I-49 connector

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I-49 CONNECTOR

STUDY CORRIDOR OPERATIONAL ANALYSIS

Technical Memorandum

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U.S. Department of Transportation
Federal Highway Administration

LAFAYETTE CONSOLIDATED GOVERNMENT

U.S. Department of Transportation
Federal Highway Administration

HNTB

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Chapter 1

INTRODUCTION

1. INTRODUCTION

1.1 Project Background

The proposed project is in Lafayette Parish, Louisiana, within the city limits of Lafayette. Now called the I-49 Connector, the project action includes construction in the Evangeline Thruway U.S. 90/U.S. 167 corridor of a freeway with accompanying interchanges and flanking collector/ distributor roadways for local traffic circulation and land access. The study corridor stretches just south of the Lafayette Regional Airport and continues north to the Interstate I-10/I-49 interchange, which is approximately five and a half (5 ½) miles.

1.2 Purpose of Study

The I-49 Connector project is currently in the preliminary design phase. To determine needed geometric design details, a traffic analysis is being conducted in two steps. The first step involved the determination of traffic assignments that will utilize the future I-49 Connector network, both average daily traffic (ADT) and design hour volumes (DHV). The results of this step have been presented in a technical memorandum which displays the ADT forecasts and the DHV assignments.

This second technical memorandum summarizes the methodology and results of the second step of the traffic study, the traffic operational analysis. A comprehensive traffic operational analysis has been performed for the main line, entrance and exit ramps, weaving sections, frontage road weaving sections, and signalized and unsignalized intersections throughout the corridor. The main goal of this memorandum is to use the DHV values determined in phase one of the traffic studies to evaluate the traffic operations and to use these results to establish the geometric requirements for the various aspects of the project. Upon completion of the operational analysis, the geometric design for the I-49 Connector corridor can be performed.

1.3 Existing Conditions In Corridor

The existing Evangeline Thruway is a north-south arterial passing through the older part of Lafayette, serving local residential and business traffic and also functioning as an integral part of the federal-aid primary highway network servicing south Louisiana. The Thruway is a four or six lane signalized arterial roadway for its limits in Lafayette until tying to I-49 north at the I-10/I-49 Interchange. The four-lane highway is characterized on its north and south ends by flanking two-way service roads (one lane each direction). On the north end, recent improvements have widened the Thruway from four to six lanes. In the core section (Union Pacific R.R. Spur to Pinhook Drive), the Thruway is a one-way couplet, three lanes each direction, utilizing streets that are part of the original city street grid. The southern end of the Thruway is four lanes and ties to US 90.

The Thruway has several major arterials crossing it along the corridor. The arterials crossing the Thruway include, Kaliste Saloom, University, Pinhook, Johnston, Jefferson, 3rd, 2nd, Simcoe, Mudd/Cameron, and Willow. These arterials serve the residential districts and the central business district by carrying the traffic east and west across the corridor. A project location map is shown in Figure 1-1.

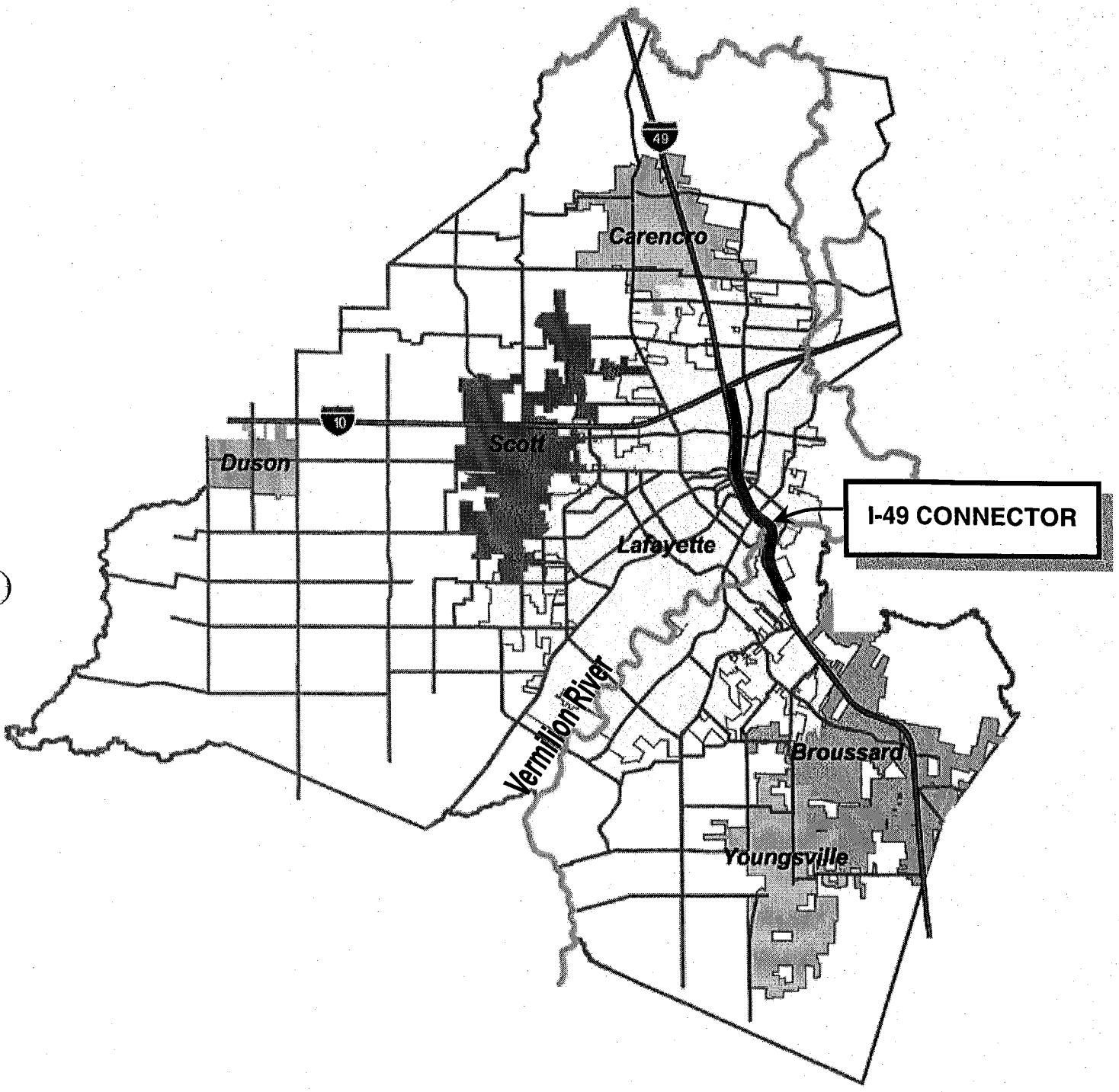

FIGURE 1-1
I-49 Connector Project Location

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I-49 connector

Chapter 2

TRAFFIC OPERATIONAL ANALYSIS

2. TRAFFIC OPERATIONAL ANALYSIS

2.1. Design Year Traffic Volume Forecasts

The Lafayette regional travel demand model (based on information from year 2000) was obtained from the Lafayette MPO and refined to take into account the proposed improvements with I-49 Connector under existing traffic conditions (year 2000) and design year 2030. The refinement of the travel demand model is described in more detail in the Traffic Assignments (ADT) Technical Memorandum.

During step one of the traffic studies, TransCAD was used to assign ADT values for the existing year 2000 network with I-49 Connector and design year 2030. VISSIM was used to assign DHV turning movements for the frontage roads, major intersections/ interchanges ramp, and mainline I-49 Connector. The turning movement assignments presented in the previous technical memorandum (DHV) were used in the operational analyses presented throughout this technical memorandum.

See the ADT and DHV technical memorandum for more information.

2.2. Traffic Operations Analysis Methodology

Table 2-1 is a list of abbreviations used throughout this technical memorandum, including the worksheets contained in Appendices A through E:

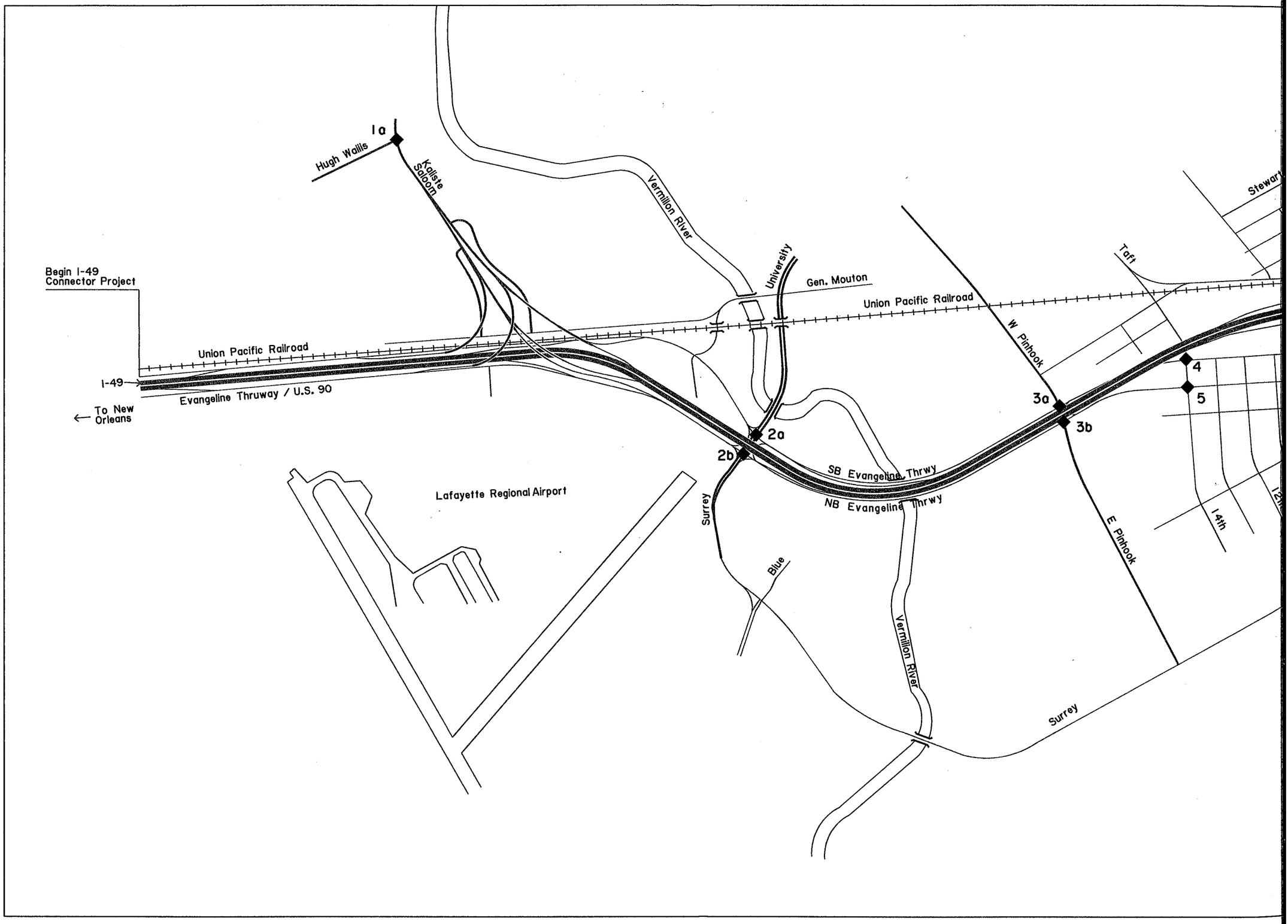
TABLE 2-1
Symbols and Definitions Used Throughout TM

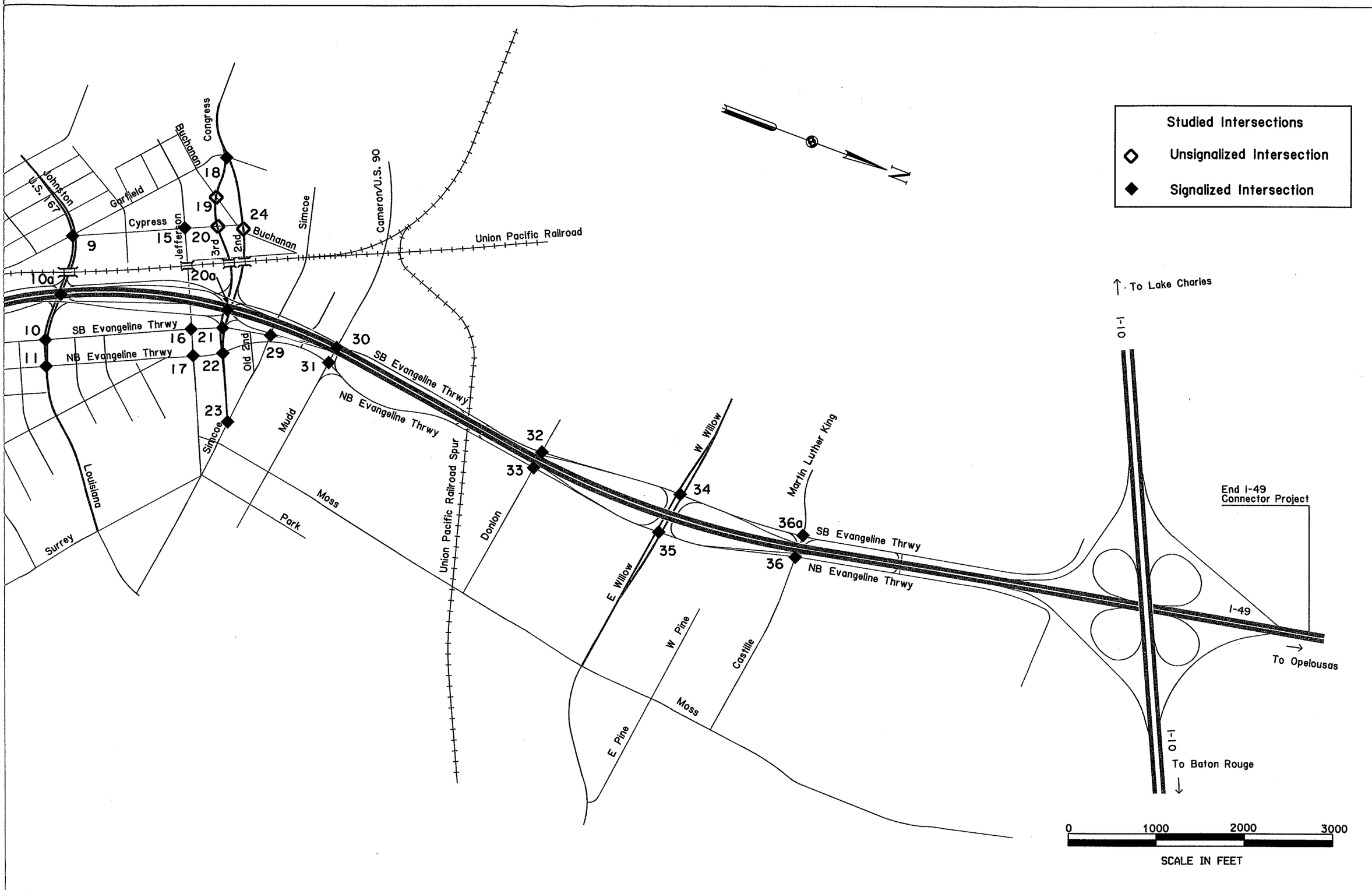
Symbol	Definition
NB,N	Northbound
SB,S	Southbound
D	Diverges
M	Merges
W	Weaving Sections
LOS	Level of Service
DDHV	Directional Design-Hourly Volume (veh/h)
AADT	Annual Average Daily Traffic (veh/day)
K	Proportional AADT occurring in the peak hour
D	Proportion of peak hour traffic in the peak direction
v/c	Volume/capacity ratio
V_F	Hourly volume for all freeway lanes of travel (veh/h)
V_1	Hourly volume for one lane of travel (veh/h)
V_R	Hourly volume for ramp (veh/h)
V_w	Hourly volume for weaving lane in weaving segment (veh/h)
V_o	Hourly volume for outer lane in weaving segment (veh/h)

Level of service (LOS) is a qualitative measure of operational conditions at a location and is directly related to roadway network performance measures such as density, traffic volume, or delay. LOS is given a letter designation ranging from A to F (for freeways, free flow to heavily congested). LOS can be related to the following scale:

LOS A = Excellent
LOS B = Good
LOS C = Average
LOS D = Below Average
LOS E = Needs Improvement
LOS F = Failing

The operational analysis conducted for this study uses year 2030 traffic volume projections and began with the design concept identified in the I-49 Connector EIS. This design concept was further developed with regard to project goals (i.e., the provision of three mainline lanes in each direction) and with respect to specific needs based on the DHV assignments. The operational analysis incorporated standard traffic engineering procedures for the various aspects of the project including the following. Vertical geometry (grades) was taken from the EIS document. Trucks were taken to be 20% for the I-49 Connector mainline and 5% for the surface streets and intersections.


1a
Hugh Wallis
Kaliste Saloom
Vermilion River
University
Gen. Mouton
Union Pacific Railroad
W Pinhook
Taft
Stewart
Begin I-49 Connector Project
Union Pacific Railroad
I-49
Evangeline Thruway / U.S. 90
To New Orleans
4
5
3a
3b
2a
2b
SB Evangeline Thrwy
NB Evangeline Thrwy
Lafayette Regional Airport
Surrey
Blue
E Pinhook
14th
Vermilion River
Surrey



SHEET NUMBER	2-3
PARISH	LAFAYETTE
FEDERAL PROJECT	DE-0009(802)
STATE PROJECT	700-24-0073

FIGURE 2-3
Intersection Key Map with
I-49 Connector

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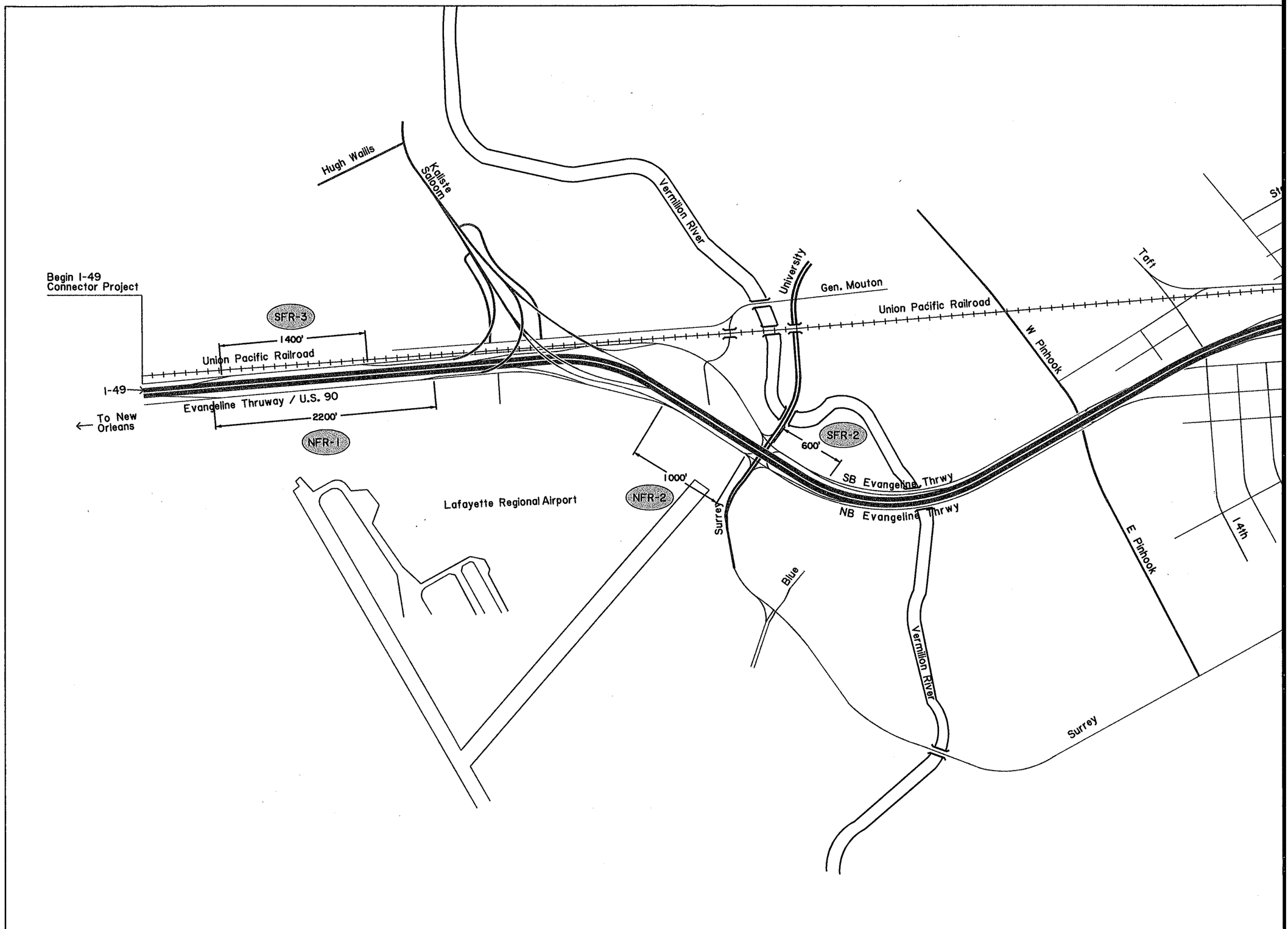
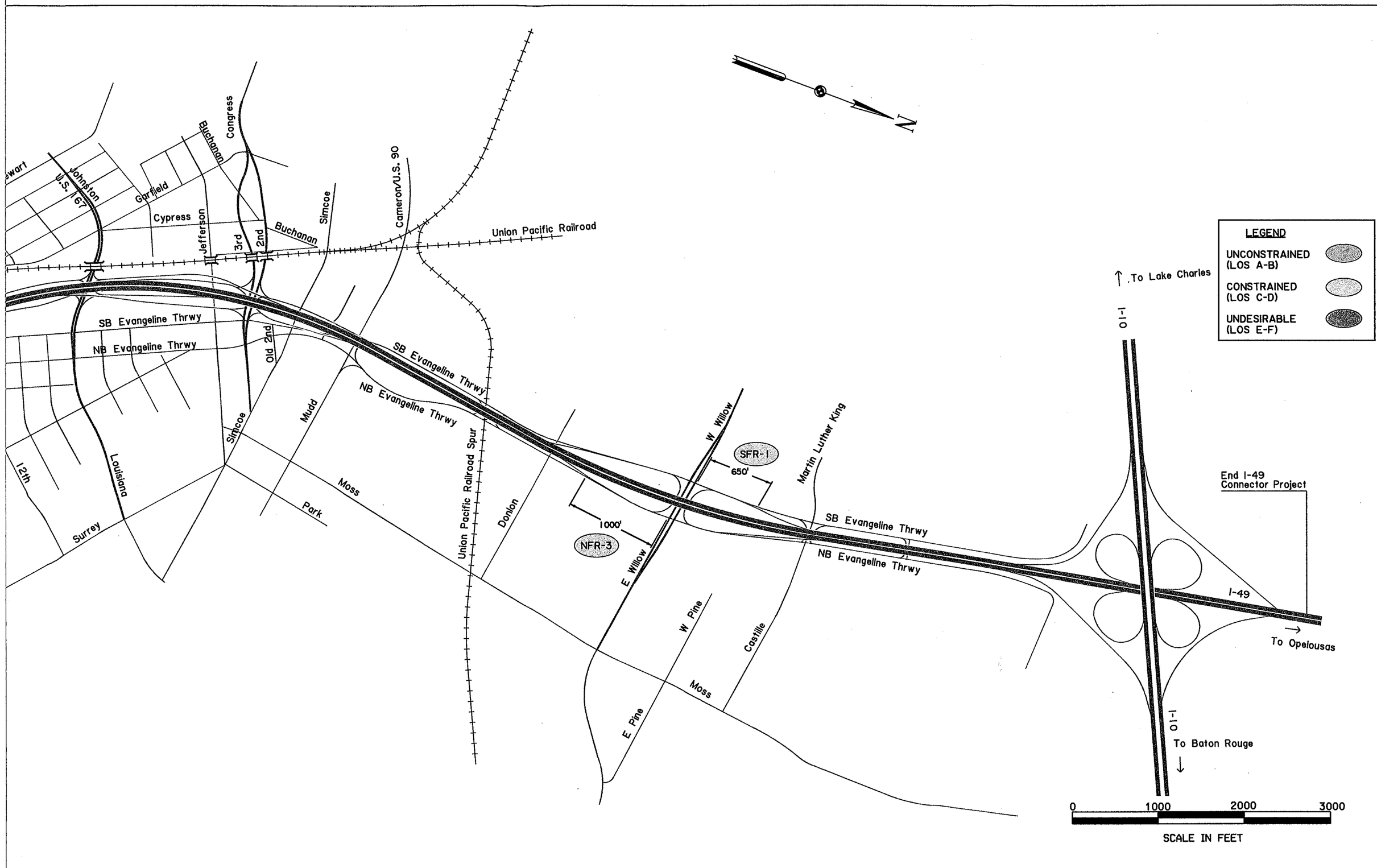

Hugh Wallis
Kaliste Saloom
Vermilion River
Begin I-49 Connector Project
SFR-3
1400'
Union Pacific Railroad
I-49
Evangeline Thruway / U.S. 90
To New Orleans
2200'
NFR-1
Lafayette Regional Airport
NFR-2
1000'
Surrey
University
Gen. Mouton
Union Pacific Railroad
600'
SFR-2
SB Evangeline Thrwy
NB Evangeline Thrwy
Blue
Vermilion River
W Pinhook
Taft
E Pinhook
14th
Surrey



SHEET NUMBER 2-2

PARISH: LAFAYETTE

FEDERAL PROJECT: DE-0009(802)

STATE PROJECT: 700-24-0073

FIGURE 2-2
Frontage Road Schematic with LOS – Year 2030

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2.2.1. *I-49 Connector Mainline*

LOS for the I-49 Connector mainline was evaluated using Chapter 22, Freeway Facilities, of *Highway Capacity Manual 2000, Transportation Research Board.* Highway Capacity Software (HCS 2000), release 4.1d, was used in the evaluation process.

2.2.2. *Ramp Merge/Diverge Areas on I-49 Connector Mainline*

LOS for ramp merge/diverge areas along the I-49 Connector mainline was evaluated using Chapter 25, Ramps and Ramp Junctions, of *Highway Capacity Manual 2000, Transportation Research Board.* HCS 2000, release 4.1d, was used in the evaluation process to produce density. Table 2-2 shows LOS criteria for ramp merge/diverge based on density.

TABLE 2-2
Ramp Merge/Diverge and Weaving Segments LOS Criteria

LOS	Merge/Diverge Areas Density (pc/mi/ln)	Weaving Segments Density (pc/mi/ln)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 20
C	> 20 - 28	> 20 - 28
D	> 28 - 35	> 28 - 35
E	> 35	> 35 - 43
F	Demand Exceeds Capacity	> 43

Source: Highway Capacity Manual 2000, Transportation Research Board.

2.2.3. *Weaving Sections on I-49 Connector Mainline*

LOS for weaving areas along the I-49 Connector mainline was evaluated using Chapter 24, Freeway Weaving, of *Highway Capacity Manual 2000, Transportation Research Board.* HCS 2000, release 4.1.d was used in the evaluation process. Table 2-2 illustrates LOS criteria for weaving section based on the standards in the *Highway Capacity Manual 2000.*

2.2.4. *Frontage Road Operations*

Weaving LOS for the parallel frontage road operations (northbound and southbound Evangeline Thruway) was evaluated using procedures identified in *Procedures to Determine Frontage Road Level of Service and Ramp Spacing, Research Report 1393-4F, Texas Transportation Institute, August 1996.* LOS for frontage road weaving operations included one-sided and two-sided weaving analysis. Table 2-3 presents one-sided and two-sided frontage road weaving analysis LOS criteria according to *Report 1393-4F.* Note that the two-sided weaving density criteria set by *Report 1393-4F* is reported in metric units: therefore a conversion is noted on the worksheets from English to metric units.

TABLE 2-3
One-Sided and Two-Sided Frontage Road Weaving Analysis LOS Criteria

LOS	One-Sided Weaving Volume (veh/hr)	Two-Sided Weaving Density (veh/km/ln)
Unconstrained (A-B)	< 1500	< 40
Constrained (C-D)	1500 - 3000	40 - 100
Undesirable (E-F)	> 3000	> 100

Source: Procedures to Determine Frontage Road Level of Service and Ramp Spacing 1996, Texas Transportation Institute.

In addition to weaving at various locations, the existing Evangeline Thruway in the core area of the project between Pinhook and Cameron/Mudd, which will operate as the parallel frontage road and is currently three lanes each direction, was analyzed as two lanes each direction. This will provide a lane for parallel parking and/or a turning lane at intersections, which is considered to be compatible with the redeveloped land use that is to be encouraged for the central core area.

2.2.5. Intersection Operations

The procedures in Chapter 16, Signalized Intersections, of the Highway Capacity Manual 2000, TRB, were utilized to determine LOS. Table 2-4 illustrates the Highway Capacity Manual LOS delay criteria for signalized and unsignalized intersections. Highway Capacity Software (HCS 2000), release 4.1d, was used in the evaluation process.

TABLE 2-4
Intersection LOS Criteria

LOS	Signalized Intersections Control Delay Per Vehicle (s/veh)	Unsignalized Intersections Average Control Delay Per Vehicle (s/veh)
A	≤ 10	0 - 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

Source: Highway Capacity Manual 2000, Transportation Research Board.

2.3. Traffic Operational Analysis Results

A general traffic study was performed for the I-49 Connector mainline during the environmental phase of the project. Based on this preliminary study it was determined that the mainline operations would require a minimum of three basic lanes in each direction for the entire length of the project to accommodate projected traffic demand. In addition, interchange locations and configurations were conceptually identified in the environmental phase. A schematic of the study corridor of the I-49 Connector Selected Alternative is shown on Figure 2-1 and the ramp merge, diverge, and weaving areas have been identified. The LOS resulting from the overall mainline operational analysis for the various mainline segments are also illustrated on Figure 2-1.

The intent of this Operations Analysis Technical Memorandum is to verify and refine the geometry produced during the environmental studies. Preliminary lane geometry has been established for each ramp, weaving section, intersection, and frontage road segment. The initial operational analysis was used to determine whether more or fewer lanes are required at a particular location or special design considerations may need to be incorporated during the more detailed geometric design. Figure 2-4 and 2-5 present the ultimate recommended lane geometry based on the studies.

2.3.1. Mainline Analysis

Figure 2-1 shows the locations and results of the mainline LOS analysis for the various freeway segments. The locations were arbitrarily chosen throughout the corridor where the basic number of lanes are normal (i.e. do not include auxiliary lanes for weaving sections). The analysis shows that three basic lanes each direction on the I-49 Connector is sufficient. The HCS worksheets prepared during the analysis are presented in Appendix A.

2.3.2. Ramp Merge/Diverge Analysis

The ramp merge/diverge locations evaluated during the operational analysis are labeled on Figure 2-1. The LOS determined from the ramp merge/diverge operational analysis are graphically shown on Figure 2-1 and reported in Table 2-5. The table has the northbound merge/diverge ramps and the southbound merge/diverge ramps organized separately. For more detailed information concerning each individual ramp merge/diverge analysis refer to Appendix B (I-49 Northbound) and Appendix C (I-49 Southbound) for the analysis worksheets for each ramp. Information gathered (i.e. design speed and proposed grades) for these worksheets was obtained from the I-49 Connector Environmental Impact Statement (EIS) dated August 2002 and the EIS supplemental study, dated October 2001, addressing geometric design issues regarding the proposed MPO Subalternative.

TABLE 2-5
Ramp Merge/Diverge LOS Analysis
(I-49 Northbound and Southbound, Year 2030)

ID No.	Description		Design Year 2030 (LOS)
I-49 Northbound			
ND-1	Exit to	Kaliste Saloom	B
ND-2	Exit to	University/Surrey	B
NM-1	Entrance From	Kaliste Saloom	B
NM-2	Entrance From	University/Surrey	B
ND-3	Exit to	Johnston/Louisiana	B
ND-4	Exit to	2nd/3rd	B
NM-3	Entrance From	Johnston/Louisiana	C
I-49 Southbound			
SD-3	Exit to	Johnston/Louisiana	C
SM-3	Entrance From	2nd/3rd	B
SM-4	Entrance From	Johnston/Louisiana	B
SD-4	Exit to	University/Surrey	C
SD-5	Exit to	Kaliste Saloom	C
SM-5	Entrance From	University/Surrey	B
SM-6	Entrance From	Kaliste Saloom	B

Notes:
ND *Northbound Diverge*
NM *Northbound Merge*
SD *Southbound Diverge*
SM *Southbound Merge*

2.3.3. Mainline Weaving Analysis

A summary of the freeway weaving analysis LOS results is shown in Table 2-6 below. Refer to Figure 2-1 for a graphical representation of the LOS determined for each weaving section. In addition, the weaving segment worksheets which contain more detailed information concerning the analysis can be found in Appendices B and C, I-49 Northbound and Southbound respectively.

TABLE 2-6
Freeway Weaving LOS Analysis
(I-49 Northbound and Southbound, Year 2030)

ID No.	Description	Design Year 2030 (LOS)
NW-1	Between Entrance from 2nd/3rd and Exit to Willow	C
NW-2	Between Entrance from Willow and Exit to I-10 Eastbound	C
SW-1	Between Entrance from I-10 Eastbound and Exit to Willow	C
SW-2	Between Entrance from Willow and Exit to 2nd/3rd	C

Notes:
NW Northbound Weave
SW Southbound Weave

The weaving analysis relied on weaving distances taken from the concept layouts in the EIS. Given the uncertainty of actual weaving distances because of the lack of detailed design information at this time, additional computations were performed that determined the absolute minimum distances that will be needed to provide the lowest LOS C. These minimum distances should be met by the designer during the detailed geometric design phase.

2.3.4. Frontage Road Operational Analysis

The weaving segments analyzed for the frontage road operations are identified in Figure 2-2. A summary of the analysis results is shown in Table 2-7. The frontage road operations analysis worksheets which were used during the analysis process are contained in Appendix D. Similar to the mainline weaving sections, the actual weaving distances are not precisely known because of the lack of detailed design information at this time. The results of the calculations give parameters for weaving lengths that the designer should bear in mind during the detailed geometric design phase. It is noted that the weaving lengths shown in the calculations and anticipated for the I-49 Connector project are above the 350' minimum value that DOTD has used on other freeway projects with slip ramps to one-way frontage roads in advance of cross street intersections.

TABLE 2-7
Frontage Road Weaving LOS Analysis
(Year 2030)

ID No.	Description	Design Year 2030
I-49 Northbound		
NFR-1	One-Sided, Near Kaliste Saloom	Unconstrained (A-B)
NFR-2	Two-Sided, Near University/Surrey	Unconstrained (A-B)
NFR-3	Two-Sided, Near Willow	Constrained (C-D)
I-49 Southbound		
SFR-1	Two-Sided, Near Willow	Constrained (C-D)
SFR-2	Two-Sided, Near University/Surrey	Unconstrained (A-B)
SFR-3	One-Sided, Near Kaliste Saloom	Unconstrained (A-B)

2.3.5. Intersection Operational Analysis

The intersections within the corridor that were evaluated for the operational analysis are identified in Figure 2-3, each with an identification number. The results from HCM software of the LOS computations for design year 2030 are shown in Table 2-8 for each intersection. The LOS computations should be considered to represent the minimal LOS expected given the volume and geometric conditions presented. Tweaking the timings and coordination during the actual operational phase may in fact result in higher performance. All intersections are predicted to operate at LOS D or better in the design year, with the exceptions noted below.

S-18, Garfield @ 2nd/3rd – LOS E (p.m.) due to high through volumes on 2nd/3rd. May consider modifying eastbound left-only lane to left-through lane. This intersection is outside the limits of construction of the I-49 Connector project.

U-19, Buchanan @ 3rd – LOS F (p.m.) for Buchanan Street stop approaches due to high through volumes on 3rd. May consider a signal at this location.

U-20, Cypress @ 3rd – LOS F (a.m. and p.m.) for Cypress Street stop approaches due to high through volumes on 3rd. May consider a signal at this location.

U-24, Cypress @ 2nd – LOS F (a.m. and p.m.) for Cypress Street stop approach due to high through volumes on 2rd. May consider a signal at this location.

Back of queues were evaluated to guide the development of the geometric design. HCS 95% criteria was used and the results are summarized within Table 2-9. Each intersection is to be evaluated and storage lengths are to be determined on an intersection by intersection basis.

The intersection analysis has assumed a two lane basic section each direction along the core area portion of the existing Evangeline Thruway. This has been supplemented by turning lanes as appropriate at intersections. This design concept allows width (utilizing existing pavement) for one parking lane throughout the corridor, which is compatible with the intended land use for this area.

Special consideration was given in reviewing the single point interchanges at Johnston Street and 2nd/3rd Street. SPIs are utilized at these locations primarily because of the following reasons: 1) no through traffic on the frontage road system; 2) limited right of way between the railroad and the existing Evangeline Thruway; 3) anticipated high volume turning movements between the CBD area and the I-49 Connector freeway (less proportion of through traffic); and 4) no conflicting pedestrian movements through the SPI (pedestrians to move east-west at other crossing locations in the corridor).

In researching the SPI for operational performance and design characteristics, two sources of information proved especially valuable. These are NCHRP Report 345, Single Point Urban Interchange Design and Operational Analysis, 1991; and Comparison of the Operational and Safety Characteristics of the Single Point Urban and Diamond Interchanges, published by the Virginia Research Council in December 1996. The information provided in these reports indicates that the SPI is an appropriate design for these two interchanges, given all of the considerations in play at these locations. The Virginia Research Council report, based on a study of nine SPI and eight diamond interchanges, is especially informative in its concise presentation of the study results. These are reproduced for information in this traffic study as Appendix F.

Perhaps the most important consideration in successful performance of the SPIs will be the ability to closely coordinate the SPI signals with the Johnston and 2nd/3rd signals at the Evangeline Thruway immediately to the east. Given their close proximity to the SPI intersections, if the Evangeline Thruway signals are not coordinated properly, they have the potential to detrimentally impact right turning traffic from the northbound exit ramps to the eastbound crossing streets, backing this traffic onto the exit ramp. Also, if eastbound queues on the two crossing streets at the Evangeline Thruway are not emptied at the end of a crossing street green, there may not be enough receiving area for ramp traffic from the SPI. The potential for problems is reduced, however, given that the northbound to eastbound turning movements for the SPIs are predicted to be low volume.

TABLE 2-8
Intersection/Interchange LOS Analysis
(Year 2030)

ID No.	Cross Streets*		Design Year 2030	
			AM	PM
S-1 a	Kaliste Saloom	@ Hugh Wallis	B	B
S-2 a	University	@ SB Evangeline Thrwy	B	B
S-2 b	Surrey	@ NB Evangeline Thrwy	C	D
S-3 a	W Pinhook	@ SB Evangeline Thrwy	C	C
S-3 b	E Pinhook	@ NB Evangeline Thrwy	C	C
S-4	14th	@ SB Evangeline Thrwy	B	C
S-5	14th	@ NB Evangeline Thrwy	B	C
S-9	Johnston/US 167	@ Cypress/Garfield	C	C
S-10 a	Johnston/US 167	@ I-49 Ramps (SPI)	C	D
S-10	Johnston/US 167	@ SB Evangeline Thrwy	B	C
S-11	Louisiana	@ NB Evangeline Thrwy	C	C
S-15	Jefferson	@ Cypress	B	C
S-16	Jefferson	@ SB Evangeline Thrwy	B	C
S-17	Jefferson	@ NB Evangeline Thrwy	B	B
S-18	Congress/2nd/3rd	@ Garfield	D	E
U-19	3rd	@ Buchanan	C	F
U-20	3rd	@ Cypress	F	F
S-20 a	2nd/3rd	@ I-49 Ramps (SPI)	D	D
S-21	2nd/3rd	@ SB Evangeline Thrwy	C	C
S-22	2nd/3rd	@ NB Evangeline Thrwy	C	C
S-23	2nd/3rd	@ Simcoe	B	B
U-24	2nd	@ Cypress/Buchanan	F	F
S-29	Simcoe	@ Evangeline Thrwy	C	D
S-30	Cameron/US 90	@ SB Evangeline Thrwy	C	C
S-31	Mudd	@ NB Evangeline Thrwy	C	C
S-32	Donlon	@ SB Evangeline Thrwy	B	B
S-33	Donlon	@ NB Evangeline Thrwy	B	B
S-34	W Willow	@ SB Evangeline Thrwy	C	C
S-35	E Willow	@ NB Evangeline Thrwy	C	C
S-36 a	Martin Luther King	@ SB Evangeline Thrwy	C	C
S-36	Castille	@ NB Evangeline Thrwy	C	C

**Notes:*
NB Northbound, S Signalized SPI Single Point Interchange
SB Southbound, U Unsignalized

TABLE 2-9
Intersection/Interchange BOQ Analysis
(Year 2030)

ID No.		Cross Streets*		Design Year 2030											
				EB			WB			NB			SB		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
S-1	a	Kaliste Saloom	@ Hugh Wallis	0	0	0	207.5	0	47.5	0	662.5	132.5	22.5	452.5	0
S-2	a	University	@ SB Evangeline Thrwy	0	110	80	285	255	0	0	0	0	47.5	202.5	2.5
S-2	b	Surrey	@ NB Evangeline Thrwy	75	115	0	0	102.5	1387.5	197.5	560	332.5	0	0	0
S-3	a	W Pinhook	@ SB Evangeline Thrwy	0	267.5	42.5	495	212.5	0	0	0	0	72.5	77.5	137.5
S-3	b	E Pinhook	@ NB Evangeline Thrwy	247.5	252.5	0	0	425	0	37.5	107.5	137.5	0	0	0
S-4		14th	@ SB Evangeline Thrwy	0	165	0	0	537.5	0	0	0	0	0	147.5	7.5
S-5		14th	@ NB Evangeline Thrwy	375	55	0	0	167.5	0	0	212.5	0	0	0	0
S-8		Johnston/US 167	@ Stewart	0	765	0	0	180	0	0	135	0	0	257.5	0
S-9		Johnston/US 167	@ Cypress/Garfield	12.5	222.5	0	307.5	265	0	12.5	410	0	82.5	247.5	0
S-10	a	Johnston/US 167	@ I-49 Ramps (SPI)	647.5	287.5	47.5	102.5	237.5	27.5	42.5	0	70	85	0	212.5
S-10		Johnston/US 167	@ SB Evangeline Thrwy	0	332.5	45	87.5	232.5	0	0	0	0	20	130	15
S-11		Louisiana	@ NB Evangeline Thrwy	42.5	407.5	0	0	322.5	0	0	232.5	140	0	0	0
S-15		Jefferson	@ Cypress	0	680	0	0	35	0	0	40	0	0	222.5	0
S-16		Jefferson	@ SB Evangeline Thrwy	0	327.5	0	100	57.5	0	0	0	0	20	177.5	5
S-17		Jefferson	@ NB Evangeline Thrwy	0	237.5	0	0	105	0	0	150	0	0	0	0
S-18		Congress/2nd/3rd	@ Garfield	262.5	2382.5	0	65	840	0	17.5	212.5	0	107.5	282.5	0
S-20	a	2nd/3rd	@ I-49 Ramps (SPI)	1232.5	455	87.5	205	380	87.5	257.5	0	72.5	50	0	562.5
S-21		2nd/3rd	@ SB Evangeline Thrwy	0	207.5	220	125	245	0	0	0	0	50	105	107.5
S-22		2nd/3rd	@ NB Evangeline Thrwy	140	257.5	0	0	392.5	0	145	247.5	0	0	0	0
S-23		2nd/3rd	@ Simcoe	0	237.5	0	395	155	0	0	0	0	0	0	0
S-29		Simcoe	@ Evangeline Thrwy	332.5	140	110	42.5	602.5	0	40	232.5	0	115	295	130
S-30		Cameron/US 90	@ SB Evangeline Thrwy	0	515	260	117.5	252.5	0	0	0	0	62.5	130	0
S-31		Mudd	@ NB Evangeline Thrwy	415	387.5	0	0	292.5	0	15	165	70	0	0	0
S-32		Donlon	@ SB Evangeline Thrwy	0	55	105	72.5	100	0	0	0	0	32.5	165	62.5
S-33		Donlon	@ NB Evangeline Thrwy	147.5	112.5	0	0	45	197.5	30	197.5	27.5	0	0	0
S-34		W Willow	@ SB Evangeline Thrwy	0	140	327.5	105	237.5	0	0	0	0	370	540	165
S-35		E Willow	@ NB Evangeline Thrwy	400	380	0	0	260	140	370	377.5	285	0	0	0
S-36	a	Martin Luther King	@ SB Evangeline Thrwy	0	95	20	187.5	87.5	0	0	0	0	87.5	200	20
S-36		Castille	@ NB Evangeline Thrwy	125	30	0	0	147.5	142.5	12.5	295	10	0	0	0

2.4 Conclusions

Based on the operational analysis results reported in this TM for the mainline, ramp junctions, weaving areas, frontage roads and intersections, it has been verified that the lane geometry of the proposed project as presented on Figures 2-4 and 2-5 will adequately accommodate the projected design year 2030 traffic for the area. The conclusions and recommendations contained herein, summarized and further described below, will be used to prepare the geometric design during the next phase of the project.

2.4.1 Mainline Segments

According to the results of the mainline analysis it was verified that three (3) basic lanes in each direction are required for all sections of the freeway in order to facilitate LOS C or better. Worksheets for mainline segments are contained in Appendix A and the results of the analysis are graphically shown on Figure 2-1. Also refer to Figure 2-4 for the final recommended mainline lane geometry. Note that the recommendation includes an additional lane each direction through the I-10/I-49 interchange. This is to facilitate the lane geometry of the six lane section of I-49 Connector immediately south of the I-10 ramp connections, to facilitate projected design year mainline traffic in this section, and to assist in weaving operations on the mainline through the cloverleaf interchange.

2.4.2 Ramp Merge/Diverge Areas

The lane configurations for the ramp junctions along the I-49 Connector corridor have also been verified based on the operational analysis. It has been determined that the proposed ramps will accommodate design year 2030 traffic to facilitate LOS C or better. See Table 2-5 for a complete list of the ramp junctions along with the corresponding LOS. Also, refer to Figure 2-1 for a graphical representation of the LOS determined for each. See Figure 2-5 for lane configurations.

From these results, it is concluded that the ramp junction lane configurations assumed prior to the analysis (one lane ramps at the mainline junction as shown on the worksheets in Appendices B and C) are adequate. One reason for this is the parallel frontage road which runs throughout the corridor alongside the freeway facility. Local traffic is able to use both the freeway and the frontage road to access cross streets; therefore, the density at the freeway ramp junctions is not excessive.

2.4.3 Mainline Weaving Areas

The four (4) weaving sections analyzed for the mainline proved to be adequate with one auxiliary lane and one lane ramp junctions. The operational analysis shows that the weaving sections experience LOS C as presented in Table 2-6 and Figure 2-1. Note that the distances used for the length of weaving segments were assumed to be 2500 feet (maximum allowed to be considered weaving analysis) based on the preliminary geometric schematic. It is anticipated that these distances may be modified once the geometric design begins. Due to this issue, each weaving section was analyzed to determine the minimum weaving lengths in which the lowest LOS C can still be achieved. Table 2-10 below shows the results of this supplemental analysis and will be used as a guide for the refined geometric design phase of the project. The HCS worksheets produced for these analyses are also contained in Appendices B and C.

TABLE 2-10
Minimum Freeway Weaving Lengths for LOS C
(I-49 Northbound and Southbound, Year 2030)

ID No.	Description	Min. Weaving Length (LOS C)
NW-1	Between Entrance from 2nd/3rd and Exit to Willow	850'
NW-2	Between Entrance from Willow and Exit to I-10 Eastbound	700'
SW-1	Between Entrance from I-10 Eastbound and Exit to Willow	2350'
SW-2	Between Entrance from Willow and Exit to 2nd/3rd	500'

Notes:
NW Northbound Weave
SW Southbound Weave

2.4.4 Frontage Road Operations

Six (6) weaving segments along the parallel frontage roads were analyzed based on the *Texas Transportation Institute's 1996 Research Report 1393-4F Procedures to Determine Frontage Road Level of Service and Ramp Spacing*, in order to evaluate the initial configuration of the frontage road at crucial areas. Both one sided and two sided weaving segments were analyzed and the results of the study are posted in Table 2-7 and graphically shown in Figure 2-2. The worksheets which show the calculations and procedures for each segment are contained in Appendix D.

One sided weaving segments involve a section of frontage road that has both an entrance ramp and an exit ramp from the same side of the roadway. The distance between the two ramps is not as influential as the volume of traffic on the two ramps accessing the frontage road. The two (2) one sided weaving segments within the corridor proved to be unconstrained (equivalent to LOS A-B) based on the analysis and therefore will adequately accommodate the projected design year 2030 traffic volumes.

Two sided weaving segments involve a section of frontage road that contains an entrance ramp in close proximity to an intersection or location where traffic is allowed to turn off the main roadway in either direction. Three major factors influencing the level of service for two sided frontage road weaving sections include: 1) the spacing between the entrance ramp junction and the approach of an intersection, 2) the projected traffic volumes on the frontage road and the entrance ramp, and 3) the type of lane configuration on the frontage road. Note that the percent weaving for all frontage road two sided segments was assumed to be 50% or more for a conservative estimate and to

provide a basis for comparison. (See worksheets in Appendix D for sketches of the various types of configurations).

It has been determined from the analysis that two (2) two sided weaving segments are unconstrained (LOS A-B) and two (2) segments are constrained (LOS C-D). Segment NFR-3 which resulted in being categorized as constrained is marginally over the limit for unconstrained conditions (calculated as 48.56 veh/km/ln when the limit for unconstrained is 40 veh/km/ln) and thus is moderately constrained. The other segment categorized as constrained, SFR-1, however, is closer to the limit for constrained conditions (calculated as 97.8 veh/km/ln with a limit for constrained at 100 veh/km/ln) and thus is strongly constrained. This is due to the short spacing of the ramp to the intersection and the higher ramp traffic volume compared to the frontage road volumes. Recommendations for improving this level of service would be to provide a third lane (auxiliary) for the frontage road after crossing the Willow Street intersection. This would allow vehicles the option to continue on the same lane from the freeway ramp and not be forced to weave in the small spacing before the interchange. See Figure 2-5 for an illustration of the lane geometry recommended at this intersection and others along the corridor.

2.4.5 Intersection Operations

Twenty nine (29) signalized intersections and three (3) unsignalized intersections throughout the corridor were analyzed for LOS using HCS based on projected design year 2030 traffic volumes. See Table 2-8 for intersection analysis results for the a.m. and p.m. design year 2030 traffic volumes. Also refer to the intersection worksheets in Appendix E for more detailed information including intersection schematic layouts, design hour volumes, and phasing inputs.

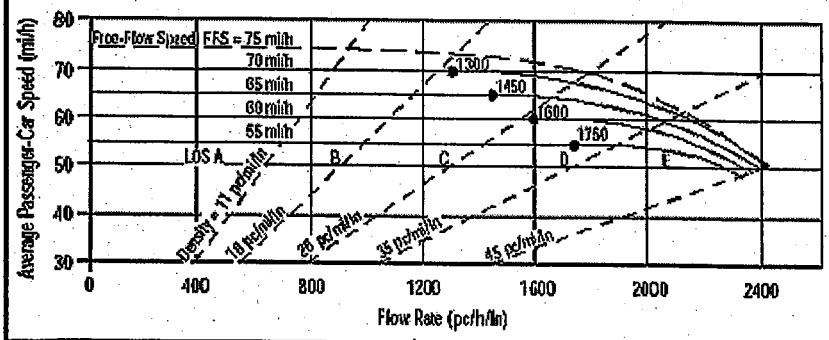
Based on the results of the analysis, the intersections in the corridor should operate at LOS D or better in the design year with the recommended lane geometry (except as noted in Section 2.3.5 for several unsignalized fringe intersections in the CBD area). This includes reducing from three lanes to two lanes that section of the Thruway in the core area, creating space for a parallel parking lane which would be compatible with intended redeveloped land use.

I-49 connector

Appendix A

I-49 Main Line Analysis Worksheets
(Year 2030)

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/16/04
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Northbound
From/To	South to Kaliste Saloom (ML-1)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	2600 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Level
DDHV = AADT x K x D	veh/h	Grade % Length	mi
Driver type adjustment	1.00	Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	3178	pc/h
S	57.0	mi/h
D = v_p / S	18.6	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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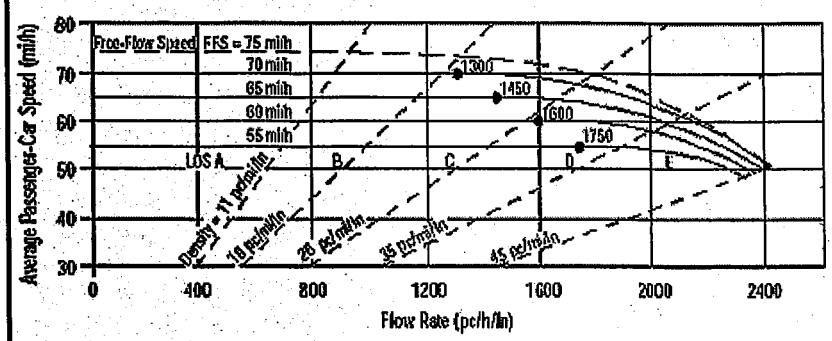
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information / Site Information

General Information		Site Information	
Analyst	ASM	Highway/Direction of Travel	I-49 Connector/Southbound
Agency or Company	HNTB	From/To	South to Kaliste Saloom (ML-1)
Date Performed	11/16/04	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3430 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Level
DDHV = AADT x K x D	veh/h	Grade % Length	mi
Driver type adjustment	1.00	Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs / Calc Speed Adj and FFS

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	12.0	ft	f_{LW}	0.0	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	0.0	mi/h
Interchange Density	0.50	I/mi	f_{ID}	0.0	mi/h
Number of Lanes, N			f_N	3.0	mi/h
FFS (measured)		mi/h	FFS	57.0	mi/h
Base free-flow Speed, BFFS	60.0	mi/h			

LOS and Performance Measures / Design (N)

LOS and Performance Measures		Design (N)		
Operational (LOS)		Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln	Design LOS	C	
		v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	4192	pc/h
S	mi/h	S	57.0	mi/h
D = v_p / S	pc/mi/ln	D = v_p / S	24.5	pc/mi/ln
LOS		Required Number of Lanes, N	3	

Glossary / Factor Location

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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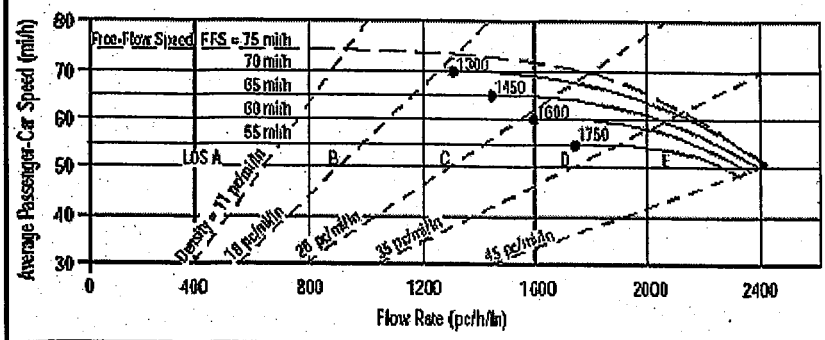

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/16/04
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Northbound
From/To	Kaliste Saloom to Univ (ML-2)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☑ Oper.(LOS) ☑ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	2360 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Level
DDHV = AADT x K x D	veh/h	Grade % Length	mi
Driver type adjustment	1.00	Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	B	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	2884	pc/h
S	57.0	mi/h
D = v_p / S	16.9	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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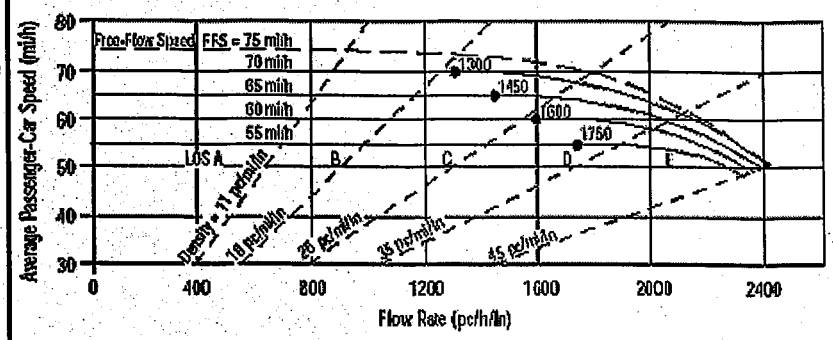

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM	Highway/Direction of Travel	I-49 Connector/Southbound
Agency or Company	HNTB	From/To	Kaliste Saloom to Univ (ML-2)
Date Performed	11/4/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3300 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Level
DDHV = AADT x K x D	veh/h	Grade % Length	mi
Driver type adjustment	1.00	Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	4033	pc/h
S	57.0	mi/h
D = v_p / S	23.6	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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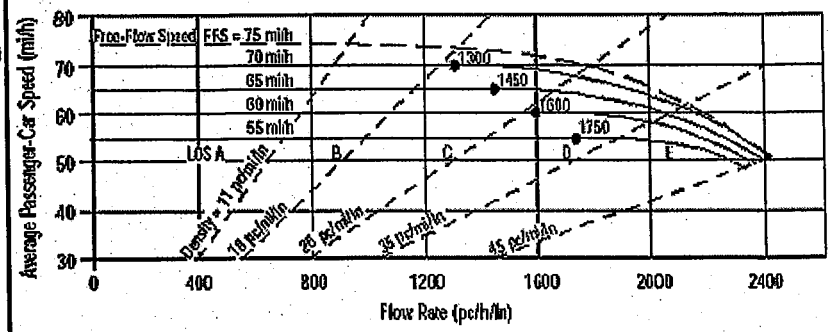
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Northbound
From/To	University to Johnston (ML-3)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3090 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 2.00% Length	0.20mi
Driver type adjustment	1.00	Up/Down %	2.00

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	3777	pc/h
S	57.0	mi/h
D = v_p / S	22.1	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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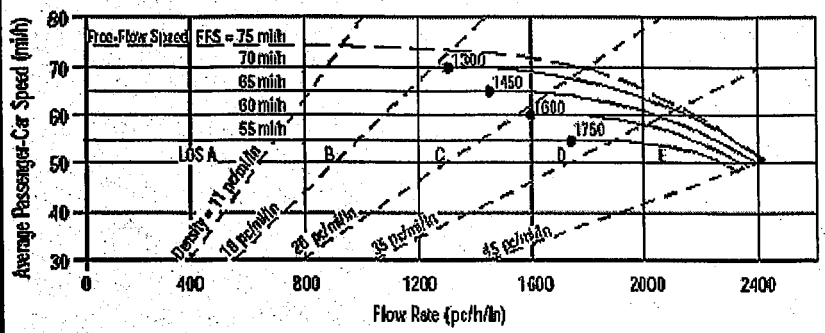

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Southbound
From/To	Johnston to University (ML-3)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☒ Oper.(LOS) ☒ Des.(N) ☒ Planning Data

Flow Inputs

Volume, V	3400 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 3.00% Length	0.20mi
Driver type adjustment	1.00	Up/Down %	3.00

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	4156	pc/h
S	57.0	mi/h
D = v_p / S	24.3	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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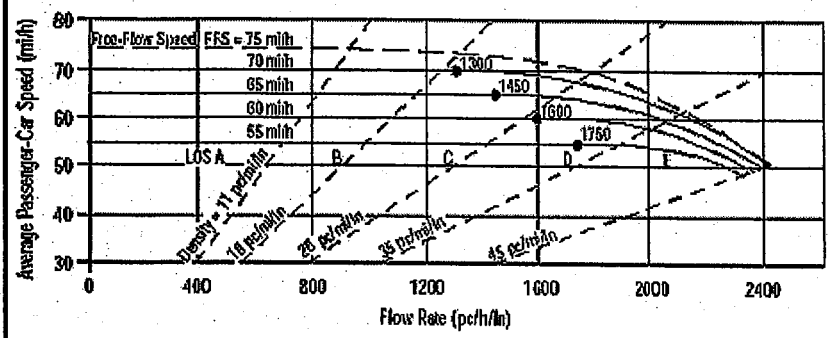

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Northbound
From/To	Johston to Willow (ML-4)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3300 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 2.00% Length	0.20mi
Driver type adjustment	1.00	Up/Down %	2.00

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	4033	pc/h
S	57.0	mi/h
D = v_p / S	23.6	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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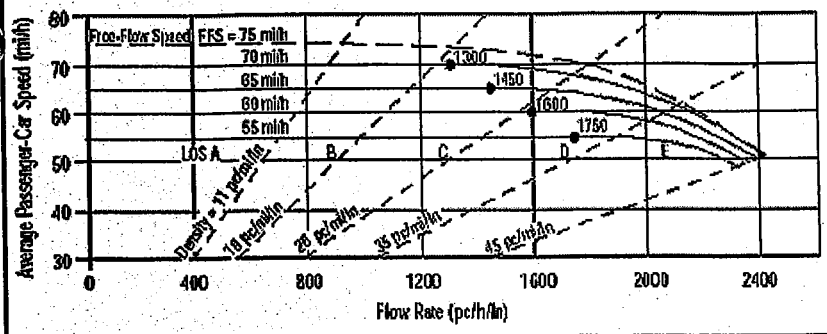

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Southbound
From/To	Johston to Willow (ML-4)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☒ Oper.(LOS) ☒ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3460 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 2.00% Length	0.20mi
Driver type adjustment	1.00	Up/Down %	2.00

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	4229	pc/h
S	57.0	mi/h
D = v_p / S	24.7	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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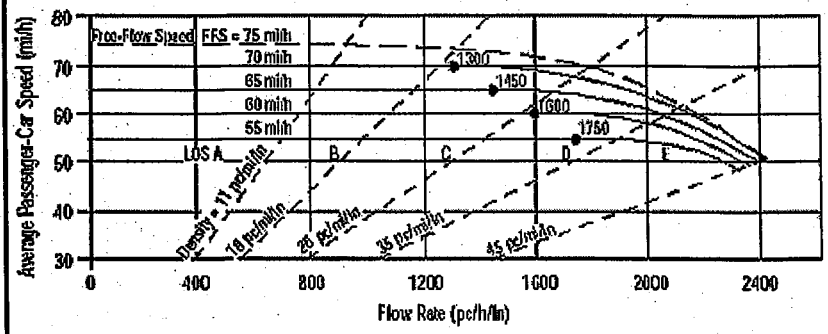

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Northbound
From/To	Congress to Willow (ML-5)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3550 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 0.40% Length	0.45mi
Driver type adjustment	1.00	Up/Down %	0.40

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	4339	pc/h
S	57.0	mi/h
D = v_p / S	25.4	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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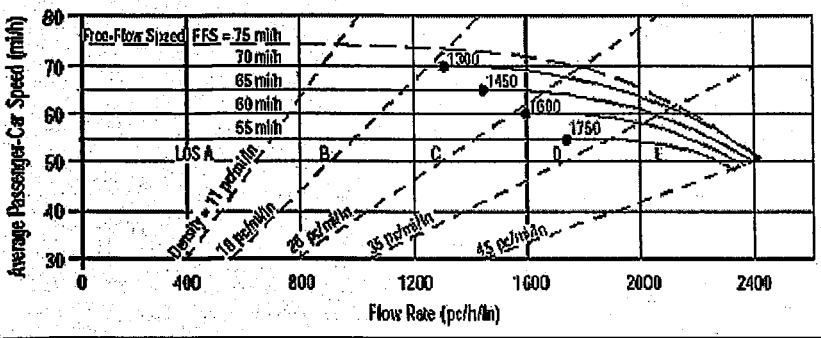

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Southbound
From/To	Willow to Congress (ML-5)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3090 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 0.40% Length	0.45mi
Driver type adjustment	1.00	Up/Down %	0.40

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	3777	pc/h
S	57.0	mi/h
D = v_p / S	22.1	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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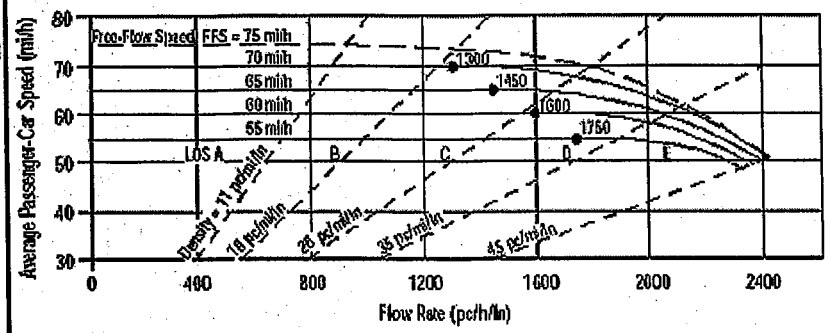

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Northbound
From/To	Willow to I-10 (ML-6)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description I-49 Connector Operational Analysis

☐ Oper.(LOS) ☑ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	3120 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 3.00% Length	0.10mi
Driver type adjustment	1.00	Up/Down %	3.00

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	3813	pc/h
S	57.0	mi/h
D = v_p / S	22.3	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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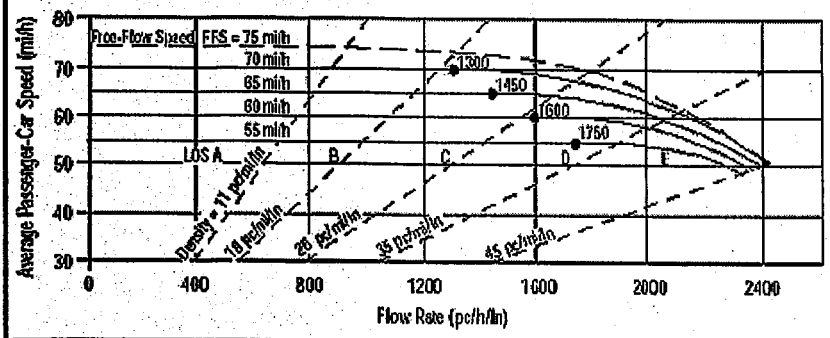

Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	ASM
Agency or Company	HNTB
Date Performed	11/4/2004
Analysis Time Period	

Site Information

Highway/Direction of Travel	I-49 Connector/Southbound
From/To	I-10 to Willow (ML-6)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description – I-49 Connector Operational Analysis

☒ Oper.(LOS) ☒ Des.(N) ☒ Planning Data

Flow Inputs

Volume, V	2890 veh/h	Peak-Hour Factor, PHF	0.90
AADT	veh/day	%Trucks and Buses, P_T	20
Peak-Hr Prop. of AADT, K		%RVs, P_R	0
Peak-Hr Direction Prop, D		General Terrain:	Grade
DDHV = AADT x K x D	veh/h	Grade 3.00% Length	0.10mi
Driver type adjustment	1.00	Up/Down %	3.00

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.909

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	0.50	I/mi
Number of Lanes, N		
FFS (measured)		mi/h
Base free-flow Speed, BFFS	60.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	0.0	mi/h
f_N	3.0	mi/h
FFS	57.0	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mi/h
D = v_p / S	pc/mi/ln
LOS	

Design (N)

Design (N)

Design LOS	C	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	3532	pc/h
S	57.0	mi/h
D = v_p / S	20.7	pc/mi/ln
Required Number of Lanes, N	3	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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I-49 connector

Appendix B

I-49 Northbound Ramp Merge/Diverge/Weave Analysis Worksheets (Year 2030)

RAMP DIVERGE

Ramp Description: I-49 NB Exit to KALISTE SALOOM

ND – 1
Year 2030 p.m.

FACTORS:

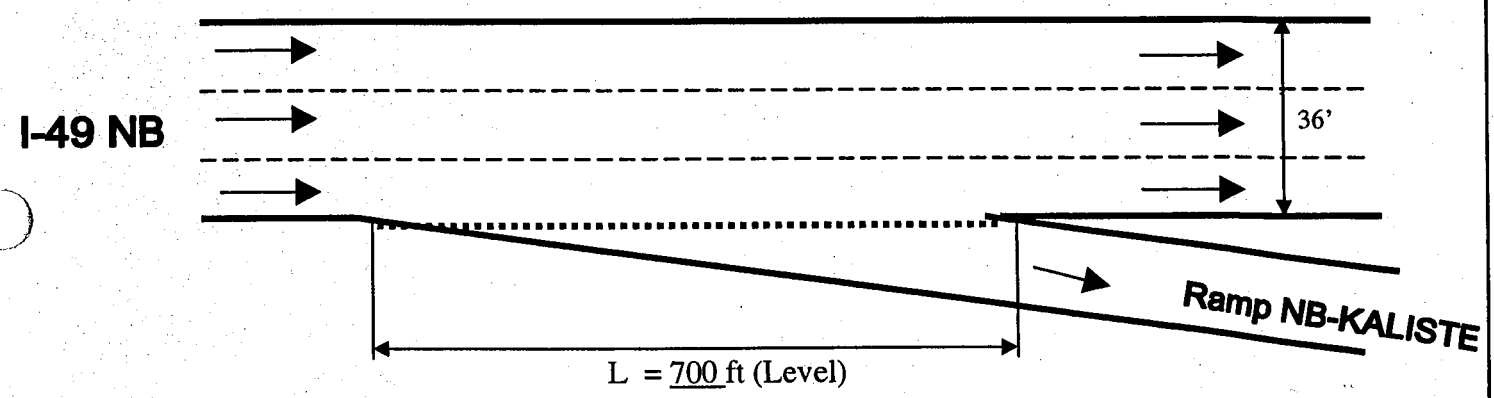
Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = Level

Upstream ramp: Y ( ) or N (●)
Name:_____
On ( ) or Off ( )
Distance to Ramp _____ft
Volume _____ veh/h

Downstream ramp: Y (●) or N ( )
Name: NB-UNIV (ND-2)
On ( ) or Off (●)
Distance to Ramp 3700 ft
Volume 350 veh/h

	p.m.
V_F	2600 vph
% Trucks	20%



	p.m.
V_R	590 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	17.7 pc/mi/ln
RAMP SPEED	52.4 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	I-49 to Kaliste Saloom (ND-1)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Level	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☐ On
☑ No ☐ Off		☐ No ☑ Off
L_{up} = ft		L_{down} = 3700 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 350 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2600	0.90	Level	20	0	0.909	1.00	3178
Ramp	590	0.90	Level	5	0	0.976	1.00	672
UpStream								
DownStream	350	0.90	Level	5	0	0.976	1.00	399

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 25-2 or 25-3)	L_{EQ} =498.76 (Equation 25-8 or 25-9)
P_{FM}= using Equation	P_{FD} =0.650 using Equation 5
V_{12}= pc/h	V_{12} = 2300 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Capacity Checks

	Actual	Maximum	LOS F?
$V_{Fi}=V_F$	3178	6900	No
V_{12}	2300	4400:All	No
$V_{FO} = V_F - V_R$	2506	6900	No
V_R	672	2100	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 17.7 (pc/ mi /ln)

LOS= B (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Speed Estimation

D_s = 0.423 (Exhibit 25-19)

S_R= 52.4 mph (Exhibit 25-19)

S_0= 65.8 mph (Exhibit 25-19)

S = 55.5 mph (Exhibit 25-15)

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RAMP DIVERGE

Ramp Description: I-49 NB Exit to UNIVERSITY/SURREY

ND – 2
Year 2030 p.m.

FACTORS:

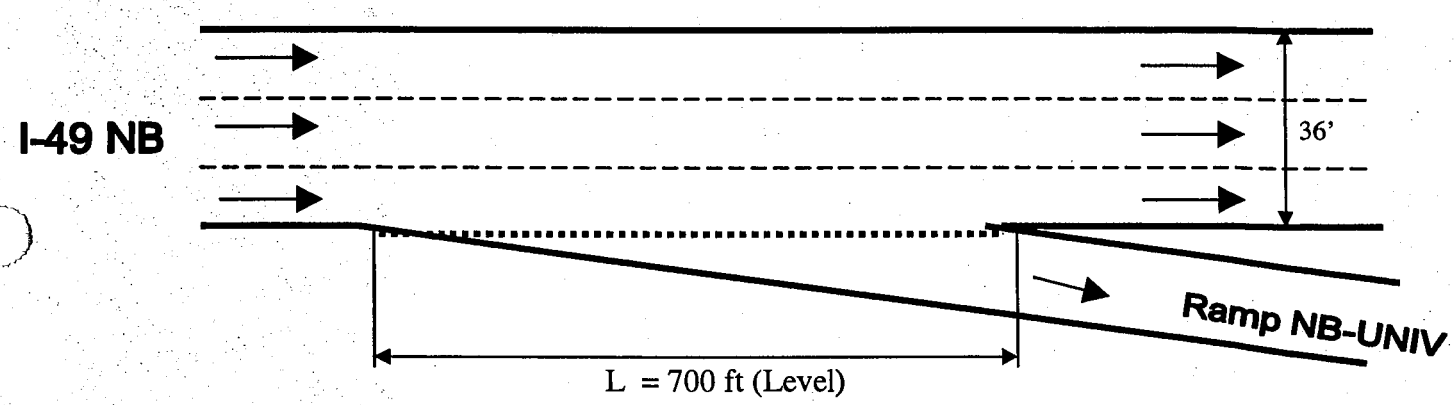
Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = Level

Upstream ramp: Y (●) or N ( )
Name: NB-KALISTE (ND-1)
On ( ) or Off (●)
Distance to Ramp 3700 ft
Volume 590 veh/h

Downstream ramp: Y (●) or N ( )
Name: Kaliste – NB (NM-1)
On (●) or Off ( )
Distance to Ramp 1300 ft
Volume 900 veh/h

	p.m.
V_F	2010 vph
% Trucks	20%



	p.m.
V_R	350 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	13.4 pc/mi/ln
RAMP SPEED	52.8 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	To University/Surrey (ND-2)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Level	Downstream Adj Ramp
☑ Yes ☑ On		☐ Yes ☐ On
☐ No ☑ Off		☑ No ☐ Off
L_{up} = 3700 ft		L_{down} = ft
Vu = 590 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2010	0.90	Level	20	0	0.909	1.00	2457
Ramp	350	0.90	Level	5	0	0.976	1.00	399
UpStream	590	0.90	Level	5	0	0.976	1.00	672
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.680 using Equation 5

V_{12} = 1799 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2457	6900	No
V_{12}	1799	4400:All	No
$V_{FO} = V_F - V_R$	2058	6900	No
V_R	399	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 13.4 (pc/ mi /ln)

LOS= B (Exhibit 25-4)

Speed Estimation

D_s = 0.399 (Exhibit 25-19)

S_R= 52.8 mph (Exhibit 25-19)

S_0= 65.8 mph (Exhibit 25-19)

S = 55.8 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	To University/Surrey (ND-2)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☑ On
☑ No ☐ Off		☐ No ☐ Off
L_{up} = ft		L_{down} = 1300 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 900 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2010	0.90	Level	20	0	0.909	1.00	2457
Ramp	350	0.90	Level	5	0	0.976	1.00	399
UpStream								
DownStream	900	0.90	Grade	5	0	0.976	1.00	1025

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.680 using Equation 5

V_{12} = 1799 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2457	6900	No
V_{12}	1799	4400:All	No
$V_{FO} = V_F - V_R$	2058	6900	No
V_R	399	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 13.4 (pc/ mi /ln)

LOS= B (Exhibit 25-4)

Speed Estimation

D_s = 0.399 (Exhibit 25-19)

S_R= 52.8 mph (Exhibit 25-19)

S_0= 65.8 mph (Exhibit 25-19)

S = 55.8 mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 NB Entrance from KALISTE SALOOM

NM – 1
Year 2030 p.m.

FACTORS:

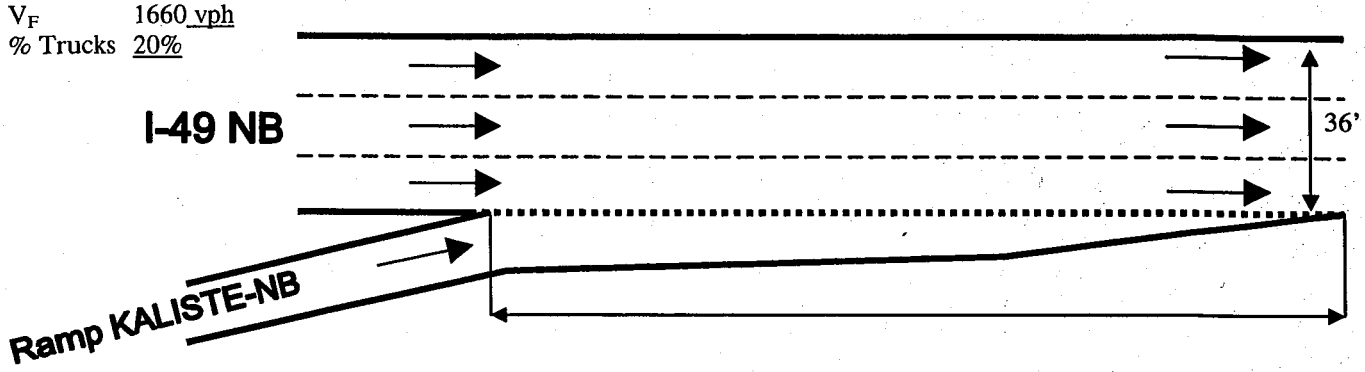
Mainline: Design Speed = 60 mph, Grade = 1.8 %

Ramp: Design Speed = 40 mph, Grade = -4 %

Upstream ramp: Y (●) or N ( )
Name: NB –UNIV (ND-2)
On ( ) or Off (●)
Distance to Ramp 1300 ft
Volume 350 veh/h

Downstream ramp: Y (●) or N ( )
Name: UNIV-NB (NM-2)
On (●) or Off ( )
Distance to Ramp 2400 ft
Volume 730 veh/h

	p.m.
V_F	1660 vph
% Trucks	20%



L = 1200 ft

	p.m.
V_R	700 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	13.5 pc/mi/ln
RAMP SPEED	55 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From Kaliste Saloom (NM-1)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

L_{up} = 1300 ft

Vu = 350 veh/h

Terrain Grade

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	1660	0.90	Grade	20	0	0.909	1.00	2029
Ramp	700	0.90	Grade	5	0	0.976	1.00	797
UpStream	350	0.90	Level	5	0	0.976	1.00	399
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = 827.36 (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 1240 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2826	See Exhibit 25-7	No
V_{R12}	2037	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = 13.5 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.255 (Exibit 25-19)

S_R= 55.4 mph (Exhibit 25-19)

S_0= 59.0 mph (Exhibit 25-19)

S= 56.4 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From Kaliste Saloom (NM-1)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☒ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain Grade

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☒ Yes ☒ On

☐ No ☐ Off

L_{down} = 2400 ft

VD = 730 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	1660	0.90	Grade	20	0	0.909	1.00	2029
Ramp	700	0.90	Grade	5	0	0.976	1.00	797
UpStream								
DownStream	730	0.90	Grade	5	0	0.976	1.00	831

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\ (P_{FM})$$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 1240 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2826	See Exhibit 25-7	No
V_{R12}	2037	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = 13.5 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.255 (Exibit 25-19)

S_R= 55.4 mph (Exhibit 25-19)

S_0= 59.0 mph (Exhibit 25-19)

S= 56.4 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 NB Entrance from UNIVERSITY/SURREY

NM – 2
Year 2030 p.m.

FACTORS:

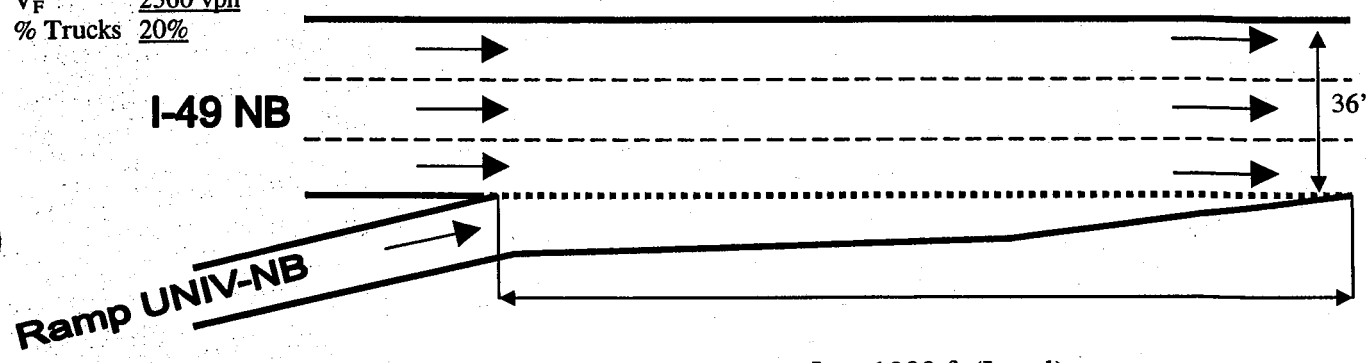
Mainline: Design Speed = 60 mph, Grade = 1%

Ramp: Design Speed = 40 mph, Grade = 1%

Upstream ramp: Y (●) or N ( )
Name: KALISTE-NB (NM-1)
On (●) or Off ( )
Distance to Ramp 2400 ft
Volume 700 veh/h

Downstream ramp: Y ( ) or N (●)
Name:NB-JOHNS (ND-3)
On ( ) or Off (●)
Distance to Ramp 4800 ft
Volume 100 veh/h

	p.m.
V_F	2360 vph
% Trucks	20%



L = 1200 ft (Level)

	p.m.
V_R	730 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	17.8 pc/mi/ln
RAMP SPEED	55 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From University/Surrey (NM-2)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☒ Yes ☒ On		☐ Yes ☐ On
☐ No ☐ Off		☒ No ☐ Off
L_{up} = 2400 ft		L_{down} = ft
Vu = 700 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph	VD = veh/h
	Sketch (show lanes, L_A, L_D, V_R, V_f)	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2360	0.90	Grade	20	0	0.909	1.00	2884
Ramp	730	0.90	Grade	5	0	0.976	1.00	831
UpStream	700	0.90	Grade	5	0	0.976	1.00	797
DownStream								

Estimation of v_{12}

Merge Areas

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 1762 pc/h

Diverge Areas

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3715	See Exhibit 25-7	No
V_{R12}	2593	4600:All	No

	Actual	Maximum	LOS F?
$V_{Fi}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 17.8 (pc/ m/ln)

LOS = B (Exhibit 25-4)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

M_S = 0.277 (Exibit 25-19)

S_R= 55.0 mph (Exhibit 25-19)

S_0= 57.8 mph (Exhibit 25-19)

S= 55.8 mph (Exhibit 25-14)

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From University/Surrey (NM-2)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☐ On
☑ No ☐ Off		☐ No ☑ Off
L_{up} = ft		L_{down} = 4800 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph	VD = 100 veh/h
	Sketch (show lanes, L_A, L_D, V_R, V_f)	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2360	0.90	Grade	20	0	0.909	1.00	2884
Ramp	730	0.90	Grade	5	0	0.976	1.00	831
UpStream								
DownStream	100	0.90	Grade	5	0	0.976	1.00	114

Estimation of v_{12}

Merge Areas

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = 478.99 (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 1762 pc/h

Diverge Areas

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3715	See Exhibit 25-7	No
V_{R12}	2593	4600:All	No

	Actual	Maximum	LOS F?
V_{Fi}=V_F		See Exhibit 25-14	
V_{12}		4400:All	
V_{FO} = V_F - V_R		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R = 17.8 (pc/ m/ln)

LOS = B (Exhibit 25-4)

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

M_S = 0.277 (Exibit 25-19)

S_R= 55.0 mph (Exhibit 25-19)

S_0= 57.8 mph (Exhibit 25-19)

S= 55.8 mph (Exhibit 25-14)

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMP DIVERGE

Ramp Description: I-49 NB Exit to JOHNSTON/LOUISIANA

ND – 3
Year 2030 p.m.

FACTORS:

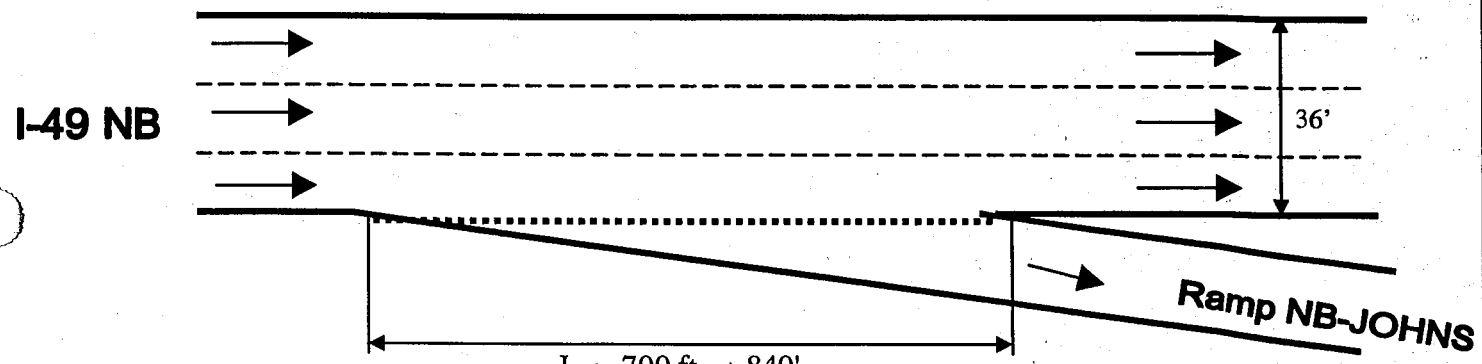
Mainline: Design Speed = 60 mph, Grade = 0.4%, Level

Ramp: Design Speed = 40 mph, Grade = -4.0%

Upstream ramp: Y (•) or N ( )
Name: UNIV-NB (NM-2)
On (•) or Off ( )
Distance to Ramp 4800 ft
Volume 730 veh/h

Downstream ramp: Y (•) or N ( )
Name: NB-2/3 (ND-4)
On ( ) or Off (•)
Distance to Ramp 950 ft
Volume 360 veh/h

	p.m.
V_F	3090 vph
% Trucks	20%



L = 700 ft → 840'
b/c grade 700(1.2) = 840'

	p.m.
V_R	100 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	18.9 pc/mi/ln
RAMP SPEED	53.3 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	To Johnston/Louisiana (ND-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp
☒ Yes ☒ On
☐ No ☐ Off
L_{up} = 4800 ft
Vu = 730 veh/h

Terrain Grade

S_{FF} = 60.0 mph S_{FR} = 40.0 mph
Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☒ No ☐ Off
L_{down} = ft
VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3090	0.90	Level	20	0	0.909	1.00	3777
Ramp	100	0.90	Grade	5	0	0.976	1.00	114
UpStream	730	0.90	Grade	5	0	0.976	1.00	831
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 25-2 or 25-3)
P_{FM}= using Equation
V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$
D_R = (pc/ mi /ln)
LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} =4989.94 (Equation 25-8 or 25-9)
P_{FD} =0.674 using Equation 6
V_{12} = 2584 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3777	6900	No
V_{12}	2584	4400:All	No
$V_{FO} = V_F - V_R$	3663	6900	No
V_R	114	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$
D_R = 18.9 (pc/ mi /ln)
LOS= B (Exhibit 25-4)

Speed Estimation

D_s = 0.373 (Exhibit 25-19)
S_R= 53.3 mph (Exhibit 25-19)
S_0= 65.1 mph (Exhibit 25-19)
S = 56.5 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	To Johnston/Louisiana (ND-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☐ On
☑ No ☐ Off		☐ No ☑ Off
L_{up} = ft		L_{down} = 950 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 360 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3090	0.90	Level	20	0	0.909	1.00	3777
Ramp	100	0.90	Grade	5	0	0.976	1.00	114
UpStream								
DownStream	360	0.90	Grade	5	0	0.976	1.00	410

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 25-2 or 25-3)	L_{EQ} =415.55 (Equation 25-8 or 25-9)
P_{FM}= using Equation	P_{FD} =0.660 using Equation 5
V_{12}= pc/h	V_{12} = 2533 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3777	6900	No
V_{12}	2533	4400:All	No
$V_{FO} = V_F - V_R$	3663	6900	No
V_R	114	2100	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$	$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$
D_R = (pc/ mi /ln)	D_R = 18.5 (pc/ mi /ln)
LOS = (Exhibit 25-4)	LOS= B (Exhibit 25-4)

Speed Estimation	Speed Estimation
M_S = (Exibit 25-19)	D_s = 0.373 (Exhibit 25-19)
S_R= mph (Exhibit 25-19)	S_R= 53.3 mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)	S_0= 64.9 mph (Exhibit 25-19)
S= mph (Exhibit 25-14)	S = 56.6 mph (Exhibit 25-15)

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RAMP DIVERGE

Ramp Description: I-49 NB Exit to $2^{ND}/3^{RD}$

ND – 4
Year 2030 p.m.

FACTORS:

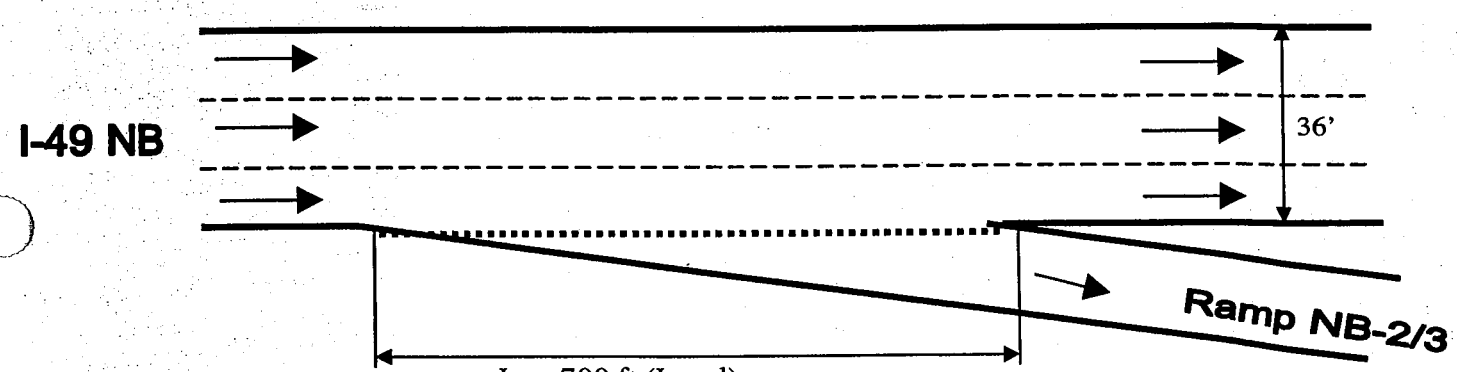
Mainline: Design Speed = 60 mph, Grade = -0.4%, Level

Ramp: Design Speed = 40 mph, Grade = -5.0%

Upstream ramp: Y (●) or N ( )
Name: NB - Johnston (ND-3)
On ( ) or Off (●)
Distance to Ramp 950 ft
Volume 100 veh/h

Downstream ramp: Y (●) or N ( )
Name: Johnston – NB (NM-3)
On ( ) or Off ( )
Distance to Ramp 2250 ft
Volume 710 veh/h

	p.m.
V_F	2990 vph
% Trucks	20%



L = 700 ft (Level)
b/c grade → 700(1.35) ≅ 950 ft

	p.m.
V_R	400 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	17.4 pc/mi/ln
RAMP SPEED	52.7 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	I-49 to 2nd/3rd (ND-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☑ Yes ☑ On		☐ Yes ☐ On
☐ No ☑ Off		☑ No ☐ Off
L_{up} = 1000 ft		L_{down} = ft
Vu = 100 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3100	0.90	Level	20	0	0.909	1.00	3789
Ramp	360	0.90	Grade	5	0	0.976	1.00	410
UpStream	100	0.90	Grade	5	0	0.976	1.00	114
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.646 using Equation 5

V_{12} = 2594 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3789	6900	No
V_{12}	2594	4400:All	No
$V_{FO} = V_F - V_R$	3379	6900	No
V_R	410	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 18.0 (pc/ mi /ln)

LOS= B (Exhibit 25-4)

Speed Estimation

D_s = 0.400 (Exhibit 25-19)

S_R= 52.8 mph (Exhibit 25-19)

S_0= 65.1 mph (Exhibit 25-19)

S = 56.1 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	I-49 to 2nd/3rd (ND-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☑ Yes ☐ On		☐ Yes ☐ On
☐ No ☑ Off		☑ No ☐ Off
L_{up} = 950 ft		L_{down} = ft
Vu = 100 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2990	0.90	Level	20	0	0.909	1.00	3654
Ramp	400	0.90	Grade	5	0	0.976	1.00	456
UpStream	100	0.90	Grade	5	0	0.976	1.00	114
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 25-2 or 25-3)	L_{EQ} = (Equation 25-8 or 25-9)
P_{FM}= using Equation	P_{FD} =0.648 using Equation 5
V_{12}= pc/h	V_{12} = 2527 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3654	6900	No
V_{12}	2527	4400:All	No
$V_{FO} = V_F - V_R$	3198	6900	No
V_R	456	2100	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 17.4 (pc/ mi /ln)

LOS= B (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Speed Estimation

D_s = 0.404 (Exhibit 25-19)

S_R= 52.7 mph (Exhibit 25-19)

S_0= 65.3 mph (Exhibit 25-19)

S = 56.1 mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 NB Entrance from JOHNSTON/LOUISIANA

NM – 3
Year 2030 p.m.

FACTORS:

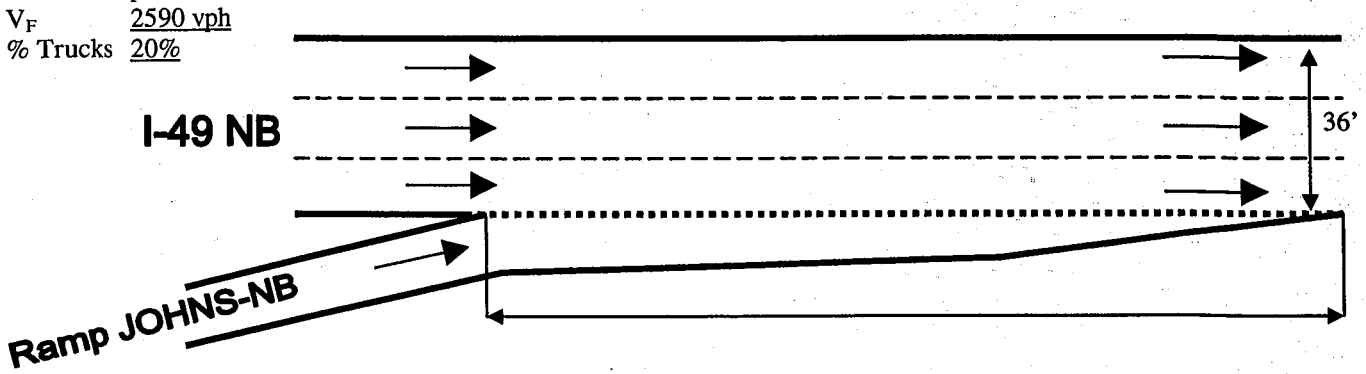
Mainline: Design Speed = 60 mph, Grade = 2.0%

Ramp: Design Speed = 40 mph, Grade = 5.0%

Upstream ramp: Y (●) or N ( )
Name: NB – 2/3 (ND-4)
On ( ) or Off (●)
Distance to Ramp 2250 ft
Volume 360 veh/h

Downstream ramp: Y (●) or N ( )
Name: 2/3-NB (NM-4)
On (●) or Off ( )
Distance to Ramp 1350 ft
Volume 980 veh/h

	p.m.
V_F	2590 vph
% Trucks	20%



	p.m.
V_R	710 vph
% Trucks	5%

L = 1200ft (Level)
b/c grade → 900'(1.5) +300' ≅ 1650'

ANALYSIS:

	p.m.
LOS	C
DENSITY	20.3 pc/mi/ln
RAMP SPEED	54.7 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From Johnston/Louisiana (NM-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☑ Yes ☑ On

☐ No ☑ Off

L_{up} = 2250 ft

Vu = 360 veh/h

Terrain Grade

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2590	0.90	Grade	20	0	0.909	1.00	3166
Ramp	710	0.90	Grade	5	0	0.930	1.00	848
UpStream	360	0.90	Grade	5	0	0.976	1.00	410
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1281.40 (Equation 25-2 or 25-3)

P_{FM}= 0.624 using Equation 1

V_{12}= 1975 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4014	See Exhibit 25-7	No
V_{R12}	2823	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 16.8 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.255 (Exibit 25-19)

S_R= 55.4 mph (Exhibit 25-19)

S_0= 57.5 mph (Exhibit 25-19)

S= 56.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From Johnston/Louisiana (NM-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain Grade

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

L_{down} = 1350 ft

VD = 980 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2590	0.90	Grade	20	0	0.909	1.00	3166
Ramp	710	0.90	Grade	5	0	0.930	1.00	848
UpStream								
DownStream	980	0.90	Grade	5	0	0.976	1.00	1116

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = 3900.05 (Equation 25-2 or 25-3)

P_{FM}= 0.766 using Equation 3

V_{12}= 2425 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4014	See Exhibit 25-7	No
V_{R12}	3273	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R = 20.3 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.292 (Exibit 25-19)

S_R= 54.7 mph (Exhibit 25-19)

S_0= 59.1 mph (Exhibit 25-19)

S= 55.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 NB Entrance from 2ND/3RD

NM – 4
Year 2030 p.m.

FACTORS:

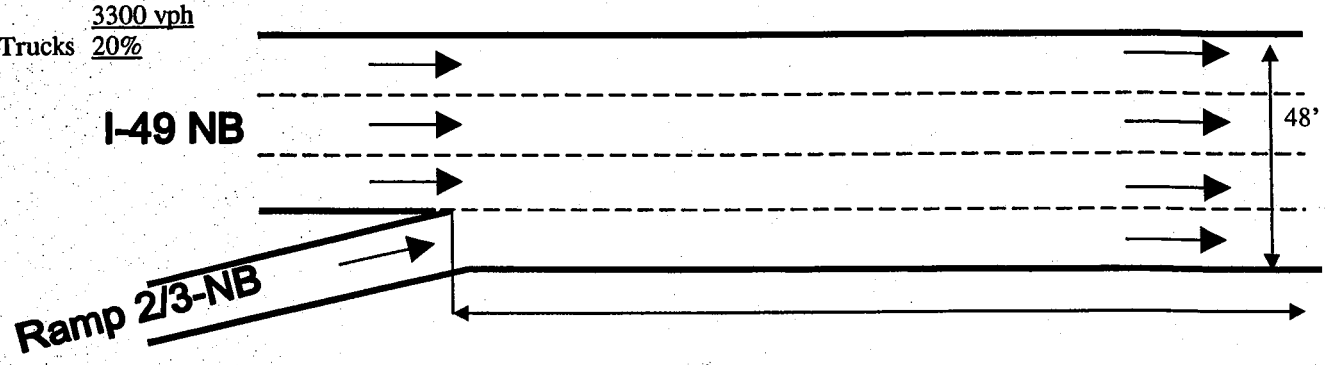
Mainline: Design Speed = 60 mph, Grade = -0.4%

Ramp: Design Speed = 40 mph, Grade = +5.0%

Upstream ramp: Y (•) or N ( )
Name: JOHNS-NB (NM-3)
On (•) or Off ( )
Distance to Ramp 1700 ft
Volume 710 veh/h

Downstream ramp: Y (•) or N ( )
Name: NB-WILLOW (ND-5)
On ( ) or Off (•)
Distance to Ramp 3000 ft
Volume 730 veh/h

	p.m.
V_F	3300 vph
% Trucks	20%



L = 3000' Auxiliary Lane

	p.m.
V_R	980 vph
% Trucks	5%

ANALYSIS:

	p.m.
LOS	B
DENSITY	16.0 pc/mi/ln
RAMP SPEED	55 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From 2nd/3rd (NM-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☒ Yes ☒ On

☐ No ☐ Off

L_{up} = 1700 ft

Vu = 710 veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☒ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	3300	0.90	Level	20	0	0.909	1.00	4033
Ramp	980	0.90	Grade	5	0	0.976	1.00	1116
UpStream	710	0.90	Grade	5	0	0.930	1.00	848
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\ (P_{FM})$$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.661 using Equation 1

V_{12}= 2668 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	5149	See Exhibit 25-7	No
V_{R12}	3784	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = 15.7 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.253 (Exibit 25-19)

S_R= 55.5 mph (Exhibit 25-19)

S_0= 56.9 mph (Exhibit 25-19)

S= 55.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Northbound
Agency or Company	HNTB	Junction	From 2nd/3rd (NM-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

L_{down} = 3000 ft

V_D = 730 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3300	0.90	Level	20	0	0.909	1.00	4033
Ramp	980	0.90	Grade	5	0	0.976	1.00	1116
UpStream								
DownStream	730	0.90	Grade	5	0	0.976	1.00	831

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1929.87 (Equation 25-2 or 25-3)

P_{FM}= 0.661 using Equation 1

V_{12}= 2668 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	5149	See Exhibit 25-7	No
V_{R12}	3784	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 15.7 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.253 (Exibit 25-19)

S_R= 55.5 mph (Exhibit 25-19)

S_0= 56.9 mph (Exhibit 25-19)

S= 55.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMP DIVERGE

Ramp Description: I-49 NB Exit to WILLOW

ND – 5
Year 2030 p.m.

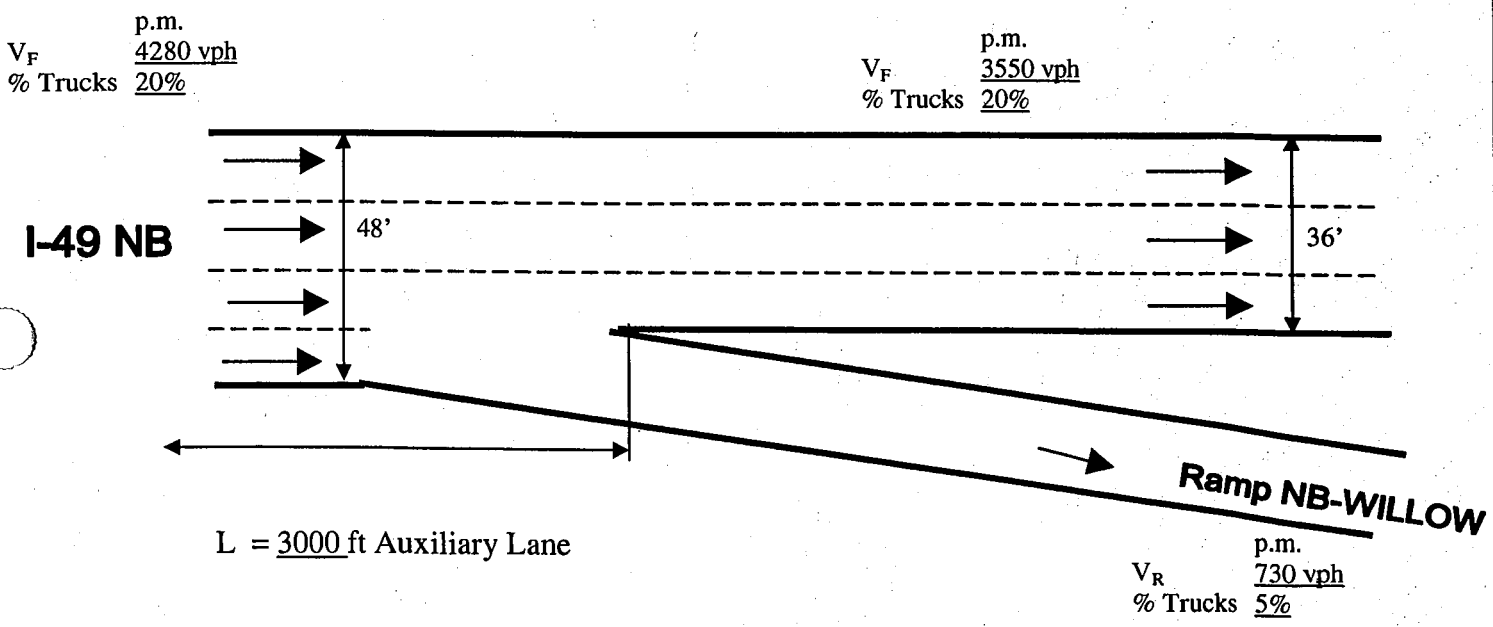
FACTORS:

Mainline: Design Speed = 60 mph, Grade = +0.4% - Level

Ramp: Design Speed = 40 mph, Grade = -4.0%

Upstream ramp: Y (●) or N ( )
Name: 2/3-NB (NM-4)
On (●) or Off ( )
Distance to Ramp 3000 ft
Volume 980 veh/h

Downstream ramp: Y (●) or N ( )
Name: WILLOW-NB (NM-5)
On (●) or Off ( )
Distance to Ramp 3000 ft
Volume 470 veh/h



ANALYSIS:

	p.m.
LOS	B
DENSITY	12.3 pc/mi/ln
RAMP SPEED	52.1 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	I-49 to Willow (ND-5)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☑ Yes ☑ On		☐ Yes ☐ On
☐ No ☐ Off		☑ No ☐ Off
L_{up} = 3000 ft		L_{down} = ft
Vu = 980 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	4280	0.90	Level	20	0	0.909	1.00	5231
Ramp	730	0.90	Grade	5	0	0.976	1.00	831
UpStream	980	0.90	Grade	5	0	0.976	1.00	1116
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =4385.60 (Equation 25-8 or 25-9)

P_{FD} =0.738 using Equation 6

V_{12} = 4077 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	5231	6900	No
V_{12}	4077	4400:All	No
$V_{FO} = V_F - V_R$	4400	6900	No
V_R	831	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 12.3 (pc/ mi /ln)

LOS= B (Exhibit 25-4)

Speed Estimation

D_s = 0.438 (Exhibit 25-19)

S_R= 52.1 mph (Exhibit 25-19)

S_0= 65.2 mph (Exhibit 25-19)

S = 54.5 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Northbound
Agency or Company	HNTB	Junction	I-49 to Willow (ND-5)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030
Project Description	I-49 Connector Operational Analysis		

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☑ On
☑ No ☐ Off		☐ No ☐ Off
L_{up} = ft		L_{down} = 3000 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 470 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	4280	0.90	Level	20	0	0.909	1.00	5231
Ramp	730	0.90	Grade	5	0	0.976	1.00	831
UpStream								
DownStream	470	0.90	Grade	5	0	0.976	1.00	535

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.591 using Equation 5

V_{12} = 3431 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	5231	6900	No
V_{12}	3431	4400:All	No
$V_{FO} = V_F - V_R$	4400	6900	No
V_R	831	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 6.8 (pc/ mi /ln)

LOS= A (Exhibit 25-4)

Speed Estimation

D_s = 0.438 (Exhibit 25-19)

S_R= 52.1 mph (Exhibit 25-19)

S_0= 62.7 mph (Exhibit 25-19)

S = 55.3 mph (Exhibit 25-15)

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WEAVING SECTION

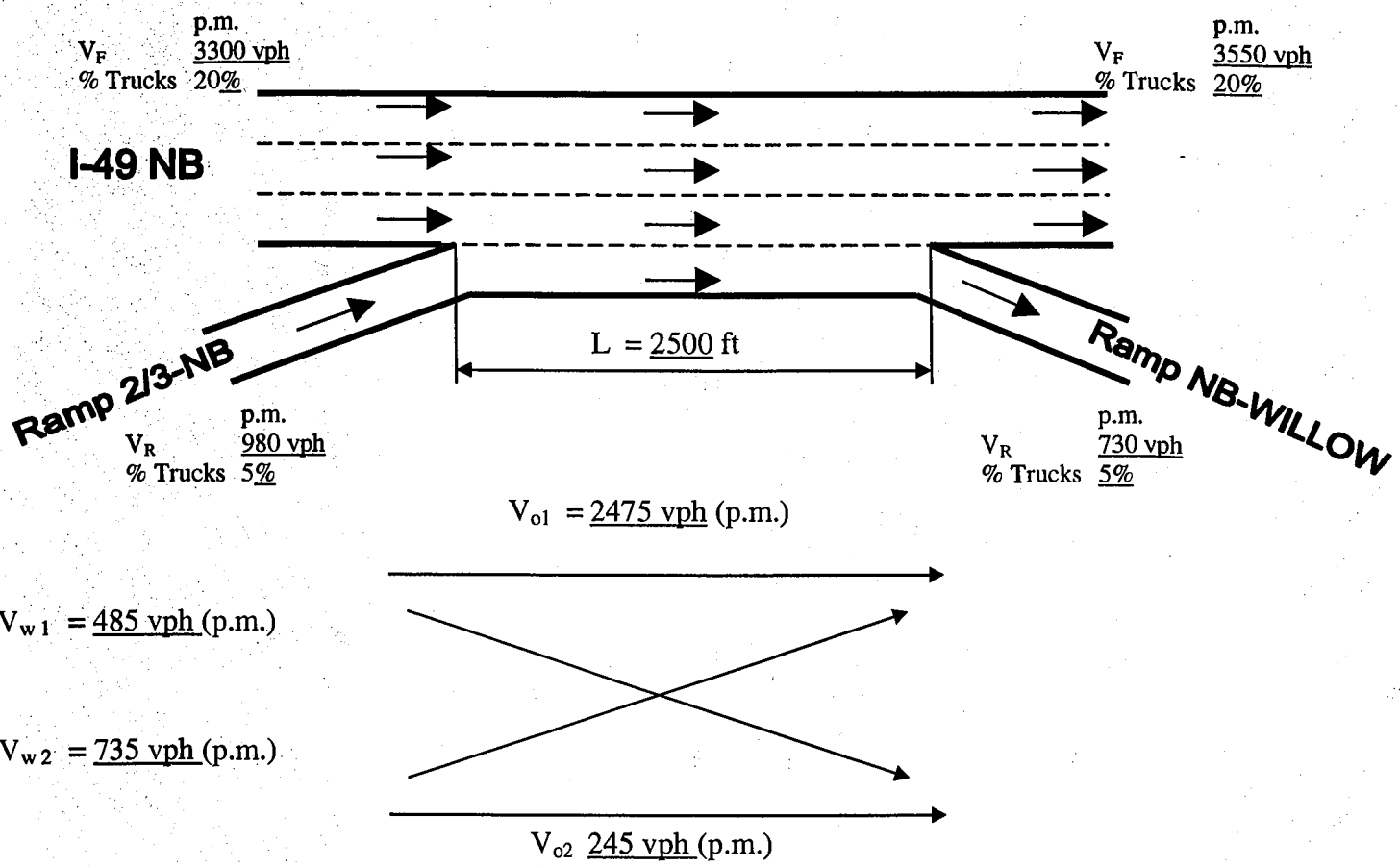
Location: Between NM-4 (Entrance from $2^{ND}/3^{RD}$) &
ND-5 (Exit to WILLOW)

NW – 1
Year 2030 p.m.

FACTORS:

Mainline: Design Speed = 60 mph, Grade = 0.4% (Level)

Ramp: Design Speed = 40 mph, Grade = +5.0%, -4.0%



ANALYSIS:

	p.m.
LOS	C
WEAVING DENSITY	23.18 pc/mi/ln
WEAVING SPEED	50.6 mph

COMMENTS:
Lowest LOS C requires minimum 850' weaving section.

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ASM
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Northbound
Weaving Seg Location	2nd/3rd to Willow (NW-1)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.30
Weaving seg length, L (ft)	2500	Weaving ratio, R	0.40
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
Vo1	2475	0.90	20	0	1.5	1.2	0.909	1.00	3024
Vo2	245	0.90	5	0	1.5	1.2	0.976	1.00	279
Vw1	485	0.90	5	0	1.5	1.2	0.976	1.00	552
Vw2	735	0.90	5	0	1.5	1.2	0.976	1.00	837
Vw				1389	Vnw				3303
V									4692

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.15	0.00
b (Exhibit 24-6)			4.00	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			1.12	0.16
Weaving and non-weaving speeds, Si (mi/h)			38.54	58.25

Number of lanes required for unconstrained operation, Nw 1.68
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	50.59
Weaving segment density, D (pc/mi/ln)	23.18
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	7738
Capacity as a 15-minute flow rate, c (veh/h)	7035
Capacity as a full-hour volume, c_h (veh/h)	6331

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Northbound
Weaving Seg Location	2nd/3rd to Willow (NW-1)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.30
Weaving seg length, L (ft)	850	Weaving ratio, R	0.40
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	fHV	fp	v
Vo1	2475	0.90	20	0	1.5	1.2	0.909	1.00	3024
Vo2	245	0.90	5	0	1.5	1.2	0.976	1.00	279
Vw1	485	0.90	5	0	1.5	1.2	0.976	1.00	552
Vw2	735	0.90	5	0	1.5	1.2	0.976	1.00	837
Vw				1389	Vnw				3303
V									4692

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.15	0.00
b (Exhibit 24-6)			4.00	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			2.66	0.35
Weaving and non-weaving speeds, Si (mi/h)			28.65	52.03

Number of lanes required for unconstrained operation, Nw 1.45
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	41.90
Weaving segment density, D (pc/mi/ln)	27.99
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	6488
Capacity as a 15-minute flow rate, c (veh/h)	5898
Capacity as a full-hour volume, c_h (veh/h)	5308

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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WEAVING SECTION

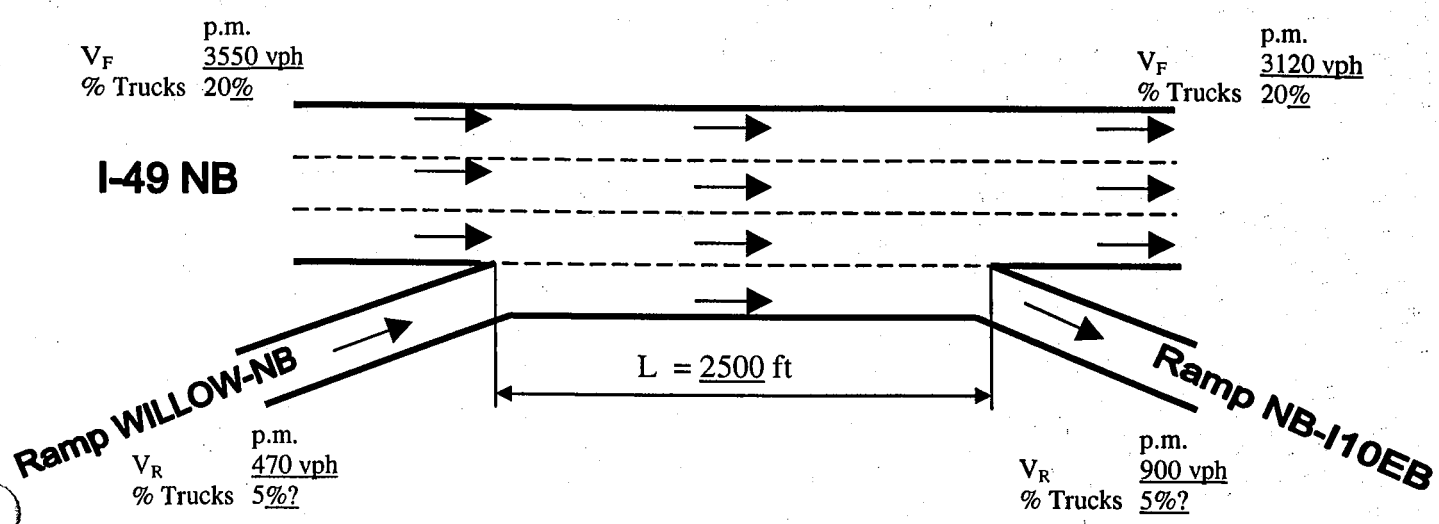
Location: Between NM-5 (Entrance from WILLOW) &
ND-6 (Exit to I-10 EB)

NW – 2
Year 2030 p.m.

FACTORS:

Mainline: Design Speed = 60 mph, Grade = (Level) – 3.0% - Level

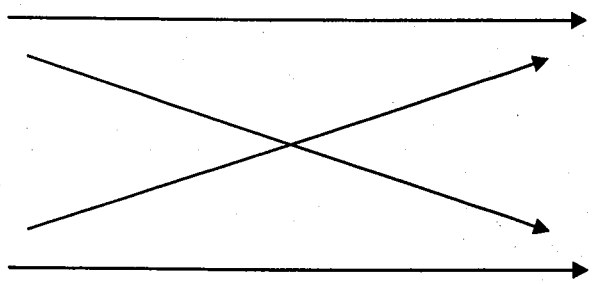
Ramp: Design Speed = 40 mph, Grade = +4.0%, Level



V_{o1} = 2372 vph (p.m.)

V_{w1} = 838 vph (p.m.)

V_{w2} = 408 vph (p.m.)



V_{o2} = 62 vph (p.m.)

ANALYSIS:

	p.m.
LOS	C
WEAVING DENSITY	21.9 pc/mi/ln
WEAVING SPEED	50.1 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Northbound
Weaving Seg Location	Willow to I-10 EB (NW-2)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.32
Weaving seg length, L (ft)	700	Weaving ratio, R	0.33
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	fHV	fp	v
Vo1	2372	0.90	20	0	1.5	1.2	0.909	1.00	2899
Vo2	62	0.90	5	0	1.5	1.2	0.976	1.00	70
Vw1	838	0.90	5	0	1.5	1.2	0.976	1.00	954
Vw2	408	0.90	5	0	1.5	1.2	0.976	1.00	464
Vw				1418	Vnw				2969
V									4387

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.15	0.00
b (Exhibit 24-6)			4.00	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			3.05	0.40
Weaving and non-weaving speeds, Si (mi/h)			27.34	50.62

Number of lanes required for unconstrained operation, Nw 1.49
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	39.70
Weaving segment density, D (pc/mi/ln)	27.63
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	6107
Capacity as a 15-minute flow rate, c (veh/h)	5552
Capacity as a full-hour volume, c_h (veh/h)	4997

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Northbound
Weaving Seg Location	Willow to I-10 EB (NW-2)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.32
Weaving seg length, L (ft)	2500	Weaving ratio, R	0.33
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
Vo1	2372	0.90	20	0	1.5	1.2	0.909	1.00	2899
Vo2	62	0.90	5	0	1.5	1.2	0.976	1.00	70
Vw1	838	0.90	5	0	1.5	1.2	0.976	1.00	954
Vw2	408	0.90	5	0	1.5	1.2	0.976	1.00	464
Vw				1418	Vnw				2969
V									4387

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.15	0.00
b (Exhibit 24-6)			4.00	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			1.10	0.16
Weaving and non-weaving speeds, Si (mi/h)			38.79	58.28

Number of lanes required for unconstrained operation, Nw 1.76
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	50.13
Weaving segment density, D (pc/mi/ln)	21.88
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	7566
Capacity as a 15-minute flow rate, c (veh/h)	6878
Capacity as a full-hour volume, c_h (veh/h)	6190

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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I-49 connector

Appendix C

I-49 Southbound Ramp Merge/Diverge/Weave Analysis Worksheets (Year 2030)

WEAVING SECTION

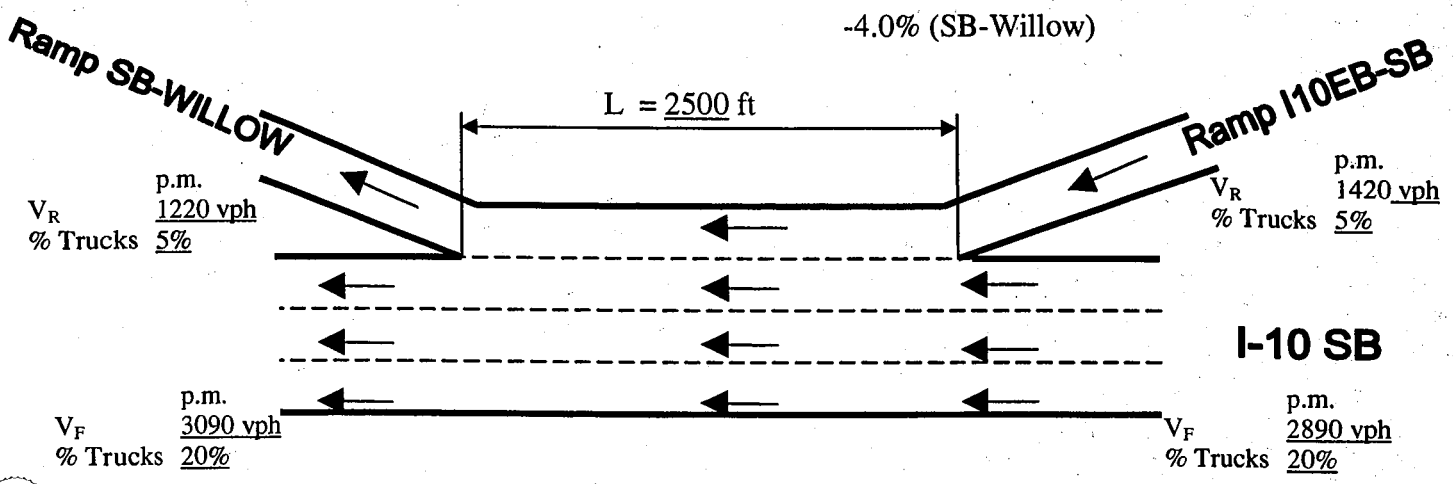
Location: Between SM-1 (Entrance from I-10 EB) &
SD-1 (Exit to WILLOW)

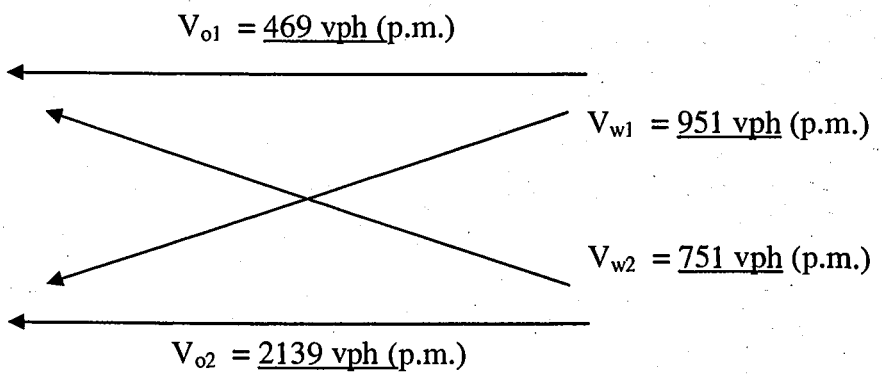
SW – 1
Year 2030 p.m.

FACTORS:

Mainline: Design Speed = 60 mph, Grade = Level, +3.0%, Level

Ramp: Design Speed = 40 mph, Grade = Level (I10EB-SB),
-4.0% (SB-Willow)





ANALYSIS:

	p.m.
LOS	C
WEAVING DENSITY	27.6 pc/mi/ln
WEAVING SPEED	46.1 mph

COMMENTS:
Lowest LOS C requires minimum 2350' weaving section.

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Southbound
Weaving Seg Location	From I-10 EB to Willow (SW-1)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.38
Weaving seg length, L (ft)	2500	Weaving ratio, R	0.44
Terrain	Grade		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
Vo1	2139	0.90	20	0	1.5	1.2	0.909	1.00	2614
Vo2	469	0.90	5	0	1.5	1.2	0.976	1.00	534
Vw1	751	0.90	5	0	1.5	1.2	0.976	1.00	855
Vw2	951	0.90	5	0	1.5	1.2	0.976	1.00	1083
Vw				1938	Vnw				3148
V									5086

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.15	0.00
b (Exhibit 24-6)			4.00	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			1.40	0.22
Weaving and non-weaving speeds, Si (mi/h)			35.85	55.87

Number of lanes required for unconstrained operation, Nw 1.98
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	46.07
Weaving segment density, D (pc/mi/ln)	27.60
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	7400
Capacity as a 15-minute flow rate, c (veh/h)	6727
Capacity as a full-hour volume, c_h (veh/h)	6054

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Southbound
Weaving Seg Location	From I-10 EB to Willow (SW-1)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.38
Weaving seg length, L (ft)	2350	Weaving ratio, R	0.44
Terrain	Grade		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
Vo1	2139	0.90	20	0	1.5	1.2	0.909	1.00	2614
Vo2	469	0.90	5	0	1.5	1.2	0.976	1.00	534
Vw1	751	0.90	5	0	1.5	1.2	0.976	1.00	855
Vw2	951	0.90	5	0	1.5	1.2	0.976	1.00	1083
Vw				1938	Vnw				3148
V									5086

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.15	0.00
b (Exhibit 24-6)			4.00	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			1.47	0.23
Weaving and non-weaving speeds, Si (mi/h)			35.26	55.52

Number of lanes required for unconstrained operation, Nw 1.97
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	45.54
Weaving segment density, D (pc/mi/ln)	27.92
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	7322
Capacity as a 15-minute flow rate, c (veh/h)	6656
Capacity as a full-hour volume, c_h (veh/h)	5990

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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WEAVING SECTION

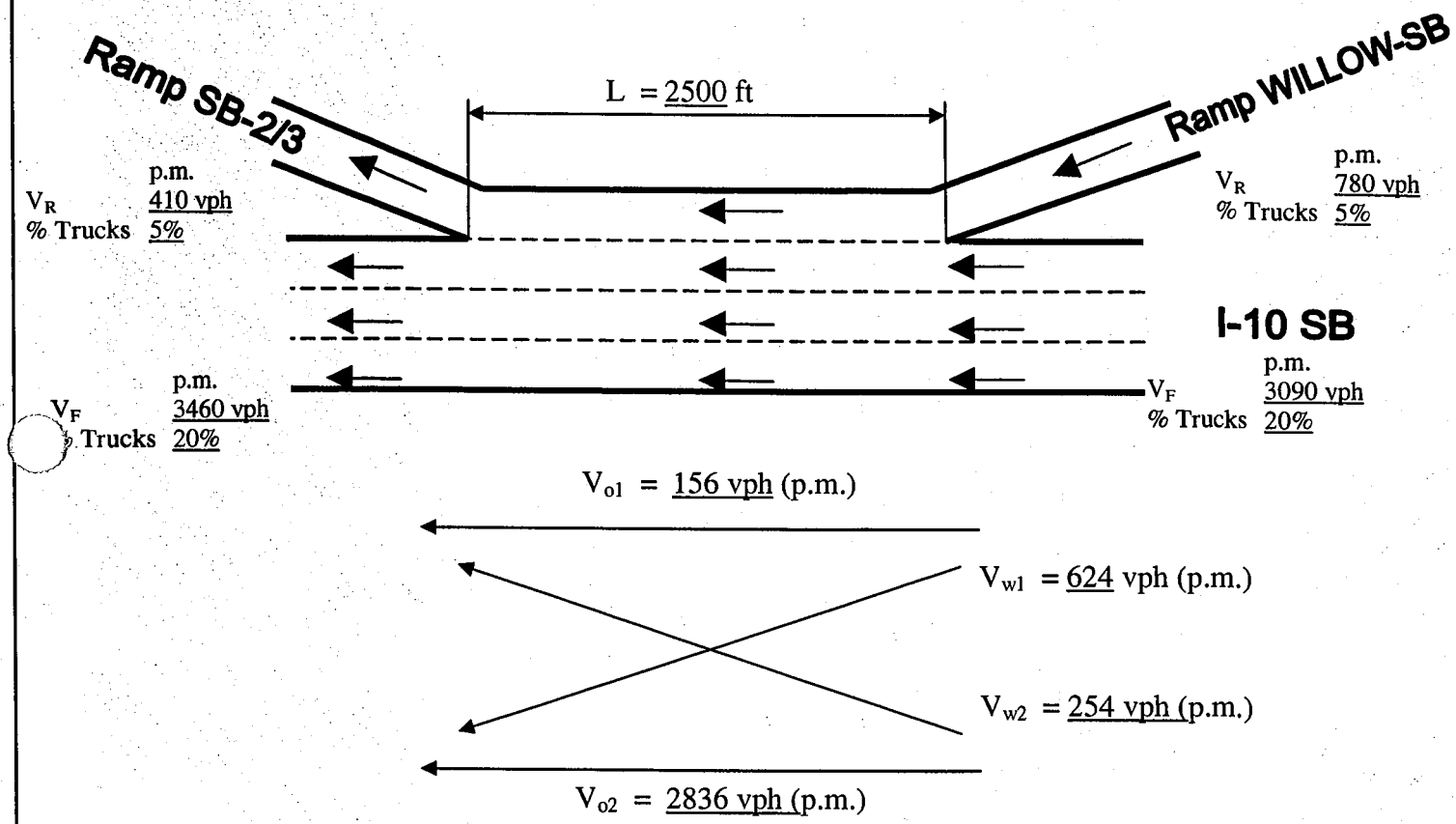
SW – 2
Year 2030 p.m.

Location: Between SM-2 (Entrance from WILLOW) &
SD-2 (Exit to 2ND/3RD)

FACTORS:

Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = +4.0% (Willow-SB), -5.0% (SB-2/3)



ANALYSIS:

	p.m.
LOS	C
WEAVING DENSITY	21.1 pc/mi/ln
WEAVING SPEED	55.0 mph

COMMENTS:
Lowest LOS C requires minimum 500' weaving section.

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Southbound
Weaving Seg Location	From Willow to 2nd/3rd (SW-2)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.22
Weaving seg length, L (ft)	2500	Weaving ratio, R	0.29
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
Vo1	2836	0.90	20	0	1.5	1.2	0.909	1.00	3466
Vo2	156	0.90	5	0	1.5	1.2	0.976	1.00	177
Vw1	254	0.90	5	0	1.5	1.2	0.976	1.00	289
Vw2	624	0.90	5	0	1.5	1.2	0.976	1.00	710
Vw				999	Vnw				3643
V									4642

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.00		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	0.41	0.21		
Weaving and non-weaving speeds, Si (mi/h)	50.37	56.39		

Number of lanes required for unconstrained operation, Nw 1.38
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	54.97
Weaving segment density, D (pc/mi/ln)	21.11
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	8312
Capacity as a 15-minute flow rate, c (veh/h)	7556
Capacity as a full-hour volume, c_h (veh/h)	6800

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	HNTB
Date Performed	11/1/2004
Analysis Time Period	

Site Information

Freeway/Dir of Travel	I-49 Southbound
Weaving Seg Location	From Willow to 2nd/3rd (SW-2)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Inputs

Freeway free-flow speed, SFF (mi/h)	60	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.22
Weaving seg length, L (ft)	500	Weaving ratio, R	0.29
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	fHV	fp	v
Vo1	2836	0.90	20	0	1.5	1.2	0.909	1.00	3466
Vo2	156	0.90	5	0	1.5	1.2	0.976	1.00	177
Vw1	254	0.90	5	0	1.5	1.2	0.976	1.00	289
Vw2	624	0.90	5	0	1.5	1.2	0.976	1.00	710
Vw				999	Vnw				3643
V									4642

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.00		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	1.50	0.70		
Weaving and non-weaving speeds, Si (mi/h)	35.01	44.48		

Number of lanes required for unconstrained operation, Nw 1.11
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	42.04
Weaving segment density, D (pc/mi/ln)	27.61
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	6418
Capacity as a 15-minute flow rate, c (veh/h)	5835
Capacity as a full-hour volume, c_h (veh/h)	5251

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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RAMP DIVERGE

Ramp Name: I-49 SB Exit to JOHNSTON/LOUISIANA

SD – 3
Year 2030 p.m.

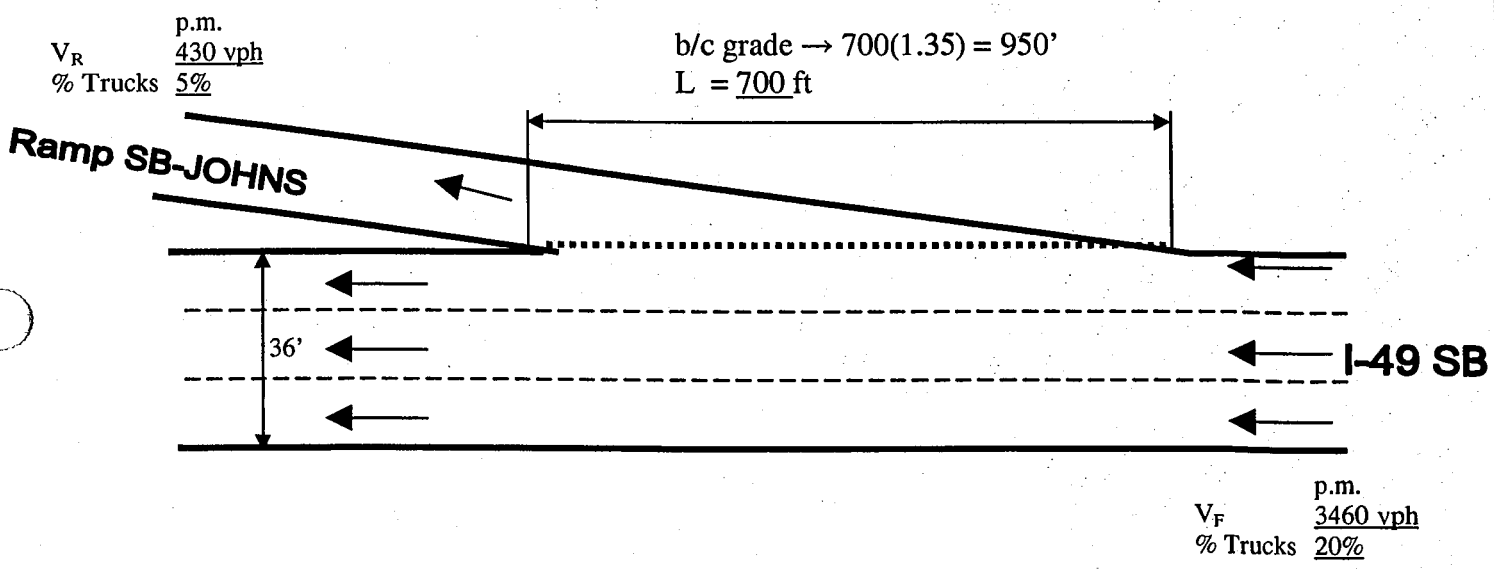
FACTORS:

Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = -5.0%

Upstream ramp: Y (•) or N ( )
Name: SB- 2/3 (SD-2)
On ( ) or Off (•)
Distance to Ramp 1400 ft
Volume 410 veh/h

Downstream ramp: Y (•) or N ( )
Name: 2/3 – SB (SM-3)
On (•) or Off ( )
Distance to Ramp 1950 ft
Volume 270 veh/h



ANALYSIS:

	p.m.
LOS	C
DENSITY	20.2 pc/mi/ln
RAMP SPEED	52.7 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Southbound
Agency or Company	HNTB	Junction	To Johnston/Louisiana (SD-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☑ Yes ☑ On		☐ Yes ☐ On
☐ No ☑ Off		☑ No ☐ Off
L_{up} = 1000 ft		L_{down} = ft
Vu = 410 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3460	0.90	Level	20	0	0.909	1.00	4229
Ramp	430	0.90	Grade	5	0	0.930	1.00	514
UpStream	410	0.90	Grade	5	0	0.976	1.00	467
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.631 using Equation 5

V_{12} = 2857 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4229	6900	No
V_{12}	2857	4400:All	No
$V_{FO} = V_F - V_R$	3715	6900	No
V_R	514	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 20.3 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.409 (Exhibit 25-19)

S_R= 52.6 mph (Exhibit 25-19)

S_0= 64.4 mph (Exhibit 25-19)

S = 55.9 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Southbound
Agency or Company	HNTB	Junction	To Johnston/Louisiana (SD-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☑ On
☑ No ☐ Off		☐ No ☐ Off
L_{up} = ft		L_{down} = 1950 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 270 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3460	0.90	Level	20	0	0.909	1.00	4229
Ramp	430	0.90	Grade	5	0	0.976	1.00	490
UpStream								
DownStream	270	0.90	Grade	5	0	0.976	1.00	308

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.632 using Equation 5

V_{12} = 2852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4229	6900	No
V_{12}	2852	4400:All	No
$V_{FO} = V_F - V_R$	3739	6900	No
V_R	490	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 20.2 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.407 (Exhibit 25-19)

S_R= 52.7 mph (Exhibit 25-19)

S_0= 64.3 mph (Exhibit 25-19)

S = 56.0 mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 SB Entrance from 2ND/3RD

SM – 3
Year 2030 p.m.

FACTORS:

Mainline: Design Speed = 60 mph, Grade = +2.0%

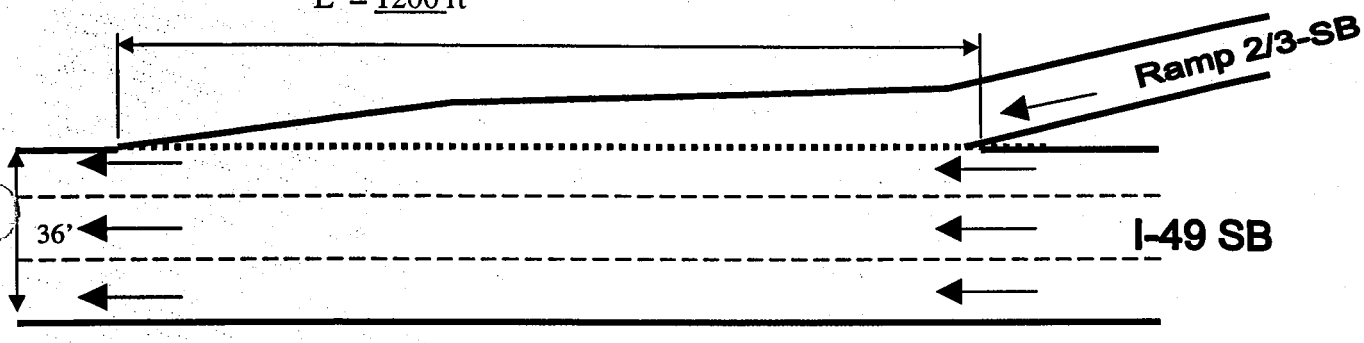
Ramp: Design Speed = 40 mph, Grade = +5.0% / 3.0%

Upstream ramp: Y (•) or N ( )
Name: SB – Johns (SD-3)
On ( ) or Off (•)
Distance to Ramp 1950 ft
Volume 430 veh/h

Downstream ramp: Y (•) or N ( )
Name: Johns-SB (SM-4)
On (•) or Off ( )
Distance to Ramp 2400 ft
Volume 100 veh/h

b/c grade → 900'(1.5) + 300' = 1650'
L = 1200 ft

	p.m.
V_R	270 vph
% Trucks	5%



	p.m.
V_F	3030 vph
% Trucks	20%

ANALYSIS:

	p.m.
LOS	B
DENSITY	15.4 pc/mi/ln
RAMP SPEED	55.6 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	I-49 from 2nd/3rd (SM-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☒ Yes ☒ On

☐ No ☒ Off

L_{up} = 1500 ft

V_u = 430 veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☒ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	3030	0.90	Level	0	0	1.000	1.00	3367
Ramp	270	0.90	Grade	0	0	1.000	1.00	300
UpStream	430	0.90	Grade	0	0	1.000	1.00	478
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\ (P_{FM})$$

L_{EQ} = 1646.70 (Equation 25-2 or 25-3)

P_{FM}= 0.642 using Equation 2

V_{12}= 2162 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3667	See Exhibit 25-7	No
V_{R12}	2462	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = 8.0 (pc/ m/ln)

LOS = A (Exhibit 25-4)

Speed Estimation

M_S = 0.156 (Exibit 25-19)

S_R= 57.2 mph (Exhibit 25-19)

S_0= 57.5 mph (Exhibit 25-19)

S= 57.3 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{Fi}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	I-49 from 2nd/3rd (SM-3)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☑ Yes ☑ On

☐ No ☐ Off

L_{down} = 2400 ft

VD = 100 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3030	0.90	Level	20	0	0.909	1.00	3703
Ramp	270	0.90	Grade	5	0	0.976	1.00	308
UpStream								
DownStream	100	0.90	Grade	5	0	0.976	1.00	114

Estimation of v_{12} (Merge Areas)

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.624 using Equation 1

V_{12}= 2310 pc/h

Estimation of v_{12} (Diverge Areas)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4011	See Exhibit 25-7	No
V_{R12}	2618	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 15.4 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

M_S = 0.242 (Exibit 25-19)

S_R= 55.6 mph (Exhibit 25-19)

S_0= 56.8 mph (Exhibit 25-19)

S= 56.0 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 SB Entrance from JOHNSTON/LOUISIANA

SM – 4
Year 2030 p.m.

FACTORS:

Mainline: Design Speed = 60 mph, Grade = Level

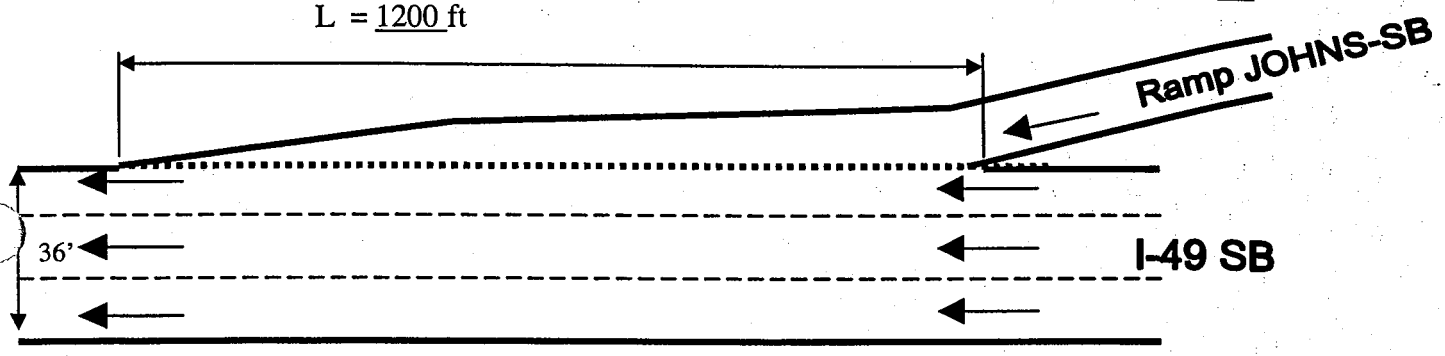
Ramp: Design Speed = 40 mph, Grade = +4.0%

Upstream ramp: Y (•) or N ( )
Name: 2nd/3rd-SB (SM-3)
On (•) or Off ( )
Distance to Ramp 2400 ft
Volume 270 veh/h

Downstream ramp: Y (•) or N ( )
Name: SB-Univ (SD-4)
On ( ) or Off (•)
Distance to Ramp 3700 ft
Volume 100 veh/h

b/c grade → 900'(1.5) + 300' = 1650'
L = 1200 ft

	p.m.
V_R	100 vph
% Trucks	5%



	p.m.
V_F	3300 vph
% Trucks	20%

ANALYSIS:

	p.m.
LOS	B
DENSITY	15.6 pc/mi/ln
RAMP SPEED	55.6 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	From Johnston/Louisiana (SM-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☒ Yes ☒ On

☐ No ☐ Off

L_{up} = 2400 ft

Vu = 270 veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☒ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3300	0.90	Level	20	0	0.909	1.00	4033
Ramp	100	0.90	Grade	5	0	0.976	1.00	114
UpStream	270	0.90	Grade	5	0	0.976	1.00	308
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.624 using Equation 1

V_{12}= 2515 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4147	See Exhibit 25-7	No
V_{R12}	2629	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 15.6 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.243 (Exibit 25-19)

S_R= 55.6 mph (Exhibit 25-19)

S_0= 56.3 mph (Exhibit 25-19)

S= 55.9 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	From Johnston/Louisiana (SM-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

L_{down} = 3700 ft

VD = 100 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3300	0.90	Level	20	0	0.909	1.00	4033
Ramp	100	0.90	Grade	5	0	0.976	1.00	114
UpStream								
DownStream	100	0.90	Grade	5	0	0.976	1.00	114

Estimation of v_{12} (Merge Areas)

$V_{12} = V_F (P_{FM})$

L_{EQ} = 398.39 (Equation 25-2 or 25-3)

P_{FM}= 0.624 using Equation 1

V_{12}= 2515 pc/h

Estimation of v_{12} (Diverge Areas)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4147	See Exhibit 25-7	No
V_{R12}	2629	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 15.6 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

M_S = 0.243 (Exibit 25-19)

S_R= 55.6 mph (Exhibit 25-19)

S_0= 56.3 mph (Exhibit 25-19)

S= 55.9 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

RAMP DIVERGE

Ramp Name: I-49 SB Exit to UNIVERSITY/SURREY

SD – 4
Year 2030 p.m.

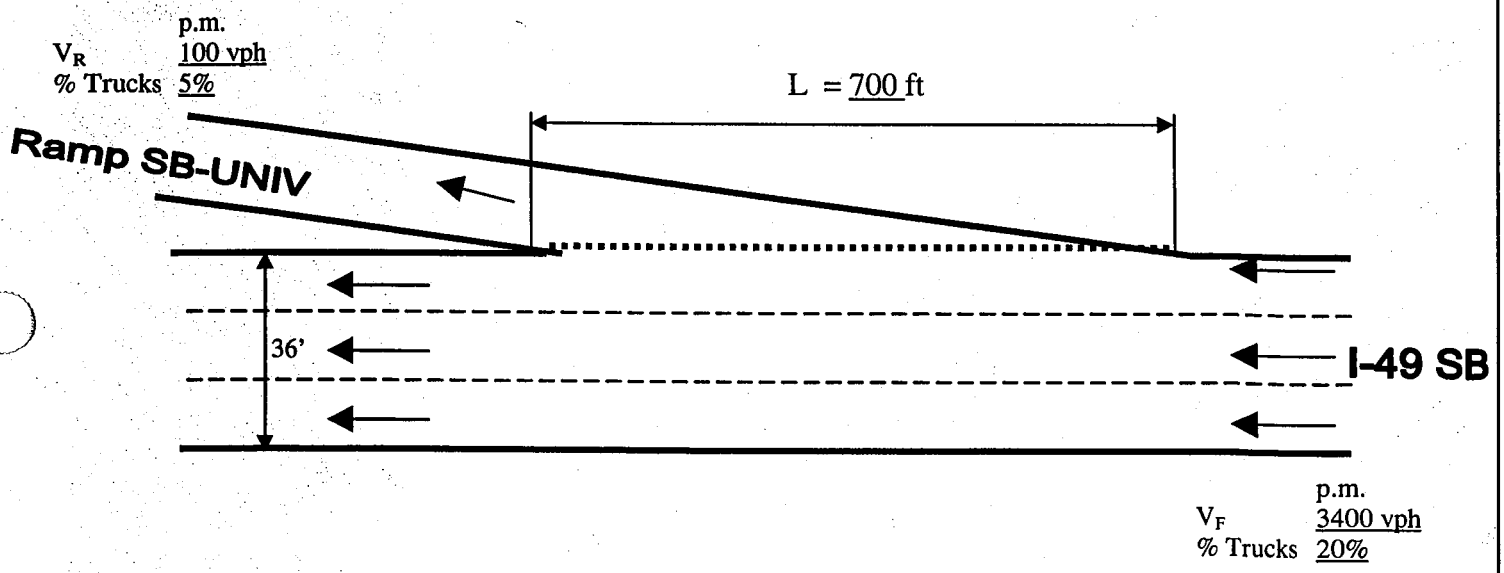
FACTORS:

Mainline: Design Speed = 60 mph, Grade = -1.0%

Ramp: Design Speed = 40 mph, Grade = -2.0%

Upstream ramp: Y (●) or N ( )
Name: Johns-SB (SM-4)
On (●) or Off ( )
Distance to Ramp 3700 ft
Volume 100 veh/h

Downstream ramp: Y (●) or N ( )
Name: SB-Kaliste (SD-5)
On ( ) or Off (●)
Distance to Ramp 3500 ft
Volume 540 veh/h



ANALYSIS:

	p.m.
LOS	C
DENSITY	21.6 pc/mi/ln
RAMP SPEED	53.3 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Southbound
Agency or Company	HNTB	Junction	To University/Surrey (SD-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☑ Yes ☑ On		☐ Yes ☐ On
☐ No ☐ Off		☑ No ☐ Off
L_{up} = 3700 ft		L_{down} = ft
Vu = 100 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3400	0.90	Grade	20	0	0.909	1.00	4156
Ramp	100	0.90	Grade	5	0	0.976	1.00	114
UpStream	100	0.90	Grade	5	0	0.976	1.00	114
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 25-2 or 25-3)	L_{EQ} =650.49 (Equation 25-8 or 25-9)
P_{FM}= using Equation	P_{FD} =0.651 using Equation 5
V_{12}= pc/h	V_{12} = 2745 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4156	6900	No
V_{12}	2745	4400:All	No
$V_{FO} = V_F - V_R$	4042	6900	No
V_R	114	2100	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 21.6 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Speed Estimation

D_s = 0.373 (Exhibit 25-19)

S_R= 53.3 mph (Exhibit 25-19)

S_0= 64.2 mph (Exhibit 25-19)

S = 56.6 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Southbound
Agency or Company	HNTB	Junction	To University/Surrey (SD-4)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☐ On
☑ No ☐ Off		☐ No ☑ Off
L_{up} = ft		L_{down} = 3500 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 540 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3400	0.90	Grade	20	0	0.909	1.00	4156
Ramp	100	0.90	Grade	5	0	0.976	1.00	114
UpStream								
DownStream	540	0.90	Grade	5	0	0.976	1.00	615

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =631.10 (Equation 25-8 or 25-9)

P_{FD} =0.651 using Equation 5

V_{12} = 2745 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4156	6900	No
V_{12}	2745	4400:All	No
$V_{FO} = V_F - V_R$	4042	6900	No
V_R	114	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 21.6 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.373 (Exhibit 25-19)

S_R= 53.3 mph (Exhibit 25-19)

S_0= 64.2 mph (Exhibit 25-19)

S = 56.6 mph (Exhibit 25-15)

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RAMP DIVERGE

Ramp Name: I-49 SB Exit to KALISTE SALOOM

SD – 5
Year 2030 p.m.

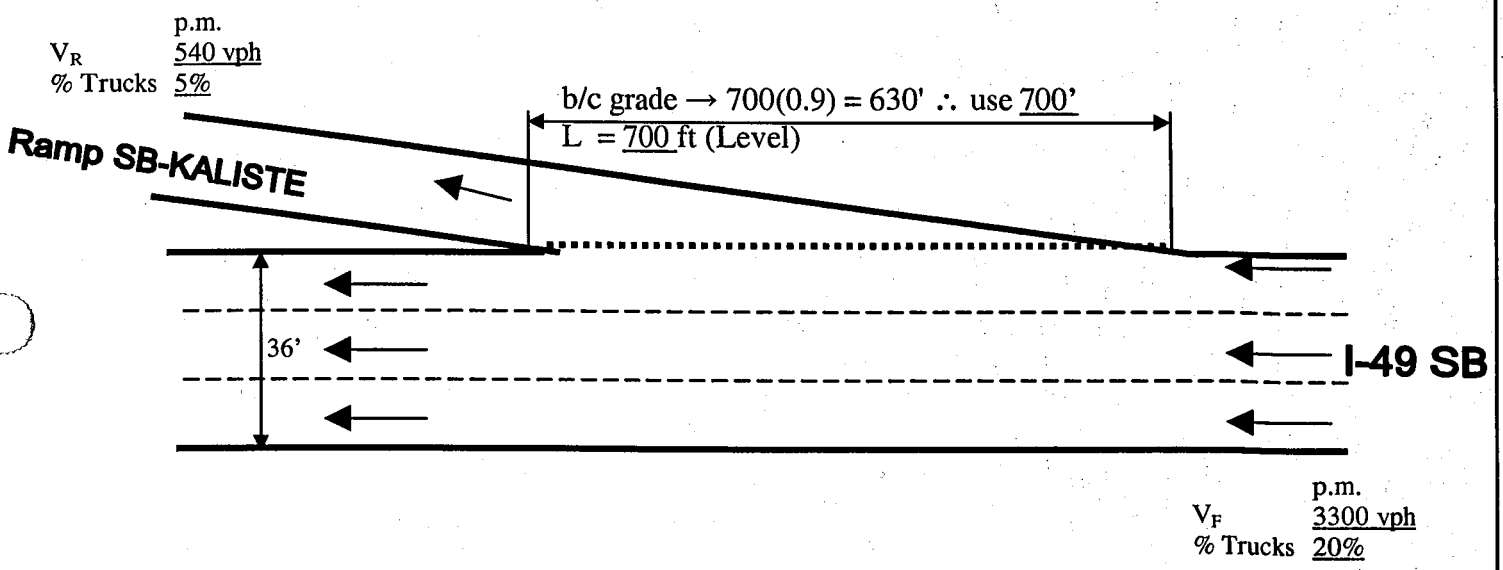
FACTORS:

Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = +4.0%

Upstream ramp: Y (●) or N ( )
Name: SB-Univ (SD-4)
On ( ) or Off (●)
Distance to Ramp 3500 ft
Volume 100 veh/h

Downstream ramp: Y (●) or N ( )
Name: Kaliste – SB (SM-5)
On (●) or Off ( )
Distance to Ramp 1500 ft
Volume 330 veh/h



ANALYSIS:

	p.m.
LOS	C
DENSITY	21.8 pc/mi/ln
RAMP SPEED	52.5 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Southbound
Agency or Company	HNTB	Junction	I-49 to Kaliste Saloom (SD-5)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Grade	Downstream Adj Ramp
☒ Yes ☒ On		☐ Yes ☐ On
☐ No ☒ Off		☒ No ☐ Off
L_{up} = 3500 ft		L_{down} = ft
Vu = 100 veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3300	0.90	Level	20	0	0.909	1.00	4033
Ramp	540	0.90	Grade	5	0	0.976	1.00	615
UpStream	100	0.90	Grade	5	0	0.976	1.00	114
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.631 using Equation 5

V_{12} = 2771 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4033	6900	No
V_{12}	2771	4400:All	No
$V_{FO} = V_F - V_R$	3418	6900	No
V_R	615	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 21.8 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.418 (Exhibit 25-19)

S_R= 52.5 mph (Exhibit 25-19)

S_0= 64.8 mph (Exhibit 25-19)

S = '55.8 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	ASM	Freeway/Dir of Travel	I-49 Southbound
Agency or Company	HNTB	Junction	I-49 to Kaliste Saloom (SD-5)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp	Terrain Level	Downstream Adj Ramp
☐ Yes ☐ On		☑ Yes ☑ On
☑ No ☐ Off		☐ No ☐ Off
L_{up} = ft		L_{down} = 1500 ft
Vu = veh/h	S_{FF} = 60.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	VD = 330 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3300	0.90	Level	20	0	0.909	1.00	4033
Ramp	540	0.90	Grade	5	0	0.976	1.00	615
UpStream								
DownStream	330	0.90	Level	5	0	0.976	1.00	376

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= using Equation

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7	
V_{R12}		4600:All	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} =0.631 using Equation 5

V_{12} = 2771 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4033	6900	No
V_{12}	2771	4400:All	No
$V_{FO} = V_F - V_R$	3418	6900	No
V_R	615	2100	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 21.8 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.418 (Exhibit 25-19)

S_R= 52.5 mph (Exhibit 25-19)

S_0= 64.8 mph (Exhibit 25-19)

S = 55.8 mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 SB Entrance from UNIVERSITY/SURREY

SM – 5
Year 2030 p.m.

FACTORS:

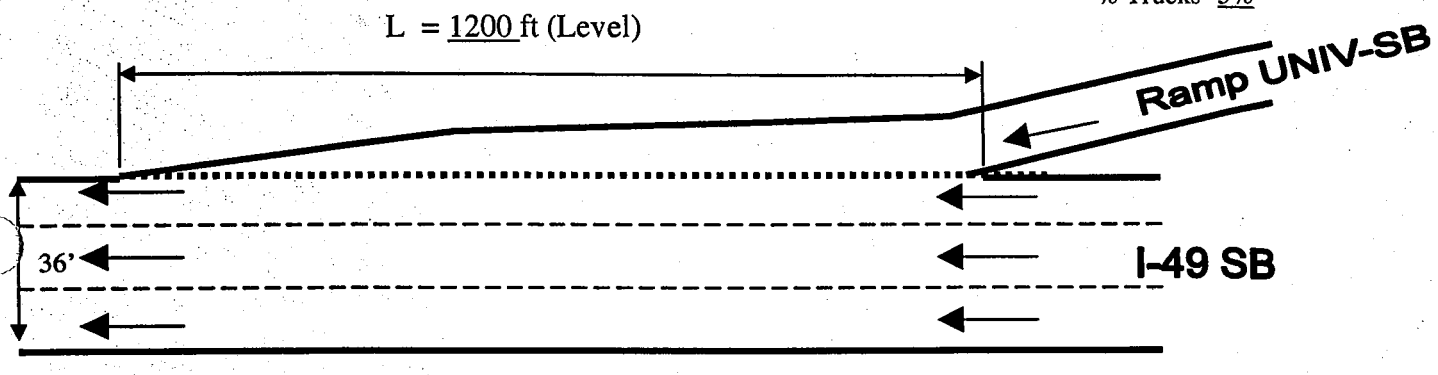
Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = Level

Upstream ramp: Y (●) or N ( )
Name: SB-Kaliste (SD-5)
On ( ) or Off (●)
Distance to Ramp 1500 ft
Volume 540 veh/h

Downstream ramp: Y (●) or N ( )
Name: Kaliste-SB (SM-6)
On (●) or Off ( )
Distance to Ramp 3000 ft
Volume 340 veh/h

	p.m.
V_R	330 vph
% Trucks	5%



	p.m.
V_F	2760 vph
% Trucks	20%

ANALYSIS:

	p.m.
LOS	B
DENSITY	16.8 pc/mi/ln
RAMP SPEED	55.1 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	I-49 from University (SM-5)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☒ Yes ☐ On

☐ No ☒ Off

L_{up} = 1500 ft

Vu = 540 veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☒ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2760	0.90	Level	20	0	0.909	1.00	3373
Ramp	330	0.90	Level	5	0	0.976	1.00	376
UpStream	540	0.90	Grade	5	0	0.976	1.00	615
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = 1024.89 (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 2061 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3749	See Exhibit 25-7	No
V_{R12}	2437	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R = 16.8 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.270 (Exibit 25-19)

S_R= 55.1 mph (Exhibit 25-19)

S_0= 57.1 mph (Exhibit 25-19)

S= 55.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	I-49 from University (SM-5)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☒ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☒ Yes ☒ On

☐ No ☐ Off

L_{down} = 3000 ft

VD = 340 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2760	0.90	Level	20	0	0.909	1.00	3373
Ramp	330	0.90	Level	5	0	0.976	1.00	376
UpStream								
DownStream	340	0.90	Level	5	0	0.976	1.00	387

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 2061 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3749	See Exhibit 25-7	No
V_{R12}	2437	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R = 16.8 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.270 (Exibit 25-19)

S_R= 55.1 mph (Exhibit 25-19)

S_0= 57.1 mph (Exhibit 25-19)

S= 55.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FI}=V_F		See Exhibit 25-14	
V_{12}		4400:All	
V_{FO} = V_F - V_R		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMP MERGE

Ramp Name: I-49 SB Entrance from KALISTE SALOOM

SM – 6
Year 2030 p.m.

FACTORS:

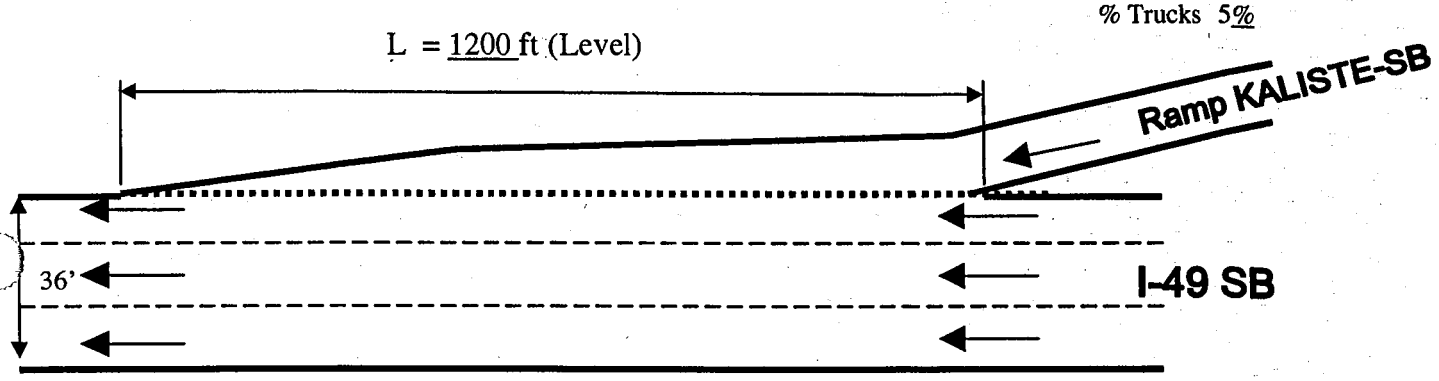
Mainline: Design Speed = 60 mph, Grade = Level

Ramp: Design Speed = 40 mph, Grade = Level

Upstream ramp: Y (●) or N ( )
Name: Univ-SB (SM-5)
On (●) or Off ( )
Distance to Ramp 3000 ft
Volume 330 veh/h

Downstream ramp: Y ( ) or N (●)
Name: _____
On or Off
Distance to Ramp _____ft
Volume _____veh/h

	p.m.
V_R	340 vph
% Trucks	5%



	p.m.
V_F	3090 vph
% Trucks	20%

ANALYSIS:

	p.m.
LOS	B
DENSITY	18.8 pc/mi/ln
RAMP SPEED	54.9 mph

COMMENTS:

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/16/04

HNTB

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst2	ASM	Freeway/Dir of Travel	Southbound
Agency or Company	HNTB	Junction	From Kaliste Saloom (SM-6)
Date Performed	11/1/2004	Jurisdiction	Lafayette, LA
Analysis Time Period		Analysis Year	2030

Project Description I-49 Connector Operational Analysis

Inputs

Upstream Adj Ramp

☑ Yes ☑ On

☐ No ☐ Off

L_{up} = 3000 ft

Vu = 330 veh/h

Terrain Level

S_{FF} = 60.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3090	0.90	Level	20	0	0.909	1.00	3777
Ramp	340	0.90	Level	5	0	0.976	1.00	387
UpStream	330	0.90	Level	5	0	0.976	1.00	376
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM}= 0.611 using Equation 1

V_{12}= 2308 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4164	See Exhibit 25-7	No
V_{R12}	2695	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R = 18.8 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.283 (Exibit 25-19)

S_R= 54.9 mph (Exhibit 25-19)

S_0= 56.5 mph (Exhibit 25-19)

S= 55.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{Fi}=V_F$		See Exhibit 25-14	
V_{12}		4400:All	
$V_{FO} = V_F - V_R$		See Exhibit 25-14	
V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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I-49 connection

Appendix D

Frontage Road Operations Worksheets (Year 2030)

FRONTAGE ROAD WEAVING

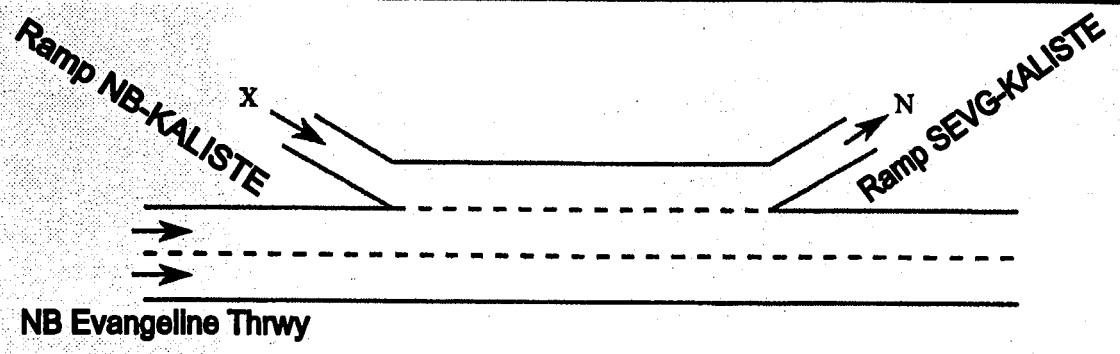
NFR – 1
Year 2030 p.m.

ONE-SIDED WEAVING ANALYSIS WORKSHEET

Location: Evangeline Thrwy Near Kaliste Saloom I/C **Direction:** North - bound

Description: Design Year 2030, p.m.

Date: 11/02/04 **Prepared By:** HNTB



Exit Ramp Volume (X): 590 vph **Entrance Ramp Volume (N):** 90 vph

Weaving Volume (X + N): 680 vph

Weaving Volume	Level of Service
< 1500 vph	Unconstrained (A-B)
1500 - 3000 vph	Constrained (C-D)
> 3000 vph	Undesirable (E-F)

Level of Service: Unconstrained

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/18/04

HNTB

FRONTAGE ROAD WEAVING

NFR – 2
Year 2030 p.m.

TWO-SIDED WEAVING ANALYSIS WORKSHEET

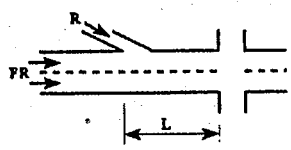
Location: Evangeline Thrwy Near University/Surrey Direction: North - bound

Description: Design Year 2030, p.m.

Date: 11/16/04 Prepared By: HNTB

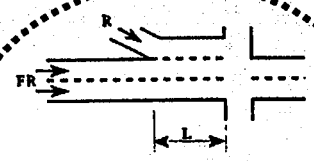
Exit Ramp Volume (R): 290 **vph** **Ramp Spacing (L):** 1000' x 0.3048 **m**
(RAMP KALISTE-NEVG)

Frontage Road Volume (FR): 1150 **vph** **Percent 2-Sided Weaving (T):** 1
[T=0 for ≤ 50%, T= 1 for > 50%]



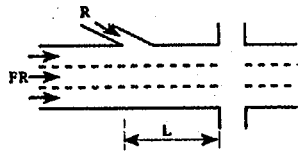
2LFR

$D_L = 0.034(FR) + 0.098(R) - 0.132(L) + 9.51(T)$



2LFR+Aux

$D_L = 0.021(FR) + 0.077(R) - 0.150(L) + 23.4(T)$



3LFR

$D_L = 0.055(FR) + 0.080(R) - 0.200(L) + 27.4(T)$

$D_L = 0.021(1150) + 0.077(290) - 0.150(304.8) + 23.4(1)$

Density (D_L): 24.16 **veh/km/ln**

Density, veh/km/ln	Level of Service	
< 40	Unconstrained	(A-B)
40 - 100	Constrained	(C-D)
> 100	Undesirable	(E-F)

Level of Service: Unconstrained

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/18/04

HNTB

FRONTAGE ROAD WEAVING

NFR – 3
Year 2030 p.m.

TWO-SIDED WEAVING ANALYSIS WORKSHEET

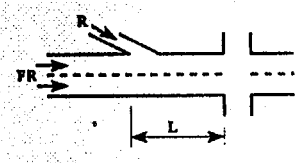
Location: Evangeline Thrwy Near Willow I/S **Direction:** North - bound

Description Design Year 2030, p.m.

Date: 11/16/04 **Prepared By:** HNTB

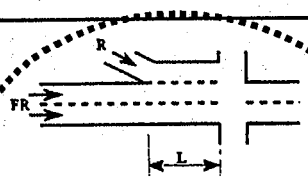
Exit Ramp Volume (R): 730 **vph** **Ramp Spacing (L):** 1000' x 0.3048**m**
(RAMP NB-WILLOW)

Frontage Road Volume (FR): 700 **vph** **Percent 2-Sided Weaving (T):** 1
[T=0 for ≤ 50%, T= 1 for > 50%]



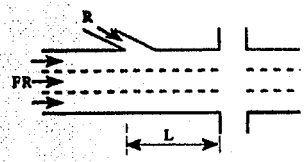
2LFR

$D_L = 0.034(FR) + 0.098(R) - 0.132(L) + 9.51(T)$



2LFR+Aux

$D_L = 0.021(FR) + 0.077(R) - 0.150(L) + 23.4(T)$



3LFR

$D_L = 0.055(FR) + 0.080(R) - 0.200(L) + 27.4(T)$

$D_L = 0.021(700) + 0.077(730) - 0.150(304.8) + 23.4(1)$

Density (D_L): 48.59 veh/km/ln

Density, veh/km/ln	Level of Service
< 40	Unconstrained (A-B)
40 - 100	Constrained (C-D)
> 100	Undesirable (E-F)

Level of Service: Constrained

Made By: ASM Date: 11/02/04
Checked By: RWS Date: 11/18/04

HNTB

FRONTAGE ROAD WEAVING

SFR – 1
Year 2030 p.m.

TWO-SIDED WEAVING ANALYSIS WORKSHEET

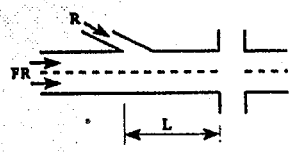
Location: Evangeline Thrwy Near Willow I/S Direction: South - bound

Description: Design Year 2030, p.m.

Date: 11/16/04 Prepared By: HNTB

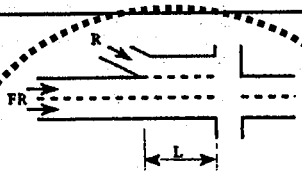
Exit Ramp Volume (R): 1230 **vph** **Ramp Spacing (L):** 650' x 0.3048 **m**
(RAMP SB-WILLOW)

Frontage Road Volume (FR): 450 **vph** **Percent 2-Sided Weaving (T):** 1
[T=0 for ≤ 50%, T= 1 for > 50%]



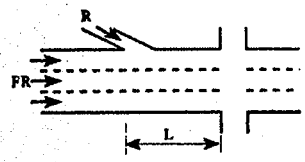
2LFR

$D_L = 0.034(FR) + 0.098(R) - 0.132(L) + 9.51(T)$



2LFR+Aux

$D_L = 0.021(FR) + 0.077(R) - 0.150(L) + 23.4(T)$



3LFR

$D_L = 0.055(FR) + 0.080(R) - 0.200(L) + 27.4(T)$

$D_L = 0.021(450) + 0.077(1230) - 0.150(198.12) + 23.4(1)$

Density (D_L): 97.8 veh/km/ln

Density, veh/km/ln	Level of Service	
< 40	Unconstrained	(A-B)
40 - 100	Constrained	(C-D)
> 100	Undesirable	(E-F)

Level of Service: Constrained

Made By: ASM Date: 11/16/04
Checked By: RWS Date: 11/18/04

HNTB

FRONTAGE ROAD WEAVING

SFR – 2
Year 2030 p.m.

TWO-SIDED WEAVING ANALYSIS WORKSHEET

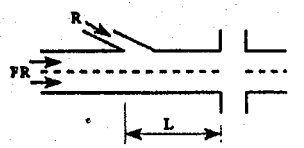
Location: Evangeline Thrwy Near University/Surrey I/C **Direction:** South - bound

Description: Design Year 2030, p.m.

Date: 11/16/04 **Prepared By:** HNTB

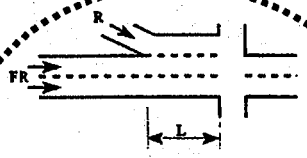
Exit Ramp Volume (R): 100 vph **Ramp Spacing (L):** 600' x 0.3048 m
(RAMP SB-UNIV)

Frontage Road Volume (FR): 640 vph **Percent 2-Sided Weaving (T):** 1
[T=0 for ≤ 50%, T= 1 for > 50%]



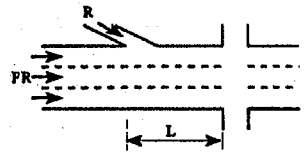
2LFR

$D_L = 0.034(FR) + 0.098(R) - 0.132(L) + 9.51(T)$



2LFR+Aux

$D_L = 0.021(FR) + 0.077(R) - 0.150(L) + 23.4(T)$



3LFR

$D_L = 0.055(FR) + 0.080(R) - 0.200(L) + 27.4(T)$

$D_L = 0.021(640) + 0.077(100) - 0.150(182.88) + 23.4(1)$

Density (D_L): 17.1 veh/km/ln

Density, veh/km/ln	Level of Service	
< 40	Unconstrained	(A-B)
40 - 100	Constrained	(C-D)
> 100	Undesirable	(E-F)

Level of Service: Unconstrained

Made By: ASM Date: 11/16/04
Checked By: RWS Date: 11/18/04

HNTB

FRONTAGE ROAD WEAVING

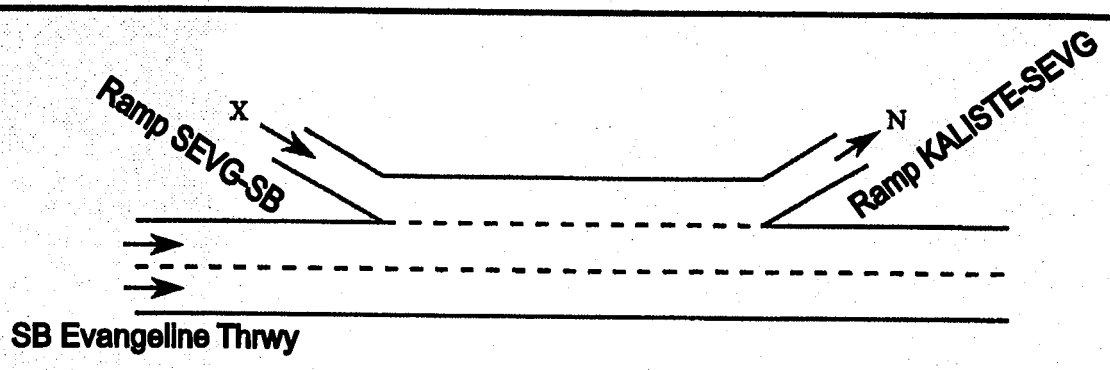
SFR – 3
Year 2030 p.m.

ONE-SIDED WEAVING ANALYSIS WORKSHEET

Location: Evangeline Thrwy Near Kaliste Saloom I/C **Direction:** South **- bound**

Description: Design Year 2030, p.m.

Date: 11/16/04 **Prepared By:** HNTB



Exit Ramp Volume (X): 340 **vph** **Entrance Ramp Volume (N):** 430 **vph**

Weaving Volume (X + N): 770 **vph**

Weaving Volume	Level of Service	
< 1500 vph	Unconstrained	(A-B)
1500 - 3000 vph	Constrained	(C-D)
> 3000 vph	Undesirable	(E-F)

Level of Service: Unconstrained

Made By: ASM Date: 11/16/04
Checked By: RWS Date: 11/18/04

HNTB

I-49 connector

Appendix E

Intersections Operations Worksheets
(Year 2030)

SIGNALIZED INTERSECTION

Intersection at HUGH WALLIS AND KALISTE SALOOM

S – 1a
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH.II

PH. III

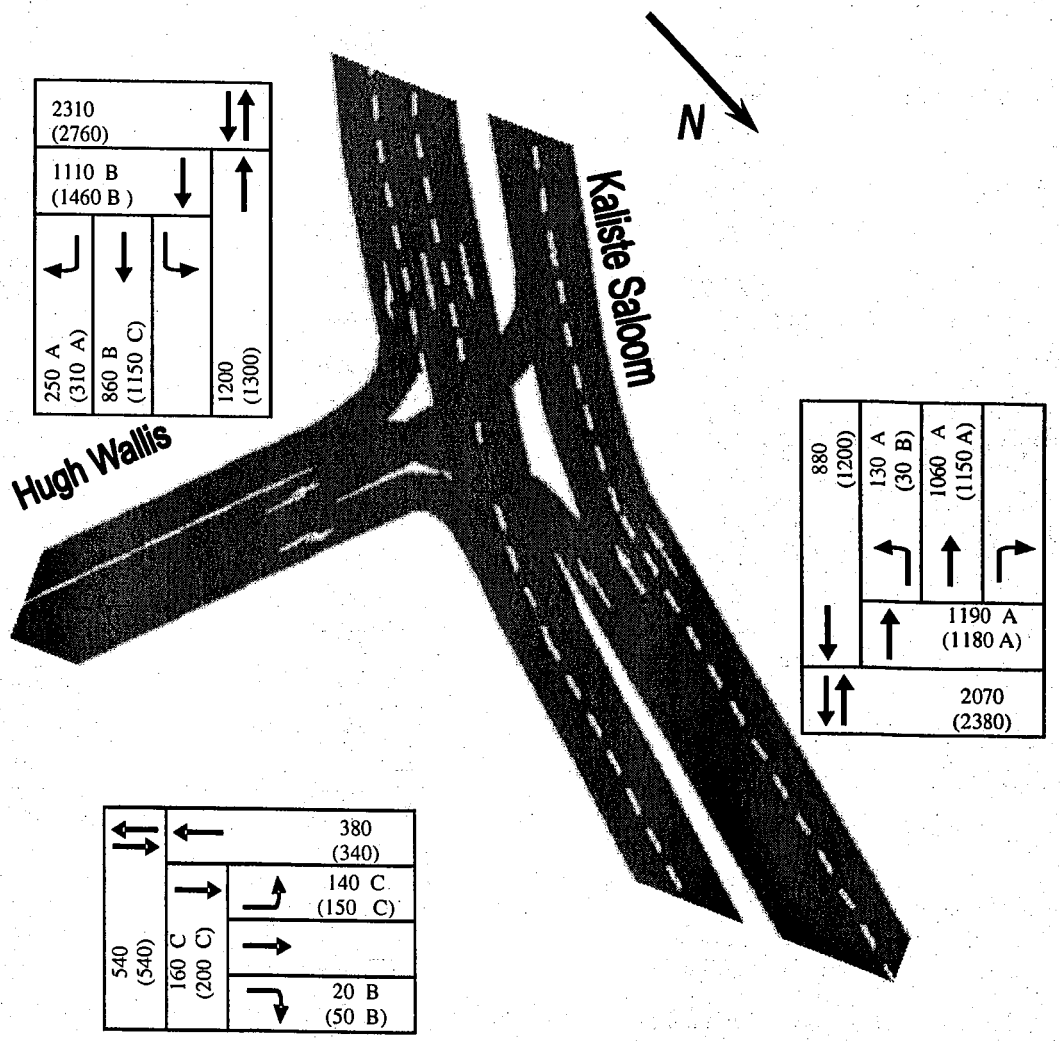
PH. IV

PH. V

PH. VI

PH. VII

PH. VII



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	B	B
Control Delay:	12.6 sec/veh	14.8 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Hugh Wallis & Kaliste (S1a_AM)
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	0	0	1	0	1	0	2	1	1	2	0
Lane group				L		R		T	R	L	T	
Volume, V (vph)				140		20		860	250	130	1060	
% Heavy vehicles, %HV				5		5		5	5	5	5	
Peak-hour factor, PHF				0.90		0.90		0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)				P		P		P	P	P	P	
Start-up lost time, l_1				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of effective green, e				2.0		2.0		2.0	2.0	2.0	2.0	
Arrival type, AT				3		3		3	3	3	3	
Unit extension, UE				3.0		3.0		3.0	3.0	3.0	3.0	
Filtering/metering, I				1.000	1.000	1.000		1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b				0.0		0.0		0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0			0		10	0		50			
Lane width				12.0		12.0		12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B				0		0		0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2					

Phasing	WB Only	02	03	04	SB Only	NS Perm	07	08
Timing	G = 20.0	G =	G =	G =	G = 10.0	G = 45.0	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 90.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				156		11		956	222	144	1178	
Lane group capacity, c				382		598		1723	1196	388	2297	
v/c ratio, X				0.41		0.02		0.55	0.19	0.37	0.51	
Total green ratio, g/C				0.22		0.39		0.50	0.78	0.67	0.67	

Uniform delay, d_1				29.9		16.9		15.6	2.6	7.7	7.6	
Progression factor, PF				1.000		1.000		1.000	1.000	1.000	1.000	
Delay calibration, k				0.50		0.50		0.50	0.50	0.50	0.50	
Incremental delay, d_2				3.2		0.1		1.3	0.3	2.7	0.8	
Initial queue delay, d_3												
Control delay				33.2		17.0		16.9	2.9	10.5	8.4	
Lane group LOS				C		B		B	A	B	A	
Approach delay				32.1			14.2			8.6		
Approach LOS				C			B			A		
Intersection delay	12.6			X_c = 0.54			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Hugh Wallis & Kaliste (S1a_PM)
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	0	0	1	0	1	0	2	1	1	2	0
Lane group				L		R		T	R	L	T	
Volume, V (vph)				150		50		1150	310	30	1150	
% Heavy vehicles, %HV				5		5		5	5	5	5	
Peak-hour factor, PHF				0.90		0.90		0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)				P		P		P	P	P	P	
Start-up lost time, l_1				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of effective green, e				2.0		2.0		2.0	2.0	2.0	2.0	
Arrival type, AT				3		3		3	3	3	3	
Unit extension, UE				3.0		3.0		3.0	3.0	3.0	3.0	
Filtering/metering, I				1.000	1.000	1.000		1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b				0.0		0.0		0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0			0		10	0		50			
Lane width				12.0		12.0		12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B				0		0		0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2					

Phasing	WB Only	02	03	04	SB Only	NS Perm	07	08
Timing	G = 20.0	G =	G =	G =	G = 10.0	G = 45.0	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 90.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				167		44		1278	289	33	1278	
Lane group capacity, c				382		598		1723	1196	293	2297	
v/c ratio, X				0.44		0.07		0.74	0.24	0.11	0.56	
Total green ratio, g/C				0.22		0.39		0.50	0.78	0.67	0.67	

Uniform delay, d_1				30.2		17.3		17.9	2.7	9.4	7.9	
Progression factor, PF				1.000		1.000		1.000	1.000	1.000	1.000	
Delay calibration, k				0.50		0.50		0.50	0.50	0.50	0.50	
Incremental delay, d_2				3.6		0.2		2.9	0.5	0.8	1.0	
Initial queue delay, d_3												
Control delay				33.8		17.5		20.8	3.2	10.2	8.9	
Lane group LOS				C		B		C	A	B	A	
Approach delay				30.4				17.6		9.0		
Approach LOS				C				B		A		
Intersection delay	14.8			X_c = 0.58				Intersection LOS		B		

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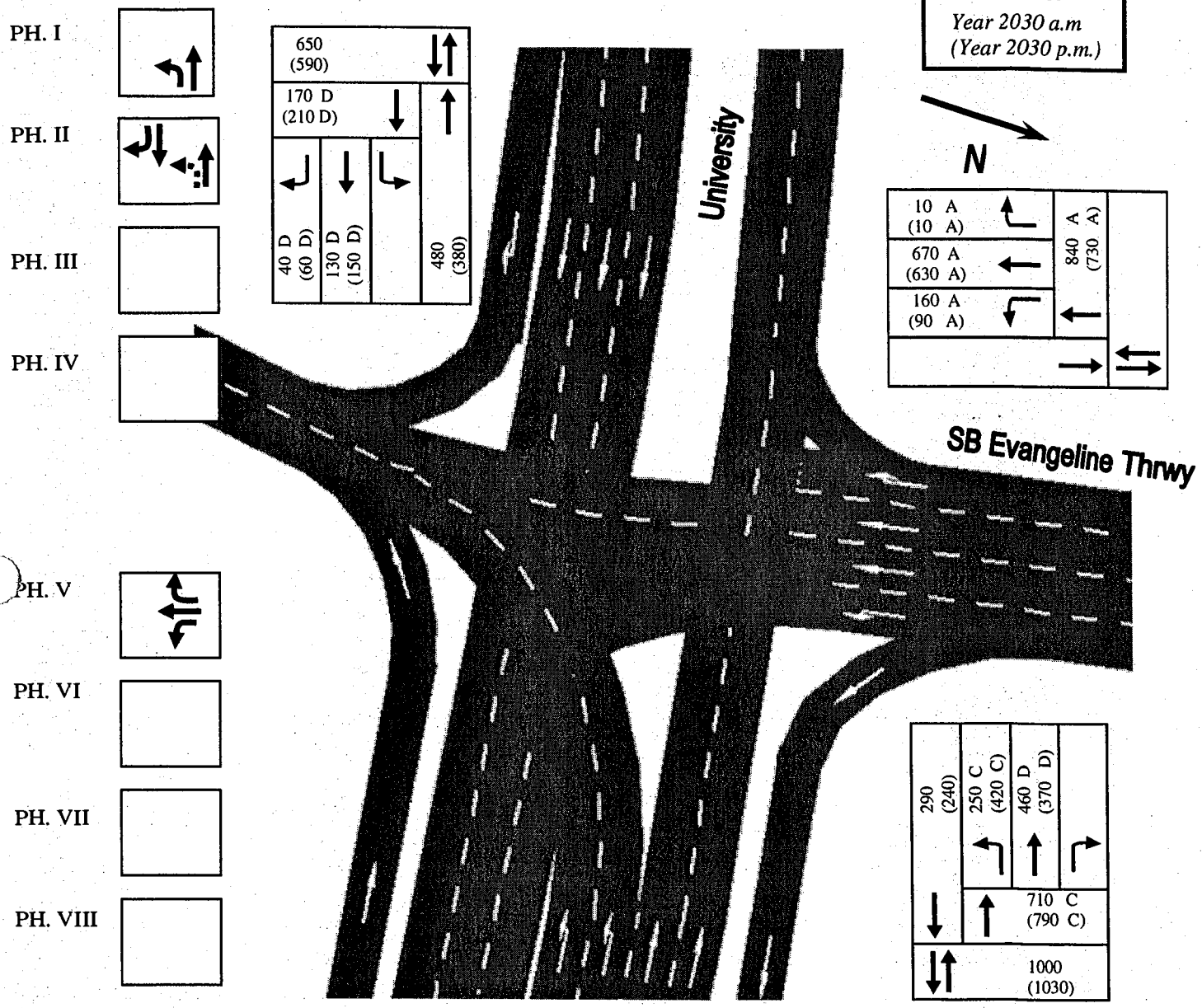
SIGNALIZED INTERSECTION

Intersection at UNIVERSITY AND SB EVANGELINE THRUWAY

S – 2a
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	B	B
Control Delay:	17.4 sec/veh	19.3 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	University/SB Evg (S2a_AM)
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	2	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		130	40	250	460					160	670	10
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		20				0			0		5
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 25.0	G = 20.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		144	22	278	511					178	744	6
Lane group capacity, c		822	256	952	1435					860	1723	769
v/c ratio, X		0.18	0.09	0.29	0.36					0.21	0.43	0.01
Total green ratio, g/C		0.17	0.17	0.42	0.42					0.50	0.50	0.50
Uniform delay, d_1		42.9	42.3	22.4	24.0					16.7	19.1	15.1

Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.5	0.7	0.8	0.7					0.5	0.8	0.0
Initial queue delay, d_3												
Control delay		43.4	42.9	23.2	24.7					6.1	7.2	5.0
Lane group LOS		D	D	C	C					A	A	A
Approach delay	43.3			24.1						7.0		
Approach LOS	D			C						A		
Intersection delay	17.4			X_c = 0.40			Intersection LOS			B		

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Version 4.1e

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	University/SB Evg (S2a_PM)
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	2	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		150	60	420	370					90	630	10
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		20				0			0		5
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 25.0	G = 20.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		167	44	467	411					100	700	6
Lane group capacity, c		822	256	941	1435					860	1723	769
v/c ratio, X		0.20	0.17	0.50	0.29					0.12	0.41	0.01
Total green ratio, g/C		0.17	0.17	0.42	0.42					0.50	0.50	0.50
Uniform delay, d_1		43.1	42.9	23.9	23.2					15.9	18.8	15.1

Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.6	1.5	1.9	0.5					0.3	0.7	0.0
Initial queue delay, d_3												
Control delay		43.7	44.3	25.8	23.7					5.6	7.0	5.0
Lane group LOS		D	D	C	C					A	A	A
Approach delay	43.8			24.8						6.8		
Approach LOS	D			C						A		
Intersection delay	19.3			X_c = 0.43			Intersection LOS			B		

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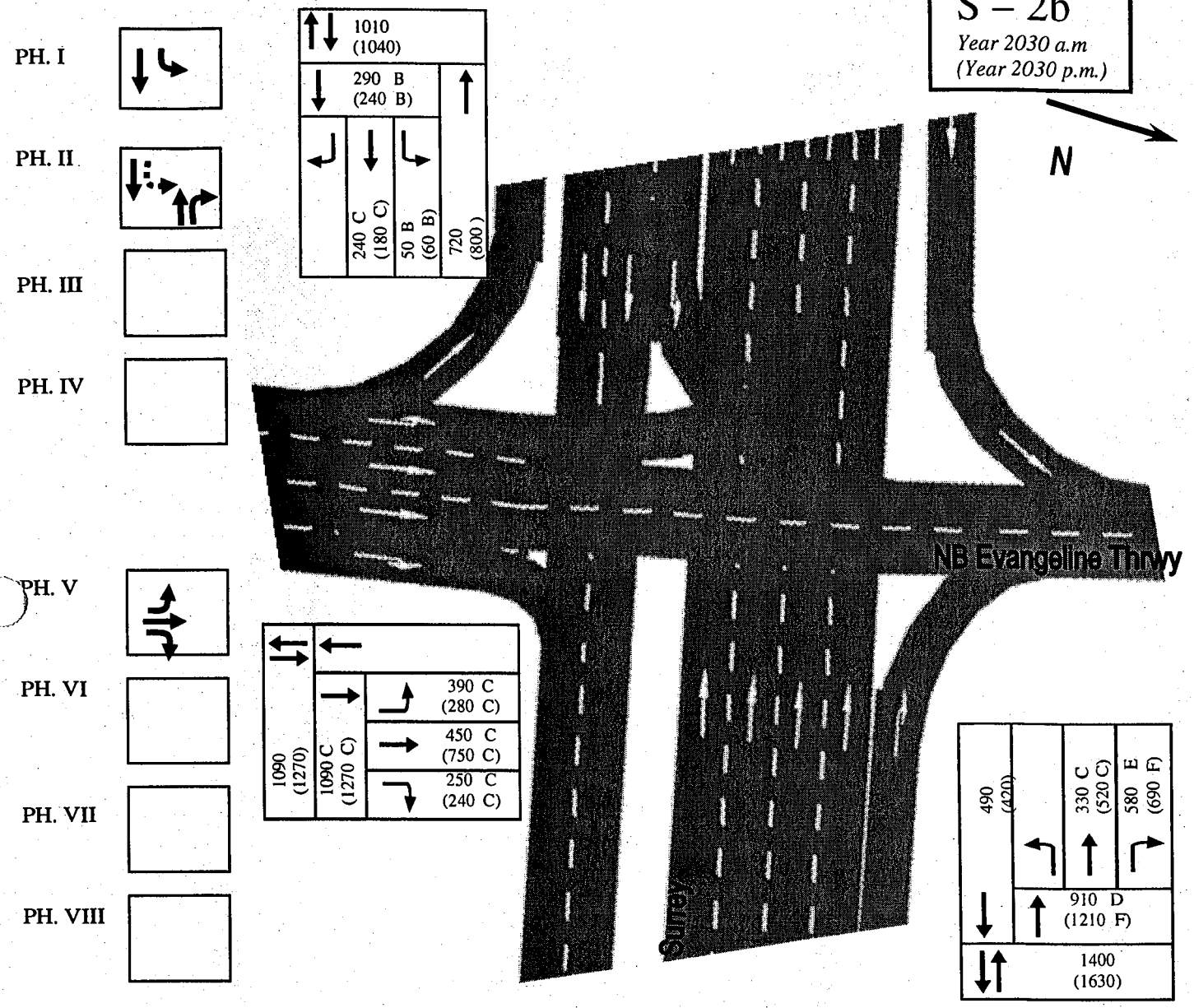
SIGNALIZED INTERSECTION

Intersection at SURREY AND NB EVANGELINE THRUWAY

S – 2b
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**C**	**D**
Control Delay:	**31.3 sec/veh**	**50 sec/veh**

COMMENTS:
Consider double right turn lane for Surrey WB during geometric design phase.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Surrey & NB Evg (S2b_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	0	4	1	2	2	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	50	240			330	580	390	450	250			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	3	3	3			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		150	0		0	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 45.0	G =	G =	G = 50.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	56	267			367	478	433	500	278			
Lane group capacity, c	449	1551			2218	519	1252	1292	577			
v/c ratio, X	0.12	0.17			0.17	0.92	0.35	0.39	0.48			
Total green ratio, g/C	0.50	0.50			0.38	0.38	0.42	0.42	0.42			
Uniform delay, d_1	15.7	16.4			25.0	35.8	23.9	24.3	25.5			

Progression factor, PF	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	0.6	0.2			0.2	24.1	0.8	0.9	2.9			
Initial queue delay, d_3												
Control delay	16.2	16.7			25.1	59.9	24.6	25.2	28.4			
Lane group LOS	B	B			C	E	C	C	C			
Approach delay	16.6			44.8			25.7					
Approach LOS	B			D			C					
Intersection delay	31.3			X_c = 0.67			Intersection LOS			C		

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Version 4.1e

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Surrey & NB Evg (S2b_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	0	4	1	2	2	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	60	180			250	690	280	750	240			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	3	3	3			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		150	0		0	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 45.0	G =	G =	G = 50.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	67	200			278	600	311	833	267			
Lane group capacity, c	479	1551			2218	519	1252	1292	577			
v/c ratio, X	0.14	0.13			0.13	1.16	0.25	0.64	0.46			
Total green ratio, g/C	0.50	0.50			0.38	0.38	0.42	0.42	0.42			
Uniform delay, d_1	15.8	16.0			24.6	37.5	22.8	27.9	25.3			

Progression factor, PF	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	0.6	0.2			0.1	90.2	0.5	2.5	2.7			
Initial queue delay, d_3												
Control delay	16.4	16.2			24.7	127.7	23.2	30.4	28.0			
Lane group LOS	B	B			C	F	C	C	C			
Approach delay	16.3			95.1			28.4					
Approach LOS	B			F			C					
Intersection delay	50.0			X_c = 0.85			Intersection LOS			D		

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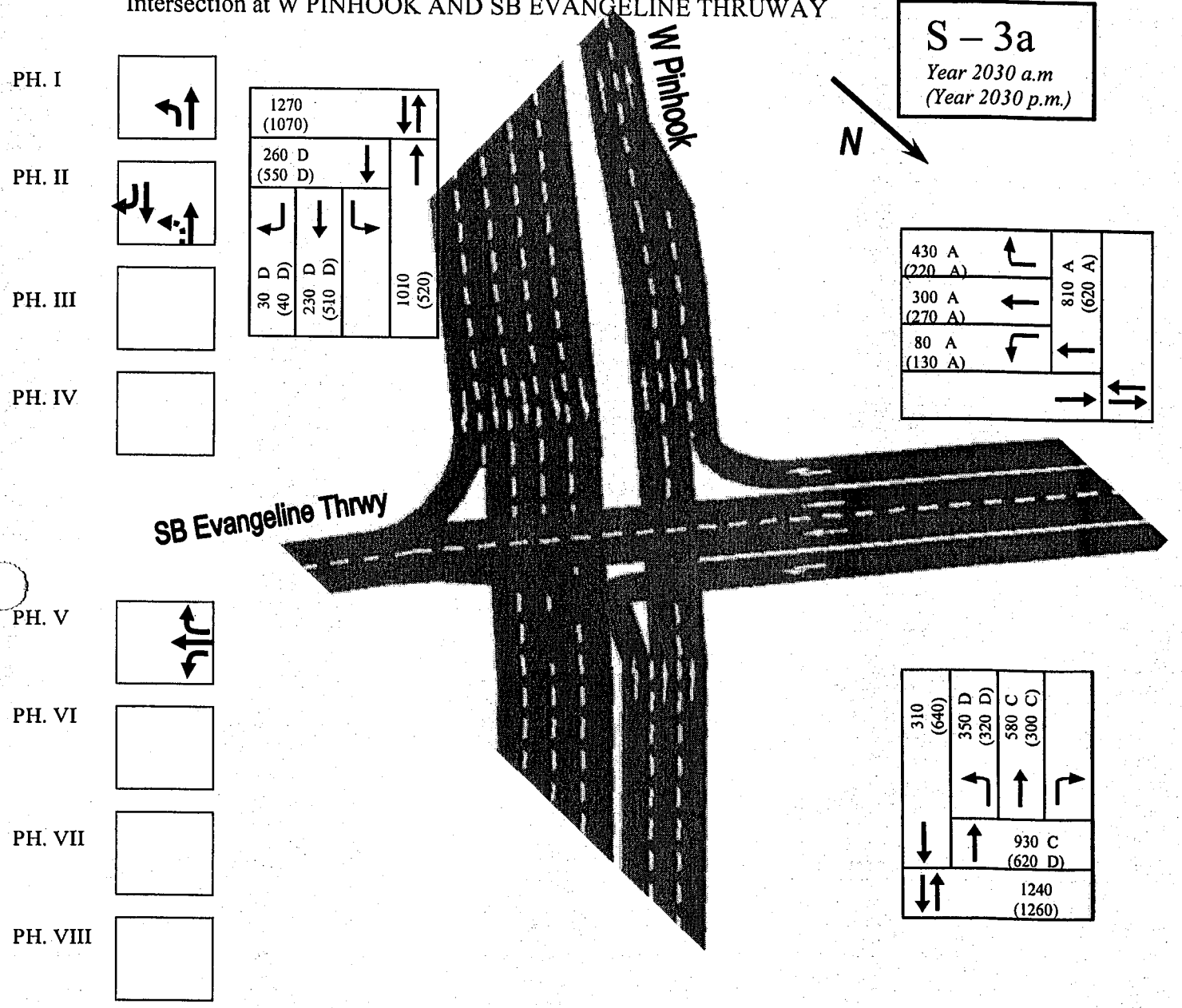
SIGNALIZED INTERSECTION

Intersection at W PINHOOK AND SB EVANGELINE THRUWAY

S – 3a
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	C
Control Delay:	26.1 sec/veh	29.4 sec/veh

COMMENTS: Consider a double left turn lane WB during detailed design phase. Need acceleration lane to allow free flow right turns SB.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Pinhook/SB Evg (S3a_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	4	1	1	2	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		230	30	350	580					80	300	430
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		20				0			0		300
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 25.0	G = 20.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		256	11	389	644					89	333	144
Lane group capacity, c		986	231	481	1292					774	1551	692
v/c ratio, X		0.26	0.05	0.81	0.50					0.11	0.21	0.21
Total green ratio, g/C		0.17	0.17	0.42	0.42					0.50	0.50	0.50
Uniform delay, d_1		43.6	42.0	27.5	25.8					15.9	16.8	16.7

Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.6	0.4	13.7	1.4					0.3	0.3	0.7
Initial queue delay, d_3												
Control delay		44.2	42.4	41.1	27.1					5.6	5.9	6.3
Lane group LOS		D	D	D	C					A	A	A
Approach delay	44.1			32.4					6.0			
Approach LOS	D			C					A			
Intersection delay	26.1			$X_c = 0.44$			Intersection LOS		C			

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Pinhook/SB Evg (S3a_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	4	1	1	2	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		510	40	320	300					130	270	220
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		20				0			0		0
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 25.0	G = 20.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		567	22	356	333					144	300	244
Lane group capacity, c		986	231	412	1292					774	1551	692
v/c ratio, X		0.58	0.10	0.86	0.26					0.19	0.19	0.35
Total green ratio, g/C		0.17	0.17	0.42	0.42					0.50	0.50	0.50
Uniform delay, d_1		46.1	42.3	27.3	22.9					16.5	16.6	18.2

Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		2.4	0.8	20.7	0.5					0.5	0.3	1.4
Initial queue delay, d_3												
Control delay		48.5	43.2	48.0	23.4					6.0	5.8	7.5
Lane group LOS		D	D	D	C					A	A	A
Approach delay	48.3			36.1						6.5		
Approach LOS	D			D						A		
Intersection delay	29.4			X_c = 0.55			Intersection LOS			C		

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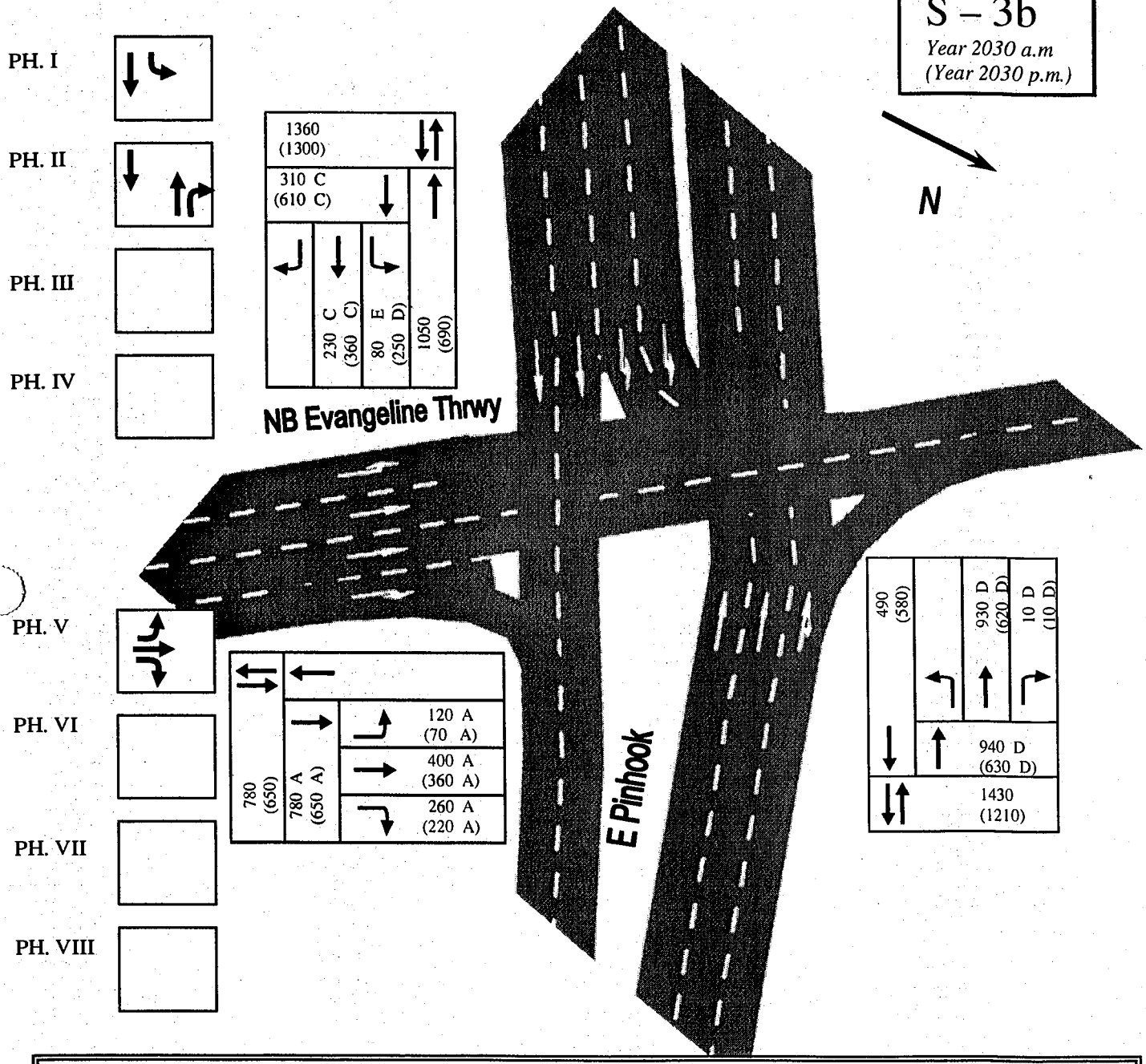
SIGNALIZED INTERSECTION

Intersection at E PINHOOK AND NB EVANGELINE THRUWAY

S – 3b
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	C
Control Delay:	28.2 sec/veh	30.3 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Pinhook & NB Evg (S3b_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	0	0	3	0	1	2	1	0	0	0
Lane group	L	T			TR		L	T	R			
Volume, V (vph)	80	230			930	10	120	400	260			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0		2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0		2.0	2.0	2.0			
Arrival type, AT	3	3			3		5	5	5			
Unit extension, UE	3.0	3.0			3.0		3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000		1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0		0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		0	0		
Lane width	12.0	12.0			12.0		12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0		0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	89	256			1044		133	444	289			
Lane group capacity, c	250	1292			1292		774	1551	692			
v/c ratio, X	0.36	0.20			0.81		0.17	0.29	0.42			
Total green ratio, g/C	0.08	0.42			0.29		0.50	0.50	0.50			

Uniform delay, d_1	52.0	22.3			39.4		16.4	17.5	19.0			
Progression factor, PF	1.000	1.000			1.000		0.333	0.333	0.333			
Delay calibration, k	0.50	0.50			0.50		0.50	0.50	0.50			
Incremental delay, d_2	3.9	0.3			5.5		0.5	0.5	1.9			
Initial queue delay, d_3												
Control delay	55.9	22.6			44.9		6.0	6.3	8.2			
Lane group LOS	E	C			D		A	A	A			
Approach delay	31.2				44.9		6.9					
Approach LOS	C				D		A					
Intersection delay	28.2				X_c = 0.54		Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Pinhook & NB Evg (S3b_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	0	0	3	0	1	2	1	0	0	0
Lane group	L	T			TR		L	T	R			
Volume, V (vph)	250	360			620	10	70	360	220			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0		2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0		2.0	2.0	2.0			
Arrival type, AT	3	3			3		5	5	5			
Unit extension, UE	3.0	3.0			3.0		3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000		1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0		0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		0	0		
Lane width	12.0	12.0			12.0		12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0		0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 25.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	278	400			700		78	400	244			
Lane group capacity, c	501	1292			922		774	1551	692			
v/c ratio, X	0.55	0.31			0.76		0.10	0.26	0.35			
Total green ratio, g/C	0.17	0.42			0.21		0.50	0.50	0.50			

Uniform delay, d_1	45.9	23.4			44.7		15.8	17.2	18.2			
Progression factor, PF	1.000	1.000			1.000		0.333	0.333	0.333			
Delay calibration, k	0.50	0.50			0.50		0.50	0.50	0.50			
Incremental delay, d_2	4.4	0.6			5.8		0.3	0.4	1.4			
Initial queue delay, d_3												
Control delay	50.3	24.1			50.5		5.5	6.1	7.5			
Lane group LOS	D	C			D		A	A	A			
Approach delay	34.8			50.5			6.5					
Approach LOS	C			D			A					
Intersection delay	30.3			X_c = 0.49			Intersection LOS			C		

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SIGNALIZED INTERSECTION

Intersection at 14TH AND SB EVANGELINE THRUWAY

S – 4
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH. II

PH. III

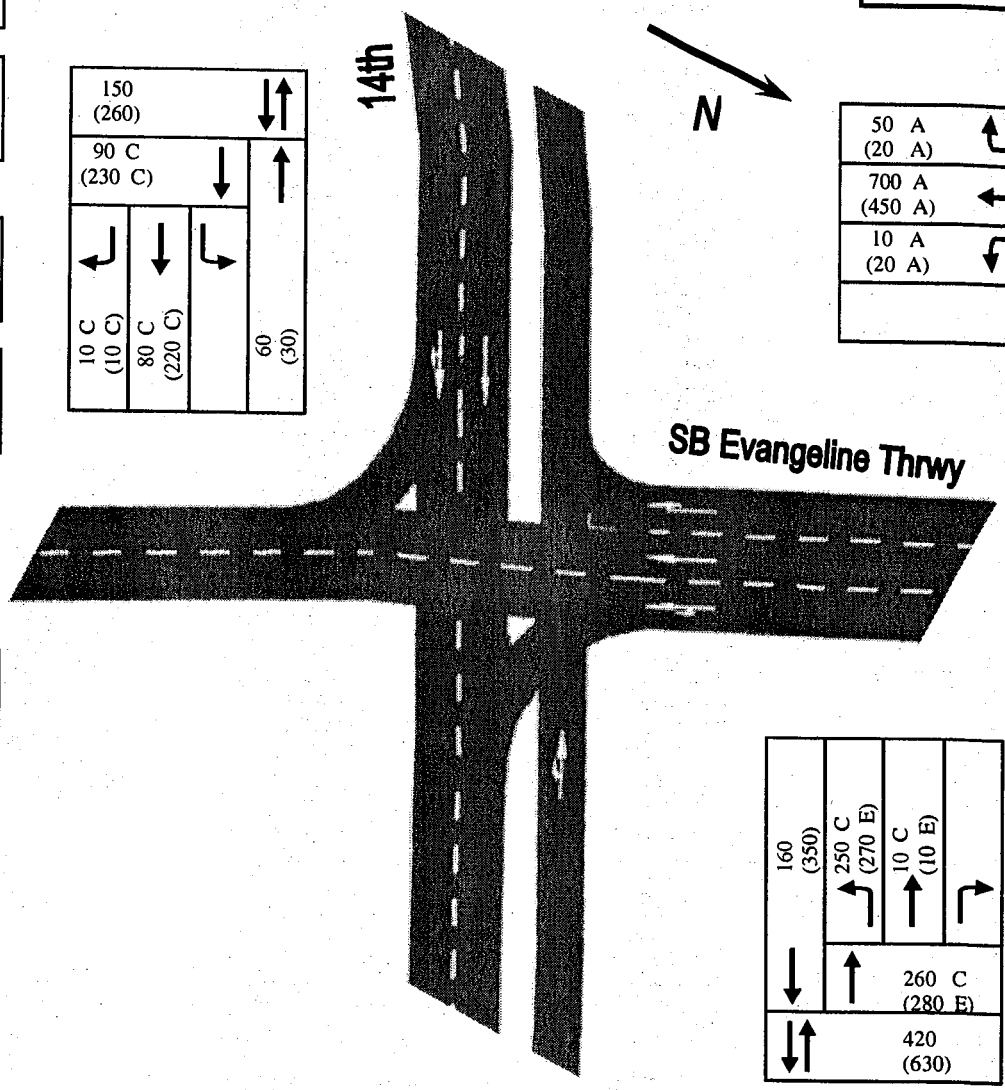
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**B**	**C**
Control Delay:	**15.3 sec/veh**	**25.1 sec/veh**

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	14th/SB Evg (S4_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	0	1	0	0	0	0	0	2	1
Lane group		TR			LT						LT	R
Volume, V (vph)		80	10	250	10					10	700	50
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0			2.0						2.0	2.0
Extension of effective green, e		2.0			2.0						2.0	2.0
Arrival type, AT		3			3						5	5
Unit extension, UE		3.0			3.0						3.0	3.0
Filtering/metering, I		1.000			1.000						1.000	1.000
Initial unmet demand, Q_b		0.0			0.0						0.0	0.0
Ped / Bike / RTOR volumes	0		0				0			0		5
Lane width		12.0			12.0						12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0						0	0
Min. time for pedestrians, G_p		3.2						3.2			3.2	

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 50.0	G =	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		100			289						789	50
Lane group capacity, c		1271			447						1550	692
v/c ratio, X		0.08			0.65						0.51	0.07
Total green ratio, g/C		0.42			0.42						0.50	0.50
Uniform delay, d_1		21.1			27.9						20.1	15.6

Progression factor, PF		1.000			1.000						0.333	0.333
Delay calibration, k		0.50			0.50						0.50	0.50
Incremental delay, d_2		0.1			7.1						1.2	0.2
Initial queue delay, d_3												
Control delay		21.2			35.0						7.9	5.4
Lane group LOS		C			C						A	A
Approach delay	21.2			35.0						7.8		
Approach LOS	C			C						A		
Intersection delay	15.3			X_c = 0.57			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	14th/SB Evg (S4_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	0	1	0	0	0	0	0	2	1
Lane group		TR			LT						LT	R
Volume, V (vph)		220	10	270	10					20	450	20
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0			2.0						2.0	2.0
Extension of effective green, e		2.0			2.0						2.0	2.0
Arrival type, AT		3			3						5	5
Unit extension, UE		3.0			3.0						3.0	3.0
Filtering/metering, I		1.000			1.000						1.000	1.000
Initial unmet demand, Q_b		0.0			0.0						0.0	0.0
Ped / Bike / RTOR volumes	0		0				0			0		5
Lane width		12.0			12.0						12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0						0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 50.0	G =	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		255			311						522	17
Lane group capacity, c		1284			350						1547	692
v/c ratio, X		0.20			0.89						0.34	0.02
Total green ratio, g/C		0.42			0.42						0.50	0.50
Uniform delay, d_1		22.3			32.4						18.0	15.2

Progression factor, PF		1.000			1.000						0.333	0.333
Delay calibration, k		0.50			0.50						0.50	0.50
Incremental delay, d_2		0.3			26.7						0.6	0.1
Initial queue delay, d_3												
Control delay		22.6			59.2						6.6	5.1
Lane group LOS		C			E						A	A
Approach delay	22.6			59.2						6.6		
Approach LOS	C			E						A		
Intersection delay	25.1			$X_c = 0.59$			Intersection LOS			C		

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SIGNALIZED INTERSECTION

Intersection at 14TH AND NB EVANGELINE THRUWAY

S – 5
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH. II

PH. III

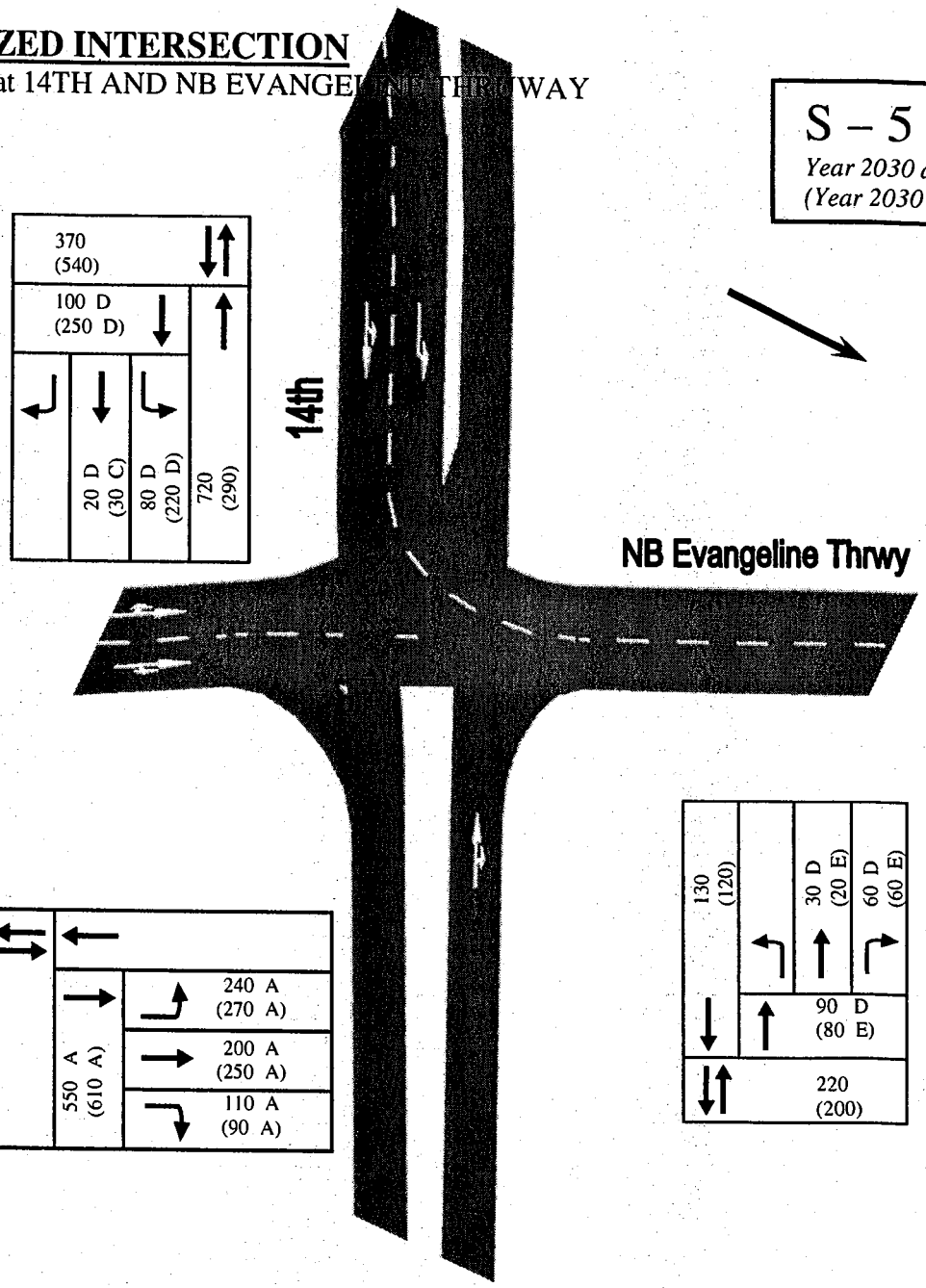
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**B**	**C**
Control Delay:	**16.9 sec/veh**	**22.0 sec/veh**

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	14th & NB Evg (S5_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	1	0	0	2	0	0	0	0
Lane group	L	LT			TR			LTR				
Volume, V (vph)	80	20			30	60	240	200	110			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0			2.0				
Extension of effective green, e	2.0	2.0			2.0			2.0				
Arrival type, AT	3	3			3			5				
Unit extension, UE	3.0	3.0			3.0			3.0				
Filtering/metering, I	1.000	1.000			1.000			1.000				
Initial unmet demand, Q_b	0.0	0.0			0.0			0.0				
Ped / Bike / RTOR volumes				0		0	0		0	0		
Lane width	12.0	12.0			12.0			12.0				
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0			0				
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	WB Only	03	04	NB Only	06	07	08
Timing	G = 25.0	G = 20.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	89	22			100			611				
Lane group capacity, c	322	339			247			1472				
v/c ratio, X	0.28	0.06			0.40			0.42				
Total green ratio, g/C	0.21	0.21			0.17			0.50				
Uniform delay, d_1	39.9	38.1			44.7			18.9				

Progression factor, PF	1.000	1.000			1.000			0.333				
Delay calibration, k	0.50	0.50			0.50			0.50				
Incremental delay, d_2	2.1	0.4			4.9			0.9				
Initial queue delay, d_3												
Control delay	42.0	38.5			49.6			7.2				
Lane group LOS	D	D			D			A				
Approach delay	41.3				49.6			7.2				
Approach LOS	D				D			A				
Intersection delay	16.9				X_c = 0.38			Intersection LOS			B	

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	14th & NB Evg (S5_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	1	0	0	2	0	0	0	0
Lane group	L	LT			TR			LTR				
Volume, V (vph)	220	30			20	60	270	250	90			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0			2.0				
Extension of effective green, e	2.0	2.0			2.0			2.0				
Arrival type, AT	3	3			3			5				
Unit extension, UE	3.0	3.0			3.0			3.0				
Filtering/metering, I	1.000	1.000			1.000			1.000				
Initial unmet demand, Q_b	0.0	0.0			0.0			0.0				
Ped / Bike / RTOR volumes				0		0	0		0	0		
Lane width	12.0	12.0			12.0			12.0				
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0			0				
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	WB Only	03	04	NB Only	06	07	08
Timing	G = 30.0	G = 15.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	244	33			89			678				
Lane group capacity, c	387	407			183			1484				
v/c ratio, X	0.63	0.08			0.49			0.46				
Total green ratio, g/C	0.25	0.25			0.13			0.50				
Uniform delay, d_1	40.1	34.4			48.9			19.4				

Progression factor, PF	1.000	1.000			1.000			0.333				
Delay calibration, k	0.50	0.50			0.50			0.50				
Incremental delay, d_2	7.6	0.4			9.0			1.0				
Initial queue delay, d_3												
Control delay	47.7	34.8			57.9			7.5				
Lane group LOS	D	C			E			A				
Approach delay	46.1			57.9			7.5					
Approach LOS	D			E			A					
Intersection delay	22.0			X_c = 0.51			Intersection LOS			C		

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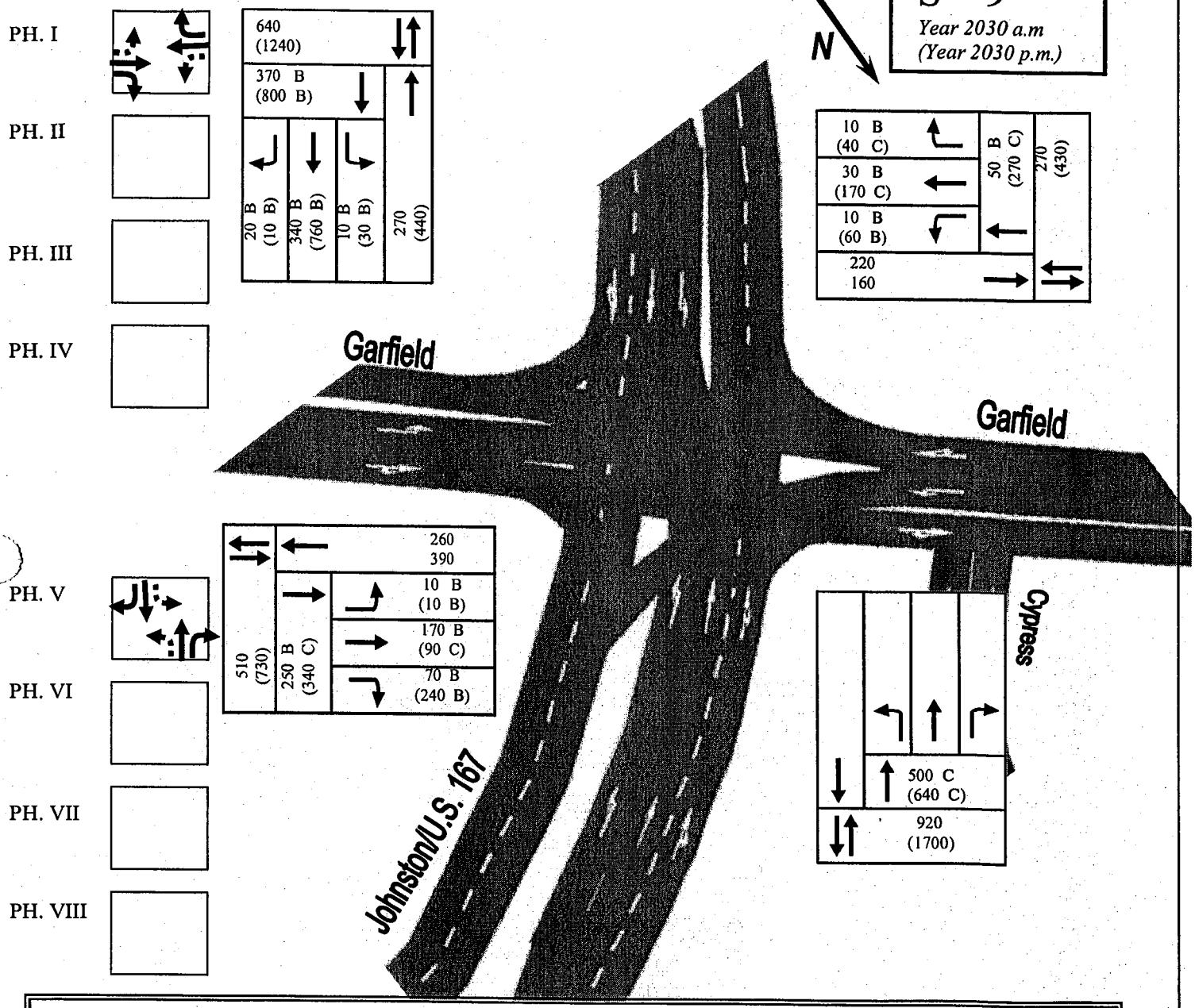
SIGNALIZED INTERSECTION

Intersection at JOHNSTON/US 167 AND CYPRESS/GARFIELD

S – 9
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**C**	**C**
Control Delay:	**21.7 sec/veh**	**22.5 sec/veh**

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Johnston & Garfield (S9_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	1	2	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Volume, V (vph)	10	340	20	210	250	40	10	170	70	10	30	10
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type, AT	3	3		3	3		3	3		3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 50.0	G =	G =	G =	G = 50.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 110.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	11	400		233	322		11	267		11	44	
Lane group capacity, c	402	1398		360	1380		539	708		392	712	
	0.03	0.29		0.65	0.23		0.02	0.38		0.03	0.06	

v/c ratio, X												
Total green ratio, g/C	0.45	0.45		0.45	0.45		0.45	0.45		0.45	0.45	
Uniform delay, d_1	16.6	18.8		23.2	18.3		16.5	19.7		16.6	16.8	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2	0.1	0.5		8.7	0.4		0.1	1.5		0.1	0.2	
Initial queue delay, d_3												
Control delay	16.7	19.3		31.9	18.7		16.6	21.3		16.7	17.0	
Lane group LOS	B	B		C	B		B	C		B	B	
Approach delay	19.3			24.2			21.1			16.9		
Approach LOS	B			C			C			B		
Intersection delay	21.7			X_c = 0.51			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Johnston & Garfield (S9_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	1	2	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Volume, V (vph)	10	340	20	210	390	40	10	90	240	60	170	40
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type, AT	3	3		3	3		3	3		3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 50.0	G =	G =	G =	G = 50.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 110.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	11	400		233	477		11	367		67	233	
Lane group capacity, c	322	1398		360	1390		419	660		319	719	
	0.03	0.29		0.65	0.34		0.03	0.56		0.21	0.32	

v/c ratio, X												
Total green ratio, g/C	0.45	0.45		0.45	0.45		0.45	0.45		0.45	0.45	
Uniform delay, d_1	16.6	18.8		23.2	19.4		16.6	21.9		18.1	19.2	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2	0.2	0.5		8.7	0.7		0.1	3.4		1.5	1.2	
Initial queue delay, d_3												
Control delay	16.8	19.3		31.9	20.1		16.7	25.3		19.6	20.4	
Lane group LOS	B	B		C	C		B	C		B	C	
Approach delay	19.3			23.9			25.0			20.2		
Approach LOS	B			C			C			C		
Intersection delay	22.5			X_c = 0.60			Intersection LOS			C		

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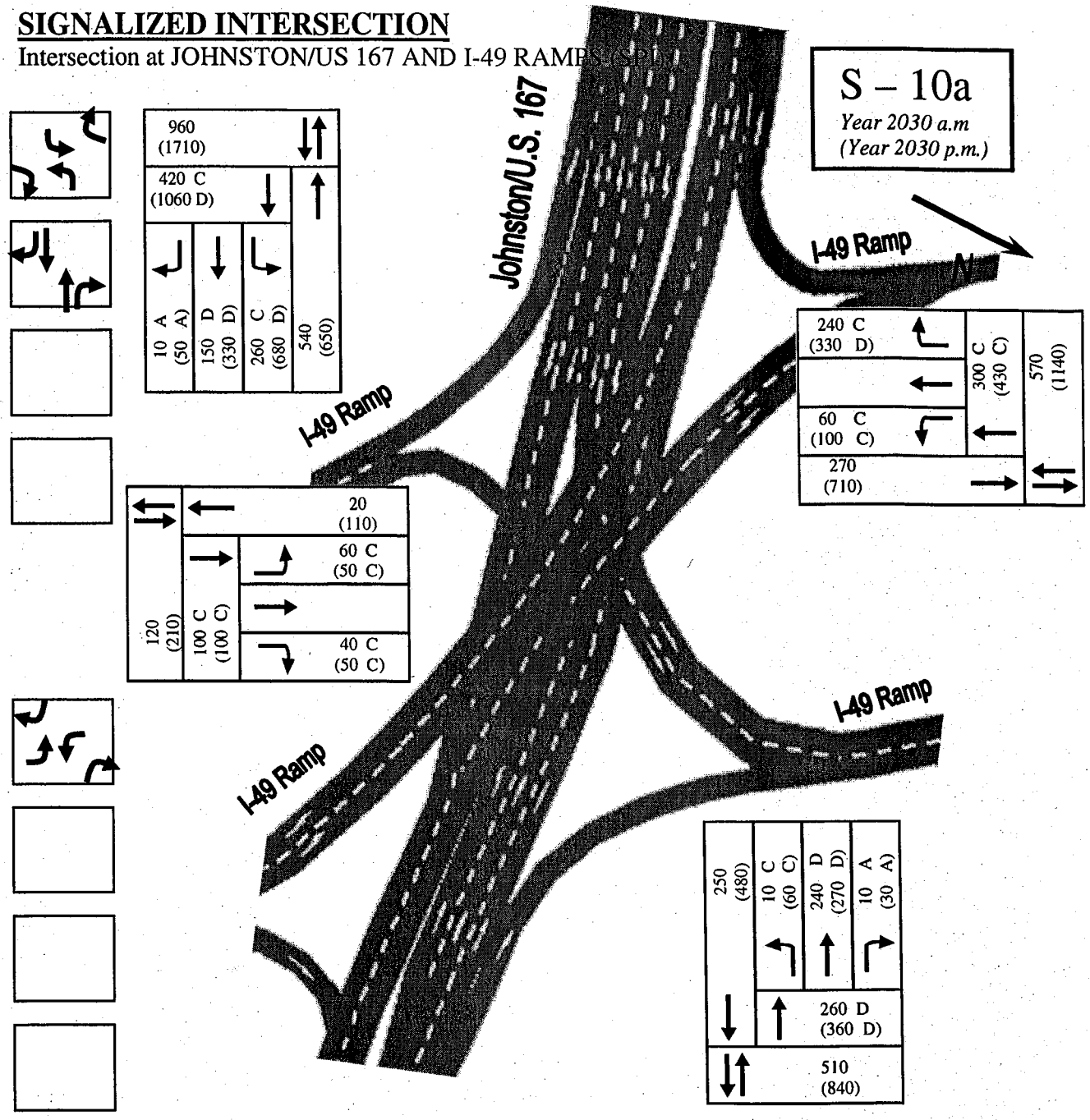
SIGNALIZED INTERSECTION

Intersection at JOHNSTON/US 167 AND I-49 RAMPS (SPD)

S – 10a
Year 2030 a.m
(Year 2030 p.m.)

PH. I
PH. II
PH. III
PH. IV
PH. V
PH. VI
PH. VII
PH. VIII



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	D
Control Delay:	34.0 sec/veh	41.0 sec/veh

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	I-49 Ramps & Johnst (S10a_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	1	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	260	150	10	10	240	10	60		40	60		240
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		2	0		2	0		10	0		200
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 35.0	G = 30.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	289	167	9	11	267	9	67		33	67		44
Lane group capacity, c	876	775	865	451	775	865	1002		404	1002		404
	0.33	0.22	0.01	0.02	0.34	0.01	0.07		0.08	0.07		0.11

v/c ratio, X												
Total green ratio, g/C	0.29	0.25	0.63	0.29	0.25	0.63	0.33		0.29	0.33		0.29
Uniform delay, d_1	33.3	35.7	8.5	30.3	36.9	8.5	27.3		30.8	27.3		31.1
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	1.0	0.6	0.0	0.1	1.2	0.0	0.1		0.4	0.1		0.5
Initial queue delay, d_3												
Control delay	34.3	36.3	8.5	30.4	38.1	8.5	27.4		31.2	27.4		31.6
Lane group LOS	C	D	A	C	D	A	C		C	C		C
Approach delay	34.5			36.9			28.7			29.1		
Approach LOS	C			D			C			C		
Intersection delay	34.0			X_c = 0.23			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	I-49 Ramps & Johnst (S10a_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	1	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	680	330	50	60	270	30	50		50	100		330
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		2	0		2	0		10	0		200
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 35.0	G = 30.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 120.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	756	367	53	67	300	31	56		44	111		144
Lane group capacity, c	876	775	865	451	775	865	1002		404	1002		404
	0.86	0.47	0.06	0.15	0.39	0.04	0.06		0.11	0.11		0.36

v/c ratio, X												
Total green ratio, g/C	0.29	0.25	0.63	0.29	0.25	0.63	0.33		0.29	0.33		0.29
Uniform delay, d_1	40.2	38.3	8.8	31.5	37.4	8.6	27.2		31.1	27.7		33.6
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	11.0	2.1	0.1	0.7	1.5	0.1	0.1		0.5	0.2		2.4
Initial queue delay, d_3												
Control delay	51.2	40.4	8.9	32.2	38.8	8.7	27.3		31.6	27.9		36.0
Lane group LOS	D	D	A	C	D	A	C		C	C		D
Approach delay	45.9			35.4			29.2			32.5		
Approach LOS	D			D			C			C		
Intersection delay	41.1			X_c = 0.46			Intersection LOS			D		

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SIGNALIZED INTERSECTION

Intersection at JOHNSTON/US 167 AND SB EVANGELINE THRUWAY

S – 10
Year 2030 a.m
(Year 2030 p.m.)

N

PH. I

PH. II

PH. III

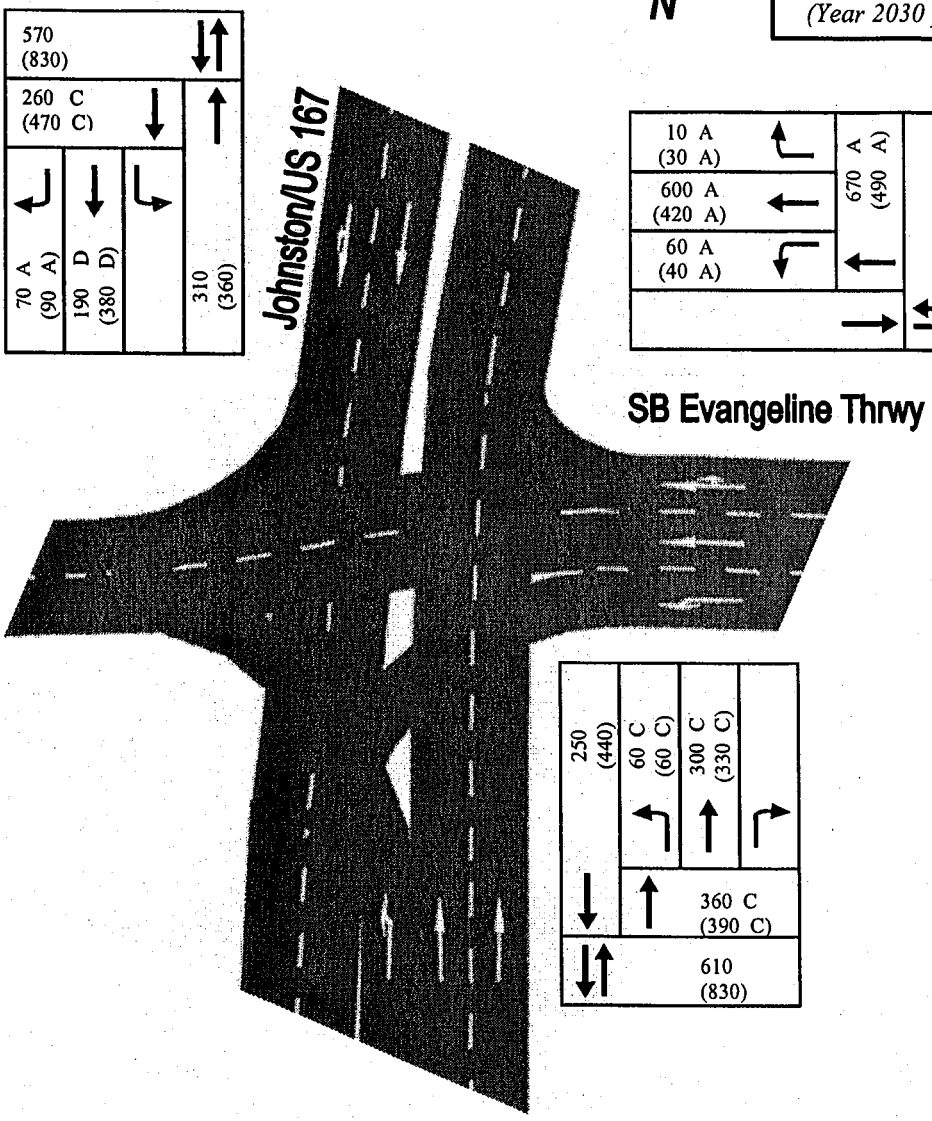
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**B**	**C**
Control Delay:	**17.7 sec/veh**	**24.7 sec/veh**

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	Louisiana & SB Evg (S10_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	1	2	0	0	0	0	1	2	0
Lane group		TR		L	T					L	TR	
Volume, V (vph)		190	70	60	300					60	600	10
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0		2.0	2.0					2.0	2.0	
Extension of effective green, e		2.0		2.0	2.0					2.0	2.0	
Arrival type, AT		3		3	3					5	5	
Unit extension, UE		3.0		3.0	3.0					3.0	3.0	
Filtering/metering, I		1.000		1.000	1.000					1.000	1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0					0.0	0.0	
Ped / Bike / RTOR volumes	0		14				0			0		2
Lane width		12.0		12.0	12.0					12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0					0	0	
Min. time for pedestrians, G_p		3.2						3.2			3.2	

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		273		67	333					67	676	
Lane group capacity, c		749		409	1292					774	1548	
v/c ratio, X		0.36		0.16	0.26					0.09	0.44	
Total green ratio, g/C		0.25		0.42	0.42					0.50	0.50	

Uniform delay, d_1		37.1		21.6	22.9					15.7	19.2	
Progression factor, PF		1.000		1.000	1.000					0.333	0.333	
Delay calibration, k		0.50		0.50	0.50					0.50	0.50	
Incremental delay, d_2		1.4		0.9	0.5					0.2	0.9	
Initial queue delay, d_3												
Control delay		38.5		22.5	23.4					5.4	7.3	
Lane group LOS		D		C	C					A	A	
Approach delay	38.5			23.2						7.1		
Approach LOS	D			C						A		
Intersection delay	17.7			X_c = 0.40			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	Louisiana & SB Evg (S10_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	1	2	0	0	0	0	1	2	0
Lane group		TR		L	T					L	TR	
Volume, V (vph)		380	90	60	330					40	420	30
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0		2.0	2.0					2.0	2.0	
Extension of effective green, e		2.0		2.0	2.0					2.0	2.0	
Arrival type, AT		3		3	3					5	5	
Unit extension, UE		3.0		3.0	3.0					3.0	3.0	
Filtering/metering, I		1.000		1.000	1.000					1.000	1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0					0.0	0.0	
Ped / Bike / RTOR volumes	0		14				0			0		2
Lane width		12.0		12.0	12.0					12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0					0	0	
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		506		67	367					44	498	
Lane group capacity, c		756		316	1292					774	1536	
v/c ratio, X		0.67		0.21	0.28					0.06	0.32	
Total green ratio, g/C		0.25		0.42	0.42					0.50	0.50	

Uniform delay, d_1		40.5		22.5	23.2					15.4	17.9	
Progression factor, PF		1.000		1.000	1.000					0.333	0.333	
Delay calibration, k		0.50		0.50	0.50					0.50	0.50	
Incremental delay, d_2		4.7		1.5	0.6					0.1	0.6	
Initial queue delay, d_3												
Control delay		45.2		24.0	23.7					5.3	6.5	
Lane group LOS		D		C	C					A	A	
Approach delay	45.2			23.8						6.4		
Approach LOS	D			C						A		
Intersection delay	24.7			X_c = 0.43			Intersection LOS			C		

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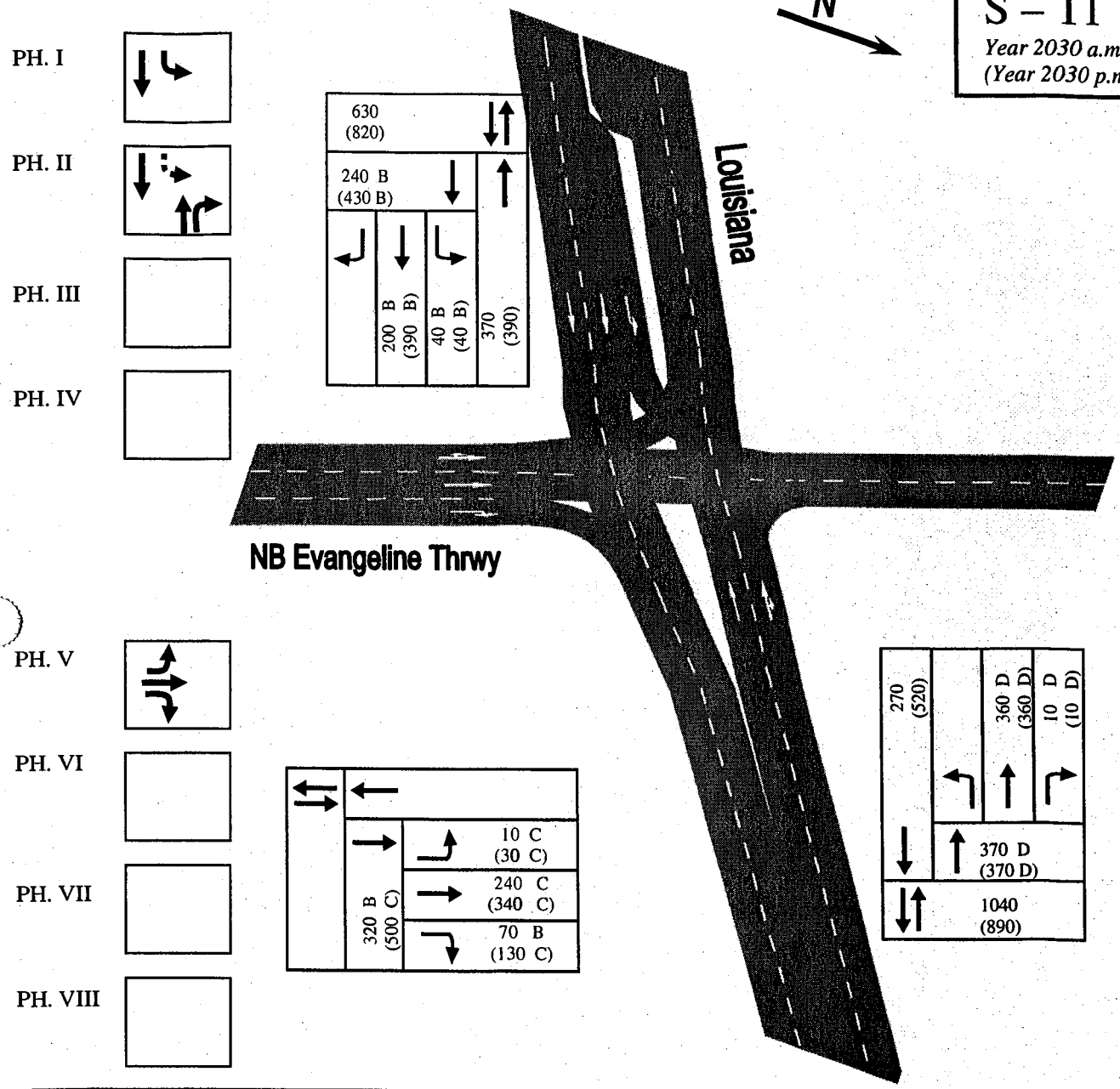
SIGNALIZED INTERSECTION

Intersection at LOUISIANA AND NB EVANGELINE

S – 11
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	C
Control Delay:	26.7 sec/veh	25.2 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Louisiana & NB Evg (S11_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	2	0	0	2	1	0	0	0
Lane group	L	T			TR			LT	R			
Volume, V (vph)	40	200			360	10	10	240	70			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0			2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0			2.0	2.0			
Arrival type, AT	3	3			3			5	5			
Unit extension, UE	3.0	3.0			3.0			3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000			1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0			0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		15	0		
Lane width	12.0	12.0			12.0			12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0			0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 35.0	G = 30.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	44	222			411			278	61			
Lane group capacity, c	609	950			772			1032	461			
v/c ratio, X	0.07	0.23			0.53			0.27	0.13			
Total green ratio, g/C	0.58	0.58			0.25			0.33	0.33			

Uniform delay, d_1	11.4	12.1			38.9			29.3	27.9			
Progression factor, PF	1.000	1.000			1.000			0.667	0.667			
Delay calibration, k	0.50	0.50			0.50			0.50	0.50			
Incremental delay, d_2	0.2	0.6			2.6			0.6	0.6			
Initial queue delay, d_3												
Control delay	11.6	12.6			41.6			20.2	19.2			
Lane group LOS	B	B			D			C	B			
Approach delay	12.5				41.6			20.0				
Approach LOS	B				D			B				
Intersection delay	26.7				X_c = 0.29			Intersection LOS			C	

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Louisiana & NB Evg (S11_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	2	0	0	2	1	0	0	0
Lane group	L	T			TR			LT	R			
Volume, V (vph)	40	390			360	10	30	340	130			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0			2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0			2.0	2.0			
Arrival type, AT	3	3			3			5	5			
Unit extension, UE	3.0	3.0			3.0			3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000			1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0			0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		15	0		
Lane width	12.0	12.0			12.0			12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0			0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 35.0	G = 30.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	44	433			411			411	128			
Lane group capacity, c	609	950			772			1029	461			
v/c ratio, X	0.07	0.46			0.53			0.40	0.28			
Total green ratio, g/C	0.58	0.58			0.25			0.33	0.33			

Uniform delay, d_1	11.4	14.2			38.9			30.8	29.4			
Progression factor, PF	1.000	1.000			1.000			0.667	0.667			
Delay calibration, k	0.50	0.50			0.50			0.50	0.50			
Incremental delay, d_2	0.2	1.6			2.6			1.2	1.5			
Initial queue delay, d_3												
Control delay	11.6	15.8			41.6			21.7	21.1			
Lane group LOS	B	B			D			C	C			
Approach delay	15.4				41.6			21.5				
Approach LOS	B				D			C				
Intersection delay	25.2				X_c = 0.44			Intersection LOS			C	

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SIGNALIZED INTERSECTION

Intersection at JEFFERSON AND CYPRESS

S – 15
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH. II

PH. III

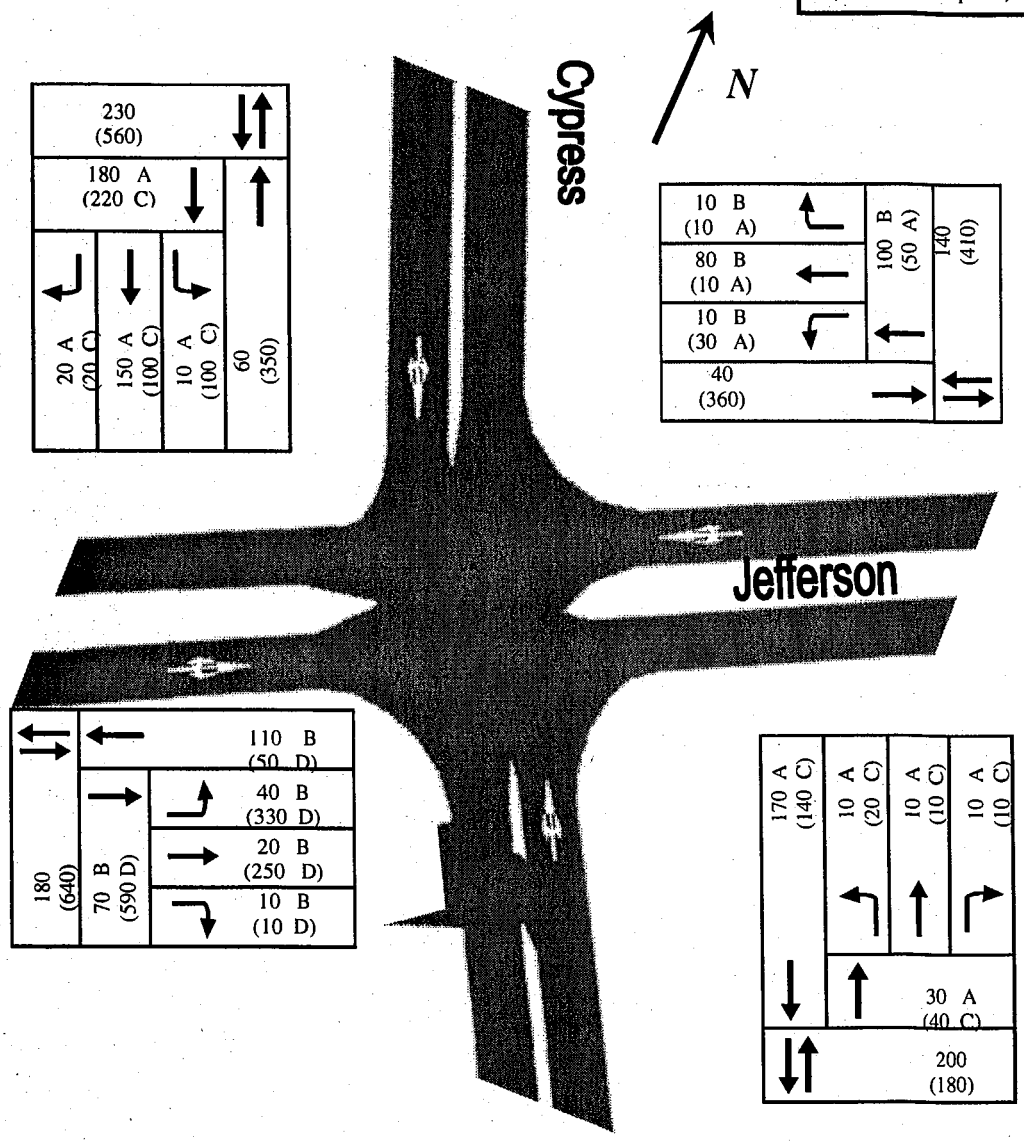
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	B	C
Control Delay:	11.8 sec/veh	31.4 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Jefferson & Cypress (S15_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	40	20	10	10	80	10	10	10	10	10	150	20
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0			12.0			12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 30.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		77			111			33			200	
Lane group capacity, c		436			523			716			795	
v/c ratio, X		0.18			0.21			0.05			0.25	

Total green ratio, g/C		0.33			0.33			0.50			0.50	
Uniform delay, d_1		14.2			14.3			7.7			8.6	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		0.9			0.9			0.1			0.8	
Initial queue delay, d_3												
Control delay		15.1			15.3			7.8			9.3	
Lane group LOS		B			B			A			A	
Approach delay	15.1			15.3			7.8			9.3		
Approach LOS	B			B			A			A		
Intersection delay	11.8			X_c = 0.24			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Jefferson & Cypress (S15_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	330	250	10	30	10	10	20	10	10	100	100	20
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0			12.0			12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 35.0	G =	G =	G =	G = 20.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 65.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		656			55			44			244	
Lane group capacity, c		696			594			398			413	
v/c ratio, X		0.94			0.09			0.11			0.59	

Total green ratio, g/C		0.54			0.54			0.31			0.31	
Uniform delay, d_1		14.1			7.3			16.1			19.0	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		22.6			0.3			0.6			6.1	
Initial queue delay, d_3												
Control delay		36.7			7.6			16.7			25.1	
Lane group LOS		D			A			B			C	
Approach delay	36.7			7.6			16.7			25.1		
Approach LOS	D			A			B			C		
Intersection delay	31.4			X_c = 0.81			Intersection LOS			C		

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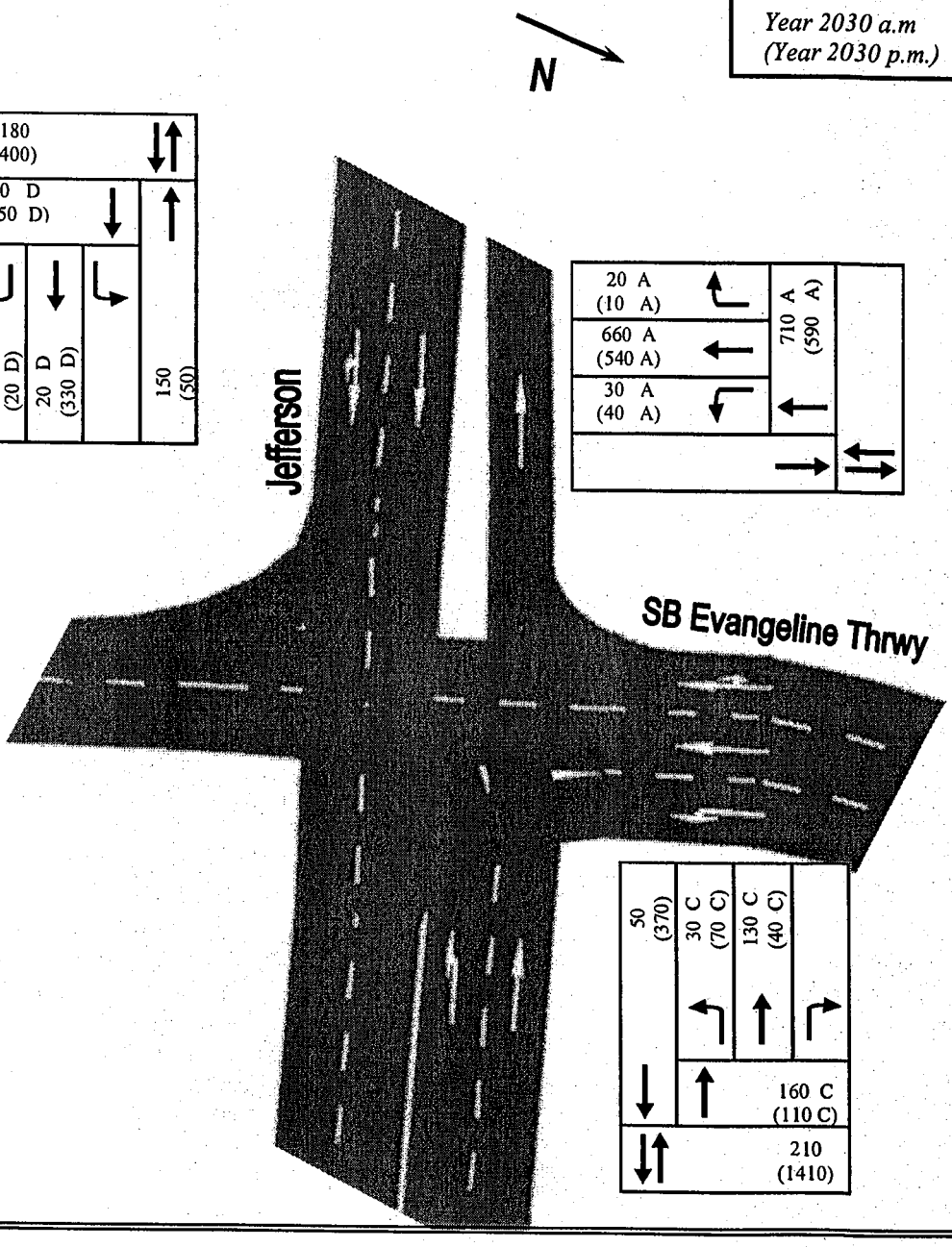
SIGNALIZED INTERSECTION

Intersection at JEFFERSON AND SB EVANGELINE THRUWAY

S – 16
Year 2030 a.m
(Year 2030 p.m.)

PH. I
PH. II
PH. III
PH. IV
PH. V
PH. VI
PH. VII
PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**B**	**C**
Control Delay:	**11.2 sec/veh**	**22.0 sec/veh**

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	DLR	Intersection	Jefferson & SB Evg (S16_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	0	2	0	0	0	0	1	2	0
Lane group		TR			LT					L	TR	
Volume, V (vph)		20	10	30	130					30	660	20
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0			2.0					2.0	2.0	
Extension of effective green, e		2.0			2.0					2.0	2.0	
Arrival type, AT		3			3					5	5	
Unit extension, UE		3.0			3.0					3.0	3.0	
Filtering/metering, I		1.000			1.000					1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0					0.0	0.0	
Ped / Bike / RTOR volumes	0		0				0			0		0
Lane width		12.0			12.0					12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0					0	0	
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 20.0	G = 25.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		33			177					33	755	
Lane group capacity, c		614			1136					774	1544	
v/c ratio, X		0.05			0.16					0.04	0.49	
Total green ratio, g/C		0.21			0.42					0.50	0.50	

Uniform delay, d_1		38.0			21.8					15.3	19.9	
Progression factor, PF		1.000			1.000					0.333	0.333	
Delay calibration, k		0.50			0.50					0.50	0.50	
Incremental delay, d_2		0.2			0.3					0.1	1.1	
Initial queue delay, d_3												
Control delay		38.2			22.1					5.2	7.7	
Lane group LOS		D			C					A	A	
Approach delay	38.2			22.1						7.6		
Approach LOS	D			C						A		
Intersection delay	11.2			X_c = 0.36			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Jefferson & SB Evg (S16_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	0	2	0	0	0	0	1	2	0
Lane group		TR		DefL	T					L	TR	
Volume, V (vph)		330	20	70	40					40	540	10
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0		2.0	2.0					2.0	2.0	
Extension of effective green, e		2.0		2.0	2.0					2.0	2.0	
Arrival type, AT		3		3	3					5	5	
Unit extension, UE		3.0		3.0	3.0					3.0	3.0	
Filtering/metering, I		1.000		1.000	1.000					1.000	1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0					0.0	0.0	
Ped / Bike / RTOR volumes	0		0				0			0		0
Lane width		12.0		12.0	12.0					12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0					0	0	
Min. time for pedestrians, G_p		3.2						3.2			3.2	

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 20.0	G = 25.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		389		78	44					44	611	
Lane group capacity, c		640		385	679					774	1546	
v/c ratio, X		0.61		0.20	0.06					0.06	0.40	
Total green ratio, g/C		0.21		0.42	0.42					0.50	0.50	

Uniform delay, d_1		43.1		22.2	21.0					15.4	18.7	
Progression factor, PF		1.000		1.000	1.000					0.333	0.333	
Delay calibration, k		0.50		0.50	0.50					0.50	0.50	
Incremental delay, d_2		4.3		1.2	0.2					0.1	0.8	
Initial queue delay, d_3												
Control delay		47.3		23.4	21.2					5.3	7.0	
Lane group LOS		D		C	C					A	A	
Approach delay	47.3			22.6						6.9		
Approach LOS	D			C						A		
Intersection delay	22.0			X_c = 0.43			Intersection LOS			C		

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SIGNALIZED INTERSECTION

Intersection at JEFFERSON AND NB EVANGELINE THRUWAY

S – 17
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH. II

PH. III

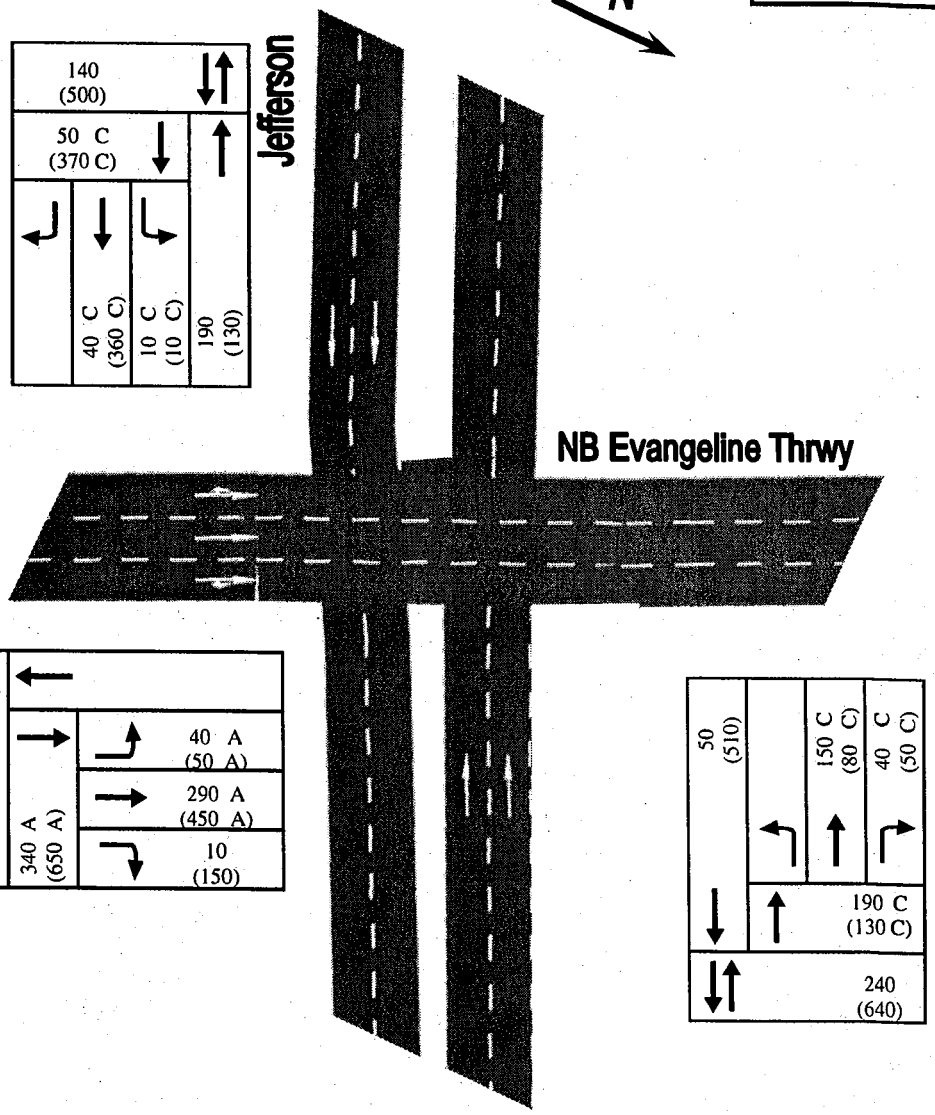
PH. IV

0
PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**B**	**B**
Control Delay:	**15.6 sec/veh**	**15.1 sec/veh**

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Jefferson & NB Evg (S17_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	0	2	0	0	3	0	0	0	0
Lane group		LT			TR			LTR				
Volume, V (vph)	10	40			150	40	40	290	10			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1		2.0			2.0			2.0				
Extension of effective green, e		2.0			2.0			2.0				
Arrival type, AT		3			3			5				
Unit extension, UE		3.0			3.0			3.0				
Filtering/metering, I		1.000			1.000			1.000				
Initial unmet demand, Q_b		0.0			0.0			0.0				
Ped / Bike / RTOR volumes				0		10	0		0	0		
Lane width		12.0			12.0			12.0				
Parking / Grade / Parking	N	0	N	N	0	N	Y	0	Y	N		N
Parking maneuvers, N_m							10		10			
Buses stopping, N_B		0			0			0				
Min. time for pedestrians, G_p					3.2			3.2			3.2	

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		55			200			377				
Lane group capacity, c		1140			882			2049				
v/c ratio, X		0.05			0.23			0.18				
Total green ratio, g/C		0.42			0.29			0.50				

Uniform delay, d_1		20.8			32.2			16.5				
Progression factor, PF		1.000			1.000			0.333				
Delay calibration, k		0.50			0.50			0.50				
Incremental delay, d_2		0.1			0.6			0.2				
Initial queue delay, d_3												
Control delay		20.9			32.8			5.7				
Lane group LOS		C			C			A				
Approach delay	20.9			32.8			5.7					
Approach LOS	C			C			A					
Intersection delay	15.6			X_c = 0.20			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Jefferson & NB Evg (S17_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	0	0	2	0	0	3	0	0	0	0
Lane group		LT			TR			LTR				
Volume, V (vph)	10	360			80	50	50	450	150			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1		2.0			2.0			2.0				
Extension of effective green, e		2.0			2.0			2.0				
Arrival type, AT		3			3			5				
Unit extension, UE		3.0			3.0			3.0				
Filtering/metering, I		1.000			1.000			1.000				
Initial unmet demand, Q_b		0.0			0.0			0.0				
Ped / Bike / RTOR volumes				0		10	0		0	0		
Lane width		12.0			12.0			12.0				
Parking / Grade / Parking	N	0	N	N	0	N	Y	0	Y	N		N
Parking maneuvers, N_m							10		10			
Buses stopping, N_B		0			0			0				
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		411			133			723				
Lane group capacity, c		1231			860			1991				
v/c ratio, X		0.33			0.15			0.36				
Total green ratio, g/C		0.42			0.29			0.50				

Uniform delay, d_1		23.7			31.5			18.3				
Progression factor, PF		1.000			1.000			0.333				
Delay calibration, k		0.50			0.50			0.50				
Incremental delay, d_2		0.7			0.4			0.5				
Initial queue delay, d_3												
Control delay		24.4			31.9			6.6				
Lane group LOS		C			C			A				
Approach delay	24.4			31.9			6.6					
Approach LOS	C			C			A					
Intersection delay	15.1			X_c = 0.35			Intersection LOS			B		

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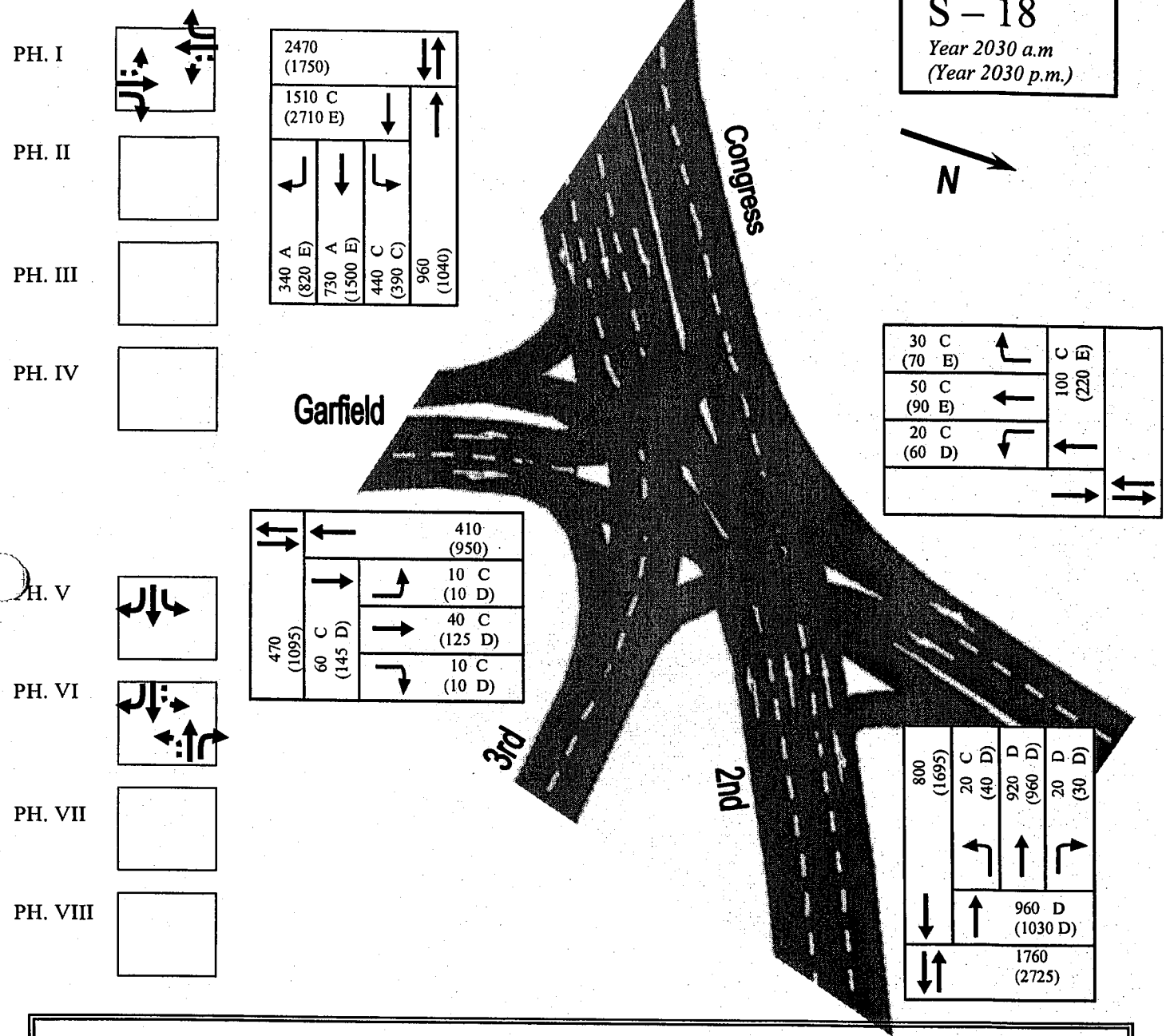
SIGNALIZED INTERSECTION

Intersection at CONGRESS/2ND/3RD AND GARFIELD

S – 18
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	D	E
Control Delay:	35.3 sec/veh	62.8 sec/veh

COMMENTS: No changes to existing intersection. Maybe considered converting EB exclusive left to left-through.

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Congress & Garfield (S18_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	1	2	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Volume, V (vph)	440	730	340	20	920	20	10	40	10	20	50	30
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P		P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type, AT	3	3		3	3		3	3		3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		60	0		0	0		5	0		2
Lane width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 23.0	G = 32.0	G =	G =	G = 20.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 90.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	489	1122		22	1044		11	50		22	87	
Lane group capacity, c	475	1981		147	1099		254	355		262	343	
	1.03	0.57		0.15	0.95		0.04	0.14		0.08	0.25	

v/c ratio, X												
Total green ratio, g/C	0.67	0.67		0.36	0.36		0.22	0.22		0.22	0.22	
Uniform delay, d_1	26.5	8.0		19.7	28.2		27.5	28.1		27.7	28.8	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2	49.1	1.2		2.1	17.5		0.3	0.8		0.6	1.8	
Initial queue delay, d_3												
Control delay	75.5	9.2		21.9	45.7		27.8	28.9		28.4	30.6	
Lane group LOS	E	A		C	D		C	C		C	C	
Approach delay	29.3			45.2			28.7			30.2		
Approach LOS	C			D			C			C		
Intersection delay	35.3			X_c = 0.95			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Congress & Garfield (S18_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	1	2	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Volume, V (vph)	390	1500	820	40	960	30	10	125	10	60	90	70
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P		P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival type, AT	3	3		3	3		3	3		3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		60	0		0	0		5	0		2
Lane width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 30.0	G = 33.0	G =	G =	G = 12.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 90.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	433	2511		44	1100		11	145		67	176	
Lane group capacity, c	596	2224		80	1132		100	216		122	203	
	0.73	1.13		0.55	0.97		0.11	0.67		0.55	0.87	

v/c ratio, X												
Total green ratio, g/C	0.76	0.76		0.37	0.37		0.13	0.13		0.13	0.13	
Uniform delay, d_1	19.8	11.0		22.6	28.0		34.3	37.1		36.5	38.2	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2	7.6	64.5		24.5	20.8		2.2	15.4		16.6	36.1	
Initial queue delay, d_3												
Control delay	27.3	75.5		47.1	48.8		36.5	52.5		53.1	74.3	
Lane group LOS	C	E		D	D		D	D		D	E	
Approach delay	68.4			48.7			51.4			68.4		
Approach LOS	E			D			D			E		
Intersection delay	62.8			X_c =.0.98			Intersection LOS			E		

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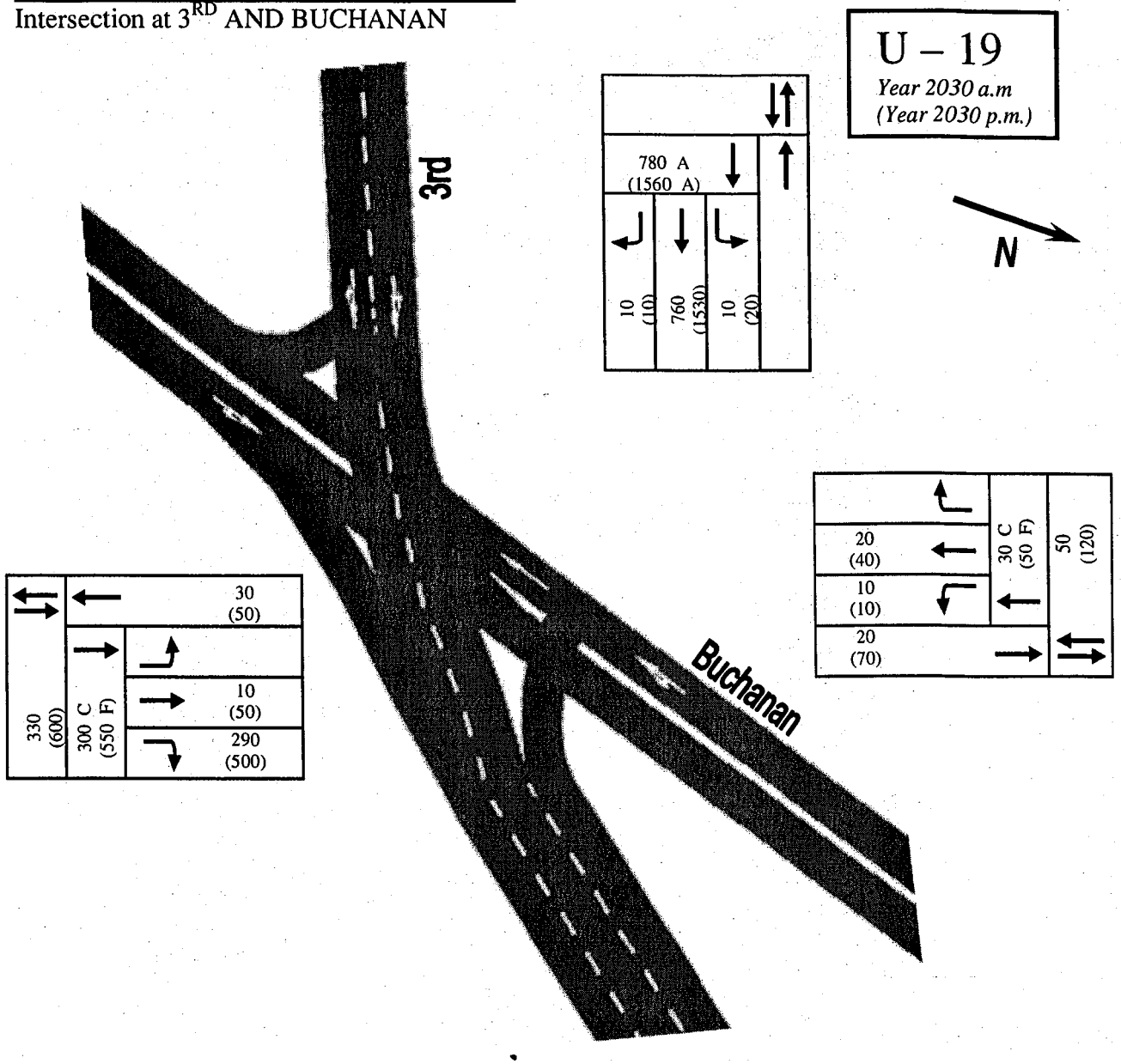
UNSIGNALIZED INTERSECTION

Intersection at 3RD AND BUCHANAN



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	F
Control Delay:	15.7-17.9 sec/veh	372.0 sec/veh

COMMENTS: No change to existing lane geometry at this intersection. Maintain as unsignalized.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	ASM
Agency/Co.	HNTB
Date Performed	11/19/2004
Analysis Time Period	

Site Information

Intersection	3rd & Buchanan (U_19AM)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description *I-49 Connector Operational Analysis*

East/West Street: *2nd/3rd* | North/South Street: *Buchanan*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	10	760	10	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	10	760	10	0	0	0
Proportion of heavy vehicles, P_{HV}	5	--	--	5	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	2	0	0	0	0
Configuration	LT		TR			
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10	10	290	10	20	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	0	10	290	10	20	0
Proportion of heavy vehicles, P_{HV}	2	5	5	5	5	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT				TR	LT		
Volume, v (vph)	10				300	30		
Capacity, c_m (vph)	1604				634	310		
v/c ratio	0.01				0.47	0.10		
Queue length (95%)	0.02				2.54	0.32		

Control Delay (s/veh)	7.3				15.7	17.9		
LOS	A				C	C		
Approach delay (s/veh)	--	--	15.7			17.9		
Approach LOS	--	--	C			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	ASM
Agency/Co.	HNTB
Date Performed	11/19/2004
Analysis Time Period	

Site Information

Intersection	3rd & Buchanan (U_19PM)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description: I-49 Connector Operational Analysis

East/West Street: 2nd/3rd | North/South Street: Buchanan

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	20	1530	10	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	20	1530	10	0	0	0
Proportion of heavy vehicles, P_{HV}	5	--	--	5	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	2	0	0	0	0
Configuration	LT		TR			
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	50	500	10	40	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	0	50	500	10	40	0
Proportion of heavy vehicles, P_{HV}	2	5	5	5	5	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT				TR	LT		
Volume, v (vph)	20				550	50		
Capacity, c_m (vph)	1604				317	0		
v/c ratio	0.01				1.74			
Queue length (95%)	0.04				35.02			

Control Delay (s/veh)	7.3				372.0			
LOS	A				F	F		
Approach delay (s/veh)	--	--	372.0					
Approach LOS	--	--	F					

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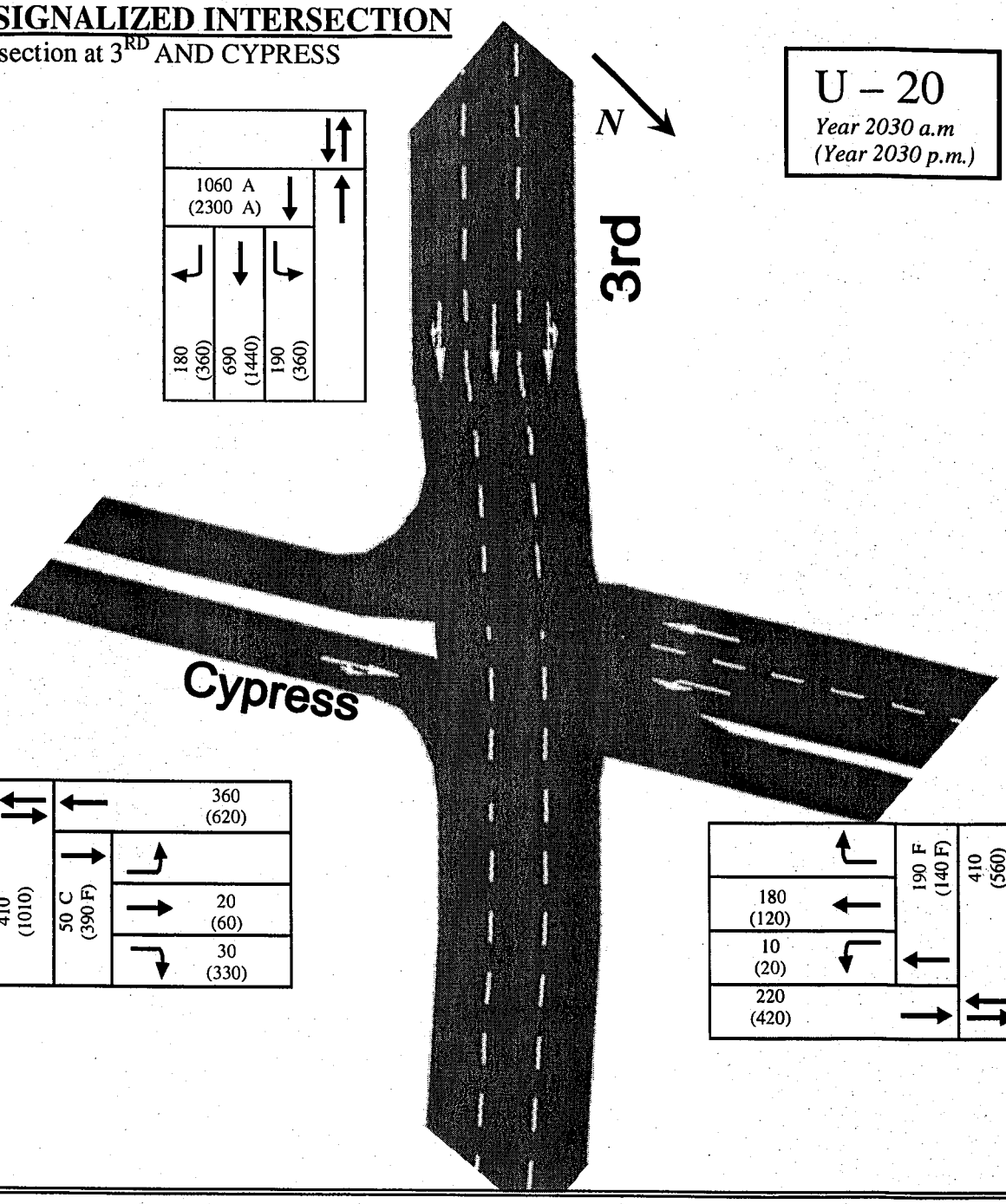
UNSIGNALIZED INTERSECTION

Intersection at 3RD AND CYPRESS

U – 20
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C/F	F
Control Delay:	19.8-203.6 sec/veh	1306 sec/veh

COMMENTS: Consider signal in the future.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	ASM	Intersection	3rd & Cypress (U_20AM)
Agency/Co.	HNTB	Jurisdiction	Lafayette, LA
Date Performed	11/19/2004	Analysis Year	2030
Analysis Time Period			

Project Description *I-49 Connector Operational Analysis*

East/West Street: *3rd* | North/South Street: *Cypress*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	190	690	180	10	10	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	190	690	180	0	0	0
Proportion of heavy vehicles, P_{HV}	5	--	--	5	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	2	0	0	0	0
Configuration	LT		TR			
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10	20	30	10	180	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	0	20	30	10	180	0
Proportion of heavy vehicles, P_{HV}	2	5	5	5	5	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT				TR	L	T	
Volume, v (vph)	190				50	10	180	
Capacity, c_m (vph)	1604				293	254	145	
v/c ratio	0.12				0.17	0.04	1.24	
Queue length (95%)	0.40				0.61	0.12	10.69	
Control Delay (s/veh)	7.5				19.8	19.8	213.8	

LOS	A			C	C	F	
Approach delay (s/veh)	--	--	19.8		203.6		
Approach LOS	--	--	C		F		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	ASM	Intersection	3rd & Cypress (U_20PM)
Agency/Co.	HNTB	Jurisdiction	Lafayette, LA
Date Performed	11/19/2004	Analysis Year	2030
Analysis Time Period			

Project Description	I-49 Connector Operational Analysis
East/West Street: 3rd	North/South Street: Cypress
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	360	1440	360	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	360	1440	360	0	0	0
Proportion of heavy vehicles, P_{HV}	5	--	--	5	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	2	0	0	0	0
Configuration	LT		TR			
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10	60	330	20	120	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	0	60	330	20	120	0
Proportion of heavy vehicles, P_{HV}	2	5	5	5	5	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT				TR	L	T	
Volume, v (vph)	360				390	20	120	
Capacity, c_m (vph)	1604				105	0	16	
v/c ratio	0.22				3.71		7.50	
Queue length (95%)	0.86				39.34		15.84	
Control Delay (s/veh)	7.9				1306		3395	

LOS	A			F	F	F	
Approach delay (s/veh)	--	--	1306				
Approach LOS	--	--	F				

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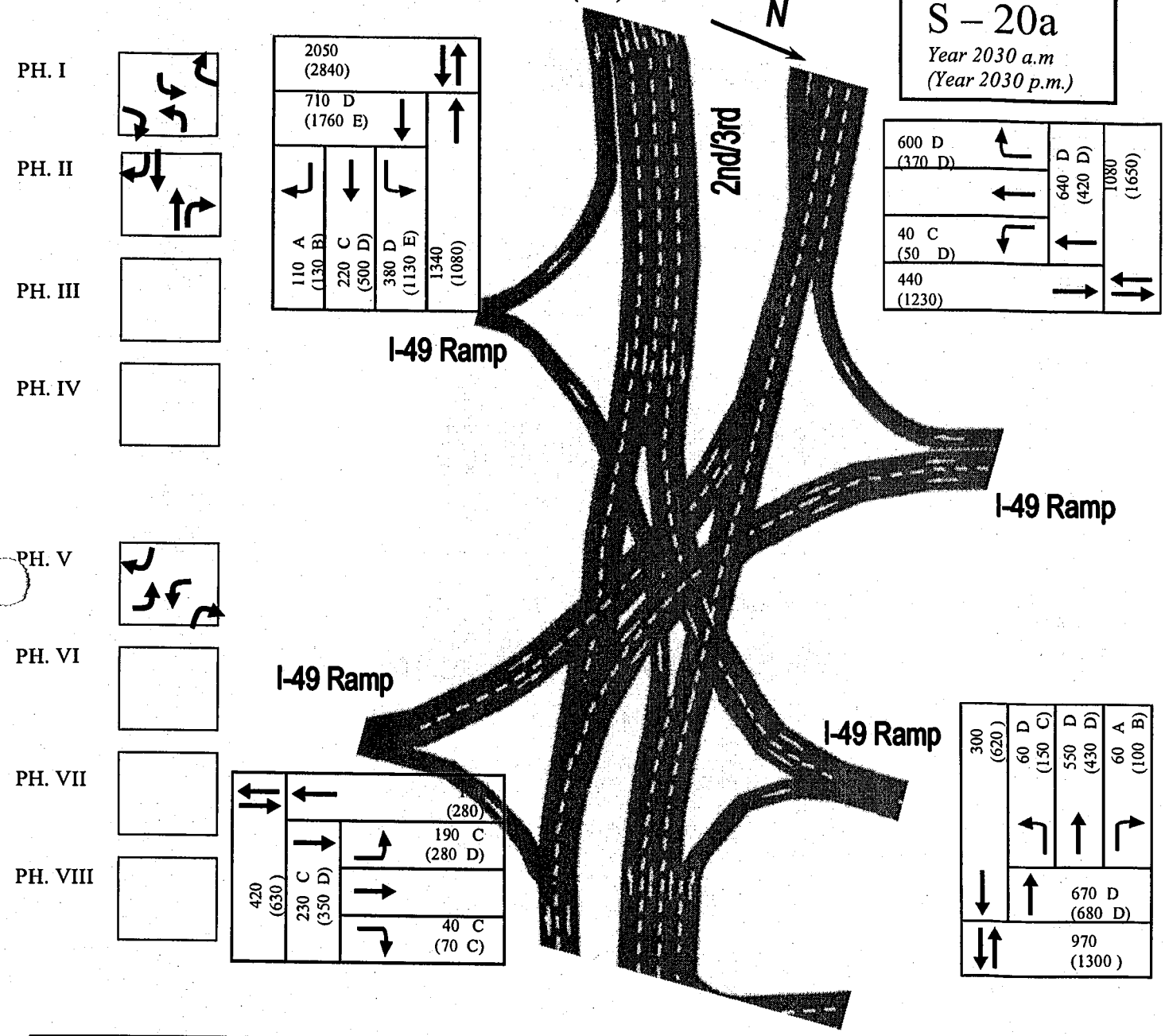
SIGNALIZED INTERSECTION

Intersection at 2ND/3RD AND I-49 RAMPS (SPI)

S – 20a
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	D	D
Control Delay:	36.7 sec/veh	(25.9) sec/veh

COMMENTS: Consider double left turn lane from 2nd/3rd WB to SB I-49 Connector. See Appedix G for additional study.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & I-49 Ramps (S20a_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	1	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	380	220	110	60	550	60	190		40	40		600
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		60	0		30	0		20	0		500
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 30.0	G = 35.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	422	244	56	67	611	33	211		22	44		111
Lane group capacity, c	751	904	923	387	904	923	1002		346	1002		346
	0.56	0.27	0.06	0.17	0.68	0.04	0.21		0.06	0.04		0.32

v/c ratio, X												
Total green ratio, g/C	0.25	0.29	0.67	0.25	0.29	0.67	0.33		0.25	0.33		0.25
Uniform delay, d_1	39.3	32.7	6.9	35.3	37.5	6.8	28.7		34.3	27.1		36.7
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	3.0	0.7	0.1	1.0	4.0	0.1	0.5		0.4	0.1		2.4
Initial queue delay, d_3												
Control delay	42.3	33.4	7.1	36.2	41.5	6.9	29.2		34.6	27.1		39.1
Lane group LOS	D	C	A	D	D	A	C		C	C		D
Approach delay	36.6			39.4			29.7			35.7		
Approach LOS	D			D			C			D		
Intersection delay	36.7			X_c = 0.47			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & I-49 Ramps (S20a_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	1	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	1130	500	130	150	430	100	280		70	50		370
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		60	0		30	0		20	0		500
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 50.0	G = 30.0	G =	G =	G = 25.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	1256	556	78	167	478	78	311		56	56		0
Lane group capacity, c	1252	775	692	645	775	692	626		577	626		577
	1.00	0.72	0.11	0.26	0.62	0.11	0.50		0.10	0.09		0.00

v/c ratio, X												
Total green ratio, g/C	0.42	0.25	0.50	0.42	0.25	0.50	0.21		0.42	0.21		0.42
Uniform delay, d_1	35.0	41.1	15.9	22.9	39.9	15.9	41.9		21.3	38.3		20.4
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	26.2	5.6	0.3	1.0	3.7	0.3	2.8		0.3	0.3		0.0
Initial queue delay, d_3												
Control delay	61.2	46.8	16.2	23.9	43.6	16.2	44.7		21.6	38.6		20.4
Lane group LOS	E	D	B	C	D	B	D		C	D		C
Approach delay	55.1			36.1			41.2			38.6		
Approach LOS	E			D			D			D		
Intersection delay	48.6			X_c = 0.80			Intersection LOS			D		

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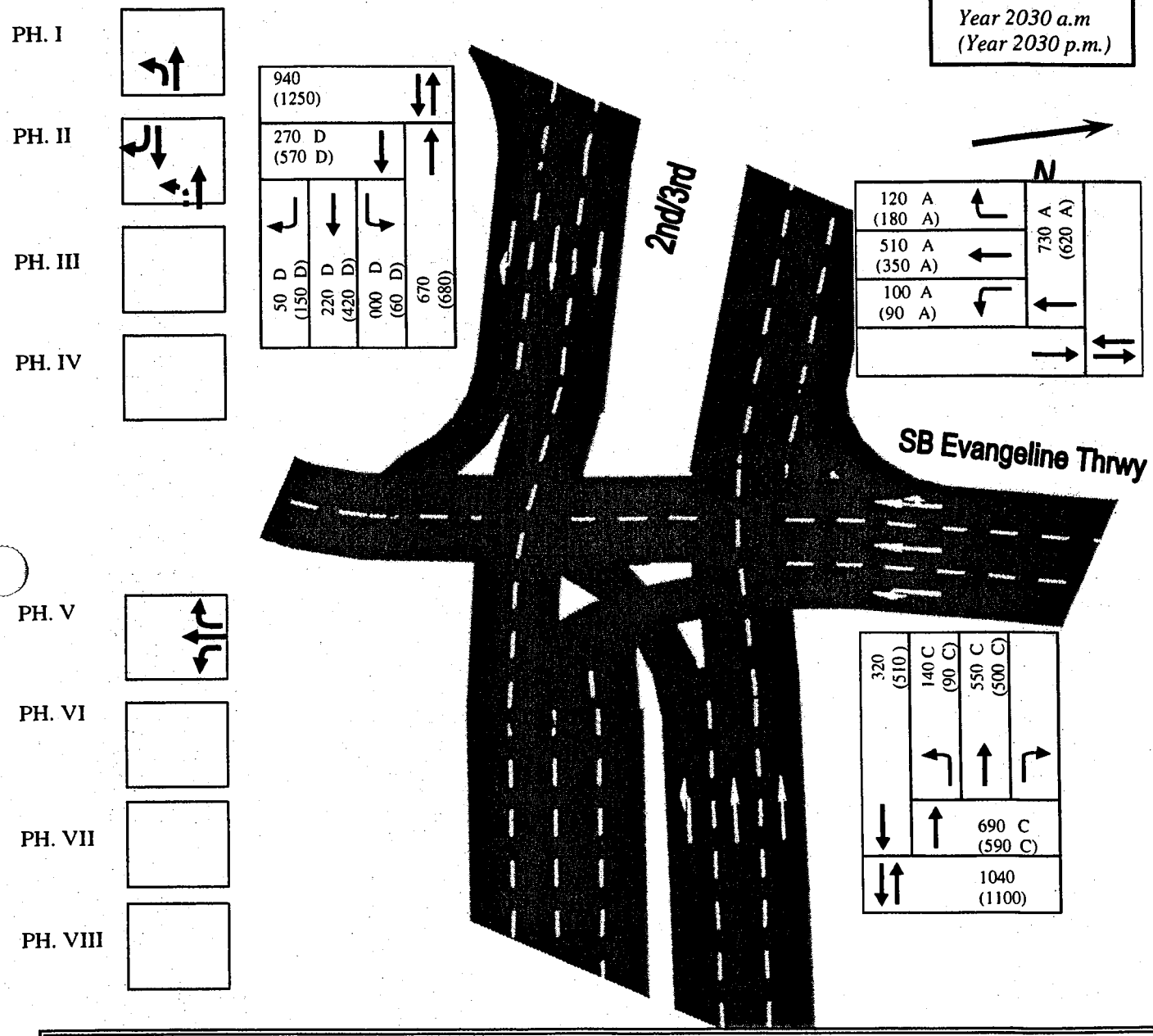
SIGNALIZED INTERSECTION

Intersection at 2ND/3RD AND SB EVANGELINE THRUWAY

S – 21
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	C
Control Delay:	20.4 sec/veh	21.2 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & SB Evang (S21_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	1	3	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		220	50	140	550					100	510	120
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0				0			0		0
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 25.0	G = 20.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		244	56	156	611					111	567	133
Lane group capacity, c		517	231	463	1848					774	1551	692
v/c ratio, X		0.47	0.24	0.34	0.33					0.14	0.37	0.19
Total green ratio, g/C		0.17	0.17	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		45.2	43.4	23.0	23.7					16.2	18.4	16.6
Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		3.1	2.5	2.0	0.5					0.4	0.7	0.6
Initial queue delay, d_3												
Control delay		48.3	45.9	25.0	24.2					5.8	6.8	6.1
Lane group LOS		D	D	C	C					A	A	A
Approach delay	47.8			24.3						6.5		
Approach LOS	D			C						A		
Intersection delay	20.4			X_c = 0.41			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & SB Evang (S21_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	1	3	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		220	150	90	500					90	350	180
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		30				0			0		0
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 20.0	G = 25.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		244	133	100	556					100	389	200
Lane group capacity, c		646	288	443	1848					774	1551	692
v/c ratio, X		0.38	0.46	0.23	0.30					0.13	0.25	0.29
Total green ratio, g/C		0.21	0.21	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		40.8	41.6	22.1	23.3					16.0	17.2	17.5
Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		1.7	5.2	1.2	0.4					0.3	0.4	1.1
Initial queue delay, d_3												
Control delay		42.5	46.9	23.3	23.8					5.7	6.1	6.9
Lane group LOS		D	D	C	C					A	A	A
Approach delay	44.0			23.7						6.3		
Approach LOS	D			C						A		
Intersection delay	21.2			X_c = 0.35			Intersection LOS			C		

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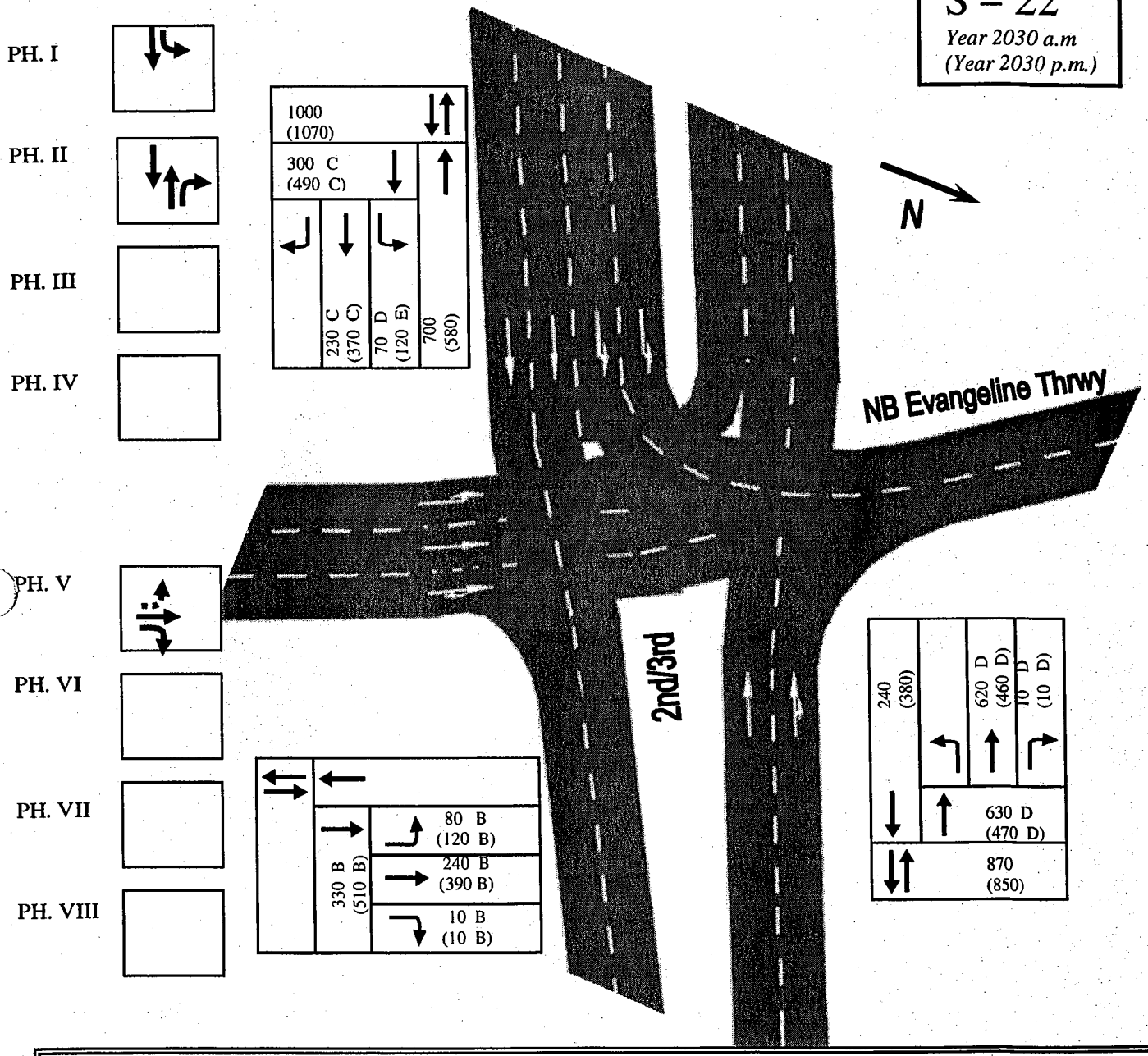
SIGNALIZED INTERSECTION

Intersection at 2ND/3RD AND NB EVANGELINE THRUWAY

S – 22
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	C
Control Delay:	34.2 sec/veh	29.6 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & NB Evang (S22_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	0	0	2	0	1	2	0	0	0	0
Lane group	L	T			TR		L	TR				
Volume, V (vph)	70	230			620	10	80	240	10			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0		2.0	2.0				
Extension of effective green, e	2.0	2.0			2.0		2.0	2.0				
Arrival type, AT	3	3			3		3	3				
Unit extension, UE	3.0	3.0			3.0		3.0	3.0				
Filtering/metering, I	1.000	1.000			1.000		1.000	1.000				
Initial unmet demand, Q_b	0.0	0.0			0.0		0.0	0.0				
Ped / Bike / RTOR volumes				0		0	0		0	0		
Lane width	12.0	12.0			12.0		12.0	12.0				
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0		0	0				
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	78	256			700		89	278				
Lane group capacity, c	250	1292			902		774	1541				
v/c ratio, X	0.31	0.20			0.78		0.11	0.18				
Total green ratio, g/C	0.08	0.42			0.29		0.50	0.50				

Uniform delay, d_1	51.8	22.3			38.9		15.9	16.5				
Progression factor, PF	1.000	1.000			1.000		1.000	1.000				
Delay calibration, k	0.50	0.50			0.50		0.50	0.50				
Incremental delay, d_2	3.2	0.3			6.5		0.3	0.3				
Initial queue delay, d_3												
Control delay	55.0	22.6			45.4		16.2	16.7				
Lane group LOS	D	C			D		B	B				
Approach delay	30.2			45.4			16.6					
Approach LOS	C			D			B					
Intersection delay	34.2			X_c = 0.39			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & NB Evang (S22_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	0	0	2	0	1	2	0	0	0	0
Lane group	L	T			TR		L	TR				
Volume, V (vph)	120	370			460	10	120	390	10			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0		2.0	2.0				
Extension of effective green, e	2.0	2.0			2.0		2.0	2.0				
Arrival type, AT	3	3			3		3	3				
Unit extension, UE	3.0	3.0			3.0		3.0	3.0				
Filtering/metering, I	1.000	1.000			1.000		1.000	1.000				
Initial unmet demand, Q_b	0.0	0.0			0.0		0.0	0.0				
Ped / Bike / RTOR volumes				0		0	0		0	0		
Lane width	12.0	12.0			12.0		12.0	12.0				
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0		0	0				
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 120.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	133	411			522		133	444				
Lane group capacity, c	250	1292			902		774	1545				
v/c ratio, X	0.53	0.32			0.58		0.17	0.29				
Total green ratio, g/C	0.08	0.42			0.29		0.50	0.50				

Uniform delay, d_1	52.8	23.5			36.2		16.4	17.5				
Progression factor, PF	1.000	1.000			1.000		1.000	1.000				
Delay calibration, k	0.50	0.50			0.50		0.50	0.50				
Incremental delay, d_2	7.9	0.6			2.7		0.5	0.5				
Initial queue delay, d_3												
Control delay	60.6	24.2			38.9		16.9	18.0				
Lane group LOS	E	C			D		B	B				
Approach delay	33.1			38.9			17.7					
Approach LOS	C			D			B					
Intersection delay	29.6			X_c = 0.41			Intersection LOS			C		

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SIGNALIZED INTERSECTION

Intersection at SIMCOE AND 2ND/3RD

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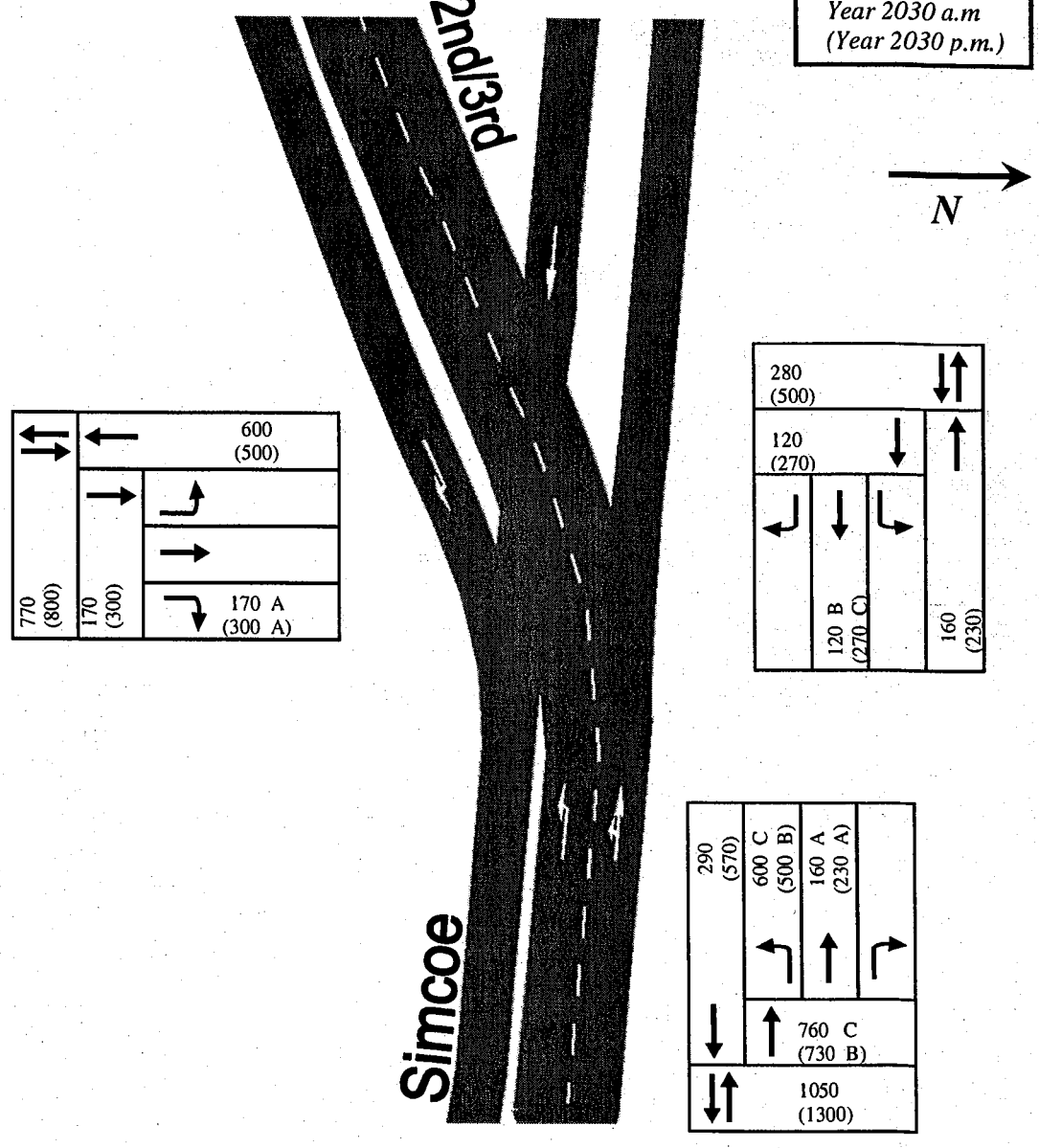
Year 2030 a.m
(Year 2030 p.m.)

PH. I
PH. II
PH. III
PH. IV
PH. V
PH. VI
PH VII
PH VIII



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	B	B
Control Delay:	18.2 sec/veh	13.0 sec/veh

COMMENTS: Install new traffic signal.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & Simcoe (S23_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	1	1	0	0	0	1	0	0	0
Lane group		T		L	LT				R			
Volume, V (vph)		120		600	160				170			
% Heavy vehicles, %HV		5		5	5				5			
Peak-hour factor, PHF		0.90		0.90	0.90				0.90			
Pretimed (P) or actuated (A)		P		P	P							
Start-up lost time, l_1		2.0		2.0	2.0				2.0			
Extension of effective green, e		2.0		2.0	2.0				2.0			
Arrival type, AT		3		3	3				3			
Unit extension, UE		3.0		3.0	3.0				3.0			
Filtering/metering, I		1.000		1.000	1.000			1.000	1.000			
Initial unmet demand, Q_b		0.0		0.0	0.0				0.0			
Ped / Bike / RTOR volumes	0						0		30			
Lane width		12.0		12.0	12.0				12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0				0			
Min. time for pedestrians, G_p	3.2						3.2					

Phasing	WB Only	EB Only	03	04	05	06	07	08
Timing	G = 30.0	G = 20.0	G =	G =	G =	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		133		667	178				156			
Lane group capacity, c		543		774	815				1409			
v/c ratio, X		0.24		0.86	0.22				0.11			
Total green ratio, g/C		0.33		0.50	0.50				1.00			
Uniform delay, d_1		14.5		13.2	8.4				0.0			

Progression factor, PF		1.000		1.000	1.000				0.950			
Delay calibration, k		0.50		0.50	0.50				0.50			
Incremental delay, d_2		1.1		12.1	0.6				0.2			
Initial queue delay, d_3												
Control delay		15.6		25.3	9.0				0.2			
Lane group LOS		B		C	A				A			
Approach delay	15.6			21.9			0.2					
Approach LOS	B			C			A					
Intersection delay	18.2			X_c = 0.62			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	2nd/3rd & Simcoe (S23_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	1	1	0	0	0	1	0	0	0
Lane group		T		L	LT				R			
Volume, V (vph)		270		500	230				300			
% Heavy vehicles, %HV		5		5	5				5			
Peak-hour factor, PHF		0.90		0.90	0.90				0.90			
Pretimed (P) or actuated (A)		P		P	P							
Start-up lost time, l_1		2.0		2.0	2.0				2.0			
Extension of effective green, e		2.0		2.0	2.0				2.0			
Arrival type, AT		3		3	3				3			
Unit extension, UE		3.0		3.0	3.0				3.0			
Filtering/metering, I		1.000		1.000	1.000			1.000	1.000			
Initial unmet demand, Q_b		0.0		0.0	0.0				0.0			
Ped / Bike / RTOR volumes	0						0		30			
Lane width		12.0		12.0	12.0				12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0				0			
Min. time for pedestrians, G_p	3.2						3.2					

Phasing	WB Only	EB Only	03	04	05	06	07	08
Timing	G = 30.0	G = 20.0	G =	G =	G =	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		300		556	256				300			
Lane group capacity, c		543		774	815				1409			
v/c ratio, X		0.55		0.72	0.31				0.21			
Total green ratio, g/C		0.33		0.50	0.50				1.00			
Uniform delay, d_1		16.3		11.7	8.9				0.0			

Progression factor, PF		1.000		1.000	1.000				0.950			
Delay calibration, k		0.50		0.50	0.50				0.50			
Incremental delay, d_2		4.0		5.7	1.0				0.3			
Initial queue delay, d_3												
Control delay		20.4		17.4	9.9				0.3			
Lane group LOS		C		B	A				A			
Approach delay	20.4			15.0			0.3					
Approach LOS	C			B			A					
Intersection delay	13.0			X_c = 0.65			Intersection LOS			B		

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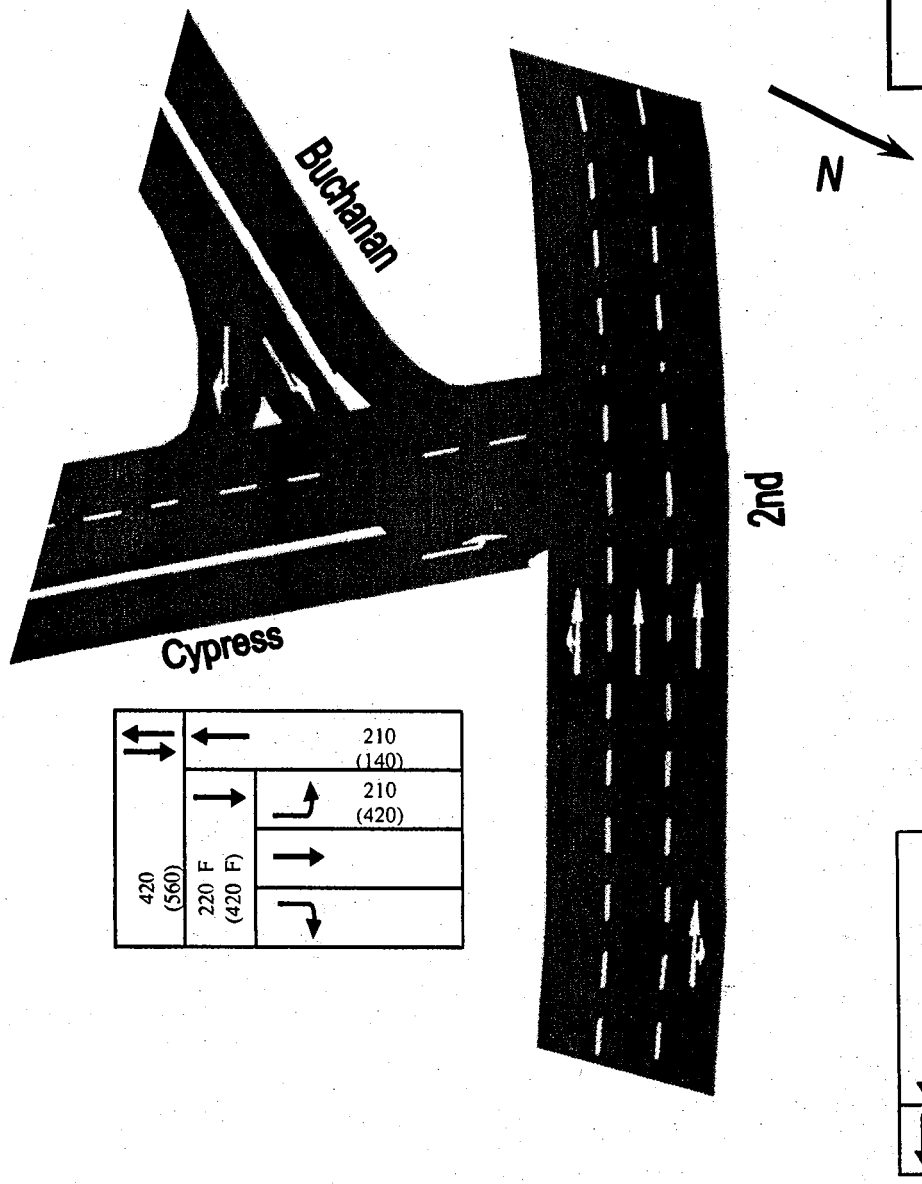
UNSIGNALIZED INTERSECTION

Intersection at 2ND AND CYPRESS/BUCHANAN

U – 24
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	F	F
Control Delay:	50.0 sec/veh	108.7 sec/veh

COMMENTS: Consider signal in the future. Should consider realignment during detailed geometric design phase.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	ASM
Agency/Co.	HNTB
Date Performed	11/19/2004
Analysis Time Period	

Site Information

Intersection	2nd & Cypr/Buchanan (U_24AM)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description *I-49 Connector Operational Analysis*

East/West Street: *2nd* | North/South Street: *Cypress/Buchanan*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	0	10	210	900	140
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	0	0	0	210	900	140
Proportion of heavy vehicles, P_{HV}	5	--	--	5	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	0	0	0	2	1
Configuration				LT	T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	210	0	0	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	210	0	0	0	0	0
Proportion of heavy vehicles, P_{HV}	5	5	5	5	5	5
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	1	0	0	0	0	0
Configuration	L					

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L					
Volume, v (vph)		210	210					
Capacity, c_m (vph)		1604	276					
v/c ratio		0.13	0.76					
Queue length (95%)		0.45	5.66					

Control Delay (s/veh)		7.6	50.0					
LOS		A	F					
Approach delay (s/veh)	--	--	50.0					
Approach LOS	--	--	F					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	ASM
Agency/Co.	HNTB
Date Performed	11/19/2004
Analysis Time Period	

Site Information

Intersection	2nd & Cypr/Buchanan (U_24PM)
Jurisdiction	Lafayette, LA
Analysis Year	2030

Project Description *I-49 Connector Operational Analysis*

East/West Street: *2nd* | North/South Street: *Cypress/Buchanan*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	0	10	140	780	170
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	0	0	0	140	780	170
Proportion of heavy vehicles, P_{HV}	5	--	--	5	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	0	0	0	2	1
Configuration				LT	T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	420	0	0	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	420	0	0	0	0	0
Proportion of heavy vehicles, P_{HV}	5	5	5	5	5	5
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	1	0	0	0	0	0
Configuration	L					

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L					
Volume, v (vph)		140	420					
Capacity, c_m (vph)		1604	382					
v/c ratio		0.09	1.10					
Queue length (95%)		0.29	15.15					

Control Delay (s/veh)		7.5	108.7					
LOS		A	F					
Approach delay (s/veh)	--	--	108.7					
Approach LOS	--	--	F					

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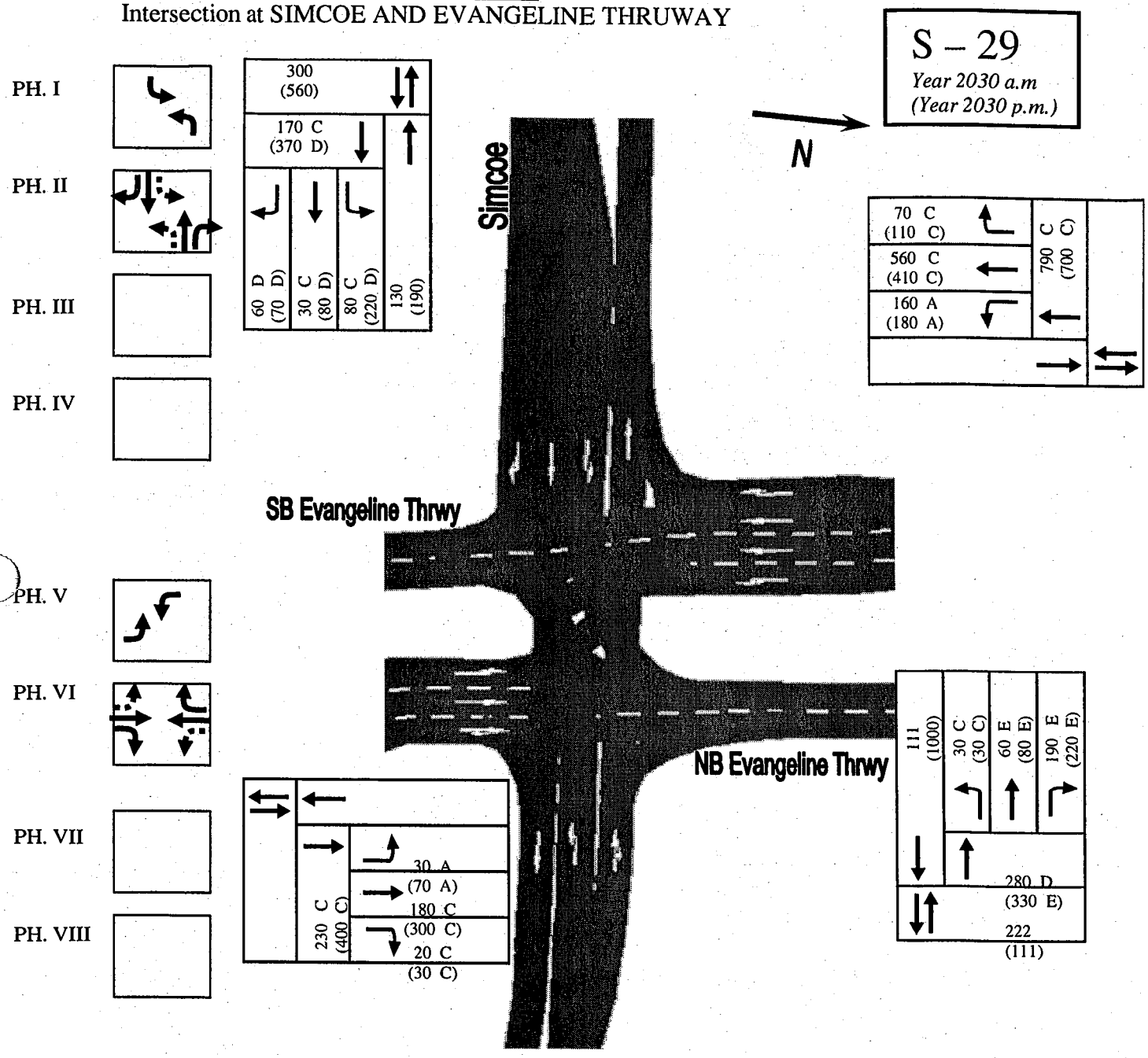
SIGNALIZED INTERSECTION

Intersection at SIMCOE AND EVANGELINE THRUWAY



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	D
Control Delay:	31.0 sec/veh	35.2 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Simcoe & Evang (S29_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	1	1	1	0	1	2	0	1	2	1
Lane group	L	T	R	L	TR		L	TR		L	T	R
Volume, V (vph)	80	30	60	30	60	190	30	180	20	160	560	70
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Arrival type, AT	3	3	3	3	3		5	5		5	5	5
Unit extension, UE	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		10	0		0	0		0	0		15
Lane width	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0		0	0		0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 20.0	G = 35.0	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y = 5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	89	33	56	33	278		33	222		178	622	61
Lane group capacity, c	341	407	346	493	361		393	891		549	904	404
v/c ratio, X	0.26	0.08	0.16	0.07	0.77		0.08	0.25		0.32	0.69	0.15

Total green ratio, g/C	0.42	0.25	0.25	0.42	0.25		0.50	0.29		0.50	0.29	0.29
Uniform delay, d_1	22.9	34.4	35.2	21.0	41.8		16.5	32.5		17.1	37.7	31.5
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		0.333	0.725		0.333	0.725	0.725
Delay calibration, k	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50	0.50	0.50
Incremental delay, d_2	1.9	0.4	1.0	0.3	14.6		0.4	0.7		1.6	4.3	0.8
Initial queue delay, d_3												
Control delay	24.8	34.8	36.2	21.2	56.4		5.9	24.2		7.3	31.6	23.6
Lane group LOS	C	C	D	C	E		A	C		A	C	C
Approach delay	30.2			52.7			21.9			26.0		
Approach LOS	C			D			C			C		
Intersection delay	31.0			X_c = 0.68			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Simcoe & Evang (S29_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	1	1	1	0	1	2	0	1	2	1
Lane group	L	T	R	L	TR		L	TR		L	T	R
Volume, V (vph)	220	80	70	30	80	220	70	300	30	180	410	110
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Arrival type, AT	3	3	3	3	3		5	5		5	5	5
Unit extension, UE	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		10	0		0	0		0	0		15
Lane width	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0		0	0		0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 20.0	G = 35.0	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y = 5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	244	89	67	33	333		78	366		200	456	106
Lane group capacity, c	304	407	346	478	363		454	892		490	904	404
v/c ratio, X	0.80	0.22	0.19	0.07	0.92		0.17	0.41		0.41	0.50	0.26

Total green ratio, g/C	0.42	0.25	0.25	0.42	0.25		0.50	0.29		0.50	0.29	0.29
Uniform delay, d_1	26.6	35.7	35.5	21.0	43.8		16.3	34.2		17.6	35.3	32.6
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		0.333	0.725		0.333	0.725	0.725
Delay calibration, k	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50	0.50	0.50
Incremental delay, d_2	19.7	1.2	1.2	0.3	30.3		0.8	1.4		2.5	2.0	1.6
Initial queue delay, d_3												
Control delay	46.3	36.9	36.7	21.2	74.1		6.3	26.2		8.4	27.6	25.2
Lane group LOS	D	D	D	C	E		A	C		A	C	C
Approach delay	42.6			69.3			22.7			22.2		
Approach LOS	D			E			C			C		
Intersection delay	35.2			X_c = 0.76			Intersection LOS			D		

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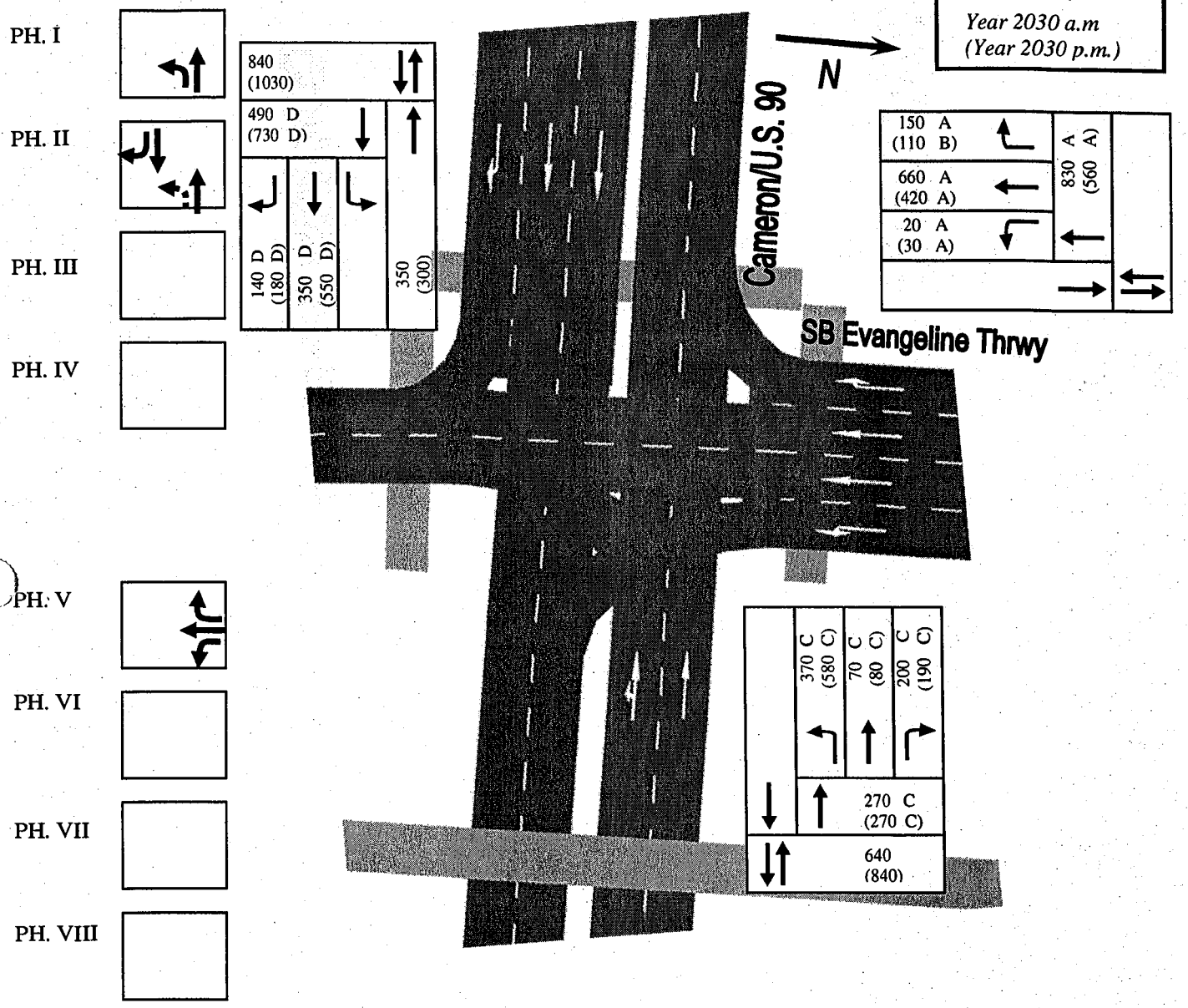
SIGNALIZED INTERSECTION

Intersection at CAMERON/US 90 AND SB EVANGELINE THRUWAY

S – 30
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	C
Control Delay:	20.4 sec/veh	29.4 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Cameron & SB Evg. (S30_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	0	2	0	0	0	0	1	2	1
Lane group		T	R		LT					L	T	R
Volume, V (vph)		350	140	70	200					20	660	150
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0		2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0		2.0					2.0	2.0	2.0
Arrival type, AT		3	3		3					5	5	5
Unit extension, UE		3.0	3.0		3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000		1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0		0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		30				0			0		30
Lane width		12.0	12.0		12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	Y	0	Y
Parking maneuvers, N_m										10		10
Buses stopping, N_B		0	0		0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		389	122		300					22	733	133
Lane group capacity, c		775	346		951					658	1551	589
v/c ratio, X		0.50	0.35		0.32					0.03	0.47	0.23
Total green ratio, g/C		0.25	0.25		0.42					0.50	0.50	0.50

Uniform delay, d_1		38.6	37.0		23.5					15.3	19.6	16.9
Progression factor, PF		1.000	1.000		1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50		0.50					0.50	0.50	0.50
Incremental delay, d_2		2.3	2.8		0.9					0.1	1.0	0.9
Initial queue delay, d_3												
Control delay		40.9	39.8		24.4					5.2	7.6	6.5
Lane group LOS		D	D		C					A	A	A
Approach delay	40.6			24.4						7.4		
Approach LOS	D			C						A		
Intersection delay	20.4			X_c = 0.53			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Cameron & SB Evg. (S30_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	0	2	0	0	0	0	1	2	1
Lane group		T	R	DefL	T					L	T	R
Volume, V (vph)		550	180	80	190					110	420	30
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		30				0			0		30
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	Y	0	Y
Parking maneuvers, N_m										10		10
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		611	167	89	211					122	467	0
Lane group capacity, c		775	346	281	679					658	1551	589
v/c ratio, X		0.79	0.48	0.32	0.31					0.19	0.30	0.00
Total green ratio, g/C		0.25	0.25	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		42.0	38.4	23.5	23.5					16.5	17.7	15.0
Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	1.000
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		8.0	4.8	2.9	1.2					0.6	0.5	0.0
Initial queue delay, d_3												
Control delay		50.0	43.1	26.4	24.6					6.1	6.4	15.0
Lane group LOS		D	D	C	C					A	A	B
Approach delay	48.5			25.2						6.3		
Approach LOS	D			C						A		
Intersection delay	29.4			X_c = 0.55					Intersection LOS	C		

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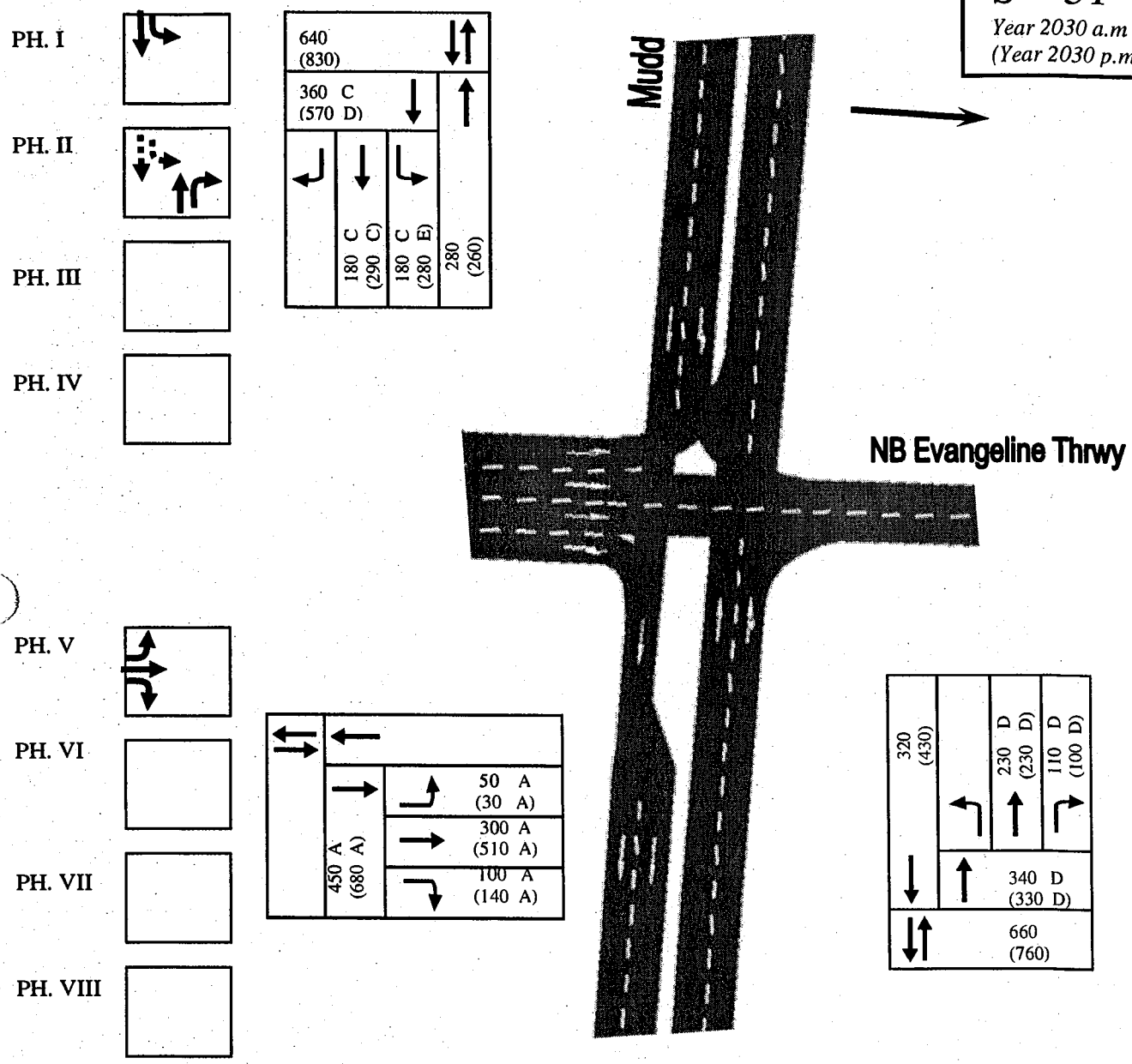
SIGNALIZED INTERSECTION

Intersection at MUDD AND NB EVANGELINE THRUWAY

S – 31
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	C
Control Delay:	23.3 sec/veh	26.6 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Mudd & NB Evg. (S31_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	2	0	1	2	1	0	0	0
Lane group	L	T			TR		L	T	R			
Volume, V (vph)	180	180			230	110	50	300	100			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0		2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0		2.0	2.0	2.0			
Arrival type, AT	3	3			3		5	5	5			
Unit extension, UE	3.0	3.0			3.0		3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000		1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0		0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		20	0		
Lane width	12.0	12.0			12.0		12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	Y	0	Y	N		N
Parking maneuvers, N_m							10		10			
Buses stopping, N_B	0	0			0		0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	200	200			378		56	333	89			
Lane group capacity, c	364	679			738		658	1551	589			
v/c ratio, X	0.55	0.29			0.51		0.09	0.21	0.15			
Total green ratio, g/C	0.42	0.42			0.25		0.50	0.50	0.50			
Uniform delay, d_1	24.1	23.3			38.7		15.7	16.8	16.2			

Progression factor, PF	1.000	1.000			1.000		0.333	0.333	0.333			
Delay calibration, k	0.50	0.50			0.50		0.50	0.50	0.50			
Incremental delay, d_2	5.9	1.1			2.5		0.3	0.3	0.5			
Initial queue delay, d_3												
Control delay	30.0	24.4			41.2		5.5	5.9	6.0			
Lane group LOS	C	C			D		A	A	A			
Approach delay	27.2			41.2			5.9					
Approach LOS	C			D			A					
Intersection delay	23.3			X_c = 0.41			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Mudd & NB Evg. (S31_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	2	0	1	2	1	0	0	0
Lane group	L	T			TR		L	T	R			
Volume, V (vph)	280	290			230	100	30	510	140			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0		2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0		2.0	2.0	2.0			
Arrival type, AT	3	3			3		5	5	5			
Unit extension, UE	3.0	3.0			3.0		3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000		1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0		0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		20	0		
Lane width	12.0	12.0			12.0		12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	Y	0	Y	N		N
Parking maneuvers, N_m							10		10			
Buses stopping, N_B	0	0			0		0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	311	322			367		33	567	133			
Lane group capacity, c	368	679			740		658	1551	589			
v/c ratio, X	0.85	0.47			0.50		0.05	0.37	0.23			
Total green ratio, g/C	0.42	0.42			0.25		0.50	0.50	0.50			
Uniform delay, d_1	35.1	25.4			38.5		15.4	18.4	16.9			

Progression factor, PF	1.000	1.000			1.000		0.333	0.333	0.333			
Delay calibration, k	0.50	0.50			0.50		0.50	0.50	0.50			
Incremental delay, d_2	20.6	2.4			2.4		0.1	0.7	0.9			
Initial queue delay, d_3												
Control delay	55.7	27.8			40.9		5.3	6.8	6.5			
Lane group LOS	E	C			D		A	A	A			
Approach delay	41.5			40.9			6.7					
Approach LOS	D			D			A					
Intersection delay	26.6			X_c = 0.55			Intersection LOS			C		

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SIGNALIZED INTERSECTION

Intersection at DONLON AND SB EVANGELINE THRUWAY

S – 32
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH. II

PH. III

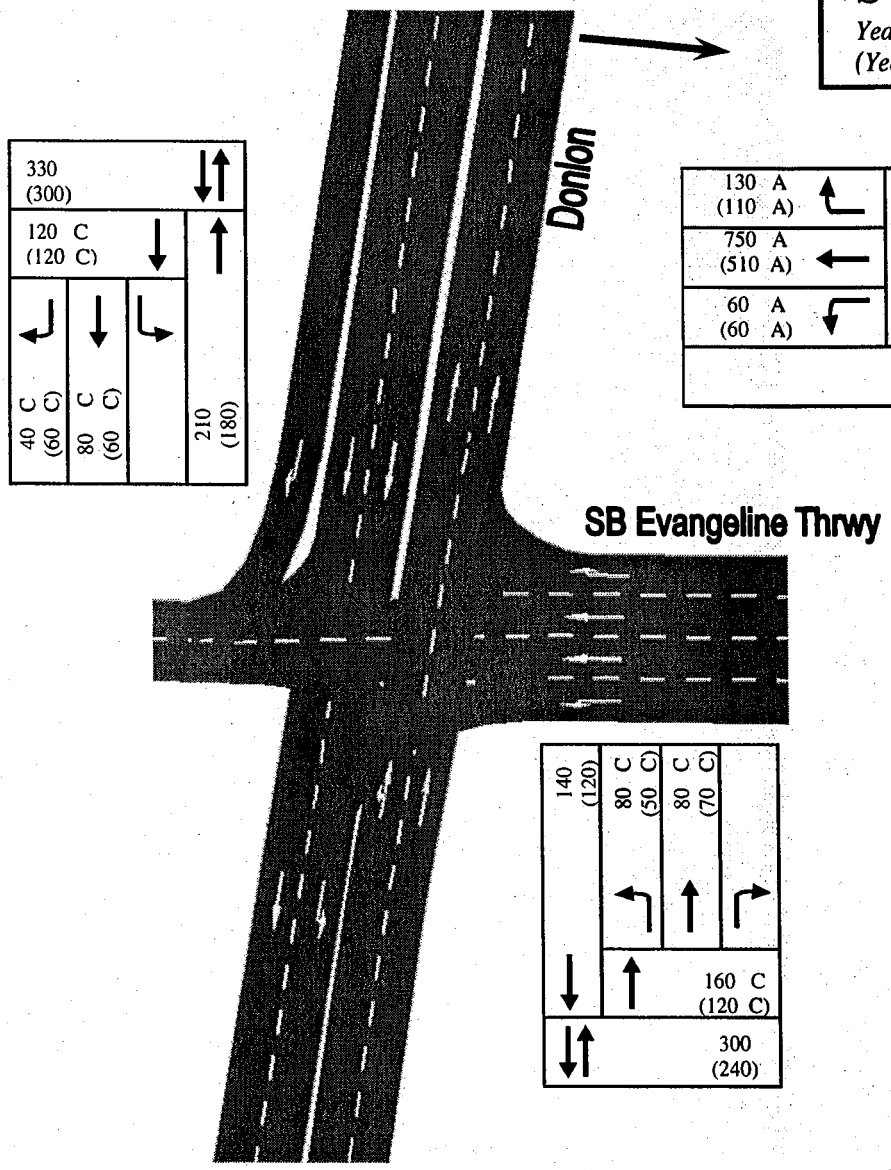
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	B	B
Control Delay:	12.0 sec/veh	11.8 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Donlon & SB Evg. (S32_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	0	2	0	0	0	0	1	2	1
Lane group		T	R	DefL	T					L	T	R
Volume, V (vph)		80	40	80	80					60	750	130
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0				0			0		0
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		89	44	89	89					67	833	144
Lane group capacity, c		904	404	460	679					774	1551	692
v/c ratio, X		0.10	0.11	0.19	0.13					0.09	0.54	0.21
Total green ratio, g/C		0.29	0.29	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		31.0	31.1	21.8	21.6					15.7	20.5	16.7
Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.2	0.5	0.9	0.4					0.2	1.3	0.7
Initial queue delay, d_3												
Control delay		31.2	31.6	22.7	22.0					5.4	8.2	6.3
Lane group LOS		C	C	C	C					A	A	A
Approach delay	31.4			22.4						7.7		
Approach LOS	C			C						A		
Intersection delay	12.0			X_c = 0.41			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Donlon & SB Evg. (S32_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	0	2	0	0	0	0	1	2	1
Lane group		T	R	DefL	T					L	T	R
Volume, V (vph)		60	60	50	70					60	510	110
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					5	5	5
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0				0			0		0
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		67	67	56	78					67	567	122
Lane group capacity, c		904	404	467	679					774	1551	692
v/c ratio, X		0.07	0.17	0.12	0.11					0.09	0.37	0.18
Total green ratio, g/C		0.29	0.29	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		30.8	31.6	21.3	21.4					15.7	18.4	16.5
Progression factor, PF		1.000	1.000	1.000	1.000					0.333	0.333	0.333
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.2	0.9	0.5	0.3					0.2	0.7	0.6
Initial queue delay, d_3												
Control delay		30.9	32.5	21.8	21.8					5.4	6.8	6.0
Lane group LOS		C	C	C	C					A	A	A
Approach delay	31.7			21.8						6.5		
Approach LOS	C			C						A		
Intersection delay	11.8			X_c = 0.32			Intersection LOS			B		

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SIGNALIZED INTERSECTION

Intersection at DONLON AND NB EVANGELINE THRUWAY

S – 33
Year 2030 a.m
(Year 2030 p.m.)

PH. I

PH. II

PH. III

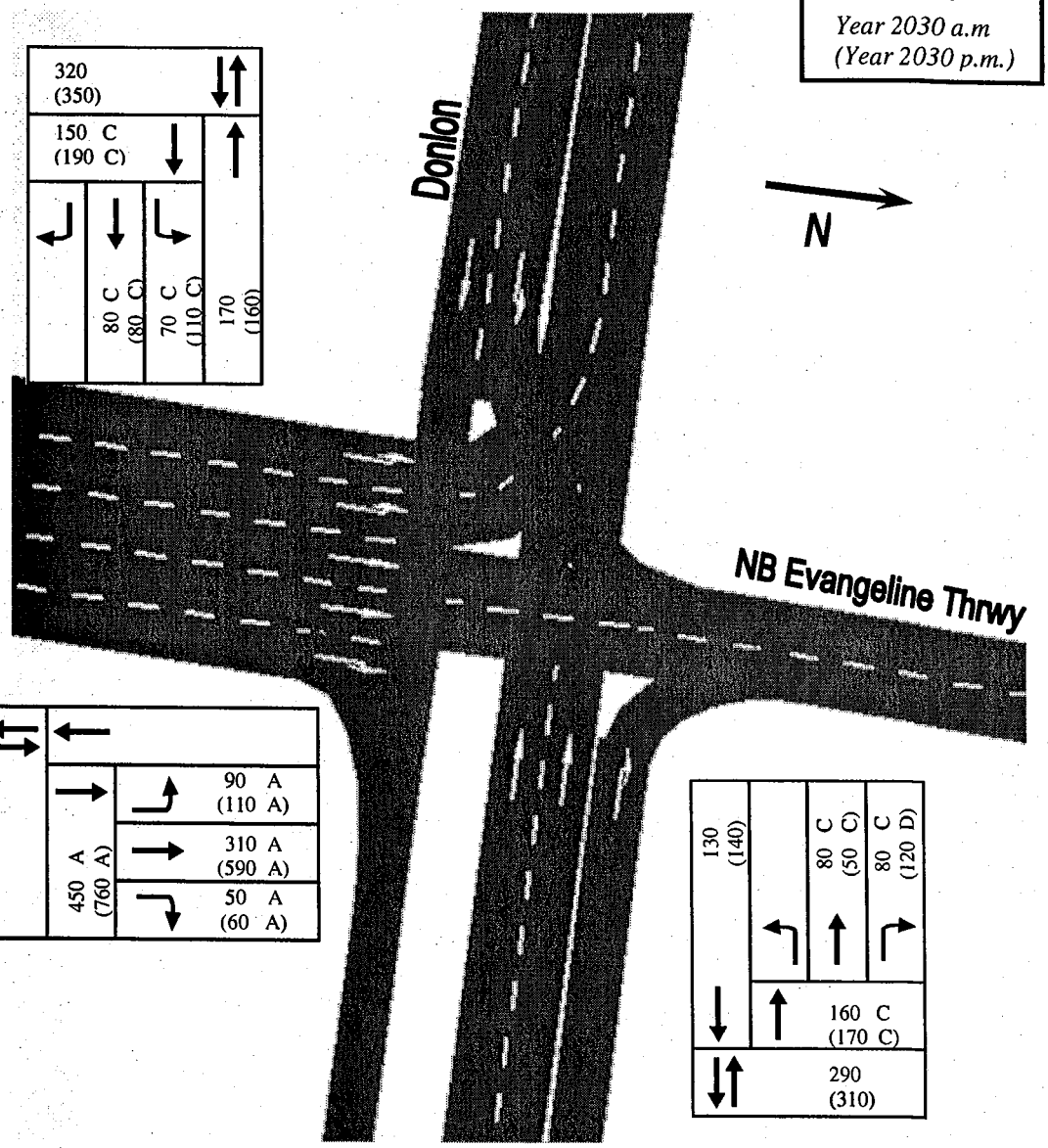
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	B	B
Control Delay:	14.7 sec/veh	13.7 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Donlon & NB Evg. (S33_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	2	1	2	2	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	70	80			80	80	90	310	50			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	5	5	5			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		10	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	78	89			89	89	100	344	44			
Lane group capacity, c	460	679			904	404	1503	1551	692			
v/c ratio, X	0.17	0.13			0.10	0.22	0.07	0.22	0.06			
Total green ratio, g/C	0.42	0.42			0.29	0.29	0.50	0.50	0.50			

Uniform delay, d_1	21.6	21.6			31.0	32.2	15.5	16.9	15.5			
Progression factor, PF	1.000	1.000			1.000	1.000	0.333	0.333	0.333			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	0.8	0.4			0.2	1.3	0.1	0.3	0.2			
Initial queue delay, d_3												
Control delay	22.4	22.0			31.2	33.4	5.3	6.0	5.3			
Lane group LOS	C	C			C	C	A	A	A			
Approach delay	22.2			32.3			5.8					
Approach LOS	C			C			A					
Intersection delay	14.7			X_c = 0.26			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Donlon & NB Evg. (S33_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	0	0	2	1	2	2	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	110	80			50	120	110	590	60			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	5	5	5			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		0	0		10	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	122	89			56	133	122	656	56			
Lane group capacity, c	470	679			904	404	1503	1551	692			
v/c ratio, X	0.26	0.13			0.06	0.33	0.08	0.42	0.08			
Total green ratio, g/C	0.42	0.42			0.29	0.29	0.50	0.50	0.50			

Uniform delay, d_1	22.3	21.6			30.7	33.3	15.6	19.0	15.6			
Progression factor, PF	1.000	1.000			1.000	1.000	0.333	0.333	0.333			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	1.3	0.4			0.1	2.2	0.1	0.8	0.2			
Initial queue delay, d_3												
Control delay	23.6	22.0			30.8	35.5	5.3	7.2	5.4			
Lane group LOS	C	C			C	D	A	A	A			
Approach delay	22.9				34.1		6.8					
Approach LOS	C				C		A					
Intersection delay	13.7				X_c = 0.44		Intersection LOS			B		

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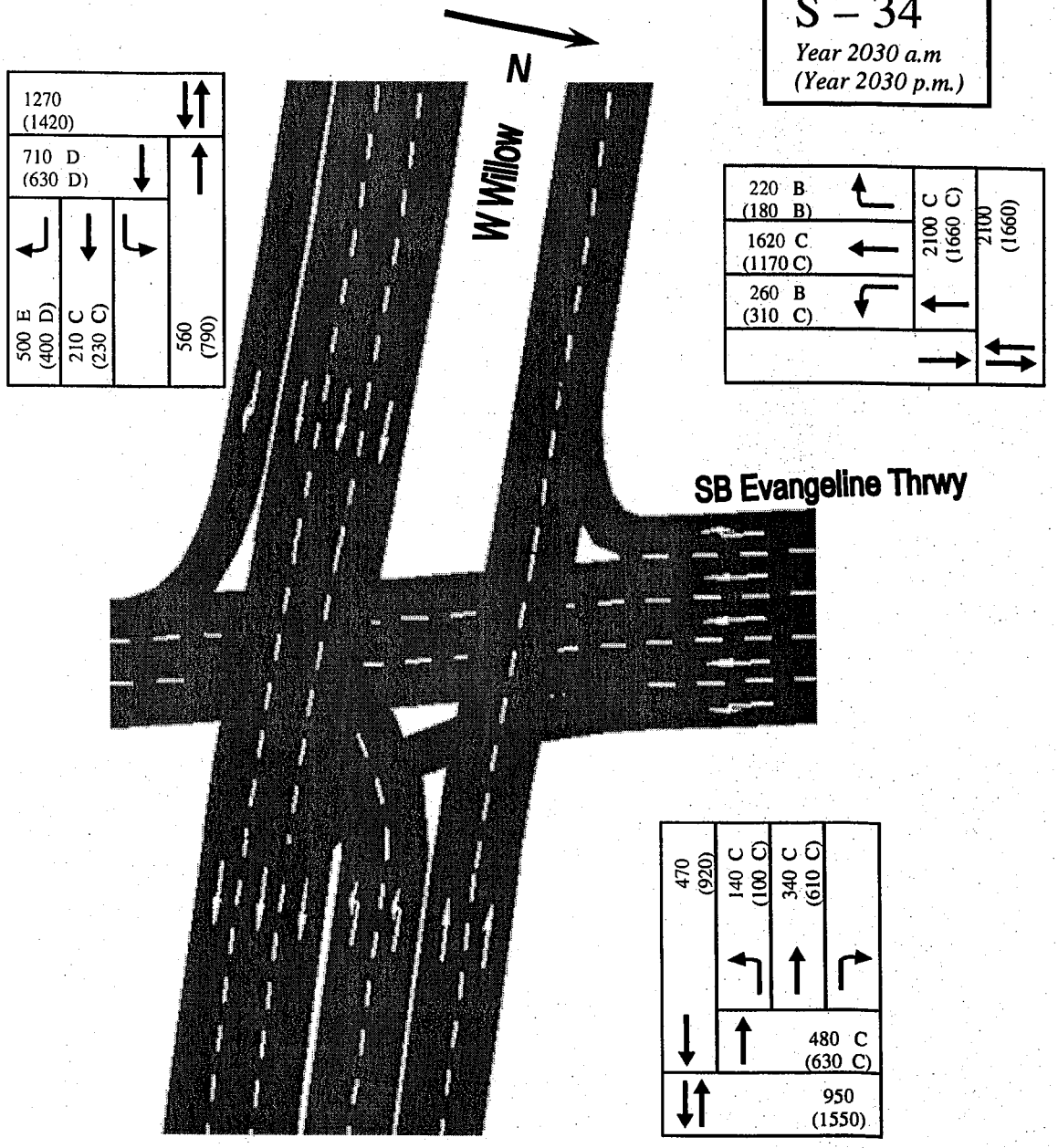
SIGNALIZED INTERSECTION

Intersection at W WILLOW AND SB EVANGELINE THRUWAY

S – 34
Year 2030 a.m
(Year 2030 p.m.)

PH. I
PH. II
PH. III
PH. IV
PH. V
PH. VI
PH. VII
PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	C
Control Delay:	29.5 sec/veh	24.6 sec/veh

COMMENTS: Perhaps add acceleration lane during detailed design phase for eastbound right turns to southbound Evangeline Thruway.

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Willow & SB Evg. (S34_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	2	0	0	0	0	1	3	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		210	500	140	340					260	1620	220
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					3	3	3
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		200				0			0		45
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p		3.2					3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		233	333	156	378					289	1800	194
Lane group capacity, c		1294	404	589	1292					774	2218	692
v/c ratio, X		0.18	0.82	0.26	0.29					0.37	0.81	0.28
Total green ratio, g/C		0.29	0.29	0.42	0.42					0.50	0.50	0.50
Uniform delay, d_1		31.8	39.6	21.7	23.3					18.4	25.2	17.4

Progression factor, PF		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.3	17.2	1.1	0.6					1.4	3.4	1.0
Initial queue delay, d_3												
Control delay		32.1	56.8	22.8	23.8					19.8	28.6	18.5
Lane group LOS		C	E	C	C					B	C	B
Approach delay	46.6			23.5						26.6		
Approach LOS	D			C						C		
Intersection delay	29.5			X_c = 0.80			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Willow & SB Evg. (S34_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	2	0	0	0	0	1	3	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		230	400	140	340					310	1170	180
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					3	3	3
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		200				0			0		45
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 10.0	G = 35.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		256	222	156	378					344	1300	150
Lane group capacity, c		1294	404	575	1292					774	2218	692
v/c ratio, X		0.20	0.55	0.27	0.29					0.44	0.59	0.22
Total green ratio, g/C		0.29	0.29	0.42	0.42					0.50	0.50	0.50
Uniform delay, d_1		31.9	35.8	21.7	23.3					19.3	21.2	16.8

Progression factor, PF		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.3	5.3	1.2	0.6					1.8	1.1	0.7
Initial queue delay, d_3												
Control delay		32.3	41.1	22.8	23.8					21.1	22.4	17.5
Lane group LOS		C	D	C	C					C	C	B
Approach delay	36.4			23.5						21.7		
Approach LOS	D			C						C		
Intersection delay	24.6			X_c = 0.58			Intersection LOS			C		

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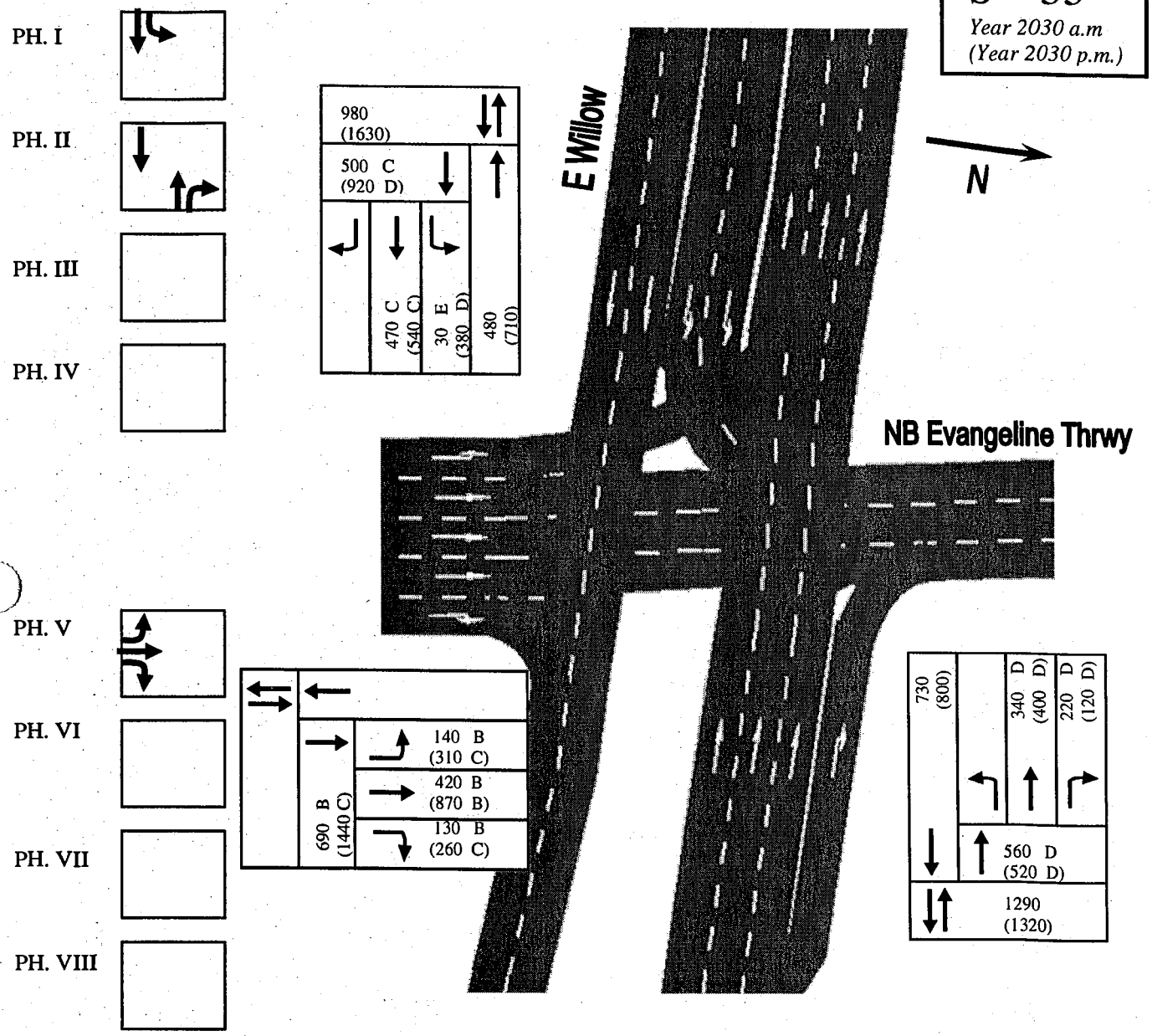
Version 4.1e

SIGNALIZED INTERSECTION

Intersection at E WILLOW AND NB EVANGELINE THRUWAY

S – 35
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	C
Control Delay:	27.1 sec/veh	31.2 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Willow & NB Evg. (S35_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	0	0	3	1	1	3	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	30	470			340	220	140	420	130			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	3	3	3			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		45	0		25	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	33	522			378	194	156	467	117			
Lane group capacity, c	376	1292			1109	346	774	2218	692			
v/c ratio, X	0.09	0.40			0.34	0.56	0.20	0.21	0.17			
Total green ratio, g/C	0.13	0.42			0.25	0.25	0.50	0.50	0.50			
Uniform delay, d_1	46.4	24.5			36.9	39.3	16.7	16.8	16.4			

Progression factor, PF	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	0.5	0.9			0.8	6.4	0.6	0.2	0.5			
Initial queue delay, d_3												
Control delay	46.9	25.5			37.7	45.7	17.3	17.0	16.9			
Lane group LOS	D	C			D	D	B	B	B			
Approach delay	26.8			40.4			17.0					
Approach LOS	C			D			B					
Intersection delay	27.1			X_c = 0.30			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Willow & NB Evg. (S35_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	0	0	3	1	1	3	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	380	540			400	120	310	870	260			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	3	3	3			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		45	0		25	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 25.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	422	600			444	83	344	967	261			
Lane group capacity, c	501	1292			924	288	774	2218	692			
v/c ratio, X	0.84	0.46			0.48	0.29	0.44	0.44	0.38			
Total green ratio, g/C	0.17	0.42			0.21	0.21	0.50	0.50	0.50			
Uniform delay, d_1	48.5	25.3			41.8	40.0	19.3	19.2	18.5			

Progression factor, PF	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	15.7	1.2			1.8	2.5	1.8	0.6	1.6			
Initial queue delay, d_3												
Control delay	64.2	26.5			43.6	42.5	21.1	19.8	20.1			
Lane group LOS	E	C			D	D	C	B	C			
Approach delay	42.1				43.4		20.1					
Approach LOS	D				D		C					
Intersection delay	31.2				X_c = 0.53		Intersection LOS			C		

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SIGNALIZED INTERSECTION

Intersection at MARTIN LUTHER KING AND SB EVANGELINE THRUWAY

PH. I

PH. II

PH. III

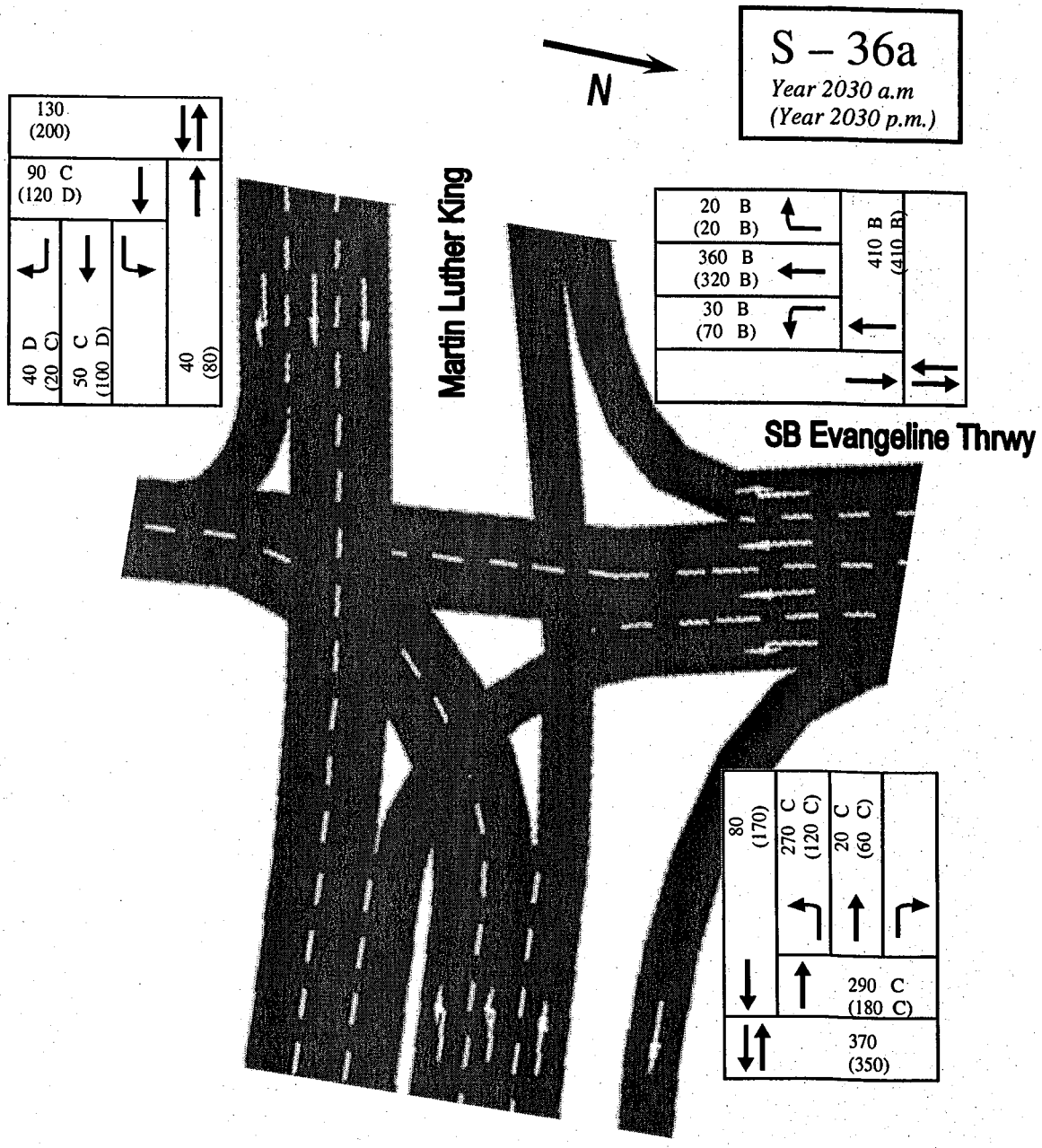
PH. IV

PH. V

PH. VI

PH. VII

PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	C	C
Control Delay:	21.6 sec/veh	22.1 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Willow & SB Evg. (S36a_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	2	1	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		50	40	270	20					30	360	20
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					3	3	3
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		10				0			0		5
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		56	33	300	22					33	400	17
Lane group capacity, c		775	346	787	679					774	1551	692
v/c ratio, X		0.07	0.10	0.38	0.03					0.04	0.26	0.02
Total green ratio, g/C		0.25	0.25	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		34.4	34.6	22.8	20.7					15.3	17.2	15.2
Progression factor, PF		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.2	0.5	1.4	0.1					0.1	0.4	0.1
Initial queue delay, d_3												
Control delay		34.6	35.1	24.2	20.8					15.4	17.6	15.3
Lane group LOS		C	D	C	C					B	B	B
Approach delay	34.8			24.0						17.4		
Approach LOS	C			C						B		
Intersection delay	21.6			X_c = 0.29					Intersection LOS	C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Willow & SB Evg. (S36a_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	2	1	2	1	0	0	0	0	1	2	1
Lane group		T	R	L	T					L	T	R
Volume, V (vph)		100	20	270	60					70	320	20
% Heavy vehicles, %HV		5	5	5	5					5	5	5
Peak-hour factor, PHF		0.90	0.90	0.90	0.90					0.90	0.90	0.90
Pretimed (P) or actuated (A)		P	P	P	P					P	P	P
Start-up lost time, l_1		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Extension of effective green, e		2.0	2.0	2.0	2.0					2.0	2.0	2.0
Arrival type, AT		3	3	3	3					3	3	3
Unit extension, UE		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Filtering/metering, I		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		10				0			0		5
Lane width		12.0	12.0	12.0	12.0					12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N		N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0					0	0	0
Min. time for pedestrians, G_p	3.2						3.2			3.2		

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		111	11	300	67					78	356	17
Lane group capacity, c		775	346	748	679					774	1551	692
v/c ratio, X		0.14	0.03	0.40	0.10					0.10	0.23	0.02
Total green ratio, g/C		0.25	0.25	0.42	0.42					0.50	0.50	0.50

Uniform delay, d_1		35.0	34.0	22.8	21.3					15.8	16.9	15.2
Progression factor, PF		1.000	1.000	1.000	1.000					1.000	1.000	1.000
Delay calibration, k		0.50	0.50	0.50	0.50					0.50	0.50	0.50
Incremental delay, d_2		0.4	0.2	1.6	0.3					0.3	0.3	0.1
Initial queue delay, d_3												
Control delay		35.4	34.2	24.4	21.6					16.1	17.3	15.3
Lane group LOS		D	C	C	C					B	B	B
Approach delay	35.3			23.9						17.0		
Approach LOS	D			C						B		
Intersection delay	22.1			X_c = 0.29			Intersection LOS			C		

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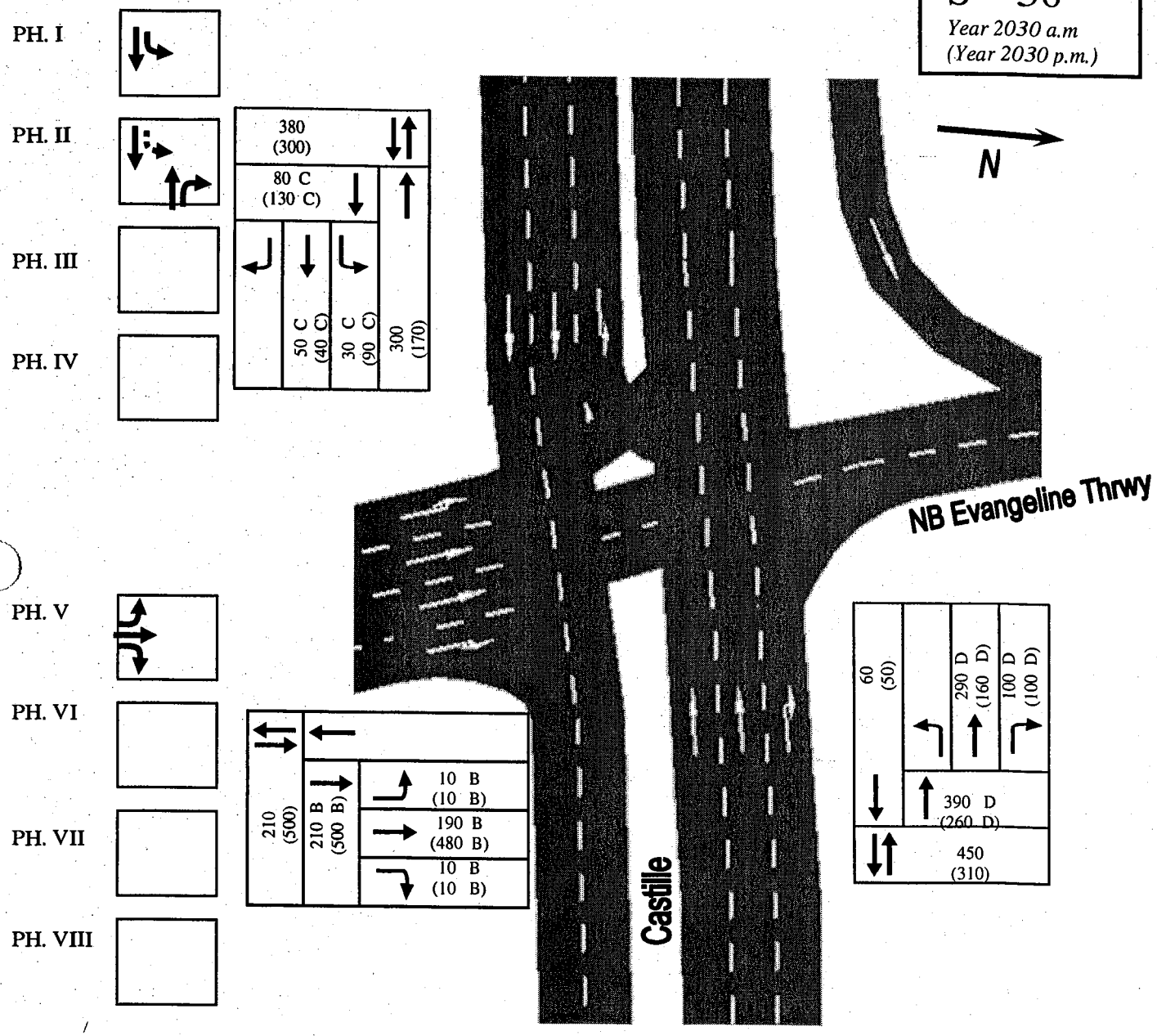
SIGNALIZED INTERSECTION

Intersection at CASTILLE AND NB EVANGELINE THRUWAY

S – 36
Year 2030 a.m
(Year 2030 p.m.)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	C
Control Delay:	29.6 sec/veh	24.2 sec/veh

COMMENTS:

Made By: DLR Date: 11/16/04
Checked By: ASM Date: 11/20/04

HNTB

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Castille & NB Evg. (S36_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	0	2	1	1	2	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	30	50			290	100	10	190	10			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	3	3	3			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		20	0		2	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	33	56			322	89	11	211	9			
Lane group capacity, c	387	1292			775	346	774	1551	692			
v/c ratio, X	0.09	0.04			0.42	0.26	0.01	0.14	0.01			
Total green ratio, g/C	0.42	0.42			0.25	0.25	0.50	0.50	0.50			

Uniform delay, d_1	21.2	20.8			37.7	36.1	15.1	16.1	15.1			
Progression factor, PF	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	0.4	0.1			1.6	1.8	0.0	0.2	0.0			
Initial queue delay, d_3												
Control delay	21.7	20.9			39.3	37.9	15.1	16.3	15.1			
Lane group LOS	C	C			D	D	B	B	B			
Approach delay	21.2			39.0			16.2					
Approach LOS	C			D			B					
Intersection delay	29.6			X_c = 0.22			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	ASM	Intersection	Castille & NB Evg. (S36_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	11/19/04	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	0	2	1	1	2	1	0	0	0
Lane group	L	T			T	R	L	T	R			
Volume, V (vph)	90	40			160	100	10	480	10			
% Heavy vehicles, %HV	5	5			5	5	5	5	5			
Peak-hour factor, PHF	0.90	0.90			0.90	0.90	0.90	0.90	0.90			
Pretimed (P) or actuated (A)	P	P			P	P	P	P	P			
Start-up lost time, l_1	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Extension of effective green, e	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Arrival type, AT	3	3			3	3	3	3	3			
Unit extension, UE	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Filtering/metering, I	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Initial unmet demand, Q_b	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Ped / Bike / RTOR volumes				0		20	0		2	0		
Lane width	12.0	12.0			12.0	12.0	12.0	12.0	12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0			0	0	0	0	0			
Min. time for pedestrians, G_p				3.2			3.2			3.2		

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 30.0	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	100	44			178	89	11	533	9			
Lane group capacity, c	453	1292			775	346	774	1551	692			
v/c ratio, X	0.22	0.03			0.23	0.26	0.01	0.34	0.01			
Total green ratio, g/C	0.42	0.42			0.25	0.25	0.50	0.50	0.50			

Uniform delay, d_1	21.9	20.7			35.8	36.1	15.1	18.1	15.1			
Progression factor, PF	1.000	1.000			1.000	1.000	1.000	1.000	1.000			
Delay calibration, k	0.50	0.50			0.50	0.50	0.50	0.50	0.50			
Incremental delay, d_2	1.1	0.0			0.7	1.8	0.0	0.6	0.0			
Initial queue delay, d_3												
Control delay	23.1	20.8			36.5	37.9	15.1	18.7	15.1			
Lane group LOS	C	C			D	D	B	B	B			
Approach delay	22.4			37.0			18.6					
Approach LOS	C			D			B					
Intersection delay	24.2			X_c = 0.34			Intersection LOS			C		

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I-49 connector

Appendix F

Single Point Interchange Supplemental Material

FINAL REPORT

COMPARISON OF THE OPERATIONAL AND SAFETY CHARACTERISTICS OF THE SINGLE POINT URBAN AND DIAMOND INTERCHANGES

NICHOLAS J. GARBER, Ph.D.
Faculty Research Engineer
Professor of Civil Engineering

MICHELLE J. SMITH, E.I.T.
Graduate Research Assistant

VIRGINIA TRANSPORTATION RESEARCH COUNCIL

Summary of Results

Literature Survey

1. The presence of frontage roads significantly degrades the performance of the SPUI, due to the need for an additional fourth phase to provide for the frontage road through movement, incurring additional lost time and delay.

6. At SPUI locations with continuous frontage roads, the overall interchange delay is significantly increased due to the requirement of an additional phase.

7. In general, the SPUI is more expensive to construct due to higher bridge and retaining wall costs.

8. The SPUI is more efficient when handling left-turn movements, and the DI is more efficient for the arterial through movement.

9. At SPUIs, signalizing the off-ramp right-turn movement decreases the overall interchange efficiency.

10. Sight distance and visibility are a problem at SPUIs due to the nature of the structure, particularly between the off-ramp and cross road vehicles.

11. The SPUI design can lead to driver confusion, and particular attention to channelization is necessary.

Operational Analysis

1. There is not enough evidence to suggest that there is a significant difference in the average stopped delay per vehicle at SPUIs and DIs (total interchange delay, off-ramp delay, and cross road delay were all tested).

2. Among the interchange sites investigated, the operational performance of DIs varied to a greater extent than did the performance of SPUIs; both sets were within a similar range of total interchange approach peak hour volumes.

3. The lack of a full right-turn lane on the off-ramp, particularly at DIs, significantly affects off-ramp delay.

4. When cross road left-turn and through volumes are both imbalanced and the higher through volume opposes the higher left-turn volume, the interchange average delay at the SPUI can be increased by up to 30 percent.

5. The delay at DIs increases more dramatically with an increase in total interchange approach volume than does the SPUI delay.

— The delay at DIs increases more dramatically with an increase in total interchange approach volume.

— The delay at SPUIs increases significantly under flow conditions where the cross road left-turn and through volumes are imbalanced and the higher cross road through volume opposes the higher left-turn volume, creating up to 30 percent higher delay values.

— The lack of a full right-turn lane, particularly at DIs, can significantly affect off-ramp delay.

- The analysis of accident data of several interchanges throughout the nation revealed no significant differences in the overall safety of the SPUI and DI. However, the safety of the interchanges is reduced at specific locations and under certain conditions:

  — When permitted left-turn phasing is used at the DI, the proportion of angle and center accidents is notably higher than at the SPUI.

  — Signalized intersections on the cross road that are adjacent to either interchange type create significant safety problems when the downstream signal is not coordinated with the interchange signal and when there is inadequate clear distance to the intersection.

  — When on-ramp flows are signalized at the SPUI, conflicts and accidents are increased as compared with SPUIs with merge control.

DESIGN GUIDELINES

Many elements of this project provided important insight and new understanding as to the advantages and disadvantages of the SPUI and DI, based on a variety of operational and safety characteristics investigated. The guidelines are based on the results of the literature review, the questionnaire survey, and the analysis of operational and safety data. For the reader's convenience, the specific result(s) upon which each guideline is based is (are) indicated.

The guidelines are divided into two categories:

1. guidelines for the *selection* of the SPUI or DI

2. guidelines for the *specific design* of the SPUI or DI.

2. Provide an additional pedestrian phase, actuated by push buttons, where all traffic signal indications for vehicular traffic are red. *(See Questionnaire Survey, Result 5.)*

- When signalized intersections on the cross road are adjacent to either type of interchange, some clear distance should be established from the off-ramp right-turn merge point to the next signal. The downstream signal should also be coordinated with the interchange whenever possible, as these intersections affect performance, operation, and safety. *(See Safety Analysis, Result 6.)*

- At SPUIs, whenever possible, signalizing the off-ramp right-turning vehicles should be avoided. A yield sign should be provided with an adequate acceleration lane. The yellow plus all-red clearance intervals will be greatly reduced when such a sign is used, thus improving the capacity of the interchange by increasing the g/C ratio. *(See Questionnaire Survey, Result 9.)*

- When right-turn off-ramp volumes are high, the lack of a full right-turn lane on the off-ramp significantly affects off-ramp delay, particularly at DIs. Therefore, under this condition, a full right-turn lane should be provided so that right-turning vehicles, which need only to yield, are not blocked by the left-turning vehicles that are waiting for a green signal indication. *(See Operational Analysis, Result 3.)*

- For the SPUI, different volume scenarios have similar changes in delay. For low-volume and high-volume situations, however, particular attention should be paid if the cross road left-turn and through volumes are both imbalanced and the higher through volume direction opposes the higher left-turn volume direction. The operational analysis indicates that this particular flow condition may cause up to a 30 percent increase in overall interchange delay as compared with other volume scenarios at the SPUI. *(See Operational Analysis, Result 4.)*

- In the SPUI design, special consideration should be given to the visibility between the off-ramps and the cross road, as visibility of the oncoming traffic from the left is reduced at the SPUI and drivers approaching the bridge from the off-ramp must rely totally on all traffic obeying the signal. *(See Questionnaire Survey, Result 10.)*

- The signalization of on-ramp flows at SPUIs should be avoided whenever possible as this results in a significant increase in rear-end on-ramp accidents. *(See Safety Analysis, Result 7.)*

- The SPUI design requires distinct attention for signing and striping to reduce confusion and possible wrong-way maneuvers. A raised island in the middle of the signalized intersection provides positive delineation and reduces this confusion. *(See Questionnaire Survey, Result 11.)*

I-49 connector

Appendix G

Comments and Responses (DOTD, LCG, and HNTB)

INTERSECTION IMPROVEMENTS RECOMMENDED BY LCG
I-49 CONNECTOR PHASE II - FUNCTIONAL PLAN
S.P.N. 700-24-0073
F.A.P. DE-0009(802)

ID No.	Cross Streets		Notes
S-1 a	Kaliste Saloom	@ Hugh Wallis	OK
S-2 a	University	@ SB Evangeline Thrwy	Double Left Needed, Right turn ok but not necessary, Traffic on U-Turns minimal & do not require separate storage lanes.
			DLR will check turning assignments. U-turns contain 1 storage lane.
S-2 b	Surrey	@ NB Evangeline Thrwy	Same as above.
S-3 a	W Pinhook	@ SB Evangeline Thrwy	Double Left Needed at WB Pinhook, Separate EB Right Turn not Needed, Add U-Turn.
			Double left turns on Pinhook Westbound have been incorporated with limited queue length due to Right-of-way constraints. SPUI configuration was considered for this intersection. See attached geometry and traffic analysis.
S-3 b	E Pinhook	@ NB Evangeline Thrwy	OK
S-4	Taft/14th	@ SB Evangeline Thrwy	Leave SBEV 3 lanes like existing conditions.
			See attached memo on Evangeline Thruway lane configuration.
S-5	Taft/14th	@ NB Evangeline Thrwy	Same as above. Also, keep EB Taft with dual permissive Left turns.
			Dual Left turns included.
S-8	Johnston/US 167	@ Stewart	Not necessary for analysis. Remove.

		This intersection has been removed from analysis.
S-9	Johnston/US 167 @ Cypress/Garfield	Do not allow left turns from/to Cypress (make median), Add exclusive right turn for WB Garfield
		Done
S-10 a	Johnston/US 167 @ I-49 Ramps (SPUI)	Include Double Left for both ramps entering Johnston.
		This SPUI has been designed to have pavement available for double lefts but it is planned to initially stripe the pavement as a single lane for Johnston WB left turn. HCS has been run for both cases and it has been verified to be acceptable. The HCS worksheet is located in appendix G.
S-10	Johnston/US 167 @ SB Evangeline Thrwy	Keep SBEV 3 lanes; remove SBEV Rt. Turn; Remove Johnston Rt. Turn onto SBEV.
		See attached memo on Evangeline Thruway lane configuration.
S-11	Louisiana @ NB Evangeline Thrwy	Keep NBEV 3 lanes.
		See attached memo on Evangeline Thruway lane configuration.
S-15	Jefferson @ Cypress	OK
S-16	Jefferson @ SB Evangeline Thrwy	Maintain 2 thru lanes on Jefferson by using medians, Keep SBEV 3 lanes, remove SBEV exclusive Rt. Turn lane, Keep 1 Lt. Turn lane for Jefferson at SBEV & NBEV.
		See attached memo on Evangeline Thruway lane configuration.
S-17	Jefferson @ NB Evangeline Thrwy	Same as above.
		See attached memo on Evangeline Thruway lane configuration.
S-18	Congress/2nd/3rd @ Garfield	Keep existing conditions, Add SB Garfield Lt. Turn.
		No changes at this intersection are anticipated and therefore, left turn will remain at SB Garfield.
U-19	3rd @ Buchanan	Keep unsignalized, Add thru lane to EB 3rd
		See Appendix G for intersection analysis with a third true lane. Stopped controlled.
U-20	3rd @ Cypress	Improve radius at EB 3rd Rt. Turn onto Cypress. (Due to Bus Route)
		Improvements have been made to this turn out.

S-20 a	2nd/3rd	@ I-49 Ramps (SPI)	Include Double Left for both ramps entering 2nd/3rd.
			This SPUI has been designed to have pavement available for double lefts but it is planned to initially stripe the pavement as a single lane for 2nd/3rd WB left turn. HCS has been run for both cases and it has been verified to be acceptable. The HCS worksheet is located in appendix G.
S-21	2nd/3rd	@ SB Evangeline Thrwy	Maintain existing conditions, Keep SBEV & NBEV 3 lanes total, Maintain 2 thru lanes and 1 Lt. Turn for 2nd/3rd, Exclusive right turn EB 2nd/3rd not necessary.
			See attached memo on Evangeline Thruway lane configuration.
S-22	2nd/3rd	@ NB Evangeline Thrwy	Maintain existing conditions, Single EB 2nd /3rd Lt. Turn adequate.
			Double left turn has been used in order to provide adequate queue length for vehicles turning.
S-23	2nd/3rd	@ Simcoe	Currently unsignalized. Proposed signalization or stopped condition at EB Simcoe is a possible alternative.
			Both signalized and unsignalized options result in favorable LOS.
U-24	2nd	@ Cypress/Buchanan	OK
S-29	Simcoe	@ Evangeline Thrwy	Maintain existing conditions, use side by side Lt. turns between SBEV & NBEV.
			These existing intersections have been combined into one due to realignment of Evangeline Thruway in this area. A single left turn lane will be provided for both Simcoe approaches.
S-30	Cameron/US 90/Mudd	@ SB Evangeline Thrwy	Use existing pavement as much as possible. ***LCG will send drawings of recent studies for this intersection.***
			This intersection will be relocated slightly to the east due to realignment of Evangeline Thruway in this area. The intersection will primarily operate as it does today.
S-31	Mudd	@ NB Evangeline Thrwy	Keep SBEV & NBEV 3 lanes.
			See attached memo on Evangeline Thruway lane configuration.
S-32	Donlon	@ SB Evangeline Thrwy	Change intersection to maintain existing conditions.
			Additional study will be preformed during geometric design phase.
S-33	Donlon	@ NB Evangeline Thrwy	Change intersection to maintain existing conditions.
			Additional study will be preformed during geometric design phase.

S-34	W Willow	@ SB Evangeline Thrwy	OK
S-35	E Willow	@ NB Evangeline Thrwy	Maintain Existing conditions.
S-36 a	Martin Luther King	@ SB Evangeline Thrwy	Keep SBEV 3 thru lanes with 1 Rt. Turn; Use single WB Castile Lt. Turn, Keep 2 EB thru lanes to Castile.
			Possible reconfiguration during the geometric design phase.
S-36	Castille	@ NB Evangeline Thrwy	Improve connection with access roadway north of Castile.
			Possible improvements will be studied during the geometric design phase.

Action Items Recommended by LaDOTD

#1	HNTB is to study the operational impact due to using three thru lanes in the core area of the Evangeline Thruway. Upon completion HNTB will submit a memo as part of the traffic report with findings and recommendation of which configuration shall be used for the geometric phase of the project.
	HNTB has studied the two lane and three lane configurations, see attached memo for details. It is recommended to stripe Evangeline Thruway for two thru lanes in each direction and provide dedicated turn lanes at various intersections.
#2	HNTB is to study the geometric alignment of the Evangeline Thruway @ 2nd and 3rd and present alternative configurations for review by DOTD. This will be submitted with the core area geometric submittal package.
	An alternative to combine 2 intersections (2nd/3rd @ SBEV and 2nd/3rd @ NBEV) into one intersection has been developed and evaluated based on geometric constraints and traffic analysis. See attachments
#3	HNTB will develop a scope and labor estimate for a study regarding improving capacity at Evangeline Thruway over the Vermilion River crossing and how it could be tied into the future I-49 Connector.
	HNTB is currently in discussion with DOTD concerning this study.

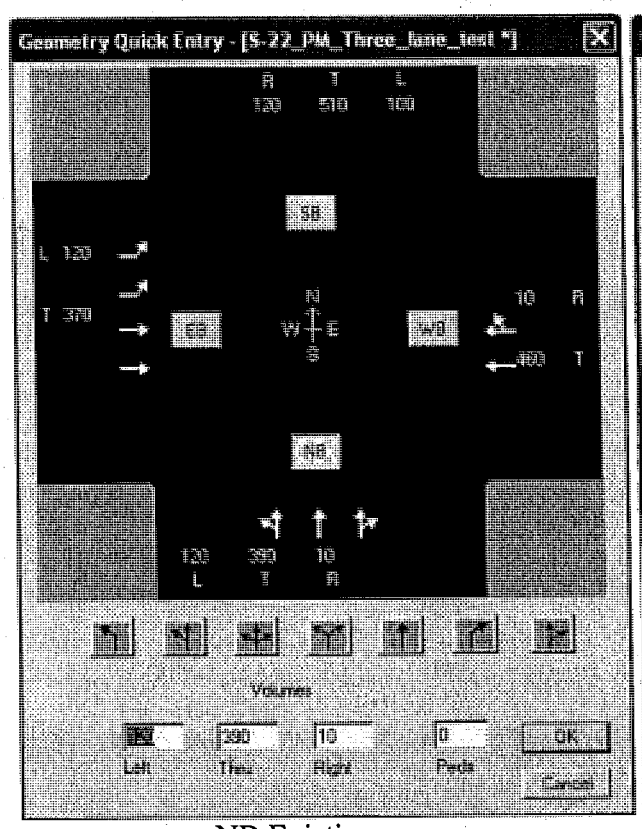
Made By: DLR
Date: 10/17/05

A Detailed Comparison between Lane Geometry Alternatives along Evangeline Thruway

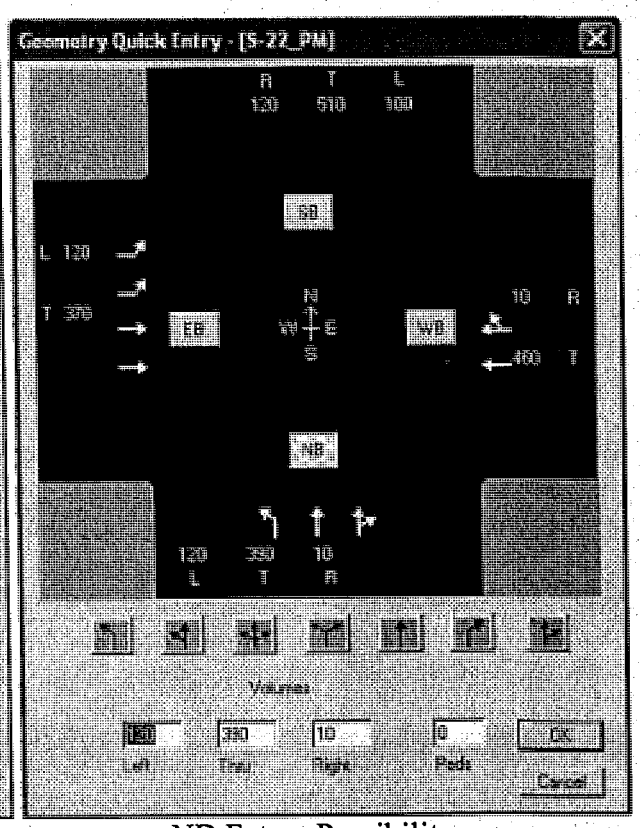
The purpose of this study is to determine if there is any difference operationally between two differing lane geometry for the core section of the Evangeline Thruway, located in Lafayette, La.

The existing Evangeline Thruway within the core area operates as a one lane couplet, three lanes each direction, with approximately 50,000 + vehicles per day. Based upon our traffic studies conducted, traffic volumes after the implementation of the I-49 Connector along the Evangeline Thruway will fall to approximately 17,000 vehicles per day. Due to the decrease in traffic in the core area, additional traffic configurations may be accommodated and desired for the one way couplets.

Currently both northbound and southbound Evangeline Thruway within the core area operate with three (3) lanes each with lane configuration at the intersection as a left-thru, thru, and right-thru. The alternatives to be considered for comparison consists of either a dedicated left, thru, right-thru or a left-thru, thru, right. An example of the two alternatives is illustrated below (see northbound lane configurations). The first of the figures is the existing condition along Northbound Evangeline Thruway and the second is the possible future configuration.



NB Existing



NB Future Possibility

As shown in the illustration the future possibility has a dedicated left turn lane where as the existing condition has a left-thru lane.

To determine which configuration operates better, two intersections were chosen for analysis within the Highway Capacity Software (HCS 4.1e). Both lane configurations for each intersection were analyzed independently for comparison. Volumes for the I-49 connector design year (2030) were used, and besides the lane configurations, all other traffic data was identical.

The results for two intersections analyzed are:

<u>Northbound Evangeline Thruway at 2nd & 3rd</u>

Existing Configuration northbound lanes (left-thru, thru, right-thru) LOS & Delay:	C	23.5 sec/veh
Future Possible Configuration northbound lanes (left, thru, right-thru) LOS & Delay:	C	24.2 sec/veh

<u>Northbound Evangeline Thruway at Louisiana</u>

Existing Configuration northbound lanes (left-thru, thru, right-thru) LOS & Delay:	C	21.1 sec/veh
Future Possible Configuration northbound lanes(left-thru, thru, right) LOS & Delay:	C	21.5 sec/veh

As you can see, the results from the different configurations only differ by a very negligible amount. Not enough to select one configuration over another. Therefore additional performance measures should be considered when determining the lane configurations.

Pros of the existing configuration:

- The local traffic is used to it.
- Geometry will not have to be adjusted to accommodate exclusive left or right turn lanes.
- The operational difference between the two configurations will only widen as the volumes increase.

Cons of the existing configuration:

- Rear end conflict points are created by having left or right turning vehicles and thru vehicles within the same lane.

Pros of the possible future configuration:

- Reduction of the conflict points between left or right turning vehicles and thru vehicles.
- Allows for on-street parking.
- Allows for more lefts or rights on red due to the turning lanes not being occupied by thru vehicles.
- May result in lower maintenance cost due to reducing the travelway.

Cons of the possible future configuration:

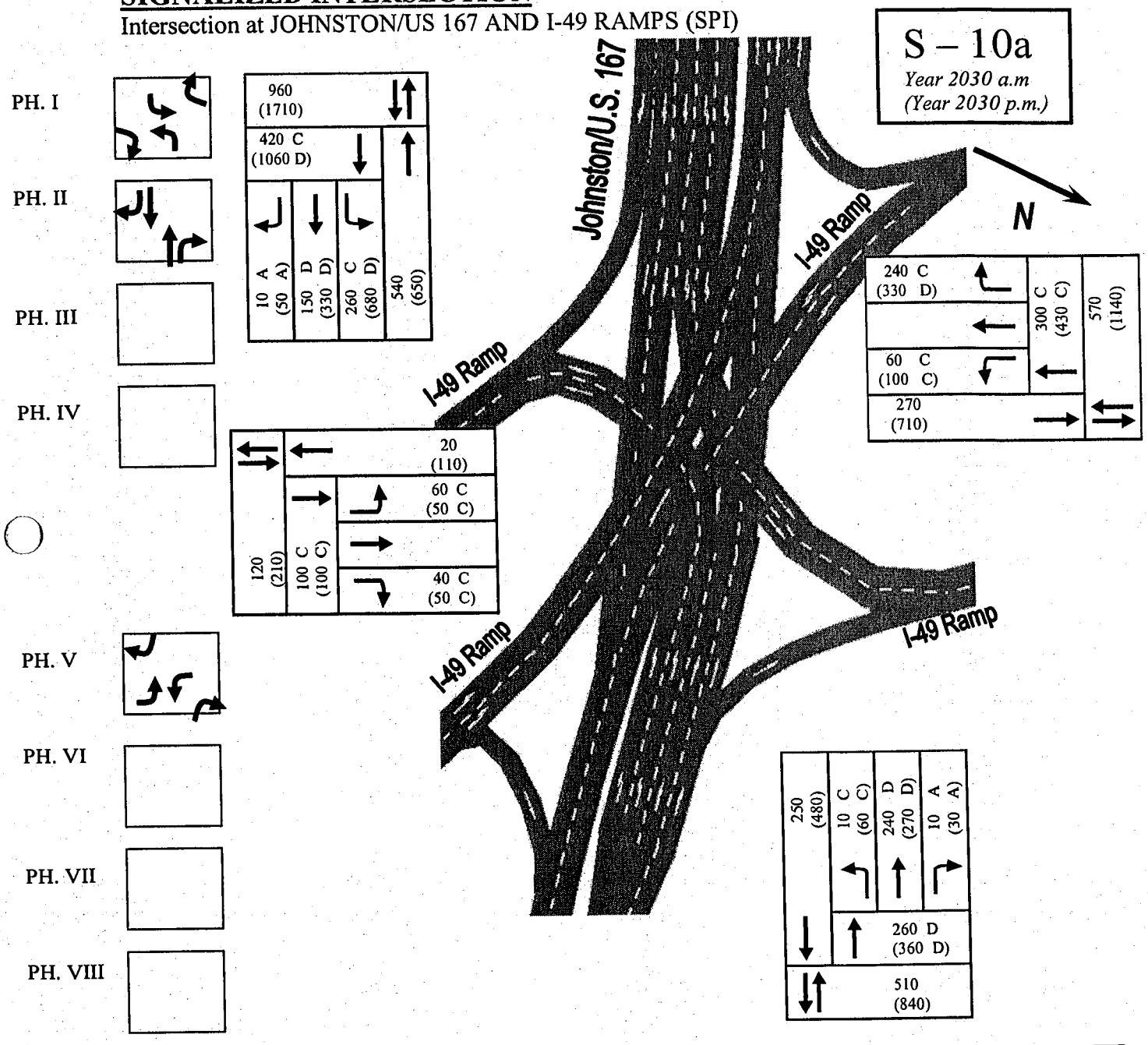
- Reduction of the overall capacity of the thruway.

Recommendations:

With the expected low volume, it is recommended to stripe Evangeline Thruway for two lanes in each direction and provide for dedicated turning lanes at intersections. This configuration will improve safety by allowing dedicated turning lanes which remove vehicles from the thru traffic stream and thus remove potential conflict points. The reduction in conflict points have shown to produce a safer roadway by cutting down on the number of accidents. Also, the three lane roadway pavement structure will still remain in place, and if warranted, the roadway can be re-striped for three lanes as it exists today.

SIGNALIZED INTERSECTION

Intersection at JOHNSTON/US 167 AND I-49 RAMPS (SPI)



ANALYSIS:

Year 2030	a.m.	p.m.
Intersection LOS:	C	D
Control Delay:	34.0 sec/veh	41.1 sec/veh

COMMENTS: **This shows that the operational difference between a double or single left from Johnson is negligible.**

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	I-49 Ramps & Johnst (S10a_AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	2	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	260	150	10	10	240	10	60		40	60		240
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		2	0		2	0		10	0		200
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 35.0	G = 30.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	289	167	9	11	267	9	67		33	67		44
Lane group capacity, c	876	775	865	876	775	865	1002		404	1002		404
	0.33	0.22	0.01	0.01	0.34	0.01	0.07		0.08	0.07		0.11

v/c ratio, X												
Total green ratio, g/C	0.29	0.25	0.63	0.29	0.25	0.63	0.33		0.29	0.33		0.29
Uniform delay, d_1	33.3	35.7	8.5	30.2	36.9	8.5	27.3		30.8	27.3		31.1
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	1.0	0.6	0.0	0.0	1.2	0.0	0.1		0.4	0.1		0.5
Initial queue delay, d_3												
Control delay	34.3	36.3	8.5	30.2	38.1	8.5	27.4		31.2	27.4		31.6
Lane group LOS	C	D	A	C	D	A	C		C	C		C
Approach delay	34.5			36.9			28.7			29.1		
Approach LOS	C			D			C			C		
Intersection delay	34.0			X_c = 0.23			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	I-49 Ramps & Johnst (S10a_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	2	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	680	330	50	60	270	30	50		50	100		330
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		2	0		2	0		10	0		200
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 35.0	G = 30.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	756	367	53	67	300	31	56		44	111		144
Lane group capacity, c	876	775	865	876	775	865	1002		404	1002		404
	0.86	0.47	0.06	0.08	0.39	0.04	0.06		0.11	0.11		0.36

v/c ratio, X												
Total green ratio, g/C	0.29	0.25	0.63	0.29	0.25	0.63	0.33		0.29	0.33		0.29
Uniform delay, d_1	40.2	38.3	8.8	30.8	37.4	8.6	27.2		31.1	27.7		33.6
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	11.0	2.1	0.1	0.2	1.5	0.1	0.1		0.5	0.2		2.4
Initial queue delay, d_3												
Control delay	51.2	40.4	8.9	31.0	38.8	8.7	27.3		31.6	27.9		36.0
Lane group LOS	D	D	A	C	D	A	C		C	C		D
Approach delay	45.9			35.2			29.2			32.5		
Approach LOS	D			D			C			C		
Intersection delay	41.1			X_c = 0.46			Intersection LOS			D		

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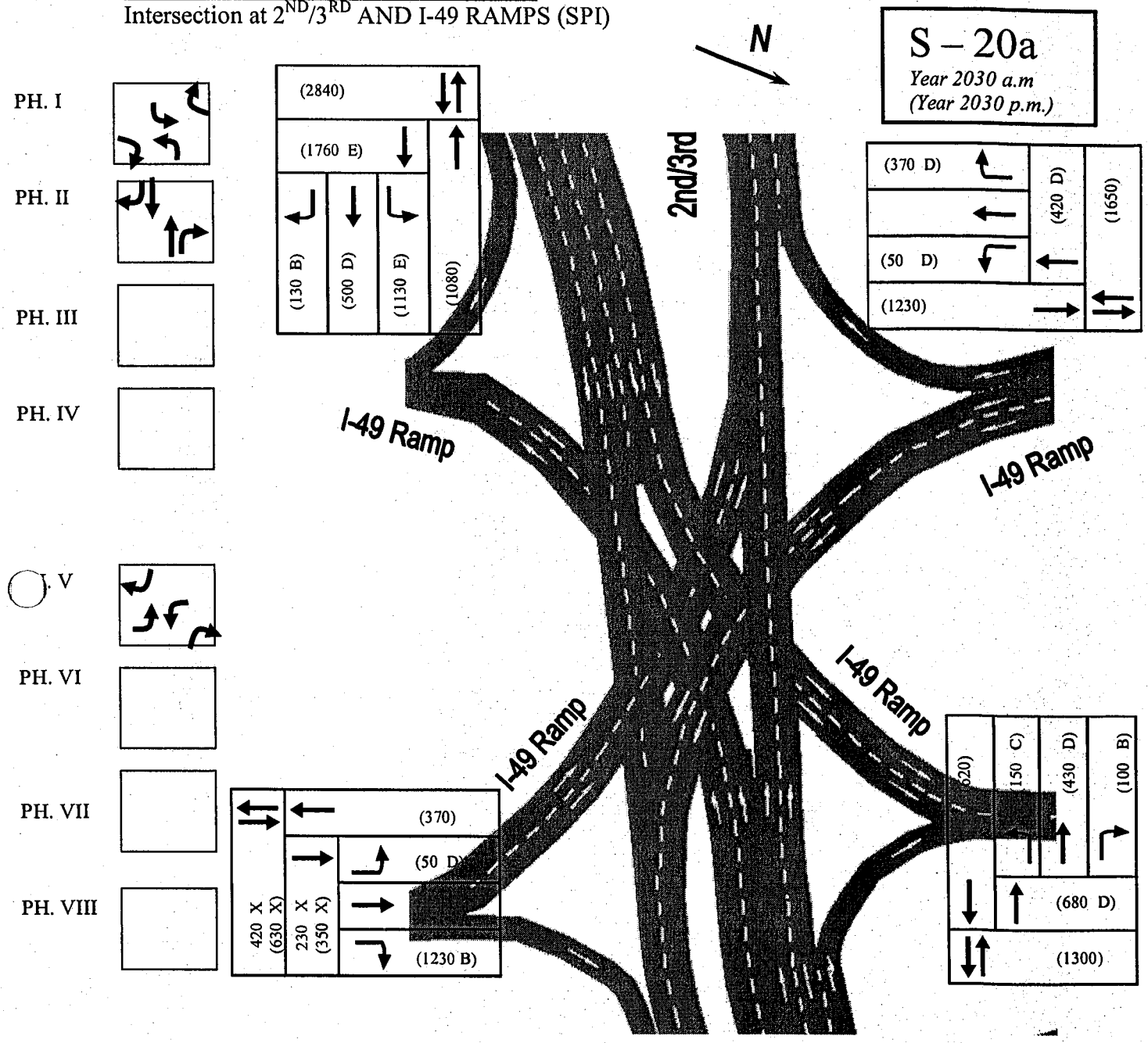
SIGNALIZED INTERSECTION

Intersection at 2ND/3RD AND I-49 RAMPS (SPI)



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	n/a	D
Control Delay:	n/a sec/veh	(47.0) sec/veh

COMMENTS: As shown, double lefts are provided at all I-49 Ramps.

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	2nd/3rd & I-49 Ramps (S20a_PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysis

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	2	2	1	2	2	1	2	0	1	2	0	1
Lane group	L	T	R	L	T	R	L		R	L		R
Volume, V (vph)	1130	500	130	150	430	100	280		70	50		370
% Heavy vehicles, %HV	5	5	5	5	5	5	5		5	5		5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P			P		
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Arrival type, AT	3	3	3	3	3	3	3		3	3		3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Ped / Bike / RTOR volumes	0		60	0		30	0		20	0		0
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0		0	0		0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	06	07	08
Timing	G = 50.0	G = 30.0	G =	G =	G = 25.0	G =	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	1256	556	78	167	478	78	311		56	56		411
Lane group capacity, c	1252	775	692	1252	775	692	626		577	626		577
	1.00	0.72	0.11	0.13	0.62	0.11	0.50		0.10	0.09		0.71

v/c ratio, X												
Total green ratio, g/C	0.42	0.25	0.50	0.42	0.25	0.50	0.21		0.42	0.21		0.42
Uniform delay, d_1	35.0	41.1	15.9	21.6	39.9	15.9	41.9		21.3	38.3		29.0
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000		1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50		0.50
Incremental delay, d_2	26.2	5.6	0.3	0.2	3.7	0.3	2.8		0.3	0.3		7.3
Initial queue delay, d_3												
Control delay	61.2	46.8	16.2	21.8	43.6	16.2	44.7		21.6	38.6		36.3
Lane group LOS	E	D	B	C	D	B	D		C	D		D
Approach delay	55.1			35.6			41.2			36.6		
Approach LOS	E			D			D			D		
Intersection delay	47.0			X_c = 0.80			Intersection LOS			D		

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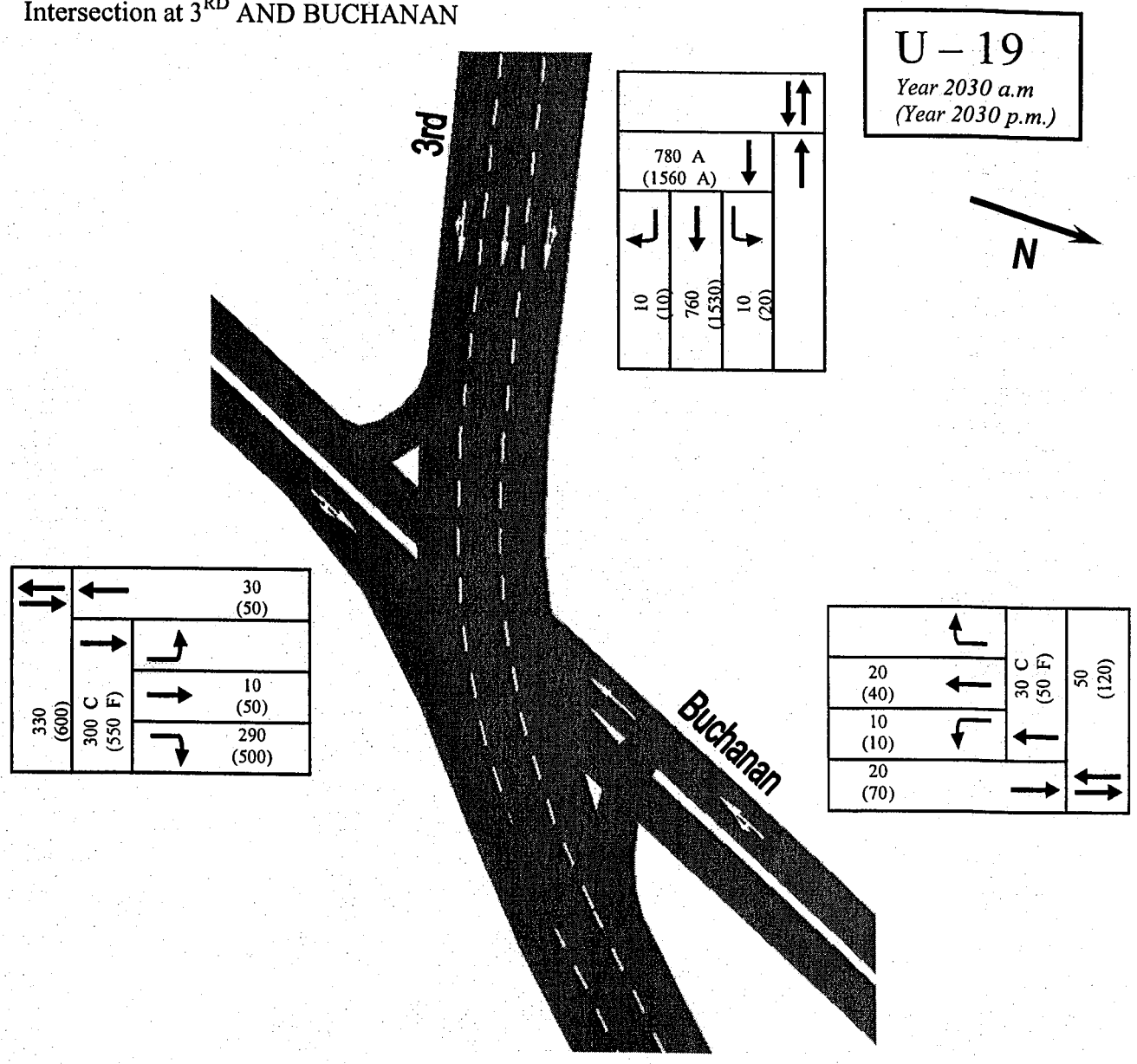
Version 4.1e

UNSIGNALIZED INTERSECTION

Intersection at 3RD AND BUCHANAN



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	A	C
Control Delay:	n/a sec/veh	n/a sec/veh

COMMENTS: Three lanes may be added to Buchanan. The pavement width is in place and would require only re-stripping.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998						0.870				
Flt Protected		0.999									0.984	
Satd. Flow (prot)	0	5070	0	0	0	0	0	1621	0	0	1833	0
Flt Permitted		0.999									0.984	
Satd. Flow (perm)	0	5070	0	0	0	0	0	1621	0	0	1833	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3806			2813			1826			2108	
Travel Time (s)		86.5			63.9			41.5			47.9	
Volume (vph)	10	760	10	0	0	0	0	10	290	10	20	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
Adj. Flow (vph)	11	826	11	0	0	0	0	11	315	11	22	0
Lane Group Flow (vph)	0	848	0	0	0	0	0	326	0	0	33	0
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 40.2% ICU Level of Service A
Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999						0.877				
Flt Protected		0.999									0.990	
Satd. Flow (prot)	0	5075	0	0	0	0	0	1634	0	0	1844	0
Flt Permitted		0.999									0.990	
Satd. Flow (perm)	0	5075	0	0	0	0	0	1634	0	0	1844	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2262			2557			1609			1464	
Travel Time (s)		51.4			58.1			36.6			33.3	
Volume (vph)	20	1530	10	0	0	0	0	50	500	10	40	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	1700	11	0	0	0	0	56	556	11	44	0
Lane Group Flow (vph)	0	1733	0	0	0	0	0	612	0	0	55	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

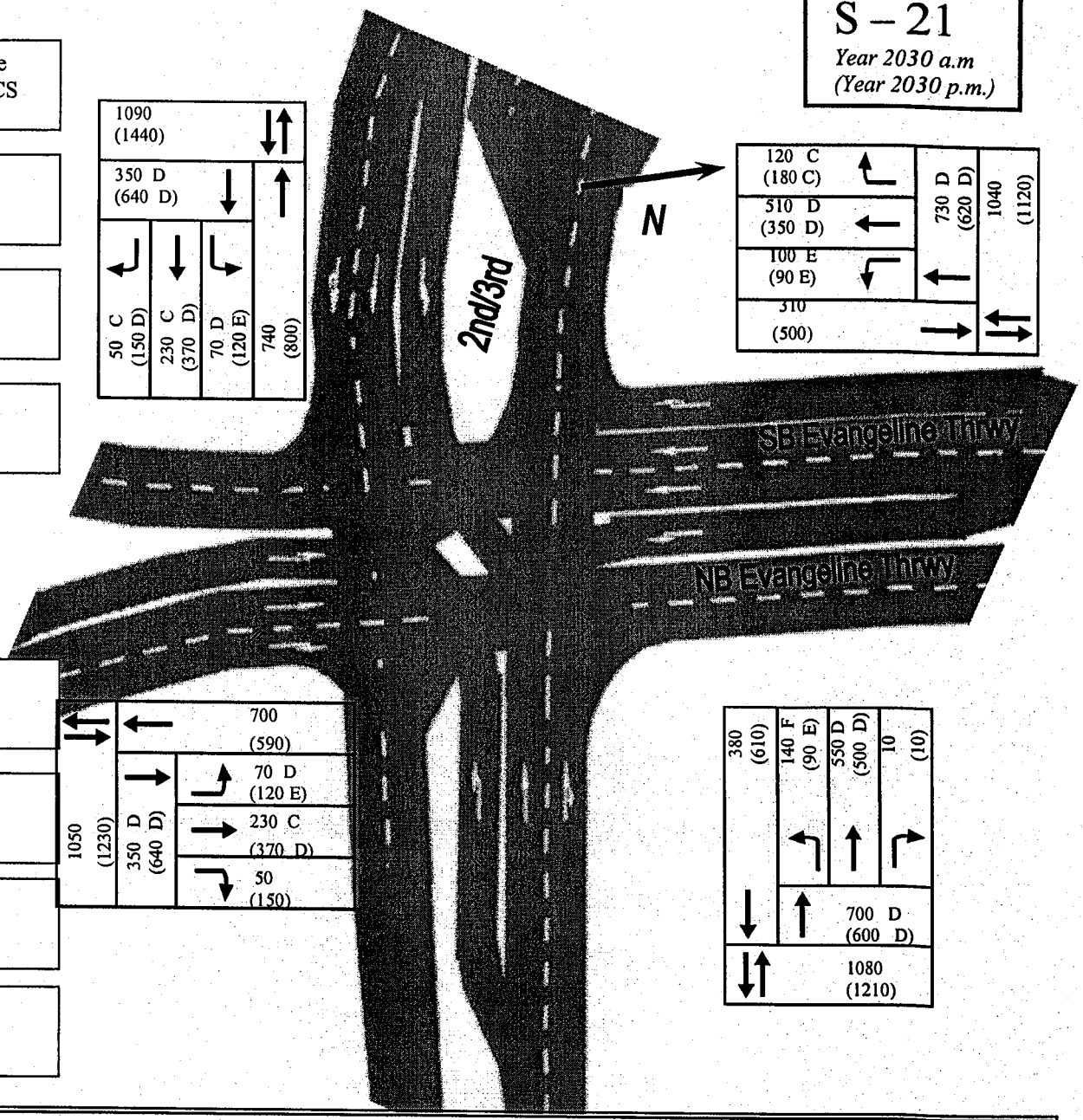
Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 70.4% ICU Level of Service C
Analysis Period (min) 15

SIGNALIZED INTERSECTION

Intersection at 2ND/3RD AND SB/NB EVANGELINE THRUWAY

S – 21
Year 2030 a.m
(Year 2030 p.m.)

PH. I — See HCS
PH. II
PH. III
PH. IV
PH. V
PH. VI
PH. VII
PH. VIII



ANALYSIS:

Year 2030	**a.m.**	**p.m.**
Intersection LOS:	**D**	**D**
Control Delay:	**42.8 sec/veh**	**42.2 sec/veh**

COMMENTS:

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	2nd/3rd & NB/SB EV (AM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysisn (3 lane)

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	1	2	0	1	2	0	1	2	1
Lane group	L	TR		L	TR		L	TR		L	T	R
Volume, V (vph)	70	230	50	140	550	10	80	240	10	100	510	120
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Arrival type, AT	3	3		3	3		3	3		3	3	3
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0		0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 15.0	G = 35.0	G = 0.0	G =	G = 15.0	G = 35.0	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y = 5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	78	312		156	622		89	278		111	567	133
Lane group capacity, c	193	880		193	902		193	899		193	904	634
v/c ratio, X	0.40	0.35		0.81	0.69		0.46	0.31		0.58	0.63	0.21

Total green ratio, g/C	0.13	0.29		0.13	0.29		0.13	0.29		0.13	0.29	0.46
Uniform delay, d_1	48.4	33.6		51.1	37.7		48.7	33.1		49.5	36.8	19.5
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	1.000
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	0.50
Incremental delay, d_2	6.2	1.1		29.3	4.3		7.7	0.9		11.9	3.3	0.8
Initial queue delay, d_3												
Control delay	54.6	34.7		80.4	42.0		56.5	34.0		61.4	40.1	20.2
Lane group LOS	D	C		F	D		E	C		E	D	C
Approach delay	38.7			49.7			39.4			39.8		
Approach LOS	D			D			D			D		
Intersection delay	42.8			X_c = 0.67			Intersection LOS			D		

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Version 4.1e

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	WJM	Intersection	2nd/3rd & NB/SB EV (PM)
Agency or Co.	HNTB	Area Type	CBD or Similar
Date Performed	1/04/06	Jurisdiction	Lafayette, LA
Time Period		Analysis Year	2030
		Project ID	I-49 Connector Operational Analysisn (3 lane)

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	2	0	1	2	0	1	2	0	1	2	1
Lane group	L	TR		L	TR		L	TR		L	T	R
Volume, V (vph)	120	370	150	90	500	10	120	390	10	90	350	180
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	5	5	5	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Arrival type, AT	3	3		3	3		3	3		3	3	3
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0		0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 15.0	G = 35.0	G = 0.0	G =	G = 15.0	G = 35.0	G =	G =
	Y = 5	Y = 5	Y =	Y =	Y = 5	Y = 5	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 120.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	133	578		100	567		133	444		100	389	200
Lane group capacity, c	193	865		193	902		193	901		193	904	634
v/c ratio, X	0.69	0.67		0.52	0.63		0.69	0.49		0.52	0.43	0.32

Total green ratio, g/C	0.13	0.29		0.13	0.29		0.13	0.29		0.13	0.29	0.46
Uniform delay, d_1	50.3	37.4		49.1	36.9		50.3	35.2		49.1	34.4	20.6
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	1.000
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50		0.50	0.50	0.50
Incremental delay, d_2	18.3	4.1		9.6	3.3		18.3	1.9		9.6	1.5	1.3
Initial queue delay, d_3												
Control delay	68.6	41.5		58.7	40.2		68.6	37.1		58.7	35.9	21.9
Lane group LOS	E	D		E	D		E	D		E	D	C
Approach delay	46.5			43.0			44.3			35.2		
Approach LOS	D			D			D			D		
Intersection delay	42.2			X_c = 0.61			Intersection LOS			D		

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