
[05:00-05:15]	2	30 MPH	7 F	Dry		0
[05:15-05:30]	1	38 MPH	7 F	Dry		0
[05:30-05:45]	5	33 MPH	7 F	Dry		0
[05:45-06:00]	2	23 MPH	7 F	Dry		0
[06:00-06:15]	6	27 MPH	7 F	Dry		0
[06:15-06:30]	8	26 MPH	7 F	Dry		0
[06:30-06:45]	10	25 MPH	5 F	Dry		0
[06:45-07:00]	16	26 MPH	5 F	Dry		0
[07:00-07:15]	24	25 MPH	7 F	Dry		0
[07:15-07:30]	20	23 MPH	7 F	Dry		0
[07:30-07:45]	20	24 MPH	7 F	Dry		0

[Raw] Volume Report

HI-Star ID: 3424
Street: WRIGHT BROS & I380 SB RAMP
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WB LT
Oper: CAL
Posted: 40
AADT Factor: 1

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1779
AADT Count: 1,779

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	15	29 MPH	9 F	Dry		0
[08:00-08:15]	10	25 MPH	11 F	Dry		0
[08:15-08:30]	10	27 MPH	13 F	Dry		0
[08:30-08:45]	17	25 MPH	15 F	Dry		0
[08:45-09:00]	20	24 MPH	17 F	Dry		0
[09:00-09:15]	19	25 MPH	19 F	Dry		0
[09:15-09:30]	16	24 MPH	21 F	Dry		0
[09:30-09:45]	8	26 MPH	23 F	Dry		0
[09:45-10:00]	21	27 MPH	27 F	Dry		0
[10:00-10:15]	9	22 MPH	29 F	Dry		0
[10:15-10:30]	15	23 MPH	29 F	Dry		0
[10:30-10:45]	19	25 MPH	31 F	Dry		0
[10:45-11:00]	28	24 MPH	33 F	Dry		1
[11:00-11:15]	57	22 MPH	35 F	Dry		11
[11:15-11:30]	31	22 MPH	37 F	Dry		1
[11:30-11:45]	34	23 MPH	39 F	Dry		2
[11:45-12:00]	1	0 MPH	42 F	Dry		8
	1779	24 MPH	19 F			

Date/Time/Volume/Average Speed/Temperature Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8990
Street: WRIGHT BROS BLVD WEST OF I3
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EB LT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 2720
AADT Count: 2,783

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,Feb/24/10				
[12:00-12:15]	40	25 MPH	39 F	---
[12:15-12:30]	46	23 MPH	39 F	---
[12:30-12:45]	40	22 MPH	39 F	---
[12:45-13:00]	43	24 MPH	41 F	---
[13:00-13:15]	50	24 MPH	41 F	---
[13:15-13:30]	41	22 MPH	41 F	---
[13:30-13:45]	40	23 MPH	41 F	---
[13:45-14:00]	32	22 MPH	41 F	---
[14:00-14:15]	39	21 MPH	39 F	---
[14:15-14:30]	52	20 MPH	39 F	---
[14:30-14:45]	60	19 MPH	37 F	---
[14:45-15:00]	45	22 MPH	37 F	---
[15:00-15:15]	42	19 MPH	37 F	---
[15:15-15:30]	58	22 MPH	35 F	---
[15:30-15:45]	80	22 MPH	33 F	---
[15:45-16:00]	54	20 MPH	33 F	---
[16:00-16:15]	62	17 MPH	31 F	---
[16:15-16:30]	59	20 MPH	33 F	---
[16:30-16:45]	74	20 MPH	33 F	---
[16:45-17:00]	51	22 MPH	35 F	---
[17:00-17:15]	60	22 MPH	37 F	---
[17:15-17:30]	40	25 MPH	39 F	---
[17:30-17:45]	46	23 MPH	41 F	---
[17:45-18:00]	35	28 MPH	42 F	---
[18:00-18:15]	37	21 MPH	42 F	---
[18:15-18:30]	45	24 MPH	44 F	---
[18:30-18:45]	39	21 MPH	44 F	---
[18:45-19:00]	22	24 MPH	46 F	---
[19:00-19:15]	44	26 MPH	46 F	---
[19:15-19:30]	24	23 MPH	46 F	---
[19:30-19:45]	18	30 MPH	48 F	---
[19:45-20:00]	20	23 MPH	48 F	---
[20:00-20:15]	15	27 MPH	48 F	---
[20:15-20:30]	10	29 MPH	50 F	---
[20:30-20:45]	15	24 MPH	50 F	---
[20:45-21:00]	34	27 MPH	50 F	---

Date/Time/Volume/Average Speed/Temperature Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8990
Street: WRIGHT BROS BLVD WEST OF I3
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EB LT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 2720
AADT Count: 2,783

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,Feb/24/10				
[21:00-21:15]	26	27 MPH	50 F	---
[21:15-21:30]	34	25 MPH	50 F	---
[21:30-21:45]	28	28 MPH	50 F	---
[21:45-22:00]	23	26 MPH	52 F	---
[22:00-22:15]	33	26 MPH	52 F	---
[22:15-22:30]	24	25 MPH	52 F	---
[22:30-22:45]	13	27 MPH	52 F	---
[22:45-23:00]	15	27 MPH	52 F	---
[23:00-23:15]	16	27 MPH	52 F	---
[23:15-23:30]	10	27 MPH	52 F	---
[23:30-23:45]	9	26 MPH	52 F	---
[23:45-00:00]	19	28 MPH	52 F	---
Wed,Feb/24/10	1762	24 MPH	43 F	
Thu,Feb/25/10				
[00:00-00:15]	16	29 MPH	52 F	---
[00:15-00:30]	20	27 MPH	52 F	---
[00:30-00:45]	20	30 MPH	52 F	---
[00:45-01:00]	7	30 MPH	52 F	---
[01:00-01:15]	21	29 MPH	52 F	---
[01:15-01:30]	7	28 MPH	54 F	---
[01:30-01:45]	4	24 MPH	54 F	---
[01:45-02:00]	7	29 MPH	54 F	---
[02:00-02:15]	10	24 MPH	54 F	---
[02:15-02:30]	8	32 MPH	54 F	---
[02:30-02:45]	7	27 MPH	54 F	---
[02:45-03:00]	5	20 MPH	54 F	---
[03:00-03:15]	4	26 MPH	54 F	---
[03:15-03:30]	0	0 MPH	54 F	---
[03:30-03:45]	7	25 MPH	54 F	---
[03:45-04:00]	6	26 MPH	54 F	---
[04:00-04:15]	3	23 MPH	54 F	---
[04:15-04:30]	7	18 MPH	56 F	---
[04:30-04:45]	14	23 MPH	56 F	---
[04:45-05:00]	6	23 MPH	56 F	---
[05:00-05:15]	21	23 MPH	56 F	---
[05:15-05:30]	18	26 MPH	56 F	---

Date/Time/Volume/Average Speed/Temperature Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8990
Street: WRIGHT BROS BLVD WEST OF I3
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EB LT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 2720
AADT Count: 2,783

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Thu,Feb/25/10				
[05:30-05:45]	20	22 MPH	56 F	---
[05:45-06:00]	20	27 MPH	56 F	---
[06:00-06:15]	17	23 MPH	56 F	---
[06:15-06:30]	22	22 MPH	56 F	---
[06:30-06:45]	21	25 MPH	56 F	---
[06:45-07:00]	29	23 MPH	56 F	---
[07:00-07:15]	27	21 MPH	56 F	---
[07:15-07:30]	33	24 MPH	54 F	---
[07:30-07:45]	35	21 MPH	54 F	---
[07:45-08:00]	30	22 MPH	52 F	---
[08:00-08:15]	30	25 MPH	52 F	---
[08:15-08:30]	36	26 MPH	50 F	---
[08:30-08:45]	36	23 MPH	46 F	---
[08:45-09:00]	31	24 MPH	44 F	---
[09:00-09:15]	40	22 MPH	42 F	---
[09:15-09:30]	24	24 MPH	39 F	---
[09:30-09:45]	36	25 MPH	35 F	---
[09:45-10:00]	32	23 MPH	33 F	---
[10:00-10:15]	45	23 MPH	31 F	---
[10:15-10:30]	62	23 MPH	35 F	---
[10:30-10:45]	50	24 MPH	39 F	---
[10:45-11:00]	37	25 MPH	41 F	---
[11:00-11:15]	25	20 MPH	39 F	---
[11:15-11:30]	1	0 MPH	35 F	---
[11:30-11:45]	1	75 MPH	33 F	---
[11:45-12:00]	0	0 MPH	33 F	---
Thu,Feb/25/10	958	24 MPH	49 F	
Feb/24/10 12:00 Feb/25/10 12:00	2720	24 MPH	46 F	

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS BLVD WEST OF I380 NB
Location: WRIGHT BROS & I380 NB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 8876. The study was done in the EAST BOUND lane at WRIGHT BROS BLVD WEST OF I380 NB in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1808 vehicles passed through the location with a peak volume of 69 on Feb/25/10 at [06:45-07:00] and a minimum volume of 0 on Feb/25/10 at [01:15-01:30]. The AADT count for this study was 1,850.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 40 - 45 MPH range or lower. The average speed for all classifed vehicles was 36 MPH with 20.32% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.90 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 40MPH and the 85th percentile was 47.10 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
8	39	101	179	249	193	286	368	226	90	31	9	3	3	1					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 1400 which represents 78 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 386 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
1400	354	15	12	2	1	2	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/25/10 at [06:45-07:00] the average headway between vehicles was 12.857 seconds. During the slowest traffic period, on Feb/25/10 at [01:15-01:30] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 31.00 and 56.00 degrees F.

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8876
Street: WRIGHT BROS BLVD WEST OF I3
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EAST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1808
AADT Count: 1,850

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	26	37 MPH	37 F	---		1
[12:15-12:30]	32	41 MPH	37 F	---		1
[12:30-12:45]	20	40 MPH	39 F	---		0
[12:45-13:00]	28	39 MPH	39 F	---		1
[13:00-13:15]	30	38 MPH	39 F	---		1
[13:15-13:30]	28	38 MPH	41 F	---		1
[13:30-13:45]	23	37 MPH	41 F	---		1
[13:45-14:00]	14	37 MPH	41 F	---		0
[14:00-14:15]	25	40 MPH	41 F	---		1
[14:15-14:30]	37	32 MPH	39 F	---		2
[14:30-14:45]	39	36 MPH	39 F	---		2
[14:45-15:00]	61	31 MPH	39 F	---		3
[15:00-15:15]	24	39 MPH	37 F	---		1
[15:15-15:30]	20	40 MPH	35 F	---		0
[15:30-15:45]	42	36 MPH	35 F	---		2
[15:45-16:00]	32	36 MPH	35 F	---		1
[16:00-16:15]	46	32 MPH	33 F	---		2
[16:15-16:30]	41	34 MPH	31 F	---		2
[16:30-16:45]	29	35 MPH	33 F	---		1
[16:45-17:00]	33	33 MPH	35 F	---		1
[17:00-17:15]	29	32 MPH	35 F	---		1
[17:15-17:30]	44	35 MPH	37 F	---		2
[17:30-17:45]	43	34 MPH	39 F	---		2
[17:45-18:00]	25	38 MPH	41 F	---		1
[18:00-18:15]	24	38 MPH	41 F	---		1
[18:15-18:30]	22	37 MPH	42 F	---		1
[18:30-18:45]	25	40 MPH	42 F	---		1
[18:45-19:00]	19	38 MPH	44 F	---		1
[19:00-19:15]	18	39 MPH	44 F	---		0
[19:15-19:30]	20	41 MPH	46 F	---		0
[19:30-19:45]	13	42 MPH	46 F	---		0
[19:45-20:00]	10	36 MPH	46 F	---		0
[20:00-20:15]	21	42 MPH	48 F	---		0
[20:15-20:30]	10	40 MPH	48 F	---		0
[20:30-20:45]	11	45 MPH	48 F	---		0
[20:45-21:00]	11	41 MPH	48 F	---		0
[21:00-21:15]	10	43 MPH	50 F	---		0
[21:15-21:30]	13	45 MPH	50 F	---		0
[21:30-21:45]	4	41 MPH	50 F	---		0
[21:45-22:00]	9	48 MPH	50 F	---		0

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8876
Street: WRIGHT BROS BLVD WEST OF I3
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: EAST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1808
AADT Count: 1,850

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	7	42 MPH	50 F	---		0
[22:15-22:30]	13	40 MPH	52 F	---		0
[22:30-22:45]	25	41 MPH	52 F	---		1
[22:45-23:00]	35	39 MPH	52 F	---		1
[23:00-23:15]	13	42 MPH	52 F	---		0
[23:15-23:30]	5	42 MPH	52 F	---		0
[23:30-23:45]	3	44 MPH	52 F	---		0
[23:45-00:00]	1	38 MPH	52 F	---		0
Thu,Feb/25/10						
[00:00-00:15]	3	31 MPH	52 F	---		0
[00:15-00:30]	2	35 MPH	52 F	---		0
[00:30-00:45]	1	58 MPH	52 F	---		0
[00:45-01:00]	1	52 MPH	52 F	---		0
[01:00-01:15]	1	22 MPH	52 F	---		0
[01:15-01:30]	0	0 MPH	52 F	---		0
[01:30-01:45]	0	0 MPH	52 F	---		0
[01:45-02:00]	0	0 MPH	52 F	---		0
[02:00-02:15]	3	34 MPH	54 F	---		0
[02:15-02:30]	1	42 MPH	54 F	---		0
[02:30-02:45]	0	0 MPH	54 F	---		0
[02:45-03:00]	1	42 MPH	54 F	---		0
[03:00-03:15]	2	48 MPH	54 F	---		0
[03:15-03:30]	1	42 MPH	54 F	---		0
[03:30-03:45]	2	38 MPH	54 F	---		0
[03:45-04:00]	2	50 MPH	54 F	---		0
[04:00-04:15]	1	52 MPH	54 F	---		0
[04:15-04:30]	0	0 MPH	54 F	---		0
[04:30-04:45]	3	49 MPH	56 F	---		0
[04:45-05:00]	1	28 MPH	56 F	---		0
[05:00-05:15]	3	31 MPH	56 F	---		0
[05:15-05:30]	4	40 MPH	56 F	---		0
[05:30-05:45]	9	44 MPH	56 F	---		0
[05:45-06:00]	11	41 MPH	56 F	---		0
[06:00-06:15]	12	38 MPH	56 F	---		0
[06:15-06:30]	19	42 MPH	56 F	---		0
[06:30-06:45]	60	35 MPH	56 F	---		3
[06:45-07:00]	69	29 MPH	56 F	---		4
[07:00-07:15]	33	37 MPH	56 F	---		1
[07:15-07:30]	51	37 MPH	54 F	---		2
[07:30-07:45]	48	33 MPH	54 F	---		2

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8876	Begin: Feb/24/10 12:00	End: Feb/25/10 12:00
Street: WRIGHT BROS BLVD WEST OF I3	Lane: EAST BOUND	Hours: 24.00
State: IA	Oper: CAL	Period: 15
City: CEDAR RAPIDS	Posted: 40	Raw Count: 1808
County: LINN	AADT Factor: 1.023	AADT Count: 1,850

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	67	31 MPH	52 F	---		4
[08:00-08:15]	31	32 MPH	52 F	---		4
[08:15-08:30]	38	33 MPH	50 F	---		2
[08:30-08:45]	40	31 MPH	48 F	---		2
[08:45-09:00]	37	34 MPH	46 F	---		2
[09:00-09:15]	17	34 MPH	42 F	---		0
[09:15-09:30]	19	33 MPH	39 F	---		1
[09:30-09:45]	14	29 MPH	37 F	---		0
[09:45-10:00]	16	37 MPH	33 F	---		0
[10:00-10:15]	10	40 MPH	33 F	---		0
[10:15-10:30]	12	35 MPH	35 F	---		0
[10:30-10:45]	10	30 MPH	39 F	---		0
[10:45-11:00]	17	31 MPH	41 F	---		0
[11:00-11:15]	20	32 MPH	42 F	---		1
[11:15-11:30]	1	0 MPH	35 F	---		0
[11:30-11:45]	1	0 MPH	35 F	---		0
[11:45-12:00]	1	75 MPH	35 F	---		0
	1808	37 MPH	46 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS BLVD WEST OF I380 NB
Location: WRIGHT BROS & I380 NB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 8990. The study was done in the EB LT lane at WRIGHT BROS BLVD WEST OF I380 NB in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2720 vehicles passed through the location with a peak volume of 80 on Feb/24/10 at [15:30-15:45] and a minimum volume of 0 on Feb/25/10 at [03:15-03:30]. The AADT count for this study was 2,783.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 25 - 30 MPH range or lower. The average speed for all classifed vehicles was 23 MPH with 0.54% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.04 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 25MPH and the 85th percentile was 29.87 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
71	251	453	686	764	284	58	14	5	5	3	0	0	0	1					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 2270 which represents 87 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 325 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
2270	284	12	10	11	6	2	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [15:30-15:45] the average headway between vehicles was 11.111 seconds. During the slowest traffic period, on Feb/25/10 at [03:15-03:30] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 31.00 and 56.00 degrees F.

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: I380 NB RAMP @ WRIGHT BROS BLVD
Location: WRIGHT BROS & I380 NB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 8989. The study was done in the NB LT lane at I380 NB RAMP @ WRIGHT BROS BLVD in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1339 vehicles passed through the location with a peak volume of 36 on Feb/25/10 at [08:15-08:30] and a minimum volume of 0 on Feb/25/10 at [00:30-00:45]. The AADT count for this study was 1,370.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 10 - 15 MPH range or lower. The average speed for all classifed vehicles was 13 MPH with 0.30% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.00 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 10MPH and the 85th percentile was 19.09 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
224	446	204	58	26	8	9	7	3	0	0	0	0	0	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 848 which represents 86 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 137 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
848	97	15	7	10	3	5	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/25/10 at [08:15-08:30] the average headway between vehicles was 24.324 seconds. During the slowest traffic period, on Feb/25/10 at [00:30-00:45] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 31.00 and 52.00 degrees F.

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8989
Street: I380 NB RAMP @ WRIGHT BROS E
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: NB LT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1339
AADT Count: 1,370

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	18	13 MPH	35 F	---		1
[12:15-12:30]	12	12 MPH	37 F	---		1
[12:30-12:45]	16	16 MPH	37 F	---		1
[12:45-13:00]	17	13 MPH	37 F	---		1
[13:00-13:15]	24	13 MPH	37 F	---		2
[13:15-13:30]	19	14 MPH	37 F	---		2
[13:30-13:45]	23	15 MPH	39 F	---		1
[13:45-14:00]	11	18 MPH	39 F	---		1
[14:00-14:15]	30	14 MPH	39 F	---		2
[14:15-14:30]	28	15 MPH	37 F	---		3
[14:30-14:45]	23	11 MPH	35 F	---		2
[14:45-15:00]	33	14 MPH	35 F	---		3
[15:00-15:15]	28	13 MPH	35 F	---		2
[15:15-15:30]	28	13 MPH	35 F	---		2
[15:30-15:45]	26	13 MPH	35 F	---		2
[15:45-16:00]	20	14 MPH	33 F	---		1
[16:00-16:15]	21	14 MPH	31 F	---		2
[16:15-16:30]	14	15 MPH	33 F	---		0
[16:30-16:45]	21	15 MPH	33 F	---		1
[16:45-17:00]	25	12 MPH	35 F	---		2
[17:00-17:15]	20	14 MPH	37 F	---		2
[17:15-17:30]	19	12 MPH	37 F	---		2
[17:30-17:45]	25	11 MPH	39 F	---		2
[17:45-18:00]	31	10 MPH	41 F	---		2
[18:00-18:15]	16	15 MPH	42 F	---		1
[18:15-18:30]	16	12 MPH	42 F	---		1
[18:30-18:45]	9	16 MPH	44 F	---		0
[18:45-19:00]	9	13 MPH	44 F	---		0
[19:00-19:15]	9	11 MPH	44 F	---		0
[19:15-19:30]	20	16 MPH	44 F	---		1
[19:30-19:45]	8	15 MPH	46 F	---		0
[19:45-20:00]	6	18 MPH	46 F	---		0
[20:00-20:15]	11	9 MPH	46 F	---		1
[20:15-20:30]	16	12 MPH	46 F	---		1
[20:30-20:45]	9	10 MPH	48 F	---		0
[20:45-21:00]	12	10 MPH	46 F	---		1
[21:00-21:15]	13	17 MPH	48 F	---		0
[21:15-21:30]	4	11 MPH	48 F	---		0
[21:30-21:45]	5	11 MPH	48 F	---		0
[21:45-22:00]	4	11 MPH	48 F	---		0

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8989
Street: I380 NB RAMP @ WRIGHT BROS E
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: NB LT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1339
AADT Count: 1,370

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	4	18 MPH	50 F	---		0
[22:15-22:30]	6	17 MPH	50 F	---		0
[22:30-22:45]	5	19 MPH	50 F	---		0
[22:45-23:00]	5	14 MPH	50 F	---		0
[23:00-23:15]	2	0 MPH	50 F	---		0
[23:15-23:30]	1	4 MPH	52 F	---		0
[23:30-23:45]	6	11 MPH	52 F	---		0
[23:45-00:00]	5	7 MPH	52 F	---		0
Thu,Feb/25/10						
[00:00-00:15]	6	9 MPH	52 F	---		0
[00:15-00:30]	4	8 MPH	52 F	---		0
[00:30-00:45]	0	0 MPH	52 F	---		0
[00:45-01:00]	1	12 MPH	52 F	---		0
[01:00-01:15]	2	12 MPH	52 F	---		0
[01:15-01:30]	3	13 MPH	52 F	---		0
[01:30-01:45]	6	4 MPH	52 F	---		0
[01:45-02:00]	3	0 MPH	52 F	---		0
[02:00-02:15]	0	0 MPH	52 F	---		0
[02:15-02:30]	2	38 MPH	52 F	---		0
[02:30-02:45]	0	0 MPH	52 F	---		0
[02:45-03:00]	4	5 MPH	52 F	---		0
[03:00-03:15]	0	0 MPH	52 F	---		0
[03:15-03:30]	4	7 MPH	52 F	---		0
[03:30-03:45]	2	0 MPH	52 F	---		0
[03:45-04:00]	6	8 MPH	52 F	---		0
[04:00-04:15]	4	4 MPH	52 F	---		0
[04:15-04:30]	9	7 MPH	52 F	---		0
[04:30-04:45]	5	11 MPH	52 F	---		0
[04:45-05:00]	16	11 MPH	52 F	---		1
[05:00-05:15]	12	18 MPH	52 F	---		0
[05:15-05:30]	22	14 MPH	52 F	---		2
[05:30-05:45]	8	12 MPH	52 F	---		0
[05:45-06:00]	14	11 MPH	52 F	---		1
[06:00-06:15]	15	12 MPH	52 F	---		1
[06:15-06:30]	19	12 MPH	52 F	---		1
[06:30-06:45]	23	18 MPH	52 F	---		1
[06:45-07:00]	17	12 MPH	52 F	---		2
[07:00-07:15]	19	16 MPH	52 F	---		1
[07:15-07:30]	14	23 MPH	52 F	---		1
[07:30-07:45]	19	14 MPH	52 F	---		1

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8989
Street: I380 NB RAMP @ WRIGHT BROS E
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: NB LT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 1339
AADT Count: 1,370

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	26	13 MPH	50 F	---		2
[08:00-08:15]	18	16 MPH	48 F	---		1
[08:15-08:30]	36	16 MPH	44 F	---		2
[08:30-08:45]	24	13 MPH	44 F	---		2
[08:45-09:00]	19	12 MPH	41 F	---		1
[09:00-09:15]	13	15 MPH	39 F	---		0
[09:15-09:30]	19	15 MPH	37 F	---		1
[09:30-09:45]	22	16 MPH	33 F	---		1
[09:45-10:00]	26	14 MPH	33 F	---		2
[10:00-10:15]	29	13 MPH	35 F	---		3
[10:15-10:30]	27	13 MPH	37 F	---		2
[10:30-10:45]	18	11 MPH	41 F	---		1
[10:45-11:00]	30	12 MPH	41 F	---		2
[11:00-11:15]	21	11 MPH	41 F	---		1
[11:15-11:30]	18	17 MPH	35 F	---		1
[11:30-11:45]	1	12 MPH	35 F	---		0
[11:45-12:00]	0	0 MPH	39 F	---		0
	1339	12 MPH	45 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: I380 NB RAMP @ WRIGHT BROS BLVD
Location: WRIGHT BROS & I380 NB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 8991. The study was done in the NB RT lane at I380 NB RAMP @ WRIGHT BROS BLVD in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 672 vehicles passed through the location with a peak volume of 26 on Feb/25/10 at [07:30-07:45] and a minimum volume of 0 on Feb/24/10 at [23:15-23:30]. The AADT count for this study was 687.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 10 - 15 MPH range or lower. The average speed for all classifed vehicles was 13 MPH with 0.23% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.23 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 10MPH and the 85th percentile was 19.35 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
120	187	77	30	13	8	2	3	0	0	0	0	0	0	1					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 386 which represents 88 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 55 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
386	38	3	3	5	2	4	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/25/10 at [07:30-07:45] the average headway between vehicles was 33.333 seconds. During the slowest traffic period, on Feb/24/10 at [23:15-23:30] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 31.00 and 54.00 degrees F.

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8991
Street: I380 NB RAMP @ WRIGHT BROS E
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: NB RT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 672
AADT Count: 687

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	12	8 MPH	39 F	---		1
[12:15-12:30]	8	11 MPH	41 F	---		0
[12:30-12:45]	9	14 MPH	41 F	---		0
[12:45-13:00]	12	14 MPH	41 F	---		1
[13:00-13:15]	7	12 MPH	41 F	---		0
[13:15-13:30]	5	8 MPH	41 F	---		0
[13:30-13:45]	10	11 MPH	41 F	---		0
[13:45-14:00]	8	10 MPH	41 F	---		0
[14:00-14:15]	7	16 MPH	41 F	---		0
[14:15-14:30]	12	15 MPH	39 F	---		0
[14:30-14:45]	11	8 MPH	39 F	---		0
[14:45-15:00]	14	10 MPH	37 F	---		1
[15:00-15:15]	4	15 MPH	37 F	---		0
[15:15-15:30]	7	13 MPH	37 F	---		0
[15:30-15:45]	15	13 MPH	35 F	---		1
[15:45-16:00]	6	12 MPH	33 F	---		0
[16:00-16:15]	5	14 MPH	31 F	---		0
[16:15-16:30]	14	16 MPH	33 F	---		1
[16:30-16:45]	5	11 MPH	35 F	---		0
[16:45-17:00]	14	12 MPH	35 F	---		0
[17:00-17:15]	11	13 MPH	37 F	---		0
[17:15-17:30]	10	13 MPH	39 F	---		0
[17:30-17:45]	15	10 MPH	41 F	---		0
[17:45-18:00]	21	12 MPH	41 F	---		1
[18:00-18:15]	8	19 MPH	42 F	---		0
[18:15-18:30]	5	20 MPH	42 F	---		0
[18:30-18:45]	15	12 MPH	44 F	---		1
[18:45-19:00]	6	19 MPH	44 F	---		0
[19:00-19:15]	13	10 MPH	44 F	---		0
[19:15-19:30]	5	13 MPH	44 F	---		0
[19:30-19:45]	12	13 MPH	46 F	---		1
[19:45-20:00]	8	10 MPH	46 F	---		0
[20:00-20:15]	7	19 MPH	46 F	---		0
[20:15-20:30]	15	10 MPH	46 F	---		0
[20:30-20:45]	6	11 MPH	46 F	---		0
[20:45-21:00]	5	18 MPH	48 F	---		0
[21:00-21:15]	3	28 MPH	48 F	---		0
[21:15-21:30]	10	11 MPH	48 F	---		0
[21:30-21:45]	6	11 MPH	48 F	---		0
[21:45-22:00]	4	17 MPH	48 F	---		0

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8991
Street: I380 NB RAMP @ WRIGHT BROS E
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: NB RT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 672
AADT Count: 687

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	8	10 MPH	48 F	---		0
[22:15-22:30]	3	8 MPH	50 F	---		0
[22:30-22:45]	2	18 MPH	50 F	---		0
[22:45-23:00]	3	22 MPH	50 F	---		0
[23:00-23:15]	2	12 MPH	50 F	---		0
[23:15-23:30]	0	0 MPH	50 F	---		0
[23:30-23:45]	5	14 MPH	50 F	---		0
[23:45-00:00]	2	13 MPH	52 F	---		0
Thu,Feb/25/10						
[00:00-00:15]	8	10 MPH	52 F	---		0
[00:15-00:30]	0	0 MPH	52 F	---		0
[00:30-00:45]	0	0 MPH	52 F	---		0
[00:45-01:00]	0	0 MPH	52 F	---		0
[01:00-01:15]	1	12 MPH	52 F	---		0
[01:15-01:30]	0	0 MPH	52 F	---		0
[01:30-01:45]	0	0 MPH	52 F	---		0
[01:45-02:00]	3	14 MPH	52 F	---		0
[02:00-02:15]	0	0 MPH	52 F	---		0
[02:15-02:30]	0	0 MPH	52 F	---		0
[02:30-02:45]	0	0 MPH	52 F	---		0
[02:45-03:00]	0	0 MPH	52 F	---		0
[03:00-03:15]	1	12 MPH	52 F	---		0
[03:15-03:30]	0	0 MPH	52 F	---		0
[03:30-03:45]	0	0 MPH	52 F	---		0
[03:45-04:00]	0	0 MPH	52 F	---		0
[04:00-04:15]	0	0 MPH	54 F	---		0
[04:15-04:30]	0	0 MPH	54 F	---		0
[04:30-04:45]	1	22 MPH	54 F	---		0
[04:45-05:00]	1	12 MPH	54 F	---		0
[05:00-05:15]	1	12 MPH	54 F	---		0
[05:15-05:30]	1	12 MPH	54 F	---		0
[05:30-05:45]	1	0 MPH	54 F	---		0
[05:45-06:00]	5	9 MPH	54 F	---		0
[06:00-06:15]	1	4 MPH	54 F	---		0
[06:15-06:30]	8	10 MPH	54 F	---		0
[06:30-06:45]	20	12 MPH	54 F	---		1
[06:45-07:00]	13	13 MPH	54 F	---		0
[07:00-07:15]	12	12 MPH	54 F	---		0
[07:15-07:30]	11	14 MPH	52 F	---		0
[07:30-07:45]	26	15 MPH	52 F	---		2

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8991
Street: I380 NB RAMP @ WRIGHT BROS E
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: NB RT
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 672
AADT Count: 687

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	19	15 MPH	52 F	---		1
[08:00-08:15]	14	16 MPH	50 F	---		1
[08:15-08:30]	17	15 MPH	48 F	---		1
[08:30-08:45]	22	17 MPH	44 F	---		2
[08:45-09:00]	16	12 MPH	42 F	---		1
[09:00-09:15]	12	11 MPH	39 F	---		0
[09:15-09:30]	3	13 MPH	35 F	---		0
[09:30-09:45]	7	17 MPH	31 F	---		0
[09:45-10:00]	7	16 MPH	35 F	---		0
[10:00-10:15]	3	0 MPH	39 F	---		0
[10:15-10:30]	7	15 MPH	41 F	---		0
[10:30-10:45]	11	12 MPH	44 F	---		0
[10:45-11:00]	4	11 MPH	46 F	---		0
[11:00-11:15]	9	7 MPH	46 F	---		0
[11:15-11:30]	11	13 MPH	39 F	---		0
[11:30-11:45]	1	75 MPH	35 F	---		0
[11:45-12:00]	0	0 MPH	35 F	---		0
	672	12 MPH	46 F			

Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: CEDAR RAPIDS
Street: WRIGHT BROS BLVD EAST OF I380 NB
Location: WRIGHT BROS & I380 NB RAMP

A study of vehicle traffic was conducted with HI-STAR unit number 8992. The study was done in the WEST BOUND lane at WRIGHT BROS BLVD EAST OF I380 NB in CEDAR RAPIDS, IA in LINN county. The study began on Feb/24/10 at 12:00 and concluded on Feb/25/10 at 12:00, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3648 vehicles passed through the location with a peak volume of 208 on Feb/24/10 at [15:00-15:15] and a minimum volume of 0 on Feb/25/10 at [03:45-04:00]. The AADT count for this study was 3,732.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 20 - 25 MPH range or lower. The average speed for all classifed vehicles was 30 MPH with 15.16% vehicles exceeding the posted speed of 40 MPH. The HI-STAR found 0.37 percent of the total vehicles were traveling in excess of 55 MPH. The mode speed for this traffic study was 20MPH and the 85th percentile was 45.08 MPH.

< to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to >					
90	317	526	527	448	387	279	375	329	143	42	11	2	0	0					

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Vans & Pickups. The number of Passenger Vehicles in the study was 0 which represents 0 percent of the total classified vehicles. The number of Vans & Pickups in the study was 3071 which represents 88 percent of the total classified vehicles. The number of Busses & Trucks in the study was 0 which represents 0 percent of the total classified vehicles. The number of Tractor Tailers in the study was 405 which represents 0 percent of the total classified vehicles.

< to 21	22 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 139	140 to >												
3071	376	8	5	7	4	5	0												

CHART 2

HEADWAY

During the peak traffic period, on Feb/24/10 at [15:00-15:15] the average headway between vehicles was 4.306 seconds. During the slowest traffic period, on Feb/25/10 at [03:45-04:00] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 31.00 and 56.00 degrees F.

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8992
Street: WRIGHT BROS BLVD EAST OF I38
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WEST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3648
AADT Count: 3,732

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[12:00-12:15]	66	33 MPH	35 F	---		3
[12:15-12:30]	44	32 MPH	37 F	---		2
[12:30-12:45]	45	34 MPH	37 F	---		2
[12:45-13:00]	69	34 MPH	39 F	---		3
[13:00-13:15]	79	32 MPH	39 F	---		4
[13:15-13:30]	45	29 MPH	39 F	---		3
[13:30-13:45]	42	38 MPH	41 F	---		2
[13:45-14:00]	65	32 MPH	39 F	---		3
[14:00-14:15]	79	31 MPH	37 F	---		4
[14:15-14:30]	52	29 MPH	39 F	---		3
[14:30-14:45]	71	31 MPH	37 F	---		4
[14:45-15:00]	98	27 MPH	35 F	---		7
[15:00-15:15]	208	25 MPH	33 F	---		13
[15:15-15:30]	86	25 MPH	31 F	---		6
[15:30-15:45]	78	26 MPH	33 F	---		5
[15:45-16:00]	119	28 MPH	33 F	---		7
[16:00-16:15]	118	23 MPH	35 F	---		8
[16:15-16:30]	65	29 MPH	35 F	---		4
[16:30-16:45]	84	25 MPH	37 F	---		6
[16:45-17:00]	95	26 MPH	37 F	---		6
[17:00-17:15]	90	24 MPH	39 F	---		6
[17:15-17:30]	76	25 MPH	39 F	---		5
[17:30-17:45]	61	26 MPH	41 F	---		4
[17:45-18:00]	47	32 MPH	42 F	---		2
[18:00-18:15]	46	32 MPH	44 F	---		2
[18:15-18:30]	41	35 MPH	44 F	---		2
[18:30-18:45]	37	36 MPH	46 F	---		1
[18:45-19:00]	42	35 MPH	46 F	---		2
[19:00-19:15]	48	32 MPH	46 F	---		2
[19:15-19:30]	23	39 MPH	48 F	---		1
[19:30-19:45]	30	35 MPH	48 F	---		1
[19:45-20:00]	39	34 MPH	48 F	---		2
[20:00-20:15]	34	42 MPH	48 F	---		1
[20:15-20:30]	43	37 MPH	50 F	---		2
[20:30-20:45]	35	41 MPH	50 F	---		1
[20:45-21:00]	43	40 MPH	50 F	---		1
[21:00-21:15]	35	36 MPH	50 F	---		1
[21:15-21:30]	18	41 MPH	50 F	---		0
[21:30-21:45]	21	35 MPH	52 F	---		1
[21:45-22:00]	8	44 MPH	52 F	---		0

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8992
Street: WRIGHT BROS BLVD EAST OF I38
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WEST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3648
AADT Count: 3,732

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Wed,Feb/24/10						
[22:00-22:15]	8	35 MPH	52 F	---		0
[22:15-22:30]	22	37 MPH	52 F	---		1
[22:30-22:45]	16	43 MPH	52 F	---		0
[22:45-23:00]	14	34 MPH	52 F	---		0
[23:00-23:15]	73	27 MPH	52 F	---		4
[23:15-23:30]	11	37 MPH	52 F	---		0
[23:30-23:45]	7	32 MPH	52 F	---		0
[23:45-00:00]	2	38 MPH	52 F	---		0
Thu,Feb/25/10						
[00:00-00:15]	4	33 MPH	52 F	---		0
[00:15-00:30]	4	45 MPH	52 F	---		0
[00:30-00:45]	3	34 MPH	52 F	---		0
[00:45-01:00]	2	20 MPH	52 F	---		0
[01:00-01:15]	2	45 MPH	54 F	---		0
[01:15-01:30]	1	58 MPH	54 F	---		0
[01:30-01:45]	4	45 MPH	54 F	---		0
[01:45-02:00]	3	33 MPH	54 F	---		0
[02:00-02:15]	2	40 MPH	54 F	---		0
[02:15-02:30]	1	32 MPH	54 F	---		0
[02:30-02:45]	2	37 MPH	54 F	---		0
[02:45-03:00]	2	42 MPH	54 F	---		0
[03:00-03:15]	7	32 MPH	54 F	---		0
[03:15-03:30]	3	35 MPH	54 F	---		0
[03:30-03:45]	1	52 MPH	56 F	---		0
[03:45-04:00]	0	0 MPH	56 F	---		0
[04:00-04:15]	7	42 MPH	56 F	---		0
[04:15-04:30]	3	43 MPH	56 F	---		0
[04:30-04:45]	5	36 MPH	56 F	---		0
[04:45-05:00]	6	40 MPH	56 F	---		0
[05:00-05:15]	8	35 MPH	56 F	---		0
[05:15-05:30]	10	32 MPH	56 F	---		0
[05:30-05:45]	14	26 MPH	56 F	---		0
[05:45-06:00]	11	32 MPH	56 F	---		0
[06:00-06:15]	25	37 MPH	56 F	---		1
[06:15-06:30]	34	35 MPH	56 F	---		1
[06:30-06:45]	40	30 MPH	56 F	---		3
[06:45-07:00]	58	30 MPH	56 F	---		3
[07:00-07:15]	76	25 MPH	56 F	---		5
[07:15-07:30]	59	28 MPH	56 F	---		3
[07:30-07:45]	69	28 MPH	54 F	---		4

[Raw] Volume Report

WRIGHT BROS & I380 NB RAMP

HI-Star ID: 8992
Street: WRIGHT BROS BLVD EAST OF I38
State: IA
City: CEDAR RAPIDS
County: LINN

Begin: Feb/24/10 12:00
Lane: WEST BOUND
Oper: CAL
Posted: 40
AADT Factor: 1.023

End: Feb/25/10 12:00
Hours: 24.00
Period: 15
Raw Count: 3648
AADT Count: 3,732

Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		Period Occupancy
Thu,Feb/25/10						
[07:45-08:00]	73	26 MPH	52 F	---		4
[08:00-08:15]	32	27 MPH	52 F	---		2
[08:15-08:30]	21	23 MPH	50 F	---		1
[08:30-08:45]	54	24 MPH	48 F	---		4
[08:45-09:00]	50	24 MPH	44 F	---		4
[09:00-09:15]	30	27 MPH	42 F	---		2
[09:15-09:30]	31	28 MPH	39 F	---		2
[09:30-09:45]	26	31 MPH	35 F	---		1
[09:45-10:00]	33	30 MPH	33 F	---		1
[10:00-10:15]	30	23 MPH	33 F	---		2
[10:15-10:30]	31	32 MPH	37 F	---		2
[10:30-10:45]	36	36 MPH	39 F	---		2
[10:45-11:00]	59	28 MPH	39 F	---		3
[11:00-11:15]	85	24 MPH	39 F	---		6
[11:15-11:30]	13	16 MPH	35 F	---		0
[11:30-11:45]	0	0 MPH	35 F	---		0
[11:45-12:00]	0	0 MPH	35 F	---		0
	3648	32 MPH	46 F			

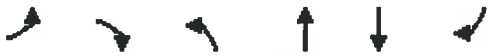
Appendix 4: Model Outputs

Traffic Analysis
No Airport Expansion

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	160	28	260	100	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	174	30	283	109	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			204		809	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			204		809	102
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		100	100
cM capacity (veh/h)			1364		252	933

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	116	88	283	54	54
Volume Left	0	0	283	0	0
Volume Right	0	30	0	0	0
cSH	1700	1700	1364	1700	1700
Volume to Capacity	0.07	0.05	0.21	0.03	0.03
Queue Length 95th (ft)	0	0	19	0	0
Control Delay (s)	0.0	0.0	8.3	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		6.0		
Approach LOS					

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	364	5	0	75	100	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	396	5	0	82	109	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	190	109	109			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	190	109	109			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	99	100			
cM capacity (veh/h)	799	945	1482			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	396	5	82	109
Volume Left	396	0	0	0
Volume Right	0	5	0	0
cSH	799	945	1700	1700
Volume to Capacity	0.50	0.01	0.05	0.06
Queue Length 95th (ft)	70	0	0	0
Control Delay (s)	13.8	8.8	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	13.8		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	85	25	50	301	13	34	100	305	50	25	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	92	27	54	327	14	37	109	332	54	27	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	341			120			528	665	60	652	671	171
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341			120			528	665	60	652	671	171
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			96			90	69	67	68	92	97
cM capacity (veh/h)	1214			1466			370	349	993	168	346	843

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	54	62	58	54	218	123	37	440	54	54
Volume Left	54	0	0	54	0	0	37	0	54	0
Volume Right	0	0	27	0	0	14	0	332	0	27
cSH	1214	1700	1700	1466	1700	1700	370	1319	168	491
Volume to Capacity	0.04	0.04	0.03	0.04	0.13	0.07	0.10	0.33	0.32	0.11
Queue Length 95th (ft)	4	0	0	3	0	0	8	37	33	9
Control Delay (s)	8.1	0.0	0.0	7.6	0.0	0.0	15.8	12.8	36.3	13.3
Lane LOS	A			A			C	B	E	B
Approach Delay (s)	2.5			1.0			13.0		24.8	
Approach LOS							B		C	

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	415	40	216	228	0	0	0	0	30	0	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	1770	1863					1770	1583	
Flt Permitted		1.00	1.00	0.43	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	807	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	451	43	235	248	0	0	0	0	33	0	159
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	0	0	111	0
Lane Group Flow (vph)	0	451	24	235	248	0	0	0	0	33	48	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		34.0	34.0	34.0	34.0					18.0	18.0	
Effective Green, g (s)		34.0	34.0	34.0	34.0					18.0	18.0	
Actuated g/C Ratio		0.57	0.57	0.57	0.57					0.30	0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		1055	897	457	1055					531	474	
v/s Ratio Prot		0.24			0.13						c0.03	
v/s Ratio Perm			0.02	c0.29						0.02		
v/c Ratio		0.43	0.03	0.51	0.24					0.06	0.10	
Uniform Delay, d1		7.4	5.7	7.9	6.5					15.0	15.2	
Progression Factor		0.97	0.66	1.81	1.62					1.00	1.00	
Incremental Delay, d2		1.3	0.1	2.6	0.3					0.2	0.4	
Delay (s)		8.5	3.8	17.0	10.9					15.2	15.6	
Level of Service		A	A	B	B					B	B	
Approach Delay (s)		8.1			13.9			0.0			15.5	
Approach LOS		A			B			A			B	

Intersection Summary				
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	118	0	0	491	50	102	0	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.99		1.00	0.85				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	1863			1840		1770	1583				
Flt Permitted	0.15	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	287	1863			1840		1770	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	128	0	0	534	54	111	0	35	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	25	0	0	0	0
Lane Group Flow (vph)	277	128	0	0	582	0	111	10	0	0	0	0
Turn Type	pm+pt	NA			NA		Perm	NA				
Protected Phases	7	4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	35.0	35.0			22.0		17.0	17.0				
Effective Green, g (s)	35.0	35.0			22.0		17.0	17.0				
Actuated g/C Ratio	0.58	0.58			0.37		0.28	0.28				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Grp Cap (vph)	389	1086			674		501	448				
v/s Ratio Prot	c0.11	0.07			c0.32			0.01				
v/s Ratio Perm	0.31						c0.06					
v/c Ratio	0.71	0.12			0.86		0.22	0.02				
Uniform Delay, d1	10.1	5.6			17.6		16.4	15.5				
Progression Factor	1.60	0.93			1.00		1.00	1.00				
Incremental Delay, d2	9.9	0.2			13.8		1.0	0.1				
Delay (s)	26.1	5.4			31.4		17.5	15.6				
Level of Service	C	A			C		B	B				
Approach Delay (s)		19.6			31.4			17.0			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	100	26	240	160	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	28	261	174	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			137		732	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			137		732	68
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		100	100
cM capacity (veh/h)			1445		292	981

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	72	64	261	87	87
Volume Left	0	0	261	0	0
Volume Right	0	28	0	0	0
cSH	1700	1700	1445	1700	1700
Volume to Capacity	0.04	0.04	0.18	0.05	0.05
Queue Length 95th (ft)	0	0	16	0	0
Control Delay (s)	0.0	0.0	8.0	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		4.8		
Approach LOS					

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	313	5	0	75	85	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	340	5	0	82	92	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	174	92	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	174	92	92			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	58	99	100			
cM capacity (veh/h)	816	965	1502			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	340	5	82	92
Volume Left	340	0	0	0
Volume Right	0	5	0	0
cSH	816	965	1700	1700
Volume to Capacity	0.42	0.01	0.05	0.05
Queue Length 95th (ft)	52	0	0	0
Control Delay (s)	12.5	8.8	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	12.5		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	65	10	50	315	13	28	100	260	50	25	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	71	11	54	342	14	30	109	283	54	27	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357			82			451	596	41	602	594	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357			82			451	596	41	602	594	178
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			93	72	72	74	93	97
cM capacity (veh/h)	1199			1514			431	392	1021	209	392	834

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	27	47	34	54	228	128	30	391	54	54
Volume Left	27	0	0	54	0	0	30	0	54	0
Volume Right	0	0	11	0	0	14	0	283	0	27
cSH	1199	1700	1700	1514	1700	1700	431	1409	209	534
Volume to Capacity	0.02	0.03	0.02	0.04	0.13	0.08	0.07	0.28	0.26	0.10
Queue Length 95th (ft)	2	0	0	3	0	0	6	29	25	8
Control Delay (s)	8.1	0.0	0.0	7.5	0.0	0.0	14.0	12.0	28.2	12.5
Lane LOS	A			A			B	B	D	B
Approach Delay (s)	2.0			1.0			12.2		20.4	
Approach LOS							B		C	

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	32.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	285	40	79	230	0	0	0	0	31	0	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	1770	1863					1770	1583	
Flt Permitted		1.00	1.00	0.54	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	999	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	310	43	86	250	0	0	0	0	34	0	173
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	0	0	104	0
Lane Group Flow (vph)	0	310	17	86	250	0	0	0	0	34	69	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		16.0	16.0	16.0	16.0					16.0	16.0	
Effective Green, g (s)		16.0	16.0	16.0	16.0					16.0	16.0	
Actuated g/C Ratio		0.40	0.40	0.40	0.40					0.40	0.40	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		745	633	399	745					708	633	
v/s Ratio Prot		c0.17			0.13						c0.04	
v/s Ratio Perm			0.01	0.09						0.02		
v/c Ratio		0.42	0.03	0.22	0.34					0.05	0.11	
Uniform Delay, d1		8.6	7.3	7.9	8.3					7.3	7.5	
Progression Factor		2.27	3.93	0.87	0.90					1.00	1.00	
Incremental Delay, d2		1.7	0.1	1.2	1.1					0.1	0.3	
Delay (s)		21.3	28.7	8.0	8.6					7.5	7.9	
Level of Service		C	C	A	A					A	A	
Approach Delay (s)		22.2			8.5			0.0			7.8	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	199	0	0	277	50	78	0	68	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.98		1.00	0.85				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	1863			1824		1770	1583				
Flt Permitted	0.48	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	901	1863			1824		1770	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	216	0	0	301	54	85	0	74	0	0	0
RTOR Reduction (vph)	0	0	0	0	16	0	0	44	0	0	0	0
Lane Group Flow (vph)	136	216	0	0	339	0	85	30	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	16.0	16.0			16.0		16.0	16.0				
Effective Green, g (s)	16.0	16.0			16.0		16.0	16.0				
Actuated g/C Ratio	0.40	0.40			0.40		0.40	0.40				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Grp Cap (vph)	360	745			729		708	633				
v/s Ratio Prot		0.12			c0.19			0.02				
v/s Ratio Perm	0.15						c0.05					
v/c Ratio	0.38	0.29			0.46		0.12	0.05				
Uniform Delay, d1	8.5	8.1			8.8		7.6	7.3				
Progression Factor	1.12	1.10			1.00		1.00	1.00				
Incremental Delay, d2	2.8	0.9			2.1		0.3	0.1				
Delay (s)	12.4	9.9			11.0		7.9	7.5				
Level of Service	B	A			B		A	A				
Approach Delay (s)		10.9			11.0			7.7			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	215	38	350	135	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	41	380	147	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			275		1089	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			275		1089	138
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			70		100	100
cM capacity (veh/h)			1285		148	886

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	156	119	380	73	73
Volume Left	0	0	380	0	0
Volume Right	0	41	0	0	0
cSH	1700	1700	1285	1700	1700
Volume to Capacity	0.09	0.07	0.30	0.04	0.04
Queue Length 95th (ft)	0	0	31	0	0
Control Delay (s)	0.0	0.0	9.0	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		6.5		
Approach LOS					

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	445	10	0	100	140	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	484	11	0	109	152	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	261	152	152			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	152	152			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	34	99	100			
cM capacity (veh/h)	728	894	1429			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	484	11	109	152
Volume Left	484	0	0	0
Volume Right	0	11	0	0
cSH	728	894	1700	1700
Volume to Capacity	0.66	0.01	0.06	0.09
Queue Length 95th (ft)	127	1	0	0
Control Delay (s)	19.2	9.1	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	18.9		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	12.4		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	115	35	70	405	20	45	135	410	70	35	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	125	38	76	440	22	49	147	446	76	38	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	462			163			726	910	82	891	918	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	462			163			726	910	82	891	918	231
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			95			79	39	54	0	84	95
cM capacity (veh/h)	1096			1413			237	240	962	60	238	771

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	76	83	80	76	293	168	49	592	76	76
Volume Left	76	0	0	76	0	0	49	0	76	0
Volume Right	0	0	38	0	0	22	0	446	0	38
cSH	1096	1700	1700	1413	1700	1700	237	970	60	363
Volume to Capacity	0.07	0.05	0.05	0.05	0.17	0.10	0.21	0.61	1.27	0.21
Queue Length 95th (ft)	6	0	0	4	0	0	19	108	161	19
Control Delay (s)	8.5	0.0	0.0	7.7	0.0	0.0	24.1	19.1	320.3	17.5
Lane LOS	A			A			C	C	F	C
Approach Delay (s)	2.7			1.1			19.5		168.9	
Approach LOS							C		F	

Intersection Summary			
Average Delay	25.1		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	555	55	290	305	0	0	0	0	40	0	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	1770	1863					1770	1583	
Flt Permitted		1.00	1.00	0.38	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	706	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	603	60	315	332	0	0	0	0	43	0	212
RTOR Reduction (vph)	0	0	17	0	0	0	0	0	0	0	172	0
Lane Group Flow (vph)	0	603	43	315	332	0	0	0	0	43	40	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		65.0	65.0	65.0	65.0					17.0	17.0	
Effective Green, g (s)		65.0	65.0	65.0	65.0					17.0	17.0	
Actuated g/C Ratio		0.72	0.72	0.72	0.72					0.19	0.19	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		1345	1143	509	1345					334	299	
v/s Ratio Prot		0.32			0.18						c0.03	
v/s Ratio Perm			0.03	c0.45						0.02		
v/c Ratio		0.45	0.04	0.62	0.25					0.13	0.13	
Uniform Delay, d1		5.1	3.6	6.3	4.2					30.3	30.4	
Progression Factor		1.06	0.59	0.69	0.80					1.00	1.00	
Incremental Delay, d2		1.1	0.1	4.6	0.4					0.8	0.9	
Delay (s)		6.5	2.2	9.0	3.7					31.1	31.3	
Level of Service		A	A	A	A					C	C	
Approach Delay (s)		6.1			6.3			0.0			31.3	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	160	0	0	660	70	135	0	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.99		1.00	0.85				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	1863			1839		1770	1583				
Flt Permitted	0.28	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	528	1863			1839		1770	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	174	0	0	717	76	147	0	43	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	35	0	0	0	0
Lane Group Flow (vph)	370	174	0	0	789	0	147	8	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	66.0	66.0			66.0		16.0	16.0				
Effective Green, g (s)	66.0	66.0			66.0		16.0	16.0				
Actuated g/C Ratio	0.73	0.73			0.73		0.18	0.18				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Grp Cap (vph)	387	1366			1348		314	281				
v/s Ratio Prot		0.09			0.43			0.00				
v/s Ratio Perm	c0.70						c0.08					
v/c Ratio	0.96	0.13			0.59		0.47	0.03				
Uniform Delay, d1	10.7	3.5			5.6		33.2	30.6				
Progression Factor	2.40	2.52			1.00		1.00	1.00				
Incremental Delay, d2	34.2	0.2			1.9		4.9	0.2				
Delay (s)	59.9	9.1			7.5		38.1	30.7				
Level of Service	E	A			A		D	C				
Approach Delay (s)		43.6			7.5			36.5			0.0	
Approach LOS		D			A			D			A	

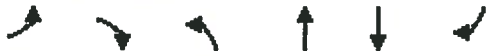
Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	135	35	320	215	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	38	348	234	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			185		978	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			185		978	92
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			75		100	100
cM capacity (veh/h)			1387		186	947

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	98	87	348	117	117
Volume Left	0	0	348	0	0
Volume Right	0	38	0	0	0
cSH	1700	1700	1387	1700	1700
Volume to Capacity	0.06	0.05	0.25	0.07	0.07
Queue Length 95th (ft)	0	0	25	0	0
Control Delay (s)	0.0	0.0	8.5	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		5.1		
Approach LOS					

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	445	10	0	100	120	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	484	11	0	109	130	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	239	130	130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	239	130	130			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	35	99	100			
cM capacity (veh/h)	749	919	1455			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	484	11	109	130
Volume Left	484	0	0	0
Volume Right	0	11	0	0
cSH	749	919	1700	1700
Volume to Capacity	0.65	0.01	0.06	0.08
Queue Length 95th (ft)	119	1	0	0
Control Delay (s)	18.1	9.0	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.9		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	12.1		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	90	15	70	420	20	35	135	350	70	35	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	98	16	76	457	22	38	147	380	76	38	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	478			114			620	812	57	818	810	239
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478			114			620	812	57	818	810	239
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			95			87	48	62	18	87	95
cM capacity (veh/h)	1080			1473			298	285	997	93	286	762

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	38	65	49	76	304	174	38	527	76	76
Volume Left	38	0	0	76	0	0	38	0	76	0
Volume Right	0	0	16	0	0	22	0	380	0	38
cSH	1080	1700	1700	1473	1700	1700	298	1023	93	416
Volume to Capacity	0.04	0.04	0.03	0.05	0.18	0.10	0.13	0.52	0.82	0.18
Queue Length 95th (ft)	3	0	0	4	0	0	11	76	110	17
Control Delay (s)	8.5	0.0	0.0	7.6	0.0	0.0	18.9	16.2	130.1	15.6
Lane LOS	A			A			C	C	F	C
Approach Delay (s)	2.1			1.0			16.4		72.8	
Approach LOS							C		F	

Intersection Summary			
Average Delay	14.9		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	380	45	105	310	0	0	0	0	40	0	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	1770	1863					1770	1583	
Flt Permitted		1.00	1.00	0.42	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	778	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	413	49	114	337	0	0	0	0	43	0	234
RTOR Reduction (vph)	0	0	28	0	0	0	0	0	0	0	140	0
Lane Group Flow (vph)	0	413	21	114	337	0	0	0	0	43	94	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		19.0	19.0	19.0	19.0					18.0	18.0	
Effective Green, g (s)		19.0	19.0	19.0	19.0					18.0	18.0	
Actuated g/C Ratio		0.42	0.42	0.42	0.42					0.40	0.40	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		786	668	328	786					708	633	
v/s Ratio Prot		c0.22			0.18						c0.06	
v/s Ratio Perm			0.01	0.15						0.02		
v/c Ratio		0.53	0.03	0.35	0.43					0.06	0.15	
Uniform Delay, d1		9.7	7.6	8.8	9.2					8.3	8.6	
Progression Factor		2.25	4.03	1.19	1.22					1.00	1.00	
Incremental Delay, d2		2.4	0.1	2.6	1.5					0.2	0.5	
Delay (s)		24.2	30.8	13.1	12.7					8.5	9.1	
Level of Service		C	C	B	B					A	A	
Approach Delay (s)		24.9			12.8			0.0			9.0	
Approach LOS		C			B			A			A	

Intersection Summary				
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	270	0	0	370	70	105	0	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.98		1.00	0.85				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	1863			1823		1770	1583				
Flt Permitted	0.38	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	709	1863			1823		1770	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	293	0	0	402	76	114	0	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	63	0	0	0	0
Lane Group Flow (vph)	185	293	0	0	463	0	114	35	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	21.0	21.0			21.0		16.0	16.0				
Effective Green, g (s)	21.0	21.0			21.0		16.0	16.0				
Actuated g/C Ratio	0.47	0.47			0.47		0.36	0.36				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Grp Cap (vph)	330	869			850		629	562				
v/s Ratio Prot		0.16			0.25			0.02				
v/s Ratio Perm	c0.26						c0.06					
v/c Ratio	0.56	0.34			0.54		0.18	0.06				
Uniform Delay, d1	8.7	7.6			8.6		10.0	9.6				
Progression Factor	1.40	1.37			1.00		1.00	1.00				
Incremental Delay, d2	6.1	0.9			2.5		0.6	0.2				
Delay (s)	18.2	11.4			11.1		10.6	9.8				
Level of Service	B	B			B		B	A				
Approach Delay (s)		14.0			11.1			10.2			0.0	
Approach LOS		B			B			B			A	

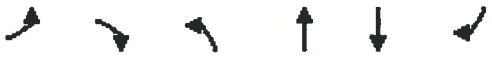
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	250	45	405	155	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	49	440	168	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			321		1261	160
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			321		1261	160
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			64		100	100
cM capacity (veh/h)			1236		104	856

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	181	139	440	84	84
Volume Left	0	0	440	0	0
Volume Right	0	49	0	0	0
cSH	1700	1700	1236	1700	1700
Volume to Capacity	0.11	0.08	0.36	0.05	0.05
Queue Length 95th (ft)	0	0	41	0	0
Control Delay (s)	0.0	0.0	9.5	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		6.9		
Approach LOS					

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	515	10	0	115	160	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	560	11	0	125	174	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1207	1120	1130	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1207	1120	1130	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	66		0	8	0	100
cM capacity (veh/h)	1623		0	135	133	1085

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	560	11	125	174
Volume Left	560	0	0	0
Volume Right	0	11	0	0
cSH	1623	1700	135	133
Volume to Capacity	0.34	0.01	0.92	1.30
Queue Length 95th (ft)	39	0	156	275
Control Delay (s)	8.4	0.0	120.9	243.7
Lane LOS	A		F	F
Approach Delay (s)	8.2		120.9	243.7
Approach LOS			F	F

Intersection Summary			
Average Delay	71.5		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	130	40	80	470	20	55	155	475	80	40	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	141	43	87	511	22	60	168	516	87	43	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	533			185			832	1043	92	1024	1054	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	533			185			832	1043	92	1024	1054	266
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			94			67	14	45	0	77	94
cM capacity (veh/h)	1031			1387			182	196	947	21	193	732

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	87	94	91	87	341	192	60	685	87	87
Volume Left	87	0	0	87	0	0	60	0	87	0
Volume Right	0	0	43	0	0	22	0	516	0	43
cSH	1031	1700	1700	1387	1700	1700	182	733	21	305
Volume to Capacity	0.08	0.06	0.05	0.06	0.20	0.11	0.33	0.93	4.11	0.29
Queue Length 95th (ft)	7	0	0	5	0	0	34	332	Err	29
Control Delay (s)	8.8	0.0	0.0	7.8	0.0	0.0	34.1	42.9	Err	21.4
Lane LOS	A			A			D	E	F	C
Approach Delay (s)	2.8			1.1			42.2		5010.2	
Approach LOS							E		F	

Intersection Summary			
Average Delay	499.6		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	645	60	335	355	0	0	0	0	45	0	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		1863	1583	1770	1863					1770		1583
Flt Permitted		1.00	1.00	0.33	1.00					0.95		1.00
Satd. Flow (perm)		1863	1583	615	1863					1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	701	65	364	386	0	0	0	0	49	0	245
RTOR Reduction (vph)	0	0	17	0	0	0	0	0	0	0	0	201
Lane Group Flow (vph)	0	701	48	364	386	0	0	0	0	49	0	44
Turn Type		NA	Perm	Perm	NA					custom		custom
Protected Phases		4			8							
Permitted Phases			4	8						6		6
Actuated Green, G (s)		66.0	66.0	66.0	66.0					16.0		16.0
Effective Green, g (s)		66.0	66.0	66.0	66.0					16.0		16.0
Actuated g/C Ratio		0.73	0.73	0.73	0.73					0.18		0.18
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		1366	1160	451	1366					314		281
v/s Ratio Prot		0.38			0.21							
v/s Ratio Perm			0.03	c0.59						c0.03		0.03
v/c Ratio		0.51	0.04	0.81	0.28					0.16		0.16
Uniform Delay, d1		5.1	3.3	7.8	4.0					31.3		31.3
Progression Factor		1.11	0.55	2.05	2.00					1.00		1.00
Incremental Delay, d2		1.3	0.1	5.5	0.2					1.1		1.2
Delay (s)		7.0	1.9	21.6	8.3					32.3		32.5
Level of Service		A	A	C	A					C		C
Approach Delay (s)		6.6			14.7			0.0			32.4	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	185	0	0	765	80	160	0	50	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Util. Factor	1.00	1.00			1.00		1.00		1.00			
Frt	1.00	1.00			0.99		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1770	1863			1839		1770		1583			
Flt Permitted	0.08	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	155	1863			1839		1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	201	0	0	832	87	174	0	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	44	0	0	0
Lane Group Flow (vph)	429	201	0	0	915	0	174	0	10	0	0	0
Turn Type	pm+pt	NA			NA		custom		custom			
Protected Phases	7	4			8							
Permitted Phases	4						2		2			
Actuated Green, G (s)	66.0	66.0			44.0		16.0		16.0			
Effective Green, g (s)	66.0	66.0			44.0		16.0		16.0			
Actuated g/C Ratio	0.73	0.73			0.49		0.18		0.18			
Clearance Time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Grp Cap (vph)	436	1366			899		314		281			
v/s Ratio Prot	c0.20	0.11			0.50							
v/s Ratio Perm	c0.52						c0.10		0.01			
v/c Ratio	0.98	0.15			1.02		0.55		0.03			
Uniform Delay, d1	29.1	3.6			23.0		33.7		30.6			
Progression Factor	1.10	2.33			1.00		1.00		1.00			
Incremental Delay, d2	36.8	0.2			34.5		6.9		0.2			
Delay (s)	68.7	8.6			57.5		40.6		30.8			
Level of Service	E	A			E		D		C			
Approach Delay (s)		49.5			57.5			38.3			0.0	
Approach LOS		D			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	40	375	250	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	43	408	272	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			212		1141	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			212		1141	106
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			70		100	100
cM capacity (veh/h)			1356		136	928

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	112	100	408	136	136
Volume Left	0	0	408	0	0
Volume Right	0	43	0	0	0
cSH	1700	1700	1356	1700	1700
Volume to Capacity	0.07	0.06	0.30	0.08	0.08
Queue Length 95th (ft)	0	0	32	0	0
Control Delay (s)	0.0	0.0	8.8	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		5.3		
Approach LOS					

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	490	10	0	115	135	0
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	533	11	0	125	147	0
Pedestrians					115	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					10	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	115		1139	1180	1191	115
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	115		1139	1180	1191	115
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	60		0	0	0	100
cM capacity (veh/h)	1333		0	103	102	848

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	533	11	125	147
Volume Left	533	0	0	0
Volume Right	0	11	0	0
cSH	1333	1700	103	102
Volume to Capacity	0.40	0.01	1.21	1.44
Queue Length 95th (ft)	49	0	209	269
Control Delay (s)	9.5	0.0	233.2	321.6
Lane LOS	A		F	F
Approach Delay (s)	9.3		233.2	321.6
Approach LOS			F	F

Intersection Summary			
Average Delay	99.8		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	100	15	80	490	20	45	155	405	80	40	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	109	16	87	533	22	49	168	440	87	43	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	554			125			709	932	62	943	929	277
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	554			125			709	932	62	943	929	277
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			94			80	29	55	0	82	94
cM capacity (veh/h)	1012			1459			240	239	989	48	239	720

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	43	72	53	87	355	199	49	609	87	87
Volume Left	43	0	0	87	0	0	49	0	87	0
Volume Right	0	0	16	0	0	22	0	440	0	43
cSH	1012	1700	1700	1459	1700	1700	240	862	48	359
Volume to Capacity	0.04	0.04	0.03	0.06	0.21	0.12	0.20	0.71	1.81	0.24
Queue Length 95th (ft)	3	0	0	5	0	0	19	151	216	23
Control Delay (s)	8.7	0.0	0.0	7.6	0.0	0.0	23.8	22.1	567.2	18.2
Lane LOS	A			A			C	C	F	C
Approach Delay (s)	2.2			1.0			22.2		292.7	
Approach LOS							C		F	

Intersection Summary			
Average Delay	40.6		
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	445	60	125	360	0	0	0	0	50	0	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		1863	1583	1770	1863					1770		1583
Flt Permitted		1.00	1.00	0.38	1.00					0.95		1.00
Satd. Flow (perm)		1863	1583	713	1863					1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	484	65	136	391	0	0	0	0	54	0	266
RTOR Reduction (vph)	0	0	31	0	0	0	0	0	0	0	0	173
Lane Group Flow (vph)	0	484	34	136	391	0	0	0	0	54	0	93
Turn Type		NA	Perm	Perm	NA					custom		custom
Protected Phases		4			8							
Permitted Phases			4	8						6		6
Actuated Green, G (s)		31.0	31.0	31.0	31.0					21.0		21.0
Effective Green, g (s)		31.0	31.0	31.0	31.0					21.0		21.0
Actuated g/C Ratio		0.52	0.52	0.52	0.52					0.35		0.35
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		962	817	368	962					619		554
v/s Ratio Prot		c0.26			0.21							
v/s Ratio Perm			0.02	0.19						0.03		c0.06
v/c Ratio		0.50	0.04	0.37	0.41					0.09		0.17
Uniform Delay, d1		9.5	7.2	8.7	8.9					13.1		13.5
Progression Factor		0.94	0.60	1.30	1.24					1.00		1.00
Incremental Delay, d2		1.8	0.1	2.6	1.2					0.3		0.7
Delay (s)		10.8	4.4	13.8	12.2					13.4		14.1
Level of Service		B	A	B	B					B		B
Approach Delay (s)		10.0			12.6			0.0			14.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	310	0	0	430	80	120	0	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Util. Factor	1.00	1.00			1.00		1.00		1.00			
Frt	1.00	1.00			0.98		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1770	1863			1823		1770		1583			
Flt Permitted	0.36	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	678	1863			1823		1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	212	337	0	0	467	87	130	0	114	0	0	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	82	0	0	0
Lane Group Flow (vph)	212	337	0	0	543	0	130	0	32	0	0	0
Turn Type	Perm	NA			NA		custom		custom			
Protected Phases		4			8							
Permitted Phases	4						2		2			
Actuated Green, G (s)	35.0	35.0			35.0		17.0		17.0			
Effective Green, g (s)	35.0	35.0			35.0		17.0		17.0			
Actuated g/C Ratio	0.58	0.58			0.58		0.28		0.28			
Clearance Time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Grp Cap (vph)	395	1086			1063		501		448			
v/s Ratio Prot		0.18			0.30							
v/s Ratio Perm	c0.31						c0.07		0.02			
v/c Ratio	0.54	0.31			0.51		0.26		0.07			
Uniform Delay, d1	7.6	6.4			7.4		16.6		15.7			
Progression Factor	1.74	1.61			1.00		1.00		1.00			
Incremental Delay, d2	4.7	0.7			1.8		1.3		0.3			
Delay (s)	17.9	10.9			9.2		17.9		16.0			
Level of Service	B	B			A		B		B			
Approach Delay (s)		13.6			9.2			17.0			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Traffic Analysis
Airport Expansion
Existing Geometry

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	215	40	370	135	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	43	402	147	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			277		1133	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			277		1133	139
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			69		100	100
cM capacity (veh/h)			1283		135	884

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	156	121	402	73	73
Volume Left	0	0	402	0	0
Volume Right	0	43	0	0	0
cSH	1700	1700	1283	1700	1700
Volume to Capacity	0.09	0.07	0.31	0.04	0.04
Queue Length 95th (ft)	0	0	34	0	0
Control Delay (s)	0.0	0.0	9.1	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		6.7		
Approach LOS					

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	470	10	0	100	140	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	511	11	0	109	152	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	261	152	152			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	152	152			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	30	99	100			
cM capacity (veh/h)	728	894	1429			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	511	11	109	152
Volume Left	511	0	0	0
Volume Right	0	11	0	0
cSH	728	894	1700	1700
Volume to Capacity	0.70	0.01	0.06	0.09
Queue Length 95th (ft)	145	1	0	0
Control Delay (s)	20.7	9.1	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	20.5		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	13.6		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	115	35	70	425	20	45	135	435	70	35	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	125	38	76	462	22	49	147	473	76	38	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			163			736	932	82	913	940	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			163			736	932	82	913	940	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			95			79	37	51	0	83	95
cM capacity (veh/h)	1075			1413			232	233	962	53	230	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	76	83	80	76	308	176	49	620	76	76
Volume Left	76	0	0	76	0	0	49	0	76	0
Volume Right	0	0	38	0	0	22	0	473	0	38
cSH	1075	1700	1700	1413	1700	1700	232	984	53	354
Volume to Capacity	0.07	0.05	0.05	0.05	0.18	0.10	0.21	0.63	1.44	0.22
Queue Length 95th (ft)	6	0	0	4	0	0	19	116	174	20
Control Delay (s)	8.6	0.0	0.0	7.7	0.0	0.0	24.7	19.7	402.6	18.0
Lane LOS	A			A			C	C	F	C
Approach Delay (s)	2.7			1.0			20.1		210.3	
Approach LOS							C		F	

Intersection Summary				
Average Delay	28.8			
Intersection Capacity Utilization	45.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	570	65	290	315	0	0	0	0	40	0	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	1770	1863					1770	1583	
Flt Permitted		1.00	1.00	0.37	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	688	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	620	71	315	342	0	0	0	0	43	0	223
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	181	0
Lane Group Flow (vph)	0	620	51	315	342	0	0	0	0	43	42	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		65.0	65.0	65.0	65.0					17.0	17.0	
Effective Green, g (s)		65.0	65.0	65.0	65.0					17.0	17.0	
Actuated g/C Ratio		0.72	0.72	0.72	0.72					0.19	0.19	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		1345	1143	496	1345					334	299	
v/s Ratio Prot		0.33			0.18						c0.03	
v/s Ratio Perm			0.03	c0.46						0.02		
v/c Ratio		0.46	0.04	0.64	0.25					0.13	0.14	
Uniform Delay, d1		5.2	3.6	6.4	4.3					30.3	30.4	
Progression Factor		1.07	0.58	0.67	0.78					1.00	1.00	
Incremental Delay, d2		1.1	0.1	5.1	0.4					0.8	1.0	
Delay (s)		6.7	2.1	9.4	3.7					31.1	31.4	
Level of Service		A	A	A	A					C	C	
Approach Delay (s)		6.2			6.4			0.0			31.4	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	165	0	0	660	70	145	45	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.99		1.00	0.94				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	1863			1839		1770	1746				
Flt Permitted	0.28	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	528	1863			1839		1770	1746				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	179	0	0	717	76	158	49	35	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	29	0	0	0	0
Lane Group Flow (vph)	380	179	0	0	789	0	158	55	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	66.0	66.0			66.0		16.0	16.0				
Effective Green, g (s)	66.0	66.0			66.0		16.0	16.0				
Actuated g/C Ratio	0.73	0.73			0.73		0.18	0.18				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Grp Cap (vph)	387	1366			1348		314	310				
v/s Ratio Prot		0.10			0.43			0.03				
v/s Ratio Perm	c0.72						c0.09					
v/c Ratio	0.98	0.13			0.59		0.50	0.18				
Uniform Delay, d1	11.4	3.5			5.6		33.4	31.4				
Progression Factor	2.40	2.53			1.00		1.00	1.00				
Incremental Delay, d2	39.5	0.2			1.9		5.7	1.3				
Delay (s)	66.9	9.1			7.5		39.1	32.7				
Level of Service	E	A			A		D	C				
Approach Delay (s)		48.4			7.5			36.9			0.0	
Approach LOS		D			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	135	35	340	215	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	38	370	234	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			185		1022	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			185		1022	92
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			73		100	100
cM capacity (veh/h)			1387		170	947

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	98	87	370	117	117
Volume Left	0	0	370	0	0
Volume Right	0	38	0	0	0
cSH	1700	1700	1387	1700	1700
Volume to Capacity	0.06	0.05	0.27	0.07	0.07
Queue Length 95th (ft)	0	0	27	0	0
Control Delay (s)	0.0	0.0	8.5	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		5.2		
Approach LOS					

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	445	10	0	100	120	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	484	11	0	109	130	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	239	130	130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	239	130	130			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	35	99	100			
cM capacity (veh/h)	749	919	1455			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	484	11	109	130
Volume Left	484	0	0	0
Volume Right	0	11	0	0
cSH	749	919	1700	1700
Volume to Capacity	0.65	0.01	0.06	0.08
Queue Length 95th (ft)	119	1	0	0
Control Delay (s)	18.1	9.0	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.9		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	12.1		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	90	15	70	440	20	35	135	370	70	35	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	98	16	76	478	22	38	147	402	76	38	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	500			114			630	834	57	840	832	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			114			630	834	57	840	832	250
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			95			87	47	60	10	86	95
cM capacity (veh/h)	1060			1473			291	276	997	84	278	750

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	38	65	49	76	319	181	38	549	76	76
Volume Left	38	0	0	76	0	0	38	0	76	0
Volume Right	0	0	16	0	0	22	0	402	0	38
cSH	1060	1700	1700	1473	1700	1700	291	1034	84	405
Volume to Capacity	0.04	0.04	0.03	0.05	0.19	0.11	0.13	0.53	0.90	0.19
Queue Length 95th (ft)	3	0	0	4	0	0	11	81	121	17
Control Delay (s)	8.5	0.0	0.0	7.6	0.0	0.0	19.2	16.6	159.4	15.9
Lane LOS	A			A			C	C	F	C
Approach Delay (s)	2.1			1.0			16.8		87.7	
Approach LOS							C		F	

Intersection Summary				
Average Delay	16.4			
Intersection Capacity Utilization	40.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	390	55	105	320	0	0	0	0	40	0	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	1770	1863					1770	1583	
Flt Permitted		1.00	1.00	0.41	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	757	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	424	60	114	348	0	0	0	0	43	0	245
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	147	0
Lane Group Flow (vph)	0	424	25	114	348	0	0	0	0	43	98	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		19.0	19.0	19.0	19.0					18.0	18.0	
Effective Green, g (s)		19.0	19.0	19.0	19.0					18.0	18.0	
Actuated g/C Ratio		0.42	0.42	0.42	0.42					0.40	0.40	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		786	668	319	786					708	633	
v/s Ratio Prot		c0.23			0.19						c0.06	
v/s Ratio Perm			0.02	0.15						0.02		
v/c Ratio		0.54	0.04	0.36	0.44					0.06	0.15	
Uniform Delay, d1		9.7	7.6	8.8	9.2					8.3	8.6	
Progression Factor		2.25	4.26	1.17	1.20					1.00	1.00	
Incremental Delay, d2		2.6	0.1	2.8	1.6					0.2	0.5	
Delay (s)		24.5	32.6	13.1	12.7					8.5	9.2	
Level of Service		C	C	B	B					A	A	
Approach Delay (s)		25.5			12.8			0.0			9.1	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	270	0	0	370	70	115	0	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.98		1.00	0.85				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	1863			1823		1770	1583				
Flt Permitted	0.38	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	709	1863			1823		1770	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	293	0	0	402	76	125	0	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	63	0	0	0	0
Lane Group Flow (vph)	196	293	0	0	463	0	125	35	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	21.0	21.0			21.0		16.0	16.0				
Effective Green, g (s)	21.0	21.0			21.0		16.0	16.0				
Actuated g/C Ratio	0.47	0.47			0.47		0.36	0.36				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Grp Cap (vph)	330	869			850		629	562				
v/s Ratio Prot		0.16			0.25			0.02				
v/s Ratio Perm	c0.28						c0.07					
v/c Ratio	0.59	0.34			0.54		0.20	0.06				
Uniform Delay, d1	8.9	7.6			8.6		10.1	9.6				
Progression Factor	1.39	1.36			1.00		1.00	1.00				
Incremental Delay, d2	6.9	0.9			2.5		0.7	0.2				
Delay (s)	19.2	11.3			11.1		10.8	9.8				
Level of Service	B	B			B		B	A				
Approach Delay (s)		14.5			11.1			10.3			0.0	
Approach LOS		B			B			B			A	

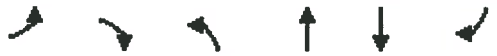
Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	250	51	460	155	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	55	500	168	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			327		1384	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			327		1384	164
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			59		100	100
cM capacity (veh/h)			1229		80	852

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	181	146	500	84	84
Volume Left	0	0	500	0	0
Volume Right	0	55	0	0	0
cSH	1700	1700	1229	1700	1700
Volume to Capacity	0.11	0.09	0.41	0.05	0.05
Queue Length 95th (ft)	0	0	50	0	0
Control Delay (s)	0.0	0.0	9.9	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		7.4		
Approach LOS					

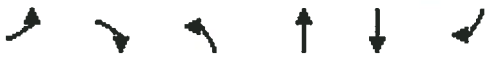
Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	585	10	0	115	160	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	636	11	0	125	174	0

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total (vph)	636	11	125	174
Volume Left (vph)	636	0	0	0
Volume Right (vph)	0	11	0	0
Hadj (s)	0.53	-0.67	0.03	0.03
Departure Headway (s)	6.0	4.8	6.1	6.0
Degree Utilization, x	1.05	0.01	0.21	0.29
Capacity (veh/h)	599	743	575	583
Control Delay (s)	74.7	6.6	10.8	11.5
Approach Delay (s)	73.6		10.8	11.5
Approach LOS	F		B	B

Intersection Summary			
Delay	53.9		
Level of Service	F		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	585	10	0	115	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	11	0	125	174	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	636	6	0	125	174	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		16.0	16.0	
Effective Green, g (s)	26.0	26.0		16.0	16.0	
Actuated g/C Ratio	0.52	0.52		0.32	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	920	823		596	596	
v/s Ratio Prot	c0.36			0.07	c0.09	
v/s Ratio Perm		0.00				
v/c Ratio	0.69	0.01		0.21	0.29	
Uniform Delay, d1	9.0	5.8		12.4	12.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	0.0		0.8	1.2	
Delay (s)	13.2	5.8		13.2	14.0	
Level of Service	B	A		B	B	
Approach Delay (s)	13.1			13.2	14.0	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	130	40	80	525	20	60	155	540	80	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3415		1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.30	1.00		0.64	1.00	1.00	0.70	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	558	3415		1184	1863	1583	1306	1863	1583	1212	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	141	43	87	571	22	65	168	587	87	43	43
RTOR Reduction (vph)	0	22	0	0	0	11	0	0	374	0	27	0
Lane Group Flow (vph)	87	162	0	87	571	11	65	168	213	87	59	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	27.0	27.0		27.0	27.0	27.0	20.0	20.0	20.0	20.0	20.0	
Effective Green, g (s)	27.0	27.0		27.0	27.0	27.0	20.0	20.0	20.0	20.0	20.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	273	1676		581	914	777	474	677	575	440	626	
v/s Ratio Prot		0.05			c0.31			0.09			0.03	
v/s Ratio Perm	0.16			0.07		0.01	0.05		c0.13	0.07		
v/c Ratio	0.32	0.10		0.15	0.62	0.01	0.14	0.25	0.37	0.20	0.09	
Uniform Delay, d1	8.4	7.5		7.7	10.3	7.2	11.7	12.2	12.9	12.0	11.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.1	0.1		0.5	3.2	0.0	0.6	0.9	1.8	1.0	0.3	
Delay (s)	11.5	7.6		8.2	13.5	7.2	12.3	13.1	14.7	13.0	11.8	
Level of Service	B	A		A	B	A	B	B	B	B	B	
Approach Delay (s)		8.9			12.6			14.2			12.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	680	90	335	385	0	0	0	0	45	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		1.00	1.00	0.97	1.00					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		1863	1583	3433	1863					1770		1583
Flt Permitted		1.00	1.00	0.27	1.00					0.95		1.00
Satd. Flow (perm)		1863	1583	976	1863					1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	739	98	364	418	0	0	0	0	49	0	272
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	0	206
Lane Group Flow (vph)	0	739	63	364	418	0	0	0	0	49	0	66
Turn Type		NA	Perm	Perm	NA					custom		custom
Protected Phases		4			8							
Permitted Phases			4	8						6		6
Actuated Green, G (s)		45.0	45.0	45.0	45.0					17.0		17.0
Effective Green, g (s)		45.0	45.0	45.0	45.0					17.0		17.0
Actuated g/C Ratio		0.64	0.64	0.64	0.64					0.24		0.24
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		1197	1017	627	1197					429		384
v/s Ratio Prot		c0.40			0.22							
v/s Ratio Perm			0.04	0.37						0.03		c0.04
v/c Ratio		0.62	0.06	0.58	0.35					0.11		0.17
Uniform Delay, d1		7.4	4.6	7.1	5.8					20.6		20.9
Progression Factor		1.05	0.56	1.96	1.93					1.00		1.00
Incremental Delay, d2		2.3	0.1	2.2	0.4					0.5		1.0
Delay (s)		10.1	2.7	16.1	11.6					21.2		21.9
Level of Service		B	A	B	B					C		C
Approach Delay (s)		9.2			13.7			0.0			21.8	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	190	0	0	770	80	185	0	50	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	1.00			1.00	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	1863			1863	1583	1770		1583			
Flt Permitted	0.10	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	371	1863			1863	1583	1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	462	207	0	0	837	87	201	0	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	39	0	0	41	0	0	0
Lane Group Flow (vph)	462	207	0	0	837	48	201	0	13	0	0	0
Turn Type	pm+pt	NA			NA	Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	45.0	45.0			35.0	35.0	17.0		17.0			
Effective Green, g (s)	45.0	45.0			35.0	35.0	17.0		17.0			
Actuated g/C Ratio	0.64	0.64			0.50	0.50	0.24		0.24			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Grp Cap (vph)	500	1197			931	791	429		384			
v/s Ratio Prot	c0.08	0.11			0.45							
v/s Ratio Perm	c0.51					0.03	c0.11		0.01			
v/c Ratio	0.92	0.17			0.90	0.06	0.47		0.03			
Uniform Delay, d1	17.4	5.0			15.9	9.0	22.6		20.2			
Progression Factor	1.43	1.12			1.00	1.00	1.00		1.00			
Incremental Delay, d2	21.8	0.3			13.3	0.1	3.6		0.2			
Delay (s)	46.6	5.9			29.2	9.2	26.3		20.4			
Level of Service	D	A			C	A	C		C			
Approach Delay (s)		34.0			27.3			25.0			0.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	45	425	250	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	49	462	272	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			217		1253	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		1253	109
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			66		100	100
cM capacity (veh/h)			1349		108	924

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	112	105	462	136	136
Volume Left	0	0	462	0	0
Volume Right	0	49	0	0	0
cSH	1700	1700	1349	1700	1700
Volume to Capacity	0.07	0.06	0.34	0.08	0.08
Queue Length 95th (ft)	0	0	39	0	0
Control Delay (s)	0.0	0.0	9.0	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		5.7		
Approach LOS					

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	555	10	0	115	135	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	603	11	0	125	147	0

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total (vph)	603	11	125	147
Volume Left (vph)	603	0	0	0
Volume Right (vph)	0	11	0	0
Hadj (s)	0.53	-0.67	0.03	0.03
Departure Headway (s)	5.9	4.7	6.1	6.1
Degree Utilization, x	0.99	0.01	0.21	0.25
Capacity (veh/h)	607	757	580	582
Control Delay (s)	55.8	6.5	10.8	11.1
Approach Delay (s)	55.0		10.8	11.1
Approach LOS	F		B	B

Intersection Summary			
Delay	41.5		
Level of Service	E		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	555	10	0	115	135	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	603	11	0	125	147	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	603	6	0	125	147	0
Confl. Peds. (#/hr)	115					
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		16.0	16.0	
Effective Green, g (s)	26.0	26.0		16.0	16.0	
Actuated g/C Ratio	0.52	0.52		0.32	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	920	823		596	596	
v/s Ratio Prot	c0.34			0.07	c0.08	
v/s Ratio Perm		0.00				
v/c Ratio	0.66	0.01		0.21	0.25	
Uniform Delay, d1	8.7	5.8		12.4	12.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	0.0		0.8	1.0	
Delay (s)	12.4	5.8		13.2	13.5	
Level of Service	B	A		B	B	
Approach Delay (s)	12.3			13.2	13.5	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	100	15	80	540	20	50	155	465	80	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3471		1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.28	1.00		0.67	1.00	1.00	0.70	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	526	3471		1253	1863	1583	1306	1863	1583	1212	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	109	16	87	587	22	54	168	505	87	43	43
RTOR Reduction (vph)	0	9	0	0	0	12	0	0	325	0	28	0
Lane Group Flow (vph)	43	116	0	87	587	10	54	168	180	87	58	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0	21.0	16.0	16.0	16.0	16.0	16.0	
Effective Green, g (s)	21.0	21.0		21.0	21.0	21.0	16.0	16.0	16.0	16.0	16.0	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	245	1619		584	869	738	464	662	562	430	612	
v/s Ratio Prot		0.03			c0.32			0.09			0.03	
v/s Ratio Perm	0.08			0.07		0.01	0.04		c0.11	0.07		
v/c Ratio	0.18	0.07		0.15	0.68	0.01	0.12	0.25	0.32	0.20	0.10	
Uniform Delay, d1	7.0	6.6		6.9	9.3	6.4	9.7	10.3	10.5	10.1	9.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	0.1		0.5	4.2	0.0	0.5	0.9	1.5	1.1	0.3	
Delay (s)	8.5	6.7		7.4	13.5	6.5	10.3	11.2	12.0	11.1	10.0	
Level of Service	A	A		A	B	A	B	B	B	B	A	
Approach Delay (s)		7.2			12.5			11.7			10.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	480	85	125	385	0	0	0	0	50	0	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		1.00	1.00	0.97	1.00					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		1863	1583	3433	1863					1770		1583
Flt Permitted		1.00	1.00	0.30	1.00					0.95		1.00
Satd. Flow (perm)		1863	1583	1084	1863					1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	522	92	136	418	0	0	0	0	54	0	293
RTOR Reduction (vph)	0	0	55	0	0	0	0	0	0	0	0	168
Lane Group Flow (vph)	0	522	37	136	418	0	0	0	0	54	0	125
Turn Type		NA	Perm	Perm	NA					custom		custom
Protected Phases		4			8							
Permitted Phases			4	8						6		6
Actuated Green, G (s)		16.0	16.0	16.0	16.0					16.0		16.0
Effective Green, g (s)		16.0	16.0	16.0	16.0					16.0		16.0
Actuated g/C Ratio		0.40	0.40	0.40	0.40					0.40		0.40
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		745	633	433	745					708		633
v/s Ratio Prot		c0.28			0.22							
v/s Ratio Perm			0.02	0.13						0.03		c0.08
v/c Ratio		0.70	0.06	0.31	0.56					0.08		0.20
Uniform Delay, d1		10.0	7.4	8.2	9.3					7.4		7.8
Progression Factor		2.11	4.63	0.78	0.85					1.00		1.00
Incremental Delay, d2		5.2	0.2	1.6	2.6					0.2		0.7
Delay (s)		26.3	34.3	8.0	10.5					7.6		8.5
Level of Service		C	C	A	B					A		A
Approach Delay (s)		27.5			9.9			0.0			8.4	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	315	0	0	435	80	140	0	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	1.00			1.00	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	1863			1863	1583	1770		1583			
Flt Permitted	0.35	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1273	1863			1863	1583	1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	342	0	0	473	87	152	0	114	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	68	0	0	0
Lane Group Flow (vph)	245	342	0	0	473	35	152	0	46	0	0	0
Turn Type	Perm	NA			NA	Perm	custom		custom			
Protected Phases		4			8							
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	16.0	16.0			16.0	16.0	16.0		16.0			
Effective Green, g (s)	16.0	16.0			16.0	16.0	16.0		16.0			
Actuated g/C Ratio	0.40	0.40			0.40	0.40	0.40		0.40			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Grp Cap (vph)	509	745			745	633	708		633			
v/s Ratio Prot		0.18			c0.25							
v/s Ratio Perm	0.19					0.02	c0.09		0.03			
v/c Ratio	0.48	0.46			0.63	0.05	0.21		0.07			
Uniform Delay, d1	8.9	8.8			9.7	7.4	7.9		7.4			
Progression Factor	0.94	0.94			1.00	1.00	1.00		1.00			
Incremental Delay, d2	2.5	1.6			4.1	0.2	0.7		0.2			
Delay (s)	10.9	9.8			13.8	7.5	8.6		7.6			
Level of Service	B	A			B	A	A		A			
Approach Delay (s)		10.3			12.8			8.2			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Traffic Analysis
Airport Expansion
Improved Geometry

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	215	40	370	135	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	43	402	147	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			277		1133	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			277		1133	139
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			69		100	100
cM capacity (veh/h)			1283		135	884

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	156	121	402	73	73
Volume Left	0	0	402	0	0
Volume Right	0	43	0	0	0
cSH	1700	1700	1283	1700	1700
Volume to Capacity	0.09	0.07	0.31	0.04	0.04
Queue Length 95th (ft)	0	0	34	0	0
Control Delay (s)	0.0	0.0	9.1	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		6.7		
Approach LOS					

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	470	10	0	100	140	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	11	0	109	152	0
RTOR Reduction (vph)	0	7	0	0	0	0
Lane Group Flow (vph)	511	4	0	109	152	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	708	633		745	745	
v/s Ratio Prot	c0.29			0.06	c0.08	
v/s Ratio Perm		0.00				
v/c Ratio	0.72	0.01		0.15	0.20	
Uniform Delay, d1	10.1	7.2		7.6	7.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.3	0.0		0.4	0.6	
Delay (s)	16.4	7.2		8.1	8.4	
Level of Service	B	A		A	A	
Approach Delay (s)	16.2			8.1	8.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	115	35	70	425	20	45	135	435	70	35	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3415		1770	3539	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.49	1.00		0.65	1.00	1.00	0.71	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	906	3415		1208	3539	1583	1318	1863	1583	1236	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	125	38	76	462	22	49	147	473	76	38	38
RTOR Reduction (vph)	0	23	0	0	0	13	0	0	284	0	23	0
Lane Group Flow (vph)	76	140	0	76	462	9	49	147	189	76	53	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	362	1366		483	1415	633	527	745	633	494	689	
v/s Ratio Prot		0.04			c0.13			0.08			0.03	
v/s Ratio Perm	0.08			0.06		0.01	0.04		c0.12	0.06		
v/c Ratio	0.21	0.10		0.16	0.33	0.01	0.09	0.20	0.30	0.15	0.08	
Uniform Delay, d1	7.9	7.5		7.7	8.3	7.2	7.5	7.8	8.2	7.7	7.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.66	0.71	2.86	1.00	1.00	
Incremental Delay, d2	1.3	0.2		0.7	0.6	0.0	0.3	0.5	1.0	0.7	0.2	
Delay (s)	9.2	7.7		8.4	8.9	7.3	5.2	6.1	24.4	8.3	7.6	
Level of Service	A	A		A	A	A	A	A	C	A	A	
Approach Delay (s)		8.1			8.8			18.9			8.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	570	65	290	315	0	0	0	0	40	0	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	0.97	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	3433	1863					1770	1583	
Flt Permitted		1.00	1.00	0.31	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	1112	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	620	71	315	342	0	0	0	0	43	0	223
RTOR Reduction (vph)	0	0	31	0	0	0	0	0	0	0	156	0
Lane Group Flow (vph)	0	620	40	315	342	0	0	0	0	43	67	0
Turn Type		NA	Perm	Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		34.0	34.0	34.0	34.0					18.0	18.0	
Effective Green, g (s)		34.0	34.0	34.0	34.0					18.0	18.0	
Actuated g/C Ratio		0.57	0.57	0.57	0.57					0.30	0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		1055	897	630	1055					531	474	
v/s Ratio Prot		c0.33			0.18						c0.04	
v/s Ratio Perm			0.03	0.28						0.02		
v/c Ratio		0.59	0.04	0.50	0.32					0.08	0.14	
Uniform Delay, d1		8.4	5.8	7.9	6.9					15.1	15.3	
Progression Factor		1.11	0.59	1.42	1.44					1.00	1.00	
Incremental Delay, d2		2.3	0.1	2.3	0.7					0.3	0.6	
Delay (s)		11.7	3.5	13.5	10.6					15.4	16.0	
Level of Service		B	A	B	B					B	B	
Approach Delay (s)		10.9			12.0			0.0			15.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	165	0	0	660	70	145	45	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	0.97	1.00			1.00	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.94				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	3433	1863			1863	1583	1770	1746				
Flt Permitted	0.26	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	950	1863			1863	1583	1770	1746				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	179	0	0	717	76	158	49	35	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	30	0	26	0	0	0	0
Lane Group Flow (vph)	380	179	0	0	717	46	158	58	0	0	0	0
Turn Type	Perm	NA			NA	Perm	Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	36.0	36.0			36.0	36.0	16.0	16.0				
Effective Green, g (s)	36.0	36.0			36.0	36.0	16.0	16.0				
Actuated g/C Ratio	0.60	0.60			0.60	0.60	0.27	0.27				
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Grp Cap (vph)	570	1117			1117	949	472	465				
v/s Ratio Prot		0.10			0.38			0.03				
v/s Ratio Perm	c0.40					0.03	c0.09					
v/c Ratio	0.67	0.16			0.64	0.05	0.33	0.13				
Uniform Delay, d1	8.0	5.3			7.8	4.9	17.7	16.7				
Progression Factor	1.52	1.33			1.00	1.00	1.00	1.00				
Incremental Delay, d2	5.1	0.3			2.8	0.1	1.9	0.6				
Delay (s)	17.3	7.3			10.6	5.0	19.6	17.2				
Level of Service	B	A			B	A	B	B				
Approach Delay (s)		14.1			10.1			18.8			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	135	35	340	215	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	38	370	234	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			185		1022	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			185		1022	92
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			73		100	100
cM capacity (veh/h)			1387		170	947

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	98	87	370	117	117
Volume Left	0	0	370	0	0
Volume Right	0	38	0	0	0
cSH	1700	1700	1387	1700	1700
Volume to Capacity	0.06	0.05	0.27	0.07	0.07
Queue Length 95th (ft)	0	0	27	0	0
Control Delay (s)	0.0	0.0	8.5	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		5.2		
Approach LOS					

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	445	465	0	100	120	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	484	505	0	109	130	0
RTOR Reduction (vph)	0	303	0	0	0	0
Lane Group Flow (vph)	484	202	0	109	130	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	708	633		745	745	
v/s Ratio Prot	c0.27			0.06	c0.07	
v/s Ratio Perm		0.13				
v/c Ratio	0.68	0.32		0.15	0.17	
Uniform Delay, d1	9.9	8.3		7.6	7.7	
Progression Factor	1.00	1.00		1.00	0.97	
Incremental Delay, d2	5.3	1.3		0.4	0.5	
Delay (s)	15.2	9.6		8.1	8.0	
Level of Service	B	A		A	A	
Approach Delay (s)	12.3			8.1	8.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	90	15	70	440	20	35	135	370	70	35	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3465		1770	3539	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.48	1.00		0.68	1.00	1.00	0.71	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	892	3465		1266	3539	1583	1318	1863	1583	1236	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	98	16	76	478	22	38	147	402	76	38	38
RTOR Reduction (vph)	0	10	0	0	0	13	0	0	241	0	23	0
Lane Group Flow (vph)	38	104	0	76	478	9	38	147	161	76	53	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	356	1386		506	1415	633	527	745	633	494	689	
v/s Ratio Prot		0.03			c0.14			0.08			0.03	
v/s Ratio Perm	0.04			0.06		0.01	0.03		c0.10	0.06		
v/c Ratio	0.11	0.08		0.15	0.34	0.01	0.07	0.20	0.25	0.15	0.08	
Uniform Delay, d1	7.5	7.4		7.7	8.3	7.2	7.4	7.8	8.0	7.7	7.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.63	0.70	2.77	1.00	1.00	
Incremental Delay, d2	0.6	0.1		0.6	0.6	0.0	0.2	0.5	0.8	0.7	0.2	
Delay (s)	8.1	7.5		8.3	9.0	7.3	4.9	5.9	23.0	8.3	7.6	
Level of Service	A	A		A	A	A	A	A	C	A	A	
Approach Delay (s)		7.7			8.8			17.6			8.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	390	55	105	320	0	0	0	0	40	0	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	0.97	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1863	1583	3433	1863					1770	1583	
Flt Permitted		1.00	1.00	0.28	1.00					0.95	1.00	
Satd. Flow (perm)		1863	1583	1027	1863					1770	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	424	60	114	348	0	0	0	0	43	0	245
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	167	0
Lane Group Flow (vph)	0	424	22	114	348	0	0	0	0	43	78	0
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		18.0	18.0	26.0	26.0					16.0	16.0	
Effective Green, g (s)		18.0	18.0	26.0	26.0					16.0	16.0	
Actuated g/C Ratio		0.36	0.36	0.52	0.52					0.32	0.32	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Grp Cap (vph)		670	569	726	968					566	506	
v/s Ratio Prot		c0.23		0.01	c0.19						c0.05	
v/s Ratio Perm			0.01	0.07						0.02		
v/c Ratio		0.63	0.04	0.16	0.36					0.08	0.15	
Uniform Delay, d1		13.3	10.4	7.0	7.1					11.8	12.2	
Progression Factor		1.27	2.01	0.90	1.12					1.00	1.00	
Incremental Delay, d2		4.4	0.1	0.4	0.9					0.3	0.7	
Delay (s)		21.3	21.0	6.7	8.9					12.1	12.8	
Level of Service		C	C	A	A					B	B	
Approach Delay (s)		21.2			8.3			0.0			12.7	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	270	0	0	370	70	115	0	90	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	0.97	1.00			1.00	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	3433	1863			1863	1583	1770	1583				
Flt Permitted	0.31	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	1105	1863			1863	1583	1770	1583				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	293	0	0	402	76	125	0	98	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	49	0	67	0	0	0	0
Lane Group Flow (vph)	196	293	0	0	402	27	125	31	0	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	7	4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	26.0	26.0			18.0	18.0	16.0	16.0				
Effective Green, g (s)	26.0	26.0			18.0	18.0	16.0	16.0				
Actuated g/C Ratio	0.52	0.52			0.36	0.36	0.32	0.32				
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Grp Cap (vph)	760	968			670	569	566	506				
v/s Ratio Prot	0.02	c0.16			c0.22			0.02				
v/s Ratio Perm	0.11					0.02	c0.07					
v/c Ratio	0.26	0.30			0.60	0.05	0.22	0.06				
Uniform Delay, d1	7.1	6.8			13.1	10.4	12.4	11.8				
Progression Factor	0.94	1.12			1.00	1.00	1.00	1.00				
Incremental Delay, d2	0.7	0.7			3.9	0.2	0.9	0.2				
Delay (s)	7.3	8.3			17.0	10.6	13.3	12.0				
Level of Service	A	A			B	B	B	B				
Approach Delay (s)		7.9			16.0			12.8			0.0	
Approach LOS		A			B			B			A	

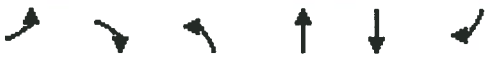
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	250	51	460	155	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	55	500	168	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			327		1384	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			327		1384	164
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			59		100	100
cM capacity (veh/h)			1229		80	852

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	181	146	500	84	84
Volume Left	0	0	500	0	0
Volume Right	0	55	0	0	0
cSH	1700	1700	1229	1700	1700
Volume to Capacity	0.11	0.09	0.41	0.05	0.05
Queue Length 95th (ft)	0	0	50	0	0
Control Delay (s)	0.0	0.0	9.9	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		7.4		
Approach LOS					

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	585	10	0	115	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	11	0	125	174	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	636	6	0	125	174	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		16.0	16.0	
Effective Green, g (s)	26.0	26.0		16.0	16.0	
Actuated g/C Ratio	0.52	0.52		0.32	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	920	823		596	596	
v/s Ratio Prot	c0.36			0.07	c0.09	
v/s Ratio Perm		0.00				
v/c Ratio	0.69	0.01		0.21	0.29	
Uniform Delay, d1	9.0	5.8		12.4	12.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	0.0		0.8	1.2	
Delay (s)	13.2	5.8		13.2	13.9	
Level of Service	B	A		B	B	
Approach Delay (s)	13.1			13.2	13.9	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	130	40	80	525	20	60	155	540	80	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3415		1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.28	1.00		0.64	1.00	1.00	0.70	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	526	3415		1184	1863	1583	1306	1863	1583	1212	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	141	43	87	571	22	65	168	587	87	43	43
RTOR Reduction (vph)	0	23	0	0	0	12	0	0	364	0	27	0
Lane Group Flow (vph)	87	161	0	87	571	10	65	168	223	87	59	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	19.0	19.0	19.0	19.0	19.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	19.0	19.0	19.0	19.0	19.0	
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46	0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	241	1570		544	856	728	496	707	601	460	654	
v/s Ratio Prot		0.05			c0.31			0.09			0.03	
v/s Ratio Perm	0.17			0.07		0.01	0.05		c0.14	0.07		
v/c Ratio	0.36	0.10		0.16	0.67	0.01	0.13	0.24	0.37	0.19	0.09	
Uniform Delay, d1	8.7	7.7		7.9	10.5	7.3	10.1	10.6	11.2	10.4	10.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.95	0.99	3.89	1.00	1.00	
Incremental Delay, d2	4.2	0.1		0.6	4.1	0.0	0.5	0.7	1.5	0.9	0.3	
Delay (s)	12.9	7.8		8.5	14.6	7.4	10.1	11.2	45.0	11.3	10.2	
Level of Service	B	A		A	B	A	B	B	D	B	B	
Approach Delay (s)		9.4			13.6			35.3			10.7	
Approach LOS		A			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	680	90	335	385	0	0	0	0	45	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		1.00	1.00	0.97	1.00					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		1863	1583	3433	1863					1770		1583
Flt Permitted		1.00	1.00	0.27	1.00					0.95		1.00
Satd. Flow (perm)		1863	1583	976	1863					1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	739	98	364	418	0	0	0	0	49	0	272
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	0	206
Lane Group Flow (vph)	0	739	63	364	418	0	0	0	0	49	0	66
Turn Type		NA	Perm	Perm	NA					custom		custom
Protected Phases		4			8							
Permitted Phases			4	8						6		6
Actuated Green, G (s)		45.0	45.0	45.0	45.0					17.0		17.0
Effective Green, g (s)		45.0	45.0	45.0	45.0					17.0		17.0
Actuated g/C Ratio		0.64	0.64	0.64	0.64					0.24		0.24
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		1197	1017	627	1197					429		384
v/s Ratio Prot		c0.40			0.22							
v/s Ratio Perm			0.04	0.37						0.03		c0.04
v/c Ratio		0.62	0.06	0.58	0.35					0.11		0.17
Uniform Delay, d1		7.4	4.6	7.1	5.8					20.6		20.9
Progression Factor		1.05	0.56	1.96	1.93					1.00		1.00
Incremental Delay, d2		2.3	0.1	2.2	0.4					0.5		1.0
Delay (s)		10.1	2.7	16.1	11.6					21.2		21.9
Level of Service		B	A	B	B					C		C
Approach Delay (s)		9.2			13.7			0.0			21.8	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	190	0	0	770	80	185	0	50	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	1.00			1.00	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	1863			1863	1583	1770		1583			
Flt Permitted	0.10	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	371	1863			1863	1583	1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	462	207	0	0	837	87	201	0	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	39	0	0	41	0	0	0
Lane Group Flow (vph)	462	207	0	0	837	48	201	0	13	0	0	0
Turn Type	pm+pt	NA			NA	Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	45.0	45.0			35.0	35.0	17.0		17.0			
Effective Green, g (s)	45.0	45.0			35.0	35.0	17.0		17.0			
Actuated g/C Ratio	0.64	0.64			0.50	0.50	0.24		0.24			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Grp Cap (vph)	500	1197			931	791	429		384			
v/s Ratio Prot	c0.08	0.11			0.45							
v/s Ratio Perm	c0.51					0.03	c0.11		0.01			
v/c Ratio	0.92	0.17			0.90	0.06	0.47		0.03			
Uniform Delay, d1	17.4	5.0			15.9	9.0	22.6		20.2			
Progression Factor	1.43	1.12			1.00	1.00	1.00		1.00			
Incremental Delay, d2	21.8	0.3			13.3	0.1	3.6		0.2			
Delay (s)	46.6	5.9			29.2	9.2	26.3		20.4			
Level of Service	D	A			C	A	C		C			
Approach Delay (s)		34.0			27.3			25.0			0.0	
Approach LOS		C			C			C			A	

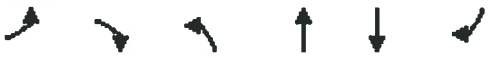
Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	45	425	250	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	49	462	272	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			217		1253	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		1253	109
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			66		100	100
cM capacity (veh/h)			1349		108	924

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	112	105	462	136	136
Volume Left	0	0	462	0	0
Volume Right	0	49	0	0	0
cSH	1700	1700	1349	1700	1700
Volume to Capacity	0.07	0.06	0.34	0.08	0.08
Queue Length 95th (ft)	0	0	39	0	0
Control Delay (s)	0.0	0.0	9.0	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		5.7		
Approach LOS					

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	555	10	0	115	135	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	603	11	0	125	147	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	603	6	0	125	147	0
Confl. Peds. (#/hr)	115					
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		16.0	16.0	
Effective Green, g (s)	26.0	26.0		16.0	16.0	
Actuated g/C Ratio	0.52	0.52		0.32	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	920	823		596	596	
v/s Ratio Prot	c0.34			0.07	c0.08	
v/s Ratio Perm		0.00				
v/c Ratio	0.66	0.01		0.21	0.25	
Uniform Delay, d1	8.7	5.8		12.4	12.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	0.0		0.8	1.0	
Delay (s)	12.4	5.8		13.2	13.5	
Level of Service	B	A		B	B	
Approach Delay (s)	12.3			13.2	13.5	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	100	15	80	540	20	50	155	465	80	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3471		1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.28	1.00		0.67	1.00	1.00	0.70	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	526	3471		1253	1863	1583	1306	1863	1583	1212	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	109	16	87	587	22	54	168	505	87	43	43
RTOR Reduction (vph)	0	9	0	0	0	12	0	0	325	0	28	0
Lane Group Flow (vph)	43	116	0	87	587	10	54	168	180	87	58	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0	21.0	16.0	16.0	16.0	16.0	16.0	
Effective Green, g (s)	21.0	21.0		21.0	21.0	21.0	16.0	16.0	16.0	16.0	16.0	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	245	1619		584	869	738	464	662	562	430	612	
v/s Ratio Prot		0.03			c0.32			0.09			0.03	
v/s Ratio Perm	0.08			0.07		0.01	0.04		c0.11	0.07		
v/c Ratio	0.18	0.07		0.15	0.68	0.01	0.12	0.25	0.32	0.20	0.10	
Uniform Delay, d1	7.0	6.6		6.9	9.3	6.4	9.7	10.3	10.5	10.1	9.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	0.1		0.5	4.2	0.0	0.5	0.9	1.5	1.1	0.3	
Delay (s)	8.5	6.7		7.4	13.5	6.5	10.3	11.2	12.0	11.1	10.0	
Level of Service	A	A		A	B	A	B	B	B	B	A	
Approach Delay (s)		7.2			12.5			11.7			10.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	480	85	125	385	0	0	0	0	50	0	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		1.00	1.00	0.97	1.00					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		1863	1583	3433	1863					1770		1583
Flt Permitted		1.00	1.00	0.30	1.00					0.95		1.00
Satd. Flow (perm)		1863	1583	1084	1863					1770		1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	522	92	136	418	0	0	0	0	54	0	293
RTOR Reduction (vph)	0	0	55	0	0	0	0	0	0	0	0	168
Lane Group Flow (vph)	0	522	37	136	418	0	0	0	0	54	0	125
Turn Type		NA	Perm	Perm	NA					custom		custom
Protected Phases		4			8							
Permitted Phases			4	8						6		6
Actuated Green, G (s)		16.0	16.0	16.0	16.0					16.0		16.0
Effective Green, g (s)		16.0	16.0	16.0	16.0					16.0		16.0
Actuated g/C Ratio		0.40	0.40	0.40	0.40					0.40		0.40
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		745	633	433	745					708		633
v/s Ratio Prot		c0.28			0.22							
v/s Ratio Perm			0.02	0.13						0.03		c0.08
v/c Ratio		0.70	0.06	0.31	0.56					0.08		0.20
Uniform Delay, d1		10.0	7.4	8.2	9.3					7.4		7.8
Progression Factor		2.11	4.63	0.78	0.85					1.00		1.00
Incremental Delay, d2		5.2	0.2	1.6	2.6					0.2		0.7
Delay (s)		26.3	34.3	8.0	10.5					7.6		8.5
Level of Service		C	C	A	B					A		A
Approach Delay (s)		27.5			9.9			0.0			8.4	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	315	0	0	435	80	140	0	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	1.00			1.00	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	1863			1863	1583	1770		1583			
Flt Permitted	0.35	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1273	1863			1863	1583	1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	342	0	0	473	87	152	0	114	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	68	0	0	0
Lane Group Flow (vph)	245	342	0	0	473	35	152	0	46	0	0	0
Turn Type	Perm	NA			NA	Perm	custom		custom			
Protected Phases		4			8							
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	16.0	16.0			16.0	16.0	16.0		16.0			
Effective Green, g (s)	16.0	16.0			16.0	16.0	16.0		16.0			
Actuated g/C Ratio	0.40	0.40			0.40	0.40	0.40		0.40			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Grp Cap (vph)	509	745			745	633	708		633			
v/s Ratio Prot		0.18			c0.25							
v/s Ratio Perm	0.19					0.02	c0.09		0.03			
v/c Ratio	0.48	0.46			0.63	0.05	0.21		0.07			
Uniform Delay, d1	8.9	8.8			9.7	7.4	7.9		7.4			
Progression Factor	0.94	0.94			1.00	1.00	1.00		1.00			
Incremental Delay, d2	2.5	1.6			4.1	0.2	0.7		0.2			
Delay (s)	10.9	9.8			13.8	7.5	8.6		7.6			
Level of Service	B	A			B	A	A		A			
Approach Delay (s)		10.3			12.8			8.2			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

MASTER PLAN

THE EASTERN IOWA AIRPORT CEDAR RAPIDS

Appendix B

Level I Energy Efficiency and Sustainability Analysis

Level I

Energy Efficiency and Sustainability Analysis

Eastern Iowa Airport

Cedar Rapids, Iowa

March 13th 2012

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Overview

On Thursday 8th March, 2012 Manus McDevitt of Sustainable Engineering Group met with Matt Dubbe, Andy Olson, Mitch Walker and Katie Haun from Mead and Hunt to review several key buildings at the Eastern Iowa Airport. The major focus of this effort was on the larger terminal building but several of the outlying buildings were also briefly examined.

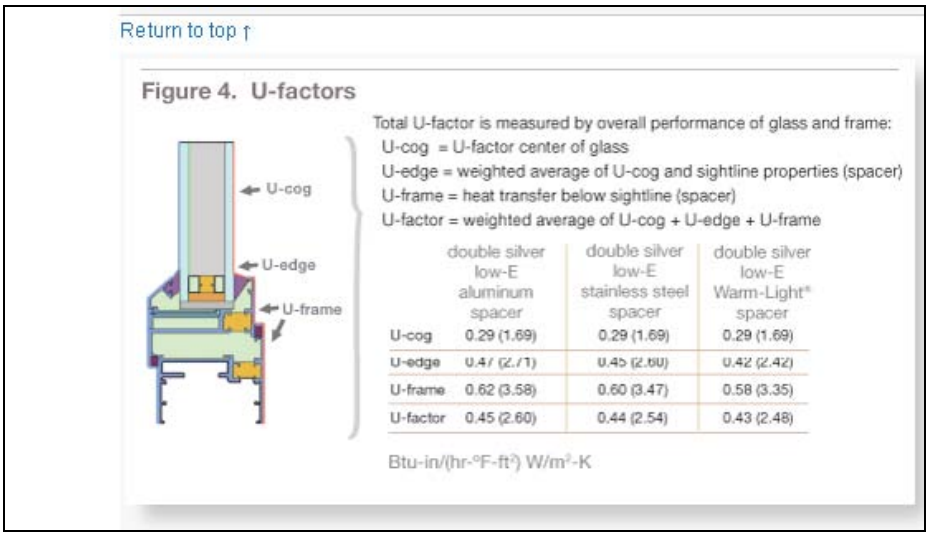
The objective of this effort is to observe the main energy consuming building systems such as heating, cooling, ventilation, lighting, plug load and domestic hot water usage and gain a reasonable understanding of the potential opportunities that may be available to enhance energy efficiency and sustainability at the facility. This information will be used for consideration when compiling the Master Plan for the airport, currently being written by Mead and Hunt. Also, it is understood that there may be a design project in the near future for the main terminal building involving upgrades to the main public spaces. This report shall try to address on a big-picture basis both the long-term master plan and medium term terminal design issues. Further investigation and analysis should be performed if any more detail is required.

Terminal Building

Building Envelop

It was observed that there was a mix of double and single glazed curtain wall throughout the exterior of the building. The height of the glass was at around 7' which is somewhat restricting the passage of natural light deep into the building. A large skylight in the center of the building was observed to be clear glass. This is likely contributing to the creation of hot spots in the space below during peak summer days. Glare may also be an issue as there appears to be little or no tinting on the glass. It was difficult to observe the roof and wall insulation but it would be expected that since the building was originally constructed in 1984 that code-minimum amount of insulation was provided at this time. Subsequent renovations were also likely to have code-minimum insulation levels for the building envelop.

For future work it may be worth considering the existing curtain wall system with a more energy efficient type that will also allow daylight to enter at a higher level than existing. The new curtain wall could include a thermal break system such as Azon Warm-Light (see below).



In general it was also found that the seals at doors and opening appeared to be worn resulting in unconditioned outdoor air infiltrating into the building. At the time of the next building upgrade it is recommended that all exterior door and opening seals be replaced.

Heating, Cooling and Ventilation Systems

The terminal building is mostly heated and cooled using water-source heat pump units located in mechanical rooms or ceiling spaces close to the thermal zones they serve. There are approximately (80) heat pumps in service throughout the building. A piping system is connected to each heat pump that provides a water supply at a controlled temperature somewhere between cooling and heating setpoints (unable to confirm actual conditions but these were noted in another document as 80F heating and 75F cooling – note that typically these are 55F heating and 85F cooling).

There is a Direct Digital Control system controlling the operations of all the heating and cooling equipment. From observation this appears to be a fairly comprehensive system and one that can be used as a basis for expanding on for future work.

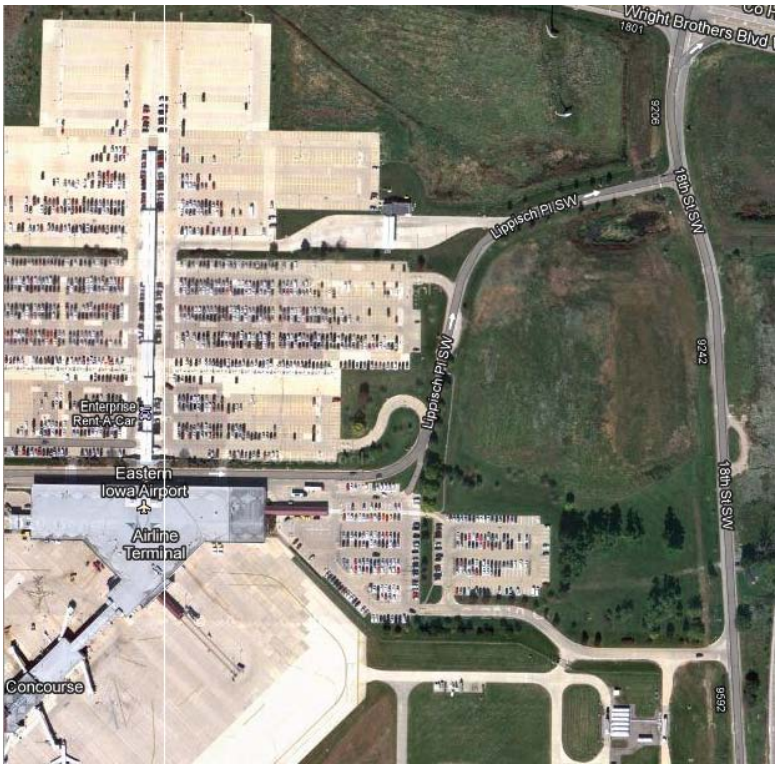
Based on some comments made by the facilities staff it appears that the heat pump equipment involves regular effort in diagnosing and repairing maintenance issues. It is recommended as part of the upcoming architectural design project for the terminal to further investigate the issues with the heat pumps and make corrections to the system design as needed to eliminate or reduce these issues. Also, control setpoints appear to be different from what is typically seen in these types of systems so it is recommended that time should be spent reviewing these setpoints and corrections made where necessary.

The major heat pump and cooling tower equipment and pumps appear to be original to the time when they were installed. It was noted that the original building was built in 1984 but several additions happened after this time. The typical heat pump life is 19 years and cooling tower life is 20 years so it would be worth considering replacement of this equipment fairly soon. The boilers appear to be recently installed and in good condition. These units typically last up to 30

years with regular service and maintenance so replacement will not be necessary well into the future.

Two newer rooftop units have been installed recently and based on feedback from facilities staff there are some operational issues that are still being worked on.

Iowa has a successful track record with installing geothermal heat pump systems. The piping and ductwork systems for water-source and ground-source systems is very similar therefore when the time comes to replace the major HVAC equipment consideration should be given to conversion to a ground-source system. Note that Alliant Energy is currently offering incentives of around $350 per ton of installed cooling system for geothermal heat pumps. Below shows a Google satellite photo where it can be seen that there appears to be a large green-space to the east of the terminal building where a potential geothermal field could be installed. The area needed will likely be around 50% of the terminal building footprint.



Lighting

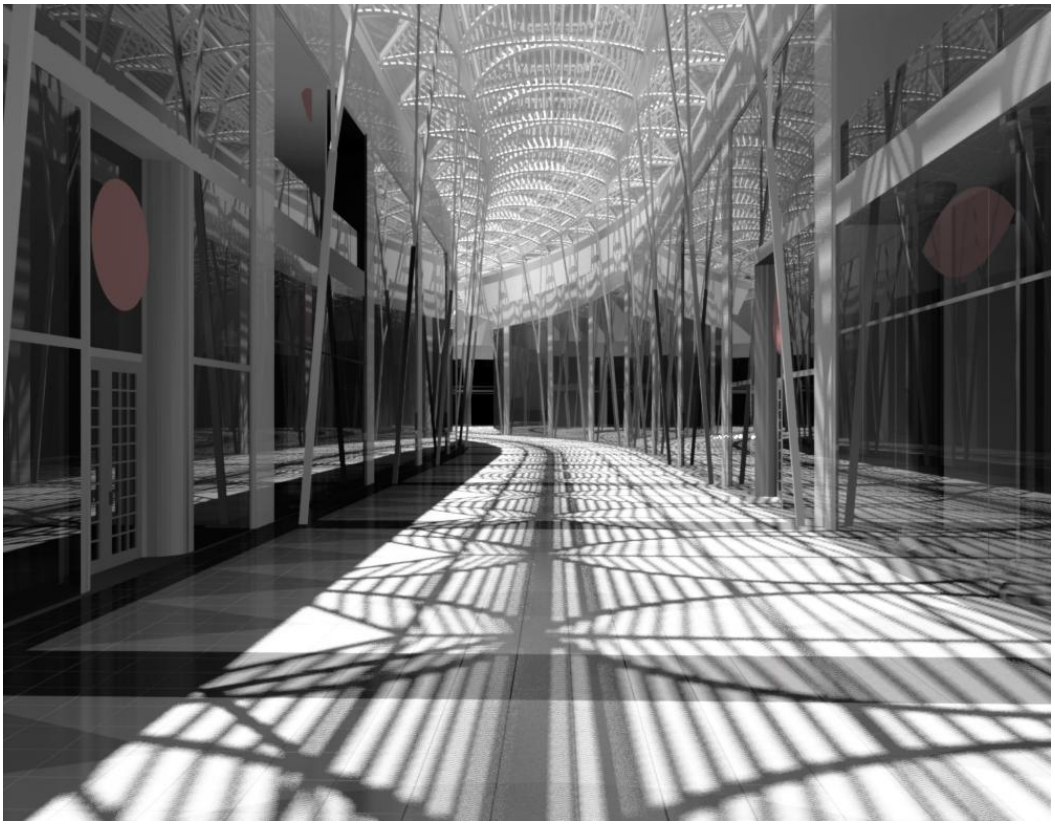
Daylight harvesting offers one of the major opportunities for energy conservation in the terminal building. Effective daylighting will also provide a more natural and pleasing indoor environment that will only add to the sense of well-being within the facility. The terminal building is mostly a single story building with high ceilings and a significant above-ceiling space. This offers opportunities to install natural lighting systems such as translucent roof-mounted panels (for example, Calwall panels with VLT's of 20% and R-20 insulation value). Also, if the curtain-wall exterior was to be refurbished (recommended as some curtain-wall is single-glazed with no

emissivity coating observed) a new curtain-wall could offer lighting at higher parts of the wall system that allows for deeper daylighting to the interior space.

It was noted that within the last 1-2 years a majority of the 2x2 light fixtures have been upgraded to a more efficient T-8 type and that these fixtures may not be able to be re-used if a daylighting control system is specified since dimmable ballast fixtures will be required.

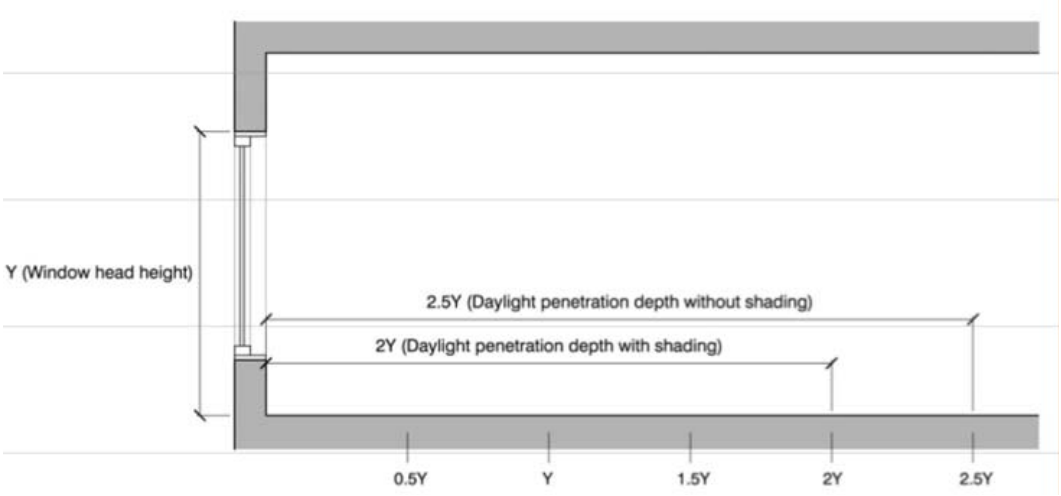
Notice in the picture below the contrast between the electric-lit foreground and the naturally lit background.

A variety of lamp types can be used to augment with artificial lighting such as 4' linear 25Watt T8 suspended uplights with dimmable ballasts. Spot lighting can be effectively provided using LED fixtures, or compact fluorescent. It is recommended that a daylighting simulation software be used to optimize natural light levels throughout the space. This will optimize placement of vision and daylight glazing as well as color selections to enhance the effect of natural light. Below is a typical output from a computer-generated daylighting software tool for a corridor space.

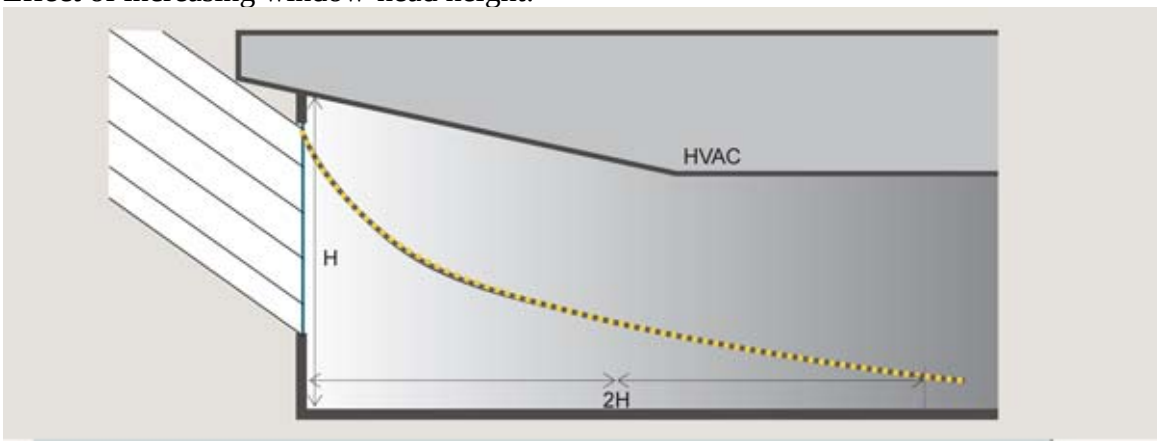


For reference, below is the Portland International Airport where the daytime lighting power consumption is only 0.17W/SF with daylighting averaging around 12 hours per day.

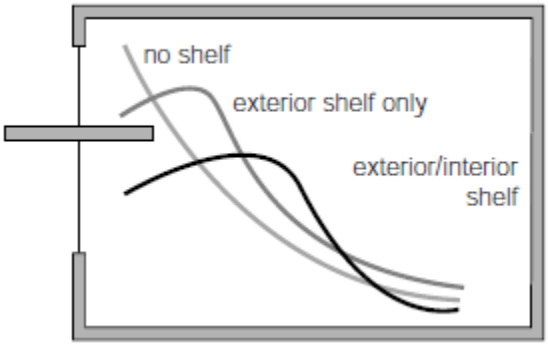
Also, below are some rules of thumb when considering daylight design. The diagram below illustrates the importance of the placement of glass as high as possible in the exterior wall.



Effect of increasing window-head height:



Effect of placement of light shelving at exterior (exterior/interior shelf provides the more even light distribution, but not necessarily the deepest):



Emergency Generator

A 1,250KVA generator is available for emergency operation. Consideration may be given to using this unit as a peak-shaving device to help reduce demand charges. Sometimes clients are very nervous about using their generators for anything but emergency usage so this measure should be approached carefully.

Field Maintenance Building

Building Envelop

This building had its original wall and roof insulation in tact and appeared to be in reasonably good shape. In the future, as an energy conservation measure, it may be worth considering stripping this off and replacing with a SIP or other type of paneled insulation system with a higher R-value.

Infiltration did not appear to be an issue since the large overhead doors were well-sealed around their edge and minimal daylight could be seen.

Heating, Cooling and Ventilation Systems

Only the office portion was air-conditioned. The unit was a residential style condensing style furnace air-conditioner with above-average rated energy efficiency. It is expected that there is at least several years of useful life left on this unit.

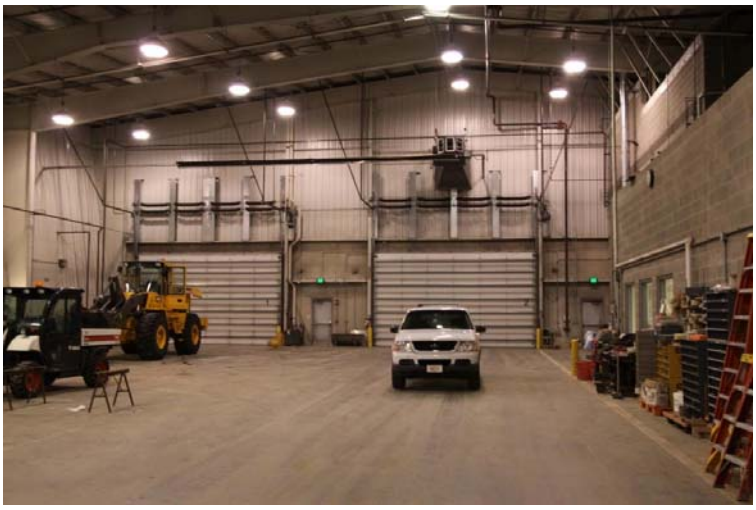
A single bathroom exhaust fan served both male and female bathrooms and the facilities staff noted that this fan remained on 24/7. An occupancy switch to turn the fan off when the bathrooms are unoccupied would be an effective energy efficiency measure here.

The main warehouse area is heated using infra-red radiant heaters suspended at high level off the roof structure. These units appeared to be in relatively good condition. Also, (3) mixed air units located over the main doorways are likely to be original to the building and are operated in conjunction with the specialized exhaust fans used for maintenance and servicing work.

All HVAC equipment appears to be installed original to the building and has an expected life of approximately 20 years. It is recommended that at the next major renovation project for this building that all equipment is replaced and newer, higher energy efficient equipment is installed.

Lighting Systems

The main floor areas are lit using high-bay metal halide lamps. It is unclear as to their wattage but its likely that these are 400 Watt fixtures. High bay T5 lamps work very well as replacements for these types of units and would be worth replacing in the near future.



Natural lighting systems should also be considered for this facility, similar to the recently renovated baggage facility that has a combination of Solatubes (or similar) and high efficiency fluorescent lighting. Below is a file photo of a warehouse type facility naturally lit with these types of devices.

Other Buildings Observed from the Exterior

It was noted that a significant amount of exterior lighting was original to the buildings. It would be worth considering retrofitting these light fixtures with a lower energy use type. Upon reviewing Alliant Energy's website it appears that there are attractive incentives available to help offset the cost of this work.

MASTER PLAN

THE EASTERN IOWA AIRPORT CEDAR RAPIDS

Appendix C

Commercial Real Estate Assessment & Strategy

COMMERCIAL REAL ESTATE ASSESSMENT & STRATEGY

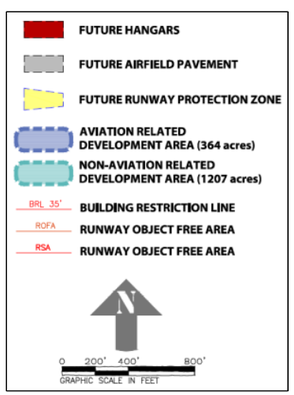
THE EASTERN IOWA AIRPORT

JUNE 10, 2013

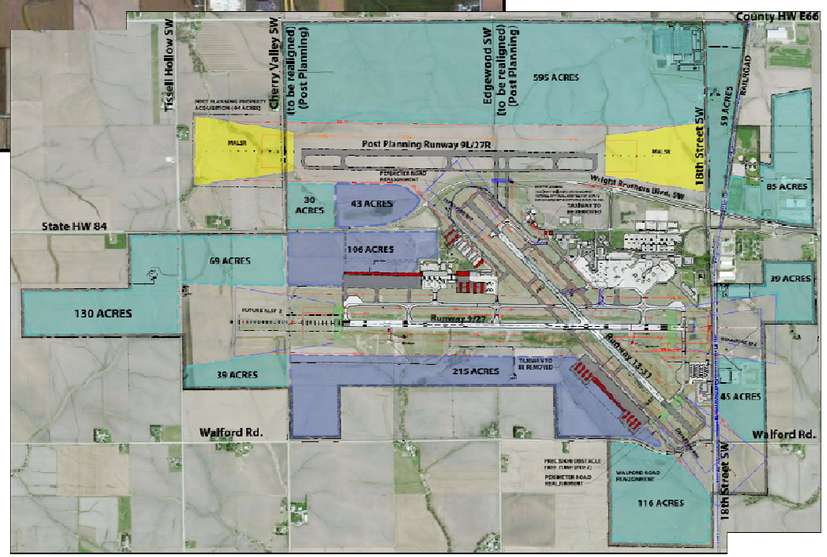
PROJECT CONTEXT

Airport Vicinity

Source: Google Earth



Subject Properties



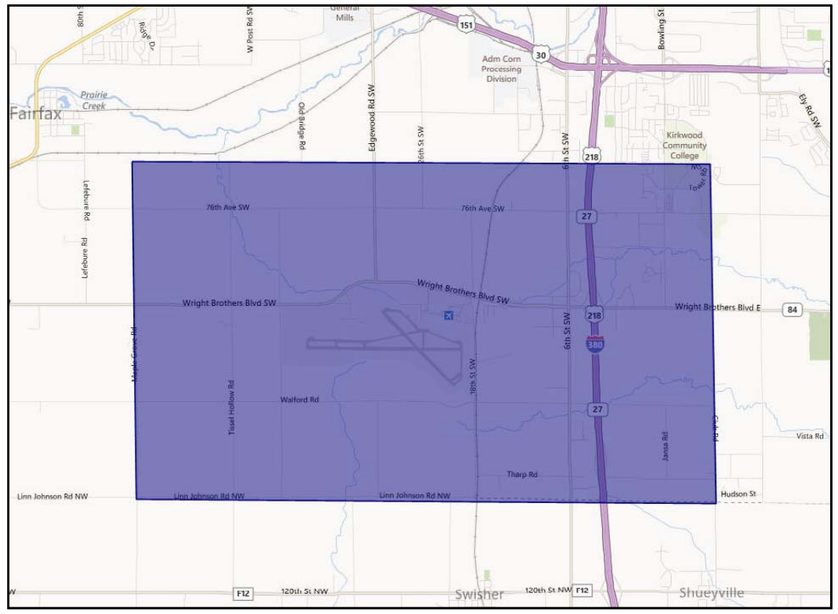
Source: CID Draft Master Plan, May 2013

Scope, Methodology & Bases of Findings

- Assessment of non-aviation & aviation property
- Client work sessions
- Stakeholder engagement
- Market research, fieldwork, analytics
- Regional, reference, and study areas
- Economic development coordination
- Demand assessment
- Benchmarking and development concept research
- C&S staff experience

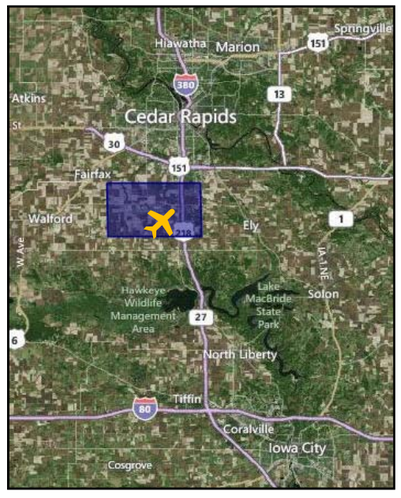
PROJECT CONTEXT

CID Study Area



Source: CoStar, C&S Companies

Study Area Context



Source: Google Earth, C&S Companies

Commercial Inventory Comparison

	Linn County		CID Study Area		
Commercial Land Use	**Inventory (SF)**	**% of County Total Inventory**	**Inventory (SF)**	**% of Study Area Total Inventory**	**% of County Inventory by Land Use**
Office	6,300,000	17%	100,000	5%	2%
Industrial	18,000,000	49%	2,000,000	91%	11%
Flex	3,500,000	10%	25,000	1%	1%
Retail	8,900,000	24%	75,000	3%	1%
TOTAL INVENTORY	36,700,000		2,200,000		

Source: CoStar, Cedar Rapids City Assessor, C&S Companies

Stakeholder Engagement

We met, interviewed &/or interacted with representatives from the following agencies, organizations and groups:

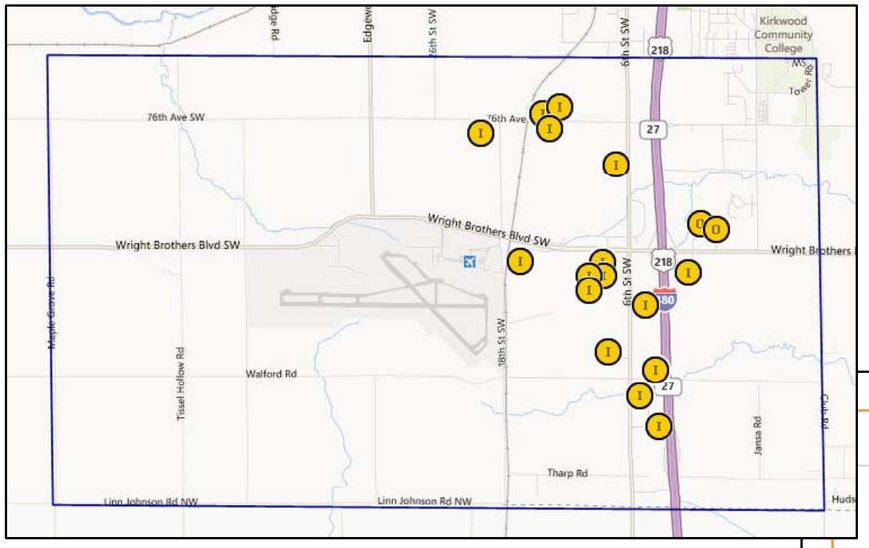
STAKEHOLDER	SECTOR
Airport Commission Representatives Airport Senior Staff	**Client**
Cedar Rapids Convention & Visitors Bureau Cedar Rapids Metro Economic Alliance City of Cedar Rapids Community Development Department: *City Planning, Economic Development Services & Corridor MPO* Iowa City Area Development Group (ICAD) Iowa Economic Development Authority (IEDA)	**Community & Economic Development**
Cedar Rapids Community School District Kirkwood Community College	**Education**
Airport adjacent/vicinity developers &/or land owners Corridor Business Journal	**Private Sector**
Alliant Energy MidAmerican Energy	**Utilities**

Data Sources

- CoStar Group with ESRI demographics
- City of Cedar Rapids – Eastern Iowa Airport
- Woods & Poole Economics
- U.S. Census Bureau
  - Economic Census
  - County Business Patterns
  - Center for Economic Studies; Local Employment Dynamics
- ULI Dollars & Cents of Shopping Centers
- Cedar Rapids City Assessor's Office
- Cedar Rapids Metro Economic Alliance
- Iowa Economic Development Authority
- Iowa Workforce Development
- FAA, TRB, & ACRP
- City of Cedar Rapids Community Development Department
- Linn County Planning & Development Department
- City of Cedar Rapids Convention & Visitor's Bureau
- Local & regional business & planning organizations & utilities
- Various business journals, industry associations & publications, commercial brokerage reports

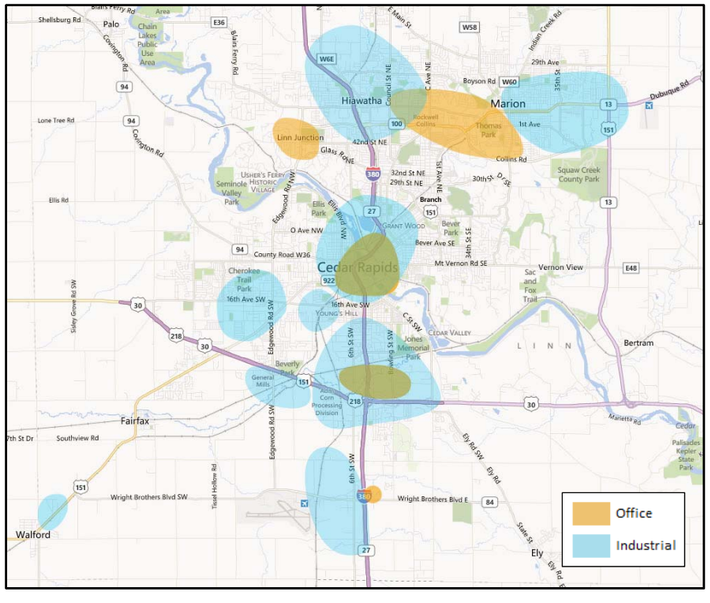
SNAPSHOT: Office & Industrial

Existing Product Concentration: Study Area (min 25,000 SF)



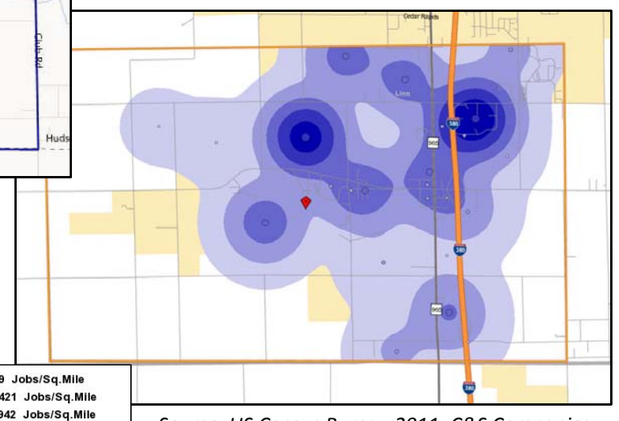
Source: CoStar, Cedar Rapids City Assessor, C&S Companies

Prevailing Development Pattern: Linn County (min 25,000 SF)



Source: CoStar, C&S Companies

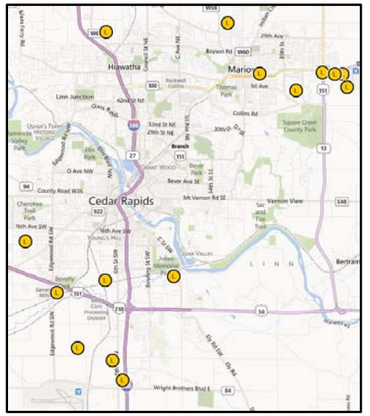
Employment Density: Study Area



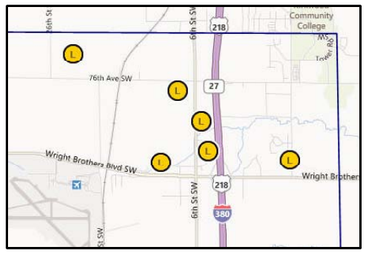
Source: US Census Bureau 2011, C&S Companies

Vacant Land - designated office &/or industrial use (15 AC min)

Linn County



Study Area



Source: CoStar, C&S Companies

STUDY AREA KEY MARKET METRICS	CORPORATE OFFICE (min 25,000 SF)	INDUSTRIAL & FLEX (min 25,000 SF)
Total inventory	70,000 SF	2,000,000 SF
Average building size	35,000 SF	125,000 SF
Average age	8 years	10 years
Average parcel size	3 acres	3 - 10 acres
Prevailing scale of development	.40 FAR	.25 FAR
Annualized delivery	3,500 SF	122,000 SF
Prevailing market vacancy rates	worsening ▲	stabilizing ◀▶
Prevailing market rental rates	stabilizing ◀▶	Improving ▲

Sources of Demand

- Strongest projected employment growth through 2040 of any LCRPC Planning Area
- Estimated employment growth, 2013-2032
  - Office-using : 1.3% average annual growth
  - Industrial-using: 0.4% average annual growth
- Inventory replacement from elsewhere in market
- Strategic relocations

Competitive Inventory & Developments

- Hwy 100 (Hiawatha & Marion)
- Hwy 30/I-380 and Westdale Mall
- Potentially others
- No planned, proposed or under-construction projects within study area

Observations/Findings

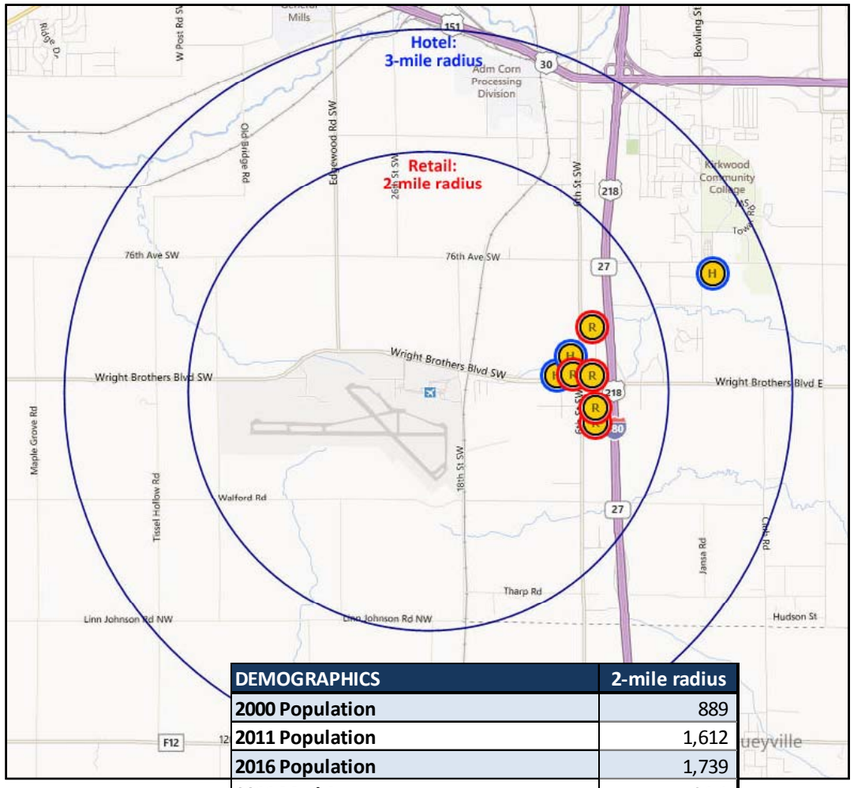
- Approximately 1 office building of average size added to the study area every 10 years
- Approximately 1 industrial building of average size added to study area every year
- Study area office product is approximately 1.5% of countywide total (25,000 SF min)
- Study area industrial product is approximately 13% of countywide total (25,000 SF min)
- Large competitive inventory of fee simple property will likely absorb first
- Complexity of ground lease
- For study area, approximately 70,000 SF or 4± acres of corporate office and 2.4 MM SF of industrial/flex or 224± acres demand projected for the 20-year planning horizon

Result

No appreciable office or industrial/flex demand captured on-site at CID for the planning horizon

SNAPSHOT: Retail & Hotel

Existing Product Concentration: Retail & Hotel Trade Areas

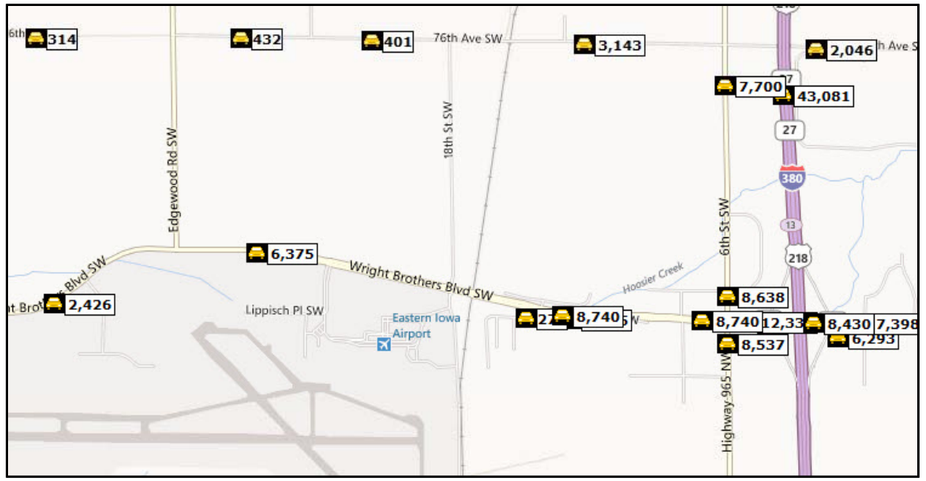


Source: CoStar, Cedar Rapids City Assessor, C&S Companies

DEMOGRAPHICS	2-mile radius
2000 Population	889
2011 Population	1,612
2016 Population	1,739
2011 Med Age	24.1
% Pop Grwth 2000-2010	76.2%
% Pop Grwth 2011-2016	7.9%
2000 Households	324
2011 Households	614
2011 Avg HH Size	2.6
2016 Households	670
% HH Grwth 2000-2010	83.8%
% HH Grwth 2011-2016	9.1%
2011 Avg HH Inc	$ 62,517
2011 Med HH Inc	$ 49,823
2016 Avg HH Inc	$ 74,267
2016 Med HH Inc	$ 61,596
2011 Owner Occ'd Housing	342
2011 Renter Occ'd Housing	272
2011 Med Val Owner-Occ'd HH Units	$ 142,593
Total Consum Spend 2011 Cons Spdng $	$ 13,324,577

Source: ESRI; U.S. Census Bureau; C&S Companies

Traffic Volume: CID Vicinity



Source: MPSI Estimate

HOTEL PROPERTIES BY YEAR BUILT
CID Trade Area: 3-mile Radius

Property	Rooms	Opening Date	Chain Scale
Country Inn & Suites	74	1998	Upper Midscale
AmericInn Lodge & Suites Cedar Rapids	62	2004	Midscale
The Hotel at Kirkwood	71	2010	Independent

Source: C&S Companies

TRADE AREA KEY MARKET METRICS	CONVENIENCE RETAIL/RESTAURANT/SERVICES (2-mile radius)	HOTEL (3-mile radius)
Total inventory	15,000 SF	207 rooms
Average building size	5,000 SF	69 rooms
Average age	8 years	8 years
Typical parcel size	1 acre	3 acres (midscales only)
Prevailing scale of development	.05 - .10 FAR	31 rooms/acre (midscales only)
Annualized delivery	1,300 SF	15 rooms
Prevailing market vacancy rates	improving ▲	--
Prevailing market rental rates	stabilizing ◀▶	--

Sources of Demand

- Strongest projected employment growth through 2040 of any LCRPC Planning Area
- Local employment, residents & airport passengers
- Business & interstate travelers
- Significant passerby traffic on I-380

Categories considered & analyzed

- Interchange & convenience –oriented retail, restaurant & services
- Lodging accommodations

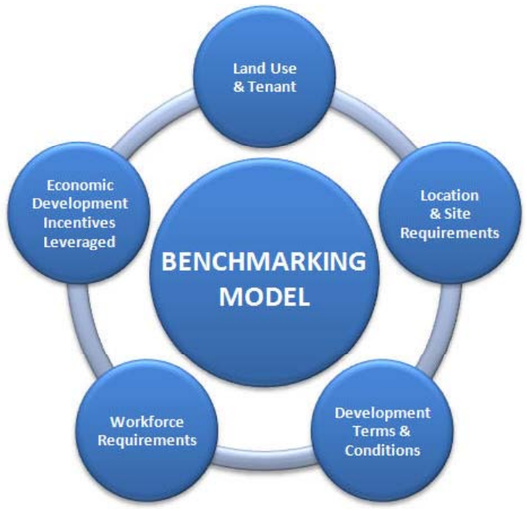
Observations/Findings

- Significant retail and hotel competitive concentrations established elsewhere
- Smaller-scale, economical hotel product and interchange-style retail observed near CID
- Approximately 1 retail property of average size added to trade area every 4 years
- About 1 hotel of average size added to trade area every 4.5 years with the most recent product delivered earlier this decade
- Study area retail product is less than 1% of countywide total (less than 25,000 SF)
- Ample inventory of high visibility, fee simple property available proximate I-380 interchange and/or Wright Brothers Blvd.
- Competitive advantage for study area is proximity/connectivity to I-380 and Creative Corridor and significant available land inventory
- For the study area, approximately 25,000 SF or 7.5± acres of retail/restaurant/services demand and potential for up to 2 midscale hotel properties at industry standard number-of-rooms projected for the 20-year planning horizon

Result

No supportable retail/restaurant/ services and/or hotel demand captured on-site at CID

SNAPSHOT: Aviation-related & Non-aviation



INDUSTRY BENCHMARKING FOR SELECT AVIATION-RELATED & NON-AVIATION USES

Use	Tenant	Airport Location	Estimated Land Size (acres)	Estimated Building Size (square feet)	Estimated FAR[1]	# Stories	Airside / Ramp Access	On-site Employment	Site Information / Surrounding Related Development	Special Economic Incentives Leveraged
Distribution & Logistics Centers										
Logistics Center	FedEx SuperHub	Memphis International Airport (MEM), Memphis, TN	518	3,450,000	.15	1 - 2	Yes	15,000	FedEx packaging design and development offices.	A land exchange agreement was created to relocate the existing Tennessee Air National Guard facilities to a new location at the airport and allowed a landlocked FedEx to expand its operations by 103 acres.
Logistics Center	UPS WorldPort	Louisville International Airport	600	5,200,000	.20	1 - 2	Yes	20,000	Embry-Riddle Aeronautical University.	UPS received preliminary approval for $31.6 million in tax incentives for up to 10 years for the WorldPort Expansion in 2006. The incentives were based on job creation.
									FedEx facilities in e offers p, office, and	The developer secured approximately $30 million in financing on its own, but later required more for the project. ANC took ownership of the facility to obtain tax exempt financing and then leased the facility back to the developer.
									ith proximity to 40 acres; Current per Press, Flabeg d American Tire	Received about $7 million from the state for site improvements & $5 million from a TIF district set up for the project; located in a foreign trade zone
Energy Production										
Natural Gas Exploration and Production	Chesapeake Energy	Dallas Fort Worth International Airport (DFW), Dallas, TX	18,000	N/A	The airport has more than 100 producing wells on its property. In 2006, the airport approved a lease of 18,000 net acres of Barnett Shale leasehold for $181 million in initial bonus and a royalty of 25 percent on all gas produced.				No information available.	
Solar Electric and Solar Thermal Arrays	Outagamie County Regional Airport	Outagamie Co Regional Airpo Appleton, WI								
Solar Panel Installations	Town of Islip	Adjacent Long MacArthur Airp Ronkonkoma, N								
Wastewater Treatment Facility	Front Range Airport Authority	Front Range Ai Watkins, CO								
Agriculture										
Cotton Farm	Darden Bridgeforth and Sons	Huntsville Inter Airport (HSV), AL								
Hay Production	Houston Airport System	George Bush Intercontinental (IAH) and Ellington (EFD), Houston								

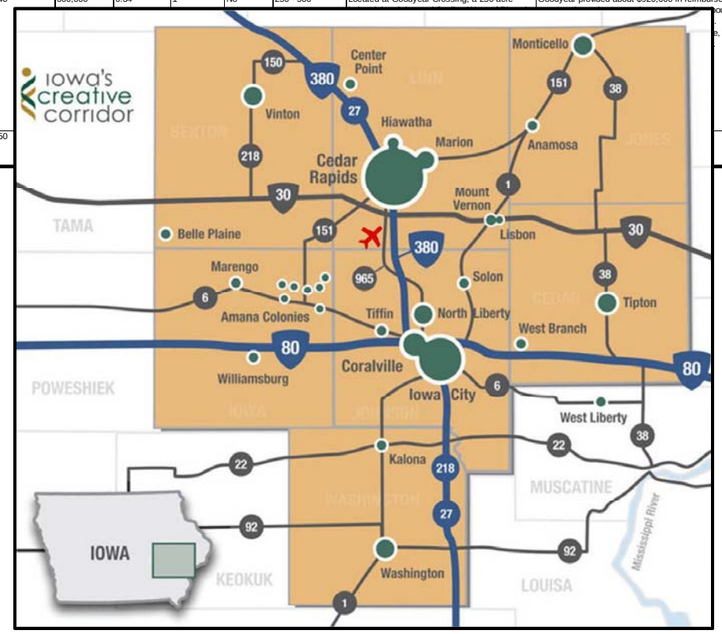
INDUSTRY BENCHMARKING FOR SELECT AVIATION-RELATED & NON-AVIATION USES

Use	Tenant	Airport Location	Estimated Land Size (acres)	Estimated Building Size (square feet)	Estimated FAR[1]	# Stories	Airside / Ramp Access	On-site Employment	Site Information / Surrounding Related Development	Special Economic Incentives Leveraged
Just-In-Time Fulfillment Centers										
Just-In-Time Fulfillment	Dell Computer Corporation: East Coast Fulfillment & Call Center	Nashville International Airport (BNA), Nashville, TN	72	660,000	.21	2 - 3	Yes (cargo through the fence)	1,000	Dell facility relies on strategic relationship with air cargo carriers to provide daily shipments of computer parts and components used to satisfy customer orders in its assembly & distribution center located just off but adjacent to airport property.	Economic incentives that lured Dell to Nashville included: free land for the site worth $6.5 million, 40 years of property tax abatements, $20 million in infrastructure improvements at the site funded by the city and state, one-time credits of $2,000 per employee against state franchise and excise taxes, Metro Nashville tax credits of $500 per employee for 40 years, industrial machinery state tax credits, and $4,000 per employee to pay for job training costs (refundable after workers were hired).
Fulfillment Center	Amazon.com	Coffeyville Municipal Airport (CFV), Coffeyville, KS	*104*	750,000	0.17	1	Yes	>500	The site is located in an industrial park at the airport along with neighboring John Deere Coffeyville Works.	Coffeyville made $1 million in infrastructure improvements and offered up to $3.5 million in cash grants based upon Amazon employing 1,000 people a year for 10 years.
Fulfillment Center	Amazon.com	Near New Castle Airport (ILG), New Castle, DE	15	200,000	0.31	1	No	500	Center is located a few miles southeast of New Castle airport in an industrial area.	No information available.
Fulfillment Center	Amazon.com	Near Phoenix Goodyear Airport (GYR), Goodyear, AZ	*45*	800,000	0.41	1	No	>600	Located at Goodyear Crossing, a 250-acre industrial park located two miles west of Phoenix Goodyear Airport.	No information available.
Fulfillment Center	Trilogy Fulfillment, a division of Eddie Bauer	Near Rickenbacker International Airport (LCK), Columbus, OH	127	2,200,000	0.40	1 - 2	No	650	Located at the Rickenback Global Logistics Park north of Rickenbacker International Airport. The facility is responsible for handling two retailers' fulfillment services.	In 2010, the retailer received a $75,000 grant from the state, as well as a tax credit valued at $400,000 for machinery, equipment, and renovations to the facility.
Fulfillment Center	Macy's/Bloomingdale's	Near Phoenix Goodyear Airport (GYR), Goodyear, AZ	*40*	600,000	0.34	1	No	250 - 500	Located at Goodyear Crossing, a 250-acre	Goodyear provided about $920,000 in reimbursed out
		he Eastern irport (CID), Rapids, IA	50							If the e, the

NATIONAL MIDDLE-OF-THE-MARKET METRICS

Use	Acreage	Economic Incentive Threshold Range (estimated NPV of incentive package)
Aircraft Manufacturing	60 - 240	$13 MM - $450 MM
Aircraft Components Manufacturing	4 - 90	up to $2 MM
MRO Commercial	23 - 89	$250,000 - $65 MM
MRO Business/Regional Jet	6 - 20	$1 MM - $10 MM
MRO Components	2 - 20	<$1 MM - $22 MM
MRO Helicopters	1 - 15	not available
JIT Fulfillment, Distribution & Logistics Centers	15 - 127	$500,000 - $33 MM
Education/Training Centers	1 - 30	$0 - $57 MM
Specialty Uses	13 - 116	$7.5 MM - $100 MM
Energy Production	5 - 42	up to $6 MM
Agriculture	up to ±3,000	not available

Source: C&S Companies



Source: Corridor Alliance - Economic Alliance & Iowa City Area Development Group; C&S Companies

Evaluation criteria for potential uses /development concepts:

- Required market characteristics
- Market timing
- Scale of development
- Balancing airport and community goals
- Revenue yield potential
- Development character
- Land development profile
- Non-aeronautical land availability
- Infrastructure leveraging
- Economic incentives

Considered primary, aviation-related & non-aviation uses

Explored other specialty uses/concepts for CID

- Data centers
- Large-scale exposition center
- Customer service, sales and support centers
- Dealership and specialty equipment sales & repair

Observations/Findings

- Regional connectivity & Creative Corridor centrality
- Strength of agriculture industry & related industries
- Evolving role of and growing need for distribution and fulfillment centers
- Skilled workforce and responsive training as a competitive advantage but potential for limited availability and quantity as a disadvantage
- Constraints exist with regard to comparative metrics for incentive thresholds and program breadth. Generally, state and local incentive & assistance package are approximately $25 MM max. However, recent project announcements by the state indicate packages of up to $50 MM may be available in particular cases.

Result

Potential market participation for JIT Fulfillment, Distribution & Logistics Centers and Agriculture (with limitations)

INVESTIGATION: Site Certification Programs

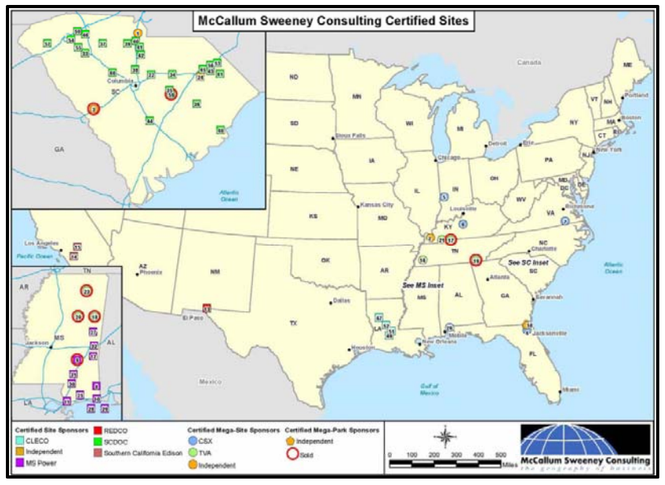
Site Certification Objectives

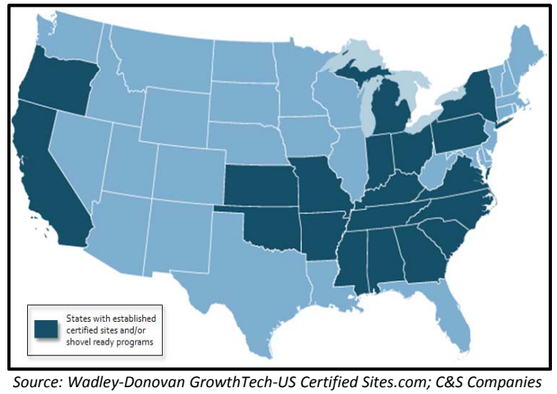
Complete-in-advance necessary site due diligence & preparation to expedite project development timeline for target sectors

↳ Reduce risks, delays & costs associated with site selection & the development process for new or expanding companies

↳ Increase competitive advantage to attract high-impact projects, new investment & employment to community

Select Examples of Certified Sites &/or Program Locations





Source: Wadley-Donovan GrowthTech-US Certified Sites.com; C&S Companies

IDEA State Certified Site Program Parameters

Criteria	Mega Site	Super Site	Large Site	Super Park
Total Contiguous Acreage	1,000+	500-999	250-499	500+ with one site ≥ 250
Minimum Developable Acreage	800+	400-799	200-399	≥200 ac. of 250 ac. site, 80% of rest of park acreage
Rail Required	Yes	Yes	No	Yes
Highway/Interstate Access	5 miles	5 miles	10 miles	5 miles
Utilities (water, wastewater, natural gas)	Minimum capacities required			

Source: McCallum Sweeny Consulting; C&S Companies

Key Factors and Considerations for Site Readiness &/or Certification

Site & Access

- Site control & suitability for development
- Minimum contiguous & developable acres
- Site preparation & due diligence cost & timing
- Necessary utility & roadway infrastructure in place on-site or fully planned with reliable timeline for installation
- Transportation network access & infrastructure – highway, airport & port. Rail access preferred but not required.

Business Climate

- Taxes & labor structure
- Leadership, political climate, local support & partnerships
- Availability of financing opportunities
- Economic development incentives & business assistance
- Workforce – supply, quality, costs, training & retention programs

Community

- Demographics & socio-economic characteristics
- Education – K-12, vocational & technical, post secondary
- Quality of life – cost-of-living, housing affordability & supply, quality medical care, commute distances, recreation, etc.
- City/County planning, regional initiatives & path of growth areas

Source: McCallum Sweeney Consulting; various state and local site certification programs; C&S Companies

Observations/Findings

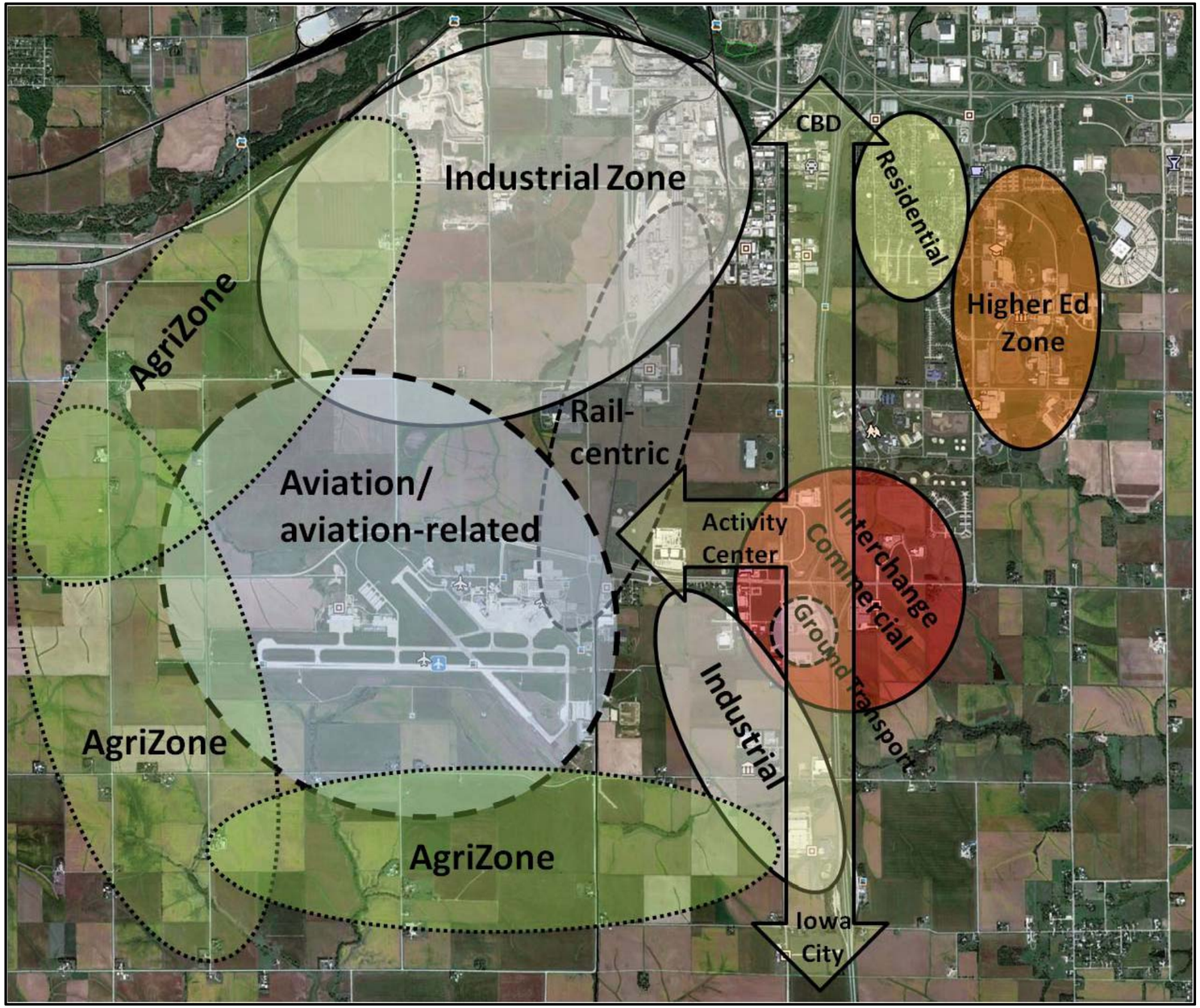
- CID has approximately 600 acres of continuous non-aviation-related property as identified in the draft Master Plan (May 2013)
- Large competitive inventory of certified sites &/or site-ready programs exists nationally
- Strong preference by users for land ownership, if not required – FAA property use constraints likely in place which restrict ability to meet this criterion
- Competitive attraction packages typically include:
  - Land contribution or write-down
  - Economic & tax incentives
  - Highly skilled workforce and training programs
  - Superior transportation access
  - Quality of life
  - Strong commitment by state/local government for cooperation, assistance and expedience in development process
  - Due diligence completed and any mitigation documented
- No critical mass or supply chain established for traditional, prominent mega-site users (e.g. auto, aircraft)
- Best potential for large site user likely related to agricultural, energy and/or distribution / logistics industries.

Result

No eminent or apparent opportunity for large-scale user development on-site. Given FAA regulation and airport operations, CID property not easily aligned with State site certification program requirements.

AIRPORT ACTIVITY CENTER

Land Use & Connectivity Relationships



Challenges to on-airport commercial development due to FAA-imposed property constraints:

- Requires review & approval of commercial leases
- Restricts uses & sale of property
- Requires fair market value rents be obtained through ground leases of commercial property
  - Nature of non-subordinated ground lease makes development projects difficult to finance
  - Ground leases require lengthy terms, generally 30 or more years

Observations/Findings

- Misperceptions exist as to competitive position of airport property for commercial development (fee-simple vs. airport-controlled)
- CID as hub & center-point of Creative Corridor
- Opportunity for collaboration between CID & community through broader activity center planning

Recommendations

- Formalize & market airport-centric activity center promoting access and visibility
- Promote synergies among airport, existing/target industries in activity center & Creative Corridor
- Leverage infrastructure & planned/proposed improvements to brand cohesive “gateway” and activity center
- Consider/adopt district plan to implement gateway approach, maintain compatible uses and target desired uses
- Capitalize on existing large footprint, agricultural leases and preserve flexibility to be market responsive to catalytic opportunities/development

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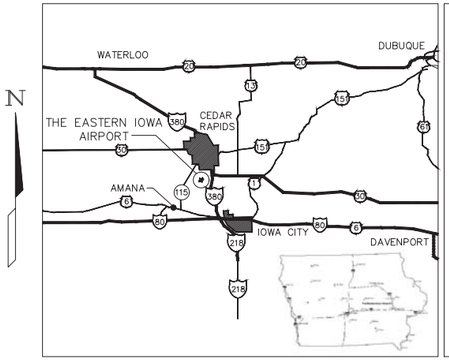
MASTER PLAN

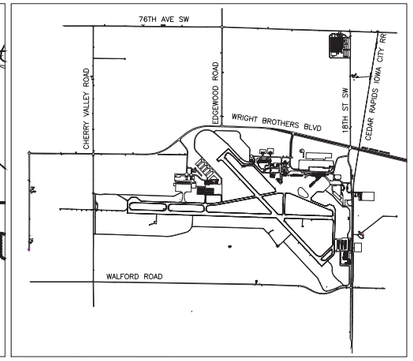
THE EASTERN IOWA AIRPORT CEDAR RAPIDS

Appendix D

Airport Layout Plan

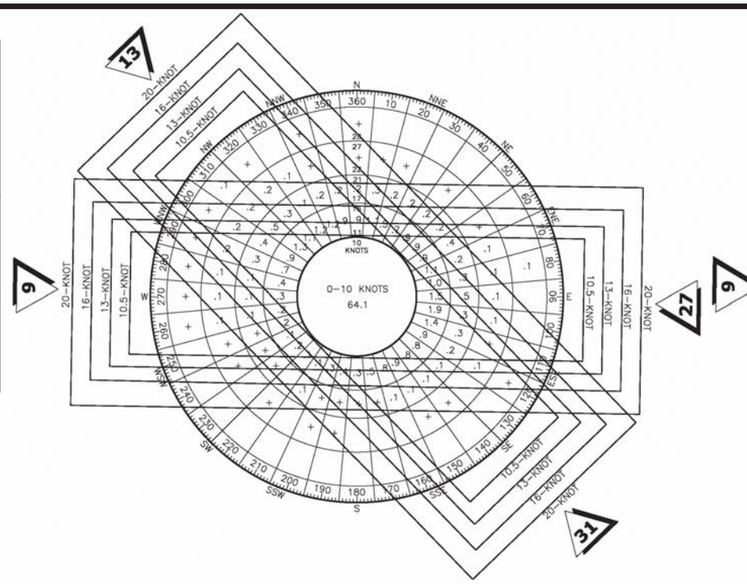


LOCATION MAP



VICINITY MAP

DRAWING INDEX



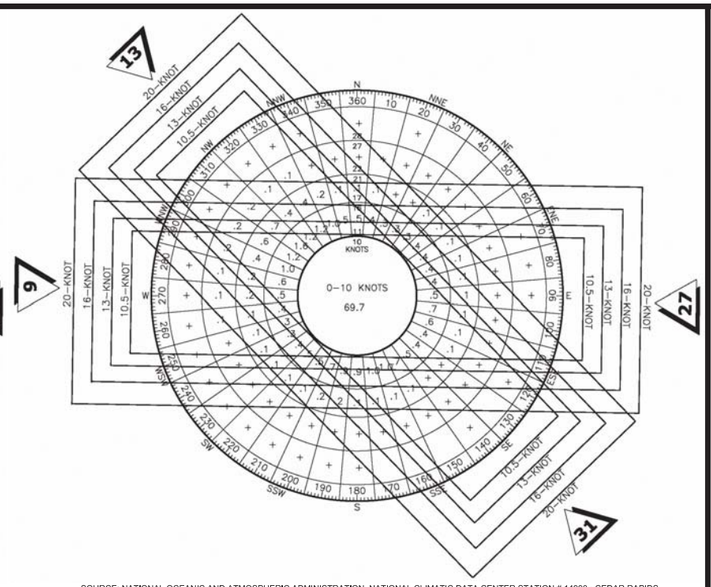
SOURCE: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL CLIMATIC DATA CENTER STATION #14990 - CEDAR RAPIDS, IOWA. PERIOD OF RECORD - JANUARY 2000 - DECEMBER 2009.

IFR Wind Coverage

	WIND COVERAGE PROVIDED UNDER IFR CONDITIONS [1]			
	10.5-KNOT	13-KNOT	16-KNOT	20-KNOT
RUNWAY DESIGNATION				
RUNWAY 9/27	85.15%	91.97%	97.40%	99.39%
RUNWAY 9	72.24%	76.92%	80.94%	82.24%
RUNWAY 27	55.46%	59.94%	64.12%	65.70%
RUNWAY 13/31	86.91%	92.64%	97.28%	99.27%
RUNWAY 13	64.27%	68.26%	71.80%	73.20%
RUNWAY 31	59.02%	62.55%	65.77%	67.13%
COMBINED	94.82%	97.95%	99.41%	99.94%

SOURCE: MEAD & HUNT UTILIZING FAA'S ONLINE WIND ANALYSIS TOOL AT HTTPS://AIRPORTS-GIS.FAA.GOV/PUBLIC/

[1] CEILING OF LESS THAN 1,000 FEET, BUT EQUAL TO OR GREATER THAN 200 FEET AND/OR VISIBILITY LESS THAN THREE STATURE MILES, BUT EQUAL TO OR GREATER THAN 1/2 STATUTE MILE. 5-KNOT TAILWIND TO MAXIMUM HEADWIND.



SOURCE: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL CLIMATIC DATA CENTER STATION # 14990 - CEDAR RAPIDS, IOWA. PERIOD OF RECORD - JANUARY 2000 - DECEMBER 2009.

All Weather Wind Coverage

	WIND COVERAGE PROVIDED UNDER ALL WEATHER CONDITIONS			
	10.5-KNOT	13-KNOT	16-KNOT	20-KNOT
RUNWAY DESIGNATION				
RUNWAY 9/27	8522%	91.83%	91.57%	99.46%
RUNWAY 9	68.99%	74.34%	79.25%	80.92%
RUNWAY 27	64.86%	68.63%	72.41%	73.37%
RUNWAY 13/31	90.42%	94.88%	98.30%	99.55%
RUNWAY 13	66.88%	69.60%	71.97%	72.78%
RUNWAY 31	63.90%	66.97%	69.58%	70.49%
COMBINED	95.30%	98.10%	99.46%	99.90%

SOURCE: MEAD & HUNT UTILIZING FAA'S ONLINE WIND ANALYSIS TOOL AT HTTPS://AIRPORTS-GIS.FAA.GOV/PUBLIC/

RUNWAY DATA

	RUNWAY 9-27						RUNWAY 13-31			
	EXISTING		ULTIMATE		ULTIMATE		EXISTING		ULTIMATE	
	9	27	9R	27L	9L	27R	13	31	13	31
RUNWAY DESIGN CODE (RDC)	D-IV-1800		D-IV-1200		D-IV-2400		C-II-2400		C-II-2400	
RUNWAY REFERENCE CODE (RRC)	D-IV-1800		D-IV-1200		D-IV-2400		D-IV-2400		D-IV-2400	
RUNWAY LENGTH & WIDTH	8,600' x 150'		8,600' x 150'		7,400' x 150'		6,200' x 150'		6,200' x 150'	
RUNWAY INSTRUMENTATION	Precision	Precision	Precision	Precision	Precision	Precision	Nonprecision	Nonprecision	Nonprecision	Precision
RUNWAY APPROACH SURFACE SLOPE	50:1	50:1	50:1	50:1	50:1	50:1	34:1	34:1	34:1	50:1
APPROACH VISIBILITY MINIMUM	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1/2 Mile	1 Mile	1/2 Mile	3/4 Mile	1/2 Mile
PART 77 APPROACH USE TYPE	PIR	PIR	PIR	PIR	PIR	PIR	C	D	C	D
TYPE OF AERONAUTICAL SURVEY REQUIRED FOR APPROACH	VERTICALLY GUIDED		VERTICALLY GUIDED		VERTICALLY GUIDED		VERTICALLY GUIDED		VERTICALLY GUIDED	
RUNWAY BEARING (TRUE)	90.91°		90.91°		90.91°		135.93°		135.93°	
MAXIMUM RUNWAY ELEVATION (Above MSL)	861.7'		861.7'		850.5'		869.4'		871.4'	
RUNWAY OBJECT FREE AREA (OFA) LENGTH/WIDTH	10,175'/800'		10,175'/800'		9,400'/800'		8,200'/800'		8,200'/800'	
RUNWAY SAFETY AREA (RSA) LENGTH/WIDTH	10,175'/500'		10,175'/500'		9,400'/500'		8,200'/500'		8,200'/500'	
RUNWAY OBSTACLE FREE ZONE (OFZ) LENGTH/WIDTH	9,000'/400'		9,000'/400'		7,800'/400'		6,600'/400'		6,600'/400'	
RUNWAY PROTECTION ZONE (RPZ) DIMENSIONS	2,500' X 1,000' X 1,750'		2,500' X 1,000' X 1,750'		2,500' X 1,000' X 1,750'		1,700' X 1,000' X 1,510'	2,500' X 1,000' X 1,750'	1,700' X 1,000' X 1,510'	2,500' X 1,000' X 1,750'
RUNWAY PAVEMENT MATERIAL	Concrete		Concrete		Concrete		Asphalt/Concrete		Asphalt/Concrete	
RUNWAY PAVEMENT SURFACE TREATMENT	Grooved		Grooved		Grooved		Grooved		Grooved	
RUNWAY PAVEMENT DESIGN STRENGTH (in thousand lbs.)	100 (S), 174 (D), 300 (DT)		100 (S), 191 (D), 375 (DT)		100 (S), 174 (D), 300 (DT)		100 (S), 174 (D), 300 (DT)		100 (S), 174 (D), 300 (DT)	
PAVEMENT CLASSIFICATION NUMBER (PCN)	80 R/B/W/T		80 R/B/W/T		80 R/B/W/T		77 R/B/W/T		77 R/B/W/T	
RUNWAY EFFECTIVE GRADIENT	.1%		.1%		.13%		.4%		.4%	
RUNWAY TOUCHDOWN ZONE ELEVATION (MSL)	856.9'	861.7'	856.9'	861.7'	844.8'	850.5'	869.6'	860.8'	871.4'	856.5'
RUNWAY MARKING	Precision		Precision		Precision		Nonprecision		Precision	
RUNWAY LIGHTING	HIRL		HIRL		HIRL		MIRL		MIRL	
RUNWAY/TAXIWAY HOLDING POSITION MARKING	260'		260'		260'		260'		260'	
TAXIWAY WIDTH	75'		75'		75'		75'		75'	
TAXIWAY DESIGN GROUP	5		5		5		5		5	
TAXIWAY LIGHTING	MITL		MITL		MITL		MITL		MITL	
TAXIWAY MARKING	Centerline		Centerline		Centerline		Centerline		Centerline	
TAXIWAY SAFETY AREA WIDTH	171'		171'		171'		79'		79'	
TAXIWAY OBJECT FREE AREA WIDTH	259'		259'		259'		131'		131'	
TAXILANE WIDTH	75'		75'		75'		75'		75'	
TAXILANE SAFTEY AREA WIDTH	171'		171'		171'		79'		79'	
TAXILANE OBJECT FREE AREA WIDTH	225'		225'		225'		115'		115'	
TAKE OFF RUN AVAILABLE (TORA)	8,600'	8,600'	8,600'	8,600'	N/A		N/A	N/A	N/A	N/A
TAKE OFF DISTANCE AVAILABLE (TODA)	8,600'	8,600'	8,600'	8,600'	N/A		N/A	N/A	N/A	N/A
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	8,175'	8,600'	8,175'	8,600'	N/A		N/A	N/A	N/A	N/A
LANDING DISTANCE AVAILABLE (LDA)	8,175'	8,175'	8,175'	8,175'	N/A		N/A	N/A	N/A	N/A
RUNWAY ELECTRONIC NAVIGATION AIDS	GPS, ILS VOR	GPS, ILS VOR	CAT II GPS VOR	GPS, ILS VOR	CAT I GPS	CAT I GPS	GPS	GPS	GPS	CAT I GPS
RUNWAY VISUAL NAVIGATION AIDS	MALSR PAPI-4	MALSR PAPI-4	ALSF-2 PAPI-4L	MALSR PAPI-4L	MALSR PAPI-4L	MALSR PAPI-4R	PAPI-4L REIL	MALSR VASI-4L	PAPI-4L REIL	MALSR PAPI-4L
THRESHOLD SITING SURFACE TYPE	7,8,9	7,8,9	7,8,9	7,8,9	7,8,9	7,8,9	5	7,8,9	5	7,8,9
RUNWAY DEPARTURE SURFACE (YES OR N/A)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

All horizontal data NAD 83; all vertical data is NAVD 88.
Pavement strengths are expressed in Single (S), Dual Wheel (D), and Dual Tandum (DT) Wheel loading capacities.
Runway/taxiway holding position marking distance from runway centerline increased one foot for each 100 feet of airport elevation above sea level.
No threshold siting surface penetrations in accordance with FAA AC 150/5300-13A, Paragraph 303.
No obstacle free zone (OFZ) penetrations.
No modifications to airport design standards required.

AIRPORT INFORMATION

	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NAVD 88	869.4'	871.2'
AIRPORT REFERENCE POINT (ARP) NAD 83	LAT. 41°53'05"N LON. 91°42'37"W	LAT. 41°53'19.77"N LON. 91°42'48.91"W
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	87°F (JULY)	SAME
COMBINED WIND COVERAGE (16kt,13kt,10.5kt)	99.46, 98.10, 95.30	SAME
MAGNETIC VARIATION (DATE)	0° 18' W (July 2012)	SAME
AIRPORT REFERENCE CODE	D-IV	SAME
DESIGN AIRCRAFT	MD-83/B757-200	SAME
NPIAS SERVICE LEVEL	COMM SVCS	SAME
TAXIWAY LIGHTING	MITL	SAME
TAXIWAY MARKING	C/L, HOLDLINES	SAME
AIRPORT & TERMINAL NAVAIDS	ASOS, GPS, LLWAS ILS, VOR	SAME
REMARKS		

RUNWAY ENDS

		COORDINATES		ELEVATION	
RUNWAY		EXISTING	ULTIMATE	EXISTING	ULTIMATE
RUNWAY 9L	Latitude	N/A	41° 53' 51.83" N	N/A	836.0'
	Longitude	N/A	91° 43' 58.48" W		
RUNWAY 27R	Latitude	N/A	41° 53' 50.65" N	N/A	846.0'
	Longitude	N/A	91° 42' 20.65" W		
RUNWAY 9R	Latitude	41° 53' 04.74" N	41° 53' 04.74" N	854.1'	854.1'
	Longitude	91° 43' 45.01" W	91° 43' 45.01" W		
RUNWAY 27L	Latitude	41° 53' 03.38" N	41° 53' 03.38" N	860.0'	860.0'
	Longitude	91° 41' 51.33" W	91° 41' 51.33" W		
RUNWAY 27L DISPLACED THRESHOLD	Latitude	41° 53' 03.45" N	41° 53' 03.45" N	860.4'	860.4'
	Longitude	91° 41' 56.95" W	91° 41' 56.95" W		
RUNWAY 13	Latitude	41° 53' 28.02" N	41° 53' 28.02" N	869.4'	869.4'
	Longitude	91° 42' 54.48" W	91° 42' 54.48" W		
RUNWAY 31	Latitude	41° 52' 44.01" N	41° 52' 44.01" N	847.7'	847.7'
	Longitude	91° 41' 57.49" W	91° 41' 57.49" W		

All existing horizontal data NAD 83 from third-party aeronautical survey dated 10/03/2011.

"The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration (Project Number 3-19-0012-043-2011) as provided under Title 49 U.S.C., Section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws." See FAA Order 5100.38, 425.b.(4).

FOR APPROVAL BY:
THE CEDAR RAPIDS AIRPORT COMMISSION

APPROVED BY: _____ ON THE DATE OF: _____

Tim Bradshaw, Airport Director

Mead & Hunt

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Airport Layout Plan Update

CEDAR RAPIDS, IOWA

REVISION

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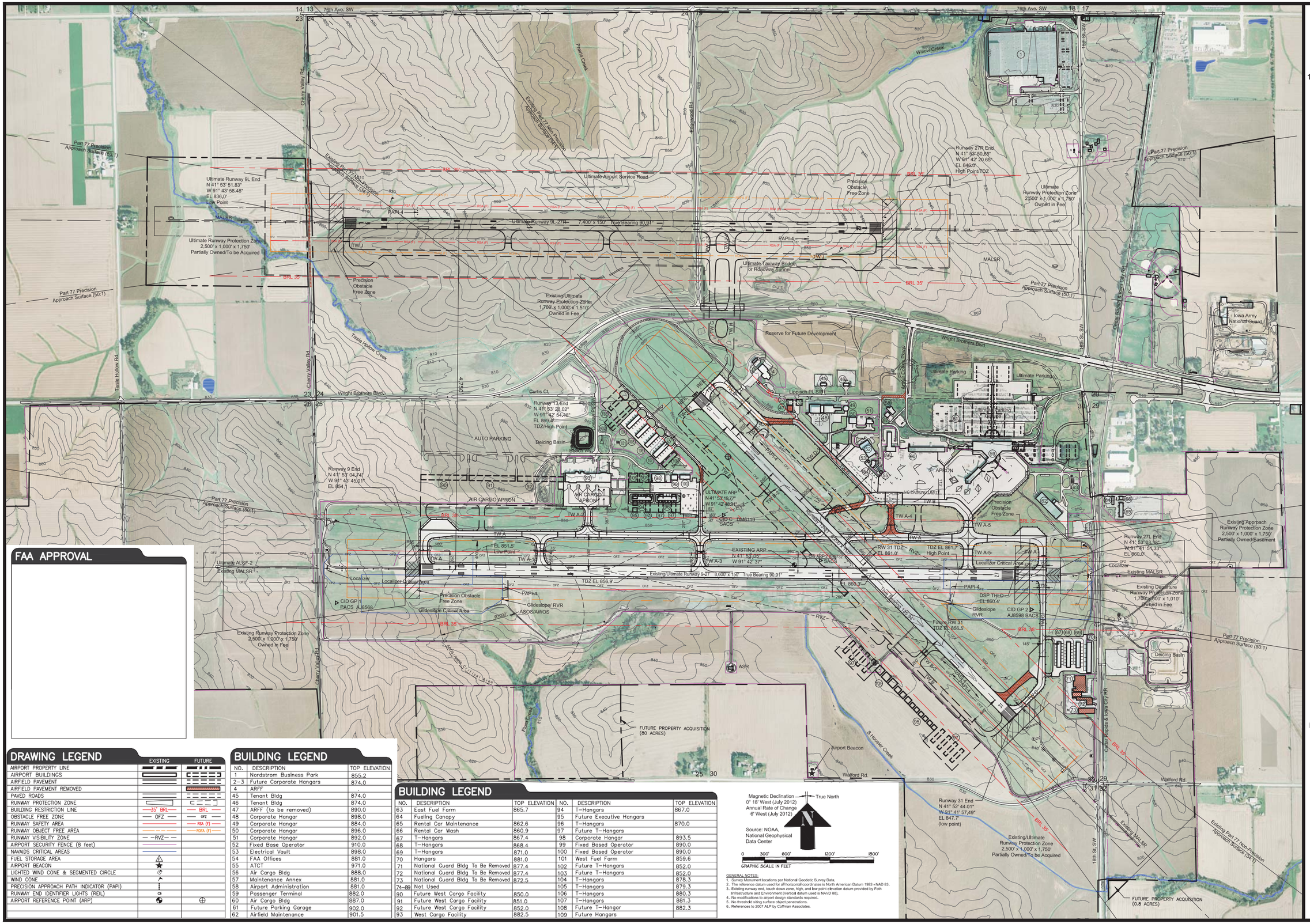
SHEET CONTENTS
AIRPORT DATA



FAA APPROVAL

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE	35' BRL	BRL
OBSTACLE FREE ZONE	OFZ	ofz
RUNWAY SAFETY AREA		RSA (F)
RUNWAY OBJECT FREE AREA		ROFA (F)
RUNWAY VISIBILITY ZONE	RVZ	
AIRPORT SECURITY FENCE (8 feet)		
NAVAIDS CRITICAL AREAS		
FUEL STORAGE AREA		
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION
1	Nordstrom Business Park	855.2
2–3	Future Corporate Hangars	874.0
4	ARFF	
45	Tenant Bldg	874.0
46	Tenant Bldg	874.0
47	ARFF (to be removed)	890.0
48	Corporate Hangar	898.0
49	Corporate Hangar	884.0
50	Corporate Hangar	896.0
51	Corporate Hangar	892.0
52	Fixed Base Operator	910.0
53	Electrical Vault	898.0
54	FAA Offices	881.0
55	ATCT	971.0
56	Air Cargo Bldg	888.0
57	Maintenance Annex	881.0
58	Airport Administration	881.0
59	Passenger Terminal	882.0
60	Air Cargo Bldg	887.0
61	Future Parking Garage	902.0
62	Airfield Maintenance	901.5

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION	NO.	DESCRIPTION	TOP ELEVATION
63	East Fuel Farm	865.7	94	T–Hangars	867.0
64	Fueling Canopy		95	Future Executive Hangars	
65	Rental Car Maintenance	862.6	96	T–Hangars	870.0
66	Rental Car Wash	860.9	97	Future T–Hangars	
67	T–Hangars	867.4	98	Corporate Hangar	893.5
68	T–Hangars	868.4	99	Fixed Based Operator	890.0
69	T–Hangars	871.0	100	Fixed Based Operator	890.0
70	Hangars	881.0	101	West Fuel Farm	859.6
71	National Guard Bldg To Be Removed	877.4	102	Future T–Hangars	852.0
72	National Guard Bldg To Be Removed	877.4	103	Future T–Hangars	852.0
73	National Guard Bldg To Be Removed	872.5	104	T–Hangars	878.3
74–89	Not Used		105	T–Hangars	879.3
90	Future West Cargo Facility	850.0	106	T–Hangars	880.3
91	Future West Cargo Facility	851.0	107	T–Hangars	881.3
92	Future West Cargo Facility	852.0	108	Future T–Hangar	882.3
93	West Cargo Facility	882.5	109	Future Hangars	

Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA, National Geophysical Data Center

True North

0 300' 600' 1200' 1500'
GRAPHIC SCALE IN FEET

GENERAL NOTES:
1. Survey Monument locations per National Geodetic Survey Data.
2. The reference datum used for all horizontal coordinates is North American Datum 1983 • NAD 83.
3. Existing runway end, touch down zone, high, and low point elevation datum provided by Foth Infrastructure and Environment (Vertical datum used is NAVD 88).
4. No modifications to airport design standards required.
5. No threshold siling surface object penetrations.
6. References to 2007 ALP by Coffman Associates.

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THE EASTERN IOWA AIRPORT
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CEDAR RAPIDS, IOWA

REVISION

NOT FOR CONSTRUCTION

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SHEET CONTENTS
AIRPORT LAYOUT DRAWING

SHEET NO. 2 of 19

C-102

MATCHLINE – SEE SHEET 4

MATCHLINE – SEE SHEET 5

HORIZONTAL SURFACE
ELEVATION = 1021.4' MSL

AIRPORT ELEVATION
871.4' MSL

CEDAR RAPIDS
MUNICIPAL AIRPORT

HORIZONTAL SURFACE
ELEVATION = 1021.4' MSL

Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA,
National Geophysical
Data Center

N

0 2000

SCALE IN FEET

NOTES

NOTE 1:
REFER TO INDIVIDUAL RUNWAY PROTECTION ZONE PLAN OF EACH RUNWAY FOR CLOSE–IN OBSTRUCTIONS.

NOTE 2:
SERVICE ROAD RESTRICTED TO RADIO EQUIPPED AUTHORIZED VEHICLES OPERATING UNDER POSITIVE CONTROL FROM ATCT. NO PENETRATION OF 20:1 VFR SURFACE.

NOTE 3:
A COMMUNICATION TOWER STUDIED UNDER 2003–ACE–2582–OE IS LOCATED APPROXIMATELY 3.8 MILES NORTH OF PLANNED RUNWAY 9R/27L, AND WITHIN THE CATEGORY D TRAFFIC PATTERN FOR THAT RUNWAY. THIS TOWER EXCEEDS THE HEIGHT STANDARD IN PART 77.23(a)(2). AS A RESULT THE TRAFFIC PATTERN FOR RWY 9R/27L WILL BE ESTABLISHED ON THE SOUTH SIDE OF THE RUNWAY.
REF: AIRSPACE STUDY NO. 2005–ACE–678–NRA

NOTE 4:
ALL RUNWAYS BASED ON ULTIMATE CONFIGURATION.

OBSTRUCTION TABLE

OBSTRUCTION NUMBER	DESCRIPTION	GROUND ELEV. MSL	TOP ELEV. MSL	PENETRATION	DISPOSITION
①	ANTENNA ON OL AIR TRAFFIC CONTROL TOWER	865	971	21.0'± OBSTR. TO 7:1 TRANSITIONAL SURFACE	OBSTRUCTION LIGHT
②	ROD ON OL GLIDE SLOPE	855	889	28.9'± OBSTR. TO PRIMARY SURFACE	OBSTRUCTION LIGHT
③	OL ANEMOMETER	850	896	2.7'± OBSTR. TO 7:1 TRANSITIONAL SURFACE	OBSTRUCTION LIGHT
④	ROD ON OL GLIDE SLOPE	842	874	25.0'± OBSTR. TO PRIMARY SURFACE	OBSTRUCTION LIGHT
⑤	OL RADIO TRANSMISSION TOWER	840	1,246	170' CLEAR TO 7:1 TRANSITIONAL SURFACE	OBSTRUCTION LIGHT
⑥	AIRPORT SERVICE ROAD	VARIES	VARIES	VARYING OBSTR. 50:1 APPROACH SURFACE	SEE NOTE NO. 2
⑦	OL COMMUNICATION TOWER		1,285	SEE NOTE NO. 3	SEE NOTE NO. 3

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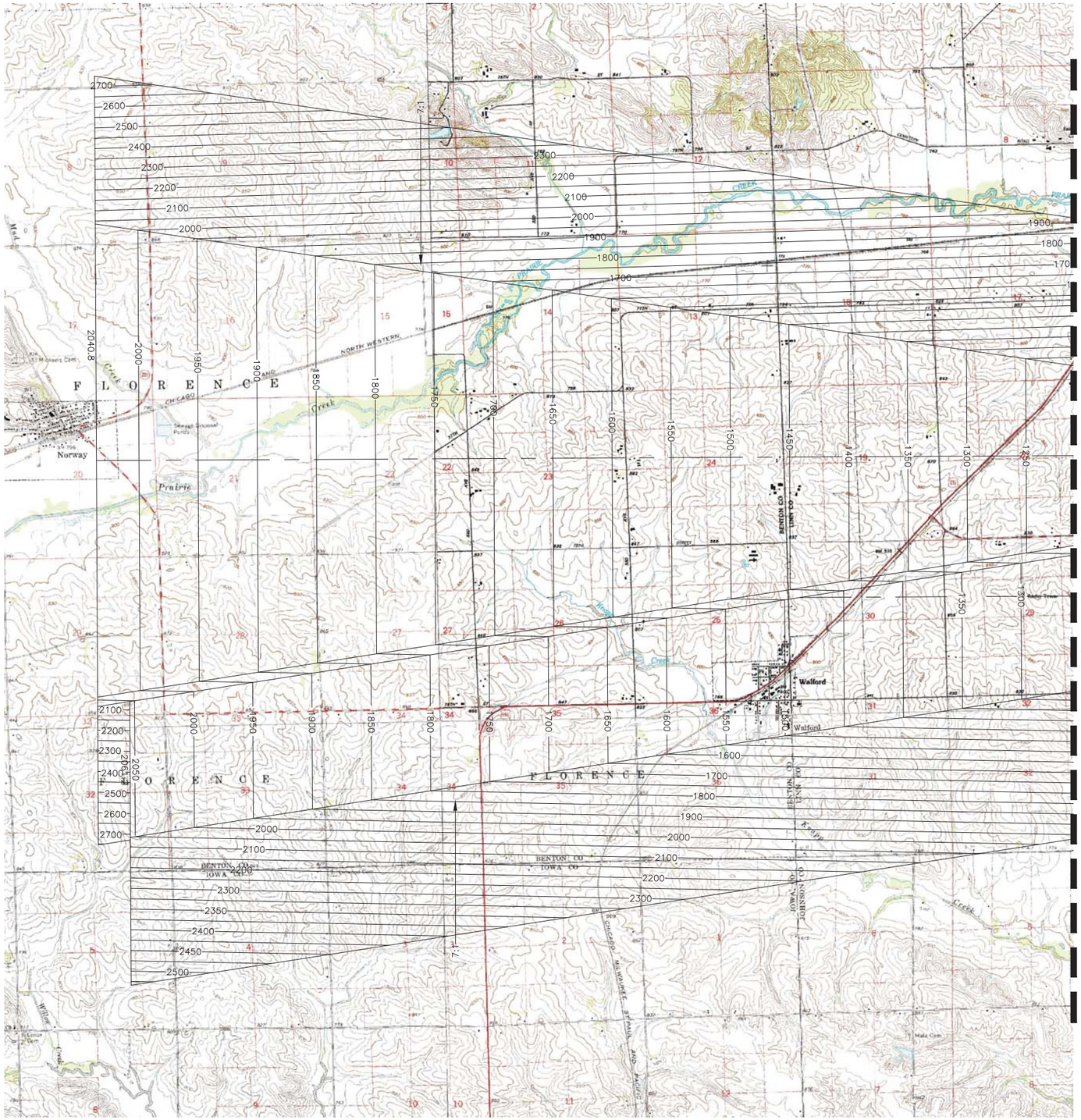
SHEET CONTENTS
AIRPORT AIRSPACE PLAN (CENTRAL)

SHEET NO. 3 of 19

C-103



Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA,
National Geophysical
Data Center

N

0 2000
SCALE IN FEET

NOTES

NOTE 1:
REFER TO INDIVIDUAL RUNWAY PROTECTION ZONE PLAN OF EACH RUNWAY FOR CLOSE-IN OBSTRUCTIONS.

NOTE 2:
SERVICE ROAD RESTRICTED TO RADIO EQUIPPED AUTHORIZED VEHICLES OPERATING UNDER POSITIVE CONTROL FROM ATCT. NO PENETRATION OF 20:1 VFR SURFACE.

NOTE 3:
A COMMUNICATION TOWER STUDIED UNDER 2003-ACE-2582-OE IS LOCATED APPROXIMATELY 3.8 MILES NORTH OF PLANNED RUNWAY 9R/27L, AND WITHIN THE CATEGORY D TRAFFIC PATTERN FOR THAT RUNWAY. THIS TOWER EXCEEDS THE HEIGHT STANDARD IN PART 77.23(a)(2). AS A RESULT THE TRAFFIC PATTERN FOR RWY 9R/27L WILL BE ESTABLISHED ON THE SOUTH SIDE OF THE RUNWAY.
REF: AIRSPACE STUDY NO. 2005-ACE-678-NRA

NOTE 4:
ALL RUNWAYS BASED ON ULTIMATE CONFIGURATION.

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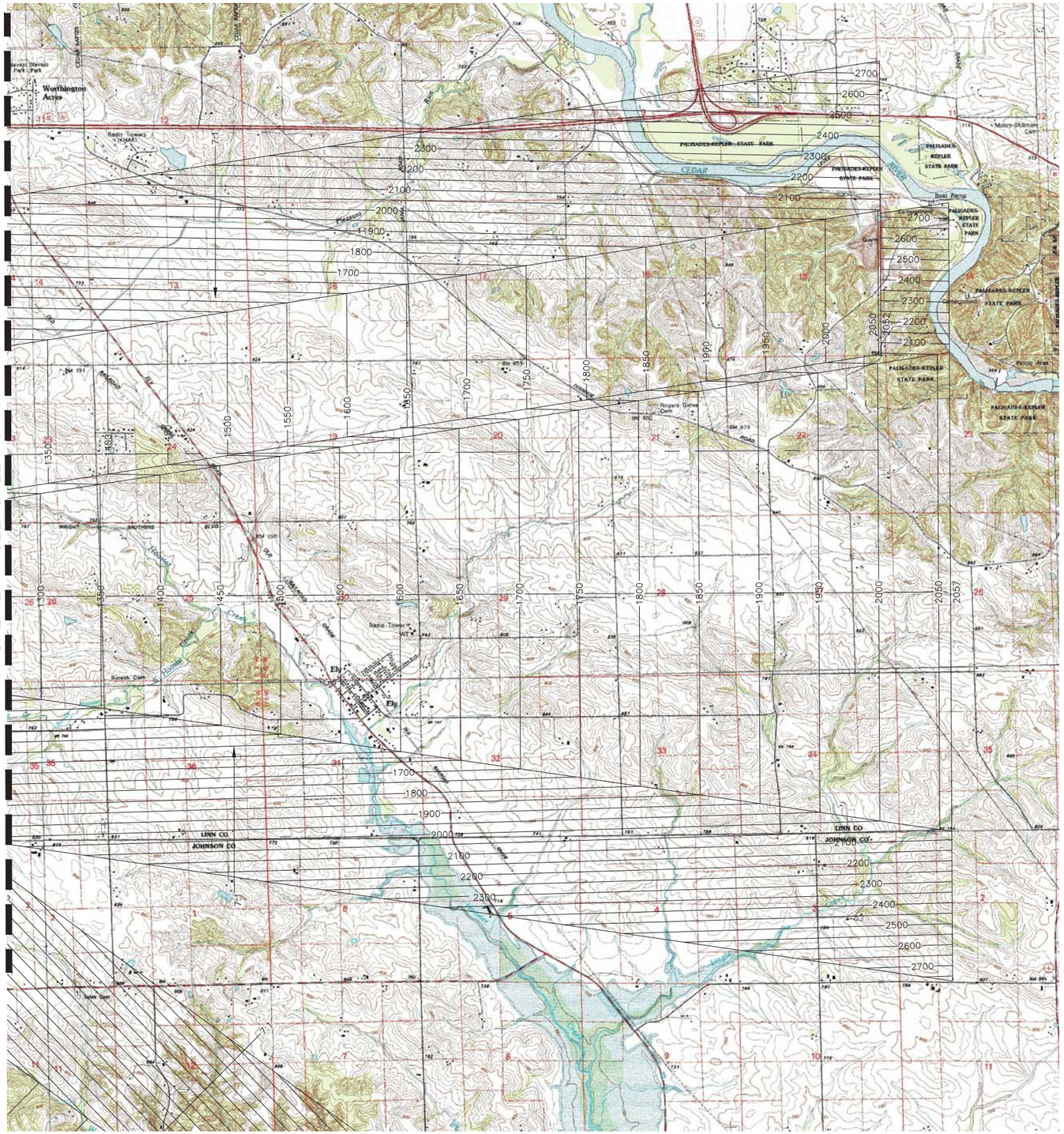
SHEET CONTENTS
AIRPORT AIRSPACE PLAN (WEST)

SHEET NO. 4 of 19

C-104

MATCHLINE – SEE SHEET 3



Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA,
National Geophysical
Data Center

N

0 2000

SCALE IN FEET

NOTES

NOTE 1:
REFER TO INDIVIDUAL RUNWAY PROTECTION ZONE PLAN OF EACH RUNWAY FOR CLOSE–IN OBSTRUCTIONS.

NOTE 2:
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NOTE 3:
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REF: AIRSPACE STUDY NO. 2005–ACE–678–NRA

NOTE 4:
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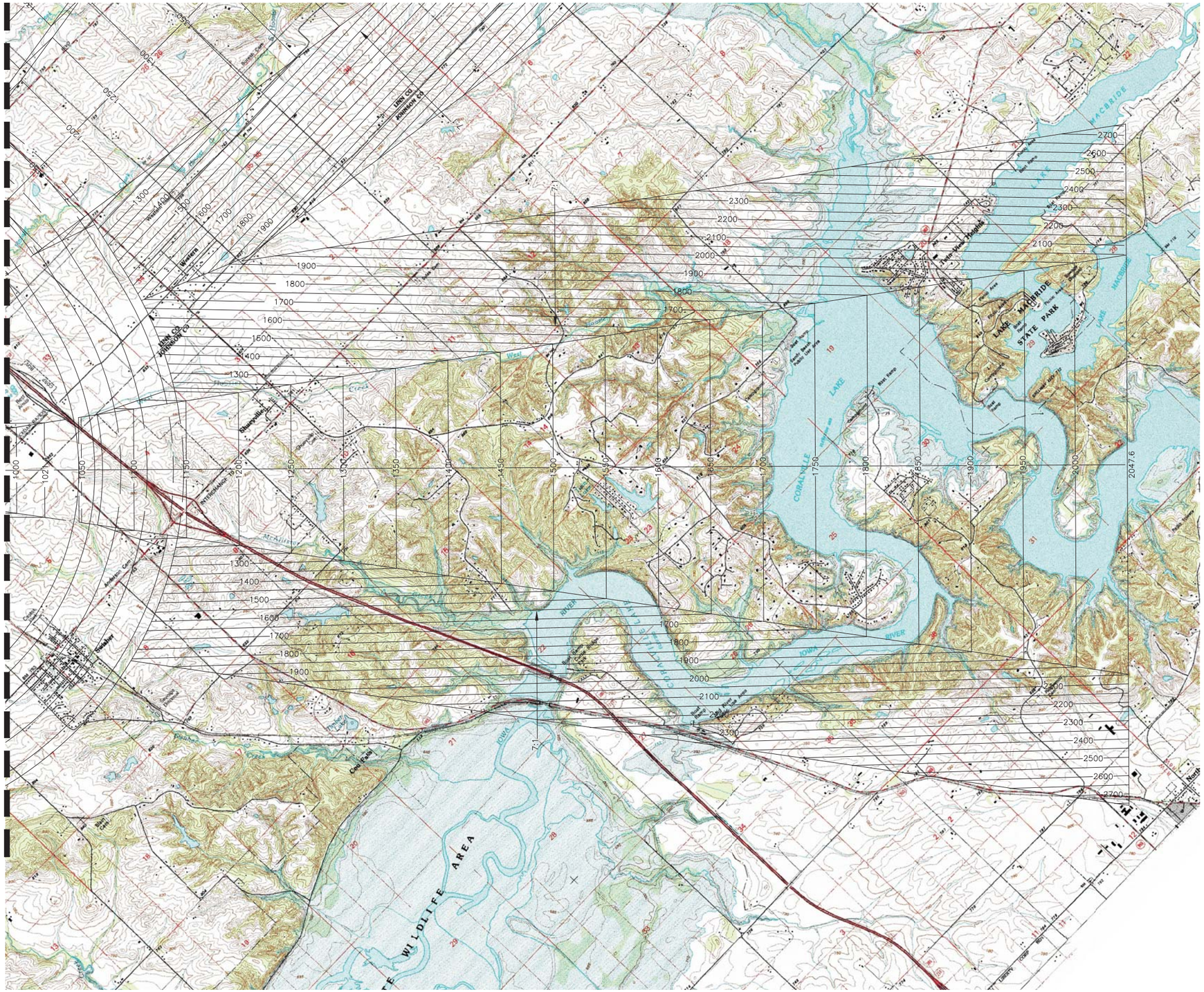
SHEET CONTENTS

AIRPORT AIRSPACE PLAN (EAST)

MATCHLINE – SEE SHEET 3



Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA,
National Geophysical
Data Center

N

0 2000
SCALE IN FEET

NOTES

NOTE 1:
REFER TO INDIVIDUAL RUNWAY PROTECTION ZONE PLAN OF EACH RUNWAY FOR CLOSE–IN OBSTRUCTIONS.

NOTE 2:
SERVICE ROAD RESTRICTED TO RADIO EQUIPPED AUTHORIZED VEHICLES OPERATING UNDER POSITIVE CONTROL FROM ATCT. NO PENETRATION OF 20:1 VFR SURFACE.

NOTE 3:
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REF: AIRSPACE STUDY NO. 2005–ACE–678–NRA

NOTE 4:
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SHEET CONTENTS

AIRPORT AIRSPACE PLAN (SOUTHEAST)

SHEET NO. 6 of 19

C-106

NOTE 1: SEE RUNWAY PROTECTION ZONE PLAN AND PROFILES FOR INNER SURFACE CLEARANCES

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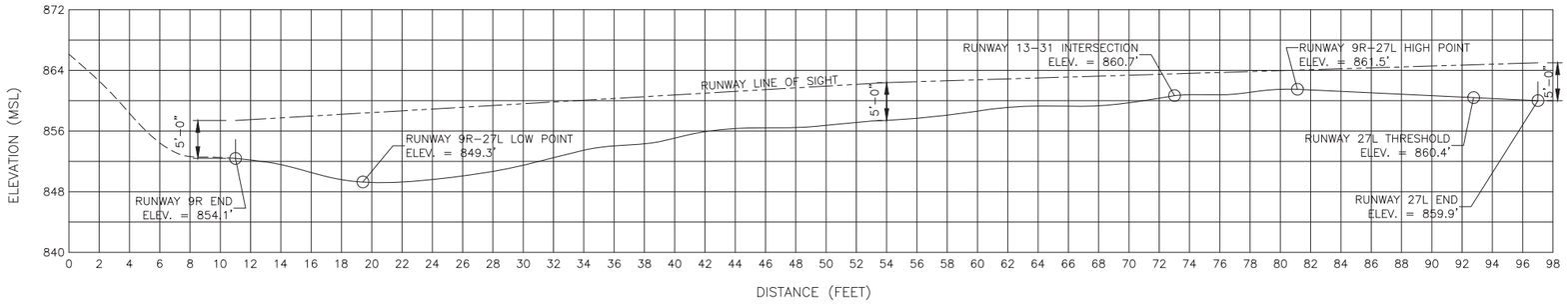
SHEET CONTENTS

AIRPORT AIRSPACE APPROACH PROFILES

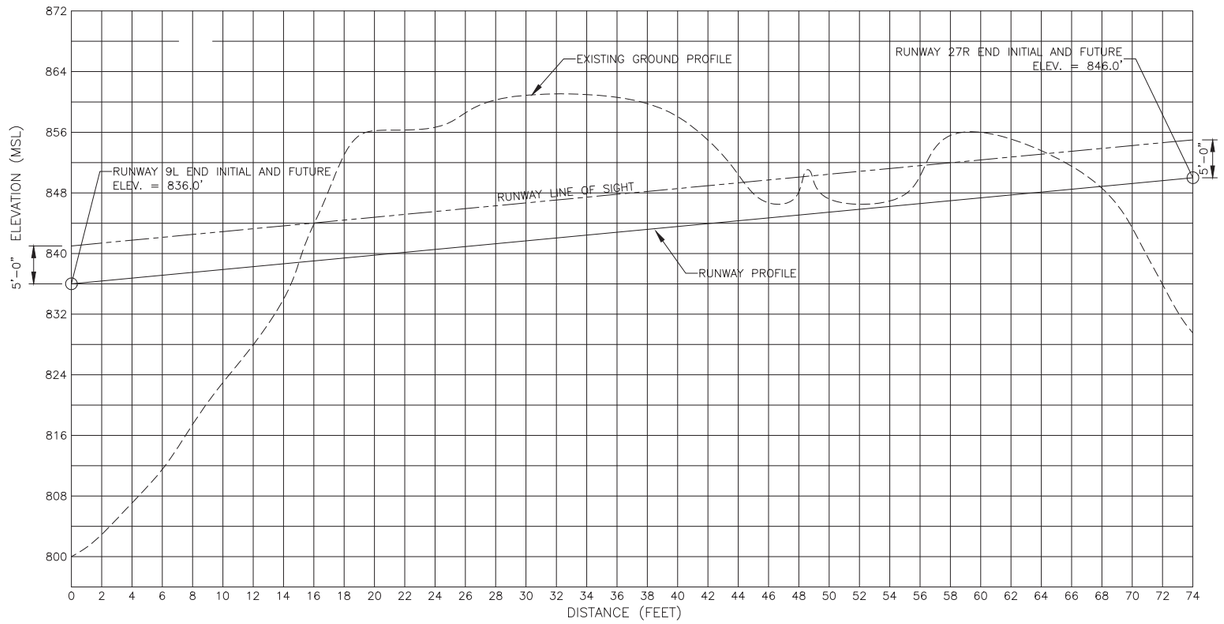
SHEET NO. 7 of 19

C-107

RUNWAY 9R 27L (H:1"=500' V:1"=10')

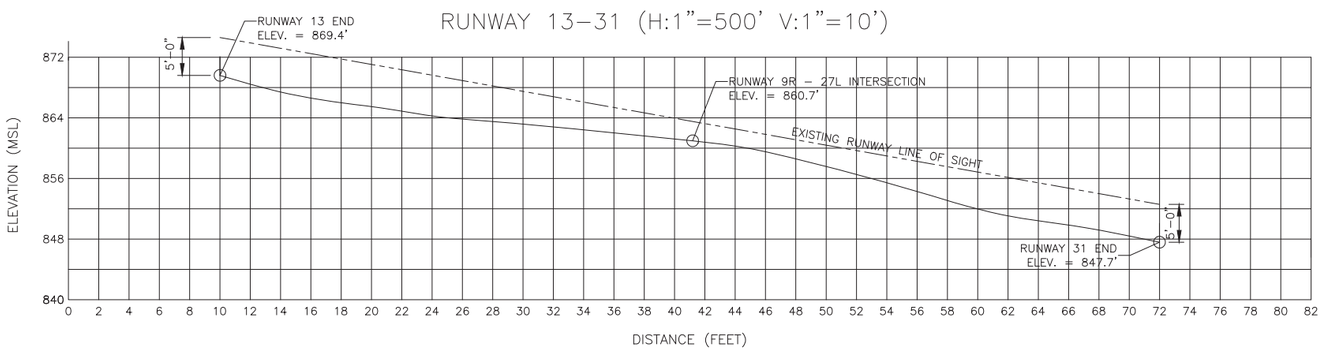


RUNWAY 9L-27R (H:1"=500' V:1"=10')



NOTE:
RUNWAY ELEVATIONS TO BE DETERMINED DURING FINAL DESIGN

RUNWAY 13-31 (H:1"=500' V:1"=10')



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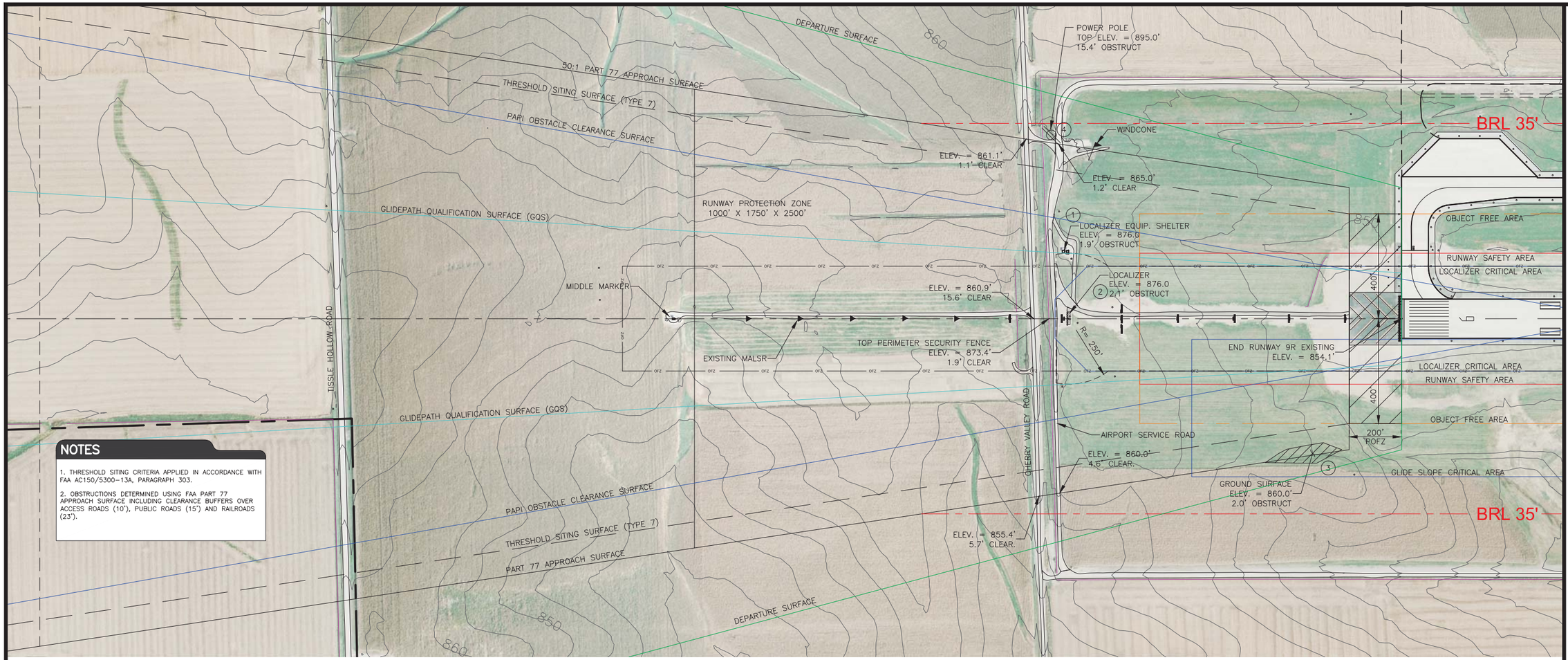
SHEET CONTENTS
RUNWAY CENTERLINE PROFILES

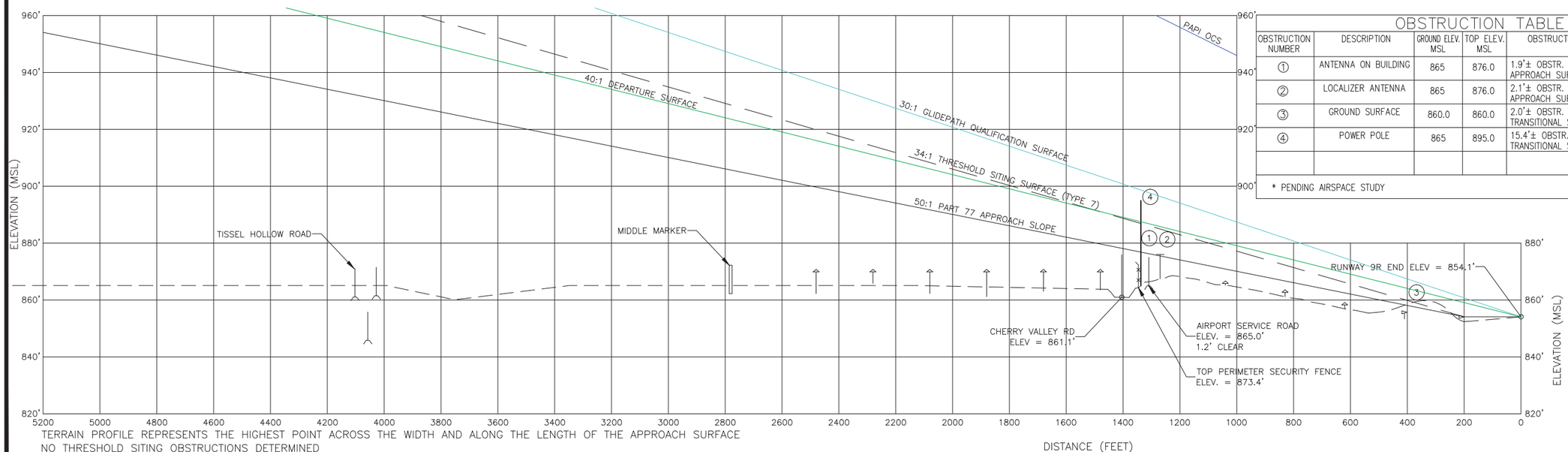
C-108



NOTES

1. THRESHOLD SITING CRITERIA APPLIED IN ACCORDANCE WITH FAA AC150/5300-13A, PARAGRAPH 303.

2. OBSTRUCTIONS DETERMINED USING FAA PART 77 APPROACH SURFACE INCLUDING CLEARANCE BUFFERS OVER ACCESS ROADS (10'), PUBLIC ROADS (15') AND RAILROADS (23').



TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE
NO THRESHOLD SITING OBSTRUCTIONS DETERMINED

OBSTRUCTION TABLE

OBSTRUCTION NUMBER	DESCRIPTION	GROUND ELEV. MSL	TOP ELEV. MSL	OBSTRUCTION	DISPOSITION
①	ANTENNA ON BUILDING	865	876.0	1.9'± OBSTR. TO APPROACH SURFACE	OBSTRUCTION LIGHT
②	LOCALIZER ANTENNA	865	876.0	2.1'± OBSTR. TO APPROACH SURFACE	OBSTRUCTION LIGHT
③	GROUND SURFACE	860.0	860.0	2.0'± OBSTR. TO 7:1 TRANSITIONAL SURFACE	TO REMAIN *
④	POWER POLE	865	895.0	15.4'± OBSTR. TO 7:1 TRANSITIONAL SURFACE	TO REMAIN *

* PENDING AIRSPACE STUDY

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Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA, National Geophysical Data Center

N

0 200

SCALE IN FEET

THE EASTERN IOWA AIRPORT
Airport Layout Plan Update

CEDAR RAPIDS, IOWA

REVISION

NOT FOR CONSTRUCTION

AIP NO.: 3-19-0012-043-2011
M&H NO.: 332700-114044.0
DATE: May 2014
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DO NOT SCALE DRAWINGS

SHEET CONTENTS

INNER PORTION OF THE APPROACH SURFACE RUNWAY 9R

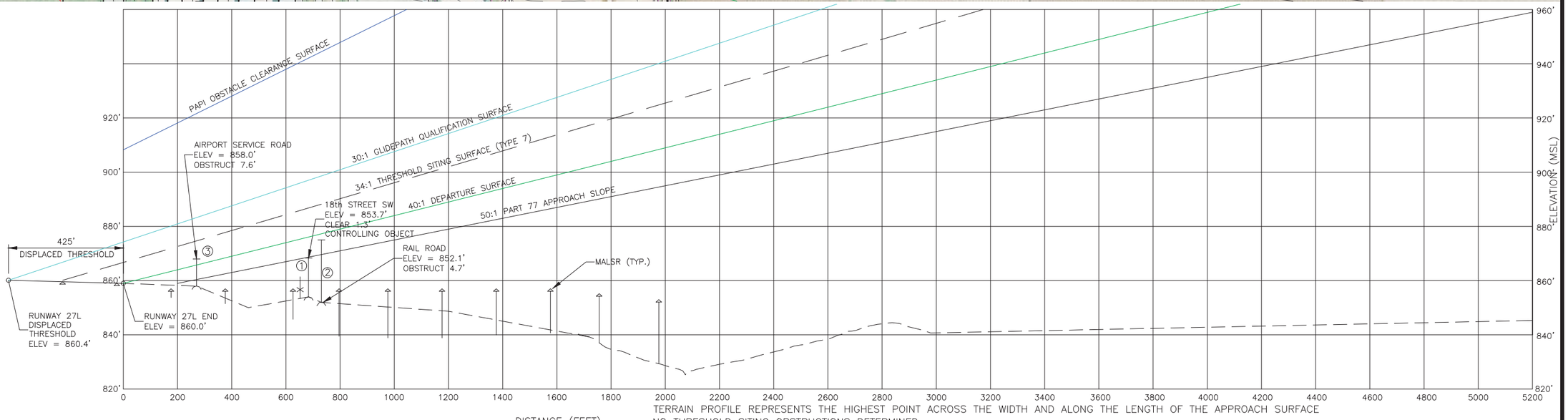
SHEET NO. 9 of 19

C-109

NOTES

1. THRESHOLD SITING CRITERIA APPLIED IN ACCORDANCE WITH FAA AC150/5300-13A, PARAGRAPH 303.

2. OBSTRUCTIONS DETERMINED USING FAA PART 77 APPROACH SURFACE INCLUDING CLEARANCE BUFFERS OVER ACCESS ROADS (10'), PUBLIC ROADS (15') AND RAILROADS (23').



TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE
NO THRESHOLD SITING OBSTRUCTIONS DETERMINED

OBSTRUCTION TABLE

OBSTRUCTION NUMBER	DESCRIPTION	ELEVATION MSL	OBSTRUCTION	DISPOSITION
①	18TH STREET	853.7'	1.3'± OBSTRUCTION TO 50:1 APPROACH SURF.	RESOLVED [1]
②	CEDAR RAPIDS & IOWA CITY RAILROAD	852.1'	4.7'± OBSTRUCTION TO 50:1 APPROACH SURF.	TO REMAIN [1]
③	AIRPORT SERVICE ROAD	858.0'	7.6'± OBSTRUCTION TO 50:1 APPROACH SURF.	TO REMAIN [1]

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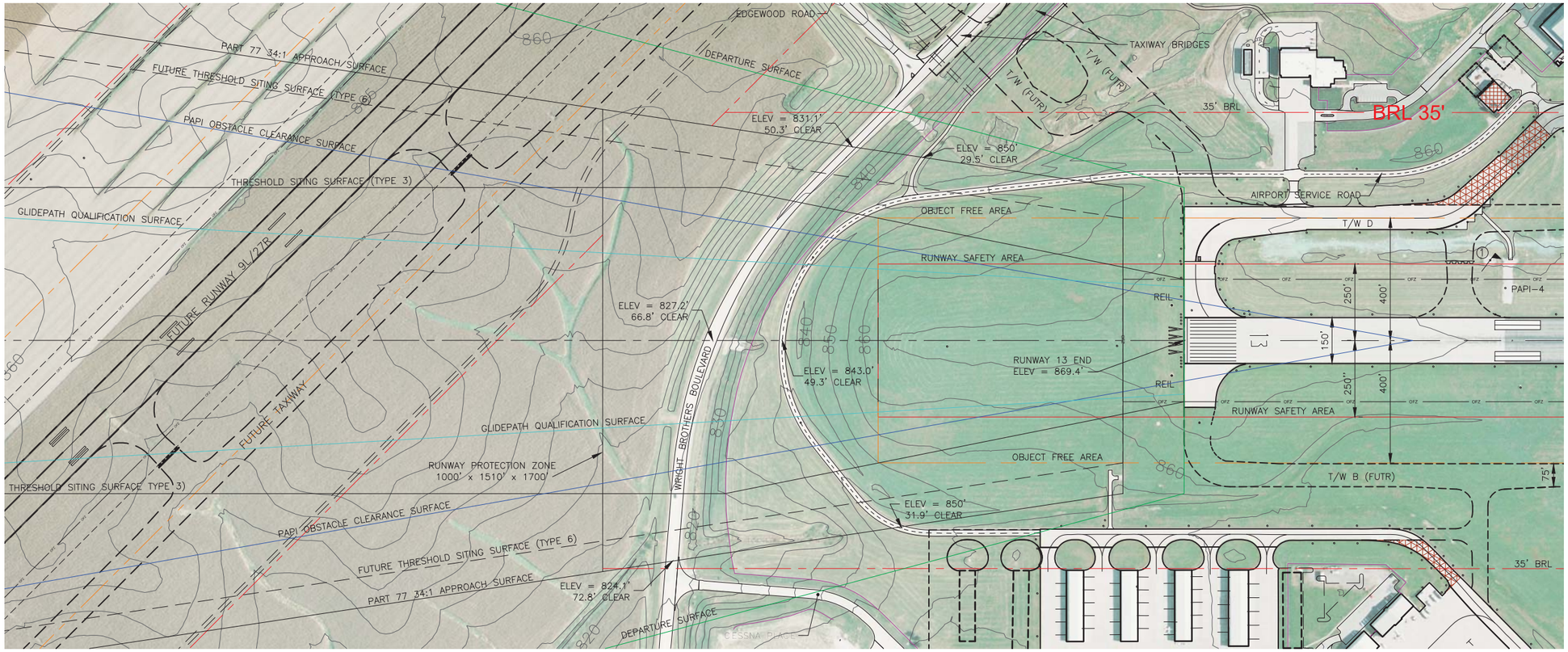
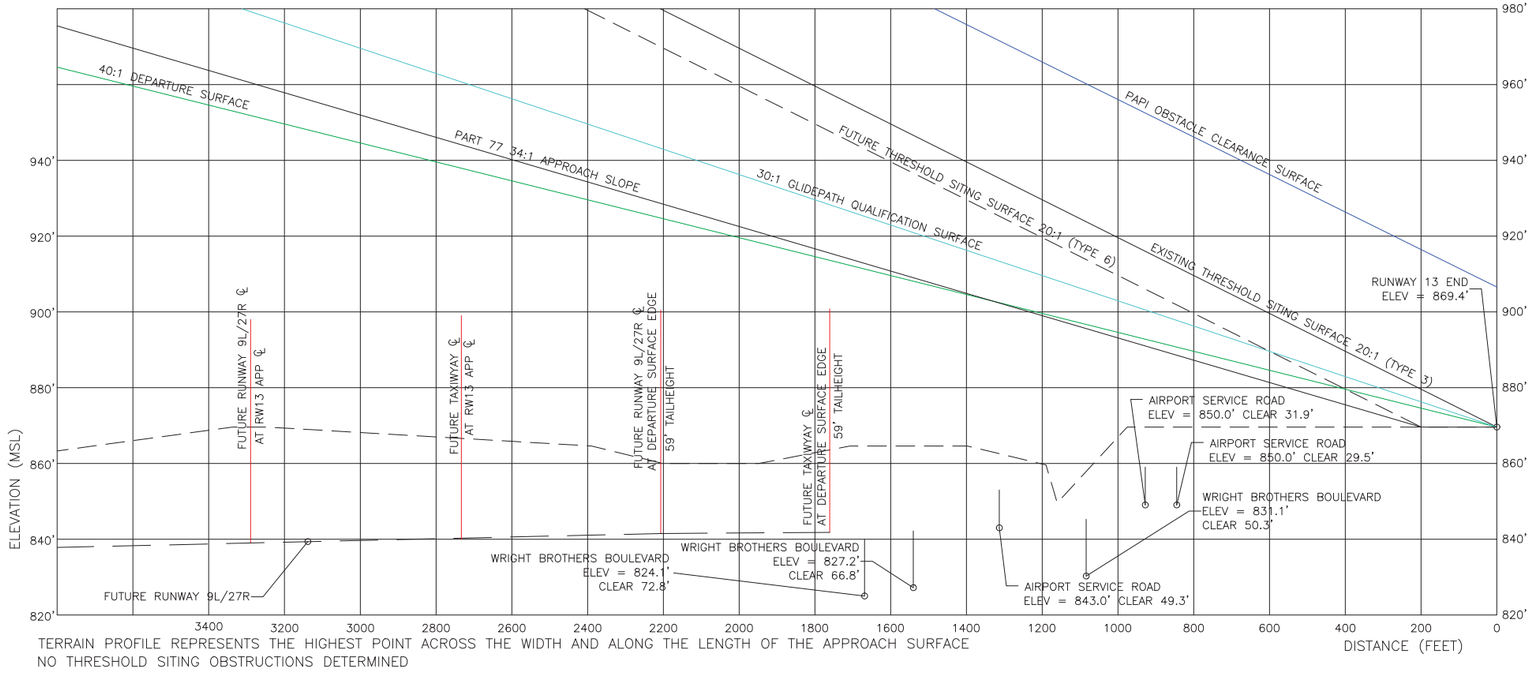
SHEET CONTENTS

INNER PORTION OF THE APPROACH SURFACE RUNWAY 27L

SHEET NO. 10 of 19

C-110





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NO THRESHOLD SITING OBSTRUCTIONS DETERMINED

NOTES

1. THRESHOLD SITING CRITERIA APPLIED IN ACCORDANCE WITH FAA AC150/5300-13A, PARAGRAPH 303.

2. OBSTRUCTIONS DETERMINED USING FAA PART 77 ULTIMATE APPROACH SURFACE INCLUDING CLEARANCE BUFFERS OVER ACCESS ROADS (10'), PUBLIC ROADS (15') AND RAILROADS (23').

OBSTRUCTION TABLE

OBSTRUCTION NUMBER	DESCRIPTION	TOP ELEVATION MSL	PENETRATION	DISPOSITION
①	WINDCONE	879.0'	9.4'± OBSTR. TO PRIMARY SURFACE	OBSTRUCTION LIGHT

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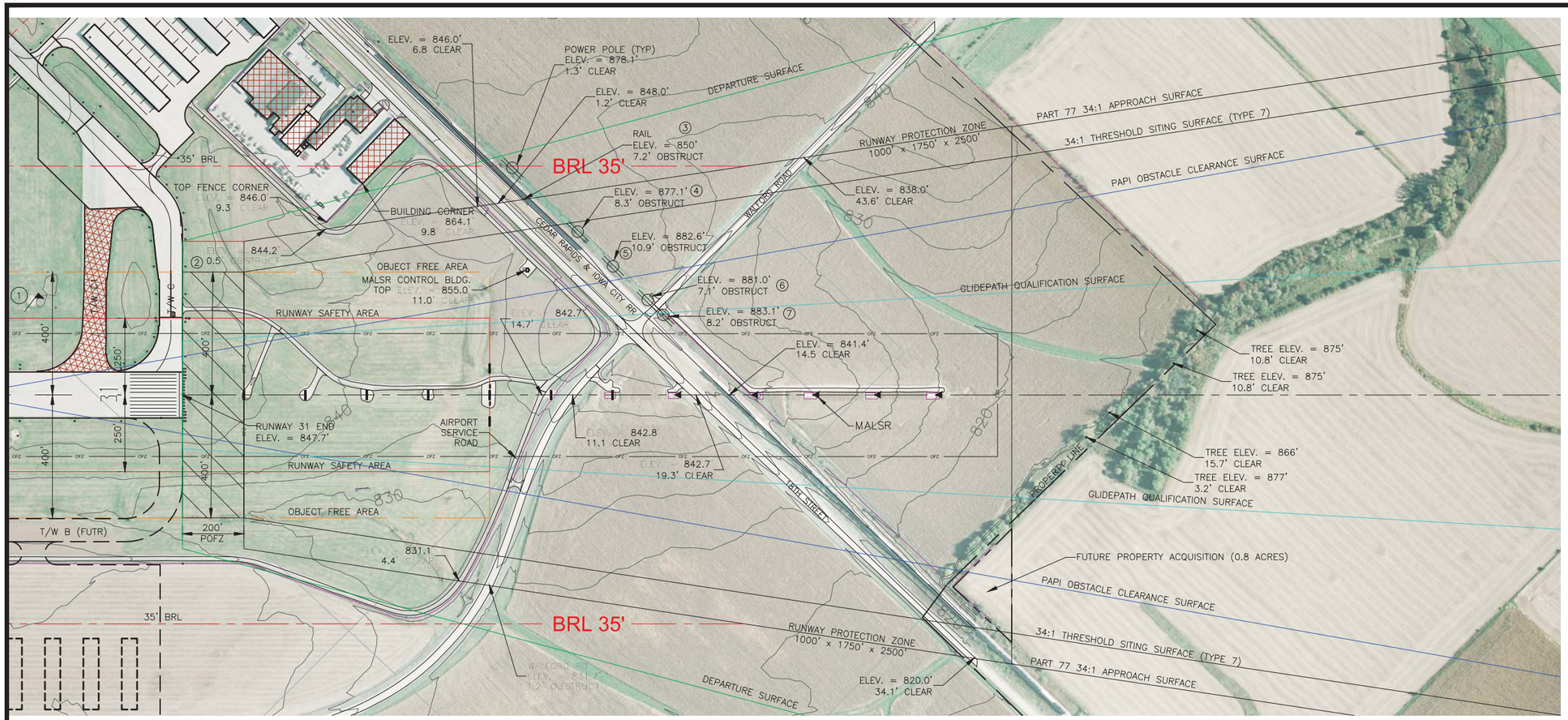
SHEET CONTENTS

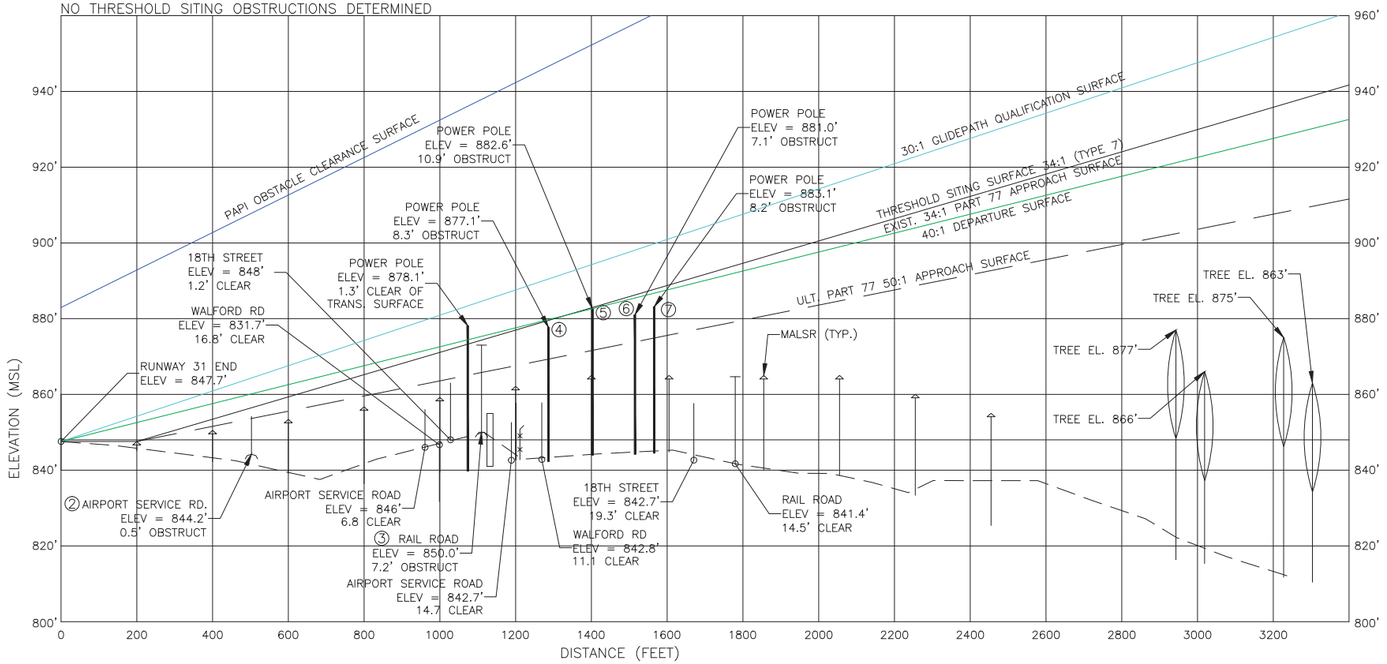
INNER PORTION OF THE APPROACH SURFACE RUNWAY 13

SHEET NO. 11 of 19

C-111



TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE
NO THRESHOLD SITING OBSTRUCTIONS DETERMINED



NOTES

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2. OBSTRUCTIONS DETERMINED USING FAA PART 77 ULTIMATE APPROACH SURFACE INCLUDING CLEARANCE BUFFERS OVER ACCESS ROADS (10'), PUBLIC ROADS (15') AND RAILROADS (23').

OBSTRUCTION TABLE

OBSTRUCTION NUMBER	DESCRIPTION	GROUND ELEVATION MSL	TOP ELEVATION MSL	PENETRATION	DISPOSITION
①	WINDCONE	845'	867.2'	19.6'± OBSTR. TO PRIMARY SURFACE	OBS. LIGHTED
②	AIRPORT SERVICE ROAD	844.2	844.2	INTERMITTENT PENET. TO PRIMARY SURF.	TO REMAIN [1]
③	CEDAR RAPIDS & IOWA CITY RAILROAD	867.2'	867.2'	7.2'± OBSTR. TO TO APPROACH SURF.	TO REMAIN [1]
④	POWER POLE	845'	877.1	8.3'± OBSTR. TO TO APPROACH SURF.	TO REMAIN * [1]
⑤	POWER POLE	845'	882.6'	10.9'± OBSTR. TO TO APPROACH SURF.	TO REMAIN * [1]
⑥	POWER POLE	845'	881.0'	7.1'± OBSTR. TO TO APPROACH SURF.	TO REMAIN * [1]
⑦	POWER POLE	845'	883.1'	8.2'± OBSTR. TO TO APPROACH SURF.	TO REMAIN * [1]

* PENDING AIRSPACE STUDY

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0 200
SCALE IN FEET

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CEDAR RAPIDS, IOWA

REVISION

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SHEET CONTENTS
INNER PORTION OF THE APPROACH SURFACE RUNWAY 31

SHEET NO. 12 of 19

C-112

NOTES

1. THRESHOLD SITING CRITERIA APPLIED IN ACCORDANCE WITH FAA AC150/5300-13A, PARAGRAPH 303.

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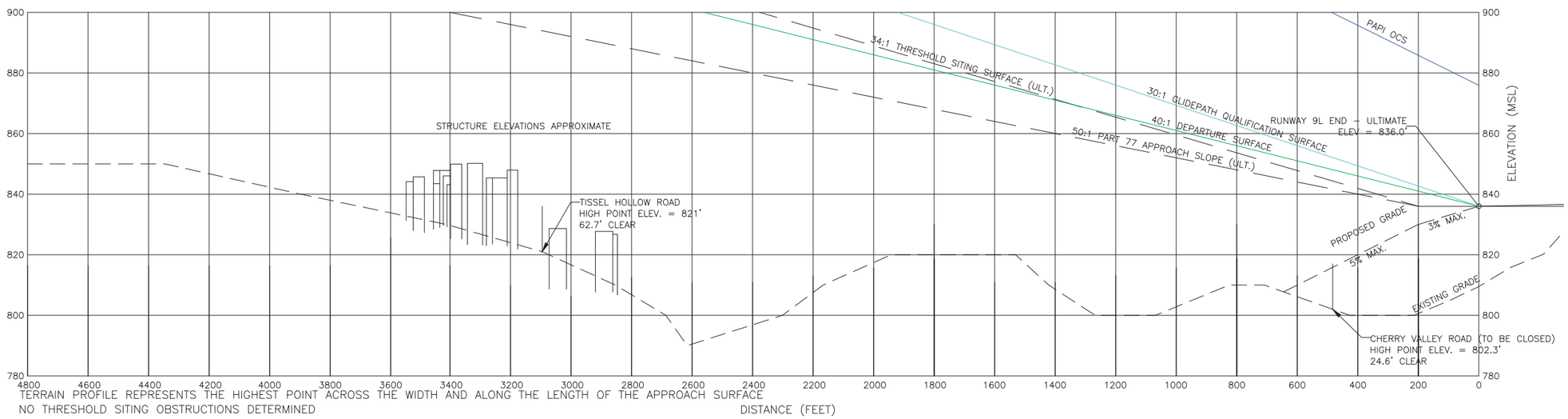

TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE
NO THRESHOLD SITING OBSTRUCTIONS DETERMINED

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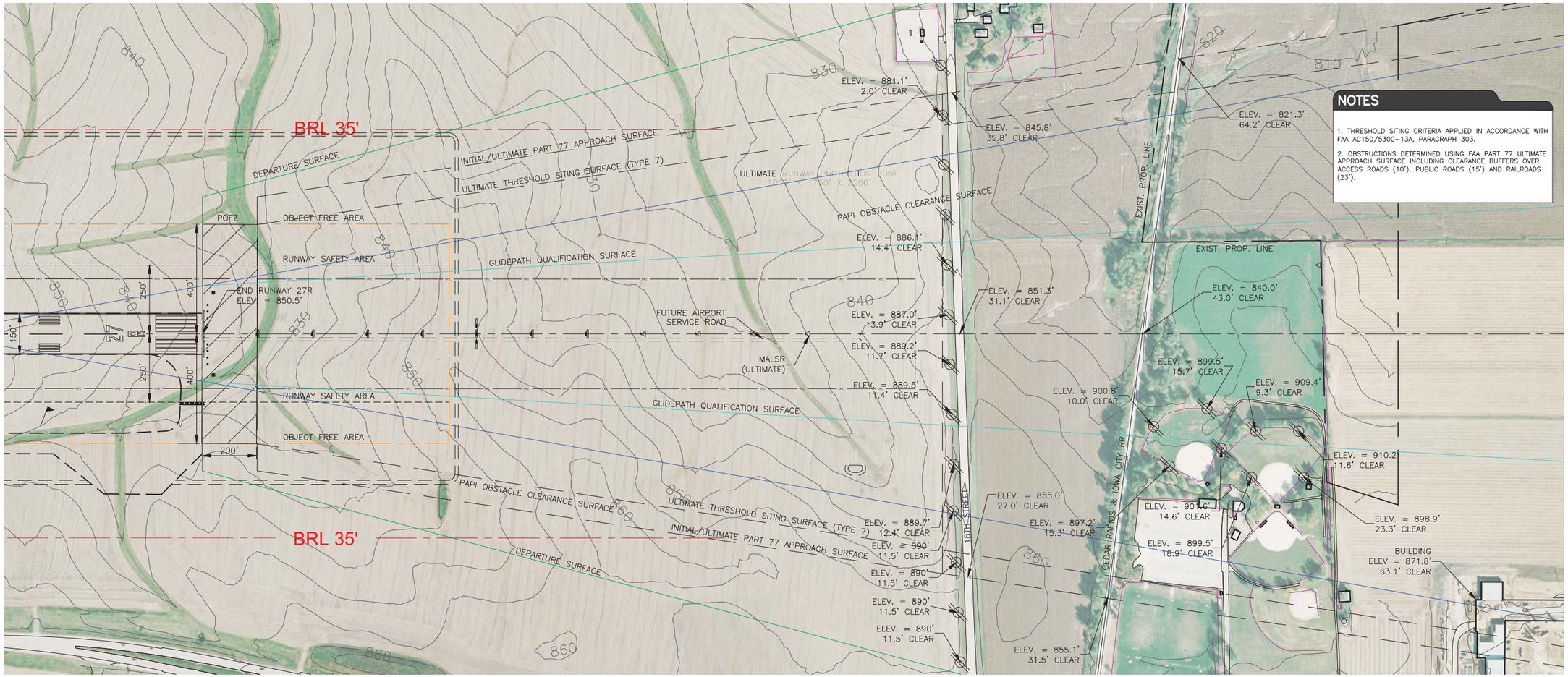
SHEET CONTENTS

INNER PORTION OF THE APPROACH SURFACE RUNWAY 9L - ULTIMATE

SHEET NO. 13 of 19

C-113



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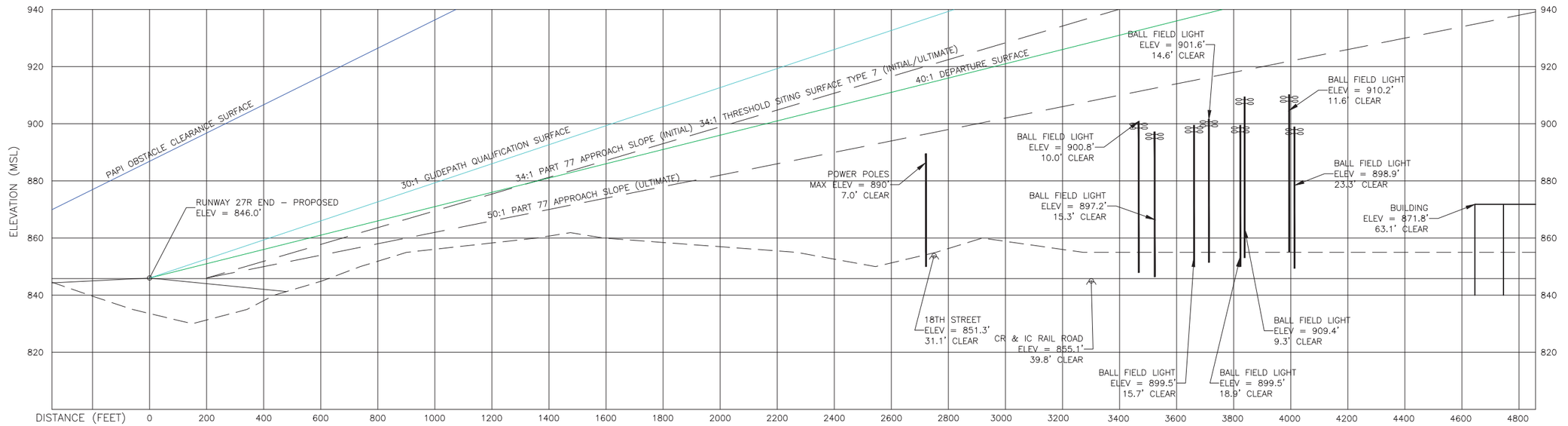

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SHEET CONTENTS

INNER PORTION OF THE APPROACH SURFACE RUNWAY 27R - ULTIMATE

C-114

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE	35' BRL	BRL
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY SAFETY AREA		RSA (F)
RUNWAY OBJECT FREE AREA		ROFA (F)
RUNWAY VISIBILITY ZONE	RVZ	
AIRPORT SECURITY FENCE (8 feet)		
NAVAIDS CRITICAL AREAS		
FUEL STORAGE AREA		
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION
2	FUTURE EXECUTIVE HANGAR	
3	FUTURE EXECUTIVE HANGAR	
4	ARFF	
45	Tenant Bldg	874.0
46	Tenant Bldg	874.0
47	ARFF TO BE REMOVED	890.0
48	Corporate Hangar	898.0
49	Corporate Hangar	884.0
50	Corporate Hangar	896.0
51	Corporate Hangar	892.0
52	Fixed Base Operator	910.0
53	Electrical Vault	898.0
54	FAA Offices	881.0
55	ATCT	971.0
56	Air Cargo Bldg	888.0
57	Maintenance Annex	881.0
58	Airport Administration	881.0
59	Passenger Terminal	882.0
60	Air Cargo Bldg	887.0
61	Future Parking Garage	902.0
62	Airfield Maintenance	901.5
63	East Fuel Farm	865.7
64	Fueling Canopy	
65	Rental Car Maintenance	862.6
66	Rental Car Wash	860.9

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SHEET CONTENTS
TERMINAL AREA DRAWING - EAST

SHEET NO. 15 of 19

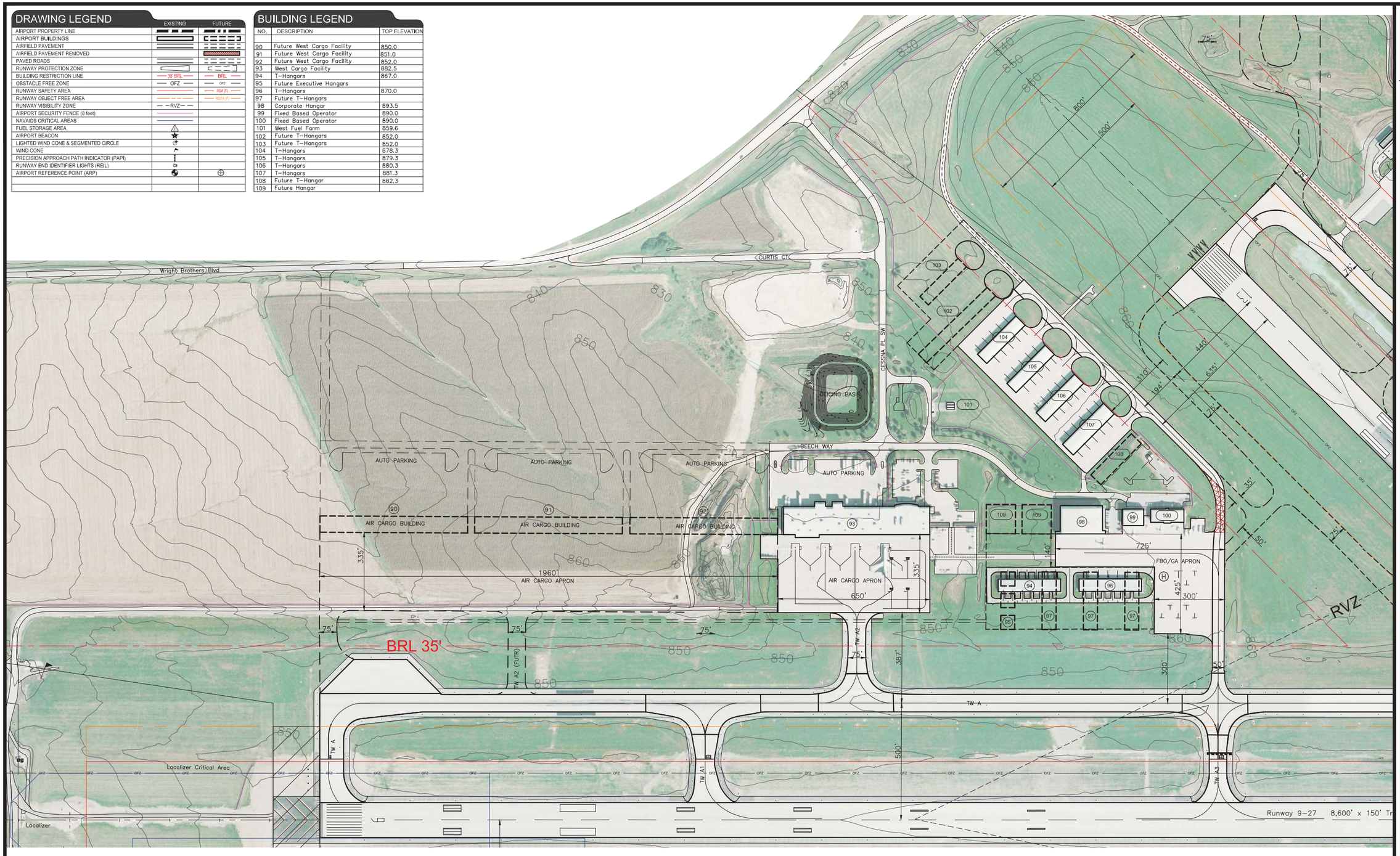
C-115

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE	35' BRL	BRL
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY SAFETY AREA		RSA (F)
RUNWAY OBJECT FREE AREA		ROFA (F)
RUNWAY VISIBILITY ZONE	RVZ	
AIRPORT SECURITY FENCE (8 feet)		
NAVAIDS CRITICAL AREAS		
FUEL STORAGE AREA		
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION
90	Future West Cargo Facility	850.0
91	Future West Cargo Facility	851.0
92	Future West Cargo Facility	852.0
93	West Cargo Facility	882.5
94	T-Hangars	867.0
95	Future Executive Hangars	
96	T-Hangars	870.0
97	Future T-Hangars	
98	Corporate Hangar	893.5
99	Fixed Based Operator	890.0
100	Fixed Based Operator	890.0
101	West Fuel Farm	859.6
102	Future T-Hangars	852.0
103	Future T-Hangars	852.0
104	T-Hangars	878.3
105	T-Hangars	879.3
106	T-Hangars	880.3
107	T-Hangars	881.3
108	Future T-Hangar	882.3
109	Future Hangar	



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SHEET CONTENTS
TERMINAL AREA
DRAWING - WEST

SHEET NO. 16 of 19

C-116

FUTURE PLANNED LAND USE LEGEND

AO	AIRFIELD OPERATIONS
AC	AIR CARRIER
CA	AIR CARGO
SP	AIRPORT SUPPORT
GA	GENERAL AVIATION
RS	RESERVE FOR AVIATION-RELATED USE
RV	REVENUE SUPPORT
AG	AGRICULTURE/OPEN SPACE
CI	COMMERCIAL INDUSTRIAL
IN	INDUSTRIAL
GR	GROWTH CORRIDOR
CM	COMMERCIAL
MR	MEDIUM DENSITY RESIDENTIAL (SEE NOTE)
OF	OFFICE
PF	PUBLIC FACILITIES
	CROP LIMIT LINE
	EXISTING PROPERTY LINE
	ULTIMATE PROPERTY LINE

NOTE: MEDIUM DENSITY RESIDENTIAL CURRENTLY PLANNED WITHIN THE RUNWAY 31 APPROACH, SEE MASTER PLAN REPORT FOR DISCUSSION. THE CITY IS AWARE OF POSSIBLE INCOMPATIBLE LAND USE AND IS ADDRESSING THE ISSUE.

EXISTING CITY/COUNTY ZONING (GENERALIZED)

	AGRICULTURAL
	RESIDENTIAL
	INDUSTRIAL
	AIRPORT
	COMMERCIAL
	PUBLIC
	OPEN SPACE
	ROW/UNDEFINED

CITY LIMITS

PART 77 APPROACH

PART 77 HORIZONTAL SURFACE LIMITS

PART 77 APPROACH (FUT.)

PART 77 APPROACH (EXIST.)

Ultimate Runway Protection Zone
2,500' x 1,000' x 1,750'
Owned in Fee

Existing Runway Protection Zone
1,700' x 500' x 1,010'
Owned in Fee

Ultimate Runway 9L-27R: 7,400' x 150', True Bearing 90.91°

Ultimate Runway 9R-27L: 8,600' x 150', True Bearing 90.91°

Existing Runway Protection Zone
2,500' x 1,000' x 1,750'
Partially Owned/Easement

Existing Runway Protection Zone
2,500' x 1,000' x 1,750'
Partially Owned/To be Acquired

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SCALE IN FEET

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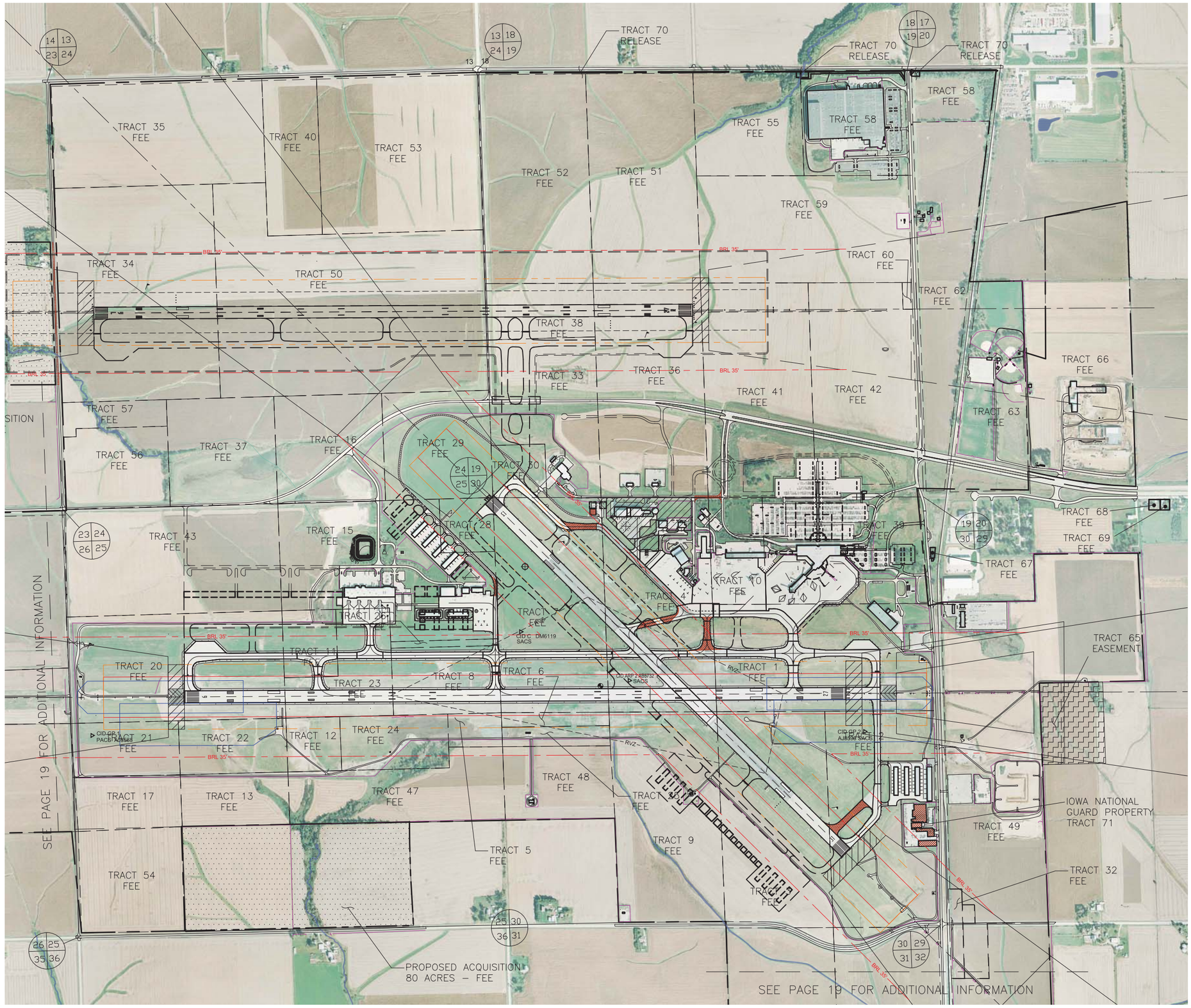
SHEET CONTENTS
AIRPORT LANDUSE - FUTURE

SHEET NO. 17 of 19

C-117



PROPERTY DATA TABLE

ORIGINAL PURCHASE			
TRACT	DATE	ACRES	TYPE
1	11/19/42	80	FEE
2	12/2/42	80	FEE
3	12/2/42	80	FEE
4	12/2/42	80	FEE
5	12/2/42	3	FEE
6	12/2/42	3	FEE
7	12/3/42	80	FEE
8	12/3/42	25	FEE
9	12/3/42	80	FEE
FAA PROJECT NO. 9-13-036-5702			
10	6/27/57	18.5	FEE
FAA PROJECT NO. 0375			
11	3/12/69	12.672	FEE
12	3/12/69	9.091	FEE
13	7/26/61	20	FEE
14	3/11/67	28.6833	FEE
15	3/12/69	79.980	FEE
16	4/10/69	40	FEE
17	2/29/72	19.5	FEE
18	3/1/72	80	FEE
FAA PROJECT NO. 6105			
19	7/29/61	11.5	FEE
20	7/26/61	80	FEE
21	7/26/61	20	FEE
22	7/26/61	20	FEE
23	7/26/61	27.328	FEE
24	7/26/61	23.52	FEE
25	7/26/61	8.21	FEE
26	7/26/61	2.75	FEE
27	3/11/69	6.887	FEE
28	3/11/69	7.52	FEE
29	4/10/69	40	FEE
30	10/21/69	4.21	FEE
31	6/15/70	0.568	FEE
32	2/24/67	4.545	FEE
FAA PROJECT NO. 6-19-0012-06			
33	10/21/69	60.84	FEE
34	4/14/72	118	FEE
35	4/14/72	78	FEE
FAA PROJECT NO. 6-19-0012-07			
36	2/29/72	80	FEE
37	4/14/72	38	FEE
38	4/17/72	20	FEE
39	7/1/77	54.39	FEE
40	10/9/78	39.25	FEE
41	4/4/79	78.19	FEE
42	4/5/79	75.62	FEE
FAA PROJECT NO. 6-19-0012-04			
43	5/26/76	77	FEE
44	1/21/77	65.85	FEE
45	2/23/77	77	FEE
46	6/29/77	38.5	FEE
47	4/2/77	44.39	FEE
48	4/26/77	30.14	FEE
49	4/27/77	154.26	FEE
50	4/29/77	158.5	FEE
65	12/21/66	18.4	EASEMENT
FAA PROJECT NO. 6-19-0012-08			
51	2/29/72	77.14	FEE
52	4/17/72	77.14	FEE
53	12/2/77	77.1	FEE
NOT A FAA PROJECT			
54	2/29/72	38	FEE
55	3/1/72	40	FEE
56	4/14/72	27	FEE
57	5/30/73	13	FEE
58	2/28/75	52.5	FEE
59	2/26/79	79.25	FEE
60	6/16/79	1.15	FEE
61	6/27/80	118.5	FEE
62	1/27/92	25.02	FEE
63	1/27/92	45.51	FEE
64	9/20/94	156.08	FEE
66	4/28/99	80	FEE
67	5/19/13	0.2	FEE
68	4/10/12	0.41	FEE
69	4/10/12	0.34	FEE
OTHER			
70	9/25/13	2.7	RELEASE
71	1/26/12	5.05	CONVEYANCE

NOTES

- THE ENTIRETY OF TRACT 31 AND THE PORTION OF TRACT 32 LOCATED NORTH OF WALFORD ROAD WERE ORIGINALLY PURCHASED IN EASEMENT UNDER FAA PROJECT #9-13-036-6105. THESE EASEMENTS WERE REFERRED TO AS TRACTS 17 AND 16, RESPECTIVELY, IN THE PROJECT #6105 GRANT DOCUMENTS. THESE TRACTS WERE SUBSEQUENTLY PURCHASED IN FEE SIMPLE UNDER FAA PROJECT #6-19-0012-04 AND ARE NOW DEPICTED AS TRACTS 32 AND 31 ON THE PROPERTY MAP.
- THE PORTION OF TRACT 49 LOCATED NORTH OF THE DEICING BASIN WAS ORIGINALLY PURCHASED IN EASEMENT UNDER FAA PROJECT #9-13-036-5904. THESE EASEMENTS WERE REFERRED TO AS TRACTS 6, 7, 8, 9, AND 10 IN THE PROJECT #5904 GRANT DOCUMENTS. THE ENTIRETY OF SAID TRACTS 6, 8, AND 10, AND A PORTION OF SAID TRACT 7, WERE SUBSEQUENTLY PURCHASED IN FEE SIMPLE UNDER FAA PROJECT #6-19-0012-04 AND HAVE SINCE BEEN COMBINED WITH TRACT 49 ON THE PROPERTY MAP. THE ENTIRETY OF SAID TRACT 9 AND A PORTION OF TRACT 7 REMAIN IN EASEMENT, AND ARE COMBINED AND DEPICTED AS TRACT 65 ON THE PROPERTY MAP.
- THE AREA SHOWN AS PRIVATE PROPERTY SOUTH OF LIPPISCH PLACE WAS SOLD IN 1956. A PORTION OF THE PROPERTY SOLD IN 1956 WAS LATER RE-PURCHASED UNDER FAA PROJECT #9-13-036-0406 IN 1963. THIS PORTION OF THE PROPERTY IS WHERE THE ABANDONED AWOS STATION IS CURRENTLY LOCATED (ENROLLING THE BOUNDARY OF TRACTS 4 AND 7), AND WAS REFERRED TO AS TRACT 22 IN THE PROJECT #0406 GRANT DOCUMENTATION.
- LAND RELEASE DOCUMENTATION FOR TRACT 70 AND LAND CONVEYANCE DOCUMENTATION FOR TRACT 71 WAS SUBMITTED WITH THE REVISED ALP IN 2014 FOR INCLUSION IN FAA RECORD FILES.

LEGEND

EXISTING	ULTIMATE	
		AIRPORT PROPERTY LINE
		TRACT BOUNDARY LINE
		FACILITIES
		BUILDINGS
		PRIVATELY OWNED HANGARS AND APRON
		ULTIMATE PROPERTY INTERESTS
		EASEMENT

Mead & Hunt

Mead & Hunt, Inc.
1743 Wazee Street, Suite 400
Denver, Co 80202
phone: 303-825-8844
meadhunt.com

N

Magnetic Declination
0° 18' West (July 2012)
Annual Rate of Change
6' West (July 2012)

Source: NOAA, National Geophysical Data Center

0 600
SCALE IN FEET

THE EASTERN IOWA AIRPORT
Airport Layout Plan Update

CEDAR RAPIDS, IOWA

REVISION

NOT FOR CONSTRUCTION

AIP NO.: 3-19-0012-043-2011
M&H NO.: 332700-114044.0
DATE: May 2014
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DO NOT SCALE DRAWINGS

SHEET CONTENTS
AIRPORT PROPERTY MAP

SHEET NO. 18 of 19

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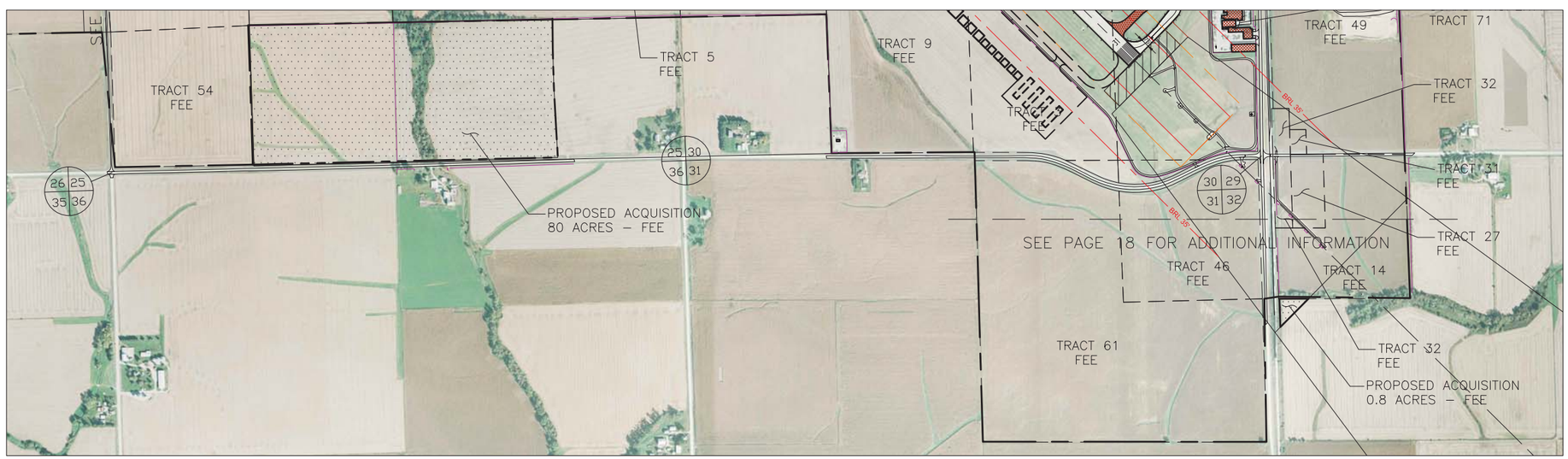

PROPERTY DATA TABLE

TRACT	DATE	ACRES	TYPE
ORIGINAL PURCHASE			
1	11/19/42	80	FEE
2	12/2/42	80	FEE
3	12/2/42	80	FEE
4	12/2/42	80	FEE
5	12/2/42	3	FEE
6	12/2/42	3	FEE
7	12/3/42	80	FEE
8	12/3/42	25	FEE
9	12/3/42	80	FEE
FAA PROJECT NO. 9-13-036-5702			
10	6/27/57	18.5	FEE
FAA PROJECT NO. 0375			
11	3/12/69	12.672	FEE
12	3/12/69	9.091	FEE
13	7/26/61	20	FEE
14	3/11/67	28.6833	FEE
15	3/12/69	79.980	FEE
16	4/10/69	40	FEE
17	2/29/72	19.5	FEE
18	3/1/72	80	FEE
FAA PROJECT NO. 6105			
19	7/29/61	11.5	FEE
20	7/26/61	80	FEE
21	7/26/61	20	FEE
22	7/26/61	20	FEE
23	7/26/61	27.328	FEE
24	7/26/61	23.52	FEE
25	7/26/61	8.21	FEE
26	7/26/61	2.75	FEE
27	3/11/69	6.887	FEE
28	3/11/69	7.52	FEE
29	4/10/69	40	FEE
30	10/21/69	4.21	FEE
31	6/15/70	0.568	FEE
32	2/24/67	4.545	FEE
FAA PROJECT NO. 6-19-0012-06			
33	10/21/69	60.84	FEE
34	4/14/72	118	FEE
35	4/14/72	78	FEE
FAA PROJECT NO. 6-19-0012-07			
36	2/29/72	80	FEE
37	4/14/72	38	FEE
38	4/17/72	20	FEE
39	7/1/77	54.39	FEE
40	10/9/78	39.25	FEE
41	4/4/79	78.19	FEE
42	4/5/79	75.62	FEE
FAA PROJECT NO. 6-19-0012-04			
43	5/26/76	77	FEE
44	1/21/77	65.85	FEE
45	2/23/77	77	FEE
46	6/29/77	38.5	FEE
47	4/2/77	44.39	FEE
48	4/26/77	30.14	FEE
49	4/27/77	154.26	FEE
50	4/29/77	158.5	FEE
65	12/21/66	18.4	EASEMENT
FAA PROJECT NO. 6-19-0012-08			
51	2/29/72	77.14	FEE
52	4/17/72	77.14	FEE
53	12/2/77	77.1	FEE
NOT A FAA PROJECT			
54	2/29/72	38	FEE
55	3/1/72	40	FEE
56	4/14/72	27	FEE
57	5/30/73	13	FEE
58	2/28/75	52.5	FEE
59	2/26/79	79.25	FEE
60	6/16/79	1.15	FEE
61	6/27/80	118.5	FEE
62	1/27/92	25.02	FEE
63	1/27/92	45.51	FEE
64	9/20/94	156.08	FEE
66	4/28/99	80	FEE
67	5/19/13	0.2	FEE
68	4/10/12	0.41	FEE
69	4/10/12	0.34	FEE
OTHER			
70	9/25/13	2.7	RELEASE
71	1/26/12	5.05	CONVEYANCE

NOTES

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SHEET CONTENTS
AIRPORT PROPERTY - CONTINUED

SHEET NO. 19 of 19

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