Apéndice 4. Cómputos para el análisis operacional

HCS+: Two-Lane Highways Release 5.2

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Two-Way Two-Lane Highway Segment Analysis

Analyst	José L. Pérez Berenguer
Agency/Co.	Pérez Berenguer y Asociados
Date Performed	11/9/2005
Analysis Time Period	7:00 - 8:00 AM
Highway	Camino Cuba
From/To	PR-2 a PR-108
Jurisdiction	Mayagüez
Analysis Year	2005
Description	Estudio de Impacto en el Tránsito Colinas de la Fuente

Input Data

Highway class	Class 2				
Shoulder width	0.0	m	Peak-hour factor, PHF	0.85	
Lane width	3.7	m	% Trucks and buses	0	%
Segment length	2.0	km	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	0	%
Grade: Length		km	Access points/km	2	/km
Up/down		%			

Two-way hourly volume, V	722	veh/h	
Directional split	50 / 50	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.9	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	1.000	
Two-way flow rate,(note-1) vp	913	pc/h
Highest directional split proportion (note-2)	457	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	km/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	70.0	km/h
Adj. for lane and shoulder width, fLS	6.8	km/h
Adj. for access points, fA	1.3	km/h
Free-flow speed, FFS	61.9	km/h
Adjustment for no-passing zones, fnp	0.0	km/h
Average travel speed, ATS	50.5	km/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	904	pc/h
Highest directional split proportion (note-2)	452	
Base percent time-spent-following, BPTSF	54.8	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	54.8	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.29	
Peak 15-min vehicle-kilometers of travel, VkmT15	425	veh-km
Peak-hour vehicle-kilometers of travel, VkmT60	1444	veh-km
Peak 15-min total travel time, TT15	8.4	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	PR-2 y Avenida Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	6:45 - 7:45 AM	Analysis Year	2005

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes				2		1		2	1	1	2	
Lane Group				L		R		T	R	L	T	
Volume (vph)				344		130		936	300	125	2132	
% Heavy Vehicles				1		0		1	1	0	3	
PHF				0.89		0.72		0.85	0.69	0.76	0.90	
Pretimed/Actuated (P/A)				A		A		A	A	A	A	
Startup Lost Time				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of Effective Green				2.0		2.0		2.0	2.0	2.0	2.0	
Arrival Type				3		3		3	3	3	4	
Unit Extension				3.0		3.0		3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume				0	0	130	0	0	300	0	0	
Lane Width				3.6		3.6		3.7	3.7	3.7	3.7	
Parking/Grade/Parking				N	3	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour				0		0		0	0	0	0	
Minimum Pedestrian Time					3.2			3.2			3.2	

Phasing	WB Only	02	03	04	SB Only	Thru & RT	07	08
Timing	G = 11.5	G =	G =	G =	G = 8.0	G = 57.0	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 4	Y = 4	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 88.5		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate				387		0		1101	0	164	2369	
Lane Group Capacity				444		207		2333	1041	165	2287	
v/c Ratio				0.87		0.00		0.47	0.00	0.99	1.04	
Green Ratio				0.13		0.13		0.64	0.64	0.09	0.64	
Uniform Delay d_1				37.8		33.5		8.1	5.6	40.2	15.7	
Delay Factor k				0.40		0.11		0.11	0.11	0.50	0.50	
Incremental Delay d_2				17.0		0.0		0.2	0.0	19.5	18.0	
PF Factor				1.000		1.000		1.000	1.000	1.000	0.456	
Control Delay				54.8		33.5		8.2	5.6	59.8	25.2	
Lane Group LOS				D		C		A	A	E	C	
Approach Delay				54.8			8.2			27.4		
Approach LOS				D			A			C		
Intersection Delay	24.8			Intersection LOS						C		

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Two-Way Two-Lane Highway Segment Analysis

Analyst	José L. Pérez Berenguer
Agency/Co.	Pérez Berenguer y Asociados
Date Performed	11/9/2005
Analysis Time Period	1:45 - 2:45 PM
Highway	Camino Cuba
From/To	PR-2 a PR-108
Jurisdiction	Mayagüez
Analysis Year	2005
Description	Estudio de Impacto en el Tránsito Colinas de la Fuente

Input Data

Highway class	Class 2				
Shoulder width	0.0	m	Peak-hour factor, PHF	0.79	
Lane width	3.7	m	% Trucks and buses	1	%
Segment length	2.0	km	% Recreational vehicles	0	%
Terrain type	Rolling		% No-passing zones	0	%
Grade: Length		km	Access points/km	2	/km
Up/down		%			

Two-way hourly volume, V	597	veh/h	
Directional split	62 / 38	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.9	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.991	
Two-way flow rate,(note-1) vp	820	pc/h
Highest directional split proportion (note-2)	508	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	km/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	70.0	km/h
Adj. for lane and shoulder width, fLS	6.8	km/h
Adj. for access points, fA	1.3	km/h
Free-flow speed, FFS	61.9	km/h
Adjustment for no-passing zones, fnp	0.0	km/h
Average travel speed, ATS	51.6	km/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.995	
Two-way flow rate,(note-1) vp	808	pc/h
Highest directional split proportion (note-2)	501	
Base percent time-spent-following, BPTSF	50.8	%
Adj.for directional distribution and no-passing zones, fd/np	0.0	
Percent time-spent-following, PTSF	50.8	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.26	
Peak 15-min vehicle-kilometers of travel, VkmT15	378	veh-km
Peak-hour vehicle-kilometers of travel, VkmT60	1194	veh-km
Peak 15-min total travel time, TT15	7.3	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	PR-2 y Avenida Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	4:15 - 5:15 PM	Analysis Year	2005

Volume and Timing Input

	EB			WB			NB			SB		
Lane Group	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes				2		1		2	1	1	2	
Volume (vph)				226		123		1822	228	153	1488	
% Heavy Vehicles				1		0		1	0	0	2	
PHF				0.74		0.90		0.87	0.86	0.72	0.95	
Pretimed/Actuated (P/A)				A		A		A	A	A	A	
Startup Lost Time				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of Effective Green				2.0		2.0		2.0	2.0	2.0	2.0	
Arrival Type				3		3		3	3	3	4	
Unit Extension				3.0		3.0		3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume				0	0	123	0	0	228	0	0	
Lane Width				3.6		3.6		3.7	3.7	3.7	3.7	
Parking/Grade/Parking				N	3	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour				0		0		0	0	0	0	
Minimum Pedestrian Time					3.2			3.2			3.2	

Phasing	WB Only	02	03	04	SB Only	Thru & RT	07	08
Timing	G = 9.0	G =	G =	G =	G = 10.0	G = 53.0	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 4	Y = 4	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 84.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate				305		0		2094	0	212	1566	
Lane Group Capacity				366		170		2285	1030	217	2263	
v/c Ratio				0.83		0.00		0.92	0.00	0.98	0.69	
Green Ratio				0.11		0.11		0.63	0.63	0.12	0.63	
Uniform Delay d_1				36.8		33.5		13.6	5.7	36.9	10.2	
Delay Factor k				0.37		0.11		0.43	0.11	0.48	0.26	
Incremental Delay d_2				15.1		0.0		6.4	0.0	13.3	0.1	
PF Factor				1.000		1.000		1.000	1.000	1.000	0.495	
Control Delay				51.9		33.5		20.0	5.7	50.2	5.1	
Lane Group LOS				D		C		B	A	D	A	
Approach Delay				51.9			20.0			10.5		
Approach LOS				D			B			B		
Intersection Delay	18.3			Intersection LOS						B		

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HCS+: MUTCD Signal Warrants Release 5.2

Analyst: José L. Pérez Berenguer
Agency: Pérez Berenguer y Asociados
Date: 11/9/2005
Project ID: Colinas de la Fuente
EW Street: Camino Cuba

Intersection: Camino Cuba y Acceso a Urb.
Jurisdiction: Mayagüez
Units: U.S. Metric
Analysis Year: 2008
NS Street: Acceso a Colinas de la Fuente

General Information

Major St. Speed (kph): 70
Nearest Signal (m): 1200
Crashes per Yr: 0

Population: Not less than 10000
Coordinated Signal System: N

School Crossing

Students in Highest Hour: 0
Adequate Gaps in Period: 0
Minutes in Period: 0

Roadway Network

Two Major Routes: 0
Weekend Count: 0
5-yr Growth Factor: 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	0	0	1	0	1
LaneUsage		LT			TR					L		R

Results

Warrant 1: Eight-Hour Vehicular Volume [ ]
1 A. Minimum Vehicular Volumes [ ]
1 B. Interruption of Continuous Traffic [ ]
1 80% Vehicular --and-- Interruption Volumes [ ]

Warrant 2: Four-Hour Vehicular Volume
2 A. Four-Hour Vehicular Volumes [ ]

Warrant 3: Peak Hour [ ]
3 A. Peak-Hour Conditions [ ]
3 B. Peak-Hour Vehicular Volume Hours Met [ ]

Warrant 4: Pedestrian Volume [ ]
4 A. Pedestrian Volumes [ ]
4 B. Gaps Same Period [ ]

Warrant 5: School Crossing [ ]
5 A. Student Volumes [ ]
5 B. Gaps Same Period [ ]

Warrant 6: Coordinated Signal System
6 Degree of Platooning [ ]

Warrant 7: Crash Experience [ ]
7 A. Adequate trials of alternatives [ ]
7 B. Reported crashes [ ]
7 80% Volumes for Warrants 1A, 1B --or-- 4 [ ]

Warrant 8: Roadway Network [ ]
8 A. Weekday Volume [ ]
8 B. Weekend Volume [ ]

Summary

Hours	Major Volume	Minor Volume	Total Volume	Delay (Veh-hr)	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 100%
07-08	746	240	986	0.0	Yes	Yes	No	Yes	Yes	No	No
08-09	0	0	0	0.0	No	No	No	No	No	No	No
09-10	0	0	0	0.0	No	No	No	No	No	No	No
10-11	0	0	0	0.0	No	No	No	No	No	No	No
11-12	0	0	0	0.0	No	No	No	No	No	No	No
12-13	0	0	0	0.0	No	No	No	No	No	No	No
13-14	0	0	0	0.0	No	No	No	No	No	No	No
14-15	0	0	0	0.0	No	No	No	No	No	No	No
15-16	0	0	0	0.0	No	No	No	No	No	No	No
16-17	585	153	738	0.0	No	No	No	No	No	No	No
17-18	0	0	0	0.0	No	No	No	No	No	No	No
18-19	0	0	0	0.0	No	No	No	No	No	No	No
Total	1331	393	1724		1	1	0	1	1	0	0

Traffic Volumes (vph)

Eastbound			Westbound			Northbound			Southbound		
L	T	R	L	T	R	L	T	R	L	T	R
49	378	0	0	283	36	0	0	0	137	0	103
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
105	131	0	0	194	155	0	0	0	62	0	91
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian Volumes and Gaps (Per Hour)

Volume	Gap	Volume	Gap	Volume	Gap	Volume	Gap
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

!

Delay	sec/veh	veh-hrs	sec/veh	veh-hrs	sec/veh	veh-hrs	sec/veh	veh-hrs
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*José L. Pérez Berenguer*
Agency/Co.	*Pérez Berenguer y Asoc.*
Date Performed	*11/9/2005*
Analysis Time Period	*6:45 - 7:45 AM*

Site Information

Intersection	*Camino Cuba/Acceso Urb*
Jurisdiction	*Mayagüez*
Analysis Year	*2008*

Project Description *Estudio de Impacto en el Tránsito Colinas de la Fuente*

East/West Street: *Camino Cuba*	North/South Street: *Acceso a Colinas de la Fuente*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*49*	*378*			*283*	*36*
Peak-Hour Factor, PHF	*0.69*	*0.69*	*1.00*	*1.00*	*0.72*	*0.72*
Hourly Flow Rate, HFR (veh/h)	*71*	*547*	*0*	*0*	*393*	*49*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*137*		*103*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.69*	*1.00*	*0.72*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*198*	*0*	*143*

Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*71*					*198*		*143*
C (m) (veh/h)	*1129*					*398*		*639*
v/c	*0.06*					*0.50*		*0.22*
95% queue length	*0.20*					*2.68*		*0.85*
Control Delay (s/veh)	*8.4*					*22.7*		*12.3*
LOS	*A*					*C*		*B*
Approach Delay (s/veh)	--	--				*18.3*		
Approach LOS	--	--				*C*		

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SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	PR-2 y Avenida Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	6:45 - 7:45 AM	Analysis Year	2008

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes				2		1		2	1	1	2	
Lane Group				L		R		T	R	L	T	
Volume (vph)				439		168		996	354	147	2269	
% Heavy Vehicles				1		0		1	1	0	3	
PHF				0.89		0.72		0.85	0.69	0.76	0.90	
Pretimed/Actuated (P/A)				A		A		A	A	A	A	
Startup Lost Time				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of Effective Green				2.0		2.0		2.0	2.0	2.0	2.0	
Arrival Type				3		3		3	3	3	4	
Unit Extension				3.0		3.0		3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume				0	0	168	0	0	354	0	0	
Lane Width				3.6		3.6		3.7	3.7	3.7	3.7	
Parking/Grade/Parking				N	3	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour				0		0		0	0	0	0	
Minimum Pedestrian Time					3.2			3.2			3.2	

Phasing	WB Only	02	03	04	SB Only	Thru & RT	07	08
Timing	G = 19.6	G =	G =	G =	G = 13.4	G = 83.0	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 4	Y = 4	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 128.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate				493		0		1172	0	193	2521	
Lane Group Capacity				524		244		2349	1049	191	2303	
v/c Ratio				0.94		0.00		0.50	0.00	1.01	1.09	
Green Ratio				0.15		0.15		0.65	0.65	0.10	0.65	
Uniform Delay d_1				53.6		45.9		11.7	7.9	57.3	22.5	
Delay Factor k				0.45		0.11		0.11	0.11	0.50	0.50	
Incremental Delay d_2				25.4		0.0		0.2	0.0	22.1	43.4	
PF Factor				1.000		1.000		1.000	1.000	1.000	0.443	
Control Delay				79.0		45.9		11.9	7.9	79.4	53.4	
Lane Group LOS				E		D		B	A	E	D	
Approach Delay				79.0			11.9			55.2		
Approach LOS				E			B			E		
Intersection Delay	46.3			Intersection LOS						D		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*José L. Pérez Berenguer*
Agency/Co.	*Pérez Berenguer y Asoc.*
Date Performed	*11/9/2005*
Analysis Time Period	*6:45 - 7:45 AM*

Site Information

Intersection	*Camino Cuba/Acceso Urb*
Jurisdiction	*Mayagüez*
Analysis Year	*2008*

Project Description *Estudio de Impacto en el Tránsito Colinas de la Fuente*

East/West Street: *Camino Cuba*	North/South Street: *Acceso a Colinas de la Fuente*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*105*	*131*			*194*	*155*
Peak-Hour Factor, PHF	*0.60*	*0.60*	*1.00*	*1.00*	*0.83*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*174*	*218*	*0*	*0*	*233*	*186*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*62*		*91*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.60*	*1.00*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*103*	*0*	*109*

Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*174*					*103*		*109*
C (m) (veh/h)	*1151*					*426*		*720*
v/c	*0.15*					*0.24*		*0.15*
95% queue length	*0.53*					*0.94*		*0.53*
Control Delay (s/veh)	*8.7*					*16.1*		*10.9*
LOS	*A*					*C*		*B*
Approach Delay (s/veh)	--	--				*13.4*		
Approach LOS	--	--				*B*		

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SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	PR-2 y Avenida Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	4:15 - 5:15 PM	Analysis Year	2008

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes				2		1		2	1	1	2	
Lane Group				L		R		T	R	L	T	
Volume (vph)				300		163		1939	306	205	1584	
% Heavy Vehicles				1		0		1	0	0	2	
PHF				0.74		0.90		0.87	0.86	0.72	0.95	
Pretimed/Actuated (P/A)				A		A		A	A	A	A	
Startup Lost Time				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of Effective Green				2.0		2.0		2.0	2.0	2.0	2.0	
Arrival Type				3		3		3	3	3	4	
Unit Extension				3.0		3.0		3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume				0	0	163	0	0	306	0	0	
Lane Width				3.6		3.6		3.7	3.7	3.7	3.7	
Parking/Grade/Parking				N	3	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour				0		0		0	0	0	0	
Minimum Pedestrian Time					3.2			3.2			3.2	

Phasing	WB Only	02	03	04	SB Only	Thru & RT	07	08
Timing	G = 17.0	G =	G =	G =	G = 19.0	G = 70.0	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 4	Y = 4	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 118.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate				405		0		2229	0	285	1667	
Lane Group Capacity				493		229		2149	969	294	2127	
v/c Ratio				0.82		0.00		1.04	0.00	0.97	0.78	
Green Ratio				0.14		0.14		0.59	0.59	0.16	0.59	
Uniform Delay d_1				49.0		43.2		24.0	9.8	49.2	18.2	
Delay Factor k				0.36		0.11		0.50	0.11	0.48	0.33	
Incremental Delay d_2				10.7		0.0		29.8	0.0	9.7	0.2	
PF Factor				1.000		1.000		1.000	1.000	1.000	0.591	
Control Delay				59.7		43.2		53.8	9.8	58.9	11.0	
Lane Group LOS				E		D		D	A	E	B	
Approach Delay				59.7			53.8			18.0		
Approach LOS				E			D			B		
Intersection Delay	39.1			Intersection LOS						D		

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HCS+: MUTCD Signal Warrants Release 5.2

Analyst: José L. Pérez Berenguer
Agency: Pérez Berenguer y Asociados
Date: 11/9/2005
Project ID: Colinas de la Fuente
EW Street: Camino Cuba

Intersection: Norte y Ave. Algarrobo
Jurisdiction: Mayagüez
Units: U.S. Metric
Analysis Year: 2028
NS Street: Avenida Algarrobo

General Information

Major St. Speed (kph): 70
Nearest Signal (m): 1200
Crashes per Yr: 0

Population: Not less than 10000
Coordinated Signal System: N

School Crossing

Students in Highest Hour: 0
Adequate Gaps in Period: 0
Minutes in Period: 0

Roadway Network

Two Major Routes: 0
Weekend Count: 0
5-yr Growth Factor: 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	2	0	0	2	0	0	2	0
LaneUsage		LTR			LTR			LTR			LTR	

Results

Warrant 1: Eight-Hour Vehicular Volume [ ]
1 A. Minimum Vehicular Volumes [ ]
1 B. Interruption of Continuous Traffic [ ]
1 80% Vehicular --and-- Interruption Volumes [ ]

Warrant 2: Four-Hour Vehicular Volume
2 A. Four-Hour Vehicular Volumes [ ]

Warrant 3: Peak Hour [ ]
3 A. Peak-Hour Conditions [ ]
3 B. Peak-Hour Vehicular Volume Hours Met [ ]

Warrant 4: Pedestrian Volume [ ]
4 A. Pedestrian Volumes [ ]
4 B. Gaps Same Period [ ]

Warrant 5: School Crossing [ ]
5 A. Student Volumes [ ]
5 B. Gaps Same Period [ ]

Warrant 6: Coordinated Signal System
6 Degree of Platooning [ ]

Warrant 7: Crash Experience [ ]
7 A. Adequate trials of alternatives [ ]
7 B. Reported crashes [ ]
7 80% Volumes for Warrants 1A, 1B --or-- 4 [ ]

Warrant 8: Roadway Network [ ]
8 A. Weekday Volume [ ]
8 B. Weekend Volume [ ]

Summary

Hours	Major Volume	Minor Volume	Total Volume	Delay (Veh-hr)	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 100%
07-08	632	476	1495	0.0	Yes	Yes	No	No	Yes	No	No
08-09	0	0	0	0.0	No	No	No	No	No	No	No
09-10	0	0	0	0.0	No	No	No	No	No	No	No
10-11	0	0	0	0.0	No	No	No	No	No	No	No
11-12	0	0	0	0.0	No	No	No	No	No	No	No
12-13	0	0	0	0.0	No	No	No	No	No	No	No
13-14	0	0	0	0.0	No	No	No	No	No	No	No
14-15	0	0	0	0.0	No	No	No	No	No	No	No
15-16	0	0	0	0.0	No	No	No	No	No	No	No
16-17	583	365	1118	0.0	No	Yes	No	No	No	No	No
17-18	0	0	0	0.0	No	No	No	No	No	No	No
18-19	0	0	0	0.0	No	No	No	No	No	No	No
Total	1215	841	2613		1	2	0	0	1	0	0

Traffic Volumes (vph)

Eastbound			Westbound			Northbound			Southbound		
L	T	R	L	T	R	L	T	R	L	T	R
61	264	62	76	353	47	74	21	173	127	129	108
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
64	38	68	192	102	71	36	259	56	50	123	59
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian Volumes and Gaps (Per Hour)

Volume	Gap	Volume	Gap	Volume	Gap	Volume	Gap
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

!

Delay	sec/veh	veh-hrs	sec/veh	veh-hrs	sec/veh	veh-hrs	sec/veh	veh-hrs
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	Periferal Norte y Ave. Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	6:45 - 7:45 AM	Analysis Year	2028

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	0
Lane Group		LTR			LTR			LTR			LTR	
Volume (vph)	61	264	62	76	353	47	74	21	173	127	129	108
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.69	0.69	0.69	0.72	0.72	0.72	0.72	0.70	0.69	0.69	0.70	0.72
Pretimed/Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time		2.0			2.0			2.0			2.0	
Extension of Effective Green		2.0			2.0			2.0			2.0	
Arrival Type		3			3			3			3	
Unit Extension		3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width		3.7			3.7			3.7			3.7	
Parking/Grade/Parking	N	6	N	N	-6	N	N	6	N	N	0	N
Parking/Hour												
Bus Stops/Hour		0			0			0			0	
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 29.8	G =	G =	G =	G = 22.2	G =	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 60.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate		561			661			384			518	
Lane Group Capacity		1344			1450			859			905	
v/c Ratio		0.42			0.46			0.45			0.57	
Green Ratio		0.50			0.50			0.37			0.37	
Uniform Delay d_1		9.6			9.8			14.3			15.1	
Delay Factor k		0.11			0.11			0.11			0.17	
Incremental Delay d_2		0.2			0.2			0.4			0.9	
PF Factor		1.000			1.000			1.000			1.000	
Control Delay		9.8			10.1			14.6			16.0	
Lane Group LOS		A			B			B			B	
Approach Delay	9.8			10.1			14.6			16.0		
Approach LOS	A			B			B			B		
Intersection Delay	12.3			Intersection LOS						B		

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SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	PR-2 y Avenida Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	6:45 - 7:45 AM	Analysis Year	2028

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1	1	1	2	1	1	2	3	1	2	3	1
Lane Group	L	T	R	L	T	R	L	T	R	L	T	R
Volume (vph)	155	63	362	448	147	169	382	1510	484	202	3439	697
% Heavy Vehicles	0	0	0	1	0	0	0	1	1	0	3	0
PHF	0.83	0.71	0.90	0.89	0.84	0.72	0.81	0.85	0.69	0.76	0.90	0.89
Pretimed/Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green	2.0	2.0	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	3	3	3	3	3	3	3	4	3
Unit Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	0	0	362	0	0	169	0	0	484	0	0	697
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Parking/Grade/Parking	N	0	N	N	3	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	Excl. Left	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 3.0	G = 7.0	G =	G =	G = 43.0	G =	G =	G =
	Y = 0	Y = 4	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 61.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	187	89	0	503	175	0	472	1776	0	266	3821	0
Lane Group Capacity	216	220	187	525	217	185	1485	3652	1140	352	3582	1151
v/c Ratio	0.87	0.40	0.00	0.96	0.81	0.00	0.32	0.49	0.00	0.31	1.07	0.00
Green Ratio	0.16	0.11	0.11	0.16	0.11	0.11	0.70	0.70	0.70	0.70	0.70	0.70
Uniform Delay d_1	24.9	25.1	23.9	25.4	26.3	23.9	3.4	4.0	2.7	3.4	9.0	2.7
Delay Factor k	0.40	0.11	0.11	0.47	0.35	0.11	0.11	0.11	0.11	0.11	0.50	0.11
Incremental Delay d_2	28.8	1.2	0.0	28.9	19.7	0.0	0.1	0.1	0.0	0.0	30.7	0.0
PF Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.425	1.000
Control Delay	53.7	26.3	23.9	54.3	46.0	23.9	3.5	4.1	2.7	3.4	34.6	2.7
Lane Group LOS	D	C	C	D	D	C	A	A	A	A	C	A
Approach Delay	44.8			52.1			4.0			32.5		
Approach LOS	D			D			A			C		
Intersection Delay	26.0			Intersection LOS						C		

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SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	Periferal Norte y Ave. Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	4:15 - 5:15 PM	Analysis Year	2028

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	0
Lane Group		LTR		DefL	TR			LTR			LTR	
Volume (vph)	64	38	68	192	102	71	36	259	56	50	123	59
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.60	0.60	0.60	0.83	0.83	0.83	0.83	0.72	0.60	0.60	0.72	0.83
Pretimed/Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time		2.0		2.0	2.0			2.0			2.0	
Extension of Effective Green		2.0		2.0	2.0			2.0			2.0	
Arrival Type		3		3	3			3			3	
Unit Extension		3.0		3.0	3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width		3.7		3.7	3.7			3.7			3.7	
Parking/Grade/Parking	N	6	N	N	-6	N	N	6	N	N	0	N
Parking/Hour												
Bus Stops/Hour		0		0	0			0			0	
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 26.0	G =	G =	G =	G = 26.0	G =	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25		Cycle Length C = 60.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate		283		231	209			496			325	
Lane Group Capacity		1136		496	305			1352			1175	
v/c Ratio		0.25		0.47	0.26			0.37			0.28	
Green Ratio		0.43		0.43	0.43			0.43			0.43	
Uniform Delay d_1		10.8		12.1	10.9			11.5			10.9	
Delay Factor k		0.11		0.11	0.11			0.11			0.11	
Incremental Delay d_2		0.1		0.7	0.2			0.2			0.1	
PF Factor		1.000		1.000	1.000			1.000			1.000	
Control Delay		10.9		12.8	11.0			11.6			11.1	
Lane Group LOS		B		B	B			B			B	
Approach Delay	10.9			11.9			11.6			11.1		
Approach LOS	B			B			B			B		
Intersection Delay	11.5			Intersection LOS						B		

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SHORT REPORT

General Information		Site Information	
Analyst	José L. Pérez Berenguer	Intersection	PR-2 y Avenida Algarrobo
Agency or Co.	Pérez Berenguer y Asociados	Area Type	All other areas
Date Performed	11/9/2005	Jurisdiction	Mayagüez
Time Period	4:15 - 5:15 PM	Analysis Year	2028

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1	1	1	2	1	1	2	3	1	2	3	1
Lane Group	L	T	R	L	T	R	L	T	R	L	T	R
Volume (vph)	471	92	416	319	71	173	421	2939	368	247	2400	247
% Heavy Vehicles	0	0	0	1	0	0	0	1	0	0	2	0
PHF	0.87	0.80	0.92	0.74	0.80	0.90	0.87	0.87	0.86	0.72	0.95	0.93
Pretimed/Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green	2.0	2.0	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	3	3	3	3	3	3	3	4	3
Unit Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	0	0	416	0	0	173	0	0	368	0	0	247
Lane Width	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Parking/Grade/Parking	N	0	N	N	3	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	Excl. Left	EW Perm	03	04	NS Perm	06	07	08
Timing	G = 32.0	G = 11.0	G =	G =	G = 72.0	G =	G =	G =
	Y = 0	Y = 3	Y =	Y =	Y = 3	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25		Cycle Length C = 121.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	541	115	0	431	89	0	484	3378	0	843	2526	0
Lane Group Capacity	547	175	148	1134	172	146	859	3083	972	1170	3053	972
v/c Ratio	0.99	0.66	0.00	0.38	0.52	0.00	0.56	1.10	0.00	0.29	0.83	0.00
Green Ratio	0.36	0.09	0.09	0.36	0.09	0.09	0.60	0.60	0.60	0.60	0.60	0.60
Uniform Delay d_1	38.6	53.2	50.0	31.4	52.5	50.0	14.9	24.5	9.9	12.0	19.5	9.9
Delay Factor k	0.49	0.23	0.11	0.11	0.12	0.11	0.16	0.50	0.11	0.11	0.37	0.11
Incremental Delay d_2	35.6	8.7	0.0	0.2	2.7	0.0	0.9	48.9	0.0	0.0	0.2	0.0
PF Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.587	1.000
Control Delay	74.2	61.9	50.0	31.6	55.2	50.0	15.8	73.4	9.9	12.0	11.7	9.9
Lane Group LOS	E	E	D	C	E	D	B	E	A	B	B	A
Approach Delay	72.0			35.7			66.2			11.7		
Approach LOS	E			D			E			B		
Intersection Delay	44.9			Intersection LOS						D		

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