Final Pioneer Trail Interchange Feasibility Study



FIN No.: 41640112201 FAP: 9999194A





Submitted to: Florida Department of Transportation District Five

Date Submitted: November 2005



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1.0 Introduction

1.1 Introduction

HNTB Corporation has been retained by the Florida Department of Transportation (FDOT), District 5, to perform services for the I-95 Systems Operational Analysis Report (SOAR). This feasibility study is being provided as part of the services for this project.

1.2 Purpose

The purpose of this feasibility study is to evaluate the traffic impact to the interstate facility and within the project study area after the addition of a new interchange on I-95. The primary objective of this report is to provide technical information and data to the Florida Department of Transportation (FDOT) to determine the feasibility of developing a new interchange. This report documents the design year traffic projections and traffic operations analyses for the proposed Pioneer Trail Interchange. If an Interchange Proposal is needed the applicant will need to refer to *The Interchange Handbook* published by FDOT for requirements for a formal Interchange Justification Report.

1.3 Methodology

The scope for this feasibility study involves developing design year traffic projections and traffic operations analyses within the study area of the proposed interchange. The design year traffic projections were completed for two alternatives. The alternatives were No-Build or without the proposed interchange, and Build with the proposed interchange. In addition, as detailed in the scope of services for this study, the proposed interchange geometry will be assumed to be either a diamond or urban interchange.

The traffic operations analyses were conducted for the analysis years using the existing volumes and future traffic projections. Basic freeway segments and ramp merge/diverge were analyzed along I-95 within the area of influence. These analyses were conducted using the procedures outlined in the *Highway Capacity Manual*, Transportation Research Board, 2000 (2000 HCM). A link level of service evaluation was also performed for roadway segments within the study area. This analysis was conducted using the generalized level of service tables in the *2002 FDOT Quality/Level of Service Handbook*.



2.0 Project Information

2.1 Project Location

The proposed interchange is located along Interstate 95 south of the existing SR 421 (Dunlawton Avenue) interchange and north of the existing SR 44 (Canal Street) interchange in Volusia County, Florida. The proposed project location is shown in Figure 1.

2.2 Study Area

The study area for the proposed Pioneer Trail interchange includes I-95 from north of SR 421 (Dunlawton Avenue) to south of the existing SR 44 (Canal Street) interchange in Volusia County. It also includes the interchanges immediately north and south of the proposed interchange location. For this study, the interchange north of the proposed location is SR 421 (Dunlawton Avenue) and SR 44 (Canal Street) is the interchange immediately south of the proposed interchange. The study area is illustrated in Figure 1.

2.3 Design Characteristics

The traffic characteristics were estimated based on available historical data and planned development in the project corridor. The development of the traffic characteristics used for the feasibility study is documented in the *I-95 SOAR Design Traffic Report*. Table 1 summarizes the traffic characteristics used for this study.

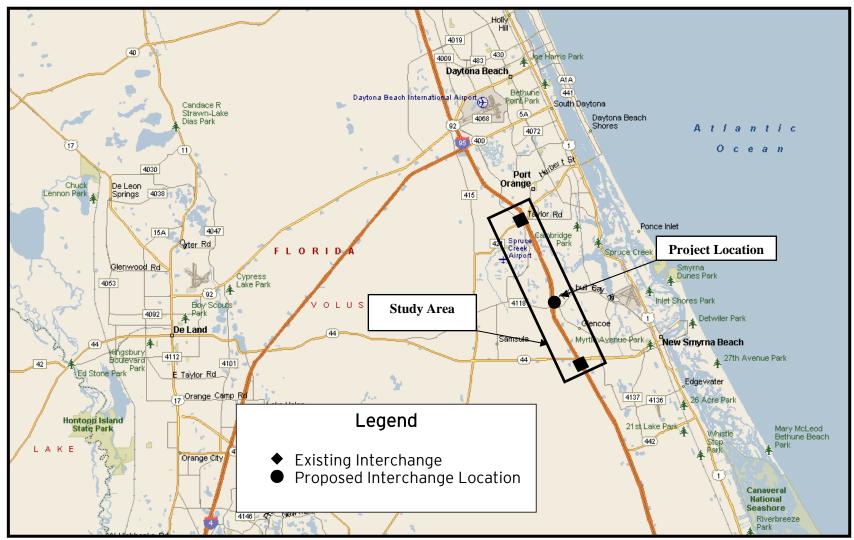
Roadway	County	Design Hour Factor (K ₃₀)	Directional Distribution Factor (D ₃₀)	Percent of Trucks in the Design Hour (T _{peak})	Peak Hour Factor (PHF)	Driver Population Factor (f _p)
I-95 Mainline and Ramps	Volusia County	10.306	57.378	7.7	0.95	1.0

Table 1 - Traffic Characteristics



Figure 1 – Project Location and Study Area Map







2.4 Interchange Spacing

The Florida Department of Transportation (Department) has defined minimum interchange spacing standards for new interchanges. These standards shown in Table 2 are documented in *The Interchange Handbook's Technical Resource Document* (January 2003). Based on the currently adopted Urban Area Boundaries the area type in the vicinity of the proposed interchange location is urban.

Table 2 - Interchange Spacing Standards

Area Type	Minimum Spacing ¹
CBD/CBD Fringe	1 mile
Urbanized Area	2 miles
Urban Area/Transitioning Area	3 miles
Rural Area	6 miles

¹⁻ Centerline to Centerline

As defined in *The Interchange Handbook's Technical Resource Document* the spacing between proposed interchanges is measured from centerline of the crossroads.

According to information found in the Department's *Interchange Report* (May 2005), the current location for interchanges within the study area is documented below in Table 3.

Table 3 - Existing Interchange Spacing

Location	Milepost	Proposed Spacing (miles)
SR 421 (Dunlawton Avenue)	23.247	-
Proposed Pioneer Trail Interchange	Approximately 19.796	3.478
SR 44 (Canal Street)	16.291	3.505

2.5 Analysis Years

The analysis years for the evaluation of the No-Build and Build alternatives for this project include:

- Existing Year 2004
- Design Year- 2030

2.6 Consistency with other Plans

The proposed interchange is currently listed as a cost feasible project in the adopted Cost Feasible Volusia County MPO 2020 Long Range Transportation Plan Refinement.



3.0 Existing Conditions

This section describes current roadway conditions in the study area and includes an evaluation of existing traffic operations.

3.1 Existing Roadway Conditions

I-95 is a north-south limited access facility along the east coast of Florida. In the study area in Volusia County I-95 is a four lane divided facility with a grassed median that varies from 150 to 200 feet. The existing I-95 corridor is classified in the project area as an urban principal arterial and the level of service (LOS) standard is LOS C.

CR 421 (Taylor Road) is a two lane divided roadway in the project study area from west of CR 415 (Tomoka Farms Road) to Williamson Boulevard /Airport Road. CR 421 (Taylor Road) is classified as an urban principal arterial in the study area and the level of service standard is LOS E.

SR 421 (Dunlawton Avenue) is a six lane divided arterial in the project study area from Williamson Boulevard/Airport Road to east of Taylor Road. The interchange with I-95 is a traditional diamond configuration. In the project study area, SR 421 (Dunlawton Avenue) is classified as an urban principal arterial and the level of service standard is LOS D.

Pioneer Trail is a two lane divided arterial in the project study area that bridges over I-95. Pioneer Trail is classified as an urban collector and the level of service standard is LOS E.

SR 44 (Canal Street) is a four lane divided arterial in the project study area. The interchange with I-95 is a traditional diamond configuration plus one southbound off loop in the southwest quadrant. SR 44 (Canal Street) is classified as a rural principal arterial from west of CR 415 (Tomoka Farms Road) to east of Samsula Drive and as an urban principal arterial from east of I-95 to east of Glencoe Road. The level of service standard for rural section is LOS B and the level of service for the urban section is LOS D.

3.2 Operational Analysis

The evaluation of the existing operating conditions consisted of an assessment of the operational analysis of the existing roadway network using the existing traffic volumes.

Operational analyses were conducted for the mainline freeway segments, ramp junctions, and intersections for the Existing Year. The capacity analysis calculations for the Existing Year conditions are included in Appendix A. The Existing Year design hour volumes and levels of service are shown in Figure 2. Table 4 lists the results of the operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for the Existing Year. There are three basic freeway segments that were analyzed. The freeway segments are divided into north of SR 421 (Dunlawton Avenue), between SR 421 (Dunlawton Avenue) and SR 44 (Canal Street), and south of SR 44 (Canal Street) operate at LOS C or better. All the freeway ramp merges and diverges operate at LOS C or better.



The intersections operating conditions for the Existing Year are shown in Table 5. The signalized intersections on SR 421 (Dunlawton Avenue) at Williamson Boulevard /Airport Road and the southbound ramp terminus operate at a LOS C and LOS D, respectively. The other signalized intersection at SR 421 (Dunlawton Avenue) and Taylor Road operates at LOS B. The SR 421 (Dunlawton Avenue) unsignalized intersection at the northbound ramp termini operates at a level of service of LOS C/F. The unsignalized intersections evaluated on SR 44 (Canal Street) are at the southbound and northbound ramp termini and Sugar Mill Road. The intersections operate at LOS A/B, LOS A/D, and LOS B/C, respectively.

Table 6 displays the results of the roadway segments level of service analysis for the Existing Year. The majority of the roadway segments are operating at or below the level of service standard.



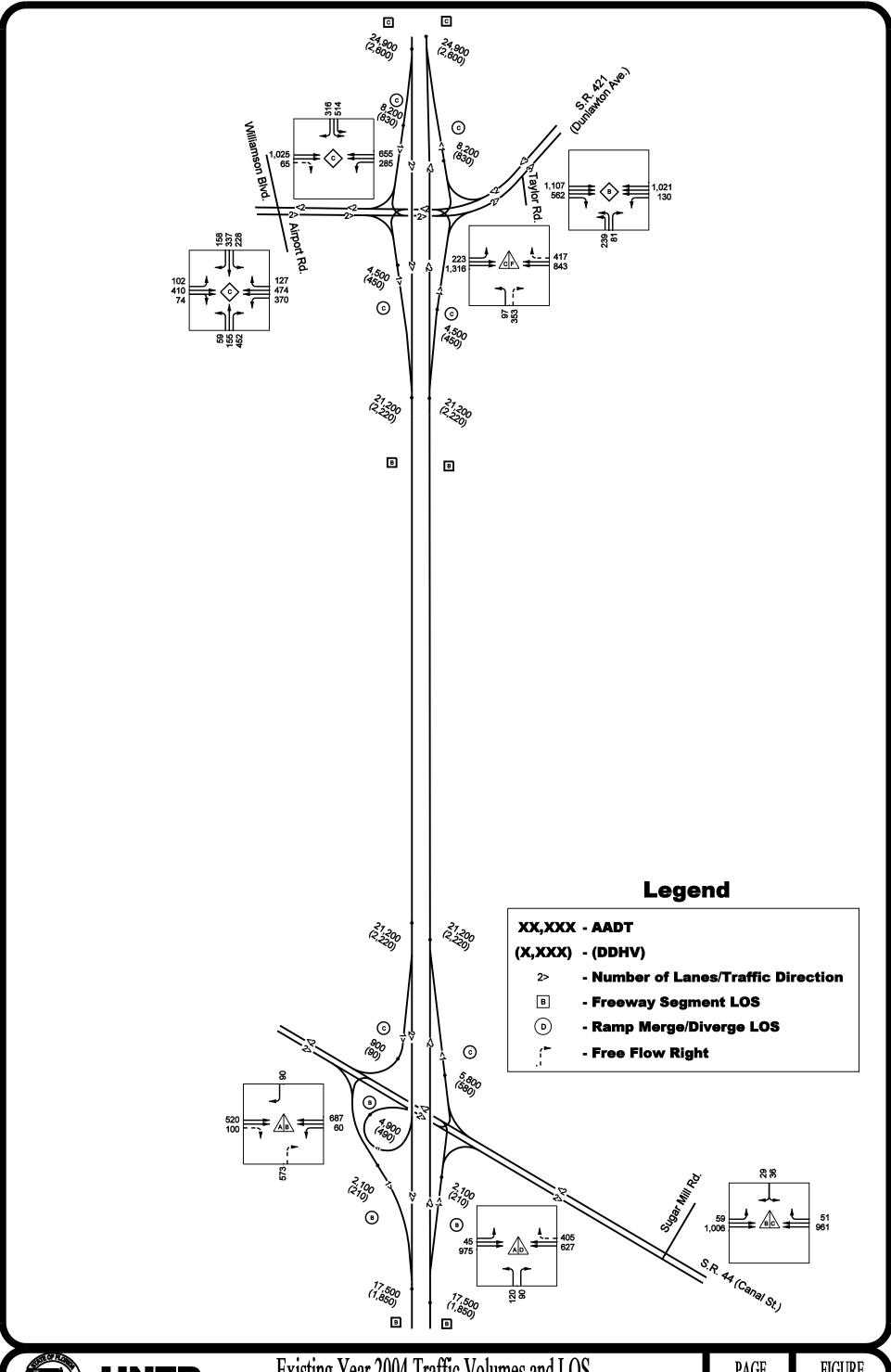




Table 4 - Existing Year (2004) Level of Service Analysis Summary

	Existing Year (2004)			
Location	Freeway		Ramp	
	Volume	LOS	Volume	LOS
North of SR 421 (Dunlawton Avenue)	2,600	С	-	-
SR 421 (Dunlawton Avenue)				
I-95 NB Off Ramp	2,220	-	450	С
I-95 NB On Ramp	1,770	-	830	С
I-95 SB Off Ramp	2,600	-	830	С
I-95 SB On Ramp	1,770	-	450	С
Between SR 421 (Dunlawton Avenue) and SR 44	2,220	В	-	-
SR 44				
I-95 NB Off Ramp	1,850	-	210	В
I-95 NB On Ramp	1,640	-	580	С
I-95 SB Off Ramp	2,220	-	90	С
I-95 SB Off Ramp (Loop)	2,130		490	В
I-95 SB On Ramp	1,640	-	210	В
South of SR 44	1,850	В	-	-

Table 5 - Existing Year (2004) Intersection Level of Service Analysis Summary

	Existing Year 2004	
Intersection	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at		
Williamson Boulevard/Airport Road	С	34.5
I-95 SB Ramps	D	39.8
I-95 NB Ramps	C/F *	532.9
Taylor Road	В	12.8
SR 44 at		
I-95 SB Ramps	A/B *	11.9
I-95 NB Ramps	A/D *	34.6
Sugar Mill Road	B/C *	23.1

^{*} Unsignalized Intersection LOS (major/minor approach)



Table 6 - Existing Year (2004) Link Level of Service Analysis

Roadway Segment	2004 No. of Lanes	Existing AADT	2004 Existing LOS
CR 421/SR 421 (Dunlawton Avenue)		1 11 12 1	
East of CR 415	2	7,660	С
From West of Airport Road to West of I-95	4	24,050	С
From East of I-95 to East of Taylor Road	6	34,000	В
·			
Taylor Road			
East of SR 421	2	12,010	D
Pioneer Trail			
East of CR 415	2	3,540	С
West of Airport Road	2	3,210	С
From East of Airport Road to East of I-95	2	3,090	С
East of Turnbull Bay Road	2	2,150	С
Turnbull Bay Road			
North of Pioneer Trail	2	1,660	С
SR 44			
West of CR 415	4	8,700	Α
From East of CR 415 to West of Samsula Drive	4	13,900	A
From East of Samsula Drive to West of I-95	4	14,300	A
From East of I-95 to West of Sugar Mill Road	4	23,500	В
From East of Sugar Mill Road to East of Glencoe Road	4	21,000	В
From East of Sagar min Road to East of Steriese Road		21,000	
CR 415 (Tomoka Farms Road)			
North of CR 421	2	5,980	С
From South of CR 421 to North of Pioneer Trail	2	6,830	С
From South of Pioneer Trail to South of SR 44	2	6,050	С
Williamson Blvd			
North of CR 421	2	11,190	D
Airport Road			
North of Pioneer Trail	2	3,380	С
Glencoe Road			
From South of Pioneer Trail to North of SR 44	2	1,200	Α
Sugar Mill Road			
North of SR 44	2	2,600	С



4.0 Future Conditions

4.1 Future Design Traffic Characteristics / Traffic Projections

The future traffic demand for the proposed Pioneer Trail Interchange feasibility study was primarily based on the 2025 Central Florida Regional Planning Model (III) that was used for the I-95 SOAR study. A complete discussion of the future year model and resulting traffic projections is documented in the *I-95 SOAR Design Traffic Report*. Traffic forecasts were prepared for the Design Year No-Build and Build Alternatives. The future traffic volumes for this interchange are shown in Section 5.0 of this report.

5.0 Evaluation of Alternatives

5.1 Description of Alternatives

The evaluation of the alternatives consisted of a comparison of a No-Build Alternative and a Build Alternative for the Design Year (2030). The No-Build Alternative for the Design Year (2030) assumes I-95 is widened to six lanes without a proposed Pioneer Trail interchange, however in the CFRPM III model Pioneer Trail is shown as an overpass over I-95. The No-Build Alternative includes the following recommended improvements from the adopted cost feasible Volusia County MPO 2020 Long Range Transportation Plan Refinement that are in the study area:

- CR 421 (Taylor Road): From CR 415 (Tomoka Farms Road) to Williamson Boulevard/Airport Road Widen to four lanes
- Pioneer Trail: From CR 415 (Tomoka Farms Road) to Turnbull Bay Rd.- Widen to four lanes
- CR 415 (Tomoka Farms Road): From Taylor Rd to SR 44 Widen to four lanes
- Williamson Boulevard: From Bellville Road to Taylor Road Widen to four lanes
- Airport Road: Summer Tree Road to Pioneer Trail Widen to four lanes

The No-Build Alternative also includes capacity projects from the Florida Department of Transportation's 2006-2010 Adopted Work Program. The project and status is noted below for the state roadways in the study area.

- SR 421 (Dunlawton Avenue): From Williamson Boulevard to 259 ft E of the northbound I-95 off ramp- Adding an additional eastbound through lane and dual eastbound left lanes - Construction is funded in fiscal year 2006/2007.
- SR 44: From Pioneer Trail to SR 415- Widen to four lanes-Construction completed June 22, 2005.

Other documentation, provided by the Department, is shown below, includes planned improvements in the project study area.



- CR 421 (Taylor Road): Southbound off ramp redesigned to accommodate dual left turn lanes, one dedicated right turn lane, and a free flow right turn lane.
- SR 421 (Dunlawton Avenue):
 - Northbound off ramp signalized to improve the intersection and replace the northbound off ramp free flow right turn lane with two dedicated right turn lanes.
 - At Williamson Boulevard: Add a second left turn lane from eastbound SR 421 to northbound Williamson Boulevard and add an additional left turn lane from westbound SR 421 to southbound Williamson Boulevard.
- Williamson Boulevard at CR 421 (Taylor Road):
 - Northbound: Restructure the geometry to allow two left turn lanes, two through lanes, and one dedicated right turn lane.
 - o Southbound: Restructure the geometry to allow two left turn lanes, one through lane, and a through/right turn lane.

The Build Alternative was developed for the feasibility study to evaluate future traffic conditions with the proposed interchange. The Build Alternative consists of the No-Build Alternative with the proposed Pioneer Trail interchange between SR 421 (Dunlawton Avenue) and SR 44 (Canal Street).

5.2 Operational Analysis

5.2.1. NO-BUILD ANALYSIS OPERATIONAL ANALYSIS

Operations analyses were conducted for the mainline freeway segments and ramp junctions, using the procedures outlined in the 2000 HCM. These analyses were conducted for the No-Build Alternative for the Design Year to determine future traffic operations. The design hour volumes and levels of service for the Design year analysis are shown in Figure 3. Table 7 lists the results of the freeway operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for the design year. The basic freeway segments north of SR 421 (Dunlawton Avenue), between SR 421 (Dunlawton Avenue) and SR 44 (Canal Street), and south of SR 44 (Canal Street) will operate at LOS B. All the freeway ramp merges and diverges are projected to operate at LOS C or better. The capacity analyses are included in Appendix A.

The intersections operating conditions for the No-Build Alternative are shown in Table 8. For the purpose of this analysis the intersection of SR 44 (Canal Street) and the northbound ramp termini was analyzed as a signalized intersection to improve the Design Year operations. The intersection evaluated on SR 421 (Dunlawton Avenue) at Taylor Road will operate at LOS D, but the other intersections on SR 421 (Dunlawton Avenue) will operate at a LOS E or worse. The SR 44 (Canal Street) intersections at the southbound ramp terminus and Sugar Mill Road will operate at a level of service of LOS F/E and LOS F/F, respectively, in the No-Build Alternative. The Sugar Mill Road intersection is over capacity, thus, the delay is so significant at the intersection that it can not be determined. The intersection of SR 44 (Canal Street) and the northbound ramp termini will operate at a LOS F.



Table 9 displays the results of the roadway segments level of service analysis for the No-Build Alternative in the Design Year. The majority of the roadway segments are still operating at or below the level of service standard, however, there are exceptions. The segment of SR 421 (Dunlawton Avenue) from west of Airport Road to East of Taylor Road will operate at LOS F. SR 44 (Canal Street) in the project area will also operate at LOS F, below the LOS standard. CR 415 (Tomoka Farms Road) from west of CR 421 to south of Pioneer Trail and Williamson Boulevard north of CR 421 will operate below the LOS standard.



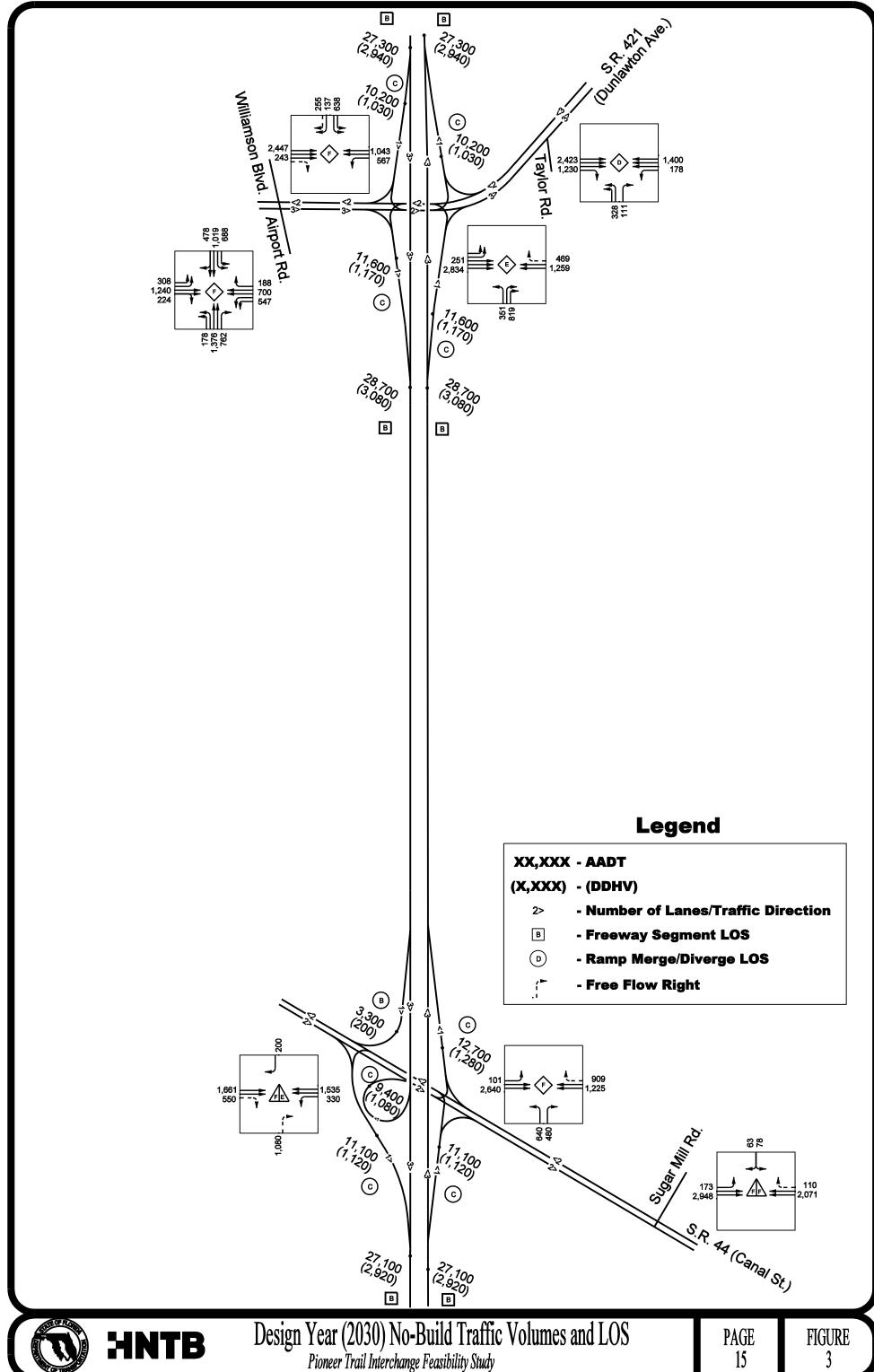




Table 7 - Design Year (2030) Level of Service Analysis Summary (No-Build Alternative)

	No Build Design Year (2030)			
	Freev	vay	Ram	р
Location	Volume	LOS	Volume	LOS
North of SR 421 (Dunlawton Avenue)	2,940	В	-	-
SR 421 (Dunlawton Avenue)				
I-95 NB Off Ramp	3,080	-	1,170	С
I-95 NB On Ramp	1,910	-	1,030	С
I-95 SB Off Ramp	2,940	-	1,030	С
I-95 SB On Ramp	1,910	-	1,170	С
Between SR 421 (Dunlawton Avenue) and SR 44	3,080	В	-	-
SR 44				
I-95 NB Off Ramp	2,920	-	1,120	С
I-95 NB On Ramp	1,800	-	1,280	С
I-95 SB Off Ramp	3,080	-	200	В
I-95 SB Off Ramp (Loop)	2,880		1,080	С
I-95 SB On Ramp	1,800	-	1,120	С
South of SR 44	2,920	В	-	-

Table 8 - Design Year (2030) Intersection Level of Service Analysis (No-Build Alternative)

	No-Build Design Year (2030)	
Intersection	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at		
Williamson Boulevard/Airport Road	F	303.8
I-95 SB Ramps	F	136.6
I-95 NB Ramps	E	63.8
Taylor Road	D	32.4
SR 44 at		
I-95 SB Ramps	F/E	37.4
I-95 NB Ramps	F ⁽¹⁾	166.8
Sugar Mill Road	F/F	ОС

(1) Assumes signalized intersection; OC = Over Capacity



Table 9 - Design Year (2030) Link Level of Service Analysis (No-Build Alternative)

Roadway Segment	2030 No. of Lanes	No-Build 2030 AADT	2030 No-Build LOS
CR 421/SR 421 (Dunlawton Avenue)			
East of CR 415	4	31,600	E
From West of Airport Road to West of I-95	4	59,500	F
From East of I-95 to East of Taylor Road	6	71,500	F
Taylor Road			
East of SR 421	2	12,600	D
Pioneer Trail			
East of CR 415	4	16,900	С
West of Airport Road	4	17,800	С
From East of Airport Road to West of I-95	4	13,000	С
East of I-95	4	9,400	С
East of Turnbull Bay Road	4	6,500	С
Turnbull Bay Road			
North of Pioneer Trail	2	11,100	D
SR 44			
West of CR 415	4	43,000	D
From East of CR 415 to West of Samsula Drive	4	46,600	D
From East of Samsula Drive to West of I-95	4	52,400	F
From East of I-95 to West of Sugar Mill Road	4	46,200	F
From East of Sugar Mill Road to East of Glencoe Road	4	40,700	F
Tomoka Farms Rd (CR 415)			
North of CR 421	2	21,500	F
From South of CR 421 to North of Pioneer Trail	2	48,200	F
South of Pioneer Trail	2	45,200	F
South of SR 44	4	29,900	Е
Williamson Blvd			
North of CR 421	4	35,100	F
Airport Road			
South of SR 421	2	35,700	F
North of Pioneer Trail	2	9,300	D
Glencoe Road			
From South of Pioneer Trail to North of SR 44	2	9,700	D
Sugar Mill Road			
North of SR 44	2	7,100	С



5.2.2. BUILD ANALYSIS OPERATIONAL ANALYSIS

Operations analyses were conducted for the mainline freeway segments and ramp junctions, using the procedures outlined in the 2000 HCM. These analyses were conducted for the Build Alternative for the Design Year to determine future traffic operations with the proposed interchange. The design hour volumes and levels of service for Build Alternative Design Year analysis is shown in Figure 4. Table 10 lists the results of the freeway operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for the design year. All of the basic freeway segments are projected to operate at LOS B in the Design Year. All the freeway ramp merges and diverges are projected to operate at LOS C or better. The capacity analyses are included in Appendix A.

The intersections operating conditions for the Build Alternative are shown in Table 11. For the purpose of this analysis the intersection of SR 44 (Canal Street) intersection with the northbound ramp termini was analyzed as a signalized intersection. In the Build Alternative the intersection operating conditions on SR 421 (Dunlawton Avenue) at Williamson Boulevard/Airport Road and the southbound ramp termini will operate at a level service of LOS F. The other intersections on SR 421 (Dunlawton Avenue) at Taylor Road and the northbound ramp termini will operate at LOS C and LOS E, respectively. The intersections on SR 44 (Canal Street) at the southbound ramp terminus will operate at a level of service of LOS F/E and at Sugar Mill Road will operate at LOS F/F. Similar to the No-Build Alternative, the Sugar Mill Road intersection will operate over capacity, thus, the delay could not be determined. The intersection on SR 44 (Canal Street) at the northbound ramps will operate at a level of service of LOS F. The ramps with the proposed Pioneer Trail interchange will operate at LOS C at the southbound ramps and LOS B at the northbound ramps.

Table 12 displays the results of the roadway segments level of service analysis for the Build Alternative in the Design Year. The majority of the roadway segments are still operating at or below the level of service standard, however, there are exceptions. The Build Alternative roadway segment level of service analysis results in SR 421 (Dunlawton Avenue) from west of Airport Road to East of Taylor Road operating at LOS F. SR 44 (Canal Street) in the project area, CR 415 (Tomoka Farms Road) from west of CR 421 to south of Pioneer Trail, and Williamson Boulevard north of CR 421 will operate below the LOS standard.



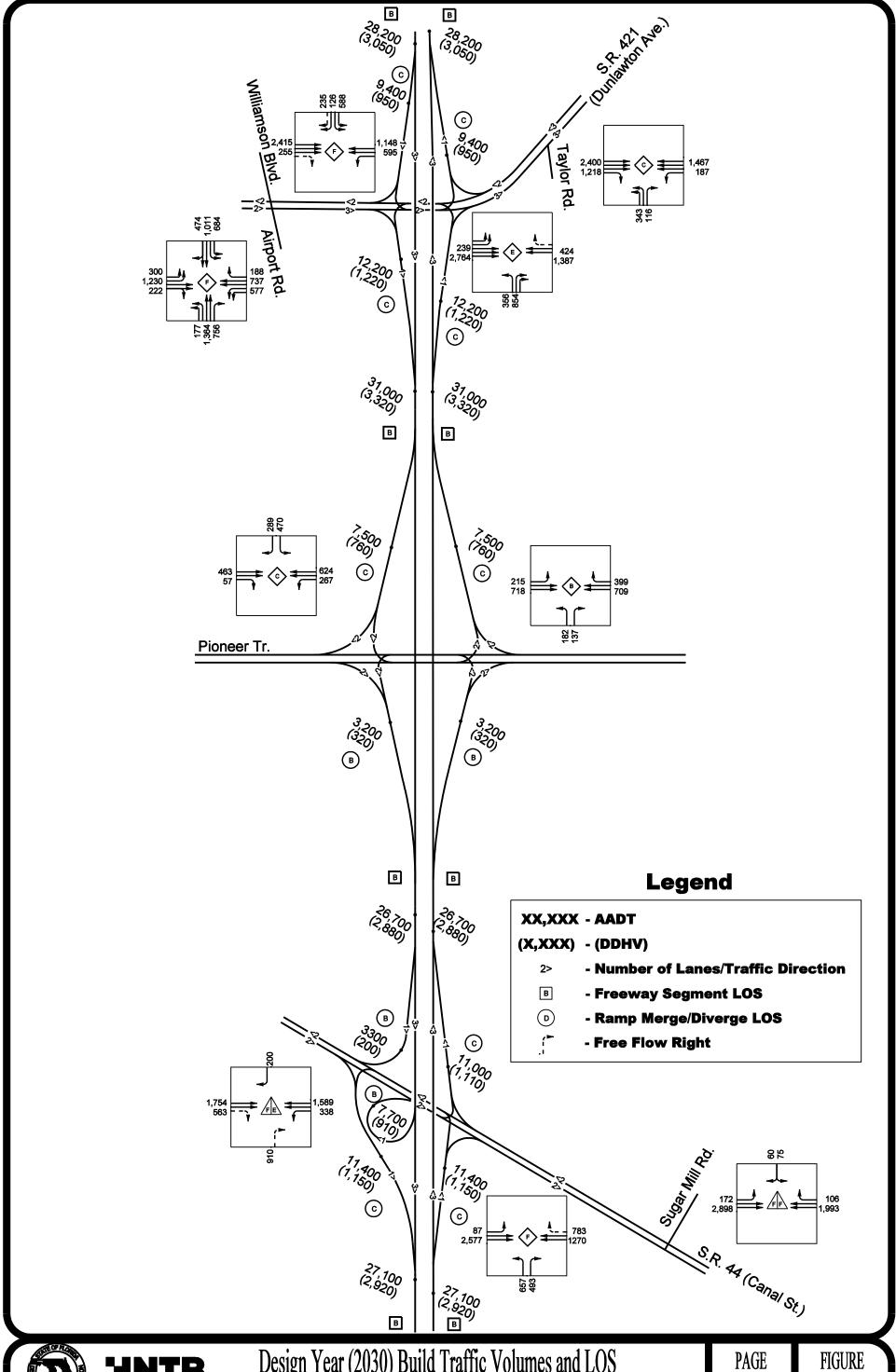


Table 10 - Design Year (2030) Level of Service Analysis Summary (Build Alternative)

	Build Design Year (2030)			
	Freeway Ramp			np
Location	Volume LOS V		Volume	LOS
North of SR 421 (Dunlawton Avenue)	3,050	В	-	-
SR 421 (Dunlawton Avenue)				
I-95 NB Off Ramp	3,320	-	1,220	С
I-95 NB On Ramp	2,100	-	950	C
I-95 SB Off Ramp	3,050	-	950	С
I-95 SB On Ramp	2,100	-	1,220	С
Between Proposed SR 421 and Proposed Pioneer Trail Interchange	3,320	В	-	-
Proposed Pioneer Trail Interchange				
I-95 NB Off Ramp	2,880	-	320	В
I-95 NB On Ramp	2,560	-	760	С
I-95 SB Off Ramp	3,320	-	760	С
I-95 SB On Ramp	2,560	-	320	В
Between Proposed Pioneer Trail Interchange and SR 44	2,880	В	-	-
SR 44				
I-95 NB Off Ramp	2,920	-	1,150	С
I-95 NB On Ramp	1,770	-	1,110	С
I-95 SB Off Ramp	2,880	-	200	В
I-95 SB Off Ramp (Loop)	2,680		910	В
I-95 SB On Ramp	1,770	-	1,150	С
South of SR 44	2,920	В	-	-



Table 11 - Design Year (2030) Intersection Level of Service Analysis (Build Alternative)

		Build (ear (2030)
Intersection	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at		
Williamson Boulevard/Airport Road	F	229.8
I-95 SB Ramps	F	94.6
I-95 NB Ramps	E ⁽¹⁾	57.3
Taylor Road	С	31.0
Pioneer Trail at		
I-95 SB Ramps	С	23.7
I-95 NB Ramps	В	13.0
SR 44 at		
I-95 SB Ramps	F/E	41.4
I-95 NB Ramps	F ⁽¹⁾	161.0
Sugar Mill Road	F/F	ОС

⁽¹⁾ Assumes signalized intersection



Table 12 - Design Year Link Level of Service Analysis (Build Alternative)

Roadway Segment	2030 No. of Lanes	Build 2030 AADT	2030 Build LOS
CR 421/SR 421 (Dunlawton Avenue)			
East of CR 415	4	30,000	D
From West of Airport Road to West of I-95	4	57,800	F
From East of I-95 to East of Taylor Road	6	72,400	F
		,	
Taylor Road			
East of SR 421	2	13,700	D
		,	
Pioneer Trail			
East of CR 415	4	9,900	С
West of Airport Road	4	10,500	С
From East of Airport Road to West of I-95	4	10,300	С
From East of I-95 to East of Turnbull Bay Road	4	13,800	С
,		,	
Turnbull Bay Road			
North of Pioneer Trail	2	13,600	D
		·	
SR 44			
West of CR 415	4	42,900	D
From East of CR 415 to West of Samsula Drive	4	50,600	D
From East of Samsula Drive to West of I-95	4	54,900	F
From East of I-95 to West of Sugar Mill Road	4	44,200	F
From East of Sugar Mill Road to East of Glencoe Road	4	40,600	F
Tomoka Farms Rd (CR 415)			
North of SR 421	2	21,600	F
From South of SR 421 to North of Pioneer Trail	2	46,400	F
South of Pioneer Trail	2	45,600	F
South of SR 44	4	31,000	E
Williamson Blvd			
North of CR 421	4	33,600	F
Airport Road			
South of SR 421	2	32,100	E
North of Pioneer Trail	4	9,700	D
Glencoe Road			
From South of Pioneer Trail to North of SR 44	2	7,300	С
Sugar Mill Road			
North of SR 44	2	3,800	С



5.3 Evaluation of Alternatives

The evaluation of alternatives consisted of a comparison of the No-Build and Build Alternative future traffic operations in the Design Year. The projected traffic operations for the No-Build Alternative were compared to the projected traffic operations for the Build Alternative for the Design Year. Table 13 lists the results of the freeway operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for each alternative. Table 13 shows that the freeway ramp merges and diverges for the No-Build and Build Alternative are projected to operate at LOS C or better in the Design Year. The freeway segment north of SR 421 (Dunlawton Avenue) in the No-Build and Build Alternative will operate at LOS B. Table 13 also shows that the freeway segment south of SR 44 (Canal Street) has the same level of service for both the No-Build and Build Alternatives. Based on this evaluation, the Build Alternative does not have a significant effect on the I-95 mainline operations.

The intersections operating conditions for the No-Build and Build Alternatives are shown in Table 14. The intersections evaluated on SR 421 (Dunlawton Avenue) will operate in both the No-Build and Build Alternatives at the same LOS except for the intersection with Taylor Road; however, the delay is reduced in the Build Alternative for all of the intersections. The intersection of SR 421 (Dunlawton Avenue) and Taylor Rd will operate at LOS C in the Build Alternative and LOS D in the No-Build Alternative. The proposed southbound ramps at Pioneer Trail will operate at LOS C and the northbound ramps will operate at LOS B. The intersections evaluated on SR 44 (Canal Street) will operate at the same level of service in the No-Build and Build Alternatives.

Table 15 compares the level of service and traffic volumes on roadway segments in the study area for the No-Build and Build Alternative. In general the level of service is the same for the No-Build and Build Alternatives; there are some roadway segments that operate better in the Build Alternative. The level of service is reduced on the following roadway segments; CR 421 east of CR 415, on Airport Road south of SR 421 (Dunlawton Avenue), and on Glencoe Road south of Pioneer Trail.

Based on the traffic patterns shown in the model, the Build Alternative does not alleviate traffic on the interchanges, but it does reduce traffic on the parallel facilities. Table 15 shows the traffic volumes in the No-Build and Build Alternatives. The traffic volumes on the parallel facilities are reduced, and in some instance a significant amount. However, on Pioneer Trail from east of I-95 to east of Turnbull Bay Rd. the traffic volumes are increased in the Build Alternative due to the vehicles desiring to use the interchange at I-95.



Table 13 -Design Year (2030) Level of Service Analysis Comparison

	No	Design			Build Design Year (2		Build Design Year (2030)			Design Ye	d and Build Tear (2030) parison	
I-95	Free	eway	Ra	mp	Free	way	Rai	mp	Freeway		Ramp	
Location	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
North of SR 421 (Dunlawton Avenue)	2,940	В	-	-	3,050	В	-	-	110	NC		
												
SR 421 (Dunlawton Avenue)												NC
I-95 NB Off Ramp	3,080	-	1,170	С	3,320	-	1,220	С	240	-	50	NC
I-95 NB On Ramp	1,910	-	1,030	С	2,100	-	950	С	190	-	<80>	NC
I-95 SB Off Ramp	2,940	-	1,030	С	3,050	-	950	С	110	-	<80>	NC
I-95 SB On Ramp	1,910	-	1,170	С	2,100	-	1,220	С	190	-	50	INC
Between SR 421 and SR 44	3,080	В	-	-	-	-	-	-	-	-	-	-
Between Proposed SR 421 and Proposed Pioneer Trail Interchange	-	-	-	-	3,320	В	-	-	-	-	-	-
Proposed Pioneer Trail Interchange												
I-95 NB Off Ramp	-	-	-	-	2,880	-	320	В	-	-	-	-
I-95 NB On Ramp	-	-	-	-	2,560	-	760	С	-	-	-	-
I-95 SB Off Ramp	-	-	-	-	3,320	-	760	С	-	-	-	-
I-95 SB On Ramp	-	-	-	-	2,560	-	320	В	-	-	-	-
Between Proposed Pioneer Trail Interchange and SR 44	-	-	-	-	2,880	В	-	-	-	-	-	-
SR 44												
I-95 NB Off Ramp	2,920	-	1,120	С	2,920	-	1,150	С	0	-	30	NC
I-95 NB On Ramp	1,800	-	1,280	С	1,770	-	1,110	С	⟨30⟩	-	<170>	NC
I-95 SB Off Ramp	3,080	-	200	В	2,880	-	200	В	<200>	-	0	NC
I-95 SB Off Ramp (Loop)	2,880	-	1,080	С	2,680		910	В	<200>	-	<170>	В
I-95 SB on Ramp	1,800	-	1,120	С	1,770	-	1,150	С	<30>	-	30	NC
South of SR 44	2,920	В			2,920	В			0	NC		

<> = Reduction ; NC= No Change



Table 14 - Design Year (2030) Intersection Level of Service Analysis Comparison

	No-Build Build Design Year Design Year (2030) (2030)		Design Year		(2	ign Year 2030) nparison
Intersection	LOS	DELAY (sec/veh)	DELAY LOS (sec/veh)		LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at						
Williamson Boulevard/Airport Road	F	303.8	F	229.8	NC	<74.0>
I-95 SB Ramps	F	136.6	F	94.6	NC	<42.0>
I-95 NB Ramps	E ⁽¹⁾	63.8	E ⁽¹⁾	57.3	NC	<6.5>
Taylor Road	D	32.4	С	31.0	С	<1.4>
Pioneer Trail at						
I-95 SB Ramps	-	-	С	23.7	ı	-
I-95 NB Ramps	-	-	В	13.0	-	-
SR 44 at						
I-95 SB Ramps	F/E*	37.4	F/E*	41.4	NC	4.0
I-95 NB Ramps	F ⁽¹⁾	166.8	F ⁽¹⁾	161.0	NC	<5.8>
Sugar Mill Rd.	F/F*	OC	F/F*	OC	NC	OC

^{*} Unsignalized Intersection LOS (major/minor approach); (1) Assumes signalized intersection; OC= Over Capacity <> = Reduction

NC= No Change



Table 15 - Design Year (2030) Link Level of Service Analysis Comparison

	2030 No. of	LOS	No-Build 2030	No-Build 2030	Build 2030	Build 2030	Comparison of No-Build and Build	Comparison of No-Build and Build
Roadway Segment	Lanes	Std	AADT	LOS	AADT	LOS	AADT	LOS
CR 421/SR 421 (Dunlawton Avenue)					7.0.12		7 1.5 .	
East of CR 415	4	Е	31,600	Е	30,000	D	<1,600>	D
From West of Airport Road to West of I-95	4	Е	59,500	F	57,800	F	<1,700>	NC
From East of I-95 to East of Taylor Road	6	D	71,500	F	72,400	F	900	NC
Taylor Road								
East of SR 421	2	Е	12,600	D	13,700	D	1,100	NC
Pioneer Trail								
East of CR 415	4	E	16,900	С	9,900	С	<7,000>	NC
West of Airport Road	4	E	17,800	С	10,500	С	<7,300>	NC
From East of Airport Road to West of I-95	4	E	13,000	С	10,300	С	<2,700>	NC
East of I-95 East of Turnbull Bay Road	4	E	9,400	С	13,800	С	4,400	NC
East of Fulfibuli bay Roau								
Turnbull Bay Road								
North of Pioneer Trail	4	E	11,100	С	13,600	D	2500	D
SR 44								
West of CR 415	2	Ε	43,000	D	50,600	D	7,600	NC
From East of CR 415 to West of Samsula Drive	4	В	46,600	D	54,900	F	8,300	
From East of Samsula Drive to West of I-95	4	В	52,400	F	44,200	F	<8,200>	NC
From East of I-95 to West of Sugar Mill Road	4	В	46,200	F	40,600	F	<5,600>	NC
From East of Sugar Mill Road to East of Glencoe Road	4	В	40,700	F	21,600	F	<19,100>	NC
CR 415 (Tomoka Farms Road)								
North of CR 421	4	D	21,500	F	46,400	F	24,900	NC
From South of CR 421 to North of Pioneer Trail	4	D	48,200	F	45,600	F	<2,600>	NC
South of Pioneer Trail	2	В	45,200	F	45,600	F	400	NC
South of SR 44	2	В	29,900	E	31,000	Е	1,100	NC
Williamson Blvd								
North of CR 421	4	E	35,100	F	33,600	F	<1,500>	NC
Airport Road	2	E	35,700	F	32,100	E	<3,600>	E
South of SR 421	4	E	9,300	D	9,700	D	400	NC
North of Pioneer Trail								
Glencoe Road		F	0.700		7 200	-	(2.400)	<u> </u>
From South of Pioneer Trail to North of SR 44	2	E	9,700	D	7,300	С	<2,400>	С
Sugar Mill Road	2	F	7 100	<u> </u>	2 000	C	(2.200)	NC
North of SR 44	2	E	7,100	С	3,800	С	<3,300>	NC



6.0 Conclusion

The proposed interchange at Pioneer Trail and I-95 will not have an adverse impact on mainline operations and it does reduce the traffic on some of the adjacent interchange ramps. The proposed interchange will reduce delay at the intersections and reduce traffic volumes on some of the roadways in the study area.

The operation of the mainline in the Build Alternative is not degraded from the No-Build Alternative. The level of service for all of the freeway segments is the same in the No-Build and Build Alternative as LOS B.

There is a reduction in the number of vehicles at some of the ramps in the Build Alternative versus the No-Build Alternative. A summary of the ramp operation for each interchange is as follows:

- The I-95/ SR 421 (Dunlawton Avenue) northbound on and southbound off ramps have a reduction of 80 vehicles in the peak period and an increase of 50 vehicles for the northbound off and southbound on ramps in the peak period. The level of service for the ramps at I-95 and SR 421 (Dunlawton Avenue) in the No-Build and Build Alternatives will be LOS C.
- The ramps at the proposed Pioneer Trail interchange with I-95 will operate at an acceptable LOS C for the southbound ramps and LOS B for the northbound ramps.
- The SR 44 (Canal Street) ramps with I-95 projections indicate there is an increase of 30 vehicles in the peak period for the northbound off and southbound on ramps and 170 less vehicles for the northbound on and southbound off ramps. The level of service for the ramps at I-95 and SR 44 (Canal Street) in the No-Build Alternative and in the Build Alternative will be LOS C or better.

The level of service is the same for the No-Build and Build Alternatives at the intersections evaluated on SR 421 (Dunlawton Avenue) and SR 44 (Canal Street), except at SR 421 (Dunlawton Avenue) and Taylor Road. The intersection summary noted below will illustrate the differences in the level of service and delay at the intersections for the No-Build and Build Alternatives.

- The intersection on SR 421 (Dunlawton Avenue) and Taylor Road will operate at a LOS D in the No-Build Alternative and at LOS C in the Build Alternative.
- The most significant reduction in delay on SR 421 (Dunlawton Avenue) is 74.0 sec/vehicles at the intersection with the Williamson Boulevard/Airport Road.
- The intersection evaluated on SR 44 (Canal Street) with a reduction in delay is at the northbound ramp terminus which has a 5.8 sec/vehicle decrease in the Build Alternative.
- The intersection on SR 44 (Canal Street) at Sugar Mill Road will continue to operate over capacity in the No-Build and Build Alternative.
- The intersections of the northbound and southbound ramps at I-95 and Pioneer Trail are projected to operate at an acceptable level of service of LOS C or better.



The effect of the proposed interchange on the number of vehicles on the parallel facilities to I-95 is negligible. The level of service on the majority of the roadway segments remain the same with an increase in the number of vehicles on some of the roadway segments. A summary of two segments with a reduction in the number of vehicles is as follows:

- The location on CR 415 (Tomoka Farms Road) there will be a 3,000 reduction of the number of vehicles in the Build Alternative.
- The number of vehicles on the section of Glencoe Road from south of Pioneer Trail to north of SR 44 will have a 2,400 decrease in the Build Alternative. The level of service in the No-Build Alternative is LOS D and is reduced to LOS C in the Build Alternative.



APPENDIX A - HCS Operational Analyses



HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Ana	lysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer Tr	SK HNTB 08/2005 PM Peak I-95/Northbound North of SR 421 2004 Existing Tail Feasibility S	tudy	
	Flow Inputs and	Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	, ER . fHV	2600 0.95 684 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1423	veh/h v % % % mi pc/h/ln
	_Speed Inputs and	Adjustments	
Lane width Right-shoulder lateral content of lanes, Normon of lanes, Italian of lanes adjustment, Italian of lanes adjustment of lanes adjustment	.W Dent, fLC	12.0 6.0 0.50 2 Measured 70.0 0.0 0.0 0.0	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Free-flow speed, FFS	•	70.0	mi/h
	LOS and Performan	Urban Freeway	
Flow rate, vp Free-flow speed, FFS Average passenger-car spe Number of lanes, N Density, D Level of service, LOS		1423 70.0 69.9 2 20.3 C	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: Diverge Analysis_____ Analyst: SK Agency/Co.: HNTB Date performed: Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound Junction: SR 421 (Dunlawton Avenue) Jurisdiction:
Analysis Year: Existing 2004 Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 2220 vph Off Ramp Data_____ Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 35.0 mph Volume on ramp 450 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft ______Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp

vph

ramp ft

Conversion to pc/h	Under E	Base	Conditi	ons_		
Junction Components	Freeway	,	Ramp		Adjacent	
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length Trucks and buses PCE, ET Recreational vehicle PCE, ER	2220 0.95 584 8 0 Level 0.00 0.00 1.5	% mi	450 0.95 118 8 0 Level 0.00 0.00 1.5 1.2	% mi	Ramp * m	

Heavy vehicle adjustment, fHV 0.962 0.962 Driver population factor, fP 1.00 1.00 Flow rate, vp 2430 493 pcph _____Estimation of V12 Diverge Areas___ L = (Equation 25-8 or 25-9) ΕQ ₽ == 1.000 Using Equation 0 FDV = V + (V - V) P = 2430 pc/h12 R F R FD _____Capacity Checks Actual Maximum LOS F? v = v2430 4800 No Fi v 2430 4400 No 12 v = v - v1937 4800 Νo FO F R v 493 2000 No R Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 20.7 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence C

____Speed Estimation

Intermediate speed variable,

D = 0.472

Space mean speed in ramp influence area,

S = 56.8 mph R

Space mean speed in outer lanes,

S = N/A mph

mph

0

S

S = 56.8

Space mean speed for all vehicles,

Phone: Fax: E-mail: Merge Analysis_____ Analyst: SK Agency/Co.: HNTB Date performed: Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound Junction: SR 421 (Dunlawton Avenue) Jurisdiction: Analysis Year: Existing 2004 Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Merqe Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 1770 vph On Ramp Data Side of freeway Right Number of lanes in ramp Free-flow speed on ramp 35.0 mph Volume on ramp 830 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane £t _____Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft _____Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Ad; Rai	jacent
Volume, V (vph)	1770	830	Kai	1
Peak-hour factor, PHF	_ · · · -			vph
	0.95	0.95		
Peak 15-min volume, v15	466	218		V
Trucks and buses	8	8		\$
Recreational vehicles	0	0		
Terrain type:	-			용
	Level	Level		
Grade	ફ		ૄ	ક
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5	111.1	mx
Recreational vehicle PCE, ER	· -			
Medicalional vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
Driver population factor, fp
                                   1.00
                                              1.00
Flow rate, vp
                                   1938
                                              909
                                                                  pcph
               Estimation of V12 Merge Areas
                L ==
                               (Equation 25-2 or 25-3)
                 ΕQ
                P =
                       1.000 Using Equation 0
                 FM
                v = v (P) = 1938 pc/h
                 12 F FM
                     Capacity Checks____
                        Actual
                                     Maximum
                                                  LOS F?
    v
                        2847
                                     4800
                                                   No
     FO
                        2847
                                     4600
                                                   No
     R12
         Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.1
                                                              pc/mi/ln
Level of service for ramp-freeway junction areas of influence C
                   ____Speed Estimation
Intermediate speed variable,
                                        M = 0.353
                                        S
Space mean speed in ramp influence area,
                                        S = 60.1
                                                   mph
                                        R
Space mean speed in outer lanes,
                                        S = N/A
                                                   mph
                                        0
Space mean speed for all vehicles,
                                        S = 60.1
                                                   mph
```

0.962

0.962

Phone: Fax: E-mail: Diverge Analysis_____ Analyst: SK Agency/Co.: HNTB Date performed: Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound Junction: SR 421 (Dunlawton Avenue) Jurisdiction: Analysis Year: Existing 2004 Description: Pioneer Trail Feasibility Study _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway 2 Free-flow speed on freeway 70.0 mph Volume on freeway 2600 vph Off Ramp Data_____ Side of freeway Right

Length of second accel/decel lane ______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp

Number of lanes in ramp Free-Flow speed on ramp

Length of first accel/decel lane

Volume on ramp

No vph

35.0

830

500

ft

mph

vph

ft

ft

_____Conversion to pc/h Under Base Conditions_____

			·
Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length Trucks and buses PCE, ET Recreational vehicle PCE, ER	2600 0.95 684 8 0 Level 0.00 % 0.00 mi 1.5	830 0.95 218 8 0 Level 0.00 0.00 1.5	Ramp vph v % % % mi mi

```
1.00
 Flow rate, vp
                                   2846
                                              909
                                                                 pcph
                _____Estimation of V12 Diverge Areas__
                L ==
                              (Equation 25-8 or 25-9)
                 ΕQ
                P =
                      1.000 Using Equation 0
                 FD
                V = V + (V - V) P = 2846 pc/h
                 12 R
                         F R FD
                 ____Capacity Checks
                        Actual
                                    Maximum
                                                  LOS F?
     v = v
                        2846
                                    4800
                                                   No
     Fi
        F
     v
                        2846
                                    4400
                                                  No
     12
     v = v - v
                        1937
                                    4800
                                                  Nо
     FO
        F R
     v
                        909
                                    2000
                                                  No
     R
          Level of Service Determination (if not F)_____
Density,
                    D = 4.252 + 0.0086 v - 0.009 L = 24.2 pc/mi/ln
                                     12 D
Level of service for ramp-freeway junction areas of influence C
         _____Speed Estimation
Intermediate speed variable,
                                       D = 0.510
                                        S
Space mean speed in ramp influence area,
                                       S = 55.7
                                                   mph
                                       R
Space mean speed in outer lanes,
                                       S = N/A
                                                   mph
                                        0
Space mean speed for all vehicles,
```

S = 55.7

mph

0.962

1.00

0.962

Heavy vehicle adjustment, fHV

Driver population factor, fp

Phone: Fax: E-mail: Merge Analysis_____ Analyst: skAgency/Co.: HNTB Date performed: Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound SR 421 (Dunlawton Avenue) Junction: SR 421 (Dunlar Jurisdiction: Analysis Year: Existing 2004 Junction: Description: Pioneer Trail Feasibility Study _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 1770 vph ____On Ramp Data Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp mph 35.0 Volume on ramp 450 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft _____Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 450 0.95 118 8 Volume, V (vph) 1770 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 466 v Trucks and buses 8 0 ş Recreational vehicles 0 용 Level Level Terrain type: ક mi Grade 왕 Length mi 1.5 1.2 Trucks and buses PCE, ET 1.5

1.2

Recreational vehicle PCE, ER

```
Driver population factor, fP
                                   1.00
                                             1.00
Flow rate, vp
                                   1938
                                             493
                                                                 pcph
               ____Estimation of V12 Merge Areas____
                L =
                              (Equation 25-2 or 25-3)
                 EQ
                P =
                      1.000 Using Equation 0
                 FM
                V = V (P) = 1938 pc/h
                 12 F FM
                    ____Capacity Checks____
                        Actual
                                    Maximum
                                                 LOS F?
    v
                        2431
                                    4800
                                                  No
     FO
                        2431
                                    4600
                                                  No
     R12
       Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.1 pc/mi/ln
Level of service for ramp-freeway junction areas of influence C
                 _____Speed Estimation
Intermediate speed variable,
                                       M = 0.330
                                        S
Space mean speed in ramp influence area,
                                       S = 60.8
                                                   mph
                                        R
Space mean speed in outer lanes,
                                       S = N/A
                                                   mph
                                        0
Space mean speed for all vehicles,
                                       S = 60.8
                                                   mph
```

0.962

0.962

Heavy vehicle adjustment, fHV

44 to 421-1

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analys	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer To	I-95/Northbound SR 421 to SR 44 2004 Existing	udy	
	Flow Inputs and Ad	ljustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	E, ER E, fHV	2220 0.95 584 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1215	veh/h v % % mi pc/h/ln
	Speed Inputs and A	djustments	
Lane width Right-shoulder lateral of Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, f Lateral clearance adjust Interchange density adju Number of lanes adjustme Free-flow speed, FFS	LW ment, fLC stment, fID	12.0 6.0 0.50 2 Measured 70.0 0.0 0.0 4.5 70.0 Urban Freeway	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	_LOS and Performanc	e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car sp Number of lanes, N Density, D Level of service, LOS	eed, S	1215 70.0 70.0 2 17.4 B	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: Diverge Analysis_____ Analyst: SK Agency/Co.: HNTB Agency/Co.: HNTB
Date performed: 8/05
Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound Junction: SR 44 (Canal Street) Junction: Sk 44 (Canal : Jurisdiction: Analysis Year: Existing 2004 Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 1850 mph vph Volume on freeway Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 35.0 mph Volume on ramp 210 vph Length of first accel/decel lane 500 £t Length of second accel/decel lane £t Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft _____Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 210 0.95 55 8 Volume, V (vph) 1850 vph 0.95 Peak-hour factor, PHF 487 Peak 15-min volume, v15 ν Trucks and buses 8 0 ક Recreational vehicles 0 Level Level 0.00 % 0.00 % Terrain type: Grade Length 0.00 mi 0.00

1.5

1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

mi

1.5

1.2

mi

```
Flow rate, vp
                                    2025
                                              230
                                                                  pcph
                Estimation of V12 Diverge Areas____
                 L ==
                               (Equation 25-8 or 25-9)
                 ΕQ
                       1.000 Using Equation 0
                 P ==
                 FD
                 v = v + (v - v) P = 2025 pc/h
                 12 R F R FD
                     ____Capacity Checks___
                        Actual
                                     Maximum
                                                   LOS F?
     v = v
                        2025
                                     4800
                                                   No
     \mathtt{Fi}
                        2025
                                     4400
                                                   No
     12
     v = v - v
                        1795
                                     4800
                                                   No
     FO F R
     v
                        230
                                     2000
                                                   No
     R
        Level of Service Determination (if not F)____
                    D = 4.252 + 0.0086 v - 0.009 L = 17.2 pc/mi/ln
Density,
                     R
                                      12
                                                D
Level of service for ramp-freeway junction areas of influence B
         _____Speed Estimation
Intermediate speed variable,
                                        D = 0.449
                                        S
Space mean speed in ramp influence area,
                                        S = 57.4
                                                   mph
                                        R
Space mean speed in outer lanes,
                                        S = N/A
                                                   mph
Space mean speed for all vehicles,
```

S = 57.4

mph

0.962

1.00

0.962

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fp

					SH	ORT F	REP()R	T							***************************************	
General Inf	ormation					[8	Site Ir	ıfo	rmatic								
Analyst Agency or C Date Perfor Time Period	med		KNM HNTB 10/05 M Peak			A J	nterse Area T Iurisdi Analys	yp ictio	e on	Ta	All	B oth	@ W Ivd er ai ng 2		son		
Volume an	d Timing	Input															
				E			WE				NE				S		
Num. of Lar	nes		LT 1	Th 2	i RT	LT 1	TH 2	┪	RT 1	LT 1	T+		RT 1	LT 1	Th	1	RT 1
Lane group	 		L	TR		1 7	T	T	R	1	T	十	R		Т		R
Volume (vpl	<u>)</u>		102	410	74	370	474	_	127	59	155	1	452	228		7	158
% Heavy ve			8	8	8	8	8		8	8	8		8	8	8		8
PHF			0.95	0.95		0.95	0.95	5	0.95	0.95	0.95	5 (95	0.95	0.9	5	0.95
Actuated (P.			A	A	Α	A	A		Α	Α	Α		Α	A	Α		Α
Startup lost			2.0	2.0		2.0	2.0	_	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Ext. eff. gree Arrival type	en		2.0	2.0		2.0	2.0	-	2.0 3	2.0 3	2.0 3		2.0 3	2.0	2.0 3		2.0 3
Unit Extensi	വ	······································	3.0	3.0		3.0	3.0	\dashv	3.0	3.0	3.0	-	3.0	3.0		,	3.0
Ped/Bike/RT		me	0	1	0	0	+	+	0	0	0.0	十	0	0			0
Lane Width			12.0	12.0	7	12.0	12.0		12.0	12.0	12.0) 1	2.0	12.0	12.0	5	12.0
Parking/Gra	de/Parkin	g	N	0	N	N	0		N	N	0		N	N	0		N
Parking/hr																	
Bus stops/h			0	0		0	0		0	0	0		0	0	0		0
Unit Extensi	on		3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0	3,0		3.0
Phasing	Excl. Le		V Perm	<u> </u>	03	04			xcl. Le		S Per			07			8
Timing	G = 15.0 $Y = 5$	0 G = Y =	= 40.0	G = Y =		G = Y =			= 8.0 = 5	G = Y =	= 35.	0	G = Y =		G Y		
Duration of A						<u> </u>		1 -	- J			nat		= 120			
Lane Gro				l De	lav. a	nd LO	S De	te	rmina			·····				******	
			EΒ			WB				N	В		T		SB	***************************************	
Adj. flow rate	2	107	510		389	499	134		62	163		476	1	240	355	T	166
Lane group	сар.	425	1091		420	1117	673		265	513		698		413	513		698
v/c ratio		0.25	0.47		0.93	0.45	0.20)	0.23	0.32	? (0.68	(D. 58	0.69	T	0.24
Green ratio		0.50	0.33		0.50	0.33	0.45	i 	0.40	0.29) ().47	(0.40	0.29	T^{a}	0.47
Unif. delay d	1	16.9	31.6		35.9	31.3	19.9		24.4	33.2	2	25.0	3	30.2	37.7	I	19.2
Delay factor	k	0.11	0.11		0.44	0.11	0.11		0.11	0.11	().25	0).17	0.26	T	0.11
Increm. dela	y d2	0.3	0.3		26.5	0.3	0.1		0.5	0.4		2.7		2.1	4.0		0.2
PF factor		1.000	1.000		1.000	1.000	1.00	0	1.000	1.00	0 1	.000) 1	.000	1.000	1	.000
Control delay	/	17.2	31.9		62.4	31.6	20.1		24.8	33.5	2	7.8	3	32.3	41.7	1	19.4
Lane group l	_os	В	С		E	С	C		С	С		С		С	D		В
Apprch. dela	у	29	9.4	41.8 28.8 33				33.9									
Approach LC	S		С	D C C				С									
Intersec. dela	а у	34	34.5 Intersection LOS				S					С					

					SH	ORT R	EPO	OR.	T T						
General In	formation								matio	n		*************************************	··		
Analyst Agency or Date Perfo Time Perio	rmed	H! 10	KNM Interse HNTB 10/05 Area T PM Peak Analys				ectic Syp∈ ictio	on e n		All o	Ramps Road ther a		'lor		
Volume a	nd Timing Ir	nout	···							~~~~~~~~	L	ung z	004		
				EB			W	/B			NB			SB	
			LT	TH	RT	LT	T		RT	LT	TH	RT	LT	TH	RT
Num. of La	nes		0	2	0	1	2		0	0	0	0	2	0	0
Lane group)			T		L	17				1			-	<u> </u>
Volume (vp				1025		285	65	5		 	 	-	514	-	
% Heavy v	eh			8		8	8			l	1	†	8	1	
PHF	S. 2.2. S.			0.95		0.95	0.9	5					0.95	1	1
Actuated (F Startup lost			 	$\frac{A}{A}$		A	A						Α		
Ext. eff. gre			-	2.0 2.0		2.0 2.0	2.0				<u> </u>		2.0		<u> </u>
Arrival type			 	3	 -	3	3	-	***************************************		 		2.0	<u> </u>	<u> </u>
Unit Extens			ļ ———	3.0	 	3.0	3.0	<u>, </u>					3.0	-	<u> </u>
Ped/Bike/R	TOR Volume	!	0	1	 	0.0	+-	-		0	ļ		3.0	 	<u> </u>
Lane Width				12.0	<u> </u>	12.0	12.0	2					12.0	 	
Parking/Gra	de/Parking	· · · · · · · · · · · · · · · · · · ·	N	0	N	N	0		N	N		N	N 12.0	10	N
Parking/hr				1			╁	\dashv		, v		7.4	/V	-	<u> </u>
Bus stops/h	r		<u> </u>	0		10	0	\dashv					0		
Unit Extens	on			3.0		3.0	3.0)					3.0	 	
Phasing	WB Only	EW P	erm	03	T	04	' T		Only	1	06	T	07	╄═	l 8
Timing	G = 23.0	G = 4	0.0	G =	10	3 =	10		40.0	G =		G =	<u> </u>	G = 0	0
	Y = 5	Y = 6		Y ==	. \	/ =	\	/ ==	6	Y =		Y =		Y=	
	Analysis (hrs									Cycle	e Lengt	h C =	120.0)	
Lane Gro	up Capaci	<u>ty, Co</u>			, and	LOS	Det	ern	ninat	ion					
			EE	}		W	В				NB			SB	
Adj. flow rate	9		1079		300	68	9						541		
ane group	сар.		1117		380	189	8						1082		
//c ratio			0.97		0.79	0.3	6	-					0.50		
Green ratio			0.33		0.57								0.33	 	
Jnif. delay d	1		39.3		33.2	14.	2		1				32.0		
Delay factor	k		0.47		0.34	0.1	1						0.11		
ncrem. dela	y d2		19.2		10.7	0.1		***************************************	_				0.4		
F factor			1.000		1.000	0 1.00	00						1.000		
ontrol delay	1		58.5		43.9	14.3	3		1				32.4		
ane group L	.os		Е		D	В							С		
pprch. dela	7	5	8.5			23.3	I		1	L				2.4	
pproach LO	S		Е			С					_		С		
itersec. dela	ıy	3	39.8 Intersection LO					os				D D			
zezoooTM			Commission @ 2000 Ft								L	···			

			Site Information								
<u>General Informati</u>	on		Site	Inforn	nation						
Analyst	KNM		Inter	section		I-95 NB 421	Ramp	s @	S.R.		
Agency/Co.	HNTB		lurie	diction		421					
Date Performed	10/05			sis Yea	<u> </u>	Existing 2004					
Analysis Time Period	PM Peak			The state of the s							
Project Description	Pioneer Trail Fe	easihility Study	,								
East/West Street: SR				/South S	Street: 1-95	Northboun	d Ram	DS.			
Intersection Orientation					(hrs): 0.25			/			
Vehicle Volumes	and Adjustn	nante									
Major Street		Eastbound		T		Westbo	und				
Movement	1	2	3		4	5			6		
	L.	T	R		L.	Т			R		
Volume (veh/h)	223	1316	0		0	843					
Peak-hour factor, PHF	0.95	0.95	0.9	5	0.95	0.95		0	.95		
Hourly Flow Rate (veh/h)	234	1385	0	0 0		887			0		
Proportion of heavy	8				0		T				
vehicles, P _{HV}	0										
Median type		Raised curb									
RT Channelized?			0						0		
Lanes	1	2			0	2			0		
Configuration	L	T				Τ					
Upstream Signal		0				0	<u> </u>				
Minor Street		Northbound				Southbo	und				
Vovement	7	8	9		10	11			12		
	L	Т	R		Ļ	Т			R		
Volume (veh/h)	97	0			0	0			0		
Peak-hour factor, PHF	0.95	0.95	0.98	2 	0.95	0.95			.95		
Hourly Flow Rate (veh/h)	102	0	0		0	0			0		
Proportion of heavy	8	0	8		0	0			0		
vehicles, P _{HV} Percent grade (%)		_L	<u> </u>			0	L				
		T N		-+		T N	— Т				
Flared approach		0	-			0					
Storage			 			<u> </u>			0		
RT Channelized?		 			0	0			0		
Lanes	<u>1</u> L	0	0		U	1			<i>-</i>		
Configuration		<u> </u>	1			1					
Control Delay, Queue		of Service WB	1	Northbo	und	c	Southbo	JHD 4			
Approach	EB		<u> </u>	,	una 9				12		
Viovement	1	4	7	8	9	10	11		12		
ane Configuration	L		L 100	<u> </u>							
/olume, v (vph)	234	····	102			_		-			
Capacity, c _m (vph)	722		57								
r/c ratio	0.32		1.79								
Queue length (95%)	1.41		9.61								
Control Delay (s/veh)	12.4		532.9								
.os	В		F								
				532.9							

(s/veh)			
Approach LOS	***	 F	

 $HCS2000^{\mathrm{TM}}$

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Version 4.1d

					Sh	IOR	RT RE	<u>EPO</u>	R	Γ							
General Inf	ormation						Sit	e Inf	for	mati	on						
Analyst Agency or C Date Perfort Time Period	med	HN 10	VM ITB /05 Peak				Are Jui	ersed ea Ty risdic alysi	ype ctio	n n		Dunla	All of	Av @ T her area ting 200	as	Rd	
Volume an	d Timing In	put															
		,		EB				W					NB			SB	-
			LT	TH	R		LT	Th		R	Γ	LT	TH	RT	LT	TH	RT
Num. of Lar	nes		0	3	1		1	3		0		2	0	1	0	0	0
Lane group				Τ	R		L	T				L		R		<u> </u>	
Volume (vpl				1107	56	-	130	102	!1			239		81		<u> </u>	
% Heavy ve	eh		ļ	8	8		8	8 0.95	<u>-</u>		_	8 0.95		8 0.95		 	ļ
PHF Actuated (P.	/^\			0.95 A	0.9 A		0.95 A	0.93 A	<u> </u>		\dashv	0.95 A		0.95 A	 	 	ļ
Startup lost		<u></u>		2.0	2.0		2.0	2.0)			2.0		2.0	 	-	
Ext. eff. gree				2.0	2.0		2.0	2.0				2.0		2.0			
Arrival type				3	3		3	3				3		3			
Unit Extensi	on			3.0	3.0)	3.0	3.0)			3.0		3.0			
Ped/Bike/R1	ΓOR Volume		0		0							0		0	0		
Lane Width				12.0	12.	0	12.0	12.0	0			12.0		12.0			
Parking/Gra	de/Parking		N	0	Ν		Ν	0		Ν		Ν	0	N	Ν		N
Parking/hr			<u> </u>					<u> </u>									
Bus stops/h			0	0		0	0				0		0				
Unit Extensi	on		<u> </u>	3.0	3.0	2	3.0	3.0	2			3.0		3.0			
Phasing	WB Only	Thru &		03			04			3 On			06)7		8
Timing	G = 10.0	G = 4		G =		G:		_		<u>15.</u>	0	G =	***************************************	G =		G =	
	Y = 5 Analysis (hrs	Y = 6		Υ =		Υ:			Y =	5		Y =	lenc	Y = jth C =	90.0	Y =	
				l Dolos		nd	- OS	Dat		min			LCIIC	jui O –	30.0		
Lane Gro	up Capaci	Ty, CC	EB		7, 4	iiu	LUS W		rei	11111	a	HOH	NB		T	SB	
A - U - D A	_				+	137	107		т-			52	IAD	85		I	
Adj. flow rate			1165	592					╀								
Lane group	cap.		2609	1163		163	340		╄			41		498	_	 	
v/c ratio			0.45	0.51	0	.84	0.3	32	丄		0.	47		0.17	ļ		
Green ratio			0.54	0.78	0).11	0.7	'1	<u>L</u>		0.	17		0.33			
Unif. delay d	1		12.3	3.7	3	9.2	4.8	8			33	3.9		21.2			
Delay factor	k		0.11	0.12	0	.38	0.1	1	T		0.	11		0.11			
Increm. dela	y d2		0.1	0.4	3	0.6	0.1	1	Π		0.	6		0.2			
PF factor			1.000	1.000	1.	.000	1.00	00		ĺ	1.0	000		1.000			
Control dela	У		12.5	4.1	6	9.9	4.9	9	Ī		34	.5		21.4			
Lane group	LOS		В	А		E	A		Ī		C			С			
Apprch. dela	ıy		9.6		T		12.2				31.2						
Approach L0	os		Α				В					С					
intersec. del	ay	12.8				Intersection				tion LOS B				В			

Fax: Phone: E-mail: Merge Analysis_____ Analyst: SK Agency/Co.: HNTB Agency/co.: HNTB
Date performed: 8/05
Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound Junction: SR 44 (Canal Street) Jurisdiction:
Analysis Year: Existing 2004 Description: Pioneer Trail Feasibility Study Freeway Data Type of analysis Merge Number of lanes in freeway 70.0 1640 mph Free-flow speed on freeway vph Volume on freeway ____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 35.0 mph Free-flow speed on ramp Volume on ramp 580 vph Length of first accel/decel lane ft 500 Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp _____Conversion to pc/h Under Base Conditions Adjacent Freeway Ramp Junction Components Ramp 1640 580 Volume, V (vph) vph Peak-hour factor, PHF 0.95 0.95 153 8 Peak 15-min volume, v15 432 v 8 0 Trucks and buses 0 0 Level Level 용 Recreational vehicles Terrain type: Grade mi mi Length mi 1.5 Trucks and buses PCE, ET

1.2

Recreational vehicle PCE, ER

1.5

1.00 1.00 Driver population factor, fP 1795 635 pcph Flow rate, vp Estimation of V12 Merge Areas_____ (Equation 25-2 or 25-3) EQ 1.000 Using Equation 0 P == FMv = v (P) = 1795 pc/h12 F FM ____Capacity Checks____ LOS F? Maximum Actual 2430 4800 Nov FΟ 4600 NO2430 v R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.0 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence C Speed Estimation____ M = 0.330Intermediate speed variable, S Space mean speed in ramp influence area, S = 60.8mph R S = N/Amph Space mean speed in outer lanes,

0.962

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

0.962

S = 60.8

mph

Phone: E-mail:		Fax:			
Div	verge Ana	alysi	S		
Analyst: SK					
Agency/Co.: HNTB					
Date performed: 8/05					
Analysis time period: PM Peak					
Freeway/Dir of Travel: I-95 Southbo	ound				
Junction: SR 44 (Cana)	L Street))			
Jurisdiction:					
Analysis Year: Existing 200)4				
Description: Pioneer Trail Feasibil	ity Stud	ly			
Fr	eeway Da	ata			
Type of analysis		Diver	ge		
Number of lanes in freeway		2			
Free-flow speed on freeway		70.0		mph	
Volume on freeway		2220		vph	1
Off	Ramp Da	ta			
Side of freeway		Right			
Number of lanes in ramp		1			
Free-Flow speed on ramp		35.0		mph	•
Volume on ramp		90		vph	
Length of first accel/decel lane		500		ft	
Length of second accel/decel lane				ft	
Adjacent Ra	mp Data	(if o	ne exist	:s)	
Ooes adjacent ramp exist?	:	No			
Volume on adjacent ramp				vph	
Position of adjacent ramp					
ype of adjacent ramp Distance to adjacent ramp				_	
istance to adjacent ramp				ft	
Conversion to pc/	h Under	Base	Conditi	ons	
unction Components	Freewa	аy	Ramp		Adjacent
olume, V (vph)	2220		90		Ramp vph
eak-hour factor, PHF	0.95		0.95		νħπ
eak 15-min volume, v15	584		24		v
rucks and buses	8		8		%
ecreational vehicles	0		0		90
errain type:	Level		Level		ď
Grade	0.00	8	0.00	%	૦
Length	0.00	mi	0.00	mi	mi
rucks and buses PCE, ET	1.5		1.5		
ecreational vehicle PCE, ER	1.2		1.2		

2430 99 pcph Flow rate, vp Estimation of V12 Diverge Areas____ L = (Equation 25-8 or 25-9) ΕQ 1.000 Using Equation 0 P == FDv = v + (v - v) P = 2430 pc/hF R FD 12 R Capacity Checks____ LOS F? Actual Maximum 2430 4800 Nov = vFi 2430 4400 No v 12 2331 4800 No v = v - vFO F R V 99 2000 No R Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 20.7 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence C Speed Estimation_____ Intermediate speed variable, D = 0.437S Space mean speed in ramp influence area, S = 57.8mph R Space mean speed in outer lanes, S = N/Amph 0

S = 57.8

mph

0.962

1.00

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

Driver population factor, fP

0.962

Phone: Fax: E-mail: Diverge Analysis_____ Analyst: SK Agency/Co.: HNTBDate performed: 8/05
Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street) Loop Jurisdiction: Analysis Year: Existing 2004 Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Diverqe Number of lanes in freeway 2 Free-flow speed on freeway 70.0 mph vph Volume on freeway 2130 Off Ramp Data_____ Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 35.0 mph Volume on ramp 490 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent 490 0.95 129 Ramp Volume, V (vph) 2130 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 561 v Trucks and buses 8 0 8 우 Recreational vehicles 0 ક Level Level Terrain type: Grade 0.00 % 0.00 Length 0.00 mi 0.00 mi шi Trucks and buses PCE, ET 1.5 1.5 Recreational vehicle PCE, ER 1.2 1.2

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                   1.00
                                              1.00
Flow rate, vp
                                   2332
                                              536
                                                                  pcph
                 Estimation of V12 Diverge Areas
                L =
                              (Equation 25-8 or 25-9)
                 EO
                P ==
                      1.000 Using Equation 0
                 FD
                V = V + (V - V) P = 2332 pc/h
                 12 R F R FD
                     ____Capacity Checks
                        Actual
                                     Maximum
                                                  LOS F?
    v = v
                        2332
                                     4800
                                                   No
     Fi
                        2332
                                     4400
                                                   No
     12
                        1796
                                     4800
                                                   Мо
     FO
         F R
                        536
                                     2000
                                                   No
     R
         Level of Service Determination (if not F)
                    D = 4.252 + 0.0086 v - 0.009 L = 19.8 pc/mi/ln
Density,
                                      12
Level of service for ramp-freeway junction areas of influence B
                Speed Estimation
Intermediate speed variable,
                                        D = 0.476
                                        S
Space mean speed in ramp influence area,
                                       S = 56.7
                                                   mph
                                        R
```

S = N/A

S = 56.7

mph

mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.962

Phone: Fax: E-mail: Merge Analysis_____ Analyst: SK Agency/Co.: HNTB Agency/co.: HNIB Date performed: 8/05 Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street) Jurisdiction:
Analysis Year: Existing 2004 Description: I-95 SOAR Freeway Data_____ Type of analysis Merge Number of lanes in freeway 70.0 mph Free-flow speed on freeway Volume on freeway 1640 vph On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph Volume on ramp 210 vph Length of first accel/decel lane 228 ft Length of second accel/decel lane ft ____Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? Nο Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 210 0.95 55 Volume, V (vph) 1640 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 432 v Trucks and buses 8 0 8 왕 Recreational vehicles 0 용 Level Level Terrain type: ફ б mi Grade ક ક Length mi mì Trucks and buses PCE, ET 1.5 1.2 1.5

1.2

Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                  1.00
                                             1.00
Flow rate, vp
                                   1795
                                             230
                                                                 pcph
                Estimation of V12 Merge Areas
                L =
                              (Equation 25-2 or 25-3)
                 ΕQ
                      1.000 Using Equation 0
                P ==
                 FM
                v = v (P) = 1795 pc/h
                 12 F FM
                     ____Capacity Checks_____
                        Actual
                                    Maximum
                                                 LOS F?
    v
                        2025
                                    4800
                                                  No
     FO
                        2025
                                    4600
                                                  No
     R12
      Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence B
                _____Speed Estimation
Intermediate speed variable,
                                       M = 0.335
                                       S
Space mean speed in ramp influence area,
                                       S = 60.6
                                                  mph
                                       R
Space mean speed in outer lanes,
                                       S = N/A
                                                  mph
                                        0
Space mean speed for all vehicles,
```

S = 60.6

mph

0.962

General Informat	ion		Sit	e Info	rmation			
Analyst	KМ			rsectio		ISR 44	1 @ 1-05	SB Ram
Agency/Co.	HNTB			sdiction		10/1.4-	r (<i>w</i>) 1-30	OD INAIII
Date Performed	8/31/2	004		alysis Y		Existi	ng 2004	
Analysis Time Period	PM Pe	ak					.9	
Project Description		**************************************						
East/West Street: SF	R 44 (Canal S	treet)	Non	h/Sout	n Street: 1-9	5 SB Ram	DS .	
Intersection Orientation	n: East-We	st			od (hrs): 0.28		·	
Vehicle Volumes	and Adjus	tments						
Major Street		Eastbou	nd		ļ	Westi	ound	
Movement	1	2		3	4	1 6		6
	L	Т		R	L	7		R
Volume (veh/h)	0	520	()	60	68	7	0
Peak-hour factor, PHF	0.95	0.95	0.	95	0.95	0.9	5	0.95
Hourly Flow Rate (veh/h)	0	547	()	63	72	3	О
Proportion of heavy	0	ļ <u></u>			0			
vehicles, P _{HV}				-	8			
Median type			Undi	vided				
RT Channelized?)				0
anes	0	2)	1	2		0
Configuration		T			L	T		
Jpstream Signal] 0				0		
linor Street		Northbour	nd			Southb	ound	
Novement	7	8			10	11		12
(21.22.2.4.1.1)	L	T	F		L	Т		R
olume (veh/h) eak-hour factor, PHF	0	0	0		0	0		90
lourly Flow Rate	0.95	0.95	0.9	5	0.95	0.98	5	0.95
/eh/h) roportion of heavy	0	0	0		0	0		94
ehicles, P _{HV}	0	0	0		0	0		8
ercent grade (%)		0				0		
lared approach		N				N		
Storage		0				0		
T Channelized?			0					0
anes	0	0	0		0	0		1
onfiguration								R
ontrol Delay, Queue	Length, Leve	el of Service						
oproach	EB	WB		Northbo	ound		Southbo	und
ovement	1	4	7	8	9	10	11	12
ne Configuration		L					† 	R
olume, v (vph)		63						94
apacity, c _m (vph)		978						618
ratio		0.06	†	 			<u> </u>	
ueue length (95%)		0.21						0.15
ontrol Delay (s/veh)		8.9	<u> </u>					0.53
OS			1				 	11.9
proach delay		<u> </u>			İ		<u> </u>	В
veh)							11.9	

Approach LOS -- -- B

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Version 4.1d

General Informa	tion		Si	e Info	rmation		···		
Analyst	İsk			ersectio		ISD A	4 @ <i>I-9</i> 8	SAID	O ~
Agency/Co.	HNTB			risdiction		<u> </u>	· W 1-90	JIVE	\dII
Date Performed	8/30/20	005		alysis Y		Fyleti	ng 2004	1	
Analysis Time Period						<u> </u>	.y 2004		
Project Description	I-95 SOAR								
East/West Street: S	R 44 (Canal S	treet)	Nor	th/South	n Street: <i>I-</i> 9	5 NR Ram	ne		
Intersection Orientation	on: <i>East-We</i>	st	Stu	dv Peric	od (hrs): 0.2	5	<i>p</i> 3		-
Vehicle Volumes	and Adius	tmonte			· · · · · · · · · · · · · · · · · · ·				
Major Street	una Aujus	Eastbour	74		1	\		······································	
Movement	1	2	10	3	4	Westl			
	L	T		R		1			6
Volume (veh/h)	45	975		o o	0	62			R 0
Peak-hour factor, PHI		0.95		9 <i>5</i>	0.95	0.9			.95
Hourly Flow Rate (veh/h)	47	1026		0	0	66		***************************************	.95 0
Proportion of heavy rehicles, P _{HV}	8				0				
Median type				Painn	d curb				
RT Channelized?				Raise)	u curp		· · · · · ·		
anes	1	2)	0				0
Configuration		 		<i>)</i>	U	2			0
Jpstream Signal		 '				T			
Minor Street						0	<u> </u>		
Movement	7	Northboun		_		Southb			
novement				9	10	11			12
/olume (veh/h)	L 400	Ţ		₹	L	Т			R
Peak-hour factor, PHF	120 0.95	0	9		0	0)
fourly Flow Rate	0.95	0.95	0.9	15	0.95	0.95	5	0.3	95
veh/h) Proportion of heavy	126	0	9.	4	0	0		C)
ehicles, P _{HV}	8	0	8		0	0		C)
ercent grade (%)		0				. 0			
lared approach		N				T N		······································	***********
Storage		0				0			
T Channelized?				, 					
anes	1	0	1 7		0			0	
onfiguration	į		R		U	-		0	
ontrol Delay, Queue		I of Comics							
oproach	EB	WB		N41 !	1	1			
ovement			<u> </u>	Northbo	·····		outhbo	und	
	1	4	7	8	9	10	11		12
ane Configuration	L		L		R			$\Box T$	
olume, v (vph)	47		126		94				**********
apacity, c _m (vph)	885		199		491			_	-
c ratio	0.05		0.63	†	0.19	 	<u> </u>		
ueue length (95%)	0.17		3.69	 			 		
ontrol Delay (s/veh)	9.3		 	 	0.70				
Ontrol Delay (S/Vell)			49.9		14.1				***************************************
	A		E	<u> </u>	В				
proach delay (veh)		46.30		34.6	· 				

Approach LOS -- -- D

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Version 4.1d

General Informa	tion		Site	e Info	rmation				
Analyst	Isk			rsectio		ISD A	1 @ Cuas	AAH D	
Agency/Co.	HNTB			sdictio		On 44	l @ Sugai	IVIIII FIC	
Date Performed	8/31/2	004		llysis Y		Existii	ng 2004		
Analysis Time Period	d PMPe	ak							
	I-95 SOAR		I I						
East/West Street: S		treet)	Nort	h/Sout	n Street: <i>Su</i>	gar Mill Ro	ad	······································	
Intersection Orientati	on: <i>East-We</i>	st	Stud	ly Perio	od (hrs): 0.2	5			
Vehicle Volumes	and Adjus	tments							
Major Street		Eastboun	d		1	Westb	ound		
Movement	1	2		3	4	1 5		6	
	L	T		7	L	T		R	
Volume (veh/h)	59	1006	C)	0	96	1	51	
Peak-hour factor, PHI	F 0.95	0.95	0.8	95	0.95	0.9	5	0.95	
Hourly Flow Rate (veh/h)	62	1058	O)	0	101	1	53	
Proportion of heavy vehicles, P _{HV}	8				o				
Median type				Daine	L d a sude				
RT Channelized?			0	****	ed curb	-	- T		
anes	1	2	0		0			0	
Configuration		 			U	2 T			
Jpstream Signal	_	i o				0	<u> </u>	R	
Minor Street		Northbound	<u> </u>				L		
Novement	7	8	9	1	10	Southb	ound ,		
	Ĺ	T	R		10 	11 T		12	
olume (veh/h)	0	-			36	- 0		R	
eak-hour factor, PHF		0.95	0.9	5	0.95	0.95		29	
lourly Flow Rate veh/h)	0	0	0.5.		37	0.93		0.95 30	
Proportion of heavy ehicles, P _{HV}	o	0	0		8	0		8	
ercent grade (%)		<u> </u>						<u> </u>	
lared approach		0	T			0			
Storage		<u> </u>				N			
		0				0			
T Channelized?			0					0	
anes	0	0	0		0	0		0	
onfiguration						LR			
ontrol Delay, Queue									
oproach	EB	WB		Vorthbo	ound		Southboun	d	
ovement	1	4	7	8	9	10	11	12	
ne Configuration	L						LR	T	
olume, v (vph)	62						67		
apacity, c _m (vph)	616						265	†	
c ratio	0.10						0.25	 	
ueue length (95%)	0.33							 	
ontrol Delay (s/veh)	11.5						0.98	<u> </u>	
os .	В						23.1		
proach delay veh)							C 23.1	<u> </u>	
W 1 - 1 1 1	4								

South of SR 44 - 2004 Existing

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analy	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer To	I-95/Northbound South of SR 44 2004 Existing ail Feasibility St	-	
	Flow Inputs and A	ujus tillents	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	E, ER E, fHV	1850 0.95 487 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1013	veh/h v % % mi pc/h/ln
	Speed Inputs and A	Adjustments	
Lane width Right-shoulder lateral of Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, f Lateral clearance adjust Interchange density adju Number of lanes adjustme Free-flow speed, FFS	LW ment, fLC stment, fID	12.0 6.0 0.50 2 Measured 70.0 0.0 0.0 4.5 70.0 Urban Freeway	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	_LOS and Performanc	e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car spe Number of lanes, N Density, D Level of service, LOS	eed, S	1013 70.0 70.0 2 14.5	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

I-4 to 421 - 2030 No Build-1

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analy	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer T	I-95/Northbound North of SR 421 2030 No Build	udy	
	Flow Inputs and A	djustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, E Recreational vehicle PCI Heavy vehicle adjustment Driver population factor Flow rate, vp	E, ER L, fHV	2940 0.95 774 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1073	veh/h v % % mi pc/h/ln
	Speed Inputs and A	Adjustments	
Lane width Right-shoulder lateral of Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, for the company of the compa	FLW ment, fLC stment, fID	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 0.0 3.0 70.0 Urban Freeway	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	LOS and Performanc	e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car sp Number of lanes, N Density, D Level of service, LOS	eed, S	1073 70.0 70.0 3 15.3	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: Diverge Analysis Analyst: skAgency/Co.: HNTB Date performed: Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound SR 421 (Dunlawton Avenue) Junction: Jurisdiction: Analysis Year: 2030 No Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Diverge Number of lanes in freeway mph vph Free-flow speed on freeway 70.0 3080 Volume on freeway Off Ramp Data_____ Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 35.0 mph Volume on ramp 1170 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft _____Conversion to pc/h Under Base Conditions Freeway Ramp Junction Components Adjacent Ramp 1170 0.95 308 8 3080 Volume, V (vph) vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 811 v 8 0

0 0 Level Level

1.2

0.00 % 0.00 %

0.00 mi 0.00 mi 1.5 1.5

1.2

0

mi

Trucks and buses

Terrain type:

Grade

Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
Flow rate, vp
                                     3372
                                                1281
                                                                    pcph
                  ____Estimation of V12 Diverge Areas___
                 L =
                                (Equation 25-8 or 25-9)
                  ΕQ
                 P ==
                        0.617 Using Equation 5
                  FD
                 V = V + (V - V) P = 2571 pc/h
                  12 R F R FD
                       ____Capacity Checks
                         Actual
                                      Maximum
                                                     LOS F?
                         3372
                                      7200
                                                     No
      Fí
     v
                         2571
                                      4400
                                                     No
      12
     V = V - V
                         2091
                                      7200
                                                     No
     FO
         F R
     v
                         1281
                                      2000
                                                     No
     R
        Level of Service Determination (if not F)_____
                     D = 4.252 + 0.0086 v - 0.009 L = 21.9 pc/mi/ln
Density,
                                        12
                                                 D
Level of service for ramp-freeway junction areas of influence C
                _____Speed Estimation
Intermediate speed variable,
                                         D = 0.543
                                          S
Space mean speed in ramp influence area,
                                         S = 54.8
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = 76.8
                                                     mph
Space mean speed for all vehicles,
                                         S = 58.8
                                                     mph
```

0.962

1.00

0.962

Phone: Fax: E-mail: Merge Analysis_____ Analyst: SK Agency/Co.: HNTB Date performed: Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound SR 421 (Dunlawton Avenue) Junction: Jurisdiction: Analysis Year: 2030 No Build Description: Pioneer Trail Feasibility Study _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 3 70.0 mph Free-flow speed on freeway Volume on freeway 1910 vph On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 1030 Volume on ramp vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 1030 0.95 271 Volume, V (vph) 1910 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 503 v Trucks and buses 8 0 8 왕 Recreational vehicles 0 용 Level Level Terrain type: Grade ซ mi ş 왕 Length mi 1.5 1.2 Trucks and buses PCE, ET 1.5

1.2

Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                  0.962
                                             0.962
                                   1.00
                                             1.00
Flow rate, vp
                                   2091
                                             1128
                                                                 pcph
                Estimation of V12 Merge Areas
                L ==
                              (Equation 25-2 or 25-3)
                 ΕQ
                ₽ ==
                      0.591 Using Equation 1
                 FM
                v = v (P) = 1237 pc/h
                 12 F FM
                     ____Capacity Checks____
                        Actual
                                    Maximum
                                                  LOS F?
    v
                        3219
                                     7200
                                                   Νo
     FO
                        2365
                                    4600
                                                   Νo
     R12
       Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence C
                Speed Estimation
Intermediate speed variable,
                                        M = 0.328
                                        S
Space mean speed in ramp influence area,
                                       S = 60.8
                                                   mph
Space mean speed in outer lanes,
                                        S = 68.7
                                                   mph
```

Space mean speed for all vehicles,

0

S = 62.7

mph

Phone: E-mail:		F	ax:							
	Dive	erge Ana	lysi:	S						
	SK									
Date performed:	HNTB									
Analysis time period:	DM Deak									
Freeway/Dir of Travel:	rn reak T-95 Southbou	ınd								
	SR 421 (Dunla		enue)							
	2030 No Build	1								
Description: Pioneer Tra			У							
	Fre	eway Da	ta							
Type of analysis										
Number of lanes in freewa	9.V		Diver 3	ge						
Free-flow speed on freewa	av -1		70.0		mm.	L				
Volume on freeway	~1		2940		mp] vp]					
	Off	Damo Dat			-					
	OII	kamp bat	-a		···					
Side of freeway		F	Right							
Number of lanes in ramp		1	<u> </u>							
Free-Flow speed on ramp		3	35.0		mph					
Volume on ramp		1	.030		vph					
Length of first accel/dec		5	00		ft					
Length of second accel/de	cel lane				ft					
	Adjacent Ram	Data (if o	ne exist	s)					
Does adjacent ramp exist?		N	o .							
Volume on adjacent ramp					vph	1				
Position of adjacent ramp										
Type of adjacent ramp										
istance to adjacent ramp					ft					
Conve	rsion to pc/h	under	Base	Conditi	ons					
unction Components		Freewa	y	Ramp		Adjacent				
olumo V (1)			_	_		Ramp				
olume, V (vph)		2940		1030		vph				
eak-hour factor, PHF		0.95		0.95						
eak 15-min volume, v15 rucks and buses		774		271		v				
ecreational vehicles		8		8		ફ				
ecreational venicles errain type:		0		0		ફ				
errain type: Grade		Level	•	Level	_					
Length		0.00	જ .	0.00	8	8				
rucks and buses PCE, ET		0.00	mi	0.00	mi	mi				
ecreational vehicle PCE,	סים	1.5		1.5						
orderonar venicle PCB,	EK	1.2		1.2						

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                   1.00
                                             1.00
 Flow rate, vp
                                   3219
                                             1128
                                                                  pcph
                 Estimation of V12 Diverge Areas
                L =
                               (Equation 25-8 or 25-9)
                 ΕQ
                P = 0.628 Using Equation 5
                 FD
                V = V + (V - V) P = 2440 pc/h
                 12 R F R FD
                     ____Capacity Checks
                        Actual
                                     Maximum
                                                  LOS F?
     v = v
                        3219
                                     7200
                                                   No
     Fi
          F
     v
                        2440
                                    4400
                                                   No
     12
     V = V -
                        2091
                                    7200
                                                   No
     FO F R
    v
                        1128
                                     2000
                                                   No
     R
        Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 20.7 pc/mi/ln
Density,
                                      12 D
Level of service for ramp-freeway junction areas of influence C
              _____Speed Estimation
Intermediate speed variable,
                                        D = 0.530
                                        S
Space mean speed in ramp influence area,
                                       S = 55.2
                                                   mph
                                        R
Space mean speed in outer lanes,
                                        S = 76.8
                                                   mph
Space mean speed for all vehicles,
```

S = 59.2

mph

0.962

Phone: E-mail:		F	ax:							
	Mero	ge Analys	sis							
	·····	, =			· · · · · · · · · · · · · · · · · · ·		··········			
Analyst:	SK									
Agency/Co.:	HNTB									
Date performed:										
Analysis time period:	PM Peak									
Freeway/Dir of Travel:										
Junction:	SR 421 (Dunla	wton Ave	enue)							
Jurisdiction:										
Analysis Year:	2030 No Build									
Description: Pioneer T	rail Feasibili	ty Study	,							
	Fre	eway Dat	a							
Type of analysis		M	lerge							
Number of lanes in free		3	1							
Free-flow speed on free	way	7	0.0		mph	1				
Volume on freeway		1	910		vph	1				
	On	Ramp Dat	a	·····	·					
Side of freeway		R	ight							
Number of lanes in ramp			.19110							
Free-flow speed on ramp			5.0		mph					
Volume on ramp			170		vph					
Length of first accel/d	ecel lane		00		ft					
Length of second accel/		_	- •		ft					
	Adjacent Ramp	p Data (if or	ne exist	s)					
Does adjacent ramp exis	⊢ ?	N	0		***************************************					
Volume on adjacent Ramp	L :	10	U		rmh					
Position of adjacent Ram	mn				vph					
Type of adjacent Ramp	"P									
Distance to adjacent Ram	mp				ft					
Conv	version to pc/h	ı Under 1	Base	Conditi	ons					
Junction Components	• , -	Freeway				7.4.4				
components		r.r.cewa]	Y	Ramp		Adjacen Ramp	L			
Volume, V (vph)		1910		1170		Kump	vph			
Peak-hour factor, PHF	0.95		0.95			νÞπ				
Peak 15-min volume, v15		503		308			v			
Trucks and buses		8		8			왕			
Recreational vehicles		0		0			96			
Cerrain type:		Level		Level			- 0			
Grade			ક		왕		ફ			
Length			mi		mi		mi			
rucks and buses PCE, ET	•	1.5		1.5						
Recreational vehicle PCE		1.2		1.2						
	•	- · -								

Heavy vehicle adjus Driver population f Flow rate, vp		1.00	0.962 1.00 1281	pcph
	Estimation of	V12 Merge Ar	eas	
F	EQ (Equ EQ = 0.591 Usin	ation 25-2 or ng Equation 1		
	r = v (P) = 123 12 F FM	7 pc/h		
	Capacit	y Checks		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
v FO		Maximum 7200	LOS F? No	
v R12	2518	4600	No	
Le	evel of Service Dete	ermination (if	not F)	
Density, D = 5.475 R Level of service fo	R	12	Α	pc/mi/ln
	Speed Est	imation		***************************************
Intermediate speed	variable,	M = 0 S	.334	
Space mean speed in	ramp influence are	ea, S = 6 R	0.6 mph	
Space mean speed in	outer lanes,	S = 6 0	8.7 mph	
Space mean speed fo	or all vehicles,	S = 6	2.5 mph	

			***************************************							_										
General in	formation	<u> </u>				SH	ORT								·····					
Analyst KNM Intersection Taylor Rd @ Willia													/illiams	son	· · · · · · · · · · · · · · · · · · ·					
Agency or Date Perfo	rmed		<i>F</i>	INTB 10/05				Area Type All other areas Jurisdiction												
Time Perio	d 		PN	1 Peak			Analysis Year 2030 No Build													
Volume a	nd Timing	Inp	ut																	
					EE			WB					SB							
Num. of Lanes				LT 2	TH 2	RT	LT 2	TH	+	RT			TH	1	RT	LT	TH	RT		
				-	 		- 	2	_	1	2		2	1	1	2	1	0		
Lane group Volume (vp			····	L 308	TR 1240) 224	547	700		R	L L		T	_	R	L	TR			
% Heavy v				8	8	8	8	700 8	-	88 8	17 8		1376	-	762	688	1019	478		
PHF		***************************************		0.95	0.95		0.95	0.95	_	95	0.9		8 0.95	+	8).95	8 0.95	8	8		
Actuated (P	7/A)			Α	A	A	A	A	_	A	0.3 A		0.95 A	╁	A.95	0.93 A	0.95 A	0.95 A		
Startup lost				2.0	2.0		2.0	2.0	_	.0	2.0		2.0	+	2.0	2.0	2.0	1-		
Ext. eff. gre	en			2.0	2.0		2.0	2.0	2	.0	2.0)	2.0		2.0	2.0	2.0	<u> </u>		
Arrival type				3	3		3	3		3	3		3		3	3	3			
Unit Extens				3.0	3.0		3.0	3.0		.0	3.	0	3.0		3.0	3.0	3.0			
Ped/Bike/R* Lane Width	TOR Volui	me		0		0	0		-	0	0				0	0		0		
	do/Dodrin			12.0	12.0		12.0	12.0	ļ		12.		12.0		2.0	12.0	16.0			
Parking/Grade/Parking Parking/hr			Ν	0	N	N	0		N N		_	0		N	N	0	Ν			
			0	0		<u> </u>		<u> </u>					Ļ							
Bus stops/hr Unit Extension			3,0	3.0		0	0		0 0		_	0		0	0	0				
Phasing	Excl. Le	f+ T-	Theu	8.RT)3	3.0	3.0	3.0		3.0			3.0 3.0		3.0	3.0			
	G = 9.0			37.0 G=		03 04 G =		G =		1. Lef			31.0		G =	07		8		
Timing	Y = 4	1	7 = 1	6	Y =		<u> </u>		=			Y =			Y =		G = Y =			
Duration of A				0.25 Cycle Length C = 120.0																
Lane Gro	up Capa	city	/, C	ontro	l Del	ay, an	d LOS	S Dete	rn	nina	tio	n								
				EB			WB	}				N	В			SB				
Adj. flow rate)	32	4	1541		576	737	198		187	7 14.		48 802		2	724	1576	T		
ane group o	сар.	24.	3	1009		243	1033	822		622		865		573		622	824			
//c ratio		1.3	3	1.53		2.37	0.71	0.24		0.30		1.67		1.40		1.16	1.91			
Green ratio		0.0	8	0.31		0.08	0.31	0.55		0.19		0.26		0.38		0.19	0.26			
Jnif. delay d	1	55.	5	41.5		55.5	36.8	14.0		41.6		44.	5 3	7.	0	48.5	44.5			
Delay factor	k	0.5	0	0.50		0.50	0.28	0.11		0.11		0.50		-		0.50	0.50			
ncrem. delay	/ d2	175	.3	242.3		629.2	2.4	0.2		0.3	308				2	90.5	415.2			
		1.00	00	1.000		1.000	1.000	1.000	,	1.000	0 1.0		0 1.	00	00	1.000	1.000			
		230	.8	283.8		684.7	39.2	14.2		41.9		352.9		27.	2	139.0	459.7			
ane group L		F		F		F	D	В		D		F		F		F	F			
pprch. delay			274			28	2.0				287	7.7				3	358.8			
pproach LO			F			ŀ					F	-					F			
ntersec. delay 303.				.8				Interse	tersection LOS F											

	······					SHO	DRT	RI	FP	OR'	T				·····				*	
General Inf	ormation					<u> </u>	J.(1	_	te l			tion) 							
Analyst Agency or 0 Date Perfor	Co.	HΛ	NM ITB /05			Intersection I-95 SB Ramps @ Taylor Road Area Type All other areas														
Time Period			Peak			Jurisdiction Analysis Year 2030 No Build														
Volume an	d Timing In																			
			LT	E	}	RT LT TH R						1 -	NB	- 				SB		
Num. of Lar	nes		0	TH	\dashv	RT 0	1		2		R 0		<u>LT</u>	TH 0	╁	RT 0	LT 2	TH 0	RT 1	
Lane group				T	十		$\frac{1}{L}$		7		۳	\dashv		l 	╁			+ -	$\frac{1}{R}$	
Volume (vpl	n)			2447	, +		56	_	104			_		-	╀		638	-	137	
% Heavy ve				8	十	• • • • • • • • • • • • • • • • • • • •	8		8			_		 	十		8	+	8	
PHF				0.95			0.9)5	0.9	5					T		0.95	1	0.95	
Actuated (P.				Α			Α		Α						Ι		Α		Α	
Startup lost			<u> </u>	2.0	4		2.0		2.0			_			丄		2.0		2.0	
Ext. eff. gree Arrival type	en		 	2.0	+		2.0		2.0 3						╀		2.0	↓	2.0	
Unit Extensi	on		ļ	3.0	┪		3.0		3.				··········		╀		3.0	 	3	
Ped/Bike/RT		 	0	3.0	+		3.0	,	3.			-+	0		╀	····	0		3.0	
Lane Width	OIL VOIGING		Ť	11.0	┪	11		0	11.	0		十			╁		12.0	-	12.0	
Parking/Grade/Parking			N	0	十	N N			0		N		N		+ ,	N N		0	N N	
Parking/hr				1	·······									T						
Bus stops/hr	Bus stops/hr			0	Ť		0		0			T	*****		T		0		0	
Unit Extensi	on			3.0	T		3.0)	3.0	0		1	•		T		3.0		3.0	
Phasing	WB Only	Thru (Only	0	3			04		SE	SB Only		06		Î		07	1	08	
Timing	G = 20.0 Y = 0	G = 5		G =		G=			G = 35		5.0			G =						
Duration of A		Y = 6		Υ=		Y= Y= 6				b		Y =	e Len		Y =	L				
				l Del:	21/	anı		76	Da	tor	mii	a a fi		C LCII	J.111	<u> </u>	120.1			
Lanc Oro.	up Capaci	1,00	ÉE		ау, Т	v, and LOS Determ WB						iat		NB			SB			
Adj. flow rate	<u> </u>	-	2576			597		1098				T			+	672	144			
Lane group o			2046			333		1966									947		436	
v/c ratio		1	1.26			1.79		0.56									0.71		0.33	
Green ratio			0.44			0.17		0.61					_				0.29		0.29	
Unif. delay d	1		33.5	<u> </u>		50.0	, ,	13.9)			***************************************	_				38.0		33.3	
Delay factor	k		0.50		7	0.50	(0.16	3		7	***************************************	\top).27		0.11	
ncrem. delay	y d2		120.7	7	1	368.	6	0.4				******				1	2.5		0.4	
PF factor		1.000)	1	1.000	0 1	.00	0							1.	.000		1.000		
Control delay		154.2	2	1	418.6		14.3				100				4	0.5		33.8		
ane group L	OS		F			F		В								T	D		С	
Apprch. dela	У	1.	54.2				156.	7							······		3	9.3		
Approach LO	S		F				F											D		
ntersec. dela	1 7	36.6			Intersecti					ctio	n L(os				F				

	<u> </u>				C.L	10	RT R	<u></u>	ΛD.	-						·····		
General In	formation			·····	<u> </u>	101			nfo		atio	n	*************************************				······································	
Analyst Agency or (Date Perfor Time Period	med	HN 10	VM ITB V05 Peak				In Ai Ju	ters rea iriso	ection Typo diction sis	on e on			All c	oth	-95 NE er are No Bu	as	ps	
Volume ar	nd Timing In	put																
			LT	EB TH	1 6) T			VB	T -	·	1.7	NB		P*** *****		SB	
Num, of Lar	nes		2	3	+	₹T 0	LT O	-	⁻ H 2		₹T 2	LT 1	TH 0	-	RT 2	LT 0	TH	RT 0
Lane group			1 7	T	+			 	- T	H	,	L	┨-	┪	R	1 -	+-	+-
Volume (vpl			251	2834	╫				59	_		351	+	-	819	-	<u> </u>	
% Heavy v			8	8	╈			1 7		_		8		┪	8	 	1	
PHF			0.95	0.95				0.	95			0.95	<u> </u>	7	0.95	╅		1
Actuated (P			Α	Α				1				Α			Α			
Startup lost			2.0	2.0				2.	-			2.0			2.0			
Ext. eff. gree	en		2.0 3	2.0	ļ			2.				2.0	<u> </u>	4	2.0	ļ		ļ
Arrival type Unit Extensi	ion		3.0	3.0	╀			1	0	<u> </u>		3	 	4	3		<u> </u>	
	ΓOR Volume		3.0	3.0	╄—		0	3	U			3.0 0	╂	4	3.0 0	0	<u> </u>	ļ
Lane Width	TOTA VOIGITIO		11.0	11.0		_		12	Ω			12.0	 	╅	12.0	U		
Parking/Gra	de/Parking		N	0	٨	\bar{j}	N		0	٨	<i>V</i>	N	10	+	N	N	 	l _N
Parking/hr	<u> </u>				T				_	-			1	+				
Bus stops/hi	r		0	0	T				,			0		+	0			
Unit Extensi	on		3.0	3.0	T			3.	0			3.0		†	3.0			<u> </u>
Phasing	EB Only	EW P	erm	03		T	04		NE	3 O	nly	T	06			7)8
Timing	G = 20.0	G = 5		G =		G			G=	4		G =			G =		G =	
-	Y = 0	Y = 5		Y =		Υ:	=		Y =	5		Y =			Y =		Y =	
	Analysis (hrs			D.L.				_	4	*			e Len	gti	1 C =	120.0)	
Lane Gro	up Capaci	ty, Co			<u>', a</u>	<u>nd</u>			ter	mi	nat	ion						
			EE	· · · · · · · · · · · · · · · · · · ·	_		W				<u> </u>		NB			ļ	SB	
Adj. flow rate		264	298		4		132		<u> </u>		36			8	62			
Lane group o	сар.	1137	270.		\perp		139	5			55	7		8	82			
v/c ratio		0.23	1.10)			0.95	5			0.6	6		0.	98			
Green ratio		0.58	0.58	3			0.42	<u> </u>			0.3	3		0.	33			
Jnif. delay d	1	19.7	25.0)			33.8	}			34.	2		39	9.6			
Delay factor	k	0.11	0.50				0.46	i			0.2	4		0.	48			
ncrem. dela	y d2	0.1	53.0				13.8				2.9	9		24	1.8	***************************************		
PF factor		1.000	1.00	0	Ī		1.00	0			1.00	00		1.0	000			
Control delay	/	19.8	78.0				47.6				37.	2		64	1.3			
.ane group L	OS	В	E		T		D				D			E	Ξ			
Apprch. dela	у	7	3.3		1		47.6		B			56.2	2					
\pproach LO	S		Е		十		D	1		7		E						
ntersec. dela	ау	6	3.8		T			1	nters	sec	tion	LOS					Е	

					SH	IOR		POR								
General Inf	ormation						Sit	e Infor	mati	on						
Analyst Agency or C Date Perfor Time Period	med	KN HN 10/ PM F	TB 05				Are Jui	ersection ea Typo risdiction alysis `	e on			All oth	lv @ Ta ier area No Build	S	d	
Volume an	d Timing Inp	out													00	
				EB	T m			WB	I R	_	LT	NB TH	RT	LT	SB TH	RT
			LT	TH	R'		LT 1	TH 3	0	-	2	0	1	0	0	0
Num. of Lar	nes		0	3	1				↓ ′				R	<u> </u>	<u> </u>	
Lane group				T	R		L	T			L		111			<u> </u>
Volume (vp				2423	123		178 8	1400 8	+	\dashv	328 8	 	1111		 	<u> </u>
% Heavy v	eh			8 0.95	8 0.9		8 0.95	0.95	-	┥	o 0.95	<u> </u>	0.95			
PHF Actuated (P	/Δ)			0.93 A	0.9 A		0.93 A	0.30 A	+	ᅦ	A		A			
Startup lost				2.0	2.0		2.0	2.0			2.0		2.0			
Ext. eff. gre				2.0	2.0	0	2.0	2.0			2.0		2.0			
Arrival type				3	3		3	3	<u> </u>		3	<u> </u>	3			
Unit Extens				3.0	3.0	0	3.0	3.0	4		3.0	<u> </u>	3.0	<u> </u>	ļ	<u> </u>
	TOR Volume		0		0				_	_	0		0	0		
Lane Width				12.0	12.		12.0	12.0			12.0		12.0			١.,
Parking/Gra	ade/Parking		N	0	Ν		N	0	N		Ν	0	N	Ν	ļ	N
Parking/hr								<u> </u>				ļ				
Bus stops/h	nr .			0	0		0	0			0		0	<u> </u>		
Unit Extens	ion			3.0	3.0	0	3.0	3.0	<u> </u>		3.0	<u> </u>	3.0			<u> </u>
Phasing	WB Only	Thru &		03			04		IB Or	_		06)7	G =)8
Timing	G = 20.0	G = 7		G =		G Y			= 20 = 5	1.0	G = Y =		G = Y =		Y =	
	Y = 0	Y = 5		Υ =		ĮΥ			- 3			e Lenc	th C =	120.0		
	Analysis (hrs			l Dolo			109	Doto	rmii	12			<u> </u>			
Lane Gro	oup Capac	Ty, Ce	<u>Sintro</u>		y, c	anu		VB		I	4011	NB			SB	
	-				_	407		74		-	45		117	 	T	1
Adj. flow ra			2551	1295		187				┿			561	<u> </u>	 	ļ
Lane group	сар.		2795			383		75		╃	69					<u> </u>
v/c ratio			0.91	1.09		0.49		28		╄	.61		0.21		<u> </u>	
Green ratio			0.58	0.79		0.17	0.	75		0.	.17		0.38			
Unif. delay	d1		22.3	12.5		45.4	4	.8		4	6.4		25.4			
Delay facto	гk		0.43	0.50		0.11	0.	11		0.	19		0.11			
Increm. del			5.1	55.6		1.0	0	.0		1	.9		0.2			
PF factor	-		1.000	1.00	0 7	1.00	0 1.	000		1.	000		1.000			
Control del	ау		27.4	68.1	7	46.3	4	.8		4	8.2		25.6			
Lane group			С	E	1	D		A		Ī	D		С			
Apprch. de			41.1		1		9.5			Т	42	.5				
Approach L			D		7		Α			Ī	E)				
			00 4		一十					tic.	2010				\sim	

Intersec. delay

32.4

Intersection LOS

С

44 to 421 - 2030 No Build-1

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analy	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer Tr	SK HNTB 08/2005 PM Peak I-95/Northbound SR 421 to SR 44 2030 No Build ail Feasibility St	udy	
	Flow Inputs and A	djustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	, ER , fhv	3080 0.95 811 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1124	veh/h v % % mi pc/h/ln
***************************************	_Speed Inputs and	Adjustments	
Lane width Right-shoulder lateral c Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, f Lateral clearance adjust Interchange density adju Number of lanes adjustment Free-flow speed, FFS	LW ment, fLC stment, fID	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 3.0 70.0 Urban Freeway	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	_LOS and Performand	e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car spe Number of lanes, N Density, D Level of service, LOS	≙ed, S	1124 70.0 70.0 3 16.1 B	<pre>pc/h/ln mi/h mi/h pc/mi/ln</pre>

Overall results are not computed when free-flow speed is less than 55 mph.

Fax: Phone: E-mail: Diverge Analysis_____ SK Analyst: Agency/Co.: HNTB Agency/Co.:

Date performed:

Analysis time period:

PM Peak Freeway/Dir of Travel: I-95 Northbound SR 44 (Canal Street) Junction: Jurisdiction:
Analysis Year: 2030 No Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Diverge Type of analysis Number of lanes in freeway 70.0 mph 2920 vph Free-flow speed on freeway Volume on freeway Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-Flow speed on ramp 1120 35.0 Volume on ramp vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions_____ Freeway Ramp Adjacent Junction Components Ramp Ram
2920 1120
0.95 0.95
768 295
8 8
0 0
Level Level
0.00 % 0.00 %
0.00 mi 0.00 mi Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 웋 ક Recreational vehicles Terrain type: Grade Length mi Trucks and buses PCE, ET 1.5

1.5 1.2

1.2

Recreational vehicle PCE, ER

```
Driver population factor, fP
                                   1.00
                                              1.00
Flow rate, vp
                                   3197
                                              1226
                                                                  pcph
                      __Estimation of V12 Diverge Areas__
                L =
                               (Equation 25-8 or 25-9)
                 ΕQ
                P ==
                       0.624 Using Equation 5
                 FD
                v = v + (v - v) P = 2455 pc/h
                 12 R F R FD
                      ____Capacity Checks_
                        Actual
                                     Maximum
                                                   LOS F?
     v = v
                        3197
                                     7200
                                                   No
     Fi
     v
                        2455
                                     4400
                                                   No
     12
     v = v - v
                        1971
                                     7200
                                                   N_{O}
     FO
         F R
                        1226
                                     2000
                                                   No
     R
         Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 20.9 pc/mi/ln
Density,
                                      12
Level of service for ramp-freeway junction areas of influence C
                Speed Estimation
Intermediate speed variable,
                                        D = 0.538
                                         S
Space mean speed in ramp influence area,
                                       S = 54.9
                                                    mph
                                        R
Space mean speed in outer lanes,
                                        S = 76.8
                                                    mph
                                        0
Space mean speed for all vehicles,
                                       S = 58.8
                                                   mph
```

0.962

Heavy vehicle adjustment, fHV

Fax: Phone: E-mail: Merge Analysis_____ SK Analyst: Agency/Co.: HNTBDate performed: 8/05 Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound SR 44 (Canal Street) Junction: Jurisdiction: Analysis Year: 2030 No Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Merge Number of lanes in freeway mph 70.0 1800 Free-flow speed on freeway vph Volume on freeway On Ramp Data____ Side of freeway Right Number of lanes in ramp 35.0 mph Free-flow speed on ramp 1280 Volume on ramp vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp ____Conversion to pc/h Under Base Conditions____ Freeway Ramp Adjacent Junction Components Ramp 1280 0.95 337 1800 Volume, V (vph) vph 0.95 474 Peak-hour factor, PHF Peak 15-min volume, v15 v 8 0 Trucks and buses 8 0 옿 Recreational vehicles O Level Level Terrain type: 용 Grade

Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

mi

1.5

1.2

1.5 1.2 mi

Driver population factor, fP 1.00 1.00 1971 1401 Flow rate, vp pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ 0.591 Using Equation 1 P === FMv = v (P) = 1166 pc/h12 F FM Capacity Checks____ Maximum LOS F? Actual 3372 7200 No v FΟ 4600 No 2567 R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.7 pc/mi/lnLevel of service for ramp-freeway junction areas of influence C Speed Estimation____ Intermediate speed variable, M = 0.337S S = 60.6πph Space mean speed in ramp influence area, R Space mean speed in outer lanes, S = 68.9mph 0

S = 62.4

mph

0.962

0.962

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

Fax: Phone: E-mail: Diverge Analysis_____ SK Analyst: Agency/Co.: HNTB Agency/Co.:

Date performed:

Analysis time period:

PM Peak Freeway/Dir of Travel: I-95 Southbound SR 44 (Canal Street) Junction: Jurisdiction:
Analysis Year: 2030 No Build Description: Pioneer Trail Feasibility Study Freeway Data Diverge Type of analysis Number of lanes in freeway 70.0 3080 mph Free-flow speed on freeway vph Volume on freeway Off Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 mph 35.0 Free-Flow speed on ramp 200 vph Volume on ramp Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No vph Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp ft Distance to adjacent ramp _____Conversion to pc/h Under Base Conditions_____ Adjacent Freeway Ramp Junction Components Ramp 3080 200 vph Volume, V (vph) 0.95 53 8 Peak-hour factor, PHF 0.95 37 811 Peak 15-min volume, v15 8 8 0 0 Level Level Trucks and buses ૃ Recreational vehicles Terrain type: 0.00 % 0.00 % 0.00 mi 0.00 mi Grade πì Length

1.5

1.2

1.5 1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Driver population factor, fP
                                  1.00
                                             1.00
Flow rate, vp
                                  3372
                                            219
                                                                pcph
               Estimation of V12 Diverge Areas
                             (Equation 25-8 or 25-9)
                L ==
                ΕQ
                      0.666 Using Equation 5
                P =
                _{
m FD}
                v = v + (v - v) P = 2318 pc/h
                12 R F R FD
                     Capacity Checks____
                                                 LOS F?
                       Actual
                                    Maximum
                                    7200
    v = v
                       3372
                                                  No
     Fi
                                    4400
                       2318
                                                  No
    V
     12
    v = v - v
                       3153
                                    7200
                                                  No
     FO F R
                       219
                                    2000
                                                  No
    v
     R
         Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 19.7 pc/mi/ln
Density,
                                     12
Level of service for ramp-freeway junction areas of influence B
               Speed Estimation
Intermediate speed variable,
                                      D = 0.448
                                       S
Space mean speed in ramp influence area,
                                       S = 57.5
                                                  mph
                                       R
Space mean speed in outer lanes,
                                       S = 76.6
                                                  mph
                                       0
Space mean speed for all vehicles,
                                       S = 62.3
                                                  mph
```

0.962

Heavy vehicle adjustment, fHV

Phone: E-mail:		Fa	ax:			
	Diver	ge Anal	lysis_			
Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction:	I-95 Southbound SR 44 (Canal St 2030 No Build ail Feasibility	treet) y Study	Y			
	Free	way Dat	La			
Type of analysis Number of lanes in freework Free-flow speed on freework Volume on freeway	ay	3	Diverg 3 70.0 2880	e	mph vph	
	Off Ra	amp Dat	ca			
Side of freeway Number of lanes in ramp Free-Flow speed on ramp Volume on ramp Length of first accel/de Length of second accel/de	cel lane ecel lane _Adjacent Ramp	3	Right 1 35.0 1080 500 (if on	e exists	mph vph ft ft	
Does adjacent ramp exist Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ram	р	P	No		vph ft	
Conv	ersion to pc/h	Under	Base	Conditio	ns	
Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length Trucks and buses PCE, ET Recreational vehicle PCE		Freewa 2880 0.95 758 8 0 Level 0.00 0.00 1.5 1.2	ay % mi	Ramp 1080 0.95 284 8 0 Level 0.00 0.00 1.5 1.2	% mi	Adjacent Ramp vph v % % % mi

```
Driver population factor, fP
                                 1.00
                                            1.00
Flow rate, vp
                                 3153
                                            1182
                                                               pcph
               Estimation of V12 Diverge Areas_____
                            (Equation 25-8 or 25-9)
               L =
                ΕQ
                     0.627 Using Equation 5
                FD
               v = v + (v - v) P = 2417 pc/h
                12 R F R FD
                    Capacity Checks____
                                   Maximum
                                                LOS F?
                       Actual
                                   7200
                       3153
                                                 No
    v = v
     Γì
         F
                                   4400
                                                 No
                       2417
     12
                       1971
                                   7200
                                                 No
    v = v - v
     FO F R
                       1182
                                   2000
                                                 No
    v
     R
        Level of Service Determination (if not F)
                   D = 4.252 + 0.0086 v - 0.009 L = 20.5
                                                           pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence C
                 Speed Estimation____
                                      D = 0.534
Intermediate speed variable,
                                      S
                                      S == 55.0
Space mean speed in ramp influence area,
                                                 mph
                                       R
                                      S = 76.8
                                                 mph
Space mean speed in outer lanes,
                                       0
Space mean speed for all vehicles,
                                      S = 58.9
                                                 mph
```

0.962

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: Merge Analysis_____ SK Analyst: Agency/Co.: HNTB Date performed: 8/05 Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound SR 44 (Canal Street) Junction: Jurisdiction:
Analysis Year: 2030 No Build Description: Pioneer Trail Feasibility Study Freeway Data Type of analysis Merge Number of lanes in freeway 70.0 1800 Free-flow speed on freeway mph Volume on freeway vph On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 1120 228 Volume on ramp vph Length of first accel/decel lane 228 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists) Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft Conversion to pc/h Under Base Conditions Freeway Ramp Adjacent Junction Components Ramp 1800 1120 0.95 0.95 474 295 8 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 8 0 8 0 Recreational vehicles 0 Level Level % 왐 Terrain type: % mi 1.5 Grade 왕 Length mi mi Trucks and buses PCE, ET 1.5 1.2

1.2

Recreational vehicle PCE, ER

Driver population factor, fP pcph 1226 1971 Flow rate, vp Estimation of V12 Merge Areas (Equation 25~2 or 25-3) L = ΕQ 0.584 Using Equation 1 FΜ v = v (P) = 1151 pc/h12 F FM ____Capacity Checks_____ LOS F? Actual Maximum 7200 $N \circ$ 3197 v FO Νо 2377 4600 R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.0 pc/mi/lnLevel of service for ramp-freeway junction areas of influence C Speed Estimation_____ M = 0.347Intermediate speed variable, S Space mean speed in ramp influence area, S = 60.3mph S = 68.8 Space mean speed in outer lanes, mph 0

0.962

1.00

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

0.962

1,00

S = 62.3

mph

				£						
General Information			Site Ir		natic)N	105 44 6	LAFORE	Jamas	
Analyst	KNM		Interse				SR 44 @	I-95 SB I	ramps	
Agency/Co.	HNTB		Jurisdi				2030 No	Ruild		
Date Performed	10/05		Analys	is yea	ar .		2030 100	DUIIU		
Analysis Time Period	PM Peak						<u> </u>			
		asibility Study				1051	10 O			
ast/West Street: SR 44		∍t)					BB Ramps			
ntersection Orientation:	East-West		Study F	erioa	(nrs)	. 0.23				
/ehicle Volumes an	d Adjustm	ents			,	<u> </u>				
/lajor Street		Eastbound					Westbou	ınd ,		
Novement	1	2	3			4	5		6	
	L	T	R			L	T		R	
/olume (veh/h)	0	1661	0			30	1535		0 0.95	
Peak-hour factor, PHF	0.95	0.95	0.95		0	.95	0.95).90	
lourly Flow Rate veh/h)	0	1748	0		3	347	1615		0	
Proportion of heavy	0					8				
/ehicles, P _{HV}	U									
Median type				Raised	d curb)				
RT Channelized?			0						0	
anes	0	2	0			1	2		0	
Configuration		T				L	T			
Jpstream Signal		0					0			
Minor Street		Northbound					Southbo	und		
Wilnor Street Movement	7	8	9			10	11		12	
Movement	L.	T	R			L	T		R	
/ 1 / h /h \	0	0	1 0			0	0		200	
Volume (veh/h) Peak-hour factor, PHF	0.95	0.95	0.95		C).95	0.95		0.95	
Hourly Flow Rate	0.95	0.00	0			0	0		210	
(veh/h) Proportion of heavy vehicles, P _{HV}	О	0	o			o	0		8	
Percent grade (%)		0	<u></u>				0			
		T N	T				N			
Flared approach		0					0			
Storage			 						0	
RT Channelized?			0			^	0		1	
Lanes	0	0	0			0	<i>\</i>		R	
Configuration							1		/\	
Control Delay, Queue L	ength, Leve	l of Service								
Approach	EB	WB	t	Northb	ound			outhboun		
Movement	1	4	7	8	[9	10	11	12	
Lane Configuration		L							R	
		347			$\neg \uparrow$				210	
Volume, v (vph)									312	
Capacity, c _m (vph)		330 1.05							0.6	
		12.52			t				4.5	
Queue length (95%)									37.	
Control Delay (s/veh)		100.3							E	
LOS		F		<u> </u>				<u> </u>		
Approach delay (s/veh)	w							37.4		

E Approach LOS

HCS2000TM

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						SL	IO	RTR	E) ()	T							******		****
General Ir	nformation					JI				Info		atic	n.							
Analyst Agency or Date Perfo Time Perio	rmed	HI 10/	NM VTB 2005 Peak	-				۱۱ ۵ ل	nter vrea uris	secti Typ diction	ion e on	***************************************	***************************************	All	ot	l-95 NE her are	eas	nps		
Volume a	nd Timing I	nput				·						-								
				E	ΞB			Ī	1	ΛB			T	N	3		T		SB	
			LT		Ή	R	Τ	LT	1	Н	F	₹T	LT	Tŀ		RT	LT		TH	RT
Num. of La	ines		1	2		0)	0		2	(2	1	0		1	0		0	0
Lane group			L	_ 7	-					Γ			L		-	R	1	十		
Volume (vp			101	26	40				12	25	┢	****	640			480	 	+		
% Heavy v PHF	/eh		8	8					Į č			********	8			8	1	1		†
Actuated (F	2//\		0.95			<u> </u>			0.				0.95			0.95				
Startup lost			2.0	$\frac{A}{2}$			\dashv		1/2				A			Α				
Ext. eff. gre			2.0	$\frac{2}{2}$					2. 2.				2.0 2.0			2.0	<u> </u>	4		
Arrival type			3	3			-		3				3	├	\dashv	2.0 3	 -	┿		
Unit Extens			3.0	3.0)		1		3.				3.0	 	┪	3.0	 	+-		
Ped/Bike/R	TOR Volume	•		\top			1	0	 -	Ŭ			0	 	\dashv	0	0	+-		
Lane Width			12.0	12.	0		7		12.	0			12.0	<u> </u>	┪	12.0	<u> </u>	+		
Parking/Gra	de/Parking		Ν	0		Ν	寸	Ν)	٨	/	N	0	+	N	Ν	╫		~
Parking/hr							寸		<u> </u>			_		۱Ť	+	, •	/ *	╫	\dashv	14
Bus stops/h	r		0	0			7		0	_			0		╅	0		+-		
Unit Extensi	on		3.0	3.0)		十		3,			_	3.0		+	3.0		╀		***************************************
Phasing	EB Only	EWP	erm)3	T		04		NB	<u> </u>	i		06	<u> </u>	0.0	7	+		
Timing	G = 5.2	G = 8	7.5	G=			G =		\neg	G =			G =	00		G=	<u>′</u>	G	90	5
	Y = 5	Y = 6		Υ =			Υ =	=		Y =			Y =			Y =		TY:		
	Analysis (hrs												Cycle	Len	gth	า C =	150.0			
_ane Gro	up Capaci	<u>ity, Co</u>	ntro	l De	ay,	an	d l	LOS	De	terr	nir	nat	ion							
			E	В				W						NB			·**	S	В	***************************************
\dj. flow rate	9	106	277	79		Π		1289)		T	67	4		5	05		T	T	
ane group o	сар.	196	195	4		1		1954	1		┪	44				13		 	十	
/c ratio		0.54	1.4	2	*	†		0.66	-		┪	1.5				98		\vdash	+	
reen ratio		0.65	0.5	8		T	····	0.58			-+	0.2				34		-	+	
Inif. delay d	1	16.3	31.			╁		21.2				54.				3.9	***************************************	┼—	+	
elay factor	k	0.14	0.50			\vdash		0.23				0.50						 	4	
icrem. delay	/ d2	3.0	193			\vdash		0.23				236.				49	·	 	_	
F factor		1.000	1.00					1.000	,		-	.00			35	000			+	
ontrol delay		19.3	224.			-		22.0				.00			34.				_	
ane group L	os	В	F	_				С	\dashv		ť	F	- +		04. F				+	
pprch. delay	/	21	6.8	L			I	2.0	L		+	•	203.0	L	,					
oproach LO	S	 	=					C	******	······································	十		203.0 F							
tersec. dela	У	16	6.8					-	In	terse	L octi	OD I	LOS							
MTonors		<u> </u>										O11]						F		

General Inform	ation		S	ite Inf	orr	nation			
Analyst	KNN	1		tersec		nation			
Agency/Co.	HNT			urisdict			SK 4	4 @ Sug	ar Mill Roa
Date Performed	10/0			nalysis		3 <i>r</i>		A/a Duille	,
Analysis Time Perio	od <i>PM I</i>	² eak		rary 313	100		2030	No Build	
Project Description			tudy						
East/West Street:	SR 44 (Canal	Street)		rth/So	ith (Stroot: O.			
Intersection Orienta	ion: East-V		St	idy Pa	riod	Street: <i>Su</i> (hrs): <i>0.2</i>	igar ivilli R	oad	
Vehicle Volume	s and Adir	ietmonto			100	(1113). U.Z	<u> </u>		
Major Street	o ana Aajt	Eastbo	und	·····					
Movement	1	2	unu T	-	-			bound	
	i i	T		3 R	-	4		5	6
Volume (veh/h)	173			0	- -	<u> </u>		T	R
Peak-hour factor, Ph				0.95	\dashv	0	20		0
Hourly Flow Rate					+	0.95	0.9	95	0.95
(veh/h) Proportion of heavy	182	3103		0		0	21	80	0
vehicles, P _{HV}	8					0	ļ <u></u>		mr sid
Median type				Rais	sed	curb		L_	
RT Channelized?				0	Ī				^
_anes	1	2		0	十	0	2		0
Configuration	L	T			╁		$\frac{1}{7}$	f.	U
Jpstream Signal		0			+		1 0		
/linor Street		Northbou	ınd		╁				
/lovement	7	8	ario	9	+	10	South		· · · · · · · · · · · · · · · · · · ·
	L	T		R	┿	***	11		12
olume (veh/h)	0	0		0	+	L	Т		R
eak-hour factor, PHI		0.95		95	╁	78 0.05	0		
lourly Flow Rate					+-	0.95	0.95		0.95
veh/h) roportion of heavy	0	0)		82	0		66
ehicles, P _{HV}	0	0)		8	0		8
ercent grade (%)		0		······································	╁		0		
lared approach		N			 				**************************************
Storage		0			+-		N N		
T Channelized?		- i		<u> </u>	ـ		0		
anes	0)	<u> </u>				0
onfiguration	<i>'</i>	0			<u> </u>	0	0		0
							LR		
ontrol Delay, Queue	Length, Lev								
proach	EB	WB		Northb	oun	ıd	5	Southbour	nd
ovement	1	4	7	8		9	10	11	12
ne Configuration	L							LR LR	
lume, v (vph)	182		1	<u> </u>				 	
pacity, c _m (vph)	221			 	***********			148	
ratio	0.82			-				0	<u></u>
eue length (95%)	····			<u> </u>					
	6.18								
ntrol Delay (s/veh)	68.8								
proach delay	F							F	
veh)		!	1			f			1

Approach LOS -- --

 $HCS2000^{\mathsf{TM}}$

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Version 4.1d

South of SR 44 - 2030 No Build

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analy	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer Ti	SK HNTB 08/2005 PM Peak I-95/Northbound South of SR 44 2030 No Build rail Feasibility St	udy	
	Flow Inputs and A	djustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	E, ER E, fH∨	2920 0.95 768 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1066	veh/h v % % mi pc/h/ln
	Speed Inputs and A	djustments	
Lane width Right-shoulder lateral of Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, f Lateral clearance adjust Interchange density adju Number of lanes adjustme Free-flow speed, FFS	LW ment, fLC stment, fID	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 0.0 3.0 70.0	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	_LOS and Performanc	Urban Freeway e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car spo Number of lanes, N Density, D Level of service, LOS		1066 70.0 70.0 3 15.2	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

I-4 to 421 - 2030 Build

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational A	nalysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer Tr	SK HNTB 08/2005 PM Peak I-95/Northbound North of SR 423 2030 Build ail Feasibility	d L ⁄ Study	
	Flow Inputs ar	ia Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	, ER . fhv	3050 0.95 803 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1113	veh/h v % % mi pc/h/ln
	_Speed Inputs a	nd Adiustments	
Lane width Right-shoulder lateral cl Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fL Lateral clearance adjustm Interchange density adjus Number of lanes adjustmen Free-flow speed, FFS	earance W Went, fLC	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 0.0 3.0 70.0 Urban Freewa	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	LOS and Perform		•
Flow rate, vp Free-flow speed, FFS Average passenger-car spe Number of lanes, N Density, D Level of service, LOS		1113 70.0 70.0 3 15.9 B	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: Diverge Analysis_____ Analyst: skAgency/Co.: HNTB Date performed: Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound Junction: SR 421 (Dunlawton Avenue) Jurisdiction: Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph 3320 vph Volume on freeway vph Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 35.0 mph Volume on ramp 1220 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists) Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions_____ Freeway Ramp Junction Components Adjacent Ramp 3320 1220 0.95 0.95 874 321 8 8 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 874 v Trucks and buses 8 0 왕 Ó 0 0 Level Level 0.00 % 0.00 % 0.00 mi 0.00 mi Recreational vehicles 옷 Terrain type: Grade Length mi Trucks and buses PCE, ET

1.5

1.2

Recreational vehicle PCE, ER

1.5

1.2

```
Driver population factor, fp
                                   1.00
                                              1.00
Flow rate, vp
                                   3635
                                             1336
                                                                  pcph
               _____Estimation of V12 Diverge Areas
                               (Equation 25-8 or 25-9)
                 ΕQ
                P =
                       0.608 Using Equation 5
                 FD
                v = v + (v - v) P = 2733 pc/h
                 12 R F R FD
                    ____Capacity Checks___
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        3635
                                     7200
                                                   No
     Fi F
     v
                        2733
                                     4400
                                                   No
     12
     v = v - v
                        2299
                                     7200
                                                   No
     FO F R
                        1336
                                     2000
                                                   N_{\odot}
     R
        Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 23.3 pc/mi/ln
Density,
                                      12
Level of service for ramp-freeway junction areas of influence C
               Speed Estimation
Intermediate speed variable,
                                        D = 0.548
                                        S
Space mean speed in ramp influence area,
                                        S = 54.6
                                                   mph
                                        R
Space mean speed in outer lanes,
                                        S = 76.8
                                                   mph
                                        0
Space mean speed for all vehicles,
                                       S = 58.9
                                                   mph
```

0.962

Heavy vehicle adjustment, fHV

Fax:			
Merge Analysis	ı		
<u> </u>			
a k			
Northbound			
	o.)		
- (Daniawcon Avenu	C <i>j</i>		
Build			
easibility Study			
Freeway Data_			
Mar	ie.		
	1 ·		
-)	mm la	
		_	
		vpn	
On Ramp Data_			
Riah	ıt		
1			
35.0	ı	mph	
35.0 950	l	mph yph	
950 ane 500		vph	
950		_	
950 ane 500		vph ft ft	
950 ane 500 lane cent Ramp Data (if		vph ft ft	
950 ane 500 Lane		vph ft ft ts)	
950 ane 500 lane cent Ramp Data (if		vph ft ft	
950 ane 500 lane cent Ramp Data (if		vph ft ft ts)	
950 ane 500 lane cent Ramp Data (if		vph ft ft ts)	
950 ane 500 lane cent Ramp Data (if	one exis	vph ft ft ts) vph	
950 ane 500 Lane cent Ramp Data (if No	one exis	vph ft ts) vph ft tons Ad	jacent
950 ane 500 lane cent Ramp Data (if No to pc/h Under Base Freeway	one exis ∈ Conditi Ramp	vph ft ts) vph ft tons	np
ane 500 Lane cent Ramp Data (if No to pc/h Under Base Freeway 2100	one exis ⇒ Conditi Ramp 950	vph ft ts) vph ft tons Ad	
ane 500 Lane cent Ramp Data (if No to pc/h Under Base Freeway 2100 0.95	one exis ⊇ Conditi Ramp 950 0.95	vph ft ts) vph ft tons Ad	np Vph
ane 500 Lane Tent Ramp Data (if No to pc/h Under Base Freeway 2100 0.95 553	one existante condition Ramp 950 0.95 250	vph ft ts) vph ft tons Ad	np vph v
ane 500 lane cent Ramp Data (if No to pc/h Under Base Freeway 2100 0.95 553 8	one existante existante existe	vph ft ts) vph ft tons Ad	np vph v %
ane 500 Lane Cent Ramp Data (if No to pc/h Under Base Freeway 2100 0.95 553 8 0	one existed conditions on the condition of the condition	vph ft ts) vph ft tons Ad	np vph v
ane 500 tane cent Ramp Data (if No to pc/h Under Base Freeway 2100 0.95 553 8 0 Level	one existante existante existe	vph ft ft ts) vph ft Adgram	vph v v % %
ane 500 500 500 500 500 500 500 500 500 50	one existance Ramp 950 0.95 250 8 0 Level	vph ft ft ts) vph ft and Rar	vph v v % %
ane 500 tane cent Ramp Data (if No to pc/h Under Base Freeway 2100 0.95 553 8 0 Level	one existance Ramp 950 0.95 250 8 0 Level	vph ft ft ts) vph ft Adgram	vph v v % %
•	Merge Analysis eak Northbound 1 (Dunlawton Avenu Build easibility Study Freeway Data Merg 3 70.0 2100 On Ramp Data Righ	Northbound 1 (Dunlawton Avenue) Build easibility Study Freeway Data Merge 3 70.0 2100 On Ramp Data Right	Merge Analysis eak Northbound 21 (Dunlawton Avenue) Build 'easibility Study Freeway Data Merge 3 70.0 mph 2100 vph On Ramp Data Right

```
Heavy vehicle adjustment, fHV
                                    0.962
Driver population factor, fp
                                    1.00
                                               1.00
 Flow rate, vp
                                    2299
                                               1040
                                                                   pcph
                Estimation of V12 Merge Areas_____
                               (Equation 25-2 or 25-3)
                 ΕQ
                 ₽ ==
                       0.591 Using Equation 1
                 FM
                 v = v (P) = 1360 pc/h
                 12 F FM
                     Capacity Checks____
                         Actual
                                     Maximum
                                                   LOS F?
     v
                         3339
                                      7200
                                                    No
      FΟ
                         2400
                                     4600
                                                    No
     R12
     Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 \text{ v} + 0.0078 \text{ v} - 0.00627 \text{ L} = 20.6 \text{ pc/mi/ln}
Level of service for ramp-freeway junction areas of influence C
                Speed Estimation
Intermediate speed variable,
                                         M = 0.329
                                         S
Space mean speed in ramp influence area,
                                         S = 60.8
                                                     mph
Space mean speed in outer lanes,
                                         S = 68.4
                                                     mph
                                         0
Space mean speed for all vehicles,
                                        S = 62.8
```

mph

Phone: E-mail:		Fax:				
D	iverge An	alysi	s			
Analyst: SK						
Agency/Co.: HNTB						
Date performed:						
Analysis time period: PM Peak						
Freeway/Dir of Travel: I-95 South]	bound					
Junction: SR 421 (Dur	nlawton A	venue])			
Jurisdiction:						
Analysis Year: 2030 Build						
Description: Pioneer Trail Feasib	ility Stu	dy				
	Freeway Da	ata				
Type of analysis		Diver	ae			
Number of lanes in freeway		3	_			
Free-flow speed on freeway		70.0		qm	h	
Volume on freeway		3050		vp		
Of	f Ramp Da	ata_				
Side of freeway		Dd b				
Number of lanes in ramp		Right				
Free-Flow speed on ramp		35.0		1	L_	
Volume on ramp		950		mp]		
Length of first accel/decel lane		500		vpl £t		
Length of second accel/decel lane				ft		
Adjacent R	amp Data	(if o	ne exist	:s)		
Does adjacent ramp exist?						
Volume on adjacent ramp		No		. 1		
Position of adjacent ramp				vph	1	
Type of adjacent ramp						
distance to adjacent ramp				ft		
Conversion to po	c/h Under	Base	Conditi	ons		
unction Components	Freewa		Ramp	******	Adjacent	
_		4	p		Ramp	
olume, V (vph)	3050		950		_	vph
eak-hour factor, PHF	0.95		0.95			r.,
eak 15-min volume, v15	803		250			v
rucks and buses	8		8			용
ecreational vehicles	0		0			8
errain type:	Level		Level			
Grade	0.00	%	0.00	્રે	ફ	
Length	0.00	mi	0.00	mi	mi	
rucks and buses PCE, ET	1.5		1.5			
ecreational vehicle PCE, ER	1.2		1.2			

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                      1.00
                                                  1.00
 Flow rate, vp
                                      3339
                                                  1040
                                                                       pcph
                      Estimation of V12 Diverge Areas____
                  L ==
                                 (Equation 25-8 or 25-9)
                   \mathbf{E}\mathbf{Q}
                  P =
                         0.629 Using Equation 5
                   FD
                  V = V + (V - V) P = 2485 pc/h
                   12 R F R FD
                       _____Capacity Checks
                          Actual
                                        Maximum
                                                       LOS F?
                          3339
                                        7200
                                                       No
      Fi
     v
                          2485
                                        4400
                                                       No
      12
                          2299
                                        7200
                                                       No
      FO
          F R
     V
                          1040
                                        2000
                                                       No
      R
         Level of Service Determination (if not F)_____
                      D = 4.252 + 0.0086 v - 0.009 L = 21.1 pc/mi/ln
Density,
                                         12
                                                   D
Level of service for ramp-freeway junction areas of influence C
               Speed Estimation
Intermediate speed variable,
                                           D = 0.522
                                           S
Space mean speed in ramp influence area,
                                           S = 55.4
                                                       mph
                                           R
Space mean speed in outer lanes,
                                           S = 76.8
                                                       mph
                                           0
Space mean speed for all vehicles,
                                          S = 59.6
                                                       mph
```

0.962

Phone: E-mail:	F	ax:				
	Merge Analy	raia				
	riorge rmary	515				
Analyst: SK						
Agency/Co.: HNTI	3					
Date performed:						
Analysis time period: PM I	Peak					
Freeway/Dir of Travel: I-95						
Junction: SR 4	21 (Dunlawton Av	enue)				
Jurisdiction:	n n '11					
Analysis Year: 2030 Description: Pioneer Trail) Build Feasibility Stud	У				
	_	-				
Type of analysis		Merge				······································
Number of lanes in freeway		3				
Free-flow speed on freeway		70.0		mpl	٦	
Volume on freeway		2100		vpł		
	On Ramp Dat	ta				
Side of freeway	Ţ	Right				
Number of lanes in ramp		L				
Free-flow speed on ramp		35.0		mph		
Volume on ramp		1220		vph		
Length of first accel/decel	_	500		ft	•	
Length of second accel/decel				ft		
Adj	acent Ramp Data (if or	ne exist	:s)		
Does adjacent ramp exist?	N	Го				
Volume on adjacent Ramp				vph		
Position of adjacent Ramp				· P11		
Type of adjacent Ramp						
istance to adjacent Ramp				ft		
Conversion	on to pc/h Under	Base	Conditi	ons		
unction Components	Freewa	Y	Ramp		Adjacent	-
olume, V (vph)	2100		1220		Ramp	1_
eak-hour factor, PHF	0.95		0.95			vph
eak 15-min volume, v15	553		321			
rucks and buses	8		8			V ક
ecreational vehicles	0		0			₹ %
errain type:	Level		Level			8
Grade	·	o _l a		%		ક
		πi		mi		-
Length		IIIT				III 1
Length rucks and buses PCE, ET ecreational vehicle PCE, ER	1.5	шт	1.5	ш		mi

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 2299 1336 pcph Estimation of V12 Merge Areas Ľ = (Equation 25-2 or 25-3) ΕQ P = 0.591 Using Equation 1 FMV = V (P) = 1360 pc/h12 F FM ____Capacity Checks____ Actual Maximum LOS F? v 3635 7200 No FO 2696 4600 No R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.8 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence C _____Speed Estimation Intermediate speed variable, M = 0.344S Space mean speed in ramp influence area, S = 60.4mph R Space mean speed in outer lanes, S = 68.4mph 0

S = 62.3

mph

Space mean speed for all vehicles,

0.962

0.962

Conoralli	afa yya ati a		·		S	HORT													
General II	ntormatio	n					Site In	forma	tion						*******				
Agency or Co. F Date Performed			KNM HNTB 10/05 M Peak	.			Intersection Taylor Rd @ Williamson Blvd Area Type All other areas Jurisdiction Analysis Year 2030 Build												
Volume a	nd Timin	g Input				Analysis Year 2030 Build													
				E	В		WB			NB SB									
		-	LT	Tŀ	1 RT	LT	TH	RT	ī		Н	RT	$+_{LT}$	TH	TF				
Num. of Lanes			2	2	0	2	2	1	2	2 2	2	1	2	1					
Lane group	***************************************		L	TR		L	Т	R	L	. 7	_	R	L	TR	+				
Volume (vr			308	124	0 222	577	737	188	17	7 130	64	756	684	1011	4				
% Heavy \	/eh		8	8	8	8	8	8	8			8	8	8	+7				
PHF Actuated (F	7/4\		0.95	0.9			0.95	0.95	0.9	5 0.9	5	0.95	0.95	0.95	0.				
Startup los			2.0	A	A	A	A	A	A			Α	Α	A	1				
Ext. eff. gre			2.0	2.0 2.0		2.0	2.0	2.0	2.0			2.0	2.0	2.0					
Arrival type			3	3		3	2.0 3	2.0 3	2.0			2.0	2.0	2.0					
Unit Extens			3.0	3.0		3.0	3.0	3.0	3.0			3	3	3	_				
Ped/Bike/RTOR Volume		0	1	0	0	3.0	0	0	3.0	-	3.0 0	3.0	3.0	<u> </u>					
Lane Width			12.0	12.0		12.0	12.0	12.0	12.	0 12.	$\frac{1}{2}$	12.0	0 12.0	400	0				
Parking/Gra	de/Parkin	ıq	T _N	0	N	N	0	N N	N N		-			16.0	<u> </u>				
Parking/hr		1	<u> </u>			U	1.4	├ ``	10		N	N	0	_ ^					
Bus stops/hr			0	0		0	0	0	0	10					_				
Jnit Extension		3.0	3.0		3.0	3.0	3.0	3.0			0	0	0						
		u & RT		 03	04		xcl. Le	<u> </u>	Thru &		3.0	3.0	3.0	<u> </u>					
iming	G = 20.0		40.0	G =		G =		= 19.		G = 51		 G≡	07	$\frac{1}{G} = \frac{G}{G}$	8				
-	Y = 4	Y = 6		Υ=	Υ = Υ		Y = 4			Y = 6 Y									
Ouration of a									C	cycle L	engt								
ane Gro	up Capa	icity, (Contro	l De	lay, ar	nd LOS	Dete	rmin	atio	n									
· · · · · · · · · · · · · · · · · · ·			EB			WB				NB	***************************************			SB					
dj. flow rate	•	324	1539		607	776	198	18	6	1436	79	96	720	1563	Т				
ane group	сар.	433	873		433	893	648	41		1139	76		411	1085	╂				
/c ratio		0.75	1.76	†	1.40	0.87	0.31				1.0				╀				
reen ratio		0.13	0.27	†	0.13	0.27	0.43	0.1		1.26	-		1.75	1.44	╀				
nif. delay d	1	62.6	55.0	 	65.0	52.5				0.34	0.8		0.13	0.34					
elay factor		0.30	0.50		0.50		27.8	60.		49.5	36		65.5	49.5	<u> </u>				
crem. delay		7.1	348.0	-	ļ	0.40	0.11	0.1		0.50	0.5		0.50	0.50	<u> </u>				
factor	7 42	1.000	1.000		194.3	9.2	0.3	0.8		124.5	42.		348.2	203.5	L				
ontrol delay			 	ļ	1.000	1.000	1.000			1.000	1.0	00	1.000	1.000					
ine group L		69.6 E	403.0 F	 -	259.3	61.7	28.0	61.5	2 1	74.0	79.		····	253.0					
			<u> </u>	<u> </u>	F	E	С	E	\perp	F	Ε		F	F					
oprch. delay 345.						33. <i>4</i>			134				3	303.7					
pproach LOS F			-		ī	F		ı	F		- 1	F							
proach LO ersec. dela		229					Interse							Г	†				

			····		SH		REPOP				""		***************************************		
General li	nformation			·	······································	S	Site Info	ormati	on				***************************************		
Analyst Agency or Date Perfo Time Perio	rmed	H 1	(NM NTB 0/05 1 Peal	·<		J.	ntersec Area Typ urisdict	oe ion	<i>[-</i> :	All c	Road other a	areas	ylor		
Volume a	ınd Timing lı	nnut				<u></u>	nalysis	Year		20)30 Bi	uild			
VOIGING a	ma raming ii	iiput	T	EB		<u> </u>	WB		7	ND	-				
					RT	LT	TH	RT	$+_{LT}$	NB	RT	LT	SB TH		
Num, of La	anes		0	3	0	1	2	10	0	10	0	2	0	1	
Lane group	0		1	T		17	T	1	† <u> </u>	1	+		╅		
Volume (v	oh)	······································	_	2415		595	1148		┪			588		R	
% Heavy v				8		8	8	†	†		╁──	8		126 8	
PHF				0.95		0.95	0.95		1			0.95	+	0.9	
Actuated (F				A		Α	Α					Α	†	A	
Startup los Ext. eff. gre			-	2.0	<u> </u>	2.0	2.0					2.0		2.0	
Arrival type			-	2.0	-	2.0	2.0	ļ	<u> </u>			2.0		2.0	
Unit Extens		····	+	3.0	╂	3.0	3.0	 	 	 	ļ	3	-	3	
	TOR Volume	<u> </u>	0	15.0	 	3.0	3.0		0	ļ	ļ	3.0	 	3.0	
ane Width			Ť	11.0		11.0	11.0		'	<u> </u>		0 12.0	┼	0	
Parking/Gra	ade/Parking		Ν	0	N	N	0	Ν	Ν		N	12.0 N	一	12.0	
Parking/hr					 '`-		<u> </u>	/ V	<u>'</u> '\	<u> </u>	/V	1//	0	_ N	
Bus stops/h	r			0	1	0	0					0	 	+-	
Jnit Extension				3.0		3.0	3.0						<u> </u>	0	
Phasing	WB Only	Thru	Only	03	1	0.0		B Only		06	T	3.0	<u> </u>	3.0	
iming	G = 25.0	G = 8		G =) =		= 25.0	- - G=		G =	07	 G =	80	
	Y = 0	Y = 6		Υ=	Y	′ =	Υ =		Y =		 V =		Y =	,	
	Analysis (hrs			<u> </u>					Сус	e Leng	th C =	= 120.0)	***************************************	
ane Gro	up Capaci	ty, Co	ontro	ol Delay	/, and	LOS	Deter	mina	tion						
			E	3		WI	3			NB		······································	SB		
dj. flow rate	е		2542	?	626	120	8					619	<u> </u>	133	
ane group	сар.		2239)	416	223	5					676		311	
c ratio			1.14		1.50	0.54			_			0.92			
reen ratio			0.48		0.21	0.69								0.43	
nif. delay d	1		31.0		47.5	9.1						0.21		0.21	
elay factor	· · · · · · · · · · · · · · · · · · ·		0.50		0.50	0.14				_		16.5		41.3	
crem. dela		†	67.0		239.4				_			0.43	—— <u> </u>	0.11	
F factor	,	 	1.000		1.000							7.3		0.9	
ontrol delay	/		98.0	<u> </u>	286.9							.000		.000	
-		1	90.0 F		200.9 F	9.4 A						3.7	4	12.2	
ane group LOS					ļ	104.1		-	L		_	E		D	
oprch. delay			98.0			V7. I						59	9.9		
		 	F			F						-	_		
oprch. delay oproach LO tersec. dela	s		F 4.6			F	Interse	-ti 1	~ C					,	

						SH	ORT R									
General Ir	nformation					····	<u> </u> s	ite In	fori	matio	n					
Agency or Co. HN			NM NTB N05 Peak	TB Area Type All other a Jurisdiction								ther are	eas	ps		
Volume a	nd Timing Ir	put														
					EB			W				NB		T	SB	***************************************
N		-	LI		TH	RT		TH		RT	LT	TH	RT	LT	TH	F
Num. of La			2	_	3	0	0	2		0	1	0	2	0	0	(
Lane group			L		Τ	<u> </u>		T			L		R			
Volume (vr			239) ,	2764			1387	7		356		854		1	T
% Heavy ν PHF	/eh		8		8			8			8		8			
Prir Actuated (F	2/Λ \		0.95	2	0.95			0.95			0.95		0.95			
Startup los			2.0	+	<u>A</u> 2.0	 		A	-		A	<u> </u>	A	<u> </u>	ļ	
Ext. eff. gre			2.0		2.0 2.0		_	2.0	-		2.0 2.0	<u> </u>	2.0	<u> </u>		
Arrival type			3	\dashv	3		+	3	+		3	 	2.0 3	 	 	
Unit Extens			3.0	1	3.0			3.0	+		3.0		3.0	<u> </u>	ļ	┼
Ped/Bike/R	TOR Volume	•	 	十			10	1	+		0		0	0	<u> </u>	┼—
Lane Width			11.0	, 1	1.0		1 -	12.0	+		12.0		12.0	 		<u> </u>
Parking/Gra	ade/Parking		Ν	+	0	Ν	N	0	+	Ν	N	0	12.0 N	N	 	
Parking/hr	<u> </u>			+			'`-	Ι <u>΄</u>	╅	′′	14	<i>U</i>	//	IV		N
Bus stops/hr			0	+	0			0	+		ō		0			
Jnit Extension			3.0	+	3.0			3.0	+		3.0					<u> </u>
Phasing	EB Only	EW P	L	TL	03	I	04	L	L	Only		~~	3.0			
	G = 20.0	G = 5		G		- 6) =			40.0	G =	06	G =	7	G =	8
Timing	Y = 0	Y = 5		Ÿ			, <u> </u>		= ;		Y =	****	Y =		Y =	
Duration of	Analysis (hrs) = 0.25	j			····			********			Lena	th C =	120 0	3.	
.ane Gro	up Capaci	ty, Co	ntro	o Io	elay	, and	LOS	Dete	ern	ninat	ion					
				В			V		••••	T		NB			SB	
\dj. flow rat	е	252	29	09	T		146			37			B99			
ane group	cap.	1188		2702		┪	1390			5 5			434			
/c ratio		0.21	1.0		-	-	1.05								——	·
Preen ratio		0.58	0.5		1	╅	0.42	<u> </u>		0.67		0.63				
Inif. delay d	l1	20.3	25.		 	╂─	35.0						0.54			
		0.11			 	+	0.50			34.			9.1			
elav factor			0.50		<u></u>					0.2			.21			
			12	1		1	27 0				3.2			1		
ncrem. dela		0.1	42.			╂	37.0						0.9			
ncrem. dela F factor	y d2	0.1 1.000	1.0	00			1.00	0		1.00	00	1.	000			
ncrem. dela F factor ontrol delay	y d2 /	0.1 1.000 20.3	1.0 67.	00 1			1.000 72.0	0		1.00 37.0	00	1. 2	000 0.0			
Delay factor ncrem. dela F factor control delay ane group L	y d2 / _OS	0.1 1.000 20.3 C	1.0 67. E	00 1			1.000 72.0 E	0		1.00	5	1.	000			
ncrem. dela F factor control delay ane group l pprch. dela	y d2 / _OS y	0.1 1.000 20.3 C	1.0 67. E 3.4	00 1			1.000 72.0 E 72.0	0		1.00 37.0	25.1	1.	000 0.0			
ncrem. dela F factor control delay ane group l	y d2 / _OS y	0.1 1.000 20.3 C	1.0 67. E	00 1			1.000 72.0 E	0		1.00 37.0	25.1 C	1.	000 0.0		E	

					SHO	ORT	REF	OR	T								
General Inf	ormation						Site	Info	rmat	ion							
Agency or Co. HN Date Performed 10			VM ITB /05 Peak			Area Juris	Area Type All othe Jurisdiction						v @ Taylor Rd er areas) Build				
Volume an	d Timing In	put															
			I-T-	EB T TH	RT	+		WB	T 5	_		NB	1 6÷	 	SB THTRT		
Num. of Lanes			0	3	1	1		TH 3	R		LT 2	TH 0	RT 1	LT 0	0	RT 0	
Lane group			 	T	R	L		T	Ť		L	<u> </u>	R	اٽ	+	 	
Volume (vpl	<u> </u>			2400	1218		7 1	467	-		343		116	 	-		
% Heavy ve				8	8	8	' '	8	+-		8		8	-	 	┼──	
PHF				0.95	0.95	0.9	5 0	.95	1		0.95	<u> </u>	0.95	†	<u> </u>	 	
Actuated (P/	/A)			Α	Α	Α		Α			Α		A				
Startup lost				2.0	2.0	2.0		2.0			2.0		2.0				
Ext. eff. gree	en			2.0	2.0	2.0		2.0	<u> </u>		2.0		2.0				
Arrival type				3	3	3	-	3	╀—	_	3	<u> </u>	3		<u> </u>	<u> </u>	
	Unit Extension		<u> </u>	3.0	3.0	3.0	<u>' </u>	3.0	╀		3.0		3.0			<u> </u>	
Ped/Bike/RTOR Volume Lane Width			0	12.0	0 12.0	12.0	_	2.0	┼	-	0 12.0		0	0	 	ļ	
			N	0	12.0 N				_	,			12.0	Α/	<u> </u>	A.,	
Parking/Grade/Parking			//	U	//	N		0			N	0	N	Ν	ļ	N	
Parking/hr				0	_				—		•					<u> </u>	
Bus stops/hr					0	0		0	 	_	0		0		<u> </u>	<u> </u>	
	Unit Extension			3.0	3.0	3.0		3.0			3.0		3.0		<u> </u>		
Phasing	WB Only G ≃ <i>20.0</i>	Thru 8 G = 7		03 G =		G =		NB O G = 20			G =	06	G =	7		8	
Timing	Y = 0	Y = 5		<u> </u>	Y =				- 20 - 5	<i></i>	Y =		Y =		G = Y =		
Duration of A	Analysis (hrs		£	,		*		<u></u>				Lena	th C =	120.0	<u> </u>		
	up Capaci	~~~~~~		Delay	/, an	d LO	S D	eter	mir	nat							
			EB				WB					NB			SB		
Adj. flow rate	3		2526	1282	19	197 154		14		361		122					
Lane group o			2795	1184 383		3 5	5175		***************************************	569		561					
v/c ratio			0.90	1.08 0.51		1 (0.30			0.63		0.22					
Green ratio			0.58	0.79	0.1	7 (0.75			0.17			0.38				
Unif. delay d	1		22.0	12.5	45.	6	4.8			46	.6		25.5				
Delay factor k		0.42	0.50	0.1	2 (0.11			0.2	21		0.11					
ncrem. delay d2		4.6	51.6	1.2	2	0.0	ŀ		2.	3		0.2					
PF factor			1.000	1.000	1.00	00 1	.000			1.0	00	1	1.000				
Control delay	1		26.7	64.1	46.	В	4.9			48.	9	1	25.7				
Lane group L	.os		С	E	D		Α			D			С				
Apprch. dela	у	3	39.3			9.6)				43 .1	1					
Approach LC)S		D			Α					D						
Intersec. delay 3			31.0			Inte			sect	ion	LOS				С		

Pioneer Trail to SR 421- 2030 Build

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analys	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer T	I-95/Northbound Pioneer Trail to SF 2030 Build		
	Flow Inputs and Ad	djustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, E Recreational vehicle PC Heavy vehicle adjustmen Driver population facto Flow rate, vp	T E, ER t, fHV	3320 0.95 874 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1212	veh/h v % % mi pc/h/ln
	Speed Inputs and A	djustments	
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density adju Number of lanes adjustmere-flow speed, FFS	fLW tment, fLC ustment, fID	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 0.0 70.0 Urban Freeway	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
Western Committee of the Committee of th	LOS and Performanc	e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car s Number of lanes, N Density, D Level of service, LOS	peed, S	1212 70.0 70.0 3 17.3	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: Diverge Analysis_____ Analyst: SK Agency/Co.: HNTBAgency/co.:
Date performed:
Analysis time period:
PM Peak Freeway/Dir of Travel: I-95 Northbound Junction: Pioneer Trail Jurisdiction: Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 2880 mph vph Volume on freeway Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 35.0 mph Volume on ramp 320 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 320 0.95 84 8 Volume, V (vph) 2880 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 758 v Trucks and buses 8 0 왕 Recreational vehicles 0 Level Level 0.00 % 0.00 % ફ Terrain type: Grade Length 0.00 mi 0.00 mi шŢ Trucks and buses PCE, ET 1.5 1.5

1.2

1.2

Recreational vehicle PCE, ER

```
1.00
                                             1.00
Flow rate, vp
                                  3153
                                             350
                                                                pcph
               ____Estimation of V12 Diverge Areas____
                L =
                              (Equation 25-8 or 25-9)
                 ΕQ
                P =
                      0.665 Using Equation 5
                 FD
                V = V + (V - V) P = 2214 pc/h
                 12 R F R FD
                    Capacity Checks____
                        Actual
                                    Maximum
                                                 LOS F?
    v = v
                        3153
                                    7200
                                                  No
     Fi
                        2214
                                    4400
                                                  No
     12
    v = v - v
                       2803
                                   7200
                                                  No
     FO F R
                       350
                                    2000
                                                 No
     R
         Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 18.8 pc/mi/ln
Density,
                                     12
Level of service for ramp-freeway junction areas of influence B
              _____Speed Estimation
Intermediate speed variable,
                                       D = 0.460
                                       S
Space mean speed in ramp influence area,
                                       S = 57.1
                                                  mph
                                       R
Space mean speed in outer lanes,
                                       S = 76.8
                                                  mph
```

0

S = 61.8

mph

0.962

0.962

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

Driver population factor, fP

Phone: Fax: E-mail: Merge Analysis_____ Analyst: SK Agency/Co.: HNTBAgency/Co.:
Date performed:
Analysis time period:
PM Peak Freeway/Dir of Travel: I-95 Northbound Pioneer Trail Junction: Jurisdiction: Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Merqe Number of lanes in freeway 3 Free-flow speed on freeway 70.0 mph Volume on freeway 2560 vph ____On Ramp Data____ Side of freeway Right Number of lanes in ramp Free-flow speed on ramp 35.0 mph Volume on ramp 760 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft ____Adjacent Ramp Data (if one exists)____ Does adjacent ramp exist? ÑΟ Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp _____Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 760 0.95 200 Volume, V (vph) 2560 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 674 ν Trucks and buses 8 용 0 Recreational vehicles 0 9 Terrain type: Level Level Grade 용 Length mi mi mi Trucks and buses PCE, ET Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2 1.5

1.2

```
Heavy vehicle adjustment, fHV
 Driver population factor, fP
                                    1.00
                                               1.00
 Flow rate, vp
                                    2803
                                               832
                                                                    pcph
                Estimation of V12 Merge Areas_____
                               (Equation 25-2 or 25-3)
                  ΕQ
                       0.591 Using Equation 1
                 P ==
                 FM
                 V = V (P) = 1658 pc/h
                  12 F FM
                     Capacity Checks
                         Actual
                                      Maximum
                                                   LOS F?
     v
                         3635
                                      7200
                                                     No
     FΟ
                         2490
                                      4600
                                                    No
     R12
       Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 \text{ v} + 0.0078 \text{ v} - 0.00627 \text{ L} = 21.4 pc/mi/ln}
Level of service for ramp-freeway junction areas of influence C
                 _____Speed Estimation
Intermediate speed variable,
                                         M = 0.333
                                         S
Space mean speed in ramp influence area,
                                         S = 60.7
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = 67.7
                                                     mph
                                         0
Space mean speed for all vehicles,
```

S = 62.7

mph

0.962

0.962

Phone: E-mail:			Fax:			
	Dir	verge An	alysi	s		
Analyst:	SK		_		***************************************	
Agency/Co.:	HNTB					
Date performed:						
Analysis time period:	DM Dook					
Freeway/Dir of Travel:	I-95 Southba	un d				
Junction:	Pioneer Trai					
Jurisdiction:	rioncer mar	. 4				
== ·	2030 Build					
Description: Pioneer T	rail Feasibil	ity Stud	iy			
	F'r	eeway Da	ata			
Type of analysis			Dirror			
Number of lanes in free	√av		Diver	.ye		
Free-flow speed on free	wav		70.0		1	,
Volume on freeway	4		3320		mpl tqv	
-					۷þ۱	1
	Off	Ramp Da	ta			
Side of freeway			Right			
Number of lanes in ramp			1			
Free-Flow speed on ramp			35.0		mph	
Volume on ramp			760		vph	
Length of first accel/de	cel lane		500		ft	•
Length of second accel/d	ecel lane.				ft	
	_Adjacent Ram	mp Data	(if o	ne exist	:s)	
Does adjacent ramp exist	?	1	No			
olume on adjacent ramp		•			vph	
Position of adjacent ram	р				v PII	
	-					
Type of adjacent ramp						
ype of adjacent ramp Distance to adjacent ram	р				ft	
pistance to adjacent ram	p ersion to pc/	h Under	Base	Conditi		
pistance to adjacent ram	_					Adjacent
converge to adjacent rame Converge Conv	_	h Under Freewa		Conditi Ramp		Adjacent Ramp
Conversation Components olume, V (vph)	_					Ramp
Conversation Components olume, V (vph) eak-hour factor, PHF	_	Freewa		Ramp		-
Conversation Components olume, V (vph) eak-hour factor, PHF eak 15-min volume, v15	_	Freewa		Ramp 760		Ramp vph
istance to adjacent ram Converse unction Components olume, V (vph) eak-hour factor, PHF eak 15-min volume, v15 rucks and buses	_	Freewa 3320 0.95		Ramp 760 0.95		Ramp vph
conversation Components olume, V (vph) eak-hour factor, PHF eak 15-min volume, v15 rucks and buses ecreational vehicles	_	Freewa 3320 0.95 874		Ramp 760 0.95 200		Ramp vph vph v %
conversation Components olume, V (vph) eak-hour factor, PHF eak 15-min volume, v15 rucks and buses ecreational vehicles errain type:	_	Freewa 3320 0.95 874 8		Ramp 760 0.95 200 8		Ramp vph
Conversation Components olume, V (vph) eak-hour factor, PHF eak 15-min volume, v15 rucks and buses ecreational vehicles errain type: Grade	_	Freewa 3320 0.95 874 8		Ramp 760 0.95 200 8 0 Level	ons	Ramp vph v % %
Conversal Conver	_	Freewa 3320 0.95 874 8 0 Level 0.00	ıy %	Ramp 760 0.95 200 8 0 Level 0.00	ons	Ramp vph vph \$
Conversation Components olume, V (vph) eak-hour factor, PHF eak 15-min volume, v15 rucks and buses ecreational vehicles errain type: Grade	ersion to pc/	Freewa 3320 0.95 874 8 0 Level	ıy	Ramp 760 0.95 200 8 0 Level	ons	Ramp vph v %

```
Flow rate, vp
                                 3635
                                            832
                                                              pcph
               Estimation of V12 Diverge Areas
               L =
                             (Equation 25-8 or 25-9)
                ΕQ
                     0.631 Using Equation 5
               P ==
                FD
               v = v + (v - v) P = 2600 pc/h
                12 R F R FD
                   ____Capacity Checks
                       Actual
                                   Maximum
                                                LOS F?
    v = v
                       3635
                                   7200
                                                No
     Fi
    v
                       2600
                                   4400
                                                No
     12
    v = v - v
                       2803
                                  7200
                                                Νo
     FO F R
                       832
                                   2000
                                                No
     R
     Level of Service Determination (if not F)
                   D = 4.252 + 0.0086 v - 0.009 L = 22.1 pc/mi/ln
Density,
                                    12
Level of service for ramp-freeway junction areas of influence C
             Speed Estimation
Intermediate speed variable,
                                      D = 0.503
                                      S
Space mean speed in ramp influence area,
                                     S = 55.9
                                                 mph
                                      R
Space mean speed in outer lanes,
                                      S ≈ 76.7
                                                 mph
```

S = 60.6

mph

0.962

1.00

0.962

1.00

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

Driver population factor, fP

Phone: Fax: E-mail: Merge Analysis_____ Analyst: SK Agency/Co.: HNTBDate performed: 8/05 Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound Junction: Pioneer Trail Jurisdiction: Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Merge Number of lanes in freeway 3 70.0 Free-flow speed on freeway mph Volume on freeway vph On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp mph 35.0 Volume on ramp 320 vph Length of first accel/decel lane 228 ft Length of second accel/decel lane ft _____Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft Conversion to pc/h Under Base Conditions Junction Components Freeway Ramp Adjacent Ramp 320 0.95 84 Volume, V (vph) 2560 vph Peak-hour factor, PHF 0.95 674 Peak 15-min volume, v15 ν 8 0 Trucks and buses 8 용 Recreational vehicles 0 ક Level Level Terrain type: % mi 1.5 ફ Grade Length mi mi Trucks and buses PCE, ET 1.5 1.2

1.2

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 2803 350 pcph Estimation of V12 Merge Areas____ L = (Equation 25-2 or 25-3) ΕQ P == 0.584 Using Equation 1 FMV = V (P) = 1637 pc/h12 F FM Capacity Checks Actual Maximum LOS F? v 3153 7200 No FO 1987 4600 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.4 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence B _____Speed Estimation Intermediate speed variable, M = 0.333S Space mean speed in ramp influence area, S = 60.7 mph R Space mean speed in outer lanes, S = 67.6mph 0

S = 63.1

mph

Space mean speed for all vehicles,

0.962

0.962

					Sł	IOI	RT RI	ΞPC	R'	T							·····	
General Inf	ormation						Si	te In	for	matic	n							
Analyst Agency or C Date Perfor Time Period	med	HN 10.	VM ITB /05 Peak			Intersection I-95 SB Ramp Tra Area Type All other Jurisdiction Analysis Year 2030 E								Trail ier a	il areas			
Volume an	d Timing In	put																
				EB	т=		<u> </u>	W		1 5=	 	N			 	SB		
Num. of Lan	00		LT O	TH 2	R 1		LT 1	TI		RT 0	LT O	T 0		RT 0	LT 1	TH 0	RT 1	
			-	T	ļ		· · · · · ·	-		-	-	+-		U		"		
Lane group	. \		ļ		F		L 267	T			-		_		L 170	_	R	
Volume (vph % Heavy ve				463 8	57 8		267 8	62 ⁴			-	+-	\dashv		470 8		289 8	
PHF	71 I		-	0.95	0.9		0.95	0.9			1	+	-		0.95		0.95	
Actuated (P/	A)			A	A		Α	A	Ξ			+-	_		A		A	
Startup lost	lime			2.0	2.6	0	2.0	2.0)						2.0		2.0	
Ext. eff. gree	en			2.0	2.0		2.0	2.0)						2.0		2.0	
Arrival type	 		ļ	3	3		3	3			ļ		-		3	ļ	3	
Unit Extension				3.0	3.0)	3.0	3.0)	ļ	ļ <u>,</u>		-		3.0	ļ	3.0	
Ped/Bike/RT Lane Width	OR Volume		0	12.0	0 12.	Λ	12.0	12.	_		0		\dashv		0 12.0	-	0 12.0	
	do/Dorkina	*****	N	0	12. N		12.U N	0		N	N		-	N	12.0 N	0	12.0 N	
Parking/Grad	Je/Parking		'^_	-			7.0	-		10	/ <u>'</u>	╂		14	- 'V	-	 '	
Parking/hr Bus stops/hr	•			0	0		0	0					+		10		10	
Unit Extension			3.0	3.0		3.0	3.0				-	\dashv		3.0		3.0		
	WB Only	EWP	 	03	٥, ۱	_	04	1 3.0		L 3 Only		06		T	07	<u> </u>	08	
Phasing	G = 10.0	G = 2		G =		1 _G				38.0				G :		 G =		
Timing	Y = 5	Y = 6		<u> </u>		Ϋ́Ξ			<u>~</u> Y =		Ÿ			Y=		ĬŸ≡	······································	
Duration of A	\nalysis (hrs) = 0.23	5								Су	cle Le	ngt	h C	= 90.0			
Lane Grou	ıp Capaci	ty, Co	ntro	l Delay	y, a	nd	LOS	De	ter	mina	tion		***************************************					
		·	EB				V					NB				SB		
Adj. flow rate	}		487	60	1	281	65	7	Τ				Τ		495		304	
Lane group o	: ар.		931	415	1	365	148	39	T			·····	T		706		631	
v/c ratio	······································		0.52	0.14	70	77	0.4	4	T				T		0.70		0.48	
Green ratio			0.28	0.28	o	,44	0.4	4	T			***************************************	T		0.42		0.42	
Unif. delay d	1		27.5	24.5	2	3.9	17.	3	T			***************************************	T		21.3		18.9	
Delay factor	k		0.13	0.11	0	.32	0.1	1							0.27		0.11	
Increm. dela	/ d2		0.5	0.2	-	9.7	0.2	2					Γ		3.1		0.6	
PF factor			1.000	1.000	1.	.000	1.0	00							1.000		1.000	
Control delay	ſ		28.0	24.6	3	3.6	17.	5					T		24.5		19.4	
Lane group L	.os		С	С		С	В	***************************************	Π						С		₿	
Apprch. dela	У	2	27.6				22.3								2	22.5		
Approach LC	S		С				С									С		
ntersec. dela	ау	23.7						Intersection LOS							С			

					SH	IOF	RT RI	ΕP	OR	T						 	
General Info	ormation									rmat	ior						
Analyst Agency or C Date Perforr Time Period	med	KN HN 10/ PM F	TB '05	Area Type All of Jurisdiction							All of	amps @ Pioneer Trail other areas 030 Build					
Volume an																	
				EB					VΒ	·			NB			SB	
			LT	TH	-	T	LT	+	Ή	RT		LT	TH	RT	LT	TH	RT
Num. of Lan	es		1	2		4	0	1		1		1	0	1	0	0	0
Lane group			L	T	<u> </u>			7		R		L		R			
Volume (vpf			215	718	<u> </u>			70		399		182		137		ļ	
% Heavy ve	eh		8	8	╀			3		8	-	8	 	8		 	
PHF Actuated (P/	/Λ\		0.95 A	0.95 A	 			0.9 A		0.95 A	<u>'</u>	0.95 A		0.95 A			-
Startup lost			2.0	2.0	 			2.		2.0	\dashv	2.0		2.0			
Ext. eff. gree			2.0	2.0	╅			2.		2.0		2.0	†	2.0			
Arrival type			3	3				3	}	3		3		3			
Unit Extensi	on		3.0	3.0				3.	0	3.0		3.0		3.0			
Ped/Bike/RT	OR Volume						0			0		0		0	0		
Lane Width			12.0	12.0				12	.0	12.0)	12.0		12.0			
Parking/Gra	de/Parking		Ν	0	٨	/	Ν		0	N		Ν	0	N	N		N
Parking/hr																	
Bus stops/hr	-		0	0				()	0		0		0			
Unit Extensi	on		3.0	3.0				3.	0	3.0		3.0		3.0			
Phasing	EW Perm	02		03			04		ž	B On	_		06	4	07)8
Timing	G = 53.0	G =		G =) =		£	= 25	.0	G =		G =		G =	
	Y = 6	Y =		Υ =		Y = Y = 6						Y =	- 1 000	Y =	00.0	Y =	
Duration of A				D I							4	************	e Lenç	yth C =	90.0		
Lane Gro	up Capaci	ty, Co			<u>/, a</u>	na			ete	rmir	1a1	tion	ND		-	0.0	
		<u> </u>	EB		4			VB			<u> </u>		NB			SB	
Adj. flow rate	3	226	756				746		42	0	19	92		144		<u> </u>	
Lane group	сар.	352	1973	3			1973	3	88	0	40	54		415			
v/c ratio		0.64	0.38	3			0.38	}	0.4	8	0.	41		0.35			
Green ratio		0.59	0.59				0.59)	0.5	9	0.	28		0.28			
Unif. delay d	1	12.2	9.8				9.8		10.	6	26	6.5		26.0			
Delay factor	k	0.22	0.11				0.11		0.1	1	0.	11		0.11			
Increm. dela	y d2	4.0	0.1				0.1		0.4	1	0.	6		0.5			
PF factor		1.000	1.00	0			1.00	0	1.0	00	1.0	000		1.000			
Control delay	1	16.2	9.9				9.9		11.	0	27	7.1		26.5			
Lane group l	₋OS	В	A		Τ		A		В		(С			
Apprch. dela	у] 1	1.4				10.3					26.	8				
Approach LC)S		В				В					С					
Intersec. dela	ау	1	3.0						Inte	rsect	ior	LOS				В	

44 to Pioneer Trail - 2030 Build

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational And	alysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer Tr	SK HNTB 08/2005 PM Peak I-95/Northbound SR 44 to Pionee 2030 Build ail Feasibility		
	Flow Inputs and	d Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE Heavy vehicle adjustment Driver population factor Flow rate, vp	, ER . fhv	2880 0.95 758 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1051	veh/h v % % mi pc/h/ln
	Speed Inputs and	d Adjustments	
Lane width Right-shoulder lateral conterchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fluteral clearance adjustment Interchange density adjustment Number of lanes adjustment Free-flow speed, FFS	_W nent, fLC ntment, fTD	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 3.0 70.0 Urban Freew	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	LOS and Performa		•
Flow rate, vp Free-flow speed, FFS Average passenger-car spe Number of lanes, N Density, D Level of service, LOS		1051 70.0 70.0 3 15.0 B	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: _____Diverge Analysis_____ Analyst: SK Agency/Co.: \mathtt{HNTB} Agency/Co.: HNTB
Date performed: 8/05
Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound SR 44 (Canal Street) Junction: Jurisdiction:
Analysis Year:

2030 Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Diverqe Number of lanes in freeway 70.0 2920 mph Free-flow speed on freeway Volume on freeway vph Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp mph 35.0 Volume on ramp 1150 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists) Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversion to pc/h Under Base Conditions Freeway Ramp Junction Components Adjacent Ramp 2920 1150 0.95 0.95 768 303 8 8 0 0 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v 8 0 Trucks and buses ક

Level Level
0.00 % 0.00 %
0.00 mi 0.00 mi

1.2

1.5

1.5

1.2

ફ

mi

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type: Grade

Length

Driver population factor, fP 1.00 1.00 Flow rate, vp 3197 1259 pcph ____Estimation of V12 Diverge Areas____ L = (Equation 25-8 or 25-9) ΕQ P = 0.622 Using Equation 5 FDV = V + (V - V) P = 2465 pc/h12 R F R FD ____Capacity Checks____ Actual Maximum LOS F? v = v3197 7200 No Fi F 2465 v 4400 No 12 v = v - v1938 7200 No FO F R v 1259 2000 No R Level of Service Determination (if not F)_____ Density, D = 4.252 + 0.0086 v - 0.009 L = 21.0 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence C Speed Estimation Intermediate speed variable, D = 0.541S Space mean speed in ramp influence area, S = 54.8mph R

0.962 0.962

S = 76.8

S = 58.7

0

πph

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Fax: Phone: E-mail: Merge Analysis Analyst: SK Agency/Co.: HNTB Date performed: 8/05 Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Northbound SR 44 (Canal Street) Junction: Jurisdiction:
Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study ____Freeway Data_____ Type of analysis Merqe Number of lanes in freeway mph 70.0 1770 Free-flow speed on freeway Volume on freeway vph On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-flow speed on ramp 1110 35.0 Volume on ramp vph 500 Length of first accel/decel lane ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp ft Conversion to pc/h Under Base Conditions_____ Freeway Ramp Adjacent Junction Components Ramp 1770 1110 0.95 0.95 466 292 8 8 Volume, V (vph) vph Peak-hour factor, PHF 0.95 466 Peak 15-min volume, v15 Trucks and buses 8 0 왕 Recreational vehicles 0 왕 Level Level Terrain type: % mi 1.5 ê Grade mi Length mi 1.5 Trucks and buses PCE, ET 1.2

Recreational vehicle PCE, ER

1.2

Heavy vehicle adjustment, fHV 0.962 0.962 Driver population factor, fP 1.00 1.00 Flow rate, vp 1938 1215 pcph Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.591 Using Equation 1 FMv = v (P) = 1146 pc/h12 F FM ____Capacity Checks_____ Maximum LOS F? Actual v 3153 7200 No FO 4600 2361 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.2 pc/mi/lnLevel of service for ramp-freeway junction areas of influence C Speed Estimation Intermediate speed variable, M = 0.327S Space mean speed in ramp influence area, S = 60.8mph R Space mean speed in outer lanes, S ≈ 68.9 mph 0

S = 62.7

mph

Space mean speed for all vehicles,

Phone: E-mail:		F	ax:				
	Dive	erge Ana	lysis	3			
Analyst:	KM						
Agency/Co.:	HNTB						
Date performed:	10/05						
Analysis time period:							
Freeway/Dir of Travel:		ınd					
Junction:	SR 44 (Canal						
Jurisdiction:	Dr. 44 (Callat	Street)					
Analysis Year:	2030 Build						
Description: Pioneer T		ty Stud	У				
	Fre	eway Dat	ta				
Type of analysis		7	Diver				
Number of lanes in free	wav		Diver 3	95			
Free-flow speed on free			3 70.0		1	2	
Volume on freeway	way				mpl		
volume on fleeway		4	2880		vpl	1	
	Off	Ramp Dat	ta		·····		
Side of freeway		F	Right				
Number of lanes in ramp		1	L				
Free-Flow speed on ramp		3	35.0		mpl	ı	
Volume on ramp		2	200		vph		
Length of first accel/de	ecel lane		500		ft	_	
Length of second accel/d	decel lane				£t		
	Adjacent Ram	p Data ((if o	ne exist	s)		
Does adjacent ramp exist	:?	N	Io				
Volume on adjacent ramp					vph		
Position of adjacent ram	qn					•	
Type of adjacent ramp	-						
Distance to adjacent ram	np				ft		
Conv	rersion to pc/l	n Under	Base	Conditi	ons		
Junction Components		Freewa	У	Ramp		Adjacent Ramp	: .
Volume, V (vph)		2880		200			vph
eak-hour factor, PHF		0.95		0.95			
eak 15-min volume, v15		758		53			v
Trucks and buses		8		8			ે
Recreational vehicles		0		0			96
'errain type:		Level		Level			Ų
Grade		0.00	%	0.00	%		%
Length		0.00	mi	0.00	mi		∾ mi
rucks and buses PCE, ET		1.5	111.1	1.5	III.		III I
Recreational vehicle PCE		1.2		1.2			
	,	- · ·		1.2			

```
Driver population factor, fP
                                  1,00
                                             1.00
Flow rate, vp
                                  3153
                                             219
                                                                pcph
               Estimation of V12 Diverge Areas
                L =
                             (Equation 25-8 or 25-9)
                ΕQ
                P ==
                      0.671 Using Equation 5
                FD
                v = v + (v - v) P = 2188 pc/h
                12 R F R FD
                     Capacity Checks
                                                 LOS F?
                       Actual
                                    Maximum
                       3153
                                    7200
                                                  No
     Fi
                       2188
                                    4400
                                                  No
     12
    v = v - v
                       2934
                                    7200
                                                  No
     FO F R
                       219
    v
                                    2000
                                                  No
     R
        Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 18.6 pc/mi/ln
Density,
                                     12
Level of service for ramp-freeway junction areas of influence B
                  _Speed Estimation____
Intermediate speed variable,
                                       D = 0.448
                                        S
Space mean speed in ramp influence area,
                                       S = 57.5
                                                  mph
                                       R
Space mean speed in outer lanes,
                                       S = 76.8
                                                  mph
                                       0
Space mean speed for all vehicles,
```

S = 62.3

mph

0.962

0.962

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: _____Diverge Analysis_____ Analyst: KM Agency/Co.: HNTBAgency/Co.: HNTB
Date performed: 10/05
Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound Junction: SR 44 (Canal Street) Loop Jurisdiction: Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway mph 70.0 2680 Free-flow speed on freeway Volume on freeway vph Off Ramp Data Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 35.0 mph Volume on ramp 910 vph Length of first accel/decel lane 500 ft Length of second accel/decel lane ft _____Adjacent Ramp Data (if one exists)____ Does adjacent ramp exist? ÑΟ Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft _____Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 910 0.95 239 8 Volume, V (vph) 2680 vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 705 ν Trucks and buses 용 Recreational vehicles 0 왐 Level Level 0.00 % Terrain type:

0.00 mi 0.00 mi

1.5

1.2

1.5

1.2

mi

Grade Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Driver population factor, fP
                                  1.00
                                             1.00
                                             996
                                                                 pcph
                                  2934
Flow rate, vp
              Estimation of V12 Diverge Areas____
                             (Equation 25-8 or 25-9)
                ΕQ
                     0.641 Using Equation 5
                _{
m FD}
                v = v + (v - v) P = 2238  pc/h
                12 R F R FD
                     ____Capacity Checks_____
                                                 LOS F?
                       Actual
                                    Maximum
                                    7200
                                                  No
                        2934
    v = v
     Fi
                       2238
                                    4400
                                                  No
     12
                                    7200
                                                  No
                       1938
    v = v - v
     FO F R
                        996
                                    2000
                                                  No
    V
     R
         Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 19.0 pc/mi/ln
Density,
                                      12
Level of service for ramp-freeway junction areas of influence B
                  Speed Estimation____
                                       D = 0.518
Intermediate speed variable,
                                       S
Space mean speed in ramp influence area,
                                      S ≈ 55.5
                                                   mph
                                        R
                                       S = 76.8
                                                   mph
Space mean speed in outer lanes,
                                        0
Space mean speed for all vehicles,
                                      S = 59.4
                                                   mph
```

0.962

0.962

Heavy vehicle adjustment, fHV

Fax: Phone: E-mail: Merge Analysis_____ SK Analyst: Agency/Co.: HNTB Date performed: 8/05 Analysis time period: PM Peak Freeway/Dir of Travel: I-95 Southbound SR 44 (Canal Street) Junction: Jurisdiction: Analysis Year: 2030 Build Description: Pioneer Trail Feasibility Study Freeway Data_____ Type of analysis Merge Number of lanes in freeway 70.0 mph Free-flow speed on freeway 1770 vph Volume on freeway On Ramp Data_____ Right Side of freeway Number of lanes in ramp 35.0 mph Free-flow speed on ramp 1150 Volume on ramp vph Length of first accel/decel lane 228 ft ft Length of second accel/decel lane Adjacent Ramp Data (if one exists)_____ No Does adjacent ramp exist? vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions_____ Adjacent Freeway Ramp Junction Components Ramp 1150 0.95 303 1770 vph Volume, V (vph) 0.95 466 Peak-hour factor, PHF Peak 15-min volume, v15 v 8 0 Trucks and buses 8 O Level Level 0 Recreational vehicles Terrain type: 왕 Grade ₹ mi mi mi Length Trucks and buses PCE, ET 1.5 1.5

1.2

1.2

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 0.962 0.962 1.00 1.00 Flow rate, vp 1938 1259 pcph Estimation of V12 Merge Areas L == (Equation 25-2 or 25-3) ΕQ 0.584 Using Equation 1 Ρ FMv = v (P) = 1132 pc/h12 F FM Capacity Checks Actual Maximum LOS F? v 3197 7200 Νо FΟ 4600 2391 v No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.1 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence C ____Speed Estimation Intermediate speed variable, M = 0.348S Space mean speed in ramp influence area, S = 60.3mph R Space mean speed in outer lanes, S = 68.9mph

Space mean speed for all vehicles,

0

S = 62.2

mph

			0:4- 1	- £	1 ²						
General Informatio					<u>nation</u>	Tom 11	Top // O / OF OD D				
Analyst	KM		Interse			SR 44 @ I-95 SB Ramp.					
Agency/Co.	HNTB		Jurisd	iction sis Yea		2030 Bu	ild				
Date Performed	10/2005 PM Peak		Allaly	515 T C	4 1	2030 00	na				
Analysis Time Period											
Project Description <i>P</i> East/West Street: <i>SR</i> 4	ioneer i raii Fe	asibility Study	North/South Street: I-95 SB Ramps								
East/vest Street. SR 2 Intersection Orientation:	1	31)		North/South Street: 1-95 SB Ramps Study Period (hrs): 0.25							
			Otday	renou	(1113). 0.20						
Vehicle Volumes a	nd Adjustm					Montho	rm ol				
Major Street		Eastbound	T 3		A	Westbo	una T	6			
Movement	1	2 T	R		<u>4</u> I	T		R			
Jaluma Jush/h)	0	1754	1 0		338	1589		0			
Volume (veh/h) Peak-hour factor, PHF	0.95	0.95	0.95		0.95	0.95		0.95			
Hourly Flow Rate											
veh/h)	0	1846			355	1672		0			
Proportion of heavy	0			I	8						
vehicles, P _{HV}			1	Raised							
Median type	<u> </u>			<u> </u>	^						
RT Channelized?	 		0			<u> </u>		0			
anes	0	2 T	0		1	2 T		U			
Configuration					<u> </u>	<i>T</i>					
Jpstream Signal		0	1								
Minor Street		Northbound	9			Southbo	und				
Movement	7	7 8			10	11		12			
	L				L	Т		R			
/olume (veh/h)	0	0	0		0	0		200			
Peak-hour factor, PHF	0.95	0.95	0.95		0.95	0.95		0.95			
Hourly Flow Rate veh/h)	0	0	0		0	0		210			
Proportion of heavy	0	0	0	ĺ	0	0		8			
vehicles, P _{HV}	Ĭ ,					Ů					
Percent grade (%)		0				0					
Flared approach		N				N					
Storage		0				0					
RT Channelized?			0					0			
anes	0	1 0	1 		0	0		1			
Configuration		1	1		-			R			
	Longth Lauci	of Service									
Control Delay, Queue	EB	or Service WB	h.	lorthb	ound	0	outhbour				
Approach				8	9	10	11	12			
Movement	1	4	7	Ö	3	10	11				
ane Configuration		<u>L</u>						R			
/olume, v (vph)		355						210			
Capacity, c _m (vph)		301			ŀ			298			
//c ratio		1.18						0.70			
Queue length (95%)		15.40						4.94			
		146.6						41.4			
Control Delay (s/veh)								E			
_OS		F			L			1			
Approach delay (s/veh)	decide.						41.4				

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HCS2000TM

					(SH	OF	RT RE	P	DR'	Ť								
General Inf	ormation							Si	te li	ıfoı	rma	tio	1						
Analyst Agency or C Date Perfori Time Period	med	HN 10/2	KNM HNTB 10/2005 PM Peak					Intersection SR 44 @ I-95 NB Ramps Area Type All other areas Jurisdiction Analysis Year 2030 Build											
Volume an	d Timing In	out			post proj		T WB NB SB												
			LT	_	EB TH	R	Ŧ	LT	V T		ΙR		LŤ	NB TH	Т	RT	LT	TH	RT
Num, of Lar	ies		1	+	2	0	-	0	2	-	0		1	0	十	1	0	0	0
			L	-	T				7	-	I		L		┪	R			
Lane group	. \		87	+	, 2577	<u> </u>			12		╂		657			193			<u></u>
Volume (vpl			8	ď	237 <i>1</i> 8				8		 		8			8			
% Heavy ve	#11	-	0.95	+	0.95				0.9		1		0.95			.95			
Actuated (P	/A)		A	†	Α	┢──			Α		1		Α			Α			
Startup lost			2.0	1	2.0				2.	0			2.0			2.0			
Ext. eff. gree			2.0	I	2.0				2.				2.0			2.0			
Arrival type			3		3				3				3			3			
Unit Extensi	on		3.0		3.0				3.	0			3.0		E	3.0			
Ped/Bike/R	TOR Volume							0			<u> </u>		0			0	0		
Lane Width			12.0		12.0				12	.0			12.0		<u> </u>	2.0			
Parking/Gra	de/Parking		N		0	Ν	!	N)		I	N	0	┸	N	N		N
Parking/hr									<u> </u>		<u> </u>								
Bus stops/h	r		0		0				()			0		┸	0			
Unit Extens	on		3.0		3.0				3.	annomini de			3.0		L	3.0			
Phasing	EB Only	EW P	erm		03			04			ВО			06		0	7		8(
Timing	G = 5.2	G= 8			} =		G				= 4	0.3				G =		G = Y =	
	Y = 5	Y = 6		Y	_		Υ	=		Υ:	= 6		Y =	a Lan		Y =	150.0		
	Analysis (hrs			Ļ						. 4 -	I			e ren	yuı	<u> </u>	130.0		
Lane Gro	up Capac	ity, Co			Delay	<u>, a</u>	na	LUS	De	ere	rmi	na	tion	ND				SB	
			E			_			VB	T		-	92	NB	E-	19		3B 	T
Adj. flow rat	е	92	27			4		133		-		-		, ,					
Lane group	сар.	184	19	54		_		195		<u> </u>		-	49			13		<u> </u>	
v/c ratio		0.50	1.3	39		_		0.6	8			 	54		ļ	01			
Green ratio		0.65	0.5	8				0.5	8			-	27		┡	34			
Unif. delay	1	16.8	31	.3				21.	7			54	4.9		49	3.3			
Delay factor	k	0.11	0.5	50				0.2	5			0.	50		0.	50			
Increm. dela	ay d2	2.1	178	3. ()			1.0)			25	4.5		42	2.7			
PF factor		1.000	1.0	00)			1.00	00			1.0	000		1.0	000			
Control dela	ıy	18.9	209	9.:	3	T		22.	7			30	9.3		91	.9			
Lane group	LOS	В	F	:		T		С					F		F	=			
Apprch. dela	ay	2	203.0			1		22.7	,			Ī	216	.2					
Approach L			F			1		С				Ι	F						
Intersec. de	···	1	61.0			1				Inte	erse	ctio	n LOS					F	
regressoo TM					right © 20		1	mitu of E	Landde		Diah	to Do	ogn red			·······		Ve	rsion 4.1e

	TWO		0:4-									
General Information					nation							
Analyst	KM			ection		SR 44 @	SR 44 @ Sugar Mill Roa					
Agency/Co.	HNTB			liction	~~	2030 Bu	ild					
Date Performed	10/2005		— Anaiy	sis Yea	3[2030 60	IIQ					
Analysis Time Period	PM Peal											
		easibility Study	N. La artin /	NI-dh Couth Cheat Come Mill Dood								
ast/West Street: SR				North/South Street: Sugar Mill Road Study Period (hrs): 0.25								
ntersection Orientation			Joludy	Study Period (hrs): 0.25								
Vehicle Volumes a	ı <u>nd Adjustı</u>	<u>ments</u>				Westbo						
Vlajor Street		Eastbound	1			vvestbo	unu	6				
Movement	11	2 T	3 R		<u>4</u> L	T		R				
7 L 11 N	172	2898	$\frac{1}{o}$		0	1993		106				
/olume (veh/h)	0.95	0.95	0.95		0.95	0.95		0.95				
Peak-hour factor, PHF Hourly Flow Rate				,								
veh/ĥ)	181	3050	0		0	2097		111				
Proportion of heavy rehicles, P _{HV}	8		_		0		<u> </u>	***				
Median type				Raisec	d curb							
RT Channelized?			0					0				
anes	1	2	0		0	2		1				
Configuration	L	τ				T		R				
Jpstream Signal		0				0						
Ainor Street		Northbound Southbound										
/lovement	7				10	11		12				
	L	Т	R		L	Т		R				
/olume (veh/h)	0	0	0		75	0		60				
Peak-hour factor, PHF	0.95	0.95	0.95	5	0.95	0.95		0.95				
lourly Flow Rate veh/h)	О	0	0		<i>7</i> 8	0		63				
Proportion of heavy rehicles, P _{HV}	О	О	О		8	0		8				
Percent grade (%)		0				0						
Flared approach		l N				N						
Storage		0				0						
RT Channelized?			0					0				
	0	0	0		0	0		0				
anes			1 -		<u> </u>	LR						
Configuration	1 1	1 -68				1 4/1	L					
Control Delay, Queue				Northb	വാർ		outhboun					
Approach	EB	WB	7	8	ound 9	10	11	12				
Movement	1	4	/	<u>_</u>	Э	10		14				
ane Configuration	<u>L</u>			ļ			LR	-				
/olume, v (vph)	181						141	 				
Capacity, c _m (vph)	215						0					
r/c ratio	0.84											
Queue length (95%)	6.38											
Control Delay (s/veh)	73.4											
.OS	F						F					
Approach delay		w		1			<u> </u>	. 				
s/veh)						1						

Approach LOS -- --

 $HCS2000^{\mathrm{TM}}$

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Version 4.1d

44 to 442 - 2030 Build

HCS2000: Basic Freeway Segments Release 4.1d

Phone: E-mail:		Fax:	
	Operational Analy	sis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Pioneer T	I-95/Northbound South of SR 44 2030 Build	udy	
***************************************	Flow Inputs and Ad	djustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, E Recreational vehicle PC Heavy vehicle adjustmen Driver population facto Flow rate, vp	E, ER t, fHV	2920 0.95 768 8 0 Level 0.00 0.00 1.5 1.2 0.962 1.00 1066	veh/h v % % mi pc/h/ln
4444	Speed Inputs and A	djustments	
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density adjustment Free-flow speed, FFS	fLW tment, fLC ustment, fID	12.0 6.0 0.50 3 Measured 70.0 0.0 0.0 0.0 3.0 70.0	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
		Urban Freeway	
	LOS and Performanc	e Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car sp Number of lanes, N Density, D Level of service, LOS	peed, S	1066 70.0 70.0 3 15.2	pc/h/ln mi/h mi/h pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.