

Appendix B

Travel Demand Modeling and Ridership Forecasting Methodology



CONNECT COBB
Northwest Transit Corridor Alternatives Analysis
December 2012

Travel Demand Model

Travel demand modeling for the Northwest Atlanta Corridor Alternatives Analysis was conducted using the latest version of the regional transportation planning model developed and maintained by the Atlanta Regional Commission (ARC), the regional planning and intergovernmental coordination agency for the 10-county region including Cobb and Fulton counties. In 2011, ARC completed an update to their regional planning model with a 2010 base year and 2040 horizon year, consistent with their Plan 2040, also adopted in 2011. The 2011/2040 ARC models include enhancements made to the transit model structure following meetings with the Federal Transit Administration (FTA) on forecasting efforts for the Metropolitan Atlanta Regional Transit Authority (MARTA) Clifton Corridor Alternatives Analysis. This current ARC model reflects preliminary results from the ARC 2010 Transit Onboard Survey and segments markets by auto ownership for each trip purpose. Another revision to the ARC model will become available in 2013, that reflects model parameters derived from the recent ARC household travel survey and final results from the ARC onboard survey.

For the Northwest Atlanta Corridor AA, the ARC 2010/2040 models were further refined to better reflect travel patterns within Cobb County and the corridor. The first step in this effort was to insert additional traffic counts into the base year highway network as count data in the original model was limited to high volume locations. To better understand aggregate trip flows through the corridor, screenlines were added to the highway network, enabling comparisons of volume-over-count at both the link level and key corridor movements. In response to these volume-over-count comparisons, changes were made to the highway network, including the addition of local circulator streets, adjustment of centroids and centroid connectors, and splitting a few traffic analysis zones (TAZs). The coding of transit routes in Cobb County was also reviewed and modified as needed to accurately reflect routing and stop locations. An error was also detected in TAZ university enrollment, subsequently corrected by ARC staff, and provided for use in this study.

A validation worksheet was created and filled in that includes numerous validation checks and comparisons against observed data and model validity guidelines and standards. The worksheet has separate tabs for trip generation, trip distribution, mode choice, highway assignment, and transit assignment. Model validity was tracked during the time that adjustments were made and some improvements in model validity were noted. Since modifications were largely limited to network edits, improvements to model validity were often isolated to individual links and bus routes. Trip generation and distribution were summarized primarily to ensure that changes made to the model would not greatly impact these steps. Comparisons of highway assignment statistics were heavily influenced by the inclusion of additional traffic counts during this revalidation effort.

A greater focus was placed on validation of mode choice and transit assignment since this is a transit study. Since mode choice constants and coefficients were consistent with guidance provided by FTA and reflected analysis of the 2010 onboard survey, it was decided to not adjust these parameters further. A comparison of linked transit trips in mode choice shows an estimated total of 271 thousand vs. observed trips of 282 thousand from the ARC Onboard Survey for an estimated-over-observed ratio of 0.96, or less than 5 percent error. Multiple points of comparison were made for transit assignment, using different sources for observed data (ARC Onboard Survey, Cobb TDP, and other miscellaneous sources). When looking at sum totals for the three operating systems (CCT, GRTA, MARTA), percent error for bus ridership is usually lower for Run #8 than the original documented ARC base year model run. The

validation worksheet is provided at the end of this Appendix, depicting comparisons of model results at the conclusion of validation adjustments.

Ridership Forecasts

Ridership forecasts for the Northwest Atlanta corridor AA were generated using both the 2010 and 2040 ARC models. Year 2010 model runs were produced primarily for the purposes of FTA “uncertainties” analysis by showing what corridor ridership would be like in the absence of forecasted growth through the year 2040. The 2010 model runs also helped to satisfy curiosity on how the project would perform if it were built today. Year 2010 model runs only included transportation corridors and transit routes that existed in 2010. For “build” conditions, stations were coded into the transit network in accordance with the latest ARC transit network coding procedures; however, no changes were made in terms of removing duplicative or competing transit routes already found in the base year 2010 network.

All edits made to centroids, centroid connectors, zone splits, local circulator streets, and existing stops and routes in the 2010 base year model networks were also made to the 2040 networks provided by the ARC, for consistency. In response to recent changes in regional transit fares, ARC staff were consulted on the need for changing fares within the model to account for increased fare levels. The answer, based on previous New Starts analyses conducted in the Atlanta region, was to continue with existing fare structures coded into the 2010 base year model. Based on circa 2010 fares for Cobb County Transit, all 2040 build scenarios were run using a one-way fare of \$1.75. All 2040 model runs, including “no build”, used recent corrections made by the ARC to 2040 university enrollment forecasts and assumed projects and services consistent with the adopted Plan 2040 highway and transit networks.

As described in Section 3.0 of this AA, most of the Tier 1 alternatives assumed either a Bus Rapid Transit (BRT) or Light Rail Transit (LRT) technology. Exceptions are the no build and transportation systems management (TSM) alternative, the latter essentially being a low cost alternative aimed at providing service comparable to the other build alternatives. The Atlanta region does not presently have BRT or LRT services in place but has reserved transit network mode codes for these modes, with operating characteristics similar to existing transit systems in the region. ARC transit network mode code 25 was used for LRT while mode code 28 was used for BRT scenarios. While operating characteristics were considered largely the same for BRT and LRT for each build alternative, it was important to test alternatives using BRT and LRT mode codes to develop a range of potential ridership for each alternative. This was also important since the ARC model does not include “dwell times” for transit vehicles at stops and stations. Assumptions on the number of stations were considered in deciding which mode code to use.

Ridership forecasts were prepared for each alternative and summarized by route, station, and the corridor segment crossing I-285. Results are presented in Section 4.0 of this AA. It should be noted that no attempt was made during Tier 1 to identify and code feeder routes or delete duplicative routes. While these assumptions could impact ridership by alternative, complementary and competitive services will be more fully addressed during the upcoming Environmental Assessment phase of project development.

COMPARISON SUMMARY

ARC 2010 Model Validation

Revalidation Run: #8

Date of Model Run: 4/17/12

Assumptions: model rerun with updated ARC university enrollment

	revised model runs
	observed data
	guidelines/other models
	existing 2010/2040 model

Trip Generation

Output Files: hbw10gm.ptt, hbshop10gm.ptt, hbother10gm.ptt, nhb10gm.ptt, hbuniv10gm.ptt, hbschool10gm.ptt, TODAM10_asign.VTT

Purpose	Latest ARC Model Run with changes		Run 6		Run 5 (3/12/12)		Run 4 (3/9/12)		Run 3 (3/2/12)		Run 2 (2/9/12)		Original ARC 2010 Model Run without changes	
	ARC 2010 Cube (Val)	%Productions	ARC 2010 Cube (Val)	%Productions	ARC 2010 Cube (Val)	%Productions	ARC 2010 Cube (Val)	%Productions	ARC 2010 Cube (Val)	%Productions	ARC 2010 Cube (Val)	%Productions	ARC 2010 Cube	%Productions
Home-Based Work	2,731,987	17.24%	2,731,987	17.24%	2,731,958	17.24%	2,731,934	17.24%	2,731,932	17.16%	2,731,976	17.16%	2,731,985	17.16%
Home-Based Shop	2,379,296	15.01%	2,379,296	15.01%	2,379,292	15.01%	2,379,288	15.01%	2,379,279	14.94%	2,379,280	14.94%	2,379,279	14.94%
Home-Based Other	4,545,266	28.68%	4,545,266	28.68%	4,545,275	28.68%	4,545,240	28.68%	4,545,194	28.54%	4,545,263	28.54%	4,545,269	28.54%
Non Home-Based	2,487,670	15.70%	5,131,270	32.38%	5,131,289	32.38%	5,131,270	32.38%	5,131,222	32.22%	5,131,284	32.22%	5,131,302	32.22%
Home-Based University	181,925	1.15%	181,925	1.15%	181,925	1.15%	106,869	0.67%	181,923	1.14%	181,922	1.14%	181,924	1.14%
Home-Based School	954,269	6.02%	954,269	6.02%	954,260	6.02%	954,264	6.02%	954,230	5.99%	954,269	5.99%	954,274	5.99%
I-I Persons	13,280,414	83.79%	15,924,014	100.47%	15,923,999	100.47%	15,848,865	100.00%	15,923,779	100.00%	15,923,994	100.00%	15,924,033	100.00%
Commercial Vehicles													#REF!	#REF!
Truck													#REF!	#REF!
I-I Truck-CV													0	#REF!
SOV	2,101,039	83.39%	2,101,039	83.39%	2,101,031	83.39%	2,100,948	83.39%	2,100,967	83.39%	2,101,105	83.39%	2,100,771	83.39%
SR2	285,700	11.34%	285,700	11.34%	285,700	11.34%	285,730	11.34%	285,722	11.34%	285,709	11.34%	285,659	11.34%
SR3	84,896	3.37%	84,896	3.37%	84,897	3.37%	84,908	3.37%	84,901	3.37%	84,900	3.37%	84,866	3.37%
SR4+	47,916	1.90%	47,916	1.90%	47,917	1.90%	47,921	1.90%	47,918	1.90%	47,916	1.90%	47,905	1.90%
Commercial Vehicles		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
Truck		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
Internal-External	2,519,550	100.00%	2,519,550	100.00%	2,519,545	100.00%	2,519,507	100.00%	2,519,508	100.00%	2,519,831	100.00%	2,519,201	100.00%
TOTAL	15,799,964		18,443,564		18,443,544		18,368,372		18,443,287		18,443,625		18,443,234	

Aggregate Trip Rates	2010 Val	2010 Original	New FDOT Guidelines*	2010 Travel Survey	FHWA Target**
Unit of Measure	ARC	ARC			
Persons per Household	2.65	2.65	2.0-2.7		n/a
Internal Trips per Household	8.15	8.15	8.0-10.0		8.0-14.0
Internal Trips per Person	3.08	3.08	3.3-4.0		3.5-4.0
Internal Trips per Employee	7.33	7.33	n/a		n/a
HBW Trips per Employee	1.26	1.26	1.20-1.55		n/a

Base 2010 ARC SE Data	2010 Reval	2010 Original Total SE Stats		Census ACS 2010 Est***		New FDOT Guidelines*
	Total SE Stats	ARC Region	Cobb County	Atlanta MSA	Cobb County	
Population	5,173,196	5,173,196	662,919	5,286,302	690,063	
Dwelling Units	1,953,185	1,953,185	255,229	2,168,806	286,561	
Employees	2,173,573	2,173,573	304,696	2,369,588	340,191	
Persons/DU	2.65	2.65	2.60	2.44	2.41	2.0 to 2.7
Emp/Pop	0.42	0.42	0.46	0.45	0.49	0.35 to 0.75

Person Trips / Household	Base Year	Person Trip/HH*
Orlando	2004	7.81
Southeast Florida	2005	8.58
Tampa Bay	2006	9.05
Nashville_TDM (Nashville)	2002	8.59
Memphis	2004	8.20
Atlanta	2000	8.15
Atlanta	2005	0.00
FHWA Model Validation & Reasonableness Checking Manual		
		6.8 to 12.4

Future Years ARC	2016 Original		2020 Original		2030 Original		2040 Original	
	ARC Region	Cobb County						
Population	5,766,979	698,074	6,196,406	722,101	7,143,031	778,781	8,035,046	830,509
Dwelling Units	2,197,430	271,414	2,372,577	282,327	2,762,077	307,560	3,142,952	333,190
Employees	2,551,412	344,971	2,740,322	364,538	3,153,244	407,283	3,651,353	458,382
Persons/DU	2.62	2.57	2.61	2.56	2.59	2.53	2.56	2.49
Emp/Pop	0.44	0.49	0.44	0.50	0.44	0.52	0.45	0.55

Comments: Comments: add in Run #8 statistics

*FSUTMS-Cube Framework Phase II: Model Calibration and Validation Standards Final Report, October 2008

**FHWA Model Validation and Reasonableness Checking Manual, 1998

***2010 American Community Survey 3-Year Estimates, U.S. Census Bureau (Atlanta MSA numbers)

ARC 2010 Model Validation

Revalidation Run: #8
Date of Model Run: 4/17/12

Assumptions: model rerun with updated ARC university enrollment

Comments: add in Run #9 statistics

Trip Distribution

revised model runs
observed data
guidelines/other models
existing 2010/2040 model

File Sources: hbwgm.rpt, hbshopgm.rpt, hbogm.rpt, nhbwm.rpt, hbnvwm.rpt, hbschoolgm.rpt

Average Trip Length (in Minutes)		Run 7	Run 6	Run 5	Run 4	Run 3	Run 2	Original Run	2005 ARC Model	2000 Travel Survey	2000 Southeast FL	2006 Tampa Bay	2004 Orlando Area	FHWA Target*
Purpose		2010 ARC												
Home-Based Work	Zero Cars	32.30	32.30	32.31	32.31	32.30	32.31	32.26	33.86	31.44	25.51	23.13	22.25	11.2-35.4
	Cars < Workers	36.97	36.97	36.98	36.98	36.97	37.00	36.91		31.61				
	Cars >= Workers Inc1-2	36.00	36.00	36.01	36.00	36.00	36.02	36.02		38.53				
	Cars >= Workers Inc3-4	42.12	42.12	42.13	42.12	42.12	42.15	42.15						
	TOTAL	36.85	36.85	36.86	36.85	36.85	36.87	36.84						
Home-Based Shop	Zero Cars	17.29	17.29	17.29	17.29	17.28	17.29	17.3	16.52	16.82	16.12	16.42	15.62	8.6-18.7
	Cars < Workers	16.60	16.60	16.60	16.60	16.59	16.60	16.59		16.03				
	Cars >= Workers Inc1-2	19.30	19.30	19.30	19.30	19.30	19.30	19.3		16.70				
	Cars >= Workers Inc3-4	19.02	19.02	19.02	19.02	19.02	19.02	19.02						
	TOTAL	18.05												
Home-Based Other	Zero Cars	18.34	18.34	18.34	18.34	18.33	18.33	18.32	18.02	17.68	18.44	16.94	16.15	10.4-17.3
	Cars < Workers	18.05	18.05	18.05	18.04	18.04	18.04	18.02		17.72				
	Cars >= Workers Inc1-2	19.85	19.85	19.85	19.85	19.85	19.85	19.84		18.66				
	Cars >= Workers Inc3-4	20.62	20.62	20.62	20.62	20.62	20.62	20.63						
	TOTAL	19.22	19.22	19.22	19.21	19.21	19.21	19.20						
Non Home-Based	Zero Cars	20.07	20.07	20.07	20.07	20.07	20.07	20.07	17.43	15.64	18.00	15.97	16.61	8.1-17.1
	Cars < Workers	21.49	21.49	21.49	21.49	21.49	21.50	21.5		17.25				
	Cars >= Workers Inc1-2	18.84	18.84	18.84	18.84	18.83	18.84	18.84		18.09				
	Cars >= Workers Inc3-4	19.41	19.41	19.41	19.41	19.40	19.41	19.41		18.75				
	TOTAL	19.95	19.95	19.95	19.95	19.95	19.96	19.96						
Home-Based University	Zero Cars	42.40	42.40	42.42	42.41	42.41	42.38	42.38	29.66	29.66	-	21.93	-	
	Cars < Workers	47.99	47.99	48.03	48.02	48.02	48.00	47.98						
	Cars >= Workers Inc1-2	52.51	52.51	52.55	52.54	52.54	52.53	52.53						
	Cars >= Workers Inc3-4	51.58	51.58	51.62	51.60	51.61	51.60	51.61						
	TOTAL	48.62	48.62	48.66	48.64	48.65	48.63	48.63						
Home-Based School	Zero Cars	17.82	17.82	17.82	17.82	17.82	17.81	17.85	15.57	15.57	21.17	17.82	-	8.9-15.9
	Cars < Workers	14.78	14.78	14.78	14.78	14.78	14.78	14.79						
	Cars >= Workers Inc1-2	17.28	17.28	17.27	17.27	17.27	17.27	17.27						
	Cars >= Workers Inc3-4	14.80	14.80	14.80	14.79	14.79	14.79	14.79						
	TOTAL	16.17	16.17	16.17	16.17	16.17	16.16	16.18						
I-I Persons											19.85	17.87	17.66	
Commercial Vehicles Truck												16.94	15.99	
I-I Truck-CV												39.73	15.17	
SOV												28.335	15.58	
SR2														
SR3														
Commercial Vehicles Truck														
I-E											58.43	58.43		
TOTAL														

*FHWA Model Validation and Reasonableness: Checking Manual, 1998

**FSUTMS-Cube Framework Phase II: Model Calibration and Validation Standards: Final Report, October 2008

***2010 American Community Survey 3-Year Estimates, U.S. Census Bureau (Atlanta MSA numbers)

Intrazonal Travel		Latest Run			Run 6			Run 5			Run 4			2010 ARC (Validation-2011)
Purpose		Total Trips	Intrazonal Trips	% Intrazonal	Total Trips	Intrazonal Trips	% Intrazonal	Total Trips	Intrazonal Trips	% Intrazonal	Total Trips	Intrazonal Trips	% Intrazonal	Total Trips
Home-Based Work	Zero Cars	112,591	5,341	4.74%	112,591	5,341	4.74%	112,607	5,343	4.74%	112,605	5,341	4.74%	112,613
	Cars < Workers	412,788	19,589	4.75%	412,788	19,589	4.75%	412,786	19,591	4.75%	412,794	19,588	4.75%	412,793
	Cars >= Workers Inc1-2	729,552	26,165	3.59%	729,552	26,165	3.59%	729,531	26,173	3.59%	729,522	26,169	3.59%	729,513
	Cars >= Workers Inc3-4	1,481,545	40,585	2.74%	1,481,545	40,585	2.74%	1,481,520	40,587	2.74%	1,481,495	40,579	2.74%	1,481,505
	TOTAL	2,736,476	91,680	3.35%	2,736,476	91,680	3.35%	2,736,444	91,693	3.35%	2,736,416	91,677	3.35%	2,736,424
Home-Based Shop	Zero Cars	47,240	6,823	14.44%	47,240	6,823	14.44%	47,246	6,826	14.45%	47,238	6,825	14.45%	47,241
	Cars < Workers	261,973	44,250	16.89%	261,973	44,250	16.89%	261,973	44,253	16.89%	261,984	44,247	16.89%	261,984
	Cars >= Workers Inc1-2	746,381	100,087	13.41%	746,381	100,087	13.41%	746,374	100,106	13.41%	746,373	100,067	13.41%	746,363
	Cars >= Workers Inc3-4	1,328,317	130,584	9.83%	1,328,317	130,584	9.83%	1,328,315	130,592	9.83%	1,328,305	130,539	9.83%	1,328,303
	TOTAL	2,383,911	281,745	11.82%	2,383,911	281,745	11.82%	2,383,908	281,778	11.82%	2,383,900	281,678	11.82%	2,383,891
Zero Cars		104,477	15,014	14.37%	104,477	15,014	14.37%	104,488	15,018	14.37%	104,486	15,017	14.37%	104,482
	Cars < Workers	505,360	94,874	18.77%	505,360	94,874	18.77%	505,365	94,879	18.77%	505,372	94,854	18.77%	505,375

	revised model runs
	observed data
	guidelines/other models
	existing 2010/2040 model

Mode Choice

HBW Trip Allocation By Mode	Latest Run		Run 7		Run 6		Run 5		Run 4		Run 3		Run 2		Output Files:		2010 ARC Transit	On-Board 2010 (mc)
	2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		mchbw.mtt_mchbo.mtt_mcnhb.n			
	Trips	% of Trips	2010 ARC (Original)	2010 ARC (Original)														
Drive Alone	2,397,413	89.09%	2,356,290	89.02%	2,356,290	89.02%	2,356,256	89.02%	2,356,168	89.02%	2,356,261	89.02%	2,356,307	89.02%	2,355,685	88.99%	-	-
Two Passengers	102,503	3.81%	100,855	3.81%	100,855	3.81%	100,851	3.81%	100,889	3.81%	100,857	3.81%	100,873	3.81%	100,765	3.81%	-	-
Three Passengers	38,313	1.42%	37,743	1.43%	37,743	1.43%	37,742	1.43%	37,742	1.43%	37,749	1.43%	37,757	1.43%	37,681	1.42%	-	-
Four+ Passengers	11,734	0.44%	11,566	0.44%	11,566	0.44%	11,569	0.44%	11,573	0.44%	11,570	0.44%	11,572	0.44%	11,547	0.44%	-	-
Total Transit*	141,049	5.24%	140,495	5.31%	140,495	5.31%	140,521	5.31%	140,400	5.30%	140,435	5.31%	140,367	5.30%	141,400	5.34%	140,507	-
Walk to Local	28,414	100.00%	27,444	100.00%	27,444	100.00%	27,406	100.00%	27,369	100.00%	27,380	100.00%	27,428	100.00%	28,252	100.00%	48.24%	70,009
Walk to Premium	40,673	20.14%	39,676	19.53%	39,676	19.53%	39,646	19.50%	39,621	19.49%	39,655	19.50%	39,641	19.54%	39,962	19.98%	-	-
Drive to Local	9,812	28.84%	9,571	28.24%	9,571	28.24%	9,571	28.21%	9,558	28.22%	9,587	28.24%	9,578	28.24%	9,570	28.26%	51.76%	70,498
Drive to Premium	62,150	6.96%	63,805	6.81%	63,805	6.81%	63,866	6.83%	63,852	6.83%	63,811	6.82%	63,720	6.82%	63,616	6.77%	-	-
Drive to Premium	62,150	44.06%	63,805	45.41%	63,805	45.41%	63,866	45.45%	63,852	45.48%	63,811	45.44%	63,720	45.40%	63,616	44.99%	-	-
TOTAL	2,691,013	100.00%	2,646,949	100.00%	2,646,949	100.00%	2,646,939	100.00%	2,646,791	100.00%	2,646,872	100.00%	2,646,876	100.00%	2,647,079	100.00%	-	-

HBO Trip Allocation By Mode	Latest Run		Run 7		Run 6		Run 5		Run 4		Run 3		Run 2		Output Files:		2010 ARC Transit	On-Board 2010 (mc)
	2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		mchbw.mtt_mchbo.mtt_mcnhb.n			
	Trips	% of Trips	2010 ARC (Original)	2010 ARC (Original)														
Drive Alone	3,835,025	69.78%	3,834,954	69.78%	3,834,954	69.78%	3,835,022	69.78%	3,834,775	69.77%	3,834,629	69.77%	3,835,235	69.78%	3,834,841	69.77%	-	-
Two Passengers	1,066,954	19.41%	1,066,954	19.41%	1,066,954	19.41%	1,066,966	19.41%	1,067,030	19.41%	1,067,062	19.42%	1,066,952	19.41%	1,066,918	19.41%	-	-
Three Passengers	302,750	5.51%	302,750	5.51%	302,750	5.51%	302,752	5.51%	302,766	5.51%	302,766	5.51%	302,734	5.51%	302,717	5.51%	-	-
Four+ Passengers	195,961	3.57%	195,970	3.57%	195,970	3.57%	195,968	3.57%	195,978	3.57%	195,972	3.57%	195,954	3.57%	195,943	3.56%	-	-
Total Transit*	95,530	1.74%	95,531	1.74%	95,531	1.74%	95,442	1.74%	95,439	1.74%	95,449	1.74%	95,454	1.74%	95,928	1.75%	85,787	-
Walk to Local	35,253	100.00%	35,252	100.00%	35,252	100.00%	35,199	100.00%	35,182	100.00%	35,190	100.00%	35,203	100.00%	35,707	100.00%	65.95%	58,100
Walk to Premium	27,509	36.90%	27,512	36.90%	27,512	36.90%	27,512	36.88%	27,512	36.88%	27,512	36.87%	27,511	36.88%	27,556	37.22%	-	-
Drive to Local	14,502	28.80%	14,505	28.80%	14,505	28.80%	14,466	28.83%	14,489	28.82%	14,487	28.82%	14,481	28.82%	14,480	28.73%	34.05%	27,687
Drive to Premium	18,266	15.18%	18,261	15.18%	18,261	15.18%	18,263	15.16%	18,261	15.18%	18,260	15.18%	18,260	15.17%	18,184	15.09%	-	-
Drive to Premium	18,266	19.12%	18,261	19.12%	18,261	19.12%	18,263	19.14%	18,261	19.13%	18,260	19.13%	18,260	19.13%	18,184	18.96%	-	-
TOTAL	5,496,220	100.00%	5,496,159	100.00%	5,496,159	100.00%	5,496,149	100.00%	5,495,988	100.00%	5,495,879	100.00%	5,496,329	100.00%	5,496,346	100.00%	-	-

NHB Trip Allocation By Mode	Latest Run		Run 7		Run 6		Run 5		Run 4		Run 3		Run 2		Output Files:		2010 ARC Transit	On-Board 2010 (mc)
	2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		mchbw.mtt_mchbo.mtt_mcnhb.n			
	Trips	% of Trips	2010 ARC (Original)	2010 ARC (Original)														
Drive Alone	3,105,454	79.05%	3,105,425	79.05%	3,105,425	79.05%	3,105,429	79.05%	3,105,329	79.05%	3,105,366	79.05%	3,105,475	79.05%	3,105,352	79.05%	-	-
Two Passengers	547,503	13.94%	547,509	13.94%	547,509	13.94%	547,515	13.94%	547,544	13.94%	547,532	13.94%	547,536	13.94%	547,524	13.94%	-	-
Three Passengers	156,431	3.98%	156,430	3.98%	156,430	3.98%	156,430	3.98%	156,440	3.98%	156,429	3.98%	156,440	3.98%	156,438	3.98%	-	-
Four+ Passengers	84,843	2.16%	84,843	2.16%	84,843	2.16%	84,846	2.16%	84,851	2.16%	84,842	2.16%	84,852	2.16%	84,852	2.16%	-	-
Total Transit*	34,308	0.87%	34,306	0.87%	34,306	0.87%	34,293	0.87%	34,271	0.87%	34,275	0.87%	34,286	0.87%	34,381	0.88%	27,877	-
Walk to Local	11,238	100.00%	11,238	100.00%	11,238	100.00%	11,225	100.00%	11,209	100.00%	11,209	100.00%	11,227	100.00%	11,410	100.00%	81.99%	22,055
Walk to Premium	16,829	32.76%	16,827	32.76%	16,827	32.76%	16,830	32.73%	16,822	32.71%	16,825	32.70%	16,823	32.75%	16,778	33.19%	-	-
Drive to Local	2,389	49.05%	2,389	49.05%	2,389	49.05%	2,389	49.08%	2,386	49.09%	2,386	49.09%	2,383	49.07%	2,365	48.80%	18.01%	5,822
Drive to Premium	2,389	6.96%	2,389	6.96%	2,389	6.96%	2,386	6.96%	2,386	6.96%	2,386	6.96%	2,383	6.95%	2,365	6.88%	-	-
Drive to Premium	2,389	11.23%	2,385	11.23%	2,385	11.23%	2,385	11.24%	2,385	11.25%	2,385	11.24%	2,385	11.24%	2,382	11.13%	-	-
TOTAL	3,928,539	100.00%	3,928,513	100.00%	3,928,513	100.00%	3,928,515	100.00%	3,928,436	100.00%	3,928,444	100.00%	3,928,589	100.00%	3,928,547	100.00%	-	-

TOTAL Trip Allocation By Mode	Latest Run		Run 7		Run 6		Run 5		Run 4		Run 3		Run 2		Output Files:		2010 ARC Transit	On-Board 2010 (mc)
	2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		2010 ARC (Reval)		mchbw.mtt_mchbo.mtt_mcnhb.n			
	Trips	% of Trips	2010 ARC (Original)	2010 ARC (Original)														
Drive Alone	9,337,892	77.07%	9,296,670	77.01%	9,296,670	77.01%	9,296,707	77.01%	9,296,272	77.01%	9,296,256	77.01%	9,297,018	77.01%	9,295,877	77.00%	-	-
Two Passengers	1,716,960	14.17%	1,715,318	14.21%	1,715,318	14.21%	1,715,331	14.21%	1,715,463	14.21%	1,715,452	14.21%	1,715,360	14.21%	1,715,208	14.21%	-	-
Three Passengers	497,494	4.11%	496,923	4.12%	496,923	4.12%	496,926	4.12%	496,968	4.12%	496,944	4.12%	496,930	4.12%	496,836	4.12%	-	-
Four+ Passengers	292,539	2.41%	292,379	2.42%	292,379	2.42%	292,383	2.42%	292,402	2.42%	292,384	2.42%	292,378	2.42%	292,342	2.42%	-	-
Total Transit*	270,888	2.24%	270,332	2.24%	270,332	2.24%	270,255	2.24%	270,110	2.24%	270,158	2.24%	270,107	2.24%	271,708	2.25%	282,359	-
Walk to Local	74,905	100.00%	73,934	100.00%	73,934	100.00%	73,830	100.00%	73,761	100.00%	73,780	100.00%	73,858	100.00%	75,369	100.00%	58.76%	204,534
Walk to Premium	85,011	27.65%	84,015	27.35%	84,015	27.35%	83,989	27.32%	83,950	27.31%	83,993	27.31%	83,974	27.34%	84,296	27.74%	-	-
Drive to Local	26,703	31.38%	26,465	31.08%	26,465	31.08%	26,455	31.08%	26,433	31.08%	26,461	31.09%	26,442	31.09%	26,415	31.02%	41.24%	77,825
Drive to Premium	84,269	9.86%	85,919	9.79%	85,919	9.79%	85,983	9.79%	85,966	9.79%	85,925	9.79%	85,833	9.79%	85,628	9.72%	-	-
Drive to Premium	84,269	31.11%	85,919	31.78%	85,919	31.78%	85,983	31.82%	85,966	31.83%	85,925	31.81%	85,833	31.78%	85,628	31.51%	-	-
TOTAL	12,115,772	100.00%	12,071,622	100.00%	12,071,622	100.00%	12,071,602	100.00%	12,071,216	100.00%	12,071,195	100.00%	12,071,793	100.00%	12,071,972	100.00%	-	-

LINKED TOTAL Trips	Estimated	Observed	est/obs
	270,888	282,396	0.96

Mode Choice Model Parameters	2010 ARC (Reval)	New FDOT Guidelines*	2010 ARC (Org)	New FDOT Guidelines*
HBW IVTT	-0.02 to -0.03	-0.0250	-0.02 to -0.03	-0.0250
HBNW IVTT	-0.			

ARC 2010 Model Validation Assumptions: model rerun with updated ARC university enrollment

Revalidation Run: #8

Date of Model Run: 4/17/12

Comments: add in Run #8 statistics

Highway Assignment 1 of 2

revised model runs
observed data
guidelines/other models
existing 2010/2040 model

Facility Type	ARC Volume/Count % Difference ((volume-Count)/Count)							New FDOT Guidelines & Standards*	TMIP** FHWA Accuracy	
	Latest Run	Run 6	Run 5	Run 4	Run 3	Run 2	2010 Model (Org)			
Interstate/ Freeway	4.06%	4.06%	4.07%	4.05%	4.06%	4.06%	3.32%	+/- 6-7%	+/- 6-7%	3.00%
Parkway	-2.66%	-2.66%	-3.83%	-3.50%	5.96%	1.77%	1.09%			
HOV Buffer Separated	8.85%	8.85%	7.97%	8.60%	8.44%	8.44%	8.54%			
Expressway	14.92%	14.92%	14.88%	15.54%	14.90%	15.53%	10.38%			
Principal Arterial - Class I	20.38%	20.38%	20.26%	20.85%	20.68%	20.42%	14.73%	+/- 10-15%	+/- 25-36%	-6.50%
Principal Arterial - Class II	21.84%	21.84%	21.81%	21.64%	21.81%	21.87%	13.53%	+/- 10-15%	+/- 25-36%	
Minor Arterial - Class I	13.09%	13.09%	12.98%	12.80%	12.83%	13.17%	16.75%	+/- 10-15%	+/- 25-36%	2.40%
Minor Arterial - Class II	8.52%	8.52%	8.51%	8.67%	8.62%	8.86%	9.65%	+/- 10-15%	+/- 25-36%	
Major Collector	-11.54%	-11.54%	-11.53%	-11.47%	-11.62%	-11.08%	-9.13%	+/- 20-25%	+/- 25-29%	20.60%
Minor Collector	-28.50%	-28.50%	-28.64%	-28.05%	-27.68%	-27.88%	-24.13%	+/- 20-25%	+/- 25-29%	
TOTAL	8.84%	8.84%	8.80%	8.91%	8.90%	8.94%	6.86%			3.00%

Volume Range	Typical Lanes	Latest Run	Run 6	Run 5	Run 4	Run 3	Run 2	2010	New FDOT Guidelines & Standards*	TMIP** FHWA Accuracy
		ARC (Reval)	ARC (Org)							
<=10,000	2L	32.86%	32.86%	32.95%	32.86%	32.92%	33.07%	32.31%	+/- 34%	+/- 29-60%
10,000-30,000	4L	33.41%	33.41%	33.01%	33.81%	33.50%	33.48%	25.73%	+/- 25%	+/- 22-25%
30,001-50,000	6L	31.39%	31.39%	31.59%	31.44%	31.66%	31.63%	24.54%	+/- 13%	+/- 22%
50,001-65,000	4-6L freeway	3.96%	3.96%	3.94%	3.30%	3.77%	3.73%	1.80%	+/- 17%	+/- 21%
65,001-75,000	6L freeway	3.76%	3.76%	3.80%	4.62%	4.01%	4.42%	3.11%	+/- 25%	+/- 21%
>75,000	8L+ freeway	2.72%	2.72%	2.71%	2.55%	2.73%	2.65%	1.02%	+/- 25%	+/- 21%
TOTAL								29%		

*FSUTMS-Cube Framework Phase II: Model Calibration and Validation Standards Final Report, October 2008

**FHWA Model Validation and Reasonableness Checking Manual, 1998

Daily Traffic on Screenline***	Latest Run			Run 6			Run 5			Run 4	
	ARC	ARC	ARC	ARC	ARC	ARC	ARC	ARC	ARC	ARC	ARC
	2010 Revalidation Total Volume	2010 Revalidation Total Count****	2010 Revalidation V/C Ratio	2010 Revalidation Total Volume	2010 Revalidation Total Count****	2010 Revalidation V/C Ratio	2010 Revalidation Total Volume	2010 Revalidation Total Count****	2010 Revalidation V/C Ratio	2010 Revalidation Total Volume	2010 Revalidation Total Count****
100	1,323,586	793,304	1.67	1,323,586	793,304	1.67	1,323,508	793,304	1.67	1,323,973	793,304
101	1,393,046	776,359	1.79	1,393,046	776,359	1.79	1,391,628	776,359	1.79	1,393,224	776,359
102	2,463,167	1,652,416	1.49	2,463,167	1,652,416	1.49	2,460,667	1,652,416	1.49	2,463,421	1,652,416
103	643,576	480,756	1.34	643,576	480,756	1.34	643,340	480,756	1.34	643,281	480,756
104	778,359	429,692	1.81	778,359	429,692	1.81	778,386	429,692	1.81	778,001	429,692
105	1,081,098	778,336	1.39	1,081,098	778,336	1.39	1,080,285	778,336	1.39	1,079,861	778,336
106	419,651	234,835	1.79	419,651	234,835	1.79	418,397	234,835	1.78	414,472	234,835
107	159,645	86,795	1.84	159,645	86,795	1.84	159,590	86,795	1.84	159,709	86,795
108	324,498	221,146	1.47	324,498	221,146	1.47	324,334	221,146	1.47	324,553	221,146
109	412,102	302,205	1.36	412,102	302,205	1.36	413,026	302,205	1.37	411,796	302,205
110	167,217	107,134	1.56	167,217	107,134	1.56	167,169	107,134	1.56	167,251	107,134
111	226,847	146,658	1.55	226,847	146,658	1.55	227,114	146,658	1.55	226,868	146,658
112	198,712	122,450	1.62	198,712	122,450	1.62	198,674	122,450	1.62	198,410	122,450
113	29,723	29,976	0.99	29,723	29,976	0.99	29,740	29,976	0.99	29,736	29,976
114	136,548	69,848	1.95	136,548	69,848	1.95	136,493	69,848	1.95	136,509	69,848
115	42,336	87,996	0.48	42,336	87,996	0.48	42,382	87,996	0.48	42,341	87,996
116	91,569	41,680	2.20	91,569	41,680	2.20	91,521	41,680	2.20	91,523	41,680
117	171,900	101,599	1.69	171,900	101,599	1.69	171,903	101,599	1.69	171,912	101,599
118	116,232	84,916	1.37	116,232	84,916	1.37	116,218	84,916	1.37	116,142	84,916
119	125,948	89,511	1.41	125,948	89,511	1.41	125,955	89,511	1.41	125,925	89,511
Total	10,305,760	6,637,612	1.55	10,305,760	6,637,612	1.55	10,300,330	6,637,612	1.55	10,298,908	6,637,612

***Links without counts were not included

ARC 2010 Model Validation Assumptions: model rerun with updated ARC university enrollment

Revalidation Run: #8
Date of Model Run: 4/17/12

Comments: close model match between observed and estimated unlinked trips, although prior run had a closer match to bus counts than this latest run...

Transit Assignment

Run Transits for Transit.prn

	revised model runs
	observed data
	guidelines/other models
	existing 2005/2030 model

Route*	Mode	Latest Run							Run 7							Run 6								
		Observed Rider (On-board Survey)	Observed Riders (Misc. Sources)	Cobb TDP Observed Ridership	ARC 2010 Model Est. (2-Way)	ARC 2010 Model Est. (Directional)	Percent Error	Estimate/Observed per TDP #	Observed Riders (On-board Survey)	Observed Riders (Misc. Sources)	Cobb TDP Observed Ridership	ARC 2010 Model Est. (2-Way)	ARC 2010 Model Est. (Directional)	Percent Error	Estimate/Observed per TDP #	Observed Riders (On-board Survey)	Observed Riders (Misc. Sources)	Cobb TDP Observed Ridership	ARC 2010 Model Est. (2-Way)	ARC 2010 Model Est. (Directional)	Percent Error	Estimate/Observed per TDP #		
CCT 10A	24	54	81	250	250	208.64%		54	81	246	246	203.70%		54	81	246	246	203.70%		246	246	203.70%		
CCT 10B	24	49	75	296	296	294.67%		49	75	305	305	306.67%		49	75	305	305	306.67%		305	305	306.67%		
CCT 10C	24	53	n/a	358	358	0.00%		53	n/a	307	307	0.00%		53	n/a	307	307	0.00%		307	307	0.00%		
CCT 100	26	197	n/a	846	846	0.00%		197	n/a	1,141	1,141	0.00%		197	n/a	1,141	1,141	0.00%		1,141	1,141	0.00%		
CCT 101	26	209	n/a	544	544	0.00%		209	n/a	656	656	0.00%		209	n/a	656	656	0.00%		656	656	0.00%		
CCT 102	26	137	n/a	190	190	0.00%		137	n/a	211	211	0.00%		137	n/a	211	211	0.00%		211	211	0.00%		
CCT 10	24	1,895	149	2,984	2,984	1.895%		1,895	149	3,056	3,056	1.895%		1,895	149	3,056	3,056	1.895%		3,056	3,056	1.895%		
CCT 10-R	24		3,100	3,827	7,096	4,112	128.90%	1.85	3,100	3,827	6,870	3,814	121.61%	1.80	3,100	3,827	3,814	3,814	23.03%		3,814	3,814	23.03%	1.00
CCT 15	24	960		640	640			960		638	638			960		638	638			638	638			
CCT 15-R	24		1,324	1,432	1,149	509	-13.22%	0.80		1,324	1,432	1,105	467	-16.54%	0.77		1,324	1,432	1,105	467	-16.54%	0.77		
CCT 20	24	954		1,134	1,134			954		1,053	1,053			954		1,053	1,053			1,053	1,053			
CCT 20-R	24		1,156	1,487	1,888	754	63.32%	1.27		1,156	1,487	1,733	680	49.91%	1.17		1,156	1,487	1,733	680	49.91%	1.17		
CCT 30	24	1,855		1,671	1,671			1,855		1,666	1,666			1,855		1,666	1,666			1,666	1,666			
CCT 30-R	24		2,434	2,935	3,706	2,035	52.26%	1.26		2,434	2,935	3,646	1,980	49.79%	1.24		2,434	2,935	3,646	1,980	49.79%	1.24		
CCT 40	24	459		627	627			459		575	575			459		575	575			575	575			
CCT 40-R	24		625	807	945	318	51.20%	1.17		625	807	888	313	42.08%	1.10		625	807	888	313	42.08%	1.10		
CCT 45	24	306		545	545			306		541	541			306		541	541			541	541			
CCT 45-R	24		550	531	802	257	45.82%	1.51		550	531	780	239	41.82%	1.47		550	531	780	239	41.82%	1.47		
CCT 50	24	1,026		904	904			1,026		912	912			1,026		912	912			912	912			
CCT 50-R	24		1,203	1,484	1,812	908	50.62%	1.22		1,203	1,484	1,776	864	47.63%	1.20		1,203	1,484	1,776	864	47.63%	1.20		
GRTA 460	56	493	405	1,164	1,164	187.41%		493	405	1,565	1,565	286.42%		493	405	1,565	1,565	286.42%		1,565	1,565	286.42%		
GRTA 460A	56	???	???	234	234	#VALUE!		???	???	314	314	#VALUE!		???	???	314	314	#VALUE!		314	314	#VALUE!		
GRTA 460AR	56	???	???	13	13	#VALUE!		???	???	13	13	#VALUE!		???	???	13	13	#VALUE!		13	13	#VALUE!		
GRTA 461	56	253	220	202	202	-8.18%		253	220	227	227	3.18%		253	220	227	227	3.18%		227	227	3.18%		
GRTA 462	56	37	37	31	31	-16.22%		37	37	80	80	116.22%		37	37	80	80	116.22%		80	80	116.22%		
GRTA 470	56	332	292	702	702	140.41%		332	292	712	712	143.84%		332	292	712	712	143.84%		712	712	143.84%		
GRTA 475	56	68	123	446	446	262.60%		68	123	467	467	279.67%		68	123	467	467	279.67%		467	467	279.67%		
GRTA 477	56	304	207	669	669	223.19%		304	207	783	783	278.26%		304	207	783	783	278.26%		783	783	278.26%		
GRTA 480	56	145	284	275	275	-3.17%		145	284	295	295	3.87%		145	284	295	295	3.87%		295	295	3.87%		
GRTA 480R	56	???	???	0	0	#VALUE!		???	???	0	0	#VALUE!		???	???	0	0	#VALUE!		0	0	#VALUE!		
GRTA 481	56	221	162	33	33	-79.63%		221	162	44	44	-72.84%		221	162	44	44	-72.84%		44	44	-72.84%		
GRTA 490	56	225	178	213	213	19.66%		225	178	251	251	41.01%		225	178	251	251	41.01%		251	251	41.01%		
GRTA 491	56	98	128	212	212	65.63%		98	128	256	256	100.00%		98	128	256	256	100.00%		256	256	100.00%		
MARTA 12	14	978	0	886	886			978	0	886	886			978	0	886	886			886	886			
MARTA 12-R	14		2,436	n/a	1,443	557	-40.76%			2,436	n/a	1,439	553	-40.93%			2,436	n/a	1,439	553	-40.93%			
MARTA 148A	14	152	n/a	103	103			152	n/a	86	86			152	n/a	86	86			86	86			
MARTA 148B	14	???	???	137	34	#VALUE!		???	???	119	33	#VALUE!		???	???	119	33	#VALUE!		119	33	#VALUE!		
CCT TOTAL	14	8,154	10,697	12,503	19,882	25,656	85.87%		8,154	10,697	12,503	19,664	19,664	83.83%						19,664	26,229	0.00%		
GRTA TOTAL	14	2,139	2,036	n/a	4,194	4,194	105.99%		2,139	2,036	n/a	5,007	5,007	145.92%						5,007	5,007	0.00%		
MARTA TOTAL	14	1,130	2,436	n/a	1,580	1,580	-35.14%		1,130	2,436	n/a	1,558	1,558	-36.04%						1,558	1,558	0.00%		
TOTAL	14	11,423	15,169	12,503	25,656	31,430	69.13%		11,423	15,169	12,503	26,229	26,229	72.91%						26,229	32,794	0.00%		
UNLINKED TOTAL		439,046			415,805		-5.29%																	
LINKED TOTAL		282,396			n/a		n/a																	
CCT TOTAL**	14	8,154		19,882	19,882	143.83%	1.52	8,154		19,664	19,664	141.16%	1.47	8,154		19,664	19,664	141.16%	1.47	17,349	17,349	112.77%	1.20	
GRTA TOTAL**	14	2,139		3,916	3,916	83.08%	N/A	2,139		4,600	4,600	115.05%	N/A	2,139		4,600	4,600	115.05%	N/A	4,600	4,600	118.79%	N/A	
MARTA TOTAL**	14	1,130		1,580	1,580	39.82%	N/A	1,130		1,558	1,558	37.88%	N/A	1,130		1,439	1,439	27.35%	N/A	1,439	1,439	27.35%	N/A	
TOTAL**	14	11,423		25,378	25,378	122.17%	1.52	11,423		25,822	25,822	126.05%	1.47	11,423		23,468	23,468	105.45%	1.20	23,468	23,468	105.45%	1.20	
CCT TOTAL**	14		10,697	17,944	17,944	67.75%	1.15		10,697	17,349	17,349	62.19%	1.11		10,697	17,349	17,349	62.19%	1.11	17,349	17,349	62.19%	0.91	
GRTA TOTAL**	14		2,036	3,947	3,947	93.86%	N/A		2,036	4,600	4,600	129.86%	N/A		2,036	4,600	4,600	129.86%	N/A	4,600	4,600	129.86%	N/A	
MARTA TOTAL**	14		2,436	1,443	1,443	-40.76%	N/A		2,436	1,439	1,439	-40.93%	N/A		2,436	1,439	1,439	-40.93%	N/A	1,439	1,439	-40.93%	N/A	
TOTAL**	14		15,169	23,334	23,334	53.83%	1.15		15,169	23,468	23,468	54.71%	1.11		15,169	23,468	23,468	54.71%	1.11	23,468	23,468	54.71%	0.91	
CCT TOTAL**	14		12,503	17,398	14,414	39.15%	0.77		12,503	16,798	13,742	34.35%	0.75		12,503	11,809	11,809	-5.55%	N/A	11,809	11,809	-5.55%	0.75	
GRTA TOTAL**	14		n/a	0	0	n/a	N/A		n/a	0	0	n/a	N/A		0	3,267	2,381	0.00%	N/A	3,267	2,381	0.00%	N/A	
MARTA TOTAL**	14		n/a	0	0	n/a	N/A		n/a	0	0	n/a	N/A		0	24,671	31,236							

INTERSECTION GRADE SEPARATION ANALYSIS

Grade separation of transit will be needed at some intersections to provide premium transit service along US 41 and maintain adequate traffic operations at critical signalized intersections. A preliminary analysis was performed to identify locations for potential grade separation of intersections within the study area. The first step was to identify intersections where traffic congestion is currently present. The 18 intersections identified in Section 3.2 were considered for potential grade separation in conjunction with implementation of premium transit alternatives. The next step in the screening process involved the use of a process that considers peak hour traffic volumes and transit frequency. The process and associated nomograph is documented in MTA Grade Crossing Policy for Light Rail Transit, Los Angeles MTA (Metropolitan Transportation Authority), December 4, 2003. This nomograph is adapted from the Institute of Transportation Engineers Informational Report, Light Rail Transit Grade Separation Guidelines, 1992 and is shown in Figure B-1: Nomograph for Initial Screening.

As Figure B-1: Nomograph for Initial Screening shows, peak hour volume per lane and peak hour light-rail trains per hour are both considered. Depending on these criteria, the screening of each intersection can have one of three results:

- At-Grade Operation Should be Feasible
- Possible at-Grade Operation
- Grade Separation Usually Required

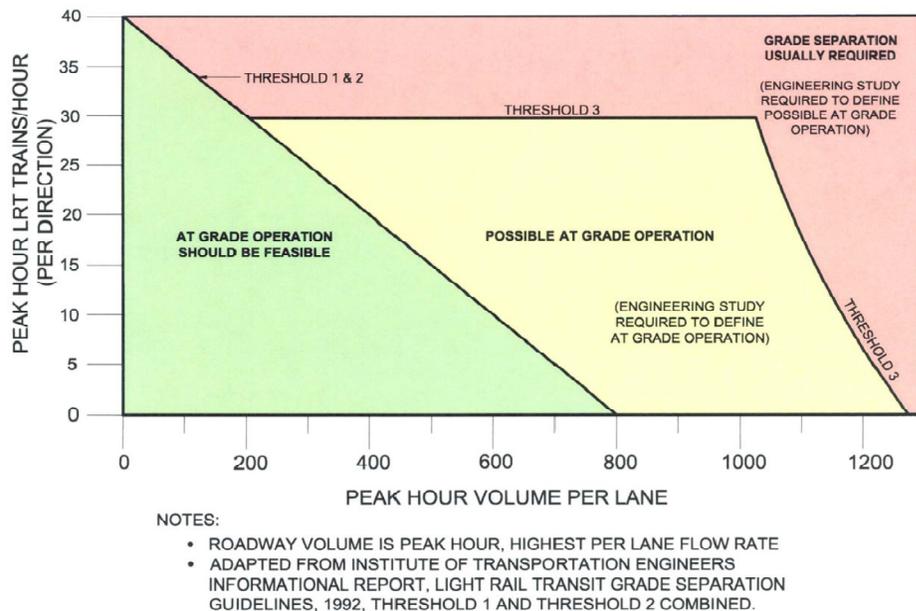


Figure B-1: Nomograph for Initial Screening

Table B-1: Nomograph Screening shows the screening results for each of the 18 intersections under analysis. This screening is based on projected 2040 traffic volumes and lane geometry. A growth factor for the US 41 corridor was developed based on the ARC Plan 2040 Travel Demand Model runs that were conducted as part of this study. This growth factor, indicating a 56% increase in traffic volume demand though year 2040, was applied to develop 2040 projected traffic volumes. The ARC RTP project CO-041 is a capacity project which is planned for completion by 2030. This project will widen Cobb Parkway/US

41 from 4 lanes to 6 lanes from North Marietta Pkwy/SR 120 to north of Windy Hill Road and will widen it to 8 lanes from Windy Hill Road to Windy Ridge Parkway.

As shown in Table B-2: Intersection Operations and Projected Traffic Volumes, the screening results for most intersections show either that "At Grade Operation Should be Feasible" or that "Possible at-Grade Operation is Feasible". The screening results for one intersection, US 41 at Elisabeth St/Industrial Park Dr, show that "Grade Separation is usually required". It should be noted that the need for grade separation using the nomograph is determined primarily by the through volumes on the mainline roadway. Cross street volumes and turning movements to and from the cross street are not considered in direct application of the nomograph.

At the intersection of US 41 at Elisabeth St/Industrial Park Dr., the turning movements to the cross street are very low, which means the through volumes on Cobb Parkway/US 41 are higher. This results in the recommendation for grade separation from the nomograph. However, the traffic volumes on Elisabeth St/Industrial Park Dr. which intersect US 41 are lower than most other cross streets that are a part of this analysis. Two other nearby roadways, Canton Road and the Canton Road Connector/SR 5, both have grade-separated intersections with Cobb Parkway/US 41. Therefore, grade separation is likely not needed at this intersection.

TableB-1: Nomograph Screening

Intersection	2040 PM Peak Hour Volume	Peak Direction # of Lanes	Peak Hour Volume/Lane	LRT Trains/ Hour	At Grade Operation Feasibility
Chastain Rd at Frey Rd/Barrett Lakes Blvd	1,724	2	862	7	Possible at Grade Operation
US 41 at Dallas Acworth Hwy/SR 92	1,473	2	736	7	Possible at Grade Operation
US 41 at Pine Mountain Rd/Jiles Rd	2,011	2	1,005	7	Possible at Grade Operation
US 41 at McCollum Pkwy/Cobb International Blvd	1,962	2	981	7	Possible at Grade Operation
US 41 at Barrett Pkwy	1,198	2	599	7	At Grade Operation Should be Feasible
US 41 at Bells Ferry Rd	1,978	2	989	7	Possible at Grade Operation
US 41 at Elisabeth St/Industrial Park Dr	2,792	2	1,396	7	Grade Separation Usually Required
US 41 at N. Marietta Pkwy/SR 120	1,939	3	646	7	At Grade Operation Should be Feasible
US 41 at Roswell Rd/SR 120	1,585	3	528	7	At Grade Operation Should be Feasible
US 41 at S. Marietta Pkwy/SR 120	1,493	3	498	7	At Grade Operation Should be Feasible
US 41 at Terrell Mill Rd	1,775	3	592	7	At Grade Operation Should be Feasible
US 41 at Windy Hill Rd	1,340	4	335	7	At Grade Operation Should be Feasible
US 41 at Windy Ridge Pkwy/ Cumberland Blvd	1,978	4	495	7	At Grade Operation Should be Feasible
Cumberland Blvd at Spring Rd	1,245	2	622	7	At Grade Operation Should be Feasible
Cumberland Blvd at Cumberland Pkwy/ Mall Driveway	2,186	3	729	7	At Grade Operation Should be Feasible
Cumberland Blvd at Akers Mill Rd/Stillhouse Rd	1,301	2	651	7	At Grade Operation Should be Feasible
US 41 at Cumberland Blvd	730	2	365	7	At Grade Operation Should be Feasible
US 41/Northside Dr at 17th St	2,061	2	1,030	7	Possible at Grade Operation

Other criteria that are important in evaluating the potential need for grade separation include the left-turn volumes from the mainline roadway at each intersection and the cross-street AADT. These criteria, using projected 2040 traffic volumes, are shown in Table B-2: Intersection Operations and Projected Traffic Volumes.

Table B-2: Intersection Operations and Projected Traffic Volumes

Intersection	Current PM Operations	Left-Turn Volume		Cross-Street AADT Range
		Peak Direction	Off-Peak Direction	
Chastain Rd at Frey Rd/Barrett Lakes Blvd	E	240	181	15,000-30,000
US 41 at Dallas Acworth Hwy/SR 92	D	752	8	15,000-30,000
US 41 at Pine Mountain Rd/Jiles Rd	D	392	236	< 15,000
US 41 at McCollum Pkwy/Cobb International Blvd	E	16	612	> 30,000
US 41 at Barrett Pkwy	E	173	214	> 45,000
US 41 at Bells Ferry Rd	E	250	170	15,000-30,000
US 41 at Elisabeth St/Industrial Park Dr	D	89	22	Local
US 41 at N. Marietta Pkwy/SR 120	E	167	390	> 30,000
US 41 at Roswell Rd/SR 120	D	161	306	> 30,000
US 41 at S. Marietta Pkwy/SR 120	D	321	410	> 45,000
US 41 at Terrell Mill Rd	C	226	0	> 30,000
US 41 at Windy Hill Rd	E	293	236	> 45,000
US 41 at Windy Ridge Pkwy/Cumberland Blvd	D	309	86	< 15,000
Cumberland Blvd at Spring Rd	E	792	120	> 45,000
Cumberland Blvd at Cumberland Pkwy/ Mall Driveway	E	1,187	190	> 30,000
Cumberland Blvd at Akers Mill Rd/Stillhouse Rd	E	626	11	15,000-30,000
US 41 at Cumberland Blvd	F	507	105	> 45,000
US 41/Northside Dr at 17th St	F	136	232	> 30,000

To compare the operations at each intersection, the criteria were all assigned a numerical value. This value is shown in Table B-3 Grade Separation Criteria Values.

Table B-3: Grade Separation Criteria Values

Roadway/Traffic Criteria	Assigned Value			
	0	1	2	3
LOS	C	D	E	F
Left-Turn Volume	< 150	150-300	> 300	N/A
Cross-Street AADT Range	15,000	15,000-30,000	30,000 - 45,000	45,000

The assigned values for the criteria at each intersection were totaled in Table 6 – Grade Separation Criteria Summary. Table B-4 Grade Separation Criteria Summary uses the nomograph output and then refines the analysis using the current PM traffic operations, left-turn volumes, and cross-street AADT range.

Table B-4: Grade Separation Criteria Summary

Intersection	Current PM Operations	Left-Turn Volume		Cross-Street AADT Range	Nomograph At-Grade Operation Feasibility	Total
		Peak Direction	Off-Peak Direction			
Chastain Rd at Frey Rd/Barrett Lakes Blvd	2	1	1	1	Possible at Grade Operation	5
US 41 at Dallas Acworth Hwy/SR 92	1	2	0	1	Possible at Grade Operation	4
US 41 at Pine Mountain Rd/Jiles Rd	1	2	1	0	Possible at Grade Operation	4
US 41 at McCollum Pkwy/Cobb International Blvd	2	0	2	2	Possible at Grade Operation	6
US 41 at Barrett Pkwy	2	1	1	3	At Grade Operation Should be Feasible	7
US 41 at Bells Ferry Rd	2	1	1	1	Possible at Grade Operation	5
US 41 at Elisabeth St/Industrial Park Dr	1	0	0	0	Grade Separation Usually Required	1
US 41 at N. Marietta Pkwy/SR 120	2	1	2	2	At Grade Operation Should be Feasible	7
US 41 at Roswell Rd/SR 120	1	1	2	2	At Grade Operation Should be Feasible	6
US 41 at S. Marietta Pkwy/SR 120	1	2	2	3	At Grade Operation Should be Feasible	8
US 41 at Terrell Mill Rd	0	1	0	2	At Grade Operation Should be Feasible	3
US 41 at Windy Hill Rd	2	1	1	3	At Grade Operation Should be Feasible	7
US 41 at Windy Ridge Pkwy/Cumberland Blvd	1	2	0	0	At Grade Operation Should be Feasible	3
Cumberland Blvd at Spring Rd	2	2	0	3	At Grade Operation Should be Feasible	7
Cumberland Blvd at Cumberland Pkwy/Mall Driveway	2	2	1	2	At Grade Operation Should be Feasible	7
Cumberland Blvd at Akers Mill Rd/ Stillhouse Rd	2	2	0	1	At Grade Operation Should be Feasible	5
US 41 at Cumberland Blvd	3	2	0	3	At Grade Operation Should be Feasible	8
US 41/Northside Dr at 17th St	3	0	1	2	Possible at Grade Operation	6

- Note: Intersections highlighted are recommended for Consideration of Potential Grade Separation

Intersections that had an initial nomograph screening result indicating “Possible at-Grade Operation” and a total criteria score of 6 or higher are considered as potentially needing grade separation. These intersections include the following:

Locations for Potential Grade-Separation of Premium Transit

- US 41 at McCollum Parkway/Cobb International Boulevard
- US 41 at Ernest Barrett Parkway
- US 41 at N. Marietta Parkway/SR 120
- US 41 at Roswell Rd/SR 120
- US 41 at S. Marietta Parkway/SR 120
- US 41 at Windy Hill Road
- Cumberland Boulevard at Spring Road
- Cumberland Boulevard at Cumberland Parkway/Mall Driveway
- US 41 at Cumberland Boulevard
- US 41/Northside Drive at 17th Street