

Appendix 1
Public Involvement Summary

CENTRAL AVENUE TOD IMPLEMENTATION PROJECT
 Consolidated Project Participation Plan
 (September 28, 2011) **Revised by M-NCPPC October 13, 2011**

AECOM TASKS	SABRA WANG TASKS	KITTELSON TASKS	OUTREACH PER TASK	SCHEDULE	RESPONSIBLE PARTY(IES)
1A. Initial Station Area and Corridor Assessment	1. Technical Analysis: Traffic Analysis	1. Project Scoping & Kick-off	Design and establish standards for a project website, Facebook page, and format for other informational materials	Sept - Oct 2011	AECOM: design of website RHI: design of Facebook page All: Identification of other info. materials needed (see attached list of potential items) M-NCPPC to host and maintain sites
1B. Background and Data Review	1. Technical Analysis: Traffic Analysis (cont)	2. Background Review & Coordination	Announce project on website, Facebook, etc. County to compile major outreach findings from earlier studies by area (lessons learned) Define role of, and appoint, Project Advisory Committee (PAC) Hold initial PAC meeting	Oct 2011 Oct 2011 Oct 2011 Oct 2011	All teams submit introductory info (project intro, schedule, outreach approach, etc.) to M-NCPPC webmaster to post M-NCPPC project staff M-NCPPC to discuss with teams; M-NCPPC to invite participants M-NCPPC staff to host; key team members to attend
				Nov 15th	

AECOM TASKS	SABRA WANG TASKS	KITTELSON TASKS	OUTREACH PER TASK	SCHEDULE	RESPONSIBLE PARTY(IES)
			Conduct initial stakeholder meetings	Oct 2011	Each team to work with M-NCPPC project staff to identify stakeholder groups; produce a separate stakeholder schedule/who is responsible for each meeting; announce meeting dates to all teams so that they can participate as appropriate
1C. Corridor-wide Market Assessment; 1D. Economic Development Strategies	1. Technical Analysis: Crash Analysis	3. Existing Conditions Analysis	Hold additional key stakeholder meetings to identify issues, opportunities and potential recommendations Design and post on-line survey/mapping exercise to identify physical points of concern in corridor and new visions for corridor	Oct - Nov 2011 Oct 2011	As needed by each team Kittelson to lead effort with input from others
			Plan and conduct PAC walking tour	Oct 2011	Kittelson to lead; others to participate as necessary
			Hold 2 public meetings (E and W sections of corridor): <ul style="list-style-type: none"> ▪ Education/info ▪ Findings to date ▪ Public input on existing conditions and ideas to be considered ▪ Post findings on website and Facebook 	Nov 2011 West Nov 29th East Dec 8th back up date Dec 6th	AECOM and Kittelson to jointly collaborate with M-NCPPC project staff to plan these sessions; teams to provide input for postings to M-NCPPC staff (Note: content emphasis might differ at each meetings based on extent of previous work in that area to date)
2A. Identify Catalytic Projects;	Technical Analysis: Multimodal LOS;	4. Complete Streets Policies + Sections;	PAC meeting to review findings to date and help develop catalytic projects	Jan 2012 West	M-NCPPC staff to organize meetings; AECOM and Kittelson/SWA to prepare content

AECOM TASKS	SABRA WANG TASKS	KITTELSON TASKS	OUTREACH PER TASK	SCHEDULE	RESPONSIBLE PARTY(IES)
2B. Draft Access and Circulation Plan	Recommendations and Cost Estimates	5. Transport. Network Functional Overlay; 6. Alternatives Analysis + Preferred Concept	and alternative concepts (Note: could be 1 or 2 sessions based on level of content for each session) Regular Website/Facebook postings Hold 2 Public Meetings (E and W sections of corridor) in workshop format to define/map stations development sites and scenarios, and provide input on complete street alternatives leading to a preferred concept	Jan 12th East Jan 19th Dec 2011 – May 2012 Feb - Mar 2012 West March 6 th East March 8th	for, present at, and elicit feedback on findings in order to move on to next tasks M-NCPPC webmaster with input from teams AECOM and Kittelson to jointly collaborate with M-NCPPC project staff to plan these sessions
3A. Financial Feasibility; 3B. Implementation Strategies; 3C. Draft and Final Priorities and Strategy Report	(work completed)	7. Implementation	PAC meeting(s) to review draft implementation recommendations Key stakeholder review meetings to review recommendations Two public meetings (E + W) to review and comment on recommendations. (An Open House format with presentation might be useful for this session)	Apr 2012 Apr 5th Apr 2012 Apr – May 2012 West May 1 st East (if not joint) May 8th Jun 2012	AECOM and Kittelson to jointly collaborate with M-NCPPC project staff to prepare for session(s) Each team to identify stakeholder group meetings needed AECOM and Kittelson to jointly collaborate with M-NCPPC project staff to prepare for session
			Planning Board and Elected Official Briefings		AECOM and Kittelson to jointly collaborate with M-NCPPC project staff to prepare for briefings



CENTRAL AVENUE BLUE LINE CORRIDOR IMPLEMENTATION

Public Meeting #1: Eastern Communities

December 8th, 2011 from 6:45 to 8:45 pm

Prince George's County Sports and Learning Complex

Part 1. Introductions and General Orientation

6:45 – 7:30 pm

- SIGN IN AND BROWSE EXHIBIT STATIONS
- WELCOME AND INTRODUCTIONS
- DESCRIPTION OF TONIGHT'S SESSION/INTRO TO INITIAL DISCUSSION
- INITIAL TABLE DISCUSSION (10 minutes)
 - *Introduce yourself to the people at your table and describe:*
 - Why have you come? What brought you to the meeting?
 - Where you live (place a dot & your first name in this location)?
 - How long have you lived in this area (write # next to dot)?
 - How you usually travel around this area: on foot, by car, by bike (show of hands)?
- MNCPPC PROJECT OVERVIEW
 - Sub-region 4 Master Plan Status and key recommendations
 - Implementing the Plan
- TABLE #2 DISCUSSION (5 minutes)
 - *Have you been previously involved in the Subregion 4 planning process (show of hands)?*
 - *What are the 2 most important outcomes that you would like to see from this implementation effort (note on the table map)?*

Part 2. Complete Streets and This Corridor: Presentation

7:30 – 7:50 pm

- PRESENTATION: PART 1
 - What are Complete Streets?
- PRESENTATION: PART 2
 - Key Issues & Opportunities in this Corridor

Part 3. Role Playing Exercise: Focus on Corridor Experience **7:50 – 8:30 pm**

- INTRODUCTION OF TABLE EXERCISE #3
- COMPLETE STREETS FROM A MODE/USER PERSPECTIVE

(Pick one of the “role cards” at your table. For the role you have chosen, answer the questions below. Then, be prepared to discuss your responses to the questions. Think about how you use the corridor today AND how you might want to use it in the future as the plan is implemented.)

 - **Imagine that you are a pedestrian in this area:**
 1. As a pedestrian here, what are your 3 major concerns?
 2. Which streets are you most *comfortable* and *uncomfortable* walking on and why? (green marker)
 3. Which *intersections* in the area need to be improved? (red marker)
 - **Now, imagine that you are a motorist or freight/truck delivery person in this area:**
 1. As a driver, do you feel it is *easy* or *difficult* to get through this area?
 2. As a driver, which *intersections* in the area need to be improved?
 3. As a delivery person, is it *easy* or *difficult* to make deliveries here?
 - **Now, imagine that you are a Metro-rider in this area:**
 1. Which *station* would you prefer to use and why?
 2. How *easy* is it to get to this station from where you live? Would you walk, take the bus or drive? If you walk, which route would you take?
 - **Now, imagine that you are a bus rider in this area:**
 1. What do you *like most and least* about taking the bus in this area?
 2. Which bus stop are you *likely to use* from your house? Is this convenient?
 - **Imagine that you are a biker in this area?**
 1. Is this an *easy area to bike* in (Yes/No)? Why do you say that?
 2. What streets do you feel *comfortable/uncomfortable* biking on?

Part 4. Recap and Next Steps **8:30 – 8:45 pm**

- REPORTING BACK AND COMMENTING
 - One representative from each table will summarize the major results of the role-playing exercise and state any preferences for the opportunity areas
 - Any other questions or comments?
- NEXT STEPS

12/14/11


Central Avenue Transit-Oriented Development (TOD) Implementation Proje...

KITTELSON MAPS

COMMENTS FOR "CENTRAL AVENUE TRANSIT-ORIENTED DEVELOPMENT (TOD) IMPLEMENTATION PROJECT"


[← Back to the map](#)

1.  Added December 14 2011
Bike lane on Harry Truman Drive

2.  Added December 14 2011
Harry Truman Drive needs better access management

3.  Added December 14 2011
Areas east of Largo road need better bike connections to the metro.

4.  Added December 14 2011
Parking in The Largo Town Center Metro lot is full by 8am

5.  Added December 14 2011
Need High quality employment areas in the project area.

map.project.kittelson.com/maps/65/admin

1/21

12/14/11

Central Avenue Transit-Oriented Development (TOD) Implementation Proje...



Added December 14 2011
Higher retail needed in the study area



Added December 14 2011
Potential bus rerouting? The busses are running but there are no riders.




Added December 14 2011
There should be retail along with the housing (mixed use) along Morgan Boulevard, people walking along Garret Morgan Boulevard to FedEx field are money walking by!



Added December 14 2011
When will recommended projects be implemented?



Added December 14 2011
Pedestrians do not feel safe along the trail/sidewalk connections behind the metro station


11.  Added December 14 2011
Night safety is a problem for pedestrians

12.  Added December 14 2011
Median/refuge missing

13.  Added December 14 2011
I want this project to include economic development and revitalization in the area

14.  Added December 14 2011
Safe pedestrian walkways along Central Avenue, improve sidewalks

15.  Added December 14 2011
What are you proposing for this project? This is not clear to alot of people

16.  Added December 14 2011
better retail needs.

17. Added December 14 2011
remove blight



18. Added December 14 2011
Great corridor for truck delivery drivers, convenient at the expense of other users (light industrial corridor).



19. Added December 14 2011
Good auto freight access.



20. Added December 14 2011
More diversity for housing options



21. Added December 14 2011
lighting for pedestrians is a problem throughout the corridor



22. Added December 14 2011
existing trails not used or maintained



23.



Added December 14 2011

Metro seems to be the center piece of the effort; not the people

24.



Added December 14 2011

Neighborhood concerned with new connections to back of homes

25.



Added December 14 2011

Maintain trees

26.



Added December 14 2011

Bike lanes on Morgan Boulevard

27.



Added December 14 2011

need reinvestment

28.

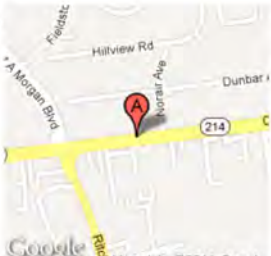



Added December 14 2011


Bike connection between neighborhoods and Largo town center and metros


29.  Added December 14 2011
neighborhood needs connection to the Morgan Boulevard Station

30.  Added December 14 2011
reinvest in developed areas


31.  Added December 14 2011
crossing central ave, not enough time and not safe

32.  Added December 14 2011
Starbucks and sit down restaurants

33.  Added December 14 2011
Community development?


34.  Added December 14 2011
Better crossing needed

35.  Added December 14 2011
development and connections across park are needed


36.  Added December 14 2011
No metrobus service to Morgan boulevard

37.  Added December 14 2011
need sign to slow down


38.  Added December 14 2011
New temp lights with generators placed in areas

39.  Added December 14 2011
Dangerous


40.  Added December 14 2011
High speed

41.  Added December 14 2011
Speed of traffic coming at corner


The map shows the intersection of Central Avenue and Brykhurst Road. A red pin is placed at the corner. The map data is from 2011.

42.  Added December 14 2011
minimize ped conflicts with signal timing


The map shows the intersection of Addison Road and 68th Street. A red pin is placed at the intersection. The map data is from 2011.

43.  Added December 14 2011
consistent speed management needed

The map shows the intersection of Addison Road and 68th Street. A red pin is placed at the intersection. The map data is from 2011.

44.  Added December 14 2011
Town homes access issues

The map shows the intersection of Hill Road and Central Avenue. A red pin is placed at the intersection. The map data is from 2011.

45.  Added December 14 2011
tough right turns because sight lines are poor

The map shows the intersection of Hill Road and Central Avenue. A red pin is placed at the intersection. The map data is from 2011.

46.  Added December 14 2011
Sight lines when permitted left turns are poor.

The map shows the intersection of Hill Road and Central Avenue. A red pin is placed at the intersection. The map data is from 2011.

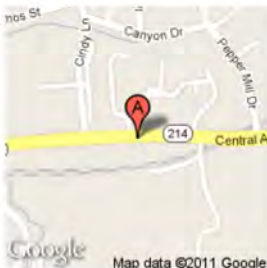
47. Added December 14 2011
sudden lane drop



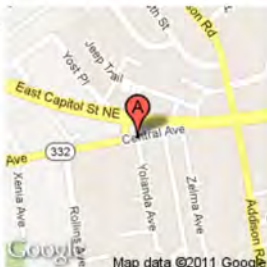
48. Added December 14 2011
Existing traffic calming



49. Added December 14 2011
poor lighting



50. Added December 14 2011
connect yolanda ave to central ave?



51. Added December 14 2011
Add sidewalks on addison...poor lighting





52. Added December 14 2011
Ped crossing needed here





53. Added December 14 2011
Confusing intersection





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- 54.  Added December 14 2011
Midblock crossing


 - 55.  Added December 14 2011
Bike lanes


 - 56.  Added December 14 2011
better streetscape and maintenance


 - 57.  Added December 14 2011
Bike lanes


 - 58.  Added December 14 2011
Neighborhoods are better walking with less traffic and with sidewalks


 - 59.  Added December 14 2011
Planned shopping center










 - 60.  Added December 14 2011
Neighborhoods are hilly, Capital Avenue is the most direct

 - 61.  Added December 14 2011
Building here that is potentially being renovated

 - 62.  Added December 14 2011
existing school bus stop

 - 63.  Added December 14 2011
existing speed bumps

 - 64.  Added December 14 2011
No walking on Central
-

- | | | |
|-----|---|---|
| 65. |  | <p>Added December 14 2011</p> <p>Wider sidewalks and school bus stops needed on Central</p> |
| 66. |  | <p>Added December 14 2011</p> <p>Rolling Ridge drive can be a bypass of Addison/Central</p> |
| 67. |  | <p>Added December 14 2011</p> <p>Add signal</p> |
| 68. |  | <p>Added December 14 2011</p> <p>Raised crosswalk or bridge</p> |
| 69. |  | <p>Added December 14 2011</p> <p>need to slow down cars, lots of pedestrians</p> |
| 70. |  | <p>Added December 14 2011</p> <p>Existing bus stops no bus stops</p> |
| 71. |  | <p>Added December 14 2011</p> <p>Need to locate bus stops at intersections, hard to see sidewalkers</p> |
| 72. |  | <p>Added December 14 2011</p> <p>Sidewalks on Addison and better lighting and drainage</p> |
| 73. |  | <p>Added December 14 2011</p> <p>Potential to widen addison with new development</p> |
| 74. |  | <p>Added December 14 2011</p> <p>New connection to Karen Boulevard</p> |
| 75. |  | <p>Added December 14 2011</p> <p>Congested intersection</p> |



Added December 14 2011
Make 1 way?



Added December 14 2011
Pedestrian bridge? Tunnel?



Added December 14 2011
bigger median Island needed



Added December 14 2011
Connection to bus stop?



Added December 14 2011
Bikes on Addison (Maine Route)



Added December 14 2011
Signal timing changes (congestion on Addison)



Added December 14 2011
New connectioun between Yolanda and Addison Road













Added December 14 2011
Right turn from old Central to Central is a problem for pedestrians.

























Added December 14 2011
East Capitol street has alot of intersection and no turn lanes.



Added December 14 2011
Sight distance problem due to Hill

- | | | |
|-----|---|---|
| 86. |  | <p>Added December 14 2011</p> <p>More local destinations for people to walk to.</p> |
| 87. |  | <p>Added December 14 2011</p> <p>connect Karen Blvd to Peppermill Drive</p> |
| 88. |  | <p>Added December 14 2011</p> <p>Ped or traffic signal needed</p> |
| 89. |  | <p>Added December 14 2011</p> <p>Right turn conflicts.</p> |
| 90. |  | <p>Added December 14 2011</p> <p>people are speeding and changing lanes</p> |
| 91. |  | <p>Added December 14 2011</p> <p>Ped signal at addison crosswalk needs improvement</p> |
| 92. |  | <p>Added December 14 2011</p> <p>No left turn signals</p> |
| 93. |  | <p>Added December 14 2011</p> <p>Policy discussion on maintenance of streetscape and other improvements</p> |
| 94. |  | <p>Added December 14 2011</p> <p>Need for sidewalks on Addison road and not just in front of the new development. There are also right-of-way issues.</p> |
| 95. |  | <p>Added December 14 2011</p> <p>Corridor wide way-findings and identification signage</p> |

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|------|---|--|
| 96. |  | <p>Added December 14 2011</p> <p>Rollins Avenue has no space for walking, poor lighting, no sidewalks, potential widening of road. There are new townhouses but lack connectivity.</p> |
| 97. |  | <p>Added December 14 2011</p> <p>Dead end streets are a potential problem for safety vehicles: Bulgar Street, Bolsan Street, Uline Street</p> |
| 98. |  | <p>Added December 14 2011</p> <p>Useless traffic signal at crown street and Central Avenue</p> |
| 99. |  | <p>Added December 14 2011</p> <p>Better Street signage</p> |
| 100. |  | <p>Added December 14 2011</p> <p>Any further development proposed?</p> |
| 101. |  | <p>Added December 14 2011</p> <p>Retiming durring peak periods</p> |
| 102. |  | <p>Added December 14 2011</p> <p>Better Bike Storage</p> |
| 103. |  | <p>Added December 14 2011</p> <p>Retiming durring the peak periods.</p> |
| 104. |  | <p>Added December 14 2011</p> <p>Set speed limits to be consistent</p> |
| 105. |  | <p>Added December 14 2011</p> <p>Retiming durring peak periods</p> |
| 106. |  | <p>Added December 14 2011</p> <p>Poor signage</p> |

107.		<p>Added December 14 2011 Need a left turn light</p>
108.		<p>Added December 14 2011 Vehicles passby on the right at Walker Mill and Addison.</p>
109.		<p>Added December 14 2011 Red light runners</p>
110.		<p>Added December 14 2011 Cars driving too fast</p>
111.		<p>Added December 14 2011 Cars driving too fast.</p>
112.		<p>Added December 14 2011 Need to improve lighting and downhill grade are a problem</p>
113.		<p>Added December 14 2011 rear end accidents concern for left turners at Addison Rd./Wilburn Drive.</p>
114.		<p>Added December 14 2011 signal coordination along East Capitol street for traffic calming</p>
115.		<p>Added December 14 2011 NO Sidewalks</p>
116.		<p>Added December 14 2011 The street suddenly changes from two lanes to one lane travelling southbound, there needs to be warning signs.</p>
117.		<p>Added November 18 2011 Hard to cross the street here. Cars never stop!</p>

Central Avenue Stakeholder Interview Summaries

Prince George's County Parks and Recreation

OVERVIEW OF PROJECT

- There are opportunities for trails to be a part of the new transportation network in the corridor, providing routes for pedestrians and bicyclists other than Central Avenue itself. This project includes short- and long-term opportunities that will support anticipated TOD development. The team reviewed preliminary design concepts for several Opportunity Areas:
 - Maryland Park Avenue connection to the Watts Branch Trail
 - Central Avenue Connector Trail to the Morgan Boulevard and Largo Town Center Metrorail stations
- Several trails projects within the corridor may benefit from work on the implementation plan, including:
 - land acquisition for the Chesapeake Beach Rail-Trail
 - construction of segments of the Cabin Branch Stream Valley Trail
 - other neighborhood trail connections

KEY ISSUES

- DPR preference for a trails network that serves destinations. Top priority is to provide access to recreation facilities and parks.
- DPR supports designating trails for transportation, because the maintenance then falls to others, such as public works, SHA or private property owners. Need to establish an MOU with the agency that has maintenance responsibilities.
- As trails are used and considered part of the transportation system, portions need to be lighted. This will require developing a set of criteria to determine when and where lighting and other safety features are needed. Examples of trails with lighting include the trail to the West Hyattsville Metrorail station, the trail to National Harbor, and the trail connecting UMD student housing in University Park to the campus.
- Trail crossings of major roads such as Central Avenue, Southern Avenue, Arena Drive, and Morgan Boulevard need to be addressed in Opportunity Area concept plans.

- More information is needed on the proposed consolidated Parks and Recreation offices complex on the M-NCPPC property near the Morgan Boulevard Metrorail station.

FOLLOW-UP, RELEVANCE TO THE PROJECT

- Chuck Kines or Eileen Navaro can provide long range travel forecasting.
- Better understand inter-agency requirements, needs and opportunities when designating a trail for transportation.
- Address the need for trail lighting
 - See if lighting CIP project can be used for trails, not just for recreation facilities.
 - Develop/recommend criteria to determine where to light trails. Current process is location-specific and does not use an established set of criteria. Toole Design Group has established a recommended set of criteria, based on research of existing trails that are lighted and work on the W&OD Trail in Virginia.
- Revise design concepts for Opportunity Areas to include trails crossings.

District Department of Transportation (DDOT) and District of Columbia Office of Planning (DCOP)

EAST CAPITOL STREET PEDESTRIAN SAFETY STUDY

- DDOT is currently performing an East Capitol Street pedestrian safety study from Minnesota Avenue to the District line. The study will be finished in April of this year (approximately). See the project website for additional information: <http://www.kls-eng.com/EastCapitolStreet/>.
- The preferred alternative is to implement full-time parking along the entire corridor, which would result in two through lanes and bike lanes in both directions. The cross section dimensions will be:
 - 10' inside lane
 - 11' outside lane
 - 5' bike lane
 - 8' parking lane
- The project will also add several pedestrian signals and/or HAWK signals.
- Looking at curb extensions on East Capitol at several location to lock it into 2 lanes in each direction.
- DDOT analysis showed that historical traffic trends on the corridor are negative, with ADT approximately 5,000 lower than it was 10 years ago.
- Capacity analysis generally shows that the corridor works adequately with a road diet. The critical intersection is Benning/East Capitol which requires reconfiguration, but otherwise operations look good. Benning/East Capitol also needs to accommodate streetcar, which complicates things.
- DDOT standard is LOS D, but this standard was applied only to existing conditions and not 2037 (2037 model shows everything failing regardless of the option chosen). DDOT's primary criteria is that changes do not degrade operations from current conditions.
- DDOT/DCOP would welcome M-NCPPC assessing the potential for a road diet on East Capitol Extended/Central Avenue. This would hopefully assist in changing the built environment and would also encourage drivers heading into the District to slow down due to the perception of coming into a denser, more urban environment. Buildings closer to the street will help to convey the vision for the corridor that the District would like to see.

CAPITOL HEIGHTS WAL-MART

- Current plan for Wal-Mart has all access from East Capitol Street. There will be no access from Southern Avenue. Primary access point will be via a new signal on 58th Avenue.

- DDOT is not currently looking at major changes to Southern Avenue/East Capitol, although they recognize the need for pedestrian improvements.
- The development will include some satellite retail, but not street-fronting. Early renderings show the development from the street as “looking similar to a school”.
- Development is “by-right” and does not require any zoning changes. As a result, DDOT is limited in the amount of improvements that they can condition on the developer.
- Primary pedestrian route to the Wal-Mart from the Metro is being planned, including need for pedestrian access improvements (bulb-outs, etc.)
- DDOT has asked Wal-Mart to look into an underpass of Southern Avenue/East Capitol Street, but this is considered unlikely.
- Improvements from Wal-Mart may include Far Northeast Livability Study recommendations.

GENERAL

- DDOT has no specific criteria for road diets. However, they actively seek opportunities to use road diets to (1) slow vehicles based on impact to pedestrian safety and (2) provide bike accommodations.
- DC recently completed a TOD plan, and would be interested in knowing any M-NCPPC plans for Capitol Heights
 - Park & Planning has designated Capitol Heights as a Community Center.
 - DCOP will provide additional information on the TOD Plan to M-NCPPC.
- DDOT is generally fine with 10’ travel lane, but prefers 11’ next to bike lanes when there is a transit route. Typical lane width of 10’ always preferred for interior lanes.
- Given the difficulty of accommodating bikes comfortably on Central Avenue, DDOT suggested the potential for the Central Avenue project team to consider a wide side-path instead of bike lanes.

Department of Public Works and Transportation (DPW&T)

MULTIMODAL IMPROVEMENT OPPORTUNITIES

- DPW&T is interested in working with M-NCPPC and SHA on a long-term access management approach.
- DPW&T noted that the section of Walker Mill Road abutting Walker Mill Regional Park was improved with bike lanes and sidewalks recently. The project team will field-check to ensure that this is reflected accurately in our maps.
- DPW&T is open to providing bus stop improvements, but would generally ask for joint cost-sharing with another entity (e.g., transit agency, developer).
- TheBus has a shelter contract, and where there is high demand will work with the contractor to install shelters. DPW&T noted that The Bus has had difficulties in the past obtaining access permits from SHA.
 - DPW&T suggested that this project could be an opportunity to smooth the process of getting permits from SHA to place shelters.
- DPW&T policy is for continuous lighting on all county roads, but SHA only lights intersections. DPW&T is very interested in having some type of lighting on Central Avenue at non-intersection locations.
- On Maryland Park Drive there has been a back and forth related to speed bumps. Divided opinion for neighbors on the same street. DPW&T is generally very open to a range of traffic calming mechanisms, and has a neighborhood traffic management program to deal with requests.
- DPW&T is increasingly looking to connect bike facilities wherever possible. They see parallel bike routes to Central Avenue as a priority.
- Issue of sidewalks on state routes has been an issue for DPW&T. DPW&T does not have resources to maintain them with the current capital budget. DPW&T is happy to maintain any new sidewalk on County roads.
- The County recently received a Safe Routes to School grant and 3 of the 5 schools are in the general area: Oak Crest, Highland Park and Gray. DPW&T is making improvements to sidewalk connections in the vicinity of these schools.

DEVELOPMENT REVIEW

- In general, several large developments along the corridor are currently installed. Several of these would be required to make significant frontage improvements.
- Additional coordination is needed between M-NCPPC, SHA and DPW&T on development projects that are in the pipeline.
- DPW&T is open to using agreements with community organizations to maintain streetscaping. There will be development on this corridor, and this is likely to be an issue.
 - Good idea to seek HOA/BID arrangement to assist in maintenance needs
- DPW&T noted the need to be realistic about approaching funding and implementation, and identify needed legislation to make it happen.
 - M-NCPPC is currently working with DHCD to designate the corridor as a sustainable community. Hopefully has the potential for funding eligibility.
- Developers talk to DPW&T and SHA before they buy property and want to find out what they are going to be required to construct. The standard response from SHA and DPW&T needs to reflect the outcomes of this study so that it is communicated to developers early-on. Needs to be a hard link between DPW&T, SHA and M-NCPPC when a developer comes to talk to the County.

SITE SPECIFIC IMPROVEMENTS

What does Central Avenue project team need to do to justify these type of improvements?

- Traffic counts at a minimum and show operations
- Need to show that there is no deterioration of operations as a result.
- Provide basic information to DPW&T and let them comment

Maryland Park Drive

- Some hesitation with closing Maryland Park Drive. Need to see numbers on how traffic would re-route, and how that would affect operations.
- Meetings with the community show that there are 2 factions, with some concerned about direct access and other concerned with traffic volume/speed. Would want to review proposals in more detail.

Addison Road Metro

- DPW&T will review Phase 2 suggestions in more detail and provide comments.

Maryland State Highway Administration (SHA) and Maryland Department of Transportation (MDOT)

ACCESS MANAGEMENT

- The consulting team wants to address the needs of MD SHA in terms of Access Management along the corridor
- The State cannot close existing driveways without financial compensation. Only when a site plan is submitted for a change in land use does the State have a 'free' opportunity to close access points.
 - SHA formerly had a capital fund to purchase access control from willing sellers. They are still developing the access management plan for this but no money is available for purchases anymore.
- To implement a long-term access management plan, requiring specific frontage improvements/ dedication, the District, Regional Planning and Access Management would need to be involved.
- The consulting team wants to find a process for implementing access management strategies for when they have a better handle on the typical cross section. However, since a typical cross section has not been decided on it is difficult for SHA to say what will be needed.

FUTURE CROSS-SECTION ALTERNATIVES

- DDOT will implement a permanent road dikes along East Capitol Street from Minnesota Avenue to Prince George's County Line
- A future roadway cross-section/ right-of-way envelope was discussed. SHA would like to review the travel forecasting technical analysis and proposed geometry.
- The County would need to produce a sectional plan amendment as well as an updated County priority letter with Central Avenue moved near the top to initiate a formal Project Planning study.

POTENTIAL EXAMPLE LOCATIONS

- **MD 64**
- **MD 510**
- **MD 201**-from MD 450 to MD 410-Part of the communities and safety program
- **MD 4** - Forrestville Road to MD 458- attempting to change the principal arterial functional classification, added midblock crossing and channelized pedestrians, residential on one side of the corridor and commercial on the other.

POTENTIAL FUNDING

- Kate Sylvester identifies that the Maryland Bikeways Program can potentially fund some of the bicycle improvements on local roads. The program plans to fund \$4 million per year for 2013 and 2014.

- MDOT has a new bikeway improvement program that can fund bike facilities on both State and local roadways, which will be a competitive pool of up to \$4 million per year.

LIGHTING AND TRANSIT SHELTERS

- SHA does not construct continuous lighting on roadways but requires warrants for roadway lighting along certain segments.
- SHA will construct continuous roadway and ped lighting as part of a project only if the County contributes funding and agrees to maintain it.
- DPWT's current policy is to continuously light all County roadways, while SHA's policy is to provide lighting only at intersections. DPWT has requested continuous lighting along Central Avenue

ADA RETROFIT FUND

- SHA has a GIS database for ADA compliance needs.
- SHA has issued a design guideline as part of the "Access to Transit Program" for bus stop landings. The guidelines are based on speed and volumes of the busses.

SHORT-TERM IMPROVEMENTS

- **Signal timing/ phasing** improvements (cycle lengths, advanced WALKs, protected left-turns) should be sent by the County through the District Office for discussion with the Office of Traffic
- Short-term **access management** changes not related to driveway closures (e.g. side street or median closures) need technical analysis to identify operational impact of diverted vehicle traffic volumes, and this should be sent by the County to SHA Access Management
- The County can **widen the sidewalk** along Central Avenue at any time, provided there is available right-of-way, they fund it, they submit plans for SHA review and obtain permits.
- The SHA's policy on **enhanced and/ or continuous lighting** is that it needs to be supported by a photometric analysis and warranted based on safety needs. The County can build and maintain additional lighting (vehicle or pedestrian scale) along MD 214 assuming they pay for it, provide the technical analysis and obtain the required permits.
- **ADA deficiencies** – this request should go through the Office of Highway Development (Lisa Choplin) which maintains a GIS database of ADA deficiencies and has several separate funds (including an access to transit improvements).
- **Improved mid-block pedestrian crossings** (signing, crosswalks, flashing beacons, pedestrian signals) should be sent to the District
 - **Enhanced crosswalk treatments** such as synthesized colored asphalt are approved by SHA and can be implemented pending approval from the District.
 - **Colored lanes for bicycles and/ or off-peak restrictions for bus and bicycle may be considered**
 - **New traffic signals** – send completed warrant analysis to District 3
 - Safety improvements such as additional crash cushions or revised lane assignment through the I-95 interchange should be requested to the District.

Washington Metropolitan Area Transit Authority (WMATA)

PEDESTRIAN ACCESS TO METRORAIL

- Project team summarized several potential projects along corridor, including significant changes at Davey Street. Most of the crossings are unmarked, roadway narrowing to add sidewalks and slow traffic. Also discussed the intersection of Davey/Southern Avenue.
 - Analysis should consider current pedestrian access to the station? Priority should be on locations with largest potential for improvement.
 - Pedestrian safety is a good motivation for identifying projects as well.
- WMATA supports improved access and safety for pedestrians, and WMATA has created implementation plans and projects to fund highest priority improvements. WMATA typically does not fund improvements outside of their property.
- Bike/Ped Plan identified \$28M of needs and only \$6M of funding. Metro is looking for local jurisdictions to take the lead on funding projects.
- WMATA is making crosswalk curb cut improvements at 5 stations currently. Our stations are not in the current 5. Recently built a sidewalk at Largo Town Center. Main criteria are high ridership, short-distance park-and-riders, and other factors that indicate high cost-effectiveness.
- Exploring mechanism to provide funding off Metro property, but haven't done this. Have not explored cost-sharing with other implementing agencies in detail yet for off-site pedestrian improvements. Currently there isn't a formal process for cost-sharing agreements.
- FTA allows use of federal money for bike/ped improvements, but there is no specific federal money for this purpose.

BUS STOP ACCESS IMPROVEMENTS

- Inaccessible bus stops are a key priority for WMATA Board
- WMATA recently received a \$1.2M FTA New Freedom capital grant is to improve ADA access to fixed route bus stops. Need to show that it will increase disabled use of the bus system. Money set aside to identify prioritized locations. Estimated \$20-25k per bus stop.

- Don't have detailed stop level bus ridership, but currently working on that using Automatic Passenger Counter data.

CAPITOL HEIGHTS/WAL-MART

- WMATA has not heard a lot of desire for a pedestrian tunnel, and doesn't see it as likely. The cost would be at least \$15M cost.
- WMATA has no particular criteria/policy on new station entrances. It depends on available funding. In addition, it would need to be designed in a way that it is very easy to police. WMATA would be unlikely to take on policing of a new tunnel unless the design minimized safety risks.

MORGAN BOULEVARD

- WMATA feels that there is a great opportunity for TOD at Morgan Boulevard using WMATA and M-NCPPC land. This is a high impact opportunity.
- Fiscal impact analysis of Cameron Crossing development would be useful. Residential may be beneficial to the County tax revenues.
- Trail connections:
 - WMATA would not build a trail near Morgan Boulevard until a TOD takes place, because WMATA would not want to constrain future development opportunities.
 - WMATA is not opposed to a trail on top of Metro alignment, but it would need a lot of feasibility analysis.

CLOSE-OUT

- WMATA would like to think about complete networks more than just complete streets. Buses and bikes do not always need to be on the same street.
- WMATA suggested that many jurisdictions have great transit ideas, but then ask others fund them, and that doesn't work. Host jurisdiction needs to dedicate their money to demonstrate their own commitment.
- WMATA suggested that one way of analyzing pedestrian and bicycle improvements is through cost-effectiveness. Recognizing that DPW&T is resource constrained, pedestrian and bicycle improvements may be significantly cheaper than accommodating the vehicle trips that would otherwise occur.

Appendix 2
Policy and Standards Review



CENTRAL AVENUE-METRO BLUE LINE CORRIDOR (TOD) IMPLEMENTATION PROJECT

Complete Streets Policy and Issues Summary

Specifications and Standards for Roadways and Bridges (DPW&T)

- “New roadway construction or reconstruction shall result in roadways that are safe and that promote mobility for auto, pedestrian, bicycle, public transit, and all other elements of the traveling public.”
- “Where possible, each street should be extended to intersect another street or to be intercepted by other streets...to eliminate any need for a cul-de-sac.”
- "...sidewalk construction is required on both sides of arterial, collector, and industrial roadways with no exceptions." The standard is much less rigid for residential streets, and is tied primarily to length of cul-de-sacs.
- “The Department supports design criteria that promote minimum traffic volumes and lowest possible speeds on residential streets.”
 - Includes standard design details for multiple traffic calming features, including speed humps, raised crosswalks, neighborhood traffic circles, speed reducing islands, pedestrian crosswalk islands, chokers, diverters, semi-diverters, and intersection tables.
 - States that a “**discontinuous street patter is also desirable**, provided that the maximum travel distance from the furthest residence to the nearest collector road is limited to 0.5 miles and that a motorist need not make more than three turning movements”
- “Shelters shall be installed adjacent to those established County transit and Metrobus stop locations where County transit planners and project engineers deem such construction feasible and cost effective.”

County Zoning Code Subtitle 27 (Prince George’s County)

- “Adequate roads will be available to serve development and all traffic it will generate, or an adopted and approved Master Plan shows those roads, which have their construction scheduled and one hundred percent (100%) funded in the current adopted County Capital Improvement Program, State Consolidated Transportation Program, or Federal Highway Administration Program; and the generated traffic will be accommodated by roads and intersections in the development’s traffic study area, so that they will operate at adequate levels of service, as defined in the General Plan and the Guidelines for Analysis of Traffic Impact of Development Proposals.”
- Minimum parking requirements are excessive and procedures for establishing reduced parking requirements in select zones are complicated.
- Limited allowance for mixed use residential/commercial buildings, increased residential density, or increased FARs, even near Metro stations.
- Driveway requirements for residential developments and parking lots limit the feasibility of access management/consolidation.

Prince George’s County Planning Department
The Maryland-National Capital Park and Planning Commission (M-NCPPC)





CENTRAL AVENUE-METRO BLUE LINE CORRIDOR (TOD) IMPLEMENTATION PROJECT

Transportation Review Guidelines (Prince George's County Planning Department)

- Draft guidelines, currently under Planning Department senior review, include a Transit-Oriented Development Checklist.

Street Construction Review Checklist (DPW&T)

- Midblock crossings are not permitted

Potential Policy Recommendations for TNFO

- Eliminate minimum parking requirements for development in TOD areas. Consider maximum parking ratios.
- Complete development of the TOD checklist to allow relaxed traffic impact requirements in TOD areas.
- Establish a mid-block crossing policy that discourages mid-block crossing in general, but provides specific criteria for appropriate use (e.g., distance from nearest signal, proximity of key destinations, traffic volume, etc.)
- Require subdivision layout to **maximize** connectivity and a complete network, rather than prioritize a discontinuous pattern.
- Establish maximum block lengths to ensure connectivity and improve access to transit.
- Establish policy for implementing CB-2 and identifying appropriate pedestrian and bicycle improvements for developer contribution.
 - Establish “rational nexus”
- Require sidewalks on both sides of all new streets in TOD & urban areas
- Require dedication of all streets & trails (including buffers and sidewalks) as public ROW based on Complete Streets typology and network
- Design new streets following the Complete Streets typology and Complete Streets principles.
 - Design streets from the outside-in, starting with desired land use and non-motorized modes
 - Sufficient buffer to support healthy trees is essential
 - Focus on intersections
 - Avoid private streets serving as parking lot access lanes.





CENTRAL AVENUE-METRO BLUE LINE CORRIDOR (TOD) IMPLEMENTATION PROJECT

Complete Streets Case Studies

Arlington, VA – Transportation Demand Management and Site Plan Review

- Arlington’s Transportation Demand Management (TDM) Program for Site Plan Development coordinates site plan development with commuter and transit services.
- The 1990 TDM Policy outlines a matrix of voluntary TDM strategies based on the site’s land-use and transportation categories. Matrix is used in site review and negotiation with the County to identify a final set of TDM strategies are written into the approved Site Plan Conditions and Transportation Management Plan (TMP).
- Developers must implement their TMP and prepare a TDM report before approval of the first Certificate of Occupancy and submit an updated TDM Report each year.

Portland, OR – Maximum Parking Requirements

- No minimum parking requirement for sites located less than 500 feet from a street with 20-minute peak hour transit service. The application requirement to request this exception is a map identifying the site and a copy of transit schedules for routes within 500 feet of the site.
- Vehicle parking substitutions allowed for tree preservation, bicycle parking, and transit-supportive plazas.
- Minimum carpool parking requirements for office, industrial, and institutional uses.
- Maximum parking requirements for all uses .



Portland Bureau of Transportation’s “Green Transportation Hierarchy”

San Francisco Metropolitan Transportation Commission Transportation for Livable Communities Program

- Housing Incentive Program (HIP) provides federal transportation funding to communities that successfully promote high-density housing and mixed-use developments in transit station areas.
- Links transportation funding and land use planning. Local governments must adopt a transit-supportive station area plan that achieves established housing densities within 0.5 miles of stations in order to receive funding.
- MTC anticipates that this will lead ultimately to the construction of an additional 42,000 units of transit-oriented housing.
- Station area plans must also address pedestrian-friendly design standards, local circulation, and TOD-supportive parking policies.



Appendix 3
Transportation Modeling Methodology and NCHRP 225 Results

MODELING DATA SOURCES

The principal tool used to develop travel forecasts for future scenarios was the Prince George's County travel demand model. This model uses the TransCAD software package and was originally a subset of the model used by Metropolitan Washington Council of Governments (MWCOCG). Over the years, M-NCPPC's Transportation Planning Section (TPS) staff has greatly increased link density and data fidelity specific to Prince George's County. The County model is the most appropriate choice for a corridor-level study along Central Avenue.

The County's transportation modelers and project staff provided model outputs for three distinct years: 2000, 2010, and 2040. The 2000 version of the model is the County's most recent, calibrated, and validated model, and uses data from the US Census, American Community Survey, MWCOCG, and other sources. Ideally, this would be the model used throughout the project area to represent existing conditions. However, the 2000 model's transportation network is missing some important transportation links that are part of the 2011 existing transportation system. Most notable among these differences is the addition of two Blue Line Metro stations at Morgan Boulevard and Largo Town Center, and a fully directional interchange at I-495 and Arena Drive. Not surprisingly, a comparison between the 2000 model results and 2011 traffic counts revealed these differences are particularly substantial on Central Avenue east of Morgan Boulevard and in the Largo Town Center.

The 2010 version of the model mitigated these concerns, as the transportation network more accurately represents actual existing conditions. The 2010 model includes the current version of the Metro transit network, as well as other relevant interchanges and roadway improvements constructed since 2000. The County is currently working to complete the validation for the year 2010 model, and is approximately halfway through the process. The model has yet to be validated for the transit network and Central Avenue, but preliminary results indicated that the model accurately depicts travel patterns in the study area.

The County has a future-year model that includes the demographic information from the adopted and approved master and sector plans in Prince George's County. The model's forecast year is not specified since the end dates of all the master and sector plans are not the same, but 2040 is the most common horizon year of the future plans. The future forecast year assumes the full build-out of all of the master plans from within the County. The transportation network in the model includes all identified master plan sector plan improvements within Prince George's County, and 2040 fiscally-constrained projects from MWCOCG's long-range transportation plan for areas outside of the County. Community Planning Division staff provided land-use inputs to Prince George's County travel demand modeling staff, which then disaggregated the data and applied it to their model's Transportation Analysis Zone (TAZ) zonal network. Based on the land-use and transportation network in the future model, it was assumed that it represents conditions in the year 2040. This model was used to evaluate No-Build conditions and as the starting point for the evaluation of Build alternatives.

Modeling data for 2007 and 2030 was obtained from MWCOCG. While this data was not specifically used to develop travel-demand forecasting for future scenarios, including the No-Build alternative, the data provided an additional check

and comparison for the Prince George's County's model data. The 2007 model was especially useful in comparison to the County's in-process 2010 model, as well as recent traffic counts.

For the Central Avenue project, AECOM completed a market-based assessment of likely growth in households and employment through the year 2033. Setting the future analysis year to 2035 ensures that any land-use changes and forecasted development from the 2033 AECOM land use/employment forecast data is incorporated into the analysis of the Build Alternatives.

Modeling Approach

The modeling approach was designed with the goal to assess future transportation conditions within the study area and to develop a preferred transportation concept for accommodating anticipated growth.

County-wide models were used to develop the No-Build forecast. As the year 2000 model was the calibrated and validated model that the County currently uses for existing conditions work, the goal was to use this model for the entire study area. Because the year 2000 model does not account for more recent additions to the transportation network, the model produced results for areas east of Morgan Boulevard that were incongruent with existing traffic count data from 2011.

The year 2000 model was used as the baseline model only for areas west of Morgan Boulevard, and the year 2010 model was used for areas east of Morgan Boulevard and Largo Town Center. The 2040 model was used as the future model. The model output data, in conjunction with existing traffic counts for the study area, were analyzed using (National Cooperative Highway Research Program) NCHRP 255 post-processing procedures to complete the forecast for the No-Build alternative. The year 2040 volume data was adjusted downward to represent year 2035 volumes and entered into the Synchro traffic model developed for the project. The final analysis volumes were developed by balancing turning movements and segment volumes in Synchro.

The Build Alternatives scenarios were developed through coordination with Park and Planning staff. The three scenarios used data from the Economic/Market Analysis for the Central Avenue corridor, in conjunction with the volumes prepared for the No-Build alternative. The market study data included projected future development tied to appropriate parcels, with supporting information on supportable office space, supportable housing units, and retail.

Forecasting of future volumes and turning movements for the three Build Alternatives began by post-processing the No-Build results. Post-processing involves the refinement of modeling outputs based on factors that may not be contained in the model – such as additions to the network, effect of mixed-use development, and non-motorized mode splits. Post-processing relies on the experience the modeling, an understanding of the land use and transportation network in the study area, and on engineering judgment

The methodology for post-processing the model results took into account No-Build trip generation, market data, potential for mode split changes, travel demand management strategies, internal capture effects, non-auto infrastructure improvements, and traffic diversion/route choice changes created by potential adoption of new transportation network

changes developed as part of the Complete Streets strategy recommendations. These parameters incorporate the effects of mixed-use development, non-auto infrastructure, and travel demand management strategies not captured explicitly within the model. Alternatives also considered the potential for dedicated transitways within the study area.

The Build Alternatives were evaluated with Synchro to assess year 2035 operations for all alternatives, and comparisons were made to the No-Build scenario. Based on Prince George's County's methodology, LOS E or better will be the standard performance metric at all signalized intersections. Our analysis approach assessed the impacts of proposed improvements that used a range of evaluation criteria that captures safety, operations, and non-automobile travel.



AM Peak

Existing Count Year 2011
 Base Model Year 2000
 Future Model Year 2040

Intersection Name	2011 Existing			2000 Base			2011 Base to Future Model			2011 Model			2040 Future Model			2011 Existing Model			2040 Analysis			2035 Final Analysis			2035 Volume / 2011 Existing Volume						
	Movement	Turning Volumes	% Approach Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume				
Central Avenue/Southern Ave	Total	3513	100.00%	4533	1248	5089	1275	5889	1275	5889	6556	1347	539	5084	5538	5811	1.53	4885	4848	552	4648	32%	8%								
	SB Approach	510	100.00%	1248	75	1275	75	1275	75	1275	79	32	34	32	34	33	1.10	33	560	560	32	560	32%	8%							
	SBL	30	5.88%																												
	SBT	325	63.73%																												
	SBR	155	30.39%																												
	WB Approach	2150	100.00%	2202	2520	3358	1.17	2865	2988	3358	1.17	2865	2988	3358	2927	1.36	2927	2927	2927	2927	91	2793	30%								
	WBL	70	3.26%																												
	WBT	1970	91.63%																												
	WBR	110	5.12%																												
	NB Approach	565	100.00%	341	493	895	0.84	1061	987	895	0.84	1061	987	895	1024	1.75	1024	1024	1024	948	948	65	948	62%							
	NBL	40	6.84%																												
	NBT	540	92.31%																												
	NBR	5	0.85%																												
EB Approach	270	100.00%	742	801	956	0.7%	322	425	801	0.7%	322	425	801	291	1.38	291	291	291	356	356	8	356	32%								
EBL	40	14.81%																													
EBT	210	77.78%																													
EBR	20	7.41%																													
Central Avenue/Addison Road	Total	4343	100.00%	5230	885	5887	832	5887	832	5887	6528	1240	5421	5643	5581	1.77	5217	5066	221	5066	17%	-14%									
	SB Approach	257	100.00%	885	210	832	210	832	210	832	175	54	29	214	116	165	0.64	214	221	221	221	56	221	17%	-14%						
	SBL	65	25.29%																												
	SBT	178	69.26%																												
	SBR	14	5.45%																												
	WB Approach	2592	100.00%	2244	2344	2609	0.4%	2885	2857	2609	0.4%	2885	2857	2609	2871	1.11	2871	2871	2871	2823	2823	98	2823	9%							
	WBL	90	3.47%																												
	WBT	2439	94.10%																												
	WBR	63	2.43%																												
	NB Approach	802	100.00%	1298	1557	2241	1.8%	1154	1486	1557	1.8%	1154	1486	1557	1320	1.65	1320	1320	1231	1231	69	1231	53%								
	NBL	382	47.63%																												
	NBT	311	38.78%																												
	NBR	109	13.59%																												
EB Approach	692	100.00%	803	854	987	0.6%	800	825	854	0.6%	800	825	800	813	1.17	813	813	792	792	42	792	14%									
EBL	37	5.35%																													
EBT	545	78.76%																													
EBR	110	15.90%																													

AM Peak

Existing Count Year 2011
Base Model Year 2000
Future Model Year 2040

NCHRP 255 Method selected
Ratio
Difference
Average

Intersection Name	2011 Existing		2000 Base		2011 Base		2040 Future		2011 Base		Difference		2040 Analysis		2035 Final		2035 Volume /	
	Movement	Turning Volumes	% Approach Volume	Model Link Volume	Future Model Growth Factor	Adjusted Base Model Volumes	Model Link Volume	Model Link Volume	2011 Existing Volume	Ratio Method (Existing * Future/Base)	Method (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	Volume	Analysis Volume	Volume	2011 Existing Volume	Volume
Central Avenue/Cindy Lane	Total	3411	100.00%	3565	0.3%	3665	3986	3814	3832	3714	1.37	96	0.92	96	97	3662	7%	3662
	SB Approach	104	100.00%	169	-0.2%	165	155	98	94	21	21	21	0.92	21	21	97	-7%	97
	SBL	23	22.12%	0	0.00%	37	34	22	21	0	0	0	0.92	0	0	21	0	21
	SBT	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0.92	0	0	0	0	0
	SBR	81	77.88%	2255	0.4%	129	121	76	73	2803	2815	1.10	0.92	75	76	2773	8%	2773
	WB Approach	2570	100.00%	0	0.00%	0	0	2826	0	0	0	0	1.10	0	0	0	0	0
	WBL	0	0.00%	0	0.00%	0	0	2804	2782	2793	22	1.10	1.10	0	0	2751	0	2751
	WBT	2550	99.22%	0	0.00%	2325	2557	22	22	22	22	1.10	1.10	22	22	22	22	22
	WBR	20	0.78%	0	0.00%	18	20	0	0	0	0	0	1.10	0	0	0	0	0
	NB Approach	0	0.00%	0	0.00%	#DIV/0!	0	0	0	0	0	0	1.10	0	0	0	0	0
NBL	0	0.00%	0	0.00%	0	0	0	0	0	0	0	1.10	0	0	0	0	0	
NBT	0	0.00%	0	0.00%	0	0	0	0	0	0	0	1.10	0	0	0	0	0	
NBR	0	0.00%	0	0.00%	0	0	0	0	0	0	0	1.10	0	0	0	0	0	
Central Avenue/Hill Road/Shady Lane	Total	4170	100.00%	5684	0.0%	5863	5692	4169	4168	4186	1.00	804	1.09	804	792	4183	0%	4183
	SB Approach	588	48.96%	713	0.8%	777	945	715	756	736	1.25	736	1.25	736	710	360	21%	360
	SBL	288	18.37%	380	0.2%	380	463	350	370	360	1.25	360	1.25	360	348	130	130	
	SBT	108	32.65%	2913	-0.2%	143	174	131	139	135	135	1.25	1.25	135	130	232	232	
	SBR	192	37.4%	0	0.00%	254	309	234	247	240	240	1.25	1.25	240	232	88	88	
	WB Approach	2543	100.00%	0	0.00%	2834	2625	2356	2334	2345	2345	0.92	0.92	2345	2378	2096	2096	
	WBL	95	3.74%	0	0.00%	106	98	88	87	88	88	0.92	0.92	88	89	89	89	
	WBT	2240	88.08%	0	0.00%	2496	2312	2075	2056	2066	2066	0.92	0.92	2066	2096	2096	2096	
	WBR	208	8.18%	863	-0.4%	232	215	193	191	192	192	0.92	0.92	192	195	195	195	
	NB Approach	349	100.00%	0	0.00%	824	720	305	245	275	305	0.79	0.79	305	313	313	313	
NBL	146	41.83%	0	0.00%	345	301	128	108	115	115	0.79	0.79	128	131	131	131		
NBT	151	43.27%	0	0.00%	356	312	132	106	119	119	0.79	0.79	132	135	135	135		
NBR	52	14.90%	1205	0.4%	123	107	45	37	41	41	0.79	0.79	45	47	47	47		
Central Avenue/Hill Road/Shady Lane	EB Approach	690	100.00%	0	0.00%	1259	1402	768	833	801	1.16	1.16	801	781	70	70	13%	70
	EBL	62	8.99%	0	0.00%	113	126	69	75	72	72	1.16	1.16	72	73	689	689	
	EBT	594	86.09%	0	0.00%	1084	1207	661	717	689	689	1.16	1.16	689	673	39	39	
	EBR	34	4.93%	0	0.00%	62	69	38	41	39	39	1.16	1.16	39	39	39	39	

AM Peak

Existing Count Year 2011
Base Model Year 2000
Future Model Year 2040

MCHRP 255 Method selected

Intersection Name	2011 Existing			Base to Future Model			2011 Base Model			Difference Method			2035 Final Analysis			2035 Volume / 2011 Existing Volume		
	Movement	Turning Volumes	% Approach Volume	2000 Base Model Link Volume	2011 Adjusted Base Model Growth Factor	2040 Future Model Link Volume	2011 Existing Volume	Ratio Method (Existing * Future/Base)	Difference (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume	2035 Volume / 2011 Existing Volume				
Central Avenue/Ritchie Road	Total	4742		5837	-0.2%	5772	123	4401	4372	4361	0.92	4496	4529	-4%				
	SB Approach	342	100.00%	313	2.0%	380	111	502	520	511	1.49	511	482	41%				
	SBL	117	34.21%			130	191	172	178	175	1.49	175	165					
	SRT	134	39.18%			149	219	197	204	200	1.49	200	189					
	SBR	91	26.61%			101	148	133	138	136	1.49	136	128					
	WB Approach	2457	100.00%	2801	-0.4%	2685	109	2178	2152	2165	0.88	2165	2215	-10%				
	WBL	166	6.76%			181	161	147	145	146	0.88	146	150					
	WBT	2189	89.09%			2392	2120	1940	1917	1929	0.88	1929	1974					
	WBR	102	4.15%			111	99	90	89	90	0.88	90	92	-1%				
	NB Approach	854	100.00%	1054	0.0%	1051	1042	847	845	846	0.99	846	847					
	NBL	366	42.86%			450	447	363	362	363	0.99	363	363					
	NBT	211	24.71%			260	257	209	209	209	0.99	209	209					
	NBR	277	32.44%			341	338	275	274	274	0.99	274	275					
EB Approach	1089	100.00%	1669	-0.3%	1605	1437	147	975	921	0.87	975	995	-9%					
EBL	84	7.71%			124	111	75	71	73	0.87	75	77						
EBT	867	79.63%			1278	1144	776	776	755	0.87	776	792						
EBR	138	12.67%			203	182	124	117	120	0.87	124	126						
Total	1484		2082	0.9%	2067	140	3044	2264	2156	1.45	1962	1986	28%					
Addison Road/Wilburn	SB Approach	423	100.00%	777	-0.5%	737	174	363	318	340	0.80	340	355	-16%				
	SBL	13	3.07%			23	19	11	10	10	0.80	10	11					
	SRT	410	96.93%			714	613	352	308	330	0.80	330	344					
	SBR	0	0.00%			0	0	0	0	0	0.80	0	0					
	WB Approach	143	100.00%	39	3.2%	53	89	241	179	210	1.47	210	199	39%				
	WBL	65	45.45%			24	40	110	81	96	1.47	96	90					
	WBT	0	0.00%			0	0	0	0	0	1.47	0	0					
	WBR	78	54.55%			29	49	132	98	115	1.47	115	108					
	NB Approach	918	100.00%	1266	1.7%	1508	2146	1306	1556	1431	1.56	1431	1343	46%				
	NBL	0	0.00%			0	0	0	0	0	1.56	0	0					
	NBT	850	92.59%			1396	1987	1210	1441	1325	1.56	1325	1243					
	NBR	68	7.41%			112	159	97	115	106	1.56	106	99					
	EB Approach	0	0.00%	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!	1.56	106	106					
EBL	0	0.00%			0	0	0	0	0	1.56	0	0						
EBT	0	0.00%			0	0	0	0	0	1.56	0	0						
EBR	0	0.00%			0	0	0	0	0	1.56	0	0						

Existing Count Year 2011
Base Model Year 2000
Future Model Year 2040

AM Peak

NCHRP 255 Method selected
Ratio
Difference
Average

Intersection Name	2011 Existing			2000 Base			2040 Future			2011 Base			Difference			2035 Final Analysis		
	Movement	Turning Volumes	% Approach Volume	Model Link Volume	Future Model Growth Factor	Adjusted Base Model Volumes	Model Link Volume	Future Model Growth Factor	Model Link Volume	2011 Existing Volume	Ratio (Existing * Future/Base)	Method (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume	2035 Volume / 2011 Existing Volume	
Hill Road/Willow																		
Total	1162	1509	130.9%	1876	0.2%	1596	713	1.50	1282	1.27	1256	1269	1.09	1367	1282	10%		
SB Approach	404	507	100.00%	567	0.6%	507	62	1.50	474	1.50	44	43	1.22	492	477	18%		
SBL	35	53	8.66%						41	1.50	41	43	1.22	43	41			
SBT	366	550	90.59%						430	1.50	462	446	1.22	446	432			
SBR	3	5	0.74%						4	1.50	4	4	1.22	4	4			
WB Approach	196	112	100.00%	68	5.9%	229	229	0.57	400	0.57	313	356	1.82	356	379	68%		
WBL	140	80	71.43%						286	0.57	223	254	1.82	254	235			
WBT	4	2	2.04%						8	0.57	6	7	1.82	7	7			
WBR	52	30	76.53%						106	0.57	83	95	1.82	95	87			
NB Approach	534	690	100.00%	731	-0.5%	583	583	1.29	451	1.29	427	439	0.82	439	455	-15%		
NBL	11	14	2.06%						9	1.29	9	9	0.82	9	9			
NBT	440	569	82.40%						372	1.29	352	362	0.82	362	375			
NBR	83	107	15.54%						70	1.29	66	68	0.82	68	71			
EB Approach	28	99	100.00%	110	-0.9%	71	71	3.55	20	3.55	0	2	0.72	2	2			
EBL	3	11	10.71%						2	3.55	0	2	0.72	2	2			
EBT	4	14	14.29%						3	3.55	0	3	0.72	3	3			
EBR	21	74	75.00%						15	3.55	0	15	0.72	15	16			
Total	782	1431	143.1%	1049	3.3%	2437	2437	1.34	1817	1.34	2170	1963	2.55	1477	1355	71%		
SB Approach	309	441	100.00%	298	4.4%	818	818	1.43	573	1.43	686	630	2.04	630	574	86%		
SBL	7	10	2.27%						13	1.43	16	14	2.04	14	13			
SBT	285	407	92.23%						529	1.43	633	581	2.04	581	530			
SBR	17	24	5.50%						32	1.43	38	35	2.04	35	32			
WB Approach	70	247	100.00%	173	3.9%	443	443	3.53	125	3.53	266	196	2.79	125	116	66%		
WBL	40	141	57.14%						72	3.53	152	117	2.79	72	66			
WBT	2	7	2.86%						4	3.53	8	6	2.79	4	3			
WBR	28	99	40.00%						50	3.53	106	78	2.79	50	46			
NB Approach	358	593	100.00%	499	1.7%	840	840	1.66	507	1.66	605	556	1.55	556	522	46%		
NBL	12	20	3.35%						17	1.66	20	19	1.55	19	17			
NBT	337	558	94.13%						478	1.66	570	524	1.55	524	491			
NBR	9	15	2.51%						13	1.66	15	14	1.55	14	13			
EB Approach	45	150	100.00%	79	8.1%	336	336	3.33	101	3.33	231	166	3.69	166	123	172%		
EBL	28	93	62.22%						63	3.33	144	103	3.69	103	90			
EBT	2	7	4.44%						4	3.33	10	7	3.69	7	6			
EBR	15	50	33.33%						21	3.33	35	28	1.86	28	26			
Morgan Blvd/Ridgefield Blvd																		

AM Peak

NCHRP 255 Method selected

Ratio
 Difference
 Average

Intersection Name	Movement	2011 Existing			2011 Base to Future		2011 Model		2040 Future		2011 Base		Difference Method		2040 Analysis		2035 Final Analysis		2035 Volume / 2011 Existing Volume	
		Turning Volumes	% Approach Volume	Model Link Volume	Model Link Volume	Growth Factor	Adjusted Base Model Volumes	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Ratio Method (Existing * Future/Base)	(Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	Volume	Volume	Volume	Volume
Morgan Blvd/Ferk-N-Ride	Total	1166		1221	1331	0.2%	657	614	1331	1.05	1271	1276	1274	1340	1125	414	1125	0	414	-4%
	SB Approach	444	100.00%	673	614	-0.2%	0	0	614	1.48	415	401	408	408	0	0	0	0	0	-7%
	SBL	0	0.00%	0	0		0	0	0		0	0	0	0	0	0	0	0	0	
	SBT	375	84.48%	0	0		555	519	519	1.48	351	339	345	345	350	350	350	350	350	
	SBR	69	15.54%	0	95		102	95	95	1.48	65	62	63	63	64	64	64	64	64	
	WB Approach	0	0.00%	0	0		#DIV/0!	0	0		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	0	0	
	WBL	0		0	0		0	0	0		0	0	0	0	0	0	0	0	0	
	WBT	0		0	0		0	0	0		0	0	0	0	0	0	0	0	0	
	WBR	0		0	0		0	0	0		0	0	0	0	0	0	0	0	0	
	NB Approach	608	100.00%	548	594	0.8%	301	363	594	0.98	733	731	732	732	711	711	711	711	711	17%
NBL	308	50.66%	0	0		293	293	293	0.98	371	370	371	371	360	360	360	360	360		
NBT	300	49.34%	0	0		0	0	0	0.98	362	360	361	361	351	351	351	351	351		
NBR	0	0.00%	0	0		#DIV/0!	0	0		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	0	0		
EB Approach	114	100.00%	0	0		#DIV/0!	0	0		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	0	0		
EBL	29	25.44%	0	0		0	0	0		0	0	0	0	0	0	0	0	0		
EBT	0	0.00%	0	0		0	0	0		0	0	0	0	0	0	0	0	0		
EBR	85	74.56%	0	0		0	0	0		0	0	0	0	0	0	0	0	0		

AM Peak

Existing Count Year: 2011
Base Model Year: 2010
Future Model Year: 2040

NCMRP 255 Method selected

Ratio
Difference
Average

Intersection Name	Movement	2011 Existing			2010 Base			2011 Base to Future			2011 Model			2011 Ratio Method			2011 Difference			2010 Analysis			2035 Final		
		Turning Volumes	% Approach	Volume	Model Link	Model Growth Factor	Adjusted Base Model	Model Link	Model Link	Volume	2011 Existing	2011 Existing	Future/Base	Existing	Future/Base	Base	Ex. + Future -	Base	Average	Growth Factor	Volume	Volume	Volume	Volume	Volume
Central Avenue/Hampton Road/Right/Left	Total	5321		4295	4319	0.0%	4319	5018	0.82	5018	0.82	5018	5018	5018	5018	5018	5018	5018	1.15	6128	6128	5972	800	800	
	SB Approach	360	100.00%	138	138	15.3%	138	570	0.38	1744	0.38	1744	892	892	892	892	892	892	3.66	1318	1318	892	318	318	
	SBL	143	39.72%	55	55		55	266	0.38	693	0.38	693	354	354	354	354	354	354	3.66	523	523	354	176	176	
	SRT	138	38.33%	53	53		53	257	0.38	668	0.38	668	342	342	342	342	342	342	3.66	505	505	342	176	176	
	SBR	79	21.94%	30	30		30	147	0.38	383	0.38	383	196	196	196	196	196	196	3.66	289	289	196	100	100	
	WB Approach	3073	100.00%	3230	3220	-0.3%	3220	2986	1.05	2802	1.05	2802	2789	2789	2789	2789	2789	2789	0.91	2795	2795	2795	2845	2845	
	WBL	479	15.59%	502	502		502	458	1.05	437	1.05	437	435	435	435	435	435	435	0.91	436	436	436	443	443	
	WBT	2212	71.98%	2318	2318		2318	2113	1.05	2017	1.05	2017	2007	2007	2007	2007	2007	2007	0.91	2012	2012	2012	2047	2047	
	WBR	382	12.43%	400	400		400	365	1.05	348	1.05	348	347	347	347	347	347	347	0.91	347	347	347	353	353	
	NB Approach	543	100.00%	729	729	1.3%	729	317	0.43	742	0.43	742	628	628	628	628	628	628	1.26	685	685	628	168	168	
	NBL	138	25.41%	43	43		43	59	0.43	189	0.43	189	160	160	160	160	160	160	1.26	174	174	168	661	661	
	NBT	101	18.60%	130	130		130	177	0.43	138	0.43	138	117	117	117	117	117	117	1.26	127	127	123	123	123	
	NBR	304	55.99%	716	729	1.8%	729	1095	0.58	1886	0.58	1886	1621	1621	1621	1621	1621	1621	1.26	384	384	370	370	370	
	EB Approach	1155	100.00%	821	821		821	85	0.58	164	0.58	164	141	141	141	141	141	141	1.40	132	132	132	145	145	
EBL	109	8.66%	372	372		372	859	0.58	1460	0.58	1460	1273	1273	1273	1273	1273	1273	1.40	1376	1376	1369	1369	1369		
EBT	985	78.43%	95	95		95	140	0.58	242	0.58	242	208	208	208	208	208	208	1.40	225	225	225	214	214		
EBR	161	12.83%	821	821		821	764	0.53	1442	0.53	1442	1493	1493	1493	1493	1493	1493	1.40	1468	1468	1468	1482	1482		
Central Avenue/95 SB	Total	5665		5414	4902	-0.3%	4902	4902	0.92	5347	0.92	5347	5347	5347	5347	5347	5347	5347	1	5403	5403	5403	1105	1105	
	SB Approach	1135	100.00%	827	826	-0.1%	826	795	0.73	1092	0.73	1092	1104	1104	1104	1104	1104	1104	1	1098	1098	1105	756	756	
	SBL	777	68.46%	565	565		565	544	0.73	748	0.73	748	756	756	756	756	756	756	1	752	752	752	0	0	
	SRT	0	0.00%	0	0		0	0	0.73	0	0.73	0	0	0	0	0	0	0	1	346	346	348	348	348	
	SBR	358	31.54%	261	261		261	251	0.73	345	0.73	345	348	348	348	348	348	348	1	346	346	348	348	348	
	WB Approach	3220	100.00%	3764	3750	-0.4%	3750	3343	1.16	2871	1.16	2871	2813	2813	2813	2813	2813	2813	1	2842	2842	2807	2807	2807	
	WBL	901	27.98%	1049	1049		1049	935	1.16	803	1.16	803	787	787	787	787	787	787	1	795	795	813	813	813	
	WBT	2319	72.02%	2701	2701		2701	2408	1.16	2067	1.16	2067	2026	2026	2026	2026	2026	2026	1	2047	2047	2094	2094	2094	
	WBR	0	0.00%	0	0		0	0	1.16	0	1.16	0	0	0	0	0	0	0	1	0	0	0	0	0	
	NB Approach	0	0.00%	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
	NBL	0	0.00%	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
	NBT	0	0.00%	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
	NBR	0	0.00%	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
	EB Approach	1550	100.00%	823	821	-0.2%	821	764	0.53	1442	0.53	1442	1493	1493	1493	1493	1493	1493	1	1468	1468	1482	1482	1482	
EBL	0	0.00%	0	0		0	0	0.53	0	0.53	0	0	0	0	0	0	0	1	0	0	0	0	0		
EBT	1224	78.97%	648	648		648	603	0.53	1159	0.53	1159	1179	1179	1179	1179	1179	1179	1	1153	1153	1170	1170	1170		
EBR	526	21.03%	173	173		173	161	0.53	303	0.53	303	314	314	314	314	314	314	1	309	309	312	312	312		

AM Peak

NCFRP 255 Method selected

Ratio
Difference
Average

Intersection Name	Movement	2011 Existing			2010 Base			Base to Future 2011 Adjusted			2011 Base Model			Ratio Method			Difference Method			Growth Factor			2035 Final		
		Turning Volumes	% Approach	Volume	Model Link	Model Growth Factor	#DIV/0!	Model Link	Model Link	Model Link	2011 Existing Volume	2011 Existing Ratio	Future Volume	Future Ratio	Existing - Future	Future/Existing	Future/Existing	Future/Existing	Future/Existing	Future/Existing	Future/Existing	Future/Existing	Future/Existing	Future/Existing	
Central Avenue/95 NB	Total	6243		6555		4525	0	4525	0	0.79	5720	5720	5629	5774	1	5876	5876	5059	0	0	0	0	0	0	0
	SB Approach	0	0.00%	0																					
	SBL	0																							
	SRT	0																							
	SBR	0																							
	WB Approach	3659	100.00%	3728		-0.4%		3713	3288	1.03	3177	3164	3164	3171	1	3171	3171	3246	0	0	0	0	0	0	0
	WBL	0	0.00%																						
	WBT	2970	82.29%					3055	2689	1.03	2614	2604	2604	2609	1	2609	2609	2671	0	0	0	0	0	0	0
	WBR	639	17.71%					657	579	1.03	562	560	560	561	1	561	561	575	0	0	0	0	0	0	0
	NB Approach	931	100.00%	480		0.1%		480	435	0.52	955	944	944	949	1	949	949	946	0	0	0	0	0	0	0
	NBL	294	31.58%					152	156	0.52	302	298	298	300	1	300	300	299	0	0	0	0	0	0	0
	NBT	0	0.00%					0	0		0	0	0	0		0	0	0	0	0	0	0	0	0	0
NBR	637	68.42%					329	337	0.52	654	646	646	650	1	650	650	647	0	0	0	0	0	0	0	
EB Approach	1703	100.00%	731		0.2%		732	764	0.43	1777	1705	1705	1756	1	1756	1756	1747	0	0	0	0	0	0	0	
EEL	541	31.77%					233	243	0.43	565	551	551	558	1	558	558	555	0	0	0	0	0	0	0	
EBT	1162	68.23%					500	521	0.43	1213	1184	1184	1198	1	1198	1198	1192	0	0	0	0	0	0	0	
EBR	0	0.00%					0	0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	
Total	2794		658		1.4%		989	989	0.39	2361	2085	2085	2311	1	2365	2365	2267	0	0	0	0	0	0	0	
SB Approach	0	0.00%	0				0	0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	
SBL	0																								
SRT	0																								
SBR	0																								
WB Approach	80	100.00%	10		3.7%		10	21	0.13	162	91	91	91	1	162	162	148	0	0	0	0	0	0	0	
WBL	62	77.50%					8	16	0.13	116	70	70	70	2	116	116	115	0	0	0	0	0	0	0	
WBT	0	0.00%					0	0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	
WBR	18	22.50%					2	5	0.13	36	20	20	28	2	36	36	33	0	0	0	0	0	0	0	
NB Approach	1400	100.00%	507		1.7%		515	758	0.37	2059	1643	1643	1851	1	1851	1851	1773	0	0	0	0	0	0	0	
NBL	0	0.00%					0	0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	
NBT	836	59.71%					308	453	0.37	1230	981	981	1105	1	1105	1105	1059	0	0	0	0	0	0	0	
NBR	564	40.29%					208	305	0.37	830	662	662	746	1	746	746	714	0	0	0	0	0	0	0	
EB Approach	314	100.00%	181		0.5%		182	210	0.58	967	347	347	352	1	352	352	346	0	0	0	0	0	0	0	
EEL	23	7.32%					13	15	0.58	27	25	25	26	1	26	26	25	0	0	0	0	0	0	0	
EBT	106	33.76%					91	71	0.58	112	115	115	119	1	119	119	117	0	0	0	0	0	0	0	
EBR	185	58.92%					107	124	0.58	214	202	202	208	1	208	208	204	0	0	0	0	0	0	0	

Harry S Truman Drive/Largo Center Drive (NDE):
NB/SB is Harry S Truman Drive

AM Peak

NCRP 255 Method selected

Intersection Name	Movement	Existing Count Year			% Approach Volume	2010 Base Model Link		Base to Future 2011 Adjusted Model Link		2011 Base Model Link		Ratio Method (Existing + Future - Base)	Difference Method (Ex. + Future - Base)	Average (Ratio + Diff.)/2	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2055 Final Analysis Volume
		2011	2010	2040		2010	2040	2011 Existing	2040 Future	2011 Existing	2040 Future						
Arenal Drive/Shoppers Way	Total	1411	1147	2257	3.2%	1147	2257	0.91	2749	2749	1488	1319	1404	2	2811	2934	
	SB Approach	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0
	SBL	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0
	SBR	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0
	WB Approach	623	477	1197	100.00%	477	1197	0.80	1488	1488	1488	1319	1404	2	1404	1268	
	WBL	45	36	86	7.22%	36	86	0.80	108	108	108	95	101	2	101	92	
	WBT	578	441	1111	92.78%	441	1111	0.80	1381	1381	1381	1224	1302	2	1302	1177	
	WBR	0	0	0	0.00%	0	0	0.00%	0	0	0	0	0	0	0	0	
	NB Approach	204	222	111	100.00%	222	111	1.07	104	104	104	97	100	0	100	90	
	NBL	155	166	84	75.98%	166	84	1.07	79	79	79	73	76	0	76	66	
NBT	0	0	0	0.00%	0	0	0.00%	0	0	0	0	0	0	0	0		
NBR	49	52	27	24.02%	52	27	1.07	25	25	25	23	24	0	24	28		
EB Approach	584	448	927	100.00%	448	927	0.79	1167	1167	1167	1047	1107	2	1107	1017		
EBL	0	0	0	0.00%	0	0	0.00%	0	0	0	0	0	0	0	0		
EBT	640	350	698	75.34%	350	698	0.79	879	879	879	789	834	2	834	766		
EBR	344	114	229	24.66%	114	229	0.79	288	288	288	258	273	2	273	251		
Total	1346	568	848	4.6%	568	848	0.29	2951	2951	1736	1736	1736	1	1736	1638		
SB Approach	274	16	257	100.00%	16	257	0.09	2930	2930	507	507	507	2	507	467		
SBL	0	0	0	0.00%	0	0	0.00%	0	0	0	0	0	0	0	0		
SBR	91	8	85	38.21%	8	85	0.09	973	973	168	168	168	6	168	155		
WB Approach	183	341	172	66.79%	341	172	0.09	1957	1957	339	339	339	6	339	312		
WBL	869	349	590	100.00%	349	590	0.40	1466	1466	1109	1109	1109	1	1109	1067		
WBT	22	9	15	2.59%	9	15	0.40	37	37	28	28	31	1	31	27		
WBR	421	169	286	48.50%	169	286	0.40	711	711	538	538	538	1	538	518		
NB Approach	425	171	289	48.96%	171	289	0.40	718	718	543	543	543	1	543	523		
NBL	5	0	0	4.81%	0	0	0.01	104	104	104	104	104	1	104	104		
NBT	399	0	0	95.19%	0	0	0.01	5	5	5	5	5	1	5	5		
NBR	0	0	0	0.00%	0	0	0.01	99	99	99	99	99	1	99	99		
EB Approach	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0		
EBL	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0		
EBT	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0		
EBR	0	0	0	0.00%	0	0	#DIV/0!	0	0	0	0	0	0	0	0		
Total	2302	716	2002	6.0%	716	2002	0.34	5877	5877	3308	3308	3308	2	3308	3156		
SB Approach	587	86	373	100.00%	86	373	0.16	2291	2291	864	864	864	1	864	817		
SBL	39	6	25	6.64%	6	25	0.16	152	152	57	57	57	3	57	54		
SBR	273	44	173	46.51%	44	173	0.16	1066	1066	402	402	402	3	402	380		
WB Approach	275	45	175	46.83%	45	175	0.16	1073	1073	405	405	405	3	405	383		
WBL	466	118	322	100.00%	118	322	0.25	1271	1271	670	670	670	2	670	635		
WBT	260	66	180	55.72%	66	180	0.25	709	709	374	374	374	2	374	354		
WBR	175	44	121	37.55%	44	121	0.25	477	477	252	252	252	2	252	238		
NB Approach	31	8	21	6.00%	8	21	0.25	85	85	45	45	45	2	45	42		
NBL	545	300	491	100.00%	300	491	0.55	893	893	736	736	736	1	736	708		
NBT	211	116	190	38.72%	116	190	0.55	346	346	285	285	315	1	315	297		
NBR	290	159	261	53.21%	159	261	0.55	475	475	392	392	434	1	434	409		
EB Approach	44	24	40	8.07%	24	40	0.55	72	72	59	59	66	1	66	62		
EBL	504	246	816	100.00%	246	816	0.49	1074	1074	1074	1074	1074	3	1074	976		
EBT	266	130	431	52.78%	130	431	0.49	884	884	567	567	567	3	567	515		
EBR	170	83	276	33.78%	83	276	0.49	363	363	464	464	464	3	464	430		
EBR	68	33	110	13.49%	33	110	0.49	226	226	145	145	145	3	145	132		

PM Peak

NCHRP 255 Method selected

Ratio
 Difference
 Average

Intersection Name	Movement	2011 Existing			Base to Future		2011 Base		2040 Future		2011 Base		Difference		2040 Analysis Volume	2035 Final Analysis Volume
		Turning Volumes	% Approach Volume	Model Link Volume	Future Model Link Volume	Adjusted Base Model Volumes	Model Link Volume	Model Volume	2011 Existing Volume	Ratio Method (Existing*/Future/Base)	Method (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)			
Central Avenue/Southern Ave	Total	3700	100.00%	4911	5180	1027	5888	1537	3837	4177	4007	1	3866	3751	912	80
	SB Approach	55	8.73%	867	1027	1449	1449	1.63	889	1052	970	1.54	970	85	738	80
	SBL	55	8.73%	867	1027	1449	1449	1.63	889	1052	970	1.54	970	85	738	80
	SBT	510	80.95%		831	1173	1173	1.63	720	852	786	1.54	786	85	738	80
	SBR	65	10.32%		106	150	150	1.63	92	109	100	1.54	100	100	100	94
	WB Approach	550	100.00%	949	1124	1585	1585	2.04	776	1011	893	1.62	893	834	114	114
	WBL	75	13.64%		153	216	216	2.04	106	138	122	1.62	122	607	607	
	WBT	400	72.73%		817	1153	1153	2.04	564	735	650	1.62	650	607	607	
	WBR	75	13.64%		153	216	216	2.04	106	138	122	1.62	122	114	114	
	NB Approach	660	100.00%	652	747	996	996	1.13	880	909	895	1.36	895	854	854	
NBL	10	1.52%		11	15	15	1.13	13	14	14	1.36	14	13	13		
NBT	585	88.64%		662	883	883	1.13	780	806	793	1.36	793	757	757		
NBR	65	9.85%		74	98	98	1.13	87	90	88	1.36	88	84	84		
EB Approach	1360	100.00%	2443	2282	403	328	1.68	1107	936	1022	0.75	1107	1151	1151		
EBL	240	17.55%		403	328	328	1.68	195	165	180	0.75	195	203	203		
EBT	1100	80.88%		1845	1503	1503	1.68	896	757	826	0.75	896	931	931		
EBR	20	1.47%		34	27	27	1.68	16	14	15	0.75	15	17	17		
Central Avenue/Addison Road	Total	4717	100.00%	5009	5345	5233	5870	1.05	5870	5941	5905	1.75	5601	5448	735	131
	SB Approach	136	17.87%	991	978	943	943	1.28	734	726	730	0.96	730	730	131	131
	SBL	136	17.87%	991	978	943	943	1.28	734	726	730	0.96	730	730	131	131
	SBT	382	50.20%		491	473	473	1.28	368	365	366	0.96	366	369	369	
	SBR	243	31.93%		312	301	301	1.28	234	232	233	0.96	233	235	235	
	WB Approach	1174	100.00%	1259	1380	1698	1698	1.18	1445	1492	1469	1.25	1469	1418	1418	
	WBL	223	18.99%		262	323	323	1.18	274	283	279	1.25	279	269	269	
	WBT	845	71.98%		993	1222	1222	1.18	1040	1074	1057	1.25	1057	1020	1020	
	WBR	106	9.03%		125	153	153	1.18	130	135	133	1.25	133	128	128	
	NB Approach	699	100.00%	1066	1088	1445	1445	1.56	736	756	746	1.07	746	738	738	
NBL	243	34.76%		378	398	398	1.56	255	263	259	1.07	259	257	257		
NBT	256	36.62%		398	419	419	1.56	269	277	273	1.07	273	270	270		
NBR	200	28.61%		311	328	328	1.56	211	216	213	1.07	213	211	211		
EB Approach	2083	100.00%	1693	1900	2447	2447	0.91	2682	2630	2656	1.28	2656	2557	2557		
EBL	82	3.94%		75	96	96	0.91	106	104	105	1.28	105	101	101		
EBT	1673	80.32%		1526	1965	1965	0.91	2154	2112	2133	1.28	2133	2054	2054		
EBR	328	15.75%		299	385	385	0.91	422	414	418	1.28	418	403	403		

MCHRP 255 Method selected

Ratio
 Difference
 Average

Intersection Name	Movement	2011 Existing Turning Volumes	2011 Existing % Approach Volume	Base to Future Model Growth Factor		2011 Adjusted Base Model Volumes	2040 Future Model Link Volume	2011 Base Model Existing Volume	Ratio Method (Existing* Future/Base)	Difference Method (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume
				2000 Base Model Link Volume	2040 Future Model Link Volume									
Central Avenue/Cindy Lane	Total	3577		3292	0.2%	231	3620	0.92	3933	3905	3919	1.10	3925	3782
	SB Approach	122	100.00%	251	-0.7%	38	178	1.89	94	69	82	0.67	94	99
	SBL	20	16.39%			0	29	1.89	15	11	13	0.67	15	16
	SBT	0	0.00%			0	0			0			0	0
	SBR	102	83.61%			193	149	1.89	79	58	68	0.67	79	83
	WB Approach	1	0.09%	1146	0.9%	1262	1569	1.10	1432	1459	1445	1.25	1445	1395
	WBL	1				1	1	1.10	1	1	1	1.25	1	1
	WBT	1121	97.31%			1228	1527	1.10	1393	1419	1406	1.25	1406	1357
	WBR	30	2.60%			33	41	1.10	37	38	38	1.25	38	36
	NB Approach	0	0.00%	0	#DIV/0!	#DIV/0!	0							0
NBL	0												0	
NBT	0												0	
NBR	0												0	
EB Approach	2303	100.00%	1895	0.0%	1889	1873	0.82	2284	2287	2285	0.99	2285	2288	
EBL	93	4.04%			76	76	0.82	92	92	92	0.99	92	92	
EBT	2210	95.96%			1813	1797	0.82	2191	2195	2193	0.99	2193	2196	
EBR	0	0.00%			0	0			0			0	0	
Central Avenue/Hill Road/Shady Lane	Total	4254		5169	0.4%	5404	6022	1.22	4956	5107	5032	1.18	4624	4548
	SB Approach	527	100.00%	700	2.5%	896	1413	1.70	831	1044	937	1.78	831	867
	SBL	286	54.27%			486	767	1.70	451	567	509	1.78	509	470
	SBT	152	28.84%			258	408	1.70	240	301	270	1.78	270	250
	SBR	89	16.89%			151	239	1.70	140	176	158	1.78	158	146
	WB Approach	1385	100.00%	1897	0.3%	1958	2118	1.41	1498	1545	1522	1.10	1522	1498
	WBL	100	7.22%			141	153	1.41	108	112	110	1.10	110	108
	WBT	1059	76.46%			1497	1619	1.41	1146	1182	1164	1.10	1164	1146
	WBR	225	16.32%			319	346	1.41	244	252	248	1.10	248	244
	NB Approach	303	100.00%	750	0.1%	759	781	2.50	312	325	319	1.05	319	316
NBL	93	30.69%			233	240	2.50	96	100	98	1.05	98	97	
NBT	162	53.47%			406	418	2.50	167	174	170	1.05	170	169	
NBR	48	15.84%			120	124	2.50	49	52	50	1.05	50	50	
EB Approach	2039	100.00%	1822	-0.2%	1791	1710	0.88	1947	1958	1952	0.96	1952	1967	
EBL	90	4.41%			79	75	0.88	86	86	86	0.96	86	87	
EBT	1847	90.58%			1623	1549	0.88	1763	1773	1768	0.96	1768	1782	
EBR	102	5.00%			90	86	0.88	97	98	98	0.96	98	98	

MCHRP 255 Method selected:

Ratio
 Difference
 Average

Intersection Name	Movement	Existing Count Year			Base to Future Model			2011 Base			2040 Future			2011 Base			Difference			2040 Analysis			2035 Final Analysis		
		2011	2000	2040	2011 Existing	Future Model	Growth Factor	Adjusted Base Model	2040 Future Model Link	2011 Existing	Future Model	Growth Factor	Ratio Method (Existing*/Future/Base)	Ratio Method (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	
Central Avenue/Ritchie Road	Total	5276	5979	6006	6078	1.13	5369	5369	5312	899	1.43	899	899	5312	899	5312	899	5312	899	5312	899	5312	899	5312	
	SB Approach	627	670	785	1087	1.25	869	869	1087	259	1.5%	869	929	899	1.43	899	297	287	307	297	287	307	297	287	307
	SBL	207			359	1.25	287	287	359	398		441	471	456	1.43	456	432	432	432	432	432	432	432	432	432
	SBT	318			551	1.25	441	441	551	128		141	151	146	1.43	146	139	139	139	139	139	139	139	139	139
	SBR	102			177	1.25	141	141	177	1617	0.0%	1660	1660	1660	1.01	1660	1658	1658	1658	1658	1658	1658	1658	1658	1658
	WB Approach	1645	1611	1617	1632	0.98	259	259	1632	253		259	259	259	1.01	259	259	259	259	259	259	259	259	259	259
	WBL	257			255	0.98	259	259	255	1241		1275	1275	1275	1.01	1275	1273	1273	1273	1273	1273	1273	1273	1273	1273
	WBT	1263			1253	0.98	1275	1275	1253	123		126	126	126	1.01	126	126	126	126	126	126	126	126	126	126
	WBR	125			124	0.98	126	126	124	1340	0.1%	825	843	834	1.04	834	834	834	834	834	834	834	834	834	834
	NB Approach	799	1323	1340	1384	1.68	231	231	1384	371		228	233	231	1.04	231	229	229	229	229	229	229	229	229	229
	NBL	221			383	1.68	231	231	383	396		244	249	245	1.04	245	245	245	245	245	245	245	245	245	245
	NBT	235			409	1.68	244	244	409	573		353	361	357	1.04	357	355	355	355	355	355	355	355	355	355
NBR	342			592	1.68	353	353	592	2265	-0.4%	1923	1915	1919	0.87	1919	1968	1968	1968	1968	1968	1968	1968	1968	1968	
EB Approach	2205	2375	229	1975	1.03	194	194	1975	229		1579	1573	1576	0.87	1576	1576	1576	1576	1576	1576	1576	1576	1576	1576	
EBL	223			200	1.03	194	194	200	1860		1579	1573	1576	0.87	1576	1576	1576	1576	1576	1576	1576	1576	1576	1576	
EBT	1811			1622	1.03	1579	1579	1622	176		149	149	149	0.87	149	149	149	149	149	149	149	149	149	149	
EBR	171			153	1.03	149	149	153																	
Addison Road/Wilburm	Total	1698	2287	1384	1889	1.35	2348	2348	2574	1.45	2461	2461	2461	1.45	2461	2157	2157	2157	2157	2157	2157	2157	2157	2157	
	SB Approach	907	1193	1384	1889	1.53	1238	1238	1889	75	1.5%	1238	1412	1325	1.46	1325	1325	1325	1325	1325	1325	1325	1325	1325	1325
	SBL	49			102	1.53	67	67	102	1310		1171	1335	1253	1.46	1253	68	68	68	68	68	68	68	68	68
	SBT	858			1787	1.53	1171	1171	1787	0		0	0	0	1.46	0	1185	1185	1185	1185	1185	1185	1185	1185	1185
	SBR	0			0	1.53	0	0	0	0		0	0	0	1.46	0	0	0	0	0	0	0	0	0	0
	WB Approach	100	36	56	107	0.56	193	193	107	38	4.9%	133	305	119	1.72	119	110	110	110	110	110	110	110	110	110
	WBL	69			74	0.56	133	133	74	0		0	0	0	1.72	0	0	0	0	0	0	0	0	0	0
	WBT	0			0	0.56	0	0	0	17		60	47	53	1.72	53	49	49	49	49	49	49	49	49	49
	WBR	31			33	0.56	60	60	33	1088	0.3%	741	770	756	1.09	756	744	744	744	744	744	744	744	744	744
	NB Approach	691	1058	0	1167	1.57	1058	1058	1167	960		654	680	667	1.09	667	657	657	657	657	657	657	657	657	657
	NBL	0			0	1.57	0	0	0	128		87	90	89	1.09	89	87	87	87	87	87	87	87	87	87
	NBT	610			1030	1.57	654	654	1030	#DIV/0!		87	90	89	1.09	89	87	87	87	87	87	87	87	87	87
NBR	81			137	1.57	87	87	137	#DIV/0!		87	90	89	1.09	89	87	87	87	87	87	87	87	87	87	
EB Approach	0	0	#DIV/0!	0	1.57	0	0	0	0		0	0	0	1.09	0	0	0	0	0	0	0	0	0	0	
EBL	0			0	1.57	0	0	0	0		0	0	0	1.09	0	0	0	0	0	0	0	0	0	0	
EBT	0			0	1.57	0	0	0	0		0	0	0	1.09	0	0	0	0	0	0	0	0	0	0	
EBR	0			0	1.57	0	0	0	0		0	0	0	1.09	0	0	0	0	0	0	0	0	0	0	

MCHRP 255 Method selected:

Ratio
 Difference
 Average

Intersection Name	Movement	Existing Count Year			2011 Existing Turning Volumes	% Approach Volume	2011 Base to Future Model		2011 Adjusted Base Model Volumes	2040 Future Model Link Volume	2011 Base Model		Ratio Method (Existing* Future/Base)	Difference Method (Ex. + Future - Base)	Average ((Ratio + Diff.)/2)	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume
		2011	2000	2040			2000 Base Model Link Volume	2011 Existing Volume			2011 Existing Volume							
Hill Road/Willow	Total	1772	1657	1737	822	100.00%	0.4%	1949	1008	130	1496	596	672	1564	1530	1.20	1475	1400
	SB Approach	486	752	822	98	11.93%	0.9%	1008	120	169	596	71	80	1564	634	1.30	534	608
	SBL	58								120	169	71	80	1564	634	1.30	76	73
	SBT	421			712	86.63%		873	873	169	516	516	582	549	1.30	549	527	
	SBR	7			12	1.44%		15	15	169	9	9	10	9	1.30	9	9	
	WB Approach	154	60	73	115	100.00%	8.4%	261	164	0.75	349	220	300	324	2.11	324	295	
	WBL	97			4	62.99%		8	8	0.75	220	189	10	10	2.11	204	186	
	WBT	5			39	3.25%		88	88	0.75	118	101	101	109	2.11	111	10	
	WBR	52			27	33.77%		22	22	1.08	20	20	20	20	2.11	20	100	
	NB Approach	605	701	656	27	100.00%	-0.6%	537	537	1.08	496	487	487	492	0.81	492	511	
	NBL	25			485	4.13%		22	22	1.08	20	20	20	20	0.81	20	21	
	NBT	448			144	73.93%		397	397	1.08	367	360	360	363	0.81	363	378	
	NBR	133			144	21.95%		118	118	1.08	109	107	107	108	0.81	108	112	
EB Approach	26	144	22	17	100.00%	0.0%	143	143	5.53	26	25	25	26	0.98	26	26		
EBL	4			105	15.38%		22	22	5.53	4	4	4	4	0.98	4	4		
EBT	3			17	11.54%		17	17	5.53	3	3	3	3	0.98	3	3		
EBR	19			105	73.08%		105	105	5.53	19	19	19	19	0.98	19	19		
Morgan Blvd/Ridgefield Blvd	Total	892	1612	1837	871	100.00%	1.3%	2431	1001	181	1345	466	1711	1578	1.71	1257	1194	
	SB Approach	406	822	871	39	4.43%	0.5%	1001	44	215	21	21	24	536	501	1.23	501	485
	SBL	18			779	89.41%		895	895	215	417	417	479	448	1.23	448	433	
	SBT	363			54	6.16%		62	62	215	29	29	33	31	1.23	31	30	
	SBR	25			132	100.00%	7.8%	293	190	3.88	75	195	135	135	3.98	75	68	
	WB Approach	34	71	85	0	100.00%		190	190	3.88	49	126	87	87	3.98	49	44	
	WBL	22			0	64.71%		0	0	3.88	0	0	0	0	3.98	0	0	
	WBT	0			47	0.00%		103	103	3.88	27	69	48	48	3.98	27	24	
	WBR	12			824	35.29%		1133	1133	1.94	584	734	659	659	1.55	659	619	
	NB Approach	425	707	824	35	100.00%	1.5%	48	48	1.94	25	31	28	28	1.55	28	26	
	NBL	18			717	4.24%		986	986	1.94	509	639	574	574	1.55	574	539	
	NBT	370			72	87.06%		99	99	1.94	51	64	57	57	1.55	57	54	
	NBR	37			10	8.71%		12	12	1.94	0.36	21	16	16	1.55	21	22	
EB Approach	27	12	4	4	100.00%	-1.7%	1	1	0.36	4	8	6	6	0.60	8	8		
EBL	10			0	37.04%		0	0	0.36	0	0	0	0	0.60	0	0		
EBT	1			6	3.70%		2	2	0.36	7	13	10	10	0.60	13	13		
EBR	16			6	59.26%				0.36					0.60				

NCHRP 255 Method selected:

Ratio
 Difference
 Average

Intersection Name	Movement	2011 Existing			2011		2011 Base		Difference		Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume
		Turning Volumes	% Approach Volume	2000 Base Model Link Volume	Future Model Growth Factor	Adjusted Base Model Volumes	2040 Future Model Link Volume	2011 Existing Model Volume	Ratio Method (Existing * Future/Base)	Method (Ex. + Future - Base)			
Morgan Blvd/Park-N-Ride	Total	1247		1381	1.7%	851	2302	111	2079	2168	1.70	1434	1315
	SB Approach	442	100.00%	559	2.6%	851	1356	1.92	705	947	1.87	826	760
	SBL	1	0.23%			2	3	1.92	2	2	1.87	2	2
	SBT	405	91.53%			779	1242	1.92	646	868	1.87	757	696
	SBR	36	8.14%			69	110	1.92	57	77	1.87	67	62
	WB Approach	0	0.00%	0	#DIV/0!	#DIV/0!	0						0
	WBL	0											0
	WBT	0											0
	WBR	0											0
	NB Approach	477	100.00%	722	0.8%	784	946	1.64	576	639	1.27	608	585
NBL	91	19.08%			149	180	1.64	110	122	1.27	116	112	
NBT	386	80.92%			634	766	1.64	466	517	1.27	492	473	
NBR	0	0.00%	0	#DIV/0!	0	0			0		0	0	
EB Approach	328	100.00%	0	#DIV/0!	#DIV/0!	0						0	
EBL	88	26.83%				0						0	
EBT	0	0.00%				0						0	
EBR	240	73.17%				0						0	

Intersection Name	Existing Count Year			PM Peak			2011 Existing			Base to			2011 Base			2040 Future			2040 Analysis			2035 Final		
	Movement	Turning Volumes	% Approach Volume	2011 Base Model Volume	Future Model Volume	Growth Factor	2011 Existing Volume	Ratio (Future/Existing)	Method (Ex. + Future - Base)	Average Diff./2	Growth Factor (From Ex. Volume)	2040 Future Model Volume	Ratio (Future/Existing)	Method (Ex. + Future - Base)	Average Diff./2	2040 Analysis Volume	Ratio (Future/Existing)	2040 Analysis Volume	2035 Final Analysis Volume	Ratio (Future/Existing)	2035 Final Analysis Volume			
																						2010 Base Model Volume	2010 Future Model Volume	2011 Existing Volume
Central Avenue/Brightseat Road	Total	5606	5606	6795	724	0.4%	6410	0.96	5831	1.20	4708	0.82	4532	4620	4996	5101	0.82	4996	5101	0.82	4996			
	SB Approach	658	658	724	229	9.8%	465	0.70	1100	0.70	1581	0.82	1303	1442	1303	1194	0.82	1303	1194	0.82	1303			
	SBL	329	329	224	77	23.4%	229	0.70	542	0.70	778	0.82	642	710	642	588	0.82	642	588	0.82	642			
	SBT	171	171	274	117	25.6%	119	0.70	282	0.70	405	0.82	334	369	334	306	0.82	334	306	0.82	334			
	SBR	168	168	224	117	25.1%	117	0.70	277	0.70	398	0.82	328	363	328	300	0.82	328	300	0.82	328			
	WB Approach	1746	1746	2604	594	-0.8%	2361	1.35	1719	1.35	1271	0.68	1104	1188	1271	1353	0.68	1271	1353	0.68	1271			
	WBL	439	439	2604	594	25.14%	1605	1.35	432	1.35	370	0.68	278	299	370	340	0.68	370	340	0.68	370			
	WBT	1187	1187	2604	594	67.98%	1605	1.35	1169	1.35	864	0.68	751	808	864	920	0.68	864	920	0.68	864			
	WBR	120	120	2604	594	6.87%	1605	1.35	1169	1.35	864	0.68	751	808	864	920	0.68	864	920	0.68	864			
	NB Approach	852	852	1538	1476	-0.4%	1476	1.71	1313	1.71	767	0.85	699	733	767	755	0.85	733	755	0.85	733			
	NBL	295	295	1538	1476	34.22%	505	1.71	449	1.71	262	0.85	239	251	262	258	0.85	251	258	0.85	251			
	NBT	136	136	1538	1476	15.78%	233	1.71	207	1.71	121	0.85	110	116	121	119	0.85	116	119	0.85	116			
	NBR	431	431	1538	1476	50.00%	738	1.71	657	1.71	383	0.85	349	366	383	378	0.85	366	378	0.85	366			
EB Approach	2330	2330	2339	2108	-0.9%	2108	0.90	1499	0.90	1657	0.72	1721	1689	1721	1799	0.72	1689	1799	0.72	1689				
EBL	132	132	2339	2108	5.67%	119	0.90	85	0.90	94	0.72	97	96	97	102	0.72	96	102	0.72	96				
EBT	1955	1955	2339	2108	83.91%	1769	0.90	1258	0.90	1390	0.72	1444	1417	1444	1510	0.72	1417	1510	0.72	1417				
EBR	243	243	2339	2108	10.43%	220	0.90	156	0.90	173	0.72	179	176	179	188	0.72	176	188	0.72	176				
Central Avenue/I-95 SB	Total	6123	6123	5724	594	-0.6%	5192	0.85	4767	0.85	5001	0.83	5166	5084	5117	5290	0.83	5117	5290	0.83	5117			
	SB Approach	1108	1108	594	594	-0.5%	591	0.53	510	0.53	956	0.89	1027	991	991	1011	0.89	991	1011	0.89	991			
	SBL	750	750	594	345	58.1%	400	0.53	345	0.53	647	0.89	695	671	671	685	0.89	671	685	0.89	671			
	SBT	0	0	594	345	0.00%	0	0.53	0	0.53	0	0.89	0	0	0	0	0.89	0	0	0.89	0			
	SBR	358	358	594	345	60.00%	191	0.53	165	0.53	309	0.89	332	320	320	327	0.89	320	327	0.89	320			
	WB Approach	2018	2018	1954	1957	-0.4%	1957	0.97	1747	0.97	1802	0.89	1808	1805	1805	1842	0.89	1805	1842	0.89	1805			
	WBL	643	643	1954	1957	31.86%	623	0.97	557	0.97	574	0.89	576	575	575	587	0.89	575	587	0.89	575			
	WBT	1375	1375	1954	1957	68.14%	1333	0.97	1190	0.97	1228	0.89	1232	1230	1230	1255	0.89	1230	1255	0.89	1230			
	WBR	0	0	1954	1957	0.00%	0	0.97	0	0.97	0	0.89	0	0	0	0	0.89	0	0	0.89	0			
	NB Approach	0	0	0	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0	0	0.00%	0	0.00%	0	0.00%	0			
	NBL	0	0	0	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0	0	0.00%	0	0.00%	0	0.00%	0			
	NBT	0	0	0	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0	0	0.00%	0	0.00%	0	0.00%	0			
	NBR	0	0	0	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0	0	0.00%	0	0.00%	0	0.00%	0			
EB Approach	2997	2997	2666	2644	-0.8%	2644	0.88	2010	0.88	2278	0.77	2363	2321	2321	2437	0.77	2321	2437	0.77	2321				
EBL	0	0	2666	2644	0.00%	0	0.88	0	0.88	0	0.77	0	0	0	0	0.77	0	0	0.77	0				
EBT	2594	2594	2666	2644	86.55%	2289	0.88	1740	0.88	1972	0.77	2045	2009	2009	2109	0.77	2009	2109	0.77	2009				
EBR	403	403	2666	2644	13.45%	356	0.88	270	0.88	306	0.77	318	312	312	328	0.77	312	328	0.77	312				

PM Peak

NCHRP 255 Method selected

Ratio
 Difference
 Average

Intersection Name	Movement	Existing Count Year			% Approach Volume	Base to Future Model		2011 Model		2010 Future Model Link Volume	2011 Existing Model Link Volume	Ratio Method (Existing * Future/Base)	Difference Method (Ex. + Future - Base)	Average ((Ratio + Diff)/2)	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume
		2011	2010	2040		Future Model Volume	Adjusted Base Model Volume	2011 Existing Volume	2011 Existing Volume								
Central Avenue/I-95 NB	Total	7153	5248	5177	73.1%	-1.5%	3110	4239	0.73	3110	4239	5015	4627	0.65	3076	5437	
	SB Approach	0	0	0	0.00%		0			0		0				0	
	SBL	0														0	
	SBT	0														0	
	SBR	0														0	
	WB Approach	2088	1937	1927	100.00%	-0.5%	1625	1761	0.92	1625	1761	1786	1774	0.85	1774	1828	
	WBL	0			0.00%		0			0		0				0	
	WBT	1737			83.19%		1352	1465	0.92	1352	1465	1486	1476	0.85	1476	1521	
	WBR	351			16.81%		273	296	0.92	273	296	300	298	0.85	298	307	
	NB Approach	1694	1102	1079	100.00%	-2.1%	424	665	0.64	424	665	1039	852	0.50	1039	1152	
	NBL	281			16.59%		70	110	0.64	70	110	172	141	0.50	172	191	
	NBT	0			0.00%		0			0		0				0	
NBR	1413			83.41%		354	555	0.64	354	555	866	711	0.50	866	961		
EB Approach	3371	2209	2171	100.00%	-1.7%	1061	1648	0.64	1061	1648	2261	1954	0.58	2261	2453		
EBL	661			19.61%		208	323	0.64	208	323	443	383	0.58	443	481		
EBT	2710			80.39%		853	1325	0.64	853	1325	1818	1571	0.58	1818	1972		
EBR	0			0.00%		0			0		0				0		
Harry S. Truman Drive/Largo Center Drive (NOTE: NB/SB is Harry S. Truman Drive)	Total	1969	758	795	38.5%	4.9%	1867	4850	0.38	1867	4850	3078	3966	2.01	3135	2934	
	SB Approach	0	0	0	0.00%		0			0		0			0	0	
	SBL	0														0	
	SBT	0														0	
	SBR	0														0	
	WB Approach	258	19	22	87.60%	13.3%	95	1138	0.08	95	1138	331	331	1.28	331	315	
	WBL	226			87.60%		83	937	0.08	83	937	290	644	2.85	290	279	
	WBT	0			0.00%		0			0		0				0	
	WBR	32			12.40%		12	141	0.08	12	141	41	91	2.85	41	40	
	NB Approach	888	439	446	100.00%	1.5%	635	1266	0.50	635	1266	1077	1172	1.32	1172	1123	
	NBL	0			0.00%		0			0		0				0	
	NBT	475			53.49%		340	677	0.50	340	677	576	627	1.32	627	601	
NBR	413			46.51%		295	589	0.50	295	589	501	545	1.32	545	522		
EB Approach	823	300	328	100.00%	9.3%	1137	2854	0.40	1137	2854	1632	2243	2.73	1632	1493		
EBL	21			2.55%		29	73	0.40	29	73	42	57	2.73	42	38		
EBT	237			28.80%		327	822	0.40	327	822	470	646	2.73	470	430		
EBR	565			68.65%		781	1959	0.40	781	1959	1120	1540	2.73	1120	1025		


PM Peak

NCHRP 255 Method selected

Intersection Name	Movement	Existing Count Year			Base to Future Model			2011 Existing			2011 Base			2040 Future			2040 Analysis			2035 Final		
		2011	2010	2040	Future Model	Adjusted Base	Model	Volume	Factor	Volume	Model	Volume	Ratio Method	Method	Volume	Volume	Volume	Volume	Volume	Volume	Volume	
		Turning	% Approach	Volume	Model Link	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	
Arena Drive/Shoppers Way	Total	2239		1502	0	1548	3.1%	2878	0.67	4290	3953	1.77	3570	3340								
	SB Approach	0	0.00%	0	0	0		0		0	0		0	0								
	SBL	0												0								
	SBT	0												0								
	SBR	0												0								
	WB Approach	802	100.00%	386	4.5%	403		909	0.50	1807	1308	1.94	1308	1220								
	WBL	82	10.22%			41		93	0.50	185	134	1.94	134	125								
	WBT	720	89.78%			362		816	0.50	1622	1174	1.94	1174	1096								
	WBR	0	0.00%			0		0			0		0	0								
	NB Approach	377	100.00%	87	-0.8%	86		67	0.23	293	358	0.95	358	361								
NBL	221	58.52%			51		39	0.23	172	210	0.86	210	212									
NBT	0	0.00%			0		0			0		0	0									
NBR	156	41.38%			36		28	0.23	121	148	0.86	148	149									
EB Approach	1060	100.00%	1029	2.8%	1058		1902	1.00	1905	1904	1.80	1905	1759									
EBL	0	0.00%			0		0			0		0	0									
EBT	721	68.02%			720		1294	1.00	1296	1295	1.80	1296	1196									
EBR	339	31.98%			338		608	1.00	609	609	1.80	609	563									
Lotford Road/Harry S. Truman Drive	Total	1098		544	2.5%	558		949	0.50	1915	1709	1.56	1627	1536								
	SB Approach	431	100.00%	259	2.5%	266		456	0.62	740	621	1.58	681	638								
	SBL	0	0.00%			0		0			0		0	0								
	SBT	291	67.52%			179		308	0.62	500	420	1.58	460	431								
	SBR	140	32.48%			86		148	0.62	240	202	1.58	221	207								
	WB Approach	515	100.00%	283	2.5%	290		492	0.56	874	717	1.54	795	747								
	WBL	43	8.35%			24		41	0.56	73	60	1.54	66	62								
	WBT	275	53.40%			155		263	0.56	467	383	1.54	425	399								
	WBR	197	38.25%			111		188	0.56	334	274	1.54	304	285								
	NB Approach	152	100.00%	2	-1.7%	2		1	0.01	77	151	0.99	151	151								
NBL	9	5.92%			0		0	0.01	5	9	0.99	9	9									
NBT	143	94.08%			2		1	0.01	73	142	0.99	142	142									
NBR	0	0.00%			0		0			0		0	0									
EB Approach	0	0.00%	0		0		0			0		0	0									
EBL	0	0.00%			0		0			0		0	0									
EBT	0	0.00%			0		0			0		0	0									
EBR	0	0.00%			0		0			0		0	0									

PM Peak

NCHRP 255 Method selected!



Intersection Name	Movement	2011 Existing			Base to Future Model		2011 Model		2011 Base Model		2010 Base Model		2010 Future Model		2011 Base Model		Difference Method (Ex. + Future - Base)	Average ((Ratio + Diff)/2)	Growth Factor (From Ex. Volume)	2040 Analysis Volume	2035 Final Analysis Volume	
		Turning Volumes	% Approach Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume	Model Link Volume						Model Link Volume
Arena/Lottstord	Total	2738	100.00%	1907	1958	2.7%	3437	0.70	4935	4601	1061	4441	4758	1065	1.68	4441	1061	1.44	4441	1061	4758	
	S8 Approach	738	100.00%	127	138	8.8%	461	0.19	2463	1061	131	1061	1061	1065	1.44	1061	1061	1.44	1061	1061	1065	
	SBL	51	12.33%		17		57	0.19	304	131				124								124
	SBT	233	31.57%		44		146	0.19	778	335				317								317
	SBR	414	56.10%		77		259	0.19	1382	595				564								564
	WB Approach	442	100.00%	741	738	-0.4%	641	1.67	384	365	365			378	0.83							378
	WBL	82	18.55%		137		119	1.67	71	64	64			70	0.83							70
	WBT	327	73.98%		546		474	1.67	284	255	255			280	0.83							280
	WBR	33	7.47%		55		48	1.67	29	26	26			28	0.83							28
	NB Approach	651	100.00%	285	292	2.5%	500	0.45	1114	859	859			929	1.52							929
	NBL	133	20.43%		60		102	0.45	228	175	175			190	1.52							190
	NBT	291	44.70%		131		224	0.45	498	384	384			415	1.52							415
NBR	227	34.87%		102		174	0.45	388	299	299			324	1.52							324	
EB Approach	907	100.00%	754	790	4.8%	1835	0.87	2107	1952	1952			1836	2.24							1836	
EBL	302	33.30%		263		611	0.87	701	650	650			611	2.24							611	
EBT	484	53.36%		422		979	0.87	1124	1042	1042			980	2.24							980	
EBR	121	13.34%		105		245	0.87	281	260	260			245	2.24							245	

Appendix 4
“No Build” Traffic Analysis and Queuing Reports

Queues

10: Southern Ave NE & MD 214 West

7/24/2012

							
Lane Group	EBL	EBT	WBL	WBT	WBR	NET	SWT
Lane Group Flow (vph)	58	315	95	2589	153	868	579
v/c Ratio	0.29	0.11	0.12	1.36	0.16	1.12	0.77
Control Delay	10.0	10.3	5.5	191.5	4.7	104.1	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	10.3	5.5	191.5	4.7	104.1	35.7
Queue Length 50th (ft)	12	31	17	~1165	15	~344	156
Queue Length 95th (ft)	26	46	33	#1301	44	#469	225
Internal Link Dist (ft)		460		823		251	355
Turn Bay Length (ft)	175		330				
Base Capacity (vph)	202	2781	768	1897	940	776	756
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.11	0.12	1.36	0.16	1.12	0.77

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Southern Ave NE & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	275	25	90	2460	145	65	750	10	30	350	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		-1.0	6.0	3.0		3.0			3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		0.95			0.95	
Flt	1.00	0.99		1.00	1.00	0.85		1.00			0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1770	5022		1770	3539	1583		3519			3366	
Flt Permitted	0.08	1.00		0.55	1.00	1.00		0.74			0.71	
Satd. Flow (perm)	150	5022		1030	3539	1583		2616			2382	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	289	26	95	2589	153	68	789	11	32	368	179
RTOR Reduction (vph)	0	10	0	0	0	43	0	1	0	0	51	0
Lane Group Flow (vph)	58	305	0	95	2589	110	0	867	0	0	528	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	53.1	48.8		50.7	47.6	47.6		26.0			26.0	
Effective Green, g (s)	55.1	53.8		60.7	52.6	55.6		29.0			29.0	
Actuated g/C Ratio	0.56	0.54		0.61	0.53	0.56		0.29			0.29	
Clearance Time (s)	4.0	11.0		4.0	11.0	11.0		6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	170	2732		693	1882	890		767			698	
v/s Ratio Prot	c0.02	0.06		0.01	c0.73							
v/s Ratio Perm	0.17			0.07		0.07		c0.33			0.22	
v/c Ratio	0.34	0.11		0.14	1.38	0.12		1.13			0.76	
Uniform Delay, d1	21.0	10.9		7.8	23.2	10.2		35.0			31.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	1.2	0.0		0.1	172.5	0.1		74.8			4.7	
Delay (s)	22.2	11.0		7.9	195.6	10.2		109.8			36.4	
Level of Service	C	B		A	F	B		F			D	
Approach Delay (s)		12.7			179.3			109.8			36.4	
Approach LOS		B			F			F			D	
Intersection Summary												
HCM Average Control Delay			135.3									F
HCM Volume to Capacity ratio			1.27									
Actuated Cycle Length (s)			98.9							15.0		
Intersection Capacity Utilization			125.4%									H
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
20: Davey Street & MD 214 West












7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	155	2425	10	0	300	15	30	5	40	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	163	2553	11	0	316	16	32	5	42	5	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		903										
pX, platoon unblocked												
vC, conflicting volume	332			2563			2995	3216	856	1546	3213	113
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			2563			2995	3216	856	1546	3213	113
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			0	37	86	83	100	99
cM capacity (veh/h)	1225			169			5	8	301	30	8	918
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NE 1	NE 2	SW 1	
Volume Total	163	1021	1021	521	0	126	126	79	37	42	11	
Volume Left	163	0	0	0	0	0	0	0	32	0	5	
Volume Right	0	0	0	11	0	0	0	16	0	42	5	
cSH	1225	1700	1700	1700	1700	1700	1700	1700	6	301	58	
Volume to Capacity	0.13	0.60	0.60	0.31	0.00	0.07	0.07	0.05	6.55	0.14	0.18	
Queue Length 95th (ft)	11	0	0	0	0	0	0	0	Err	12	15	
Control Delay (s)	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Err	18.9	79.8	
Lane LOS	A								F	C	F	
Approach Delay (s)	0.5				0.0				4676.3		79.8	
Approach LOS									F		F	
Intersection Summary												
Average Delay				118.0								
Intersection Capacity Utilization			65.5%		ICU Level of Service				C			
Analysis Period (min)			15									

Queues

90: Addison Rd. & MD 214 West

7/24/2012

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	42	658	132	132	2868	542	500	174	58	174	
v/c Ratio	0.26	0.25	0.15	0.27	1.02	0.73	0.65	0.36	0.32	0.49	
Control Delay	17.6	21.7	4.4	15.5	53.1	60.3	57.4	8.1	66.8	66.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.6	21.7	4.4	15.5	53.1	60.3	57.4	8.1	66.8	66.5	
Queue Length 50th (ft)	15	128	0	50	~1123	255	235	0	54	84	
Queue Length 95th (ft)	37	183	42	m105	#1310	309	288	61	99	122	
Internal Link Dist (ft)		307			296		726			986	
Turn Bay Length (ft)	200		200	175		350		575	200		
Base Capacity (vph)	162	2627	853	486	2802	858	885	526	443	880	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.26	0.25	0.15	0.27	1.02	0.63	0.56	0.33	0.13	0.20	

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
90: Addison Rd. & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	625	125	125	2625	100	515	475	165	55	155	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	6.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5057		3433	3539	1583	1770	3506	
Flt Permitted	0.05	1.00	1.00	0.34	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	98	5085	1583	624	5057		3433	3539	1583	1770	3506	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	658	132	132	2763	105	542	500	174	58	163	11
RTOR Reduction (vph)	0	0	67	0	2	0	0	0	136	0	4	0
Lane Group Flow (vph)	42	658	65	132	2866	0	542	500	38	58	170	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		6	2					3			
Actuated Green, G (s)	78.9	73.4	73.4	87.5	77.7		29.6	29.6	29.6	12.2	12.2	
Effective Green, g (s)	84.9	77.4	74.4	92.2	81.7		32.6	32.6	32.6	15.2	15.2	
Actuated g/C Ratio	0.57	0.52	0.50	0.61	0.54		0.22	0.22	0.22	0.10	0.10	
Clearance Time (s)	6.0	7.0	7.0	6.0	7.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	2.5	5.0	5.0	2.5	5.0		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	150	2624	785	481	2754		746	769	344	179	355	
v/s Ratio Prot	0.02	0.13		c0.02	c0.57		c0.16	0.14		0.03	c0.05	
v/s Ratio Perm	0.14		0.04	0.15					0.02			
v/c Ratio	0.28	0.25	0.08	0.27	1.04		0.73	0.65	0.11	0.32	0.48	
Uniform Delay, d1	32.3	20.2	19.9	12.5	34.1		54.6	53.5	47.1	62.6	63.7	
Progression Factor	1.00	1.00	1.00	1.11	0.93		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2	0.2	0.2	27.6		3.3	1.8	0.1	0.8	0.7	
Delay (s)	33.1	20.4	20.1	14.1	59.2		57.9	55.3	47.2	63.4	64.4	
Level of Service	C	C	C	B	E		E	E	D	E	E	
Approach Delay (s)		21.0			57.3			55.3			64.2	
Approach LOS		C			E			E			E	
Intersection Summary												
HCM Average Control Delay			51.4		HCM Level of Service				D			
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			89.7%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
95: MD 214 West

7/24/2012

	→	↘	↙	←	↖	↗			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	↑↑↑		↘	↑↑↑	↙				
Volume (veh/h)	695	130	265	2525	150	100			
Sign Control	Free			Free	Stop				
Grade	0%			0%	0%				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	732	137	279	2658	158	105			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None		None						
Median storage (veh)									
Upstream signal (ft)	376								
pX, platoon unblocked			0.93		0.93		0.93		
vC, conflicting volume			868		2244		312		
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol			607		2081		11		
tC, single (s)			4.1		6.8		6.9		
tC, 2 stage (s)									
tF (s)			2.2		3.5		3.3		
p0 queue free %			69		0		89		
cM capacity (veh/h)			902		30		996		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1	
Volume Total	293	293	283	279	886	886	886	263	
Volume Left	0	0	0	279	0	0	0	158	
Volume Right	0	0	137	0	0	0	0	105	
cSH	1700	1700	1700	902	1700	1700	1700	48	
Volume to Capacity	0.17	0.17	0.17	0.31	0.52	0.52	0.52	5.44	
Queue Length 95th (ft)	0	0	0	33	0	0	0	Err	
Control Delay (s)	0.0	0.0	0.0	10.8	0.0	0.0	0.0	Err	
Lane LOS				B				F	
Approach Delay (s)	0.0			1.0				Err	
Approach LOS								F	
Intersection Summary									
Average Delay			647.5						
Intersection Capacity Utilization			69.9%		ICU Level of Service		C		
Analysis Period (min)			15						

HCM Unsignalized Intersection Capacity Analysis
100: Cabin Branch Rd/Soper Ln & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	700	90	145	2710	10	60	0	85	5	5	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	737	95	153	2853	11	63	0	89	5	5	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					941							
pX, platoon unblocked	0.73						0.73	0.73		0.73	0.73	0.73
vC, conflicting volume	2863			832			2075	3963	293	3509	4005	956
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2252			832			1169	3763	293	3139	3821	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			81			0	100	87	0	0	97
cM capacity (veh/h)	164			797			0	2	703	2	2	789
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1		
Volume Total	5	295	295	242	153	1141	1141	581	153	32		
Volume Left	5	0	0	0	153	0	0	0	63	5		
Volume Right	0	0	0	95	0	0	0	11	89	21		
cSH	164	1700	1700	1700	797	1700	1700	1700	0	7		
Volume to Capacity	0.03	0.17	0.17	0.14	0.19	0.67	0.67	0.34	Err	4.65		
Queue Length 95th (ft)	2	0	0	0	18	0	0	0	Err	Err		
Control Delay (s)	27.7	0.0	0.0	0.0	10.6	0.0	0.0	0.0	Err	Err		
Lane LOS	D				B				F	F		
Approach Delay (s)	0.2				0.5				Err	Err		
Approach LOS									F	F		
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization			81.1%		ICU Level of Service				D			
Analysis Period (min)			15									

Queues







110: MD 214 West & Cindy

7/24/2012

	↖	→	←	↘	↙
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	32	805	2863	21	95
v/c Ratio	0.22	0.18	0.68	0.13	0.49
Control Delay	22.3	0.6	7.2	63.4	37.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	0.6	7.2	63.4	37.1
Queue Length 50th (ft)	3	9	383	20	36
Queue Length 95th (ft)	25	17	536	47	95
Internal Link Dist (ft)		861	1511	430	
Turn Bay Length (ft)	225			250	
Base Capacity (vph)	143	4429	4199	422	421
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.18	0.68	0.05	0.23
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
110: MD 214 West & Cindy

7/24/2012

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↵
Volume (vph)	30	765	2700	20	20	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	5080		1770	1583
Flt Permitted	0.03	1.00	1.00		0.95	1.00
Satd. Flow (perm)	61	5085	5080		1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	805	2842	21	21	95
RTOR Reduction (vph)	0	0	0	0	0	52
Lane Group Flow (vph)	32	805	2863	0	21	43
Turn Type	pm+pt	NA	NA		NA	custom
Protected Phases	1	6	2			
Permitted Phases	6				8	8
Actuated Green, G (s)	126.6	126.6	117.9		10.4	10.4
Effective Green, g (s)	128.6	130.6	121.9		13.4	13.4
Actuated g/C Ratio	0.86	0.87	0.81		0.09	0.09
Clearance Time (s)	5.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0		3.0	3.0
Lane Grp Cap (vph)	117	4427	4128		158	141
v/s Ratio Prot	c0.01	0.16	c0.56			
v/s Ratio Perm	0.23				0.01	c0.03
v/c Ratio	0.27	0.18	0.69		0.13	0.31
Uniform Delay, d1	9.6	1.5	6.0		62.9	63.9
Progression Factor	4.29	0.34	1.00		1.00	1.00
Incremental Delay, d2	1.3	0.1	1.0		0.4	1.2
Delay (s)	42.3	0.6	7.0		63.3	65.2
Level of Service	D	A	A		E	E
Approach Delay (s)		2.2	7.0		64.8	
Approach LOS		A	A		E	
Intersection Summary						
HCM Average Control Delay			7.7		HCM Level of Service	A
HCM Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			150.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			65.9%		ICU Level of Service	C
Analysis Period (min)			15			
c	Critical Lane Group					

Queues

130: Garrett Morgan & Ridgefield

7/24/2012

	→	↙	←	↘	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	126	68	52	21	463	16	590
v/c Ratio	0.33	0.20	0.11	0.05	0.16	0.03	0.20
Control Delay	13.2	13.3	5.9	5.9	5.3	5.7	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	13.3	5.9	5.9	5.3	5.7	5.4
Queue Length 50th (ft)	16	10	1	2	15	1	20
Queue Length 95th (ft)	55	36	19	10	33	8	41
Internal Link Dist (ft)	623		482		695		523
Turn Bay Length (ft)				150		125	
Base Capacity (vph)	1323	1234	1578	765	4960	869	4945
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.06	0.03	0.03	0.09	0.02	0.12
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
130: Garrett Morgan & Ridgfield

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔↔↔		↔	↔↔↔	
Volume (vph)	90	5	25	65	5	45	20	425	15	15	530	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Flt		0.97		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1745		1770	1610		1770	5059		1770	5044	
Flt Permitted		0.75		0.68	1.00		0.42	1.00		0.48	1.00	
Satd. Flow (perm)		1349		1260	1610		780	5059		887	5044	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	5	26	68	5	47	21	447	16	16	558	32
RTOR Reduction (vph)	0	15	0	0	38	0	0	3	0	0	6	0
Lane Group Flow (vph)	0	111	0	68	14	0	21	460	0	16	584	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		6.4		6.4	6.4		16.5	16.5		16.5	16.5	
Effective Green, g (s)		6.4		6.4	6.4		16.5	16.5		16.5	16.5	
Actuated g/C Ratio		0.19		0.19	0.19		0.50	0.50		0.50	0.50	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		262		245	313		391	2537		445	2530	
v/s Ratio Prot					0.01			0.09			c0.12	
v/s Ratio Perm		c0.08		0.05			0.03			0.02		
v/c Ratio		0.42		0.28	0.05		0.05	0.18		0.04	0.23	
Uniform Delay, d1		11.6		11.3	10.8		4.2	4.5		4.2	4.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1		0.6	0.1		0.2	0.1		0.1	0.1	
Delay (s)		12.7		11.9	10.8		4.4	4.6		4.3	4.8	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		12.7			11.4			4.6			4.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			6.0			HCM Level of Service			A			
HCM Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			32.9			Sum of lost time (s)		10.0				
Intersection Capacity Utilization			38.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

140: Morgan Metro Park and Ride & Garrett A Morgan

7/24/2012

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	368	68	363	358	63	126
v/c Ratio	0.23	0.13	0.44	0.10	0.21	0.34
Control Delay	13.2	5.1	18.1	3.4	21.1	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	5.1	18.1	3.4	21.1	7.9
Queue Length 50th (ft)	27	0	43	10	15	0
Queue Length 95th (ft)	52	22	88	21	48	38
Internal Link Dist (ft)	667			1365	395	
Turn Bay Length (ft)		100	150			
Base Capacity (vph)	3436	1092	2320	5085	1428	1302
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.06	0.16	0.07	0.04	0.10
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
 140: Morgan Metro Park and Ride & Garrett A Morgan











7/24/2012

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑	↗	↘	↑↑↑	↘	↗
Volume (vph)	350	65	345	340	60	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	1.00	0.97	0.91	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	368	68	363	358	63	126
RTOR Reduction (vph)	0	47	0	0	0	110
Lane Group Flow (vph)	368	21	363	358	63	16
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases			1	6	4	
Permitted Phases	2	2				4
Actuated Green, G (s)	14.4	14.4	10.9	30.3	5.8	5.8
Effective Green, g (s)	14.4	14.4	10.9	30.3	5.8	5.8
Actuated g/C Ratio	0.31	0.31	0.24	0.66	0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	3.0	3.0
Lane Grp Cap (vph)	1588	494	812	3342	223	199
v/s Ratio Prot			c0.11	0.07	c0.04	
v/s Ratio Perm	c0.07	0.01				0.01
v/c Ratio	0.23	0.04	0.45	0.11	0.28	0.08
Uniform Delay, d1	11.7	11.0	15.0	2.9	18.3	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	0.0	0.7	0.2
Delay (s)	12.0	11.1	15.4	3.0	19.0	18.0
Level of Service	B	B	B	A	B	B
Approach Delay (s)	11.8			9.2	18.3	
Approach LOS	B			A	B	
Intersection Summary						
HCM Average Control Delay			11.3		HCM Level of Service	B
HCM Volume to Capacity ratio			0.32			
Actuated Cycle Length (s)			46.1		Sum of lost time (s)	15.0
Intersection Capacity Utilization			34.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

150: Ritchie/Garrett A Morgan & MD 214 West

7/24/2012

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	964	158	2474	296	435	289	174	200	168
v/c Ratio	0.44	0.33	0.78	0.87	0.54	0.76	0.18	0.52	0.58	0.47
Control Delay	77.9	18.4	103.7	37.1	66.0	74.7	0.3	78.2	80.0	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.9	18.4	103.7	37.1	66.0	74.7	0.3	78.2	80.0	23.9
Queue Length 50th (ft)	73	187	91	841	176	271	0	96	114	66
Queue Length 95th (ft)	109	256	#151	#1136	222	327	0	136	156	107
Internal Link Dist (ft)		1283		929		896			1365	
Turn Bay Length (ft)	350		600		350		200	500		
Base Capacity (vph)	301	2953	202	2835	877	908	1583	990	1020	354
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.33	0.78	0.87	0.34	0.48	0.18	0.18	0.20	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
150: Ritchie/Garrett A Morgan & MD 214 West











7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	790	125	150	2200	150	420	275	275	165	190	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.86	0.86	1.00	0.97	0.95	1.00
Flt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4981		3433	5037		3044	3151	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4981		3433	5037		3044	3151	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	832	132	158	2316	158	442	289	289	174	200	168
RTOR Reduction (vph)	0	7	0	0	3	0	0	0	0	0	0	61
Lane Group Flow (vph)	132	957	0	158	2471	0	296	435	289	174	200	107
Turn Type	Prot	NA		Prot	NA		Split	NA	Free	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4		3	3	1
Permitted Phases									Free			3
Actuated Green, G (s)	12.9	97.6		8.0	92.7		28.9	28.9	170.0	14.5	14.5	27.4
Effective Green, g (s)	14.9	100.6		10.0	95.7		30.9	30.9	170.0	16.5	16.5	31.4
Actuated g/C Ratio	0.09	0.59		0.06	0.56		0.18	0.18	1.00	0.10	0.10	0.18
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0		2.5	2.5		2.5	2.5	3.0
Lane Grp Cap (vph)	301	2948		202	2836		553	573	1583	333	343	292
v/s Ratio Prot	c0.04	0.19		0.05	c0.49		0.10	c0.14		0.05	c0.06	0.03
v/s Ratio Perm									0.18			0.04
v/c Ratio	0.44	0.32		0.78	0.87		0.54	0.76	0.18	0.52	0.58	0.37
Uniform Delay, d1	73.6	17.5		78.9	31.9		63.0	66.0	0.0	73.0	73.5	60.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.3		25.4	4.0		0.8	5.5	0.3	1.1	2.1	0.8
Delay (s)	74.6	17.8		104.3	35.9		63.8	71.5	0.3	74.1	75.5	61.4
Level of Service	E	B		F	D		E	E	A	E	E	E
Approach Delay (s)		24.7			40.0			49.1			70.7	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM Average Control Delay			41.7									HCM Level of Service D
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			170.0									Sum of lost time (s) 12.0
Intersection Capacity Utilization			78.5%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

Queues

160: Shady Glen Dr/Hill Rd & MD 214 West

7/24/2012

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	74	753	95	2358	205	137	189	272	233	242
v/c Ratio	0.44	0.24	0.19	0.74	0.20	0.44	0.57	0.68	0.56	0.58
Control Delay	26.1	12.9	8.2	22.3	6.0	68.8	61.7	70.4	65.9	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	12.9	8.2	22.3	6.0	68.8	61.7	70.4	65.9	12.1
Queue Length 50th (ft)	19	108	25	538	28	67	80	150	126	0
Queue Length 95th (ft)	76	164	55	768	80	100	120	198	170	79
Internal Link Dist (ft)		1835		2003			924		2121	
Turn Bay Length (ft)	300		225		325	350		300		150
Base Capacity (vph)	170	3186	504	3206	1044	881	896	781	806	586
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.24	0.19	0.74	0.20	0.16	0.21	0.35	0.29	0.41
Intersection Summary										

HCM Signalized Intersection Capacity Analysis
160: Shady Glen Dr/Hill Rd & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	675	40	90	2240	195	130	135	45	350	130	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	0.95		0.86	0.86	1.00
Flt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	5043		1770	5085	1583	3433	3407		3044	3139	1583
Flt Permitted	0.04	1.00		0.33	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	80	5043		611	5085	1583	3433	3407		3044	3139	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	711	42	95	2358	205	137	142	47	368	137	242
RTOR Reduction (vph)	0	3	0	0	0	46	0	26	0	0	0	210
Lane Group Flow (vph)	74	750	0	95	2358	159	137	163	0	272	233	32
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						4
Actuated Green, G (s)	99.8	91.7		99.6	91.6	91.6	10.5	10.5		16.8	16.8	16.8
Effective Green, g (s)	103.8	94.7		103.6	94.6	94.6	13.5	13.5		19.8	19.8	19.8
Actuated g/C Ratio	0.69	0.63		0.69	0.63	0.63	0.09	0.09		0.13	0.13	0.13
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	169	3184		499	3207	998	309	307		402	414	209
v/s Ratio Prot	c0.03	0.15		0.01	c0.46		0.04	c0.05		c0.09	0.07	
v/s Ratio Perm	0.27			0.12		0.10						0.02
v/c Ratio	0.44	0.24		0.19	0.74	0.16	0.44	0.53		0.68	0.56	0.15
Uniform Delay, d1	21.6	12.0		7.8	19.1	11.4	64.7	65.2		62.0	61.0	57.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.8	0.2		0.2	1.5	0.3	0.7	1.3		4.1	1.4	0.2
Delay (s)	23.4	12.1		8.0	20.6	11.7	65.4	66.5		66.1	62.5	57.9
Level of Service	C	B		A	C	B	E	E		E	E	E
Approach Delay (s)		13.2			19.5			66.0			62.3	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM Average Control Delay			28.7				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			74.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

170: Hill Rd & Willow Hill Rd

7/24/2012

	→	↘	←	↙	↑	↗	↓	↘
Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	16	258	95	406	74	495	5
v/c Ratio	0.02	0.04	0.71	0.19	0.37	0.08	0.47	0.01
Control Delay	13.4	7.3	29.1	4.8	8.4	2.4	9.7	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	7.3	29.1	4.8	8.4	2.4	9.7	4.6
Queue Length 50th (ft)	2	0	73	0	62	0	82	0
Queue Length 95th (ft)	11	10	138	25	142	16	185	4
Internal Link Dist (ft)	480		402		2121		554	
Turn Bay Length (ft)								100
Base Capacity (vph)	606	595	501	645	1085	964	1043	936
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.51	0.15	0.37	0.08	0.47	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
170: Hill Rd & Willow Hill Rd













7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	15	235	10	90	10	375	70	40	430	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1817	1583		1778	1583		1860	1583		1855	1583
Flt Permitted		0.88	1.00		0.73	1.00		0.99	1.00		0.95	1.00
Satd. Flow (perm)		1639	1583		1356	1583		1840	1583		1767	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	5	16	247	11	95	11	395	74	42	453	5
RTOR Reduction (vph)	0	0	12	0	0	69	0	0	30	0	0	2
Lane Group Flow (vph)	0	10	4	0	258	26	0	406	44	0	495	3
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		15.4	15.4		15.4	15.4		33.7	33.7		33.7	33.7
Effective Green, g (s)		15.4	15.4		15.4	15.4		33.7	33.7		33.7	33.7
Actuated g/C Ratio		0.27	0.27		0.27	0.27		0.59	0.59		0.59	0.59
Clearance Time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		442	427		366	427		1086	934		1043	934
v/s Ratio Prot												
v/s Ratio Perm		0.01	0.00		0.19	0.02		0.22	0.03		0.28	0.00
v/c Ratio		0.02	0.01		0.70	0.06		0.37	0.05		0.47	0.00
Uniform Delay, d1		15.3	15.3		18.8	15.5		6.2	4.9		6.7	4.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.0	0.0		6.1	0.1		1.0	0.1		1.5	0.0
Delay (s)		15.3	15.3		24.9	15.5		7.1	5.0		8.2	4.8
Level of Service		B	B		C	B		A	A		A	A
Approach Delay (s)		15.3		22.4			6.8			8.2		
Approach LOS		B		C			A			A		
Intersection Summary												
HCM Average Control Delay			11.5		HCM Level of Service					B		
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			57.1		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			75.3%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

180: Hampton Park/Brightseat Rd. & MD 214 West

7/24/2012

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	153	1232	226	468	2258	374	179	132	389	211	321	184
v/c Ratio	0.45	0.83	0.36	0.52	0.98	0.46	0.69	0.48	0.33	0.28	0.79	0.38
Control Delay	68.0	55.1	6.3	52.2	53.5	18.5	73.3	63.3	30.7	48.5	68.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	55.1	6.3	52.2	53.5	18.5	73.3	63.3	30.7	48.5	68.9	7.7
Queue Length 50th (ft)	74	413	0	203	779	127	169	120	142	89	300	0
Queue Length 95th (ft)	111	473	63	#331	#1136	271	240	181	209	118	385	60
Internal Link Dist (ft)		1118			496			563			1338	
Turn Bay Length (ft)	650		425	340						350		350
Base Capacity (vph)	338	1492	624	894	2315	817	490	515	1193	950	515	571
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.83	0.36	0.52	0.98	0.46	0.37	0.26	0.33	0.22	0.62	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
180: Hampton Park/Brightseat Rd. & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Volume (vph)	145	1170	215	445	2145	355	170	125	370	200	305	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	0.88	0.97	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	1863	2787	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	1863	2787	3433	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	153	1232	226	468	2258	374	179	132	389	211	321	184
RTOR Reduction (vph)	0	0	160	0	0	96	0	0	0	0	0	144
Lane Group Flow (vph)	153	1232	66	468	2258	278	179	132	389	211	321	40
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	4 5	3	3	
Permitted Phases			6			2						3
Actuated Green, G (s)	12.8	41.0	41.0	37.0	65.2	65.2	19.2	19.2	62.2	29.8	29.8	29.8
Effective Green, g (s)	14.8	44.0	44.0	39.0	68.2	68.2	22.2	22.2	65.2	32.8	32.8	32.8
Actuated g/C Ratio	0.10	0.29	0.29	0.26	0.45	0.45	0.15	0.15	0.43	0.22	0.22	0.22
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	2.5	5.0	5.0	5.0	5.0	5.0	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	339	1492	464	893	2312	720	262	276	1211	751	407	346
v/s Ratio Prot	0.04	0.24		c0.14	c0.44		c0.10	0.07	0.14	0.06	c0.17	
v/s Ratio Perm			0.04			0.18						0.03
v/c Ratio	0.45	0.83	0.14	0.52	0.98	0.39	0.68	0.48	0.32	0.28	0.79	0.12
Uniform Delay, d1	63.8	49.4	39.1	47.5	40.1	27.1	60.6	58.6	27.9	48.8	55.3	47.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	5.4	0.6	1.1	14.0	1.6	6.6	1.0	0.1	0.1	9.4	0.1
Delay (s)	64.5	54.8	39.7	48.6	54.1	28.6	67.1	59.5	28.0	48.9	64.8	47.1
Level of Service	E	D	D	D	D	C	E	E	C	D	E	D
Approach Delay (s)		53.6			50.2			43.9			55.6	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM Average Control Delay			51.0									HCM Level of Service D
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0									Sum of lost time (s) 12.0
Intersection Capacity Utilization			84.4%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

Queues

200: MD 214/MD 214 West & I-495 SB off-ramp to WB 214

7/24/2012

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	SBR
Lane Group Flow (vph)	1137	995	2553	353
v/c Ratio	0.57	0.86	0.67	0.60
Control Delay	45.8	64.3	12.8	65.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.8	64.3	12.8	65.4
Queue Length 50th (ft)	381	570	495	208
Queue Length 95th (ft)	497	608	623	260
Internal Link Dist (ft)	215		315	
Turn Bay Length (ft)		325		
Base Capacity (vph)	1993	1430	3842	593
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.70	0.66	0.60
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 200: MD 214/MD 214 West & I-495 SB off-ramp to WB 214

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔	↑↑↑							↔
Volume (vph)	0	1080	0	945	2425	0	0	0	0	0	0	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0							4.0
Lane Util. Factor		0.91		0.97	0.91							0.88
Flt		1.00		1.00	1.00							0.85
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	5085							2787
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	5085							2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1137	0	995	2553	0	0	0	0	0	0	353
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	14
Lane Group Flow (vph)	0	1137	0	995	2553	0	0	0	0	0	0	339
Turn Type		NA		Prot	NA							custom
Protected Phases		4		3	8							
Permitted Phases												6
Actuated Green, G (s)		70.3		60.4	134.7							37.3
Effective Green, g (s)		70.3		60.4	134.7							37.3
Actuated g/C Ratio		0.39		0.34	0.75							0.21
Clearance Time (s)		4.0		4.0	4.0							4.0
Vehicle Extension (s)		3.0		3.0	3.0							3.0
Lane Grp Cap (vph)		1986		1152	3805							578
v/s Ratio Prot		0.22		c0.29	c0.50							
v/s Ratio Perm												c0.12
v/c Ratio		0.57		0.86	0.67							0.59
Uniform Delay, d1		43.1		55.9	11.4							64.4
Progression Factor		1.00		1.00	1.00							1.00
Incremental Delay, d2		0.4		6.9	0.5							4.3
Delay (s)		43.5		62.9	11.9							68.7
Level of Service		D		E	B							E
Approach Delay (s)		43.5			26.2			0.0			68.7	
Approach LOS		D			C			A			E	
Intersection Summary												
HCM Average Control Delay			33.1		HCM Level of Service			C				
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			180.0		Sum of lost time (s)			8.0				
Intersection Capacity Utilization			74.3%		ICU Level of Service			D				
Analysis Period (min)			15									
c Critical Lane Group												

Queues

240: I-495 NB to WB off-ramp & MD 214

7/24/2012

	→	←	↙
Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	1347	3232	316
v/c Ratio	0.36	0.87	0.52
Control Delay	4.7	12.2	37.0
Queue Delay	0.0	0.0	0.0
Total Delay	4.7	12.2	37.0
Queue Length 50th (ft)	84	407	85
Queue Length 95th (ft)	102	489	126
Internal Link Dist (ft)	369	230	179
Turn Bay Length (ft)			
Base Capacity (vph)	3729	3729	610
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.87	0.52
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 240: I-495 NB to WB off-ramp & MD 214







7/24/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↖↗	
Volume (vph)	1280	0	0	3070	300	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.91			0.91	0.97	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	5085			5085	3433	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	5085			5085	3433	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1347	0	0	3232	316	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1347	0	0	3232	316	0
Turn Type	NA			NA	NA	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	66.0			66.0	16.0	
Effective Green, g (s)	66.0			66.0	16.0	
Actuated g/C Ratio	0.73			0.73	0.18	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3729			3729	610	
v/s Ratio Prot	0.26			c0.64	c0.09	
v/s Ratio Perm						
v/c Ratio	0.36			0.87	0.52	
Uniform Delay, d1	4.4			8.8	33.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			2.3	3.1	
Delay (s)	4.4			11.1	36.6	
Level of Service	A			B	D	
Approach Delay (s)	4.4			11.1	36.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM Average Control Delay			10.9		HCM Level of Service	B
HCM Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			74.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

260: Harry S. Truman Drive & Largo Town Center Drive

7/24/2012

						
Lane Group	EBL	EBT	WBL	WBR	NBT	NBR
Lane Group Flow (vph)	26	342	121	37	1447	422
v/c Ratio	0.15	0.44	0.41	0.07	0.61	0.38
Control Delay	17.2	13.4	30.9	9.0	11.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	13.4	30.9	9.0	11.5	1.3
Queue Length 50th (ft)	0	15	40	0	120	0
Queue Length 95th (ft)	24	49	107	23	218	18
Internal Link Dist (ft)		672			788	
Turn Bay Length (ft)						
Base Capacity (vph)	174	1480	690	954	3589	1311
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.23	0.18	0.04	0.40	0.32
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
 260: Harry S. Truman Drive & Largo Town Center Drive







7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	120	205	115	0	35	0	1060	715	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0		4.0		4.0	4.0			
Lane Util. Factor	1.00	0.91		1.00		1.00		0.86	0.86			
Frt	1.00	0.91		1.00		0.85		0.97	0.85			
Flt Protected	0.95	1.00		0.95		1.00		1.00	1.00			
Satd. Flow (prot)	1770	4604		1770		1583		4641	1362			
Flt Permitted	0.95	1.00		0.95		1.00		1.00	1.00			
Satd. Flow (perm)	1770	4604		1770		1583		4641	1362			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	126	216	121	0	37	0	1116	753	0	0	0
RTOR Reduction (vph)	25	180	0	0	0	26	0	51	149	0	0	0
Lane Group Flow (vph)	1	162	0	121	0	11	0	1396	273	0	0	0
Turn Type	Prot	NA		Prot		custom		NA	pm+ov			
Protected Phases	7	4		3				2	3			
Permitted Phases						8			2			
Actuated Green, G (s)	1.6	10.7		10.4		19.5		31.4	41.8			
Effective Green, g (s)	1.6	10.7		10.4		19.5		31.4	41.8			
Actuated g/C Ratio	0.02	0.17		0.16		0.30		0.49	0.65			
Clearance Time (s)	4.0	4.0		4.0		4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0			
Lane Grp Cap (vph)	44	764		285		479		2259	967			
v/s Ratio Prot	0.00	c0.04		c0.07				c0.30	c0.05			
v/s Ratio Perm						0.01			0.16			
v/c Ratio	0.01	0.21		0.42		0.02		0.62	0.28			
Uniform Delay, d1	30.7	23.3		24.4		15.8		12.1	4.9			
Progression Factor	1.00	1.00		1.00		1.00		1.00	1.00			
Incremental Delay, d2	0.1	0.1		1.0		0.0		0.5	0.2			
Delay (s)	30.8	23.4		25.4		15.8		12.7	5.1			
Level of Service	C	C		C		B		B	A			
Approach Delay (s)		23.9			23.1			10.9			0.0	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay			13.7									B
HCM Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			64.5							8.0		
Intersection Capacity Utilization			49.1%									A
Analysis Period (min)			15									
c Critical Lane Group												

Queues

270: Lottsford Road & Harry S. Truman Drive

7/24/2012

						
Lane Group	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	42	1121	5	105	163	326
v/c Ratio	0.06	0.52	0.01	0.16	0.13	0.48
Control Delay	9.5	7.7	11.0	11.7	11.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	7.7	11.0	11.7	11.0	9.0
Queue Length 50th (ft)	6	45	1	17	13	27
Queue Length 95th (ft)	24	100	7	54	38	100
Internal Link Dist (ft)		887		758	736	
Turn Bay Length (ft)						150
Base Capacity (vph)	1286	3521	1028	1584	3008	1370
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.32	0.00	0.07	0.05	0.24
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
270: Lottsford Road & Harry S. Truman Drive










7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	40	530	535	5	100	0	0	155	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor				1.00	0.91		1.00	1.00			0.95	1.00
Frt				1.00	0.92		1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	4702		1770	1863			3539	1583
Flt Permitted				0.95	1.00		0.65	1.00			1.00	1.00
Satd. Flow (perm)				1770	4702		1208	1863			3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	42	558	563	5	105	0	0	163	326
RTOR Reduction (vph)	0	0	0	0	218	0	0	0	0	0	0	105
Lane Group Flow (vph)	0	0	0	42	903	0	5	105	0	0	163	221
Turn Type				Split	NA		Perm	NA			NA	Perm
Protected Phases				3	3			4			2	
Permitted Phases							4					2
Actuated Green, G (s)				18.6	18.6		16.3	16.3			16.3	16.3
Effective Green, g (s)				18.6	18.6		16.3	16.3			16.3	16.3
Actuated g/C Ratio				0.41	0.41		0.36	0.36			0.36	0.36
Clearance Time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0		3.0	3.0			6.0	6.0
Lane Grp Cap (vph)				733	1948		439	676			1285	575
v/s Ratio Prot				0.02	c0.19			0.06			0.05	
v/s Ratio Perm							0.00					c0.14
v/c Ratio				0.06	0.46		0.01	0.16			0.13	0.38
Uniform Delay, d1				7.9	9.5		9.1	9.7			9.5	10.6
Progression Factor				1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	0.2		0.0	0.1			0.1	1.2
Delay (s)				7.9	9.7		9.2	9.8			9.7	11.8
Level of Service				A	A		A	A			A	B
Approach Delay (s)		0.0			9.6			9.7			11.1	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM Average Control Delay				10.0			HCM Level of Service				B	
HCM Volume to Capacity ratio				0.43								
Actuated Cycle Length (s)				44.9			Sum of lost time (s)			10.0		
Intersection Capacity Utilization				58.1%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

Queues

280: Lottsford Road & Arena Drive

7/24/2012

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	271	755	187	482	311	495	58	558	247
v/c Ratio	0.76	0.69	0.62	0.52	0.97	0.29	0.51	0.82	0.31
Control Delay	58.1	43.6	54.1	44.1	94.5	29.9	71.8	53.5	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	43.6	54.1	44.1	94.5	29.9	71.8	53.5	5.4
Queue Length 50th (ft)	224	195	159	131	~247	101	44	212	20
Queue Length 95th (ft)	#402	270	254	172	#482	147	95	303	78
Internal Link Dist (ft)		719		1095		560		666	
Turn Bay Length (ft)			300		500		200		
Base Capacity (vph)	391	1204	391	1204	319	1708	137	780	830
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.63	0.48	0.40	0.97	0.29	0.42	0.72	0.30

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
280: Lottsford Road & Arena Drive







7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	515	330	130	355	240	40	295	410	60	55	380	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.86	0.86		0.86	0.86		1.00	0.91		1.00	0.91	0.91
Frt	1.00	0.97		1.00	0.99		1.00	0.98		1.00	0.96	0.85
Flt Protected	0.95	0.98		0.95	0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1522	4593		1522	4653		1770	4988		1770	3246	1441
Flt Permitted	0.95	0.98		0.95	0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1522	4593		1522	4653		1770	4988		1770	3246	1441
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	542	347	137	374	253	42	311	432	63	58	400	405
RTOR Reduction (vph)	0	25	0	0	8	0	0	14	0	0	29	111
Lane Group Flow (vph)	271	730	0	187	474	0	311	481	0	58	529	136
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	1		2	2		7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	27.5	27.5		23.3	23.3		21.2	39.3		6.4	24.5	52.0
Effective Green, g (s)	27.5	27.5		23.3	23.3		21.2	39.3		6.4	24.5	52.0
Actuated g/C Ratio	0.23	0.23		0.20	0.20		0.18	0.33		0.05	0.21	0.44
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	353	1066		299	915		317	1654		96	671	705
v/s Ratio Prot	c0.18	0.16		c0.12	0.10		c0.18	0.10		0.03	c0.16	0.04
v/s Ratio Perm												0.05
v/c Ratio	0.77	0.69		0.63	0.52		0.98	0.29		0.60	0.79	0.19
Uniform Delay, d1	42.5	41.5		43.6	42.6		48.5	29.3		54.8	44.5	20.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.6	1.8		4.0	0.5		45.1	0.1		7.2	6.1	0.1
Delay (s)	52.1	43.4		47.6	43.1		93.5	29.4		62.0	50.6	20.5
Level of Service	D	D		D	D		F	C		E	D	C
Approach Delay (s)		45.7			44.4			54.1			42.8	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			46.7				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			118.5				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			82.6%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues







290: Shoppers Way & Arena Drive

7/24/2012

						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	868	263	95	974	163	53
v/c Ratio	0.43	0.26	0.36	0.38	0.39	0.13
Control Delay	14.5	2.7	36.7	6.2	31.1	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	2.7	36.7	6.2	31.1	9.3
Queue Length 50th (ft)	141	0	39	94	63	0
Queue Length 95th (ft)	234	41	96	156	139	29
Internal Link Dist (ft)	494			472	436	
Turn Bay Length (ft)		150	350			
Base Capacity (vph)	2221	1091	414	2877	636	603
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.24	0.23	0.34	0.26	0.09
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
290: Shoppers Way & Arena Drive

7/24/2012

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Volume (vph)	825	250	90	925	155	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	868	263	95	974	163	53
RTOR Reduction (vph)	0	127	0	0	0	45
Lane Group Flow (vph)	868	136	95	974	163	8
Turn Type	NA	Perm	Prot	NA	NA	custom
Protected Phases	6		5	2		
Permitted Phases		6			8	8
Actuated Green, G (s)	36.1	36.1	7.1	48.2	11.2	11.2
Effective Green, g (s)	36.1	36.1	7.1	48.2	11.2	11.2
Actuated g/C Ratio	0.52	0.52	0.10	0.69	0.16	0.16
Clearance Time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1828	818	180	2440	284	254
v/s Ratio Prot	c0.25		0.05	c0.28		
v/s Ratio Perm		0.09			c0.09	0.01
v/c Ratio	0.47	0.17	0.53	0.40	0.57	0.03
Uniform Delay, d1	10.8	8.9	29.8	4.6	27.1	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3	2.8	0.3	5.5	0.2
Delay (s)	11.4	9.2	32.6	5.0	32.6	24.9
Level of Service	B	A	C	A	C	C
Approach Delay (s)	10.9			7.4	30.7	
Approach LOS	B			A	C	
Intersection Summary						
HCM Average Control Delay			11.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			69.9		Sum of lost time (s)	16.0
Intersection Capacity Utilization			49.3%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

300: Addison Rd. & Wilburn Dr

7/24/2012












	↙	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	95	116	1311	105	374
v/c Ratio	0.44	0.42	0.92	0.09	0.30
Control Delay	41.3	14.8	20.8	1.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	14.8	20.8	1.6	3.9
Queue Length 50th (ft)	48	8	394	4	44
Queue Length 95th (ft)	94	54	#974	17	90
Internal Link Dist (ft)	536		382		427
Turn Bay Length (ft)				100	
Base Capacity (vph)	346	390	1518	1300	1306
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.30	0.86	0.08	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
300: Addison Rd. & Wilburn Dr








7/24/2012

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	90	110	1245	100	10	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5		4.5
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1770	1583	1863	1583		1860
Flt Permitted	0.95	1.00	1.00	1.00		0.86
Satd. Flow (perm)	1770	1583	1863	1583		1603
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	116	1311	105	11	363
RTOR Reduction (vph)	0	88	0	14	0	0
Lane Group Flow (vph)	95	28	1311	91	0	374
Turn Type	NA	Prot	NA	Perm	Perm	NA
Protected Phases	3	3	6			2
Permitted Phases				6	2	
Actuated Green, G (s)	9.7	9.7	61.7	61.7		61.7
Effective Green, g (s)	9.7	9.7	61.7	61.7		61.7
Actuated g/C Ratio	0.12	0.12	0.77	0.77		0.77
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	214	191	1430	1215		1230
v/s Ratio Prot	c0.05	0.02	c0.70			
v/s Ratio Perm				0.06		0.23
v/c Ratio	0.44	0.15	0.92	0.08		0.30
Uniform Delay, d1	32.8	31.6	7.3	2.3		2.8
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.5	0.4	9.5	0.0		0.1
Delay (s)	34.3	32.0	16.8	2.3		3.0
Level of Service	C	C	B	A		A
Approach Delay (s)	33.0		15.7			3.0
Approach LOS	C		B			A
Intersection Summary						
HCM Average Control Delay			15.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.85			
Actuated Cycle Length (s)			80.4		Sum of lost time (s)	9.0
Intersection Capacity Utilization			79.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Queues

10: Southern Ave NE & MD 214 West

7/24/2012

							
Lane Group	EBL	EBT	WBL	WBT	WBR	NET	SWT
Lane Group Flow (vph)	316	1537	121	637	121	911	963
v/c Ratio	0.77	0.80	0.46	0.67	0.22	0.63	0.90
Control Delay	31.3	30.7	19.2	36.7	6.3	22.8	37.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	30.7	19.2	36.7	6.3	22.8	37.5
Queue Length 50th (ft)	120	313	37	194	0	222	283
Queue Length 95th (ft)	#232	373	67	256	41	288	#418
Internal Link Dist (ft)		460		823		251	355
Turn Bay Length (ft)	175		330				
Base Capacity (vph)	429	1996	262	952	560	1517	1122
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.77	0.46	0.67	0.22	0.60	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 10: Southern Ave NE & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	300	1420	40	115	605	115	15	755	95	80	740	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		-1.0	6.0	3.0		3.0			3.0	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		0.95			0.95	
Flt	1.00	1.00		1.00	1.00	0.85		0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1770	5064		1770	3539	1583		3478			3469	
Flt Permitted	0.19	1.00		0.15	1.00	1.00		0.93			0.69	
Satd. Flow (perm)	357	5064		288	3539	1583		3235			2391	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	1495	42	121	637	121	16	795	100	84	779	100
RTOR Reduction (vph)	0	3	0	0	0	85	0	9	0	0	9	0
Lane Group Flow (vph)	316	1534	0	121	637	36	0	902	0	0	954	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	39.9	31.9		24.9	20.9	20.9		40.1			40.1	
Effective Green, g (s)	40.9	36.9		34.9	25.9	28.9		43.1			43.1	
Actuated g/C Ratio	0.42	0.38		0.36	0.27	0.30		0.44			0.44	
Clearance Time (s)	4.0	11.0		4.0	11.0	11.0		6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	384	1926		241	945	472		1437			1062	
v/s Ratio Prot	c0.14	c0.30		0.05	0.18							
v/s Ratio Perm	0.21			0.13		0.02		0.28			c0.40	
v/c Ratio	0.82	0.80		0.50	0.67	0.08		0.63			0.90	
Uniform Delay, d1	21.3	26.7		22.1	31.8	24.5		20.8			24.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	13.3	2.4		1.6	1.9	0.1		0.9			10.1	
Delay (s)	34.6	29.1		23.7	33.7	24.5		21.6			35.0	
Level of Service	C	C		C	C	C		C			D	
Approach Delay (s)		30.0			31.1			21.6			35.0	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM Average Control Delay			29.6				HCM Level of Service		C			
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			97.0				Sum of lost time (s)		6.0			
Intersection Capacity Utilization			99.8%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
20: Davey Street & MD 214 West












7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	5	1585	5	140	805	5	25	5	140	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	1668	5	147	847	5	26	5	147	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		903										
pX, platoon unblocked				0.74			0.74	0.74	0.74	0.74	0.74	
vC, conflicting volume	853			1674			2267	2829	559	1861	2829	285
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	853			662			1467	2231	0	916	2231	285
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			78			42	78	82	94	78	99
cM capacity (veh/h)	782			680			45	24	798	95	24	712
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NE 1	NE 2	SW 1	
Volume Total	5	667	667	339	147	339	339	175	32	147	16	
Volume Left	5	0	0	0	147	0	0	0	26	0	5	
Volume Right	0	0	0	5	0	0	0	5	0	147	5	
cSH	782	1700	1700	1700	680	1700	1700	1700	40	798	56	
Volume to Capacity	0.01	0.39	0.39	0.20	0.22	0.20	0.20	0.10	0.80	0.18	0.28	
Queue Length 95th (ft)	1	0	0	0	21	0	0	0	74	17	24	
Control Delay (s)	9.6	0.0	0.0	0.0	11.8	0.0	0.0	0.0	236.9	10.5	92.1	
Lane LOS	A				B				F	B	F	
Approach Delay (s)	0.0				1.7				50.5		92.1	
Approach LOS									F		F	
Intersection Summary												
Average Delay				4.3								
Intersection Capacity Utilization			53.7%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues

90: Addison Rd. & MD 214 West

7/24/2012

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	105	2163	426	284	1211	274	284	221	137	636	
v/c Ratio	0.37	1.23	0.67	0.66	0.50	0.59	0.59	0.54	0.35	0.79	
Control Delay	21.6	148.9	31.0	59.3	26.6	65.6	65.5	11.7	50.7	54.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.6	148.9	31.0	59.3	26.6	65.6	65.5	11.7	50.7	54.1	
Queue Length 50th (ft)	44	~952	218	243	231	131	138	0	115	271	
Queue Length 95th (ft)	89	#1042	347	#431	339	174	183	77	169	322	
Internal Link Dist (ft)		307			349		726			986	
Turn Bay Length (ft)	200		200	175		350		575	200		
Base Capacity (vph)	287	1763	634	433	2406	858	885	562	450	914	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.37	1.23	0.67	0.66	0.50	0.32	0.32	0.39	0.30	0.70	

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
90: Addison Rd. & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	2055	405	270	1020	130	260	270	210	130	370	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	6.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	
Flt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	4999		3433	3539	1583	1770	3333	
Flt Permitted	0.21	1.00	1.00	0.07	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	390	5085	1583	138	4999		3433	3539	1583	1770	3333	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	2163	426	284	1074	137	274	284	221	137	389	247
RTOR Reduction (vph)	0	0	116	0	8	0	0	0	191	0	70	0
Lane Group Flow (vph)	105	2163	310	284	1203	0	274	284	30	137	566	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		6	2					3			
Actuated Green, G (s)	57.4	48.0	48.0	83.4	68.0		17.4	17.4	17.4	30.2	30.2	
Effective Green, g (s)	63.4	52.0	49.0	86.4	72.0		20.4	20.4	20.4	33.2	33.2	
Actuated g/C Ratio	0.42	0.35	0.33	0.58	0.48		0.14	0.14	0.14	0.22	0.22	
Clearance Time (s)	6.0	7.0	7.0	6.0	7.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	2.5	5.0	5.0	2.5	5.0		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	279	1763	517	432	2400		467	481	215	392	738	
v/s Ratio Prot	0.03	c0.43		c0.14	0.24		0.08	c0.08		0.08	c0.17	
v/s Ratio Perm	0.13		0.20	0.24					0.02			
v/c Ratio	0.38	1.23	0.60	0.66	0.50		0.59	0.59	0.14	0.35	0.77	
Uniform Delay, d1	26.6	49.0	42.3	39.9	26.7		60.8	60.9	57.1	49.3	54.8	
Progression Factor	1.00	1.00	1.00	1.45	0.91		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	107.3	5.1	3.1	0.7		1.6	1.6	0.2	0.4	4.6	
Delay (s)	27.2	156.3	47.3	60.9	25.1		62.4	62.5	57.3	49.7	59.4	
Level of Service	C	F	D	E	C		E	E	E	D	E	
Approach Delay (s)		134.1			31.9			61.0			57.6	
Approach LOS		F			C			E			E	
Intersection Summary												
HCM Average Control Delay			87.3			HCM Level of Service			F			
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			93.2%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 95: Addison Metro Station & MD 214 West

7/24/2012

	→	↘	↙	←	↖	↗			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	↑↑↑		↘	↑↑↑	↘				
Volume (veh/h)	2130	85	120	1295	85	165			
Sign Control	Free			Free	Stop				
Grade	0%			0%	0%				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	2242	89	126	1363	89	174			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None		None						
Median storage (veh)									
Upstream signal (ft)	429								
pX, platoon unblocked			0.66		0.66		0.66		
vC, conflicting volume			2332		2994		792		
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol			1211		2215		0		
tC, single (s)			4.1		6.8		6.9		
tC, 2 stage (s)									
tF (s)			2.2		3.5		3.3		
p0 queue free %			66		0		76		
cM capacity (veh/h)			377		16		715		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1	
Volume Total	897	897	538	126	454	454	454	263	
Volume Left	0	0	0	126	0	0	0	89	
Volume Right	0	0	89	0	0	0	0	174	
cSH	1700	1700	1700	377	1700	1700	1700	46	
Volume to Capacity	0.53	0.53	0.32	0.34	0.27	0.27	0.27	5.73	
Queue Length 95th (ft)	0	0	0	36	0	0	0	Err	
Control Delay (s)	0.0	0.0	0.0	19.3	0.0	0.0	0.0	Err	
Lane LOS				C					F
Approach Delay (s)	0.0		1.6					Err	
Approach LOS								F	
Intersection Summary									
Average Delay			644.9						
Intersection Capacity Utilization			74.5%			ICU Level of Service		D	
Analysis Period (min)			15						

HCM Unsignalized Intersection Capacity Analysis
100: Cabin Branch Rd/Soper Ln & MD 214 West

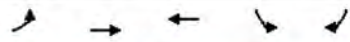
7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	2270	20	50	1400	5	5	0	100	30	5	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	2389	21	53	1474	5	5	0	105	32	5	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					941							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	1479			2411			3020	3995	807	2494	4003	494
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1243			2411			2905	3955	807	2337	3964	181
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			73			0	100	68	0	0	99
cM capacity (veh/h)	516			195			0	2	324	10	2	770
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1		
Volume Total	5	956	956	499	53	589	589	300	111	47		
Volume Left	5	0	0	0	53	0	0	0	5	32		
Volume Right	0	0	0	21	0	0	0	5	105	11		
cSH	516	1700	1700	1700	195	1700	1700	1700	0	8		
Volume to Capacity	0.01	0.56	0.56	0.29	0.27	0.35	0.35	0.18	Err	5.93		
Queue Length 95th (ft)	1	0	0	0	26	0	0	0	Err	Err		
Control Delay (s)	12.1	0.0	0.0	0.0	30.2	0.0	0.0	0.0	Err	Err		
Lane LOS	B				D				F	F		
Approach Delay (s)	0.0				1.0				Err	Err		
Approach LOS									F	F		
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization			60.2%		ICU Level of Service				B			
Analysis Period (min)			15									

Queues

110: MD 214 West & Cindy

7/24/2012








Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	95	2521	1569	37	89
v/c Ratio	0.31	0.56	0.39	0.26	0.42
Control Delay	5.9	4.6	4.7	68.7	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	4.6	4.7	68.7	18.0
Queue Length 50th (ft)	2	105	131	35	0
Queue Length 95th (ft)	m3	m24	176	72	56
Internal Link Dist (ft)		861	1511	430	
Turn Bay Length (ft)	225			250	
Base Capacity (vph)	330	4467	4061	425	448
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.56	0.39	0.09	0.20

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
110: MD 214 West & Cindy

7/24/2012

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵	↗
Volume (vph)	90	2395	1455	35	35	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	5067		1770	1583
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	248	5085	5067		1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	2521	1532	37	37	89
RTOR Reduction (vph)	0	0	1	0	0	82
Lane Group Flow (vph)	95	2521	1568	0	37	7
Turn Type	pm+pt	NA	NA		NA	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6					8
Actuated Green, G (s)	127.8	127.8	116.3		9.2	9.2
Effective Green, g (s)	129.8	131.8	120.3		12.2	12.2
Actuated g/C Ratio	0.87	0.88	0.80		0.08	0.08
Clearance Time (s)	5.0	7.0	7.0		6.0	6.0
Vehicle Extension (s)	3.0	6.0	6.0		3.0	3.0
Lane Grp Cap (vph)	301	4468	4064		144	129
v/s Ratio Prot	0.02	c0.50	0.31		c0.02	
v/s Ratio Perm	0.25					0.00
v/c Ratio	0.32	0.56	0.39		0.26	0.06
Uniform Delay, d1	2.4	2.2	4.3		64.6	63.6
Progression Factor	3.95	1.92	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.2	0.3		0.9	0.2
Delay (s)	9.7	4.4	4.5		65.6	63.8
Level of Service	A	A	A		E	E
Approach Delay (s)		4.6	4.5		64.3	
Approach LOS		A	A		E	
Intersection Summary						
HCM Average Control Delay			6.3		HCM Level of Service	A
HCM Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			150.0		Sum of lost time (s)	6.0
Intersection Capacity Utilization			59.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

130: Garrett Morgan & Ridgefield

7/24/2012

	→	↙	←	↘	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	47	31	26	626	21	490
v/c Ratio	0.08	0.10	0.07	0.04	0.17	0.04	0.14
Control Delay	9.9	12.9	7.8	4.6	3.6	4.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	12.9	7.8	4.6	3.6	4.7	3.6
Queue Length 50th (ft)	2	7	1	2	18	2	14
Queue Length 95th (ft)	18	28	16	9	34	8	27
Internal Link Dist (ft)	623		482		695		523
Turn Bay Length (ft)				150		125	
Base Capacity (vph)	1491	1832	1602	856	4979	746	4999
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.02	0.03	0.13	0.03	0.10
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
130: Garrett Morgan & Ridgfield







7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔↔↔		↔	↔↔↔	
Volume (vph)	10	5	15	45	5	25	25	540	55	20	435	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Flt		0.93		1.00	0.87		1.00	0.99		1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1708		1770	1628		1770	5015		1770	5035	
Flt Permitted		0.87		1.00	1.00		0.46	1.00		0.40	1.00	
Satd. Flow (perm)		1517		1863	1628		863	5015		752	5035	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	5	16	47	5	26	26	568	58	21	458	32
RTOR Reduction (vph)	0	14	0	0	23	0	0	11	0	0	7	0
Lane Group Flow (vph)	0	18	0	47	8	0	26	615	0	21	483	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		3.6		3.6	3.6		17.3	17.3		17.3	17.3	
Effective Green, g (s)		3.6		3.6	3.6		17.3	17.3		17.3	17.3	
Actuated g/C Ratio		0.12		0.12	0.12		0.56	0.56		0.56	0.56	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		177		217	190		483	2808		421	2819	
v/s Ratio Prot					0.00			0.12			0.10	
v/s Ratio Perm		0.01		0.03			0.03			0.03		
v/c Ratio		0.10		0.22	0.04		0.05	0.22		0.05	0.17	
Uniform Delay, d1		12.2		12.4	12.1		3.1	3.4		3.1	3.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3		0.5	0.1		0.1	0.1		0.1	0.1	
Delay (s)		12.5		12.9	12.2		3.2	3.5		3.2	3.4	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		12.5			12.6			3.5			3.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			4.2									
HCM Volume to Capacity ratio			0.22									
Actuated Cycle Length (s)			30.9						10.0			
Intersection Capacity Utilization			37.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues

140: Morgan Metro Park and Ride & Garrett A Morgan

7/24/2012

						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	589	63	116	500	126	316
v/c Ratio	0.30	0.10	0.22	0.17	0.36	0.56
Control Delay	11.5	4.0	22.7	4.5	23.2	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	4.0	22.7	4.5	23.2	7.5
Queue Length 50th (ft)	43	0	15	19	33	0
Queue Length 95th (ft)	74	19	42	34	86	58
Internal Link Dist (ft)	667			1365	395	
Turn Bay Length (ft)		100	150			
Base Capacity (vph)	3647	1153	1055	4870	1603	1463
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.05	0.11	0.10	0.08	0.22
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
 140: Morgan Metro Park and Ride & Garrett A Morgan













7/24/2012

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑	↗	↘	↑↑↑	↘	↗
Volume (vph)	560	60	110	475	120	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.91	1.00	0.97	0.91	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	589	63	116	500	126	316
RTOR Reduction (vph)	0	39	0	0	0	254
Lane Group Flow (vph)	589	24	116	500	126	62
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases			1	6	4	
Permitted Phases	2	2				4
Actuated Green, G (s)	19.1	19.1	5.6	29.7	9.6	9.6
Effective Green, g (s)	19.1	19.1	5.6	29.7	9.6	9.6
Actuated g/C Ratio	0.39	0.39	0.11	0.60	0.19	0.19
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	3.0	3.0
Lane Grp Cap (vph)	1970	613	390	3063	345	308
v/s Ratio Prot			c0.03	0.10	c0.07	
v/s Ratio Perm	c0.12	0.02				0.04
v/c Ratio	0.30	0.04	0.30	0.16	0.37	0.20
Uniform Delay, d1	10.5	9.4	20.0	4.3	17.2	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	0.1	0.7	0.3
Delay (s)	10.7	9.5	20.5	4.4	17.9	17.0
Level of Service	B	A	C	A	B	B
Approach Delay (s)	10.6			7.4	17.2	
Approach LOS	B			A	B	
Intersection Summary						
HCM Average Control Delay			11.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.32			
Actuated Cycle Length (s)			49.3		Sum of lost time (s)	15.0
Intersection Capacity Utilization			37.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

150: Ritchie/Garrett A Morgan & MD 214 West

7/24/2012

												
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Group Flow (vph)	211	2279	274	1474	162	338	374	295	453	147		
v/c Ratio	0.43	0.84	1.27	0.64	0.35	0.71	0.24	0.49	0.73	0.24		
Control Delay	66.6	35.9	210.4	35.5	62.2	72.7	0.4	61.8	69.5	3.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	66.6	35.9	210.4	35.5	62.2	72.7	0.4	61.8	69.5	3.9		
Queue Length 50th (ft)	107	715	~186	414	89	198	0	145	240	0		
Queue Length 95th (ft)	152	#973	#285	540	127	251	0	186	288	32		
Internal Link Dist (ft)		1283		929		896			1365			
Turn Bay Length (ft)	350		600		350		200	500				
Base Capacity (vph)	487	2703	215	2302	932	969	1583	1116	1150	601		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.43	0.84	1.27	0.64	0.17	0.35	0.24	0.26	0.39	0.24		

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
150: Ritchie/Garrett A Morgan & MD 214 West











7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	2010	155	260	1275	125	230	245	355	280	430	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.86	0.86	1.00	0.97	0.95	1.00
Flt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5031		3433	5017		3044	3166	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5031		3433	5017		3044	3166	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	2116	163	274	1342	132	242	258	374	295	453	147
RTOR Reduction (vph)	0	3	0	0	5	0	0	0	0	0	0	100
Lane Group Flow (vph)	211	2276	0	274	1469	0	162	338	374	295	453	47
Turn Type	Prot	NA		Prot	NA		Split	NA	Free	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4		3	3	1
Permitted Phases									Free			3
Actuated Green, G (s)	20.7	82.9		8.0	70.2		22.1	22.1	160.0	26.0	26.0	46.7
Effective Green, g (s)	22.7	85.9		10.0	73.2		24.1	24.1	160.0	28.0	28.0	50.7
Actuated g/C Ratio	0.14	0.54		0.06	0.46		0.15	0.15	1.00	0.18	0.18	0.32
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0		2.5	2.5		2.5	2.5	3.0
Lane Grp Cap (vph)	487	2701		215	2295		459	477	1583	601	619	502
v/s Ratio Prot	0.06	c0.45		c0.08	0.29		0.05	c0.11		0.09	c0.13	0.01
v/s Ratio Perm									0.24			0.02
v/c Ratio	0.43	0.84		1.27	0.64		0.35	0.71	0.24	0.49	0.73	0.09
Uniform Delay, d1	62.8	31.3		75.0	33.3		61.0	64.6	0.0	59.6	62.4	38.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	3.4		154.6	1.4		0.3	4.4	0.4	0.5	4.2	0.1
Delay (s)	63.4	34.7		229.6	34.7		61.3	69.0	0.4	60.0	66.6	38.5
Level of Service	E	C		F	C		E	E	A	E	E	D
Approach Delay (s)		37.2			65.2			38.2			59.9	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM Average Control Delay			48.9									HCM Level of Service D
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			160.0									Sum of lost time (s) 12.0
Intersection Capacity Utilization			81.7%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

Queues

160: Shady Glen Dr/Hill Rd & MD 214 West

7/24/2012

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	89	2168	116	1205	258	100	232	343	383	153
v/c Ratio	0.28	0.76	0.57	0.41	0.25	0.29	0.63	0.68	0.74	0.39
Control Delay	12.2	28.3	39.3	19.0	2.8	63.5	64.8	65.7	67.9	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	28.3	39.3	19.0	2.8	63.5	64.8	65.7	67.9	10.2
Queue Length 50th (ft)	28	563	57	224	0	47	103	186	210	0
Queue Length 95th (ft)	61	775	133	330	47	76	147	236	262	62
Internal Link Dist (ft)		1835		2003			924		2121	
Turn Bay Length (ft)	300		225		325	350		300		150
Base Capacity (vph)	325	2865	203	2955	1028	881	896	781	810	520
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.76	0.57	0.41	0.25	0.11	0.26	0.44	0.47	0.29
Intersection Summary										

HCM Signalized Intersection Capacity Analysis
160: Shady Glen Dr/Hill Rd & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1960	100	110	1145	245	95	170	50	440	250	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	0.95		0.86	0.86	1.00
Flt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	5048		1770	5085	1583	3433	3418		3044	3155	1583
Flt Permitted	0.18	1.00		0.05	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	337	5048		87	5085	1583	3433	3418		3044	3155	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	2063	105	116	1205	258	100	179	53	463	263	153
RTOR Reduction (vph)	0	3	0	0	0	108	0	22	0	0	0	128
Lane Group Flow (vph)	89	2165	0	116	1205	150	100	210	0	343	383	25
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						4
Actuated Green, G (s)	90.8	82.0		95.0	84.1	84.1	12.3	12.3		21.8	21.8	21.8
Effective Green, g (s)	94.8	85.0		99.0	87.1	87.1	15.3	15.3		24.8	24.8	24.8
Actuated g/C Ratio	0.63	0.57		0.66	0.58	0.58	0.10	0.10		0.17	0.17	0.17
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	316	2861		202	2953	919	350	349		503	522	262
v/s Ratio Prot	0.02	c0.43		c0.05	0.24		0.03	c0.06		0.11	c0.12	
v/s Ratio Perm	0.16			0.33		0.09						0.02
v/c Ratio	0.28	0.76		0.57	0.41	0.16	0.29	0.60		0.68	0.73	0.10
Uniform Delay, d1	11.7	24.7		34.4	17.3	14.6	62.3	64.4		58.9	59.5	53.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.9		3.9	0.4	0.4	0.3	2.4		3.5	5.0	0.1
Delay (s)	12.2	26.6		38.3	17.7	14.9	62.6	66.9		62.4	64.5	53.2
Level of Service	B	C		D	B	B	E	E		E	E	D
Approach Delay (s)		26.0			18.8			65.6			61.7	
Approach LOS		C			B			E			E	
Intersection Summary												
HCM Average Control Delay			32.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			15.0		
Intersection Capacity Utilization			76.0%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

170: Hill Rd & Willow Hill Rd

7/24/2012

	→	↘	←	↙	↑	↗	↓	↘
Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	42	206	105	421	116	658	11
v/c Ratio	0.03	0.11	0.69	0.24	0.36	0.11	0.60	0.01
Control Delay	16.7	7.1	33.2	6.0	6.6	1.5	9.8	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	7.1	33.2	6.0	6.6	1.5	9.8	2.9
Queue Length 50th (ft)	3	0	64	0	60	0	118	0
Queue Length 95th (ft)	12	20	124	30	117	15	233	5
Internal Link Dist (ft)	480		402		2121		554	
Turn Bay Length (ft)								100
Base Capacity (vph)	437	454	364	500	1162	1065	1097	1027
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.09	0.57	0.21	0.36	0.11	0.60	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
170: Hill Rd & Willow Hill Rd













7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	40	185	10	100	20	380	110	75	550	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.98	1.00		0.95	1.00		1.00	1.00		0.99	1.00
Satd. Flow (prot)		1817	1583		1779	1583		1858	1583		1852	1583
Flt Permitted		0.88	1.00		0.73	1.00		0.96	1.00		0.91	1.00
Satd. Flow (perm)		1635	1583		1361	1583		1796	1583		1698	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	5	42	195	11	105	21	400	116	79	579	11
RTOR Reduction (vph)	0	0	33	0	0	82	0	0	41	0	0	4
Lane Group Flow (vph)	0	10	9	0	206	23	0	421	75	0	658	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		13.2	13.2		13.2	13.2		38.9	38.9		38.9	38.9
Effective Green, g (s)		13.2	13.2		13.2	13.2		38.9	38.9		38.9	38.9
Actuated g/C Ratio		0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65
Clearance Time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		359	348		299	348		1162	1025		1099	1025
v/s Ratio Prot												
v/s Ratio Perm		0.01	0.01		0.15	0.01		0.23	0.05		0.39	0.00
v/c Ratio		0.03	0.03		0.69	0.07		0.36	0.07		0.60	0.01
Uniform Delay, d1		18.4	18.4		21.6	18.6		4.9	3.9		6.1	3.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.0	0.0		6.5	0.1		0.9	0.1		2.4	0.0
Delay (s)		18.4	18.4		28.0	18.7		5.8	4.1		8.5	3.8
Level of Service		B	B		C	B		A	A		A	A
Approach Delay (s)		18.4			24.9			5.4			8.4	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM Average Control Delay			11.0									B
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			60.1								8.0	
Intersection Capacity Utilization			81.6%									D
Analysis Period (min)			15									
c Critical Lane Group												

Queues

180: Hampton Park/Brightseat Rd. & MD 214 West

7/24/2012

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	105	1979	200	463	1384	126	274	126	400	568	321	316
v/c Ratio	0.43	1.39	0.36	0.65	0.65	0.18	0.76	0.33	0.33	0.72	0.76	0.60
Control Delay	72.7	219.9	11.2	59.7	39.1	11.3	69.1	51.7	30.4	58.6	65.0	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.7	219.9	11.2	59.7	39.1	11.3	69.1	51.7	30.4	58.6	65.0	20.4
Queue Length 50th (ft)	51	~941	25	217	400	18	255	106	146	267	296	86
Queue Length 95th (ft)	85	#1034	93	#439	538	72	333	156	213	310	381	178
Internal Link Dist (ft)		1118			496			563			1338	
Turn Bay Length (ft)	650		425	340						350		350
Base Capacity (vph)	242	1424	563	712	2120	715	502	528	1200	973	528	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	1.39	0.36	0.65	0.65	0.18	0.55	0.24	0.33	0.58	0.61	0.52

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
180: Hampton Park/Brightseat Rd. & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔↔	↔↔	↔	↔	↔	↔↔	↔↔	↔	↔
Volume (vph)	100	1880	190	440	1315	120	260	120	380	540	305	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	0.88	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	1863	2787	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	1863	2787	3433	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1979	200	463	1384	126	274	126	400	568	321	316
RTOR Reduction (vph)	0	0	120	0	0	55	0	0	0	0	0	165
Lane Group Flow (vph)	105	1979	80	463	1384	71	274	126	400	568	321	151
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	4 5	3	3	
Permitted Phases			6			2						3
Actuated Green, G (s)	8.6	39.0	39.0	29.1	59.5	59.5	27.6	27.6	62.7	31.3	31.3	31.3
Effective Green, g (s)	10.6	42.0	42.0	31.1	62.5	62.5	30.6	30.6	65.7	34.3	34.3	34.3
Actuated g/C Ratio	0.07	0.28	0.28	0.21	0.42	0.42	0.20	0.20	0.44	0.23	0.23	0.23
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	2.5	5.0	5.0	5.0	5.0	5.0	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	243	1424	443	712	2119	660	361	380	1221	785	426	362
v/s Ratio Prot	0.03	c0.39		c0.13	0.27		c0.15	0.07	0.14	0.17	c0.17	
v/s Ratio Perm			0.05			0.04						0.10
v/c Ratio	0.43	1.39	0.18	0.65	0.65	0.11	0.76	0.33	0.33	0.72	0.75	0.42
Uniform Delay, d1	66.8	54.0	41.0	54.5	35.1	26.7	56.2	51.0	27.7	53.5	53.9	49.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	179.8	0.9	2.9	1.6	0.3	8.4	0.4	0.1	3.1	7.0	0.6
Delay (s)	67.7	233.8	41.9	57.3	36.6	27.0	64.7	51.3	27.8	56.6	61.0	49.9
Level of Service	E	F	D	E	D	C	E	D	C	E	E	D
Approach Delay (s)		209.3			40.9			44.1			56.0	
Approach LOS		F			D			D			E	
Intersection Summary												
HCM Average Control Delay			105.6									F
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			150.0								12.0	
Intersection Capacity Utilization			92.7%									F
Analysis Period (min)			15									
c Critical Lane Group												

Queues

200: MD 214/MD 214 West & I-495 SB off-ramp to WB 214

7/24/2012

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	SBR
Lane Group Flow (vph)	2579	616	1479	279
v/c Ratio	0.85	0.88	0.35	0.52
Control Delay	33.2	83.4	4.1	27.5
Queue Delay	23.2	0.0	0.0	0.0
Total Delay	56.4	83.4	4.1	27.5
Queue Length 50th (ft)	849	367	119	54
Queue Length 95th (ft)	949	429	123	114
Internal Link Dist (ft)	215		315	
Turn Bay Length (ft)		325		
Base Capacity (vph)	3051	801	4322	535
Starvation Cap Reductn	581	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.04	0.77	0.34	0.52
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 200: MD 214/MD 214 West & I-495 SB off-ramp to WB 214

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔↔	↑↑↑							↔↔
Volume (vph)	0	2450	0	585	1405	0	0	0	0	0	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0							4.0
Lane Util. Factor		0.91		0.97	0.91							0.88
Frt		1.00		1.00	1.00							0.85
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	5085							2787
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	5085							2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2579	0	616	1479	0	0	0	0	0	0	279
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	167
Lane Group Flow (vph)	0	2579	0	616	1479	0	0	0	0	0	0	112
Turn Type		NA		Prot	NA							custom
Protected Phases		4		3	8							
Permitted Phases												6
Actuated Green, G (s)		107.3		36.9	148.2							23.8
Effective Green, g (s)		107.3		36.9	148.2							23.8
Actuated g/C Ratio		0.60		0.20	0.82							0.13
Clearance Time (s)		4.0		4.0	4.0							4.0
Vehicle Extension (s)		3.0		3.0	3.0							3.0
Lane Grp Cap (vph)		3031		704	4187							369
v/s Ratio Prot		c0.51		c0.18	0.29							
v/s Ratio Perm												c0.04
v/c Ratio		0.85		0.88	0.35							0.30
Uniform Delay, d1		29.8		69.3	4.0							70.6
Progression Factor		1.00		1.00	1.00							1.00
Incremental Delay, d2		2.5		11.7	0.1							2.1
Delay (s)		32.3		81.0	4.0							72.7
Level of Service		C		F	A							E
Approach Delay (s)		32.3			26.7		0.0				72.7	
Approach LOS		C			C		A				E	
Intersection Summary												
HCM Average Control Delay			32.2			HCM Level of Service		C				
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			180.0			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			96.4%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

Queues

240: I-495 NB to WB off-ramp & MD 214

7/24/2012

	→	←	↙
Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	2447	1895	200
v/c Ratio	0.72	0.56	0.25
Control Delay	9.9	7.7	29.0
Queue Delay	0.0	0.0	0.0
Total Delay	9.9	7.7	29.0
Queue Length 50th (ft)	252	161	47
Queue Length 95th (ft)	300	193	79
Internal Link Dist (ft)	369	230	179
Turn Bay Length (ft)			
Base Capacity (vph)	3908	3908	796
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.63	0.48	0.25
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 240: I-495 NB to WB off-ramp & MD 214







7/24/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘	
Volume (vph)	2325	0	0	1800	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.91			0.91	0.97	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	5085			5085	3433	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	5085			5085	3433	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2447	0	0	1895	200	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2447	0	0	1895	200	0
Turn Type	NA			NA	NA	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	55.6			55.6	19.2	
Effective Green, g (s)	55.6			55.6	19.2	
Actuated g/C Ratio	0.67			0.67	0.23	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3415			3415	796	
v/s Ratio Prot	c0.48			0.37	c0.06	
v/s Ratio Perm						
v/c Ratio	0.72			0.55	0.25	
Uniform Delay, d1	8.6			7.1	25.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.7			0.2	0.8	
Delay (s)	9.3			7.3	26.7	
Level of Service	A			A	C	
Approach Delay (s)	9.3			7.3	26.7	
Approach LOS	A			A	C	
Intersection Summary						
HCM Average Control Delay			9.3		HCM Level of Service	A
HCM Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			82.8		Sum of lost time (s)	8.0
Intersection Capacity Utilization			57.0%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

260: Harry S. Truman Drive & Largo Town Center Drive

7/24/2012

						
Lane Group	EBL	EBT	WBL	WBR	NBT	NBR
Lane Group Flow (vph)	84	1469	284	42	906	273
v/c Ratio	0.40	1.07dr	0.71	0.05	0.67	0.33
Control Delay	20.7	16.5	41.6	4.2	26.6	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	16.5	41.6	4.2	26.6	4.8
Queue Length 50th (ft)	8	142	145	0	149	27
Queue Length 95th (ft)	54	238	242	17	217	72
Internal Link Dist (ft)		672			788	
Turn Bay Length (ft)						
Base Capacity (vph)	263	2213	583	999	1700	954
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.66	0.49	0.04	0.53	0.29

Intersection Summary

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis
 260: Harry S. Truman Drive & Largo Town Center Drive







7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	430	965	270	0	40	0	600	520	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0		4.0		4.0	4.0			
Lane Util. Factor	1.00	0.91		1.00		1.00		0.86	0.86			
Frt	1.00	0.90		1.00		0.85		0.95	0.85			
Flt Protected	0.95	1.00		0.95		1.00		1.00	1.00			
Satd. Flow (prot)	1770	4558		1770		1583		4588	1362			
Flt Permitted	0.95	1.00		0.95		1.00		1.00	1.00			
Satd. Flow (perm)	1770	4558		1770		1583		4588	1362			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	453	1016	284	0	42	0	632	547	0	0	0
RTOR Reduction (vph)	66	391	0	0	0	19	0	82	90	0	0	0
Lane Group Flow (vph)	18	1078	0	284	0	23	0	824	183	0	0	0
Turn Type	Prot	NA		Prot		custom		NA	pm+ov			
Protected Phases	7	4		3				2	3			
Permitted Phases						8			2			
Actuated Green, G (s)	4.0	30.6		18.5		45.1		22.6	41.1			
Effective Green, g (s)	4.0	30.6		18.5		45.1		22.6	41.1			
Actuated g/C Ratio	0.05	0.37		0.22		0.54		0.27	0.49			
Clearance Time (s)	4.0	4.0		4.0		4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0	3.0			
Lane Grp Cap (vph)	85	1666		391		853		1239	734			
v/s Ratio Prot	0.01	c0.24		c0.16				c0.18	0.06			
v/s Ratio Perm						0.01			0.08			
v/c Ratio	0.22	1.07dr		0.73		0.03		0.67	0.25			
Uniform Delay, d1	38.3	22.1		30.3		9.0		27.2	12.4			
Progression Factor	1.00	1.00		1.00		1.00		1.00	1.00			
Incremental Delay, d2	1.3	0.9		6.6		0.0		1.4	0.2			
Delay (s)	39.6	22.9		36.8		9.0		28.5	12.5			
Level of Service	D	C		D		A		C	B			
Approach Delay (s)		23.8			33.3			24.8			0.0	
Approach LOS		C			C			C			A	
Intersection Summary												
HCM Average Control Delay			25.2									C
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			83.7						12.0			
Intersection Capacity Utilization			70.5%									C
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

Queues

270: Lottsford Road & Harry S. Truman Drive

7/24/2012

						
Lane Group	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	63	721	21	189	453	221
v/c Ratio	0.12	0.45	0.05	0.23	0.29	0.27
Control Delay	12.8	8.9	7.3	8.2	8.0	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	8.9	7.3	8.2	8.0	2.3
Queue Length 50th (ft)	10	28	2	24	30	0
Queue Length 95th (ft)	38	71	12	63	66	26
Internal Link Dist (ft)		887		758	736	
Turn Bay Length (ft)						150
Base Capacity (vph)	1307	3589	841	1711	3251	1472
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.20	0.02	0.11	0.14	0.15
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
270: Lottsford Road & Harry S. Truman Drive










7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	60	400	285	20	180	0	0	430	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor				1.00	0.91		1.00	1.00			0.95	1.00
Frt				1.00	0.94		1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	4768		1770	1863			3539	1583
Flt Permitted				0.95	1.00		0.49	1.00			1.00	1.00
Satd. Flow (perm)				1770	4768		914	1863			3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	63	421	300	21	189	0	0	453	221
RTOR Reduction (vph)	0	0	0	0	175	0	0	0	0	0	0	122
Lane Group Flow (vph)	0	0	0	63	546	0	21	189	0	0	453	99
Turn Type				Split	NA		Perm	NA			NA	Perm
Protected Phases				3	3			4			2	
Permitted Phases							4					2
Actuated Green, G (s)				12.5	12.5		18.4	18.4			18.4	18.4
Effective Green, g (s)				12.5	12.5		18.4	18.4			18.4	18.4
Actuated g/C Ratio				0.31	0.31		0.45	0.45			0.45	0.45
Clearance Time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0		3.0	3.0			6.0	6.0
Lane Grp Cap (vph)				541	1457		411	838			1592	712
v/s Ratio Prot				0.04	c0.11			0.10			c0.13	
v/s Ratio Perm							0.02					0.06
v/c Ratio				0.12	0.37		0.05	0.23			0.28	0.14
Uniform Delay, d1				10.2	11.1		6.3	6.9			7.1	6.6
Progression Factor				1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2				0.1	0.2		0.1	0.1			0.3	0.3
Delay (s)				10.3	11.3		6.4	7.0			7.4	6.9
Level of Service				B	B		A	A			A	A
Approach Delay (s)		0.0			11.2			7.0			7.2	
Approach LOS		A			B			A			A	
Intersection Summary												
HCM Average Control Delay				9.1			HCM Level of Service				A	
HCM Volume to Capacity ratio				0.32								
Actuated Cycle Length (s)				40.9			Sum of lost time (s)				10.0	
Intersection Capacity Utilization				43.8%			ICU Level of Service				A	
Analysis Period (min)				15								
c Critical Lane Group												

Queues

280: Lottsford Road & Arena Drive

7/24/2012

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	396	1209	76	503	200	779	132	630	297
v/c Ratio	0.86	0.85	0.28	0.58	0.87	0.66	0.74	0.84	0.36
Control Delay	58.9	44.4	45.0	46.2	85.4	36.2	76.1	44.2	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	44.4	45.0	46.2	85.4	36.2	76.1	44.2	11.0
Queue Length 50th (ft)	325	322	58	134	149	160	96	189	83
Queue Length 95th (ft)	#579	#439	113	179	#308	216	#195	273	158
Internal Link Dist (ft)		719		1095		560		666	
Turn Bay Length (ft)			300		500		200		
Base Capacity (vph)	459	1426	407	1275	229	1292	198	854	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.85	0.19	0.39	0.87	0.60	0.67	0.74	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
280: Lottsford Road & Arena Drive







7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	495	825	205	80	435	35	190	415	325	125	315	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.86	0.86		0.86	0.86		1.00	0.91		1.00	0.91	0.91
Frt	1.00	0.97		1.00	0.99		1.00	0.93		1.00	0.93	0.85
Flt Protected	0.95	0.99		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1522	4653		1522	4749		1770	4750		1770	3150	1441
Flt Permitted	0.95	0.99		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1522	4653		1522	4749		1770	4750		1770	3150	1441
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	521	868	216	84	458	37	200	437	342	132	332	595
RTOR Reduction (vph)	0	22	0	0	7	0	0	108	0	0	127	46
Lane Group Flow (vph)	396	1187	0	76	496	0	200	671	0	132	503	251
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	1		2	2		7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	35.1	35.1		21.0	21.0		15.0	26.4		11.7	23.1	58.2
Effective Green, g (s)	35.1	35.1		21.0	21.0		15.0	26.4		11.7	23.1	58.2
Actuated g/C Ratio	0.30	0.30		0.18	0.18		0.13	0.23		0.10	0.20	0.50
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	460	1406		275	858		228	1079		178	626	796
v/s Ratio Prot	c0.26	0.26		0.05	c0.10		c0.11	c0.14		0.07	c0.16	0.10
v/s Ratio Perm												0.08
v/c Ratio	0.86	0.84		0.28	0.58		0.88	0.62		0.74	0.80	0.32
Uniform Delay, d1	38.2	38.0		41.0	43.5		49.7	40.4		50.8	44.4	17.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.1	4.8		0.5	0.9		28.5	1.1		13.5	7.4	0.2
Delay (s)	53.4	42.8		41.6	44.5		78.2	41.5		64.3	51.8	17.4
Level of Service	D	D		D	D		E	D		E	D	B
Approach Delay (s)		45.4			44.1			49.0			43.7	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			45.6				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			116.2				Sum of lost time (s)				28.0	
Intersection Capacity Utilization			83.2%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

290: Shoppers Way & Arena Drive

7/24/2012







						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	1258	595	132	1079	279	205
v/c Ratio	0.74	0.59	0.65	0.46	0.71	0.40
Control Delay	21.7	6.1	52.8	8.3	42.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	6.1	52.8	8.3	42.6	6.9
Queue Length 50th (ft)	295	37	72	144	145	0
Queue Length 95th (ft)	378	121	#142	187	232	54
Internal Link Dist (ft)	494			472	436	
Turn Bay Length (ft)		150	350			
Base Capacity (vph)	1746	1022	226	2403	432	541
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.58	0.58	0.45	0.65	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
290: Shoppers Way & Arena Drive

7/24/2012

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Volume (vph)	1195	565	125	1025	265	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1258	595	132	1079	279	205
RTOR Reduction (vph)	0	246	0	0	0	159
Lane Group Flow (vph)	1258	349	132	1079	279	46
Turn Type	NA	Perm	Prot	NA	NA	custom
Protected Phases	6		5	2		
Permitted Phases		6			8	8
Actuated Green, G (s)	41.8	41.8	10.0	56.8	19.2	19.2
Effective Green, g (s)	41.8	41.8	10.0	56.8	19.2	19.2
Actuated g/C Ratio	0.48	0.48	0.12	0.66	0.22	0.22
Clearance Time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1710	765	205	2324	393	351
v/s Ratio Prot	c0.36		c0.07	0.30		
v/s Ratio Perm		0.22			c0.16	0.03
v/c Ratio	0.74	0.46	0.64	0.46	0.71	0.13
Uniform Delay, d1	17.9	14.8	36.5	7.3	31.1	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	1.2	6.8	0.4	8.4	0.5
Delay (s)	20.2	16.0	43.3	7.8	39.5	27.4
Level of Service	C	B	D	A	D	C
Approach Delay (s)	18.9			11.6	34.4	
Approach LOS	B			B	C	
Intersection Summary						
HCM Average Control Delay			18.5		HCM Level of Service	B
HCM Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			86.5		Sum of lost time (s)	15.5
Intersection Capacity Utilization			67.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Queues

300: Addison Rd. & Wilburn Dr

7/24/2012

	↙	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	116	53	689	95	1321
v/c Ratio	0.51	0.21	0.46	0.07	0.94
Control Delay	42.4	11.9	5.0	0.9	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	11.9	5.0	0.9	26.3
Queue Length 50th (ft)	59	0	106	0	538
Queue Length 95th (ft)	110	31	207	11	#1071
Internal Link Dist (ft)	536		382		427
Turn Bay Length (ft)				100	
Base Capacity (vph)	332	340	1502	1294	1398
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.16	0.46	0.07	0.94

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
300: Addison Rd. & Wilburn Dr

7/24/2012








	↙	↘	↑	↗	↙	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↘	↑	↗		↗
Volume (vph)	110	50	655	90	70	1185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5		4.5
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1770	1583	1863	1583		1858
Flt Permitted	0.95	1.00	1.00	1.00		0.93
Satd. Flow (perm)	1770	1583	1863	1583		1733
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	53	689	95	74	1247
RTOR Reduction (vph)	0	47	0	21	0	0
Lane Group Flow (vph)	116	6	689	74	0	1321
Turn Type	NA	Prot	NA	Perm	Perm	NA
Protected Phases	3	3	6			2
Permitted Phases				6	2	
Actuated Green, G (s)	9.2	9.2	66.0	66.0		66.0
Effective Green, g (s)	9.2	9.2	66.0	66.0		66.0
Actuated g/C Ratio	0.11	0.11	0.78	0.78		0.78
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	193	173	1460	1241		1358
v/s Ratio Prot	c0.07	0.00	0.37			
v/s Ratio Perm				0.05		c0.76
v/c Ratio	0.60	0.03	0.47	0.06		0.97
Uniform Delay, d1	35.8	33.5	3.1	2.1		8.3
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	5.2	0.1	0.2	0.0		18.2
Delay (s)	40.9	33.6	3.4	2.1		26.4
Level of Service	D	C	A	A		C
Approach Delay (s)	38.6		3.2			26.4
Approach LOS	D		A			C
Intersection Summary						
HCM Average Control Delay			19.3		HCM Level of Service	B
HCM Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			84.2		Sum of lost time (s)	9.0
Intersection Capacity Utilization			118.1%		ICU Level of Service	H
Analysis Period (min)			15			
c Critical Lane Group						

Appendix 5
Build Scenario #1 Traffic Analysis and Queuing Reports

Queues

10: Southern Ave NE & MD 214 West

7/24/2012

							
Lane Group	EBL	EBT	WBL	WBT	WBR	NET	SWT
Lane Group Flow (vph)	57	310	93	2269	175	825	567
v/c Ratio	0.43	0.15	0.12	1.08	0.18	1.11	0.78
Control Delay	22.6	13.4	7.9	77.0	8.2	116.4	52.2
Queue Delay	0.0	0.0	0.0	43.0	0.0	0.0	0.0
Total Delay	22.6	13.4	7.9	120.0	8.2	116.4	52.2
Queue Length 50th (ft)	18	65	27	~1320	43	~492	248
Queue Length 95th (ft)	47	90	47	#1447	79	#627	325
Internal Link Dist (ft)		460		823		251	355
Turn Bay Length (ft)	175		330		200		
Base Capacity (vph)	132	2105	764	2092	994	740	730
Starvation Cap Reductn	0	0	0	174	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.15	0.12	1.18	0.18	1.11	0.78

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 10: Southern Ave NE & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Volume (vph)	55	275	25	90	2200	170	65	725	10	30	350	170	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	6.0		-1.0	6.0	3.0		3.0			3.0		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		0.95			0.95		
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.95		
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			1.00		
Satd. Flow (prot)	1770	3495		1770	3539	1583		3518			3366		
Flt Permitted	0.05	1.00		0.56	1.00	1.00		0.70			0.69		
Satd. Flow (perm)	89	3495		1049	3539	1583		2487			2341		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor (vph)	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	
Adj. Flow (vph)	57	284	26	93	2269	175	67	748	10	31	361	175	
RTOR Reduction (vph)	0	5	0	0	0	27	0	1	0	0	34	0	
Lane Group Flow (vph)	57	305	0	93	2269	148	0	824	0	0	533	0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	5	2		1	6			4			8		
Permitted Phases	2			6		6	4			8			
Actuated Green, G (s)	87.2	82.9		86.6	82.6	82.6		41.0			41.0		
Effective Green, g (s)	89.2	87.9		95.9	87.6	90.6		44.0			44.0		
Actuated g/C Ratio	0.60	0.59		0.64	0.59	0.61		0.30			0.30		
Clearance Time (s)	4.0	11.0		4.0	11.0	11.0		6.0			6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0		
Lane Grp Cap (vph)	113	2063		719	2082	963		735			692		
v/s Ratio Prot	c0.02	0.09		c0.01	c0.64								
v/s Ratio Perm	0.28			0.08		0.09		c0.33			0.23		
v/c Ratio	0.50	0.15		0.13	1.09	0.15		1.12			0.77		
Uniform Delay, d1	34.5	13.7		10.0	30.7	12.6		52.5			47.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00		
Incremental Delay, d2	3.5	0.0		0.1	49.1	0.1		71.9			5.3		
Delay (s)	38.0	13.7		10.0	79.7	12.7		124.3			53.1		
Level of Service	D	B		B	E	B		F			D		
Approach Delay (s)		17.5			72.5			124.3			53.1		
Approach LOS		B			E			F			D		
Intersection Summary													
HCM Average Control Delay			75.2									HCM Level of Service	E
HCM Volume to Capacity ratio			1.08										
Actuated Cycle Length (s)			148.9									Sum of lost time (s)	12.0
Intersection Capacity Utilization			116.2%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

Queues

20: Davey Street & MD 214 West

7/24/2012

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NET	SWT
Lane Group Flow (vph)	332	163	2564	79	10
v/c Ratio	0.16	0.51	0.88	0.35	0.05
Control Delay	7.8	30.2	11.4	19.3	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	30.2	11.4	19.3	23.0
Queue Length 50th (ft)	30	59	272	13	3
Queue Length 95th (ft)	60	111	#720	48	15
Internal Link Dist (ft)	823		427	436	351
Turn Bay Length (ft)		225			
Base Capacity (vph)	2075	398	2908	764	793
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.16	0.41	0.88	0.10	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
20: Davey Street & MD 214 West










7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	300	15	155	2425	10	30	5	40	5	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor		0.95		1.00	0.95			1.00			1.00	
Frt		0.99		1.00	1.00			0.93			0.93	
Flt Protected		1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)		3514		1770	3537			1695			1695	
Flt Permitted		1.00		0.95	1.00			0.87			0.92	
Satd. Flow (perm)		3514		1770	3537			1504			1603	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	316	16	163	2553	11	32	5	42	5	0	5
RTOR Reduction (vph)	0	3	0	0	0	0	0	38	0	0	2	0
Lane Group Flow (vph)	0	329	0	163	2564	0	0	41	0	0	8	0
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		38.4		11.0	53.4			6.2			6.2	
Effective Green, g (s)		39.4		12.0	54.4			7.2			7.2	
Actuated g/C Ratio		0.58		0.18	0.80			0.11			0.11	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		2048		314	2846			160			171	
v/s Ratio Prot		0.09		0.09	c0.72							
v/s Ratio Perm								c0.03			0.01	
v/c Ratio		0.16		0.52	0.90			0.26			0.05	
Uniform Delay, d1		6.5		25.2	4.7			27.7			27.1	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		1.5	4.4			0.9			0.1	
Delay (s)		6.5		26.6	9.1			28.6			27.2	
Level of Service		A		C	A			C			C	
Approach Delay (s)		6.5			10.1			28.6			27.2	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM Average Control Delay			10.3			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			67.6			Sum of lost time (s)			6.0			
Intersection Capacity Utilization			85.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

30: Addison Rd. & MD 214 West

7/24/2012

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	41	774	129	2646	485	433	150	57	170
v/c Ratio	0.26	0.34	0.26	1.10	1.08	0.62	0.28	0.43	0.38
Control Delay	9.8	10.5	7.2	75.7	120.8	54.7	7.0	71.8	55.1
Queue Delay	0.0	0.0	0.0	76.4	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	10.5	7.2	152.1	120.8	54.7	7.0	71.8	55.1
Queue Length 50th (ft)	9	141	30	~1420	~250	191	0	49	72
Queue Length 95th (ft)	22	200	58	#1655	#384	249	53	99	109
Internal Link Dist (ft)		307		408		726			986
Turn Bay Length (ft)	200		175		350		575	200	
Base Capacity (vph)	160	2325	494	2402	448	1003	544	139	814
Starvation Cap Reductn	0	0	0	325	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.33	0.26	1.27	1.08	0.43	0.28	0.41	0.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
30: Addison Rd. & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	625	125	125	2465	100	470	420	145	55	155	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	0.5	0.0		0.5	0.0		0.5	1.0	0.5	0.5	1.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	1.00	0.95	
Flt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3451		1770	3519		3433	3539	1583	1770	3508	
Flt Permitted	0.05	1.00		0.30	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	84	3451		561	3519		3433	3539	1583	1770	3508	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Adj. Flow (vph)	41	645	129	129	2543	103	485	433	150	57	160	10
RTOR Reduction (vph)	0	10	0	0	2	0	0	0	110	0	3	0
Lane Group Flow (vph)	41	764	0	129	2644	0	485	433	40	57	167	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases	6			2					4			
Actuated Green, G (s)	89.2	85.3		94.2	87.8		14.5	23.5	29.9	5.9	14.9	
Effective Green, g (s)	95.2	89.3		98.2	91.8		17.5	26.5	35.9	8.9	17.9	
Actuated g/C Ratio	0.70	0.66		0.72	0.67		0.13	0.19	0.26	0.07	0.13	
Clearance Time (s)	3.5	4.0		3.5	4.0		3.5	4.0	3.5	3.5	4.0	
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	144	2264		488	2374		441	689	418	116	461	
v/s Ratio Prot	c0.01	0.22		c0.02	c0.75		c0.14	c0.12	0.01	0.03	0.05	
v/s Ratio Perm	0.18			0.17					0.02			
v/c Ratio	0.28	0.34		0.26	1.11		1.10	0.63	0.09	0.49	0.36	
Uniform Delay, d1	33.0	10.3		6.6	22.1		59.3	50.3	37.8	61.4	53.9	
Progression Factor	0.98	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.2		0.2	57.8		72.7	1.6	0.1	2.4	0.4	
Delay (s)	33.2	10.5		6.8	80.0		132.0	51.8	37.9	63.8	54.2	
Level of Service	C	B		A	E		F	D	D	E	D	
Approach Delay (s)		11.7			76.6			86.3			56.6	
Approach LOS		B			E			F			E	
Intersection Summary												
HCM Average Control Delay			66.9									E
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			136.1						1.0			
Intersection Capacity Utilization			105.0%									G
Analysis Period (min)			15									

c Critical Lane Group

Queues

95: Addison Metro Station & MD 214 West

7/24/2012

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	869	279	2658	263
v/c Ratio	0.62	0.73	1.11	0.68
Control Delay	19.6	37.9	71.8	29.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.6	37.9	71.8	29.8
Queue Length 50th (ft)	147	106	~684	84
Queue Length 95th (ft)	246	#218	#951	154
Internal Link Dist (ft)	408		824	134
Turn Bay Length (ft)		175		
Base Capacity (vph)	1406	443	2394	681
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.63	1.11	0.39

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 95: Addison Metro Station & MD 214 West







7/24/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	
Volume (vph)	695	130	265	2525	150	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.98		1.00	1.00	0.95	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3456		1770	3539	1711	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3456		1770	3539	1711	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	732	137	279	2658	158	105
RTOR Reduction (vph)	17	0	0	0	35	0
Lane Group Flow (vph)	852	0	279	2658	228	0
Turn Type	NA		Prot	NA	NA	
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	27.5		14.7	46.2	14.1	
Effective Green, g (s)	27.5		14.7	46.2	14.1	
Actuated g/C Ratio	0.40		0.22	0.68	0.21	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1392		381	2394	353	
v/s Ratio Prot	0.25		0.16	c0.75	c0.13	
v/s Ratio Perm						
v/c Ratio	0.61		0.73	1.11	0.65	
Uniform Delay, d1	16.2		25.0	11.0	24.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.8		7.1	56.3	4.0	
Delay (s)	17.0		32.1	67.3	28.8	
Level of Service	B		C	E	C	
Approach Delay (s)	17.0			64.0	28.8	
Approach LOS	B			E	C	
Intersection Summary						
HCM Average Control Delay			51.7		HCM Level of Service	D
HCM Volume to Capacity ratio			1.00			
Actuated Cycle Length (s)			68.3		Sum of lost time (s)	8.0
Intersection Capacity Utilization			90.9%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Queues

100: Cabin Branch Rd/Soper Ln & MD 214 West

7/24/2012

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	5	832	153	2864	152	31
v/c Ratio	0.07	0.35	0.68	0.99	0.68	0.14
Control Delay	68.6	10.1	72.0	27.0	56.3	27.2
Queue Delay	0.0	0.0	0.0	18.3	0.0	0.0
Total Delay	68.6	10.1	72.0	45.3	56.3	27.2
Queue Length 50th (ft)	4	143	125	900	91	8
Queue Length 95th (ft)	20	234	221	#1767	176	39
Internal Link Dist (ft)		824		489	324	349
Turn Bay Length (ft)	225		250			
Base Capacity (vph)	67	2448	280	2901	339	344
Starvation Cap Reductn	0	0	0	166	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.34	0.55	1.05	0.45	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
100: Cabin Branch Rd/Soper Ln & MD 214 West








7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	700	90	145	2710	10	60	0	85	5	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Flt	1.00	0.98		1.00	1.00			0.92			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3479		1770	3537			1681			1679	
Flt Permitted	0.95	1.00		0.95	1.00			0.88			0.95	
Satd. Flow (perm)	1770	3479		1770	3537			1509			1608	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	737	95	153	2853	11	63	0	89	5	5	21
RTOR Reduction (vph)	0	5	0	0	0	0	0	36	0	0	18	0
Lane Group Flow (vph)	5	827	0	153	2864	0	0	116	0	0	13	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	0.7	93.2		15.9	108.4			15.5			15.5	
Effective Green, g (s)	1.7	94.2		16.9	109.4			16.5			16.5	
Actuated g/C Ratio	0.01	0.69		0.12	0.80			0.12			0.12	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	22	2399		219	2833			182			194	
v/s Ratio Prot	0.00	0.24		c0.09	c0.81							
v/s Ratio Perm								c0.08			0.01	
v/c Ratio	0.23	0.34		0.70	1.01			0.64			0.06	
Uniform Delay, d1	66.8	8.6		57.4	13.6			57.2			53.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.2	0.1		9.3	19.6			7.1			0.1	
Delay (s)	72.0	8.7		66.7	33.2			64.3			53.4	
Level of Service	E	A		E	C			E			D	
Approach Delay (s)		9.1			34.9			64.3			53.4	
Approach LOS		A			C			E			D	
Intersection Summary												
HCM Average Control Delay			30.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			136.6			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			103.8%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

10: Southern Ave NE & MD 214 West

7/24/2012

							
Lane Group	EBL	EBT	WBL	WBT	WBR	NET	SWT
Lane Group Flow (vph)	309	1506	119	624	119	892	908
v/c Ratio	0.67	0.99	0.48	0.54	0.19	0.68	0.98
Control Delay	20.9	50.6	19.4	30.3	5.3	27.5	55.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	50.6	19.4	30.3	5.3	27.5	55.5
Queue Length 50th (ft)	104	489	32	172	0	238	291
Queue Length 95th (ft)	160	#663	68	234	38	308	#435
Internal Link Dist (ft)		460		823		251	355
Turn Bay Length (ft)	175		330		200		
Base Capacity (vph)	488	1517	250	1150	639	1308	926
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.99	0.48	0.54	0.19	0.68	0.98

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Southern Ave NE & MD 214 West

7/24/2012







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	300	1420	40	115	605	115	15	755	95	80	705	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		-1.0	6.0	3.0		3.0			3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		0.95			0.95	
Frt	1.00	1.00		1.00	1.00	0.85		0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1770	3525		1770	3539	1583		3478			3466	
Flt Permitted	0.26	1.00		0.12	1.00	1.00		0.93			0.66	
Satd. Flow (perm)	477	3525		229	3539	1583		3245			2291	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Adj. Flow (vph)	309	1465	41	119	624	119	15	779	98	83	727	98
RTOR Reduction (vph)	0	2	0	0	0	77	0	10	0	0	9	0
Lane Group Flow (vph)	309	1504	0	119	624	42	0	882	0	0	899	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	46.0	38.0		31.5	27.5	27.5		37.0			37.0	
Effective Green, g (s)	47.0	43.0		41.5	32.5	35.5		40.0			40.0	
Actuated g/C Ratio	0.47	0.43		0.42	0.32	0.36		0.40			0.40	
Clearance Time (s)	4.0	11.0		4.0	11.0	11.0		6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	425	1516		234	1150	562		1298			916	
v/s Ratio Prot	c0.11	c0.43		0.05	0.18							
v/s Ratio Perm	0.23			0.17		0.03		0.27			c0.39	
v/c Ratio	0.73	0.99		0.51	0.54	0.08		0.68			0.98	
Uniform Delay, d1	18.2	28.3		22.6	27.7	21.4		24.7			29.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	6.1	21.2		1.7	0.5	0.1		1.4			25.1	
Delay (s)	24.3	49.5		24.4	28.2	21.4		26.2			54.7	
Level of Service	C	D		C	C	C		C			D	
Approach Delay (s)		45.2			26.7			26.2			54.7	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM Average Control Delay			39.8									D
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			100.0						12.0			
Intersection Capacity Utilization			109.1%									H
Analysis Period (min)			15									

c Critical Lane Group

Queues

20: Davey Street & MD 214 West

7/24/2012

						
Lane Group	EBL	EBT	WBL	WBT	NET	SWT
Lane Group Flow (vph)	5	1673	147	852	178	15
v/c Ratio	0.03	0.81	0.91	0.34	0.49	0.06
Control Delay	23.4	14.1	80.9	4.5	11.8	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.4	14.1	80.9	4.5	11.8	15.8
Queue Length 50th (ft)	1	184	46	32	12	3
Queue Length 95th (ft)	10	#400	#143	120	55	15
Internal Link Dist (ft)		823		427	436	351
Turn Bay Length (ft)	235		225			
Base Capacity (vph)	162	2078	162	2494	956	921
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.81	0.91	0.34	0.19	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
20: Davey Street & MD 214 West










7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	1585	5	140	805	5	25	5	140	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.89			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3538		1770	3536			1643			1750	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.91	
Satd. Flow (perm)	1770	3538		1770	3536			1581			1619	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	1668	5	147	847	5	26	5	147	5	5	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	115	0	0	4	0
Lane Group Flow (vph)	5	1673	0	147	852	0	0	63	0	0	11	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	0.8	34.5		4.0	37.7			7.6			7.6	
Effective Green, g (s)	1.8	35.5		5.0	38.7			8.6			8.6	
Actuated g/C Ratio	0.03	0.61		0.09	0.67			0.15			0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	55	2162		152	2355			234			240	
v/s Ratio Prot	0.00	c0.47		c0.08	0.24							
v/s Ratio Perm								c0.04			0.01	
v/c Ratio	0.09	0.77		0.97	0.36			0.27			0.04	
Uniform Delay, d1	27.4	8.3		26.5	4.3			22.0			21.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.7	1.8		62.4	0.1			0.6			0.1	
Delay (s)	28.1	10.1		88.9	4.4			22.6			21.3	
Level of Service	C	B		F	A			C			C	
Approach Delay (s)		10.2			16.8			22.6			21.3	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM Average Control Delay			13.3			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			58.1			Sum of lost time (s)		9.0				
Intersection Capacity Utilization			73.0%			ICU Level of Service		C				
Analysis Period (min)			15									
c Critical Lane Group												

Queues

90: Addison Rd. & MD 214 West

7/24/2012

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	103	2383	263	1186	268	279	217	134	624
v/c Ratio	0.33	1.12	1.12	0.52	1.10	0.40	0.43	1.07	0.86
Control Delay	9.6	88.9	135.8	14.1	149.6	53.6	40.3	163.2	61.8
Queue Delay	0.0	11.4	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	100.3	135.8	16.8	149.6	53.6	40.3	163.2	61.8
Queue Length 50th (ft)	27	~1355	~247	299	~154	125	154	~146	271
Queue Length 95th (ft)	43	#1413	#436	354	#251	172	234	#288	347
Internal Link Dist (ft)		307		415		726			986
Turn Bay Length (ft)	200		175		350		575	200	
Base Capacity (vph)	315	2126	235	2294	243	739	503	125	763
Starvation Cap Reductn	0	48	0	955	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	1.15	1.12	0.89	1.10	0.38	0.43	1.07	0.82

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
90: Addison Rd. & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	1930	380	255	1020	130	260	270	210	130	370	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	0.5	0.0		0.5	0.0		0.5	1.0	0.5	0.5	1.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95	1.00	1.00	0.95	
Flt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3452		1770	3479		3433	3539	1583	1770	3333	
Flt Permitted	0.18	1.00		0.04	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	343	3452		82	3479		3433	3539	1583	1770	3333	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Adj. Flow (vph)	103	1991	392	263	1052	134	268	279	217	134	382	242
RTOR Reduction (vph)	0	11	0	0	7	0	0	0	13	0	68	0
Lane Group Flow (vph)	103	2372	0	263	1179	0	268	279	204	134	556	0
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		3	8	5	7	4	
Permitted Phases	6			2					8			
Actuated Green, G (s)	92.9	87.0		103.0	93.6		7.5	26.5	39.0	7.5	26.5	
Effective Green, g (s)	98.9	91.0		106.0	97.6		10.5	29.5	45.0	10.5	29.5	
Actuated g/C Ratio	0.67	0.61		0.71	0.66		0.07	0.20	0.30	0.07	0.20	
Clearance Time (s)	3.5	4.0		3.5	4.0		3.5	4.0	3.5	3.5	4.0	
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	314	2115		235	2287		243	703	480	125	662	
v/s Ratio Prot	0.02	c0.69		c0.12	0.34		c0.08	0.08	0.04	0.08	c0.17	
v/s Ratio Perm	0.20			0.68					0.08			
v/c Ratio	0.33	1.12		1.12	0.52		1.10	0.40	0.43	1.07	0.84	
Uniform Delay, d1	10.6	28.8		55.3	13.2		69.0	51.8	41.4	69.0	57.2	
Progression Factor	0.99	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	61.7		94.5	0.4		88.0	0.3	0.4	101.1	9.0	
Delay (s)	11.0	90.3		149.8	13.6		157.0	52.0	41.9	170.1	66.3	
Level of Service	B	F		F	B		F	D	D	F	E	
Approach Delay (s)		87.0			38.3			86.0			84.6	
Approach LOS		F			D			F			F	
Intersection Summary												
HCM Average Control Delay			73.6				HCM Level of Service			E		
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			148.5				Sum of lost time (s)			2.0		
Intersection Capacity Utilization			116.0%				ICU Level of Service			H		
Analysis Period (min)			15									

c Critical Lane Group

Queues

95: Addison Metro Station & MD 214 West

7/24/2012

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	2331	126	1363	263
v/c Ratio	0.97	0.86	0.49	0.87
Control Delay	34.7	111.0	6.0	75.3
Queue Delay	85.8	0.0	0.3	0.0
Total Delay	120.5	111.0	6.3	75.3
Queue Length 50th (ft)	1083	124	218	200
Queue Length 95th (ft)	#1347	#250	255	#343
Internal Link Dist (ft)	415		817	328
Turn Bay Length (ft)		175		
Base Capacity (vph)	2445	146	2846	333
Starvation Cap Reductn	495	0	725	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.20	0.86	0.64	0.79

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 95: Addison Metro Station & MD 214 West







7/24/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	
Volume (vph)	2130	85	120	1295	85	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.99		1.00	1.00	0.91	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3519		1770	3539	1668	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3519		1770	3539	1668	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2242	89	126	1363	89	174
RTOR Reduction (vph)	2	0	0	0	48	0
Lane Group Flow (vph)	2329	0	126	1363	215	0
Turn Type	NA		Prot	NA	NA	
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	99.6		12.0	115.6	22.1	
Effective Green, g (s)	99.6		12.0	115.6	22.1	
Actuated g/C Ratio	0.68		0.08	0.79	0.15	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2406		146	2808	253	
v/s Ratio Prot	c0.66		c0.07	0.39	c0.13	
v/s Ratio Perm						
v/c Ratio	0.97		0.86	0.49	0.85	
Uniform Delay, d1	21.6		66.0	5.1	60.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	11.7		37.5	0.1	23.1	
Delay (s)	33.3		103.5	5.2	83.3	
Level of Service	C		F	A	F	
Approach Delay (s)	33.3			13.5	83.3	
Approach LOS	C			B	F	
Intersection Summary						
HCM Average Control Delay			29.3		HCM Level of Service	C
HCM Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			145.7		Sum of lost time (s)	12.0
Intersection Capacity Utilization			93.1%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Queues

100: Cabin Branch Rd/Soper Ln & MD 214 West

7/24/2012

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	5	2410	53	1479	110	48
v/c Ratio	0.06	0.87	0.46	0.50	0.53	0.47
Control Delay	65.4	14.7	73.7	3.8	42.3	61.9
Queue Delay	0.0	0.4	0.0	0.1	0.0	0.0
Total Delay	65.4	15.1	73.7	4.0	42.3	61.9
Queue Length 50th (ft)	4	595	41	107	45	29
Queue Length 95th (ft)	20	907	#112	279	114	77
Internal Link Dist (ft)		817		861	324	349
Turn Bay Length (ft)	225		250			
Base Capacity (vph)	82	3128	115	3202	438	244
Starvation Cap Reductn	0	258	0	563	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.84	0.46	0.56	0.25	0.20

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
100: Cabin Branch Rd/Soper Ln & MD 214 West

7/24/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	2270	20	50	1400	5	5	0	100	30	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.87			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.97	
Satd. Flow (prot)	1770	3535		1770	3537			1619			1747	
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.53	
Satd. Flow (perm)	1770	3535		1770	3537			1604			952	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	2389	21	53	1474	5	5	0	105	32	5	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	45	0	0	8	0
Lane Group Flow (vph)	5	2410	0	53	1479	0	0	65	0	0	40	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	0.7	90.9		4.5	94.7			10.4			10.4	
Effective Green, g (s)	1.7	91.9		5.5	95.7			11.4			11.4	
Actuated g/C Ratio	0.01	0.78		0.05	0.81			0.10			0.10	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	26	2758		83	2873			155			92	
v/s Ratio Prot	0.00	c0.68		c0.03	0.42							
v/s Ratio Perm								0.04			c0.04	
v/c Ratio	0.19	0.87		0.64	0.51			0.42			0.43	
Uniform Delay, d1	57.4	8.9		55.2	3.6			50.1			50.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.6	3.4		15.0	0.2			1.8			3.3	
Delay (s)	61.0	12.3		70.2	3.7			51.9			53.4	
Level of Service	E	B		E	A			D			D	
Approach Delay (s)		12.4			6.0			51.9			53.4	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM Average Control Delay			11.6			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			117.8			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			79.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix 6
Build Scenario #2 Traffic Analysis and Queuing Reports

2011 Existing

Land Use	ITE Code	Size	Units	AM Peak			Trips		
				Hour Trips	Entering AM	Exiting AM	Entering AM	Exiting AM	
Low Rise Apartments	221	192	DUs	0.21	0.79	94	20	74	
Single Family Residential	210	3308	DUs	0.25	0.75	825	221	604	
Furniture Store	890	76,400	SF	0.69	0.31	43	9	4	
Shopping Center	820	52,500	SF	0.61	0.39	305	64	41	
Middle School	522	120	Employees	0.54	0.46	636	343	293	
Total						1,774	668	1106	

In	Out
699	1,106
-114	-188
585	918

Reduction for pedestrian, bicycle, HOV 2+, HOV 3+ and transit mode share (17%)
Final auto trips

Land Use	ITE Code	Size	Units	PM Peak			Trips		
				Hour Trips	Entering PM	Exiting PM	Entering PM	Exiting PM	
Low Rise Apartments	221	192	DUs	0.65	0.35	120	76	42	
Single Family Residential	210	3308	DUs	0.63	0.37	1,063	670	393	
Furniture Store	890	76,400	SF	0.48	0.52	34	17	18	
Shopping Center	820	52,500	SF	0.49	0.51	413	202	211	
Middle School	522	120	Employees	0.50	0.50	233	116	116	
Total						1,863	1,063	780	

In	Out
1,083	780
-184	-133
899	648

Reduction for pedestrian, bicycle, HOV 2+, HOV 3+ and transit mode share (17%)
Final auto trips

2035 Scenario 2: Mixed Use Concept A

Land Use	ITE Code	Size	Units	AM Peak			Trips		
				Hour Trips	Entering AM	Exiting AM	Entering AM	Exiting AM	
3-Story Flat	220	596	DUs	0.20	0.80	296	59	237	
Single Family Residential	210	317	DUs	0.25	0.75	22	5	16	
Shopping Center	820	223,500	SF	0.61	0.39	246	151	97	
General Office building	710	376,500	SF	0.88	0.12	542	477	65	
Residential	220	105	DUs	0.20	0.80	58	11	44	
Live/Work Unit	220	70	DUs	0.20	0.80	38	8	30	
2-Story townhouse	230	67	DUs	0.17	0.83	57	10	47	
Total						1,257	721	536	

In	Out
721	536
477	65
244	471
-105	-34
-41	-80
574	442

Work trips
All other trip purposes (including unidentified work trips)
Work trip reduction for all modes (23%)
Reduction for other trips (17%)
Final auto trips

Land Use	ITE Code	Size	Units	PM Peak			Trips		
				Hour Trips	Entering PM	Exiting PM	Entering PM	Exiting PM	
3-Story Flat	220	596	DUs	0.65	0.35	345	225	121	
Single Family Residential	210	317	DUs	0.63	0.37	21	13	8	
Shopping Center	820	223,500	SF	0.49	0.51	1,090	634	596	
General Office building	710	376,500	SF	0.17	0.83	500	85	415	
Residential	220	105	DUs	0.65	0.35	75	49	26	
Live/Work Unit	220	70	DUs	0.65	0.35	56	36	20	
2-Story townhouse	230	67	DUs	0.67	0.33	43	29	14	
Total						2,133	972	1,163	

In	Out
972	1,163
85	415
807	745
-19	-91
-151	-127
802	943

Work trips
All other trip purposes (including unidentified work trips)
Work trip reduction for all modes (23%)
Reduction for other trips (17%)
Final auto trips

-2011 Trips		2011-2035 Growth		AECOM Trips		Total Trips (2035)	
AM	PM	AM	PM	AM	PM	AM	PM
1,472	1,546	1,987	2,507	3,016	1,745	3,742	4,354
						0.81	0.88

Hill Road and Morgan Boulevard Road Diet
 230: Garrett Morgan & Ridgefield

2035 AM
 7/30/2012

	→	↙	←	↘	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	126	68	52	21	463	16	558
v/c Ratio	0.33	0.20	0.11	0.04	0.22	0.03	0.27
Control Delay	13.6	13.8	6.1	5.7	5.7	5.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	13.8	6.1	5.7	5.7	5.5	5.9
Queue Length 50th (ft)	16	10	1	2	23	1	29
Queue Length 95th (ft)	56	38	19	10	50	8	61
Internal Link Dist (ft)	623		482		695		523
Turn Bay Length (ft)				150		125	
Base Capacity (vph)	1311	1223	1564	780	3330	855	3316
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.06	0.03	0.03	0.14	0.02	0.17
Intersection Summary							







Hill Road and Morgan Boulevard Road Diet
230: Garrett Morgan & Ridgefield

2035 AM
7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Volume (vph)	90	5	25	65	5	45	20	425	15	15	500	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Flt		0.97		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1745		1770	1610		1770	3521		1770	3509	
Flt Permitted		0.75		0.68	1.00		0.44	1.00		0.49	1.00	
Satd. Flow (perm)		1349		1260	1610		825	3521		905	3509	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	5	26	68	5	47	21	447	16	16	526	32
RTOR Reduction (vph)	0	16	0	0	38	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	110	0	68	14	0	21	461	0	16	554	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8						6			2		
Actuated Green, G (s)		6.5		6.5	6.5		17.1	17.1		17.1	17.1	
Effective Green, g (s)		6.5		6.5	6.5		17.1	17.1		17.1	17.1	
Actuated g/C Ratio		0.19		0.19	0.19		0.51	0.51		0.51	0.51	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		261		244	311		420	1792		461	1786	
v/s Ratio Prot					0.01			0.13			c0.16	
v/s Ratio Perm		c0.08		0.05			0.03			0.02		
v/c Ratio		0.42		0.28	0.05		0.05	0.26		0.03	0.31	
Uniform Delay, d1		11.9		11.6	11.0		4.2	4.7		4.1	4.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1		0.6	0.1		0.1	0.2		0.1	0.3	
Delay (s)		13.0		12.2	11.1		4.3	4.9		4.2	5.1	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		13.0			11.7			4.9			5.1	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			6.4			HCM Level of Service			A			
HCM Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			33.6			Sum of lost time (s)		10.0				
Intersection Capacity Utilization			38.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Hill Road and Morgan Boulevard Road Diet
 240: Morgan Metro Park and Ride & Garrett A Morgan

2035 AM
 7/30/2012

						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	337	68	363	358	63	126
v/c Ratio	0.28	0.12	0.53	0.15	0.21	0.34
Control Delay	11.7	4.2	21.3	3.7	19.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	4.2	21.3	3.7	19.1	7.5
Queue Length 50th (ft)	32	0	43	15	14	0
Queue Length 95th (ft)	59	19	#100	31	43	35
Internal Link Dist (ft)	667			1365	395	
Turn Bay Length (ft)		100	150			
Base Capacity (vph)	1750	817	679	2762	1350	1237
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.08	0.53	0.13	0.05	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.











Hill Road and Morgan Boulevard Road Diet
 240: Morgan Metro Park and Ride & Garrett A Morgan

2035 AM
 7/30/2012

	↙	↘	↖	↗	↙	↘
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↗	↖↗	↑↑	↖	↗
Volume (vph)	320	65	345	340	60	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	337	68	363	358	63	126
RTOR Reduction (vph)	0	45	0	0	0	110
Lane Group Flow (vph)	337	23	363	358	63	16
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases			1	6	4	
Permitted Phases	2	2				4
Actuated Green, G (s)	14.3	14.3	8.4	27.7	5.5	5.5
Effective Green, g (s)	14.3	14.3	8.4	27.7	5.5	5.5
Actuated g/C Ratio	0.33	0.33	0.19	0.64	0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	3.0	3.0
Lane Grp Cap (vph)	1171	524	668	2269	225	202
v/s Ratio Prot			c0.11	0.10	c0.04	
v/s Ratio Perm	c0.10	0.01				0.01
v/c Ratio	0.29	0.04	0.54	0.16	0.28	0.08
Uniform Delay, d1	10.7	9.8	15.7	3.1	17.1	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	0.9	0.1	0.7	0.2
Delay (s)	11.1	9.9	16.6	3.2	17.7	16.8
Level of Service	B	A	B	A	B	B
Approach Delay (s)	10.9			9.9	17.1	
Approach LOS	B			A	B	
Intersection Summary						
HCM Average Control Delay			11.3		HCM Level of Service	B
HCM Volume to Capacity ratio			0.36			
Actuated Cycle Length (s)			43.2		Sum of lost time (s)	15.0
Intersection Capacity Utilization			35.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Hill Road and Morgan Boulevard Road Diet
 250: Ritchie/Garrett A Morgan & MD 214 West

2035 AM
 7/30/2012

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	964	158	2474	442	289	289	163	189	158
v/c Ratio	0.40	0.37	0.99	1.04	0.63	0.76	0.18	0.32	0.69	0.36
Control Delay	67.3	22.7	137.6	66.4	58.2	69.2	0.3	57.8	73.0	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	22.7	137.6	66.4	58.2	69.2	0.3	57.8	73.0	15.7
Queue Length 50th (ft)	63	194	81	~948	206	270	0	74	178	47
Queue Length 95th (ft)	98	284	#159	#1260	245	351	0	105	252	68
Internal Link Dist (ft)		1283		929		896			1365	
Turn Bay Length (ft)	350		600		350		200	500		
Base Capacity (vph)	328	2612	160	2388	961	522	1583	961	522	437
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.37	0.99	1.04	0.46	0.55	0.18	0.17	0.36	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.












Hill Road and Morgan Boulevard Road Diet
 250: Ritchie/Garrett A Morgan & MD 214 West

2035 AM
 7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	790	125	150	2200	150	420	275	275	155	180	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4981		3433	5037		3433	1863	1583	3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4981		3433	5037		3433	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	832	132	158	2316	158	442	289	289	163	189	158
RTOR Reduction (vph)	0	10	0	0	4	0	0	0	0	0	0	52
Lane Group Flow (vph)	132	954	0	158	2470	0	442	289	289	163	189	106
Turn Type	Prot	NA		Prot	NA		Split	NA	Free	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4		3	3	1
Permitted Phases									Free			3
Actuated Green, G (s)	12.3	75.3		5.0	68.0		28.5	28.5	150.0	20.2	20.2	32.5
Effective Green, g (s)	14.3	78.3		7.0	71.0		30.5	30.5	150.0	22.2	22.2	36.5
Actuated g/C Ratio	0.10	0.52		0.05	0.47		0.20	0.20	1.00	0.15	0.15	0.24
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0		2.5	2.5		2.5	2.5	3.0
Lane Grp Cap (vph)	327	2600		160	2384		698	379	1583	508	276	385
v/s Ratio Prot	c0.04	0.19		0.05	c0.49		0.13	c0.16		0.05	c0.10	0.03
v/s Ratio Perm									0.18			0.04
v/c Ratio	0.40	0.37		0.99	1.04		0.63	0.76	0.18	0.32	0.68	0.27
Uniform Delay, d1	63.8	21.2		71.5	39.5		54.6	56.3	0.0	57.2	60.6	46.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.4		67.9	28.6		1.6	8.4	0.3	0.3	6.3	0.4
Delay (s)	64.7	21.6		139.4	68.1		56.3	64.8	0.3	57.4	66.9	46.4
Level of Service	E	C		F	E		E	E	A	E	E	D
Approach Delay (s)		26.8			72.4			42.8			57.5	
Approach LOS		C			E			D			E	
Intersection Summary												
HCM Average Control Delay			55.7			HCM Level of Service			E			
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			84.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Hill Road and Morgan Boulevard Road Diet
 260: Shady Glen Dr/Hill Rd & MD 214 West

2035 AM
 7/30/2012

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	753	95	2358	205	121	158	47	172	192	358
v/c Ratio	0.43	0.26	0.20	0.79	0.21	0.64	0.40	0.22	0.71	0.38	0.76
Control Delay	27.1	17.0	11.4	28.3	7.9	78.3	63.4	16.8	76.4	58.6	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	17.0	11.4	28.3	7.9	78.3	63.4	16.8	76.4	58.6	25.9
Queue Length 50th (ft)	23	124	30	618	32	126	80	0	179	94	78
Queue Length 95th (ft)	81	198	69	#963	97	195	114	39	256	129	190
Internal Link Dist (ft)		1835		2003			924			1116	
Turn Bay Length (ft)	300		225		325	350		225	300		150
Base Capacity (vph)	171	2951	472	2981	980	413	866	431	413	857	609
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.26	0.20	0.79	0.21	0.29	0.18	0.11	0.42	0.22	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Hill Road and Morgan Boulevard Road Diet
 260: Shady Glen Dr/Hill Rd & MD 214 West

2035 AM
 7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	675	40	90	2240	195	130	135	45	220	125	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.91	0.91	1.00	0.91	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1770	5043		1770	5085	1583	1610	3373	1583	1610	3338	1583
Flt Permitted	0.05	1.00		0.32	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	86	5043		595	5085	1583	1610	3373	1583	1610	3338	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	711	42	95	2358	205	137	142	47	232	132	358
RTOR Reduction (vph)	0	3	0	0	0	52	0	0	42	0	0	232
Lane Group Flow (vph)	74	750	0	95	2358	153	121	158	5	172	192	126
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2			3			4
Actuated Green, G (s)	92.8	84.6		93.4	84.9	84.9	14.5	14.5	14.5	19.4	19.4	19.4
Effective Green, g (s)	96.8	87.6		97.4	87.9	87.9	17.5	17.5	16.5	22.4	22.4	22.4
Actuated g/C Ratio	0.65	0.58		0.65	0.59	0.59	0.12	0.12	0.11	0.15	0.15	0.15
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	170	2945		469	2980	928	188	394	174	240	498	236
v/s Ratio Prot	c0.03	0.15		0.01	c0.46		c0.08	0.05		c0.11	0.06	
v/s Ratio Perm	0.25			0.12		0.10			0.00			0.08
v/c Ratio	0.44	0.25		0.20	0.79	0.17	0.64	0.40	0.03	0.72	0.39	0.53
Uniform Delay, d1	24.2	15.2		10.0	24.0	14.2	63.3	61.4	59.6	60.8	57.6	59.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.2		0.2	2.2	0.4	6.5	0.5	0.1	9.1	0.4	1.8
Delay (s)	26.0	15.5		10.2	26.2	14.6	69.8	61.9	59.7	69.9	58.0	60.8
Level of Service	C	B		B	C	B	E	E	E	E	E	E
Approach Delay (s)		16.4			24.7			64.5			62.2	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM Average Control Delay			32.0									C
HCM Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			150.0									9.0
Intersection Capacity Utilization			81.0%									D
Analysis Period (min)			15									
c Critical Lane Group												

Hill Road and Morgan Boulevard Road Diet
 270: Hill Rd & Willow Hill Rd

2035 AM
 7/30/2012

	→	↘	←	↙	↑	↗	↓	↘
Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	16	258	95	406	74	468	5
v/c Ratio	0.02	0.04	0.71	0.19	0.37	0.08	0.45	0.01
Control Delay	13.4	7.3	29.1	4.8	8.4	2.4	9.3	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	7.3	29.1	4.8	8.4	2.4	9.3	4.6
Queue Length 50th (ft)	2	0	73	0	62	0	76	0
Queue Length 95th (ft)	11	10	138	25	142	16	173	4
Internal Link Dist (ft)	480		402		925		554	
Turn Bay Length (ft)						250		100
Base Capacity (vph)	606	595	501	645	1085	964	1040	936
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.51	0.15	0.37	0.08	0.45	0.01
Intersection Summary								

Hill Road and Morgan Boulevard Road Diet
270: Hill Rd & Willow Hill Rd

2035 AM
7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	5	5	15	235	10	90	10	375	70	40	405	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85	
Flt Protected		0.98	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (prot)		1817	1583		1778	1583		1860	1583		1854	1583	
Flt Permitted		0.88	1.00		0.73	1.00		0.99	1.00		0.95	1.00	
Satd. Flow (perm)		1639	1583		1356	1583		1841	1583		1762	1583	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	5	5	16	247	11	95	11	395	74	42	426	5	
RTOR Reduction (vph)	0	0	12	0	0	69	0	0	30	0	0	2	
Lane Group Flow (vph)	0	10	4	0	258	26	0	406	44	0	468	3	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		
Permitted Phases	4		4	8		8	2		2	6		6	
Actuated Green, G (s)		15.4	15.4		15.4	15.4		33.7	33.7		33.7	33.7	
Effective Green, g (s)		15.4	15.4		15.4	15.4		33.7	33.7		33.7	33.7	
Actuated g/C Ratio		0.27	0.27		0.27	0.27		0.59	0.59		0.59	0.59	
Clearance Time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		442	427		366	427		1087	934		1040	934	
v/s Ratio Prot													
v/s Ratio Perm		0.01	0.00		0.19	0.02		0.22	0.03		0.27	0.00	
v/c Ratio		0.02	0.01		0.70	0.06		0.37	0.05		0.45	0.00	
Uniform Delay, d1		15.3	15.3		18.8	15.5		6.2	4.9		6.5	4.8	
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0	0.0		6.1	0.1		1.0	0.1		1.4	0.0	
Delay (s)		15.3	15.3		24.9	15.5		7.1	5.0		7.9	4.8	
Level of Service		B	B		C	B		A	A		A	A	
Approach Delay (s)		15.3			22.4			6.8			7.9		
Approach LOS		B			C			A			A		
Intersection Summary													
HCM Average Control Delay			11.5		HCM Level of Service						B		
HCM Volume to Capacity ratio			0.53										
Actuated Cycle Length (s)			57.1		Sum of lost time (s)						8.0		
Intersection Capacity Utilization			74.0%		ICU Level of Service						D		
Analysis Period (min)			15										
c Critical Lane Group													

Hill Road & Morgan Boulevard Road Diet
 330: Garrett Morgan & Ridgefield

2035 PM
 7/30/2012

	→	↙	←	↘	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	47	31	26	626	21	458
v/c Ratio	0.08	0.10	0.07	0.04	0.25	0.04	0.18
Control Delay	10.7	13.9	8.4	4.4	3.9	4.4	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	13.9	8.4	4.4	3.9	4.4	3.7
Queue Length 50th (ft)	2	7	1	2	28	2	20
Queue Length 95th (ft)	20	30	17	9	55	8	40
Internal Link Dist (ft)	623		482		596		523
Turn Bay Length (ft)				150		125	
Base Capacity (vph)	1475	1813	1585	862	3312	731	3324
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.02	0.03	0.19	0.03	0.14
Intersection Summary							







Hill Road & Morgan Boulevard Road Diet
330: Garrett Morgan & Ridgefield

2035 PM
7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Volume (vph)	10	5	15	45	5	25	25	540	55	20	405	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.87		1.00	0.99		1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1708		1770	1628		1770	3490		1770	3502	
Flt Permitted		0.87		1.00	1.00		0.49	1.00		0.41	1.00	
Satd. Flow (perm)		1517		1863	1628		909	3490		772	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	5	16	47	5	26	26	568	58	21	426	32
RTOR Reduction (vph)	0	14	0	0	23	0	0	7	0	0	5	0
Lane Group Flow (vph)	0	18	0	47	8	0	26	619	0	21	453	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		3.6		3.6	3.6		18.6	18.6		18.6	18.6	
Effective Green, g (s)		3.6		3.6	3.6		18.6	18.6		18.6	18.6	
Actuated g/C Ratio		0.11		0.11	0.11		0.58	0.58		0.58	0.58	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		170		208	182		525	2016		446	2023	
v/s Ratio Prot					0.00			c0.18			0.13	
v/s Ratio Perm		0.01		c0.03			0.03			0.03		
v/c Ratio		0.10		0.23	0.04		0.05	0.31		0.05	0.22	
Uniform Delay, d1		12.9		13.0	12.8		3.0	3.5		3.0	3.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3		0.6	0.1		0.1	0.2		0.1	0.2	
Delay (s)		13.1		13.6	12.9		3.1	3.7		3.1	3.5	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		13.1			13.3			3.7			3.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			4.5			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			32.2			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			37.5%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Hill Road & Morgan Boulevard Road Diet
 340: Morgan Metro Park and Ride & Garrett A Morgan

2035 PM
 7/30/2012

						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	558	63	116	500	126	316
v/c Ratio	0.39	0.09	0.29	0.25	0.35	0.59
Control Delay	11.3	3.8	24.4	5.2	20.9	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	3.8	24.4	5.2	20.9	9.4
Queue Length 50th (ft)	55	0	15	27	31	10
Queue Length 95th (ft)	101	18	40	57	73	65
Internal Link Dist (ft)	667			1365	395	
Turn Bay Length (ft)		100	150			
Base Capacity (vph)	1900	879	400	2581	1263	1208
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.07	0.29	0.19	0.10	0.26
Intersection Summary						











Hill Road & Morgan Boulevard Road Diet
 340: Morgan Metro Park and Ride & Garrett A Morgan

2035 PM
 7/30/2012

	↙	↘	↖	↗	↙	↘
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↗	↖↗	↑↑	↖	↗
Volume (vph)	530	60	110	475	120	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	558	63	116	500	126	316
RTOR Reduction (vph)	0	38	0	0	0	220
Lane Group Flow (vph)	558	25	116	500	126	96
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases			1	6	4	
Permitted Phases	2	2				4
Actuated Green, G (s)	18.5	18.5	3.7	27.2	9.2	9.2
Effective Green, g (s)	18.5	18.5	3.7	27.2	9.2	9.2
Actuated g/C Ratio	0.40	0.40	0.08	0.59	0.20	0.20
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	3.0	3.0
Lane Grp Cap (vph)	1411	631	274	2075	351	314
v/s Ratio Prot			c0.03	0.14	c0.07	
v/s Ratio Perm	c0.16	0.02				0.06
v/c Ratio	0.40	0.04	0.42	0.24	0.36	0.30
Uniform Delay, d1	10.0	8.5	20.3	4.6	16.1	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	1.1	0.2	0.6	0.6
Delay (s)	10.5	8.6	21.4	4.8	16.7	16.4
Level of Service	B	A	C	A	B	B
Approach Delay (s)	10.3			7.9	16.5	
Approach LOS	B			A	B	
Intersection Summary						
HCM Average Control Delay			11.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.39			
Actuated Cycle Length (s)			46.4		Sum of lost time (s)	15.0
Intersection Capacity Utilization			41.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Hill Road & Morgan Boulevard Road Diet
 350: Ritchie/Garrett A Morgan & MD 214 West

2035 PM
 7/30/2012

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	211	2279	274	1474	242	258	374	284	437	142
v/c Ratio	0.42	1.15	1.33	0.95	0.38	0.75	0.24	0.29	0.84	0.19
Control Delay	62.1	113.8	228.7	64.0	54.2	70.5	0.4	42.0	64.6	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	113.8	228.7	64.0	54.2	70.5	0.4	42.0	64.6	2.5
Queue Length 50th (ft)	99	~962	~178	509	108	242	0	112	403	1
Queue Length 95th (ft)	145	#1265	#275	#781	141	321	0	141	498	20
Internal Link Dist (ft)		1283		929		896			1365	
Turn Bay Length (ft)	350		600		350		200	500		
Base Capacity (vph)	504	1982	206	1545	1099	596	1583	1167	633	756
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	1.15	1.33	0.95	0.22	0.43	0.24	0.24	0.69	0.19

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.












Hill Road & Morgan Boulevard Road Diet
 350: Ritchie/Garrett A Morgan & MD 214 West

2035 PM
 7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	2010	155	260	1275	125	230	245	355	270	415	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5031		3433	5017		3433	1863	1583	3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5031		3433	5017		3433	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	2116	163	274	1342	132	242	258	374	284	437	142
RTOR Reduction (vph)	0	4	0	0	7	0	0	0	0	0	0	79
Lane Group Flow (vph)	211	2275	0	274	1467	0	242	258	374	284	437	63
Turn Type	Prot	NA		Prot	NA		Split	NA	Free	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4		3	3	1
Permitted Phases									Free			3
Actuated Green, G (s)	20.0	56.0		7.0	43.0		25.9	25.9	150.0	40.1	40.1	60.1
Effective Green, g (s)	22.0	59.0		9.0	46.0		27.9	27.9	150.0	42.1	42.1	64.1
Actuated g/C Ratio	0.15	0.39		0.06	0.31		0.19	0.19	1.00	0.28	0.28	0.43
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0		2.5	2.5		2.5	2.5	3.0
Lane Grp Cap (vph)	504	1979		206	1539		639	347	1583	964	523	676
v/s Ratio Prot	0.06	c0.45		c0.08	0.29		0.07	c0.14		0.08	c0.23	0.01
v/s Ratio Perm									0.24			0.03
v/c Ratio	0.42	1.15		1.33	0.95		0.38	0.74	0.24	0.29	0.84	0.09
Uniform Delay, d1	58.2	45.5		70.5	50.9		53.5	57.7	0.0	42.3	50.7	25.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	73.6		177.9	14.2		0.3	7.9	0.4	0.1	10.9	0.1
Delay (s)	58.8	119.1		248.4	65.2		53.7	65.6	0.4	42.4	61.6	25.7
Level of Service	E	F		F	E		D	E	A	D	E	C
Approach Delay (s)		114.0			93.9			34.4			49.4	
Approach LOS		F			F			C			D	
Intersection Summary												
HCM Average Control Delay			87.2			HCM Level of Service			F			
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			91.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Hill Road & Morgan Boulevard Road Diet
 360: Shady Glen Dr/Hill Rd & MD 214 West

2035 PM
 7/30/2012

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	89	2168	116	1205	258	88	191	53	327	368	147
v/c Ratio	0.32	0.89	0.54	0.47	0.28	0.55	0.57	0.27	0.82	0.45	0.29
Control Delay	18.8	41.6	36.6	27.4	4.0	76.3	70.5	18.0	69.9	48.6	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	41.6	36.6	27.4	4.0	76.3	70.5	18.0	69.9	48.6	7.1
Queue Length 50th (ft)	36	686	56	275	0	92	100	0	335	168	0
Queue Length 95th (ft)	78	#1027	135	402	58	153	140	43	431	204	53
Internal Link Dist (ft)		1835		2003			924			2121	
Turn Bay Length (ft)	300		225		325	350		225	300		150
Base Capacity (vph)	282	2433	213	2538	920	413	868	436	437	907	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.89	0.54	0.47	0.28	0.21	0.22	0.12	0.75	0.41	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Hill Road & Morgan Boulevard Road Diet
 360: Shady Glen Dr/Hill Rd & MD 214 West

2035 PM
 7/30/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1960	100	110	1145	245	95	170	50	420	240	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.91	0.91	1.00	0.91	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1770	5048		1770	5085	1583	1610	3380	1583	1610	3338	1583
Flt Permitted	0.16	1.00		0.05	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (perm)	304	5048		101	5085	1583	1610	3380	1583	1610	3338	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	2063	105	116	1205	258	100	179	53	442	253	147
RTOR Reduction (vph)	0	3	0	0	0	129	0	0	48	0	0	111
Lane Group Flow (vph)	89	2165	0	116	1205	129	88	191	5	327	368	36
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2			3			4
Actuated Green, G (s)	78.3	69.2		83.7	71.9	71.9	12.0	12.0	12.0	34.0	34.0	34.0
Effective Green, g (s)	82.3	72.2		87.7	74.9	74.9	15.0	15.0	14.0	37.0	37.0	37.0
Actuated g/C Ratio	0.55	0.48		0.58	0.50	0.50	0.10	0.10	0.09	0.25	0.25	0.25
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	275	2430		213	2539	790	161	338	148	397	823	390
v/s Ratio Prot	0.02	c0.43		c0.05	0.24		0.05	c0.06		c0.20	0.11	
v/s Ratio Perm	0.15			0.27		0.08			0.00			0.02
v/c Ratio	0.32	0.89		0.54	0.47	0.16	0.55	0.57	0.03	0.82	0.45	0.09
Uniform Delay, d1	17.6	35.3		33.6	24.6	20.5	64.3	64.4	61.8	53.4	47.8	43.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	5.4		2.8	0.6	0.4	3.0	1.8	0.1	12.7	0.3	0.1
Delay (s)	18.3	40.8		36.5	25.3	20.9	67.2	66.1	61.9	66.1	48.1	43.6
Level of Service	B	D		D	C	C	E	E	E	E	D	D
Approach Delay (s)		39.9			25.4			65.8			54.3	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM Average Control Delay	39.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Hill Road & Morgan Boulevard Road Diet
 370: Hill Rd & Willow Hill Rd

2035 PM
 7/30/2012

	→	↘	←	↙	↑	↗	↓	↖
Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	42	206	105	421	116	621	11
v/c Ratio	0.03	0.11	0.69	0.24	0.36	0.11	0.57	0.01
Control Delay	16.7	7.1	33.2	6.0	6.6	1.5	9.2	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	7.1	33.2	6.0	6.6	1.5	9.2	2.9
Queue Length 50th (ft)	3	0	64	0	60	0	108	0
Queue Length 95th (ft)	12	20	124	30	117	15	212	5
Internal Link Dist (ft)	480		402		2121		554	
Turn Bay Length (ft)								100
Base Capacity (vph)	437	454	364	500	1163	1065	1093	1027
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.09	0.57	0.21	0.36	0.11	0.57	0.01
Intersection Summary								

Hill Road & Morgan Boulevard Road Diet
370: Hill Rd & Willow Hill Rd

2035 PM
7/30/2012








Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	40	185	10	100	20	380	110	75	515	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.98	1.00		0.95	1.00		1.00	1.00		0.99	1.00
Satd. Flow (prot)		1817	1583		1779	1583		1858	1583		1851	1583
Flt Permitted		0.88	1.00		0.73	1.00		0.97	1.00		0.91	1.00
Satd. Flow (perm)		1635	1583		1361	1583		1800	1583		1689	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	5	42	195	11	105	21	400	116	79	542	11
RTOR Reduction (vph)	0	0	33	0	0	82	0	0	41	0	0	4
Lane Group Flow (vph)	0	10	9	0	206	23	0	421	75	0	621	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		13.2	13.2		13.2	13.2		38.9	38.9		38.9	38.9
Effective Green, g (s)		13.2	13.2		13.2	13.2		38.9	38.9		38.9	38.9
Actuated g/C Ratio		0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65
Clearance Time (s)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		359	348		299	348		1165	1025		1093	1025
v/s Ratio Prot												
v/s Ratio Perm		0.01	0.01		0.15	0.01		0.23	0.05		0.37	0.00
v/c Ratio		0.03	0.03		0.69	0.07		0.36	0.07		0.57	0.01
Uniform Delay, d1		18.4	18.4		21.6	18.6		4.9	3.9		5.9	3.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.0	0.0		6.5	0.1		0.9	0.1		2.1	0.0
Delay (s)		18.4	18.4		28.0	18.7		5.8	4.1		8.1	3.8
Level of Service		B	B		C	B		A	A		A	A
Approach Delay (s)		18.4			24.9			5.4			8.0	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM Average Control Delay			10.9									B
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			60.1								8.0	
Intersection Capacity Utilization			79.8%									D
Analysis Period (min)			15									
c Critical Lane Group												

Appendix 7
Build Scenario #3 Traffic Analysis and Queuing Reports

Queues

260: Harry S. Truman Drive & Largo Town Center Drive

7/16/2012

							
Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR
Lane Group Flow (vph)	26	126	216	121	37	1304	565
v/c Ratio	0.19	0.43	0.50	0.45	0.07	0.79	0.48
Control Delay	17.5	30.6	8.8	32.5	7.3	17.8	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	30.6	8.8	32.5	7.3	17.8	2.1
Queue Length 50th (ft)	0	48	0	46	0	203	5
Queue Length 95th (ft)	23	97	53	99	19	355	37
Internal Link Dist (ft)		672				788	
Turn Bay Length (ft)							
Base Capacity (vph)	140	489	575	349	646	1918	1215
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.26	0.38	0.35	0.06	0.68	0.47
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
 260: Harry S. Truman Drive & Largo Town Center Drive







7/16/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	120	205	115	0	35	0	1060	715	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.91	0.91			
Frt	1.00	1.00	0.85	1.00		0.85		0.98	0.85			
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00			
Satd. Flow (prot)	1770	1863	1583	1770		1583		3317	1441			
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00			
Satd. Flow (perm)	1770	1863	1583	1770		1583		3317	1441			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	126	216	121	0	37	0	1116	753	0	0	0
RTOR Reduction (vph)	25	0	174	0	0	25	0	17	193	0	0	0
Lane Group Flow (vph)	1	126	42	121	0	12	0	1287	372	0	0	0
Turn Type	Prot	NA	Perm	Prot		custom		NA	pm+ov			
Protected Phases	7	4		3				2	3			
Permitted Phases			4			8			2			
Actuated Green, G (s)	1.4	12.6	12.6	9.5		20.7		31.1	40.6			
Effective Green, g (s)	1.4	12.6	12.6	9.5		20.7		31.1	40.6			
Actuated g/C Ratio	0.02	0.19	0.19	0.15		0.32		0.48	0.62			
Clearance Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0			
Lane Grp Cap (vph)	38	360	306	258		503		1582	986			
v/s Ratio Prot	0.00	c0.07		c0.07				c0.39	c0.06			
v/s Ratio Perm			0.03			0.01			0.20			
v/c Ratio	0.01	0.35	0.14	0.47		0.02		0.81	0.38			
Uniform Delay, d1	31.2	22.8	21.8	25.5		15.3		14.6	6.1			
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00	1.00			
Incremental Delay, d2	0.2	0.6	0.2	1.3		0.0		3.3	0.2			
Delay (s)	31.4	23.3	22.0	26.9		15.3		17.9	6.3			
Level of Service	C	C	C	C		B		B	A			
Approach Delay (s)		23.1			24.2			14.4			0.0	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay			16.4						HCM Level of Service		B	
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			65.2						Sum of lost time (s)		8.0	
Intersection Capacity Utilization			56.6%						ICU Level of Service		B	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

270: Lottsford Road & Harry S. Truman Drive

7/16/2012

						
Lane Group	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	42	1121	5	105	163	326
v/c Ratio	0.05	0.66	0.01	0.17	0.14	0.49
Control Delay	8.7	8.3	13.0	13.7	12.9	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	8.3	13.0	13.7	12.9	8.1
Queue Length 50th (ft)	6	58	1	19	15	19
Queue Length 95th (ft)	24	160	8	60	42	88
Internal Link Dist (ft)		887		758	736	
Turn Bay Length (ft)						150
Base Capacity (vph)	1335	2579	846	1303	2476	1173
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.43	0.01	0.08	0.07	0.28
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
270: Lottsford Road & Harry S. Truman Drive










7/16/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	40	530	535	5	100	0	0	155	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor				1.00	0.95		1.00	1.00			0.95	1.00
Frt				1.00	0.92		1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3273		1770	1863			3539	1583
Flt Permitted				0.95	1.00		0.65	1.00			1.00	1.00
Satd. Flow (perm)				1770	3273		1208	1863			3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	42	558	563	5	105	0	0	163	326
RTOR Reduction (vph)	0	0	0	0	243	0	0	0	0	0	0	145
Lane Group Flow (vph)	0	0	0	42	878	0	5	105	0	0	163	181
Turn Type				Split	NA		Perm	NA			NA	Perm
Protected Phases				3	3			4			2	
Permitted Phases							4					2
Actuated Green, G (s)				21.4	21.4		15.8	15.8			15.8	15.8
Effective Green, g (s)				21.4	21.4		15.8	15.8			15.8	15.8
Actuated g/C Ratio				0.45	0.45		0.33	0.33			0.33	0.33
Clearance Time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0		3.0	3.0			6.0	6.0
Lane Grp Cap (vph)				803	1484		404	624			1185	530
v/s Ratio Prot				0.02	c0.27			0.06			0.05	
v/s Ratio Perm							0.00					c0.11
v/c Ratio				0.05	0.59		0.01	0.17			0.14	0.34
Uniform Delay, d1				7.2	9.6		10.5	11.1			10.9	11.8
Progression Factor				1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2				0.0	0.6		0.0	0.1			0.2	1.1
Delay (s)				7.2	10.3		10.5	11.2			11.1	12.9
Level of Service				A	B		B	B			B	B
Approach Delay (s)		0.0			10.2			11.2			12.3	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM Average Control Delay				10.8			HCM Level of Service				B	
HCM Volume to Capacity ratio				0.49								
Actuated Cycle Length (s)				47.2			Sum of lost time (s)				10.0	
Intersection Capacity Utilization				67.7%			ICU Level of Service				C	
Analysis Period (min)				15								
c Critical Lane Group												

Queues

280: Lottsford Road & Arena Drive

7/16/2012

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	341	685	221	448	311	495	58	400	405
v/c Ratio	0.82	0.80	0.65	0.64	1.78	0.49	0.49	0.91	0.42
Control Delay	57.1	46.3	50.7	44.5	403.4	36.2	65.9	68.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.1	46.3	50.7	44.5	403.4	36.2	65.9	68.2	7.7
Queue Length 50th (ft)	251	243	164	163	~337	156	41	280	60
Queue Length 95th (ft)	#451	#347	256	220	#551	232	89	#504	145
Internal Link Dist (ft)		719		1095		560		666	
Turn Bay Length (ft)			300		500		200		
Base Capacity (vph)	434	890	434	891	175	1002	143	451	986
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.77	0.51	0.50	1.78	0.49	0.41	0.89	0.41

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
280: Lottford Road & Arena Drive







7/16/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	515	330	130	355	240	40	295	410	60	55	380	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.91	0.91		0.91	0.91		1.00	0.95		1.00	1.00	1.00
Flt	1.00	0.97		1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.99		0.95	0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3241		1610	3286		1770	3472		1770	1863	1583
Flt Permitted	0.95	0.99		0.95	0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	3241		1610	3286		1770	3472		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	542	347	137	374	253	42	311	432	63	58	400	405
RTOR Reduction (vph)	0	17	0	0	6	0	0	9	0	0	0	114
Lane Group Flow (vph)	341	668	0	221	442	0	311	486	0	58	400	291
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	1		2	2		7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	28.8	28.8		23.5	23.5		11.0	32.0		6.4	27.4	56.2
Effective Green, g (s)	28.8	28.8		23.5	23.5		11.0	32.0		6.4	27.4	56.2
Actuated g/C Ratio	0.26	0.26		0.21	0.21		0.10	0.28		0.06	0.24	0.50
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	411	828		336	685		173	986		101	453	874
v/s Ratio Prot	c0.21	0.21		c0.14	0.13		c0.18	0.14		0.03	c0.21	0.09
v/s Ratio Perm												0.10
v/c Ratio	0.83	0.81		0.66	0.64		1.80	0.49		0.57	0.88	0.33
Uniform Delay, d1	39.6	39.3		40.9	40.8		50.9	33.6		51.8	41.1	17.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.0	5.8		4.6	2.1		381.0	0.4		4.8	18.0	0.2
Delay (s)	52.6	45.1		45.5	42.9		431.9	34.0		56.7	59.2	17.2
Level of Service	D	D		D	D		F	C		E	E	B
Approach Delay (s)		47.6			43.7			187.5			39.3	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM Average Control Delay			78.2				HCM Level of Service			E		
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			112.7				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			90.2%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues







290: Shoppers Way & Arena Drive

7/16/2012

						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	868	263	95	974	163	53
v/c Ratio	0.43	0.26	0.36	0.38	0.39	0.13
Control Delay	14.5	2.7	36.7	6.2	31.1	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	2.7	36.7	6.2	31.1	9.3
Queue Length 50th (ft)	141	0	39	94	63	0
Queue Length 95th (ft)	234	41	96	156	139	29
Internal Link Dist (ft)	494			472	436	
Turn Bay Length (ft)		150	350			
Base Capacity (vph)	2221	1091	414	2877	636	603
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.24	0.23	0.34	0.26	0.09
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
290: Shoppers Way & Arena Drive








7/16/2012

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Volume (vph)	825	250	90	925	155	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	868	263	95	974	163	53
RTOR Reduction (vph)	0	127	0	0	0	45
Lane Group Flow (vph)	868	136	95	974	163	8
Turn Type	NA	Perm	Prot	NA	NA	custom
Protected Phases	6		5	2		
Permitted Phases		6			8	8
Actuated Green, G (s)	36.1	36.1	7.1	48.2	11.2	11.2
Effective Green, g (s)	36.1	36.1	7.1	48.2	11.2	11.2
Actuated g/C Ratio	0.52	0.52	0.10	0.69	0.16	0.16
Clearance Time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1828	818	180	2440	284	254
v/s Ratio Prot	c0.25		0.05	c0.28		
v/s Ratio Perm		0.09			c0.09	0.01
v/c Ratio	0.47	0.17	0.53	0.40	0.57	0.03
Uniform Delay, d1	10.8	8.9	29.8	4.6	27.1	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3	2.8	0.3	5.5	0.2
Delay (s)	11.4	9.2	32.6	5.0	32.6	24.9
Level of Service	B	A	C	A	C	C
Approach Delay (s)	10.9			7.4	30.7	
Approach LOS	B			A	C	
Intersection Summary						
HCM Average Control Delay			11.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			69.9		Sum of lost time (s)	16.0
Intersection Capacity Utilization			49.3%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues

260: Harry S. Truman Drive & Largo Town Center Drive

7/16/2012

							
Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR
Lane Group Flow (vph)	84	453	1016	284	42	818	361
v/c Ratio	0.38	0.66	0.93	0.88	0.05	0.86	0.42
Control Delay	14.0	24.3	21.9	59.5	3.9	34.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	24.3	21.9	59.5	3.9	34.7	5.7
Queue Length 50th (ft)	0	166	75	132	0	186	32
Queue Length 95th (ft)	39	262	#428	#271	15	#292	87
Internal Link Dist (ft)		672				788	
Turn Bay Length (ft)			400				
Base Capacity (vph)	227	764	1122	326	908	1006	863
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.59	0.91	0.87	0.05	0.81	0.42

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 260: Harry S. Truman Drive & Largo Town Center Drive







7/16/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	430	965	270	0	40	0	600	520	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00		0.91	0.91			
Frt	1.00	1.00	0.85	1.00		0.85		0.97	0.85			
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00			
Satd. Flow (prot)	1770	1863	1583	1770		1583		3275	1441			
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00			
Satd. Flow (perm)	1770	1863	1583	1770		1583		3275	1441			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	453	1016	284	0	42	0	632	547	0	0	0
RTOR Reduction (vph)	81	0	489	0	0	19	0	34	130	0	0	0
Lane Group Flow (vph)	3	453	527	284	0	23	0	784	231	0	0	0
Turn Type	Prot	NA	Perm	Prot		custom		NA	pm+ov			
Protected Phases	7	4		3				2	3			
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.3	28.8	28.8	13.1		39.6		20.0	33.1			
Effective Green, g (s)	2.3	28.8	28.8	13.1		39.6		20.0	33.1			
Actuated g/C Ratio	0.03	0.39	0.39	0.18		0.54		0.27	0.45			
Clearance Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0			
Lane Grp Cap (vph)	55	726	617	314		848		886	723			
v/s Ratio Prot	0.00	0.24		c0.16				c0.24	0.06			
v/s Ratio Perm			c0.33			0.01			0.10			
v/c Ratio	0.05	0.62	0.85	0.90		0.03		0.88	0.32			
Uniform Delay, d1	34.7	18.2	20.6	29.8		8.1		25.8	13.1			
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00	1.00			
Incremental Delay, d2	0.4	1.7	11.1	27.7		0.0		10.5	0.3			
Delay (s)	35.1	19.9	31.8	57.5		8.1		36.3	13.4			
Level of Service	D	B	C	E		A		D	B			
Approach Delay (s)		28.5			51.1			29.3			0.0	
Approach LOS		C			D			C			A	
Intersection Summary												
HCM Average Control Delay			31.2									C
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			73.9							12.0		
Intersection Capacity Utilization			81.4%									D
Analysis Period (min)			15									
c Critical Lane Group												

Queues

270: Lottsford Road & Harry S. Truman Drive

7/16/2012

						
Lane Group	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	63	721	21	189	453	221
v/c Ratio	0.11	0.57	0.05	0.24	0.30	0.27
Control Delay	12.3	10.2	8.8	9.5	9.2	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	10.2	8.8	9.5	9.2	2.6
Queue Length 50th (ft)	10	43	3	27	34	0
Queue Length 95th (ft)	38	116	14	75	79	30
Internal Link Dist (ft)		887		758	736	
Turn Bay Length (ft)						150
Base Capacity (vph)	1234	2391	811	1650	3135	1428
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.30	0.03	0.11	0.14	0.15
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
270: Lottsford Road & Harry S. Truman Drive










7/16/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	60	400	285	20	180	0	0	430	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor				1.00	0.95		1.00	1.00			0.95	1.00
Frt				1.00	0.94		1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3318		1770	1863			3539	1583
Flt Permitted				0.95	1.00		0.49	1.00			1.00	1.00
Satd. Flow (perm)				1770	3318		914	1863			3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	63	421	300	21	189	0	0	453	221
RTOR Reduction (vph)	0	0	0	0	167	0	0	0	0	0	0	125
Lane Group Flow (vph)	0	0	0	63	554	0	21	189	0	0	453	96
Turn Type				Split	NA		Perm	NA			NA	Perm
Protected Phases				3	3			4			2	
Permitted Phases							4					2
Actuated Green, G (s)				14.8	14.8		19.1	19.1			19.1	19.1
Effective Green, g (s)				14.8	14.8		19.1	19.1			19.1	19.1
Actuated g/C Ratio				0.34	0.34		0.44	0.44			0.44	0.44
Clearance Time (s)				5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0		3.0	3.0			6.0	6.0
Lane Grp Cap (vph)				597	1119		398	811			1540	689
v/s Ratio Prot				0.04	c0.17			0.10			c0.13	
v/s Ratio Perm							0.02					0.06
v/c Ratio				0.11	0.50		0.05	0.23			0.29	0.14
Uniform Delay, d1				10.0	11.6		7.2	7.8			8.0	7.5
Progression Factor				1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2				0.1	0.3		0.1	0.1			0.3	0.3
Delay (s)				10.1	11.9		7.2	7.9			8.3	7.7
Level of Service				B	B		A	A			A	A
Approach Delay (s)		0.0			11.8			7.9			8.1	
Approach LOS		A			B			A			A	
Intersection Summary												
HCM Average Control Delay				9.8			HCM Level of Service				A	
HCM Volume to Capacity ratio				0.38								
Actuated Cycle Length (s)				43.9			Sum of lost time (s)				10.0	
Intersection Capacity Utilization				49.9%			ICU Level of Service				A	
Analysis Period (min)				15								
c Critical Lane Group												

Queues

280: Lottsford Road & Arena Drive

7/16/2012

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	469	1136	76	503	200	779	132	332	595
v/c Ratio	0.90	1.05	0.24	0.76	1.04	0.92	0.87	0.89	0.63
Control Delay	63.5	83.4	46.1	57.2	132.3	57.5	105.6	76.1	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.5	83.4	46.1	57.2	132.3	57.5	105.6	76.1	20.2
Queue Length 50th (ft)	415	~572	60	221	~184	286	112	273	281
Queue Length 95th (ft)	#674	#758	110	287	#357	#422	#246	#458	441
Internal Link Dist (ft)		719		1095		560		666	
Turn Bay Length (ft)			300		500		200		
Base Capacity (vph)	523	1081	374	781	192	871	151	389	938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	1.05	0.20	0.64	1.04	0.89	0.87	0.85	0.63






















Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
280: Lottford Road & Arena Drive






7/16/2012

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	495	825	205	80	435	35	190	415	325	125	315	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.91	0.91		0.91	0.91		1.00	0.95		1.00	1.00	1.00
Flt	1.00	0.97		1.00	0.99		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3286		1610	3350		1770	3306		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	3286		1610	3350		1770	3306		1770	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	521	868	216	84	458	37	200	437	342	132	332	595
RTOR Reduction (vph)	0	13	0	0	4	0	0	105	0	0	0	35
Lane Group Flow (vph)	469	1123	0	76	499	0	200	674	0	132	332	560
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	1		2	2		7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	42.1	42.1		25.3	25.3		14.0	29.0		11.0	26.0	68.1
Effective Green, g (s)	42.1	42.1		25.3	25.3		14.0	29.0		11.0	26.0	68.1
Actuated g/C Ratio	0.33	0.33		0.20	0.20		0.11	0.22		0.09	0.20	0.53
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	524	1069		315	655		191	741		150	374	906
v/s Ratio Prot	0.29	c0.34		0.05	c0.15		c0.11	c0.20		0.07	0.18	0.20
v/s Ratio Perm												0.15
v/c Ratio	0.90	1.05		0.24	0.76		1.05	0.91		0.88	0.89	0.62
Uniform Delay, d1	41.5	43.7		43.9	49.2		57.7	48.9		58.5	50.3	21.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	17.6	41.6		0.4	5.2		78.1	15.0		39.7	21.6	1.3
Delay (s)	59.1	85.3		44.3	54.4		135.8	64.0		98.3	71.8	22.8
Level of Service	E	F		D	D		F	E		F	E	C
Approach Delay (s)		77.6			53.1			78.6			47.6	
Approach LOS		E			D			E			D	
Intersection Summary												
HCM Average Control Delay			67.0				HCM Level of Service			E		
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			129.4				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			93.0%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

290: Shoppers Way & Arena Drive

7/16/2012







						
Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Group Flow (vph)	1258	595	132	1079	279	205
v/c Ratio	0.74	0.59	0.65	0.46	0.71	0.40
Control Delay	21.7	6.1	52.8	8.3	42.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	6.1	52.8	8.3	42.6	6.9
Queue Length 50th (ft)	295	37	72	144	145	0
Queue Length 95th (ft)	378	121	#142	187	232	54
Internal Link Dist (ft)	494			472	436	
Turn Bay Length (ft)		150	350			
Base Capacity (vph)	1746	1022	226	2403	432	541
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.58	0.58	0.45	0.65	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
290: Shoppers Way & Arena Drive

7/16/2012

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Volume (vph)	1195	565	125	1025	265	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1258	595	132	1079	279	205
RTOR Reduction (vph)	0	246	0	0	0	159
Lane Group Flow (vph)	1258	349	132	1079	279	46
Turn Type	NA	Perm	Prot	NA	NA	custom
Protected Phases	6		5	2		
Permitted Phases		6			8	8
Actuated Green, G (s)	41.8	41.8	10.0	56.8	19.2	19.2
Effective Green, g (s)	41.8	41.8	10.0	56.8	19.2	19.2
Actuated g/C Ratio	0.48	0.48	0.12	0.66	0.22	0.22
Clearance Time (s)	5.5	5.5	5.0	5.5	5.0	5.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	1710	765	205	2324	393	351
v/s Ratio Prot	c0.36		c0.07	0.30		
v/s Ratio Perm		0.22			c0.16	0.03
v/c Ratio	0.74	0.46	0.64	0.46	0.71	0.13
Uniform Delay, d1	17.9	14.8	36.5	7.3	31.1	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	1.2	6.8	0.4	8.4	0.5
Delay (s)	20.2	16.0	43.3	7.8	39.5	27.4
Level of Service	C	B	D	A	D	C
Approach Delay (s)	18.9			11.6	34.4	
Approach LOS	B			B	C	
Intersection Summary						
HCM Average Control Delay			18.5		HCM Level of Service	B
HCM Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			86.5		Sum of lost time (s)	15.5
Intersection Capacity Utilization			67.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Appendix 8
Traffic Analysis for Davey Street Road Diet

**KITTELSON & ASSOCIATES, INC.**

TRANSPORTATION ENGINEERING / PLANNING

36 S Charles Street, Suite 1920, Baltimore, MD 21201 410.347.9610 410.347.9611

MEMORANDUM

Date: May 25, 2012 Project #: 11788

To: Cipriana Thompson
Chief, Traffic Design & Planning Section
Prince George's County Department of Public Works & Transportation

From: Zachary Horowitz, PE; Yolanda Takesian, AICP; and Caitlin Doolin

Project: M-NCPPC Central Avenue TOD Mobility Study

Subject: Davey Street Road Diet

The Maryland National Capital Park and Planning Commission (M-NCPPC) is evaluating transportation enhancement options for Phase III of the Central Avenue Transit Oriented Development (TOD) Mobility Study. Kittelson & Associates, Inc. (KAI) has been scoped to evaluate transportation improvements and options that improve mobility within the Central Avenue (MD 214) corridor.

This memorandum evaluates the traffic impacts of implementing a "road diet" on Davey Street, which would primarily involve reducing Davey Street to one lane in each direction from Central Avenue to Southern Avenue SE. The traffic analysis indicates that a road diet on Davey Street from Central Avenue to Southern Avenue SE would have little impact on traffic operations..

Analysis Methodology and Results

KAI completed an analysis of the AM and PM peak hour traffic volumes on two intersections: East Capitol Street Extended/Davey Street and Davey Street/Capitol Heights Boulevard. The analysis evaluated and compared the operational results of existing conditions and a "road diet" scenario along Davey Street.

The road diet would modify Davey Street approaches at East Capitol Street Extended/Davey Street and Davey Street/Capitol Heights Boulevard to a single lane in each direction. No changes would be made to the geometry on East Capitol Street Extended or Capitol Heights Boulevard.

Traffic volumes were collected in 2011 and 2012 at the two intersections for the AM and PM peak periods. These traffic counts show relatively low traffic volumes along both the eastern and western segments of Davey Streets, with peak-hour bi-directional volumes of just over 500 vehicles on the most heavily traveled portion of Davey Street (west of Capitol Heights Boulevard). Volumes in this

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range are considerably lower than typical thresholds for 2-lane streets. The traffic counts used as part of this analysis are attached as an appendix to this memorandum.

Synchro 7 was used to develop the traffic operations model and evaluate operations using procedures from the Highway Capacity Manual (HCM). Synchro 7 incorporates the HCM analysis for unsignalized intersections for operational evaluations. The HCM analysis calculates the delay and Level of Service (LOS) for the stopped approaches of unsignalized intersections. A summary of the LOS and per vehicle delay for the existing conditions and road diet scenario are reported in Table 1.

Table 1 Summary of Intersection Operations for Existing and Road Diet Conditions along Davey Street

	East Capitol Street Extended/Davey Street		Davey Street/Capitol Heights Boulevard	
Existing				
Approach	LOS	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)
Northbound	D (E)	26.9 (39.7)	B (C)	14.2 (18.4)
Southbound	F (F)	51.1 (126.1)	B (C)	12.8 (15.9)
Road Diet				
Approach	LOS	Delay (sec/vehicle)	LOS	Delay (sec/vehicle)
Northbound	D (F)	29.2 (77.8)	C (C)	15.4 (18.7)
Southbound	F (F)	51.1 (126.1)	B (C)	13.3 (17.0)

¹AM (PM)

²For analysis purposes, North Akin Avenue was removed from the intersection in the Synchro model as the HCM unsignalized analysis cannot be performed on intersections with more than four legs. The volume on Akin Avenue in the AM and PM peak hours did not exceed 10 vehicles. Additional vehicles were added to other movements at the intersection to compensate for this adjustment.

Conclusions

The analysis indicates that the southbound approaches at Central Avenue/Davey Street would remain unchanged in the road diet scenario while the northbound approach would degrade from LOS E to LOS F in the PM peak hour. This primary reason for this is the reduction of the northbound approach from two lanes to one. The road diet configuration would trap northbound right-turning vehicles behind the small number of vehicles attempting to turn left onto Central Avenue or cross Central Avenue to continue north on Davey Street.

As the delay for the left-turning or through vehicles on the approach is expected to be high, most drivers would quickly realize that it would be faster to travel out-of-direction to Southern Avenue and then north to access Central Avenue. Alternatively, the northbound approach could be striped with both a right turn lane and a through-left lane, thus eliminating any impact to northbound delay.

The analysis at the intersection of Davey Street/Capitol Heights Boulevard shows that the road diet scenario would very slightly increase per vehicle delay for the northbound and southbound approaches. Based on the results it is unlikely that drivers would be able to perceive the small increase in delay shown from the analysis results.

Overall, given the relatively low volumes on Davey Street, reducing the street cross-section as part of a road diet treatment to a single lane in each direction would have little to no impact on vehicular

M-NCPPC Central Avenue TOD Mobility Study
May 25, 2012

Project #: 11788
Page 3

traffic operations. This is particularly true, assuming that the northbound approach to East Capitol Street Extended/Davey Street be striped with two lanes (a through-left and a dedicated right turn lane).

We trust that this memorandum adequately addresses the planning-level operations associated with a road diet on Davey Street. Should you have any questions or concerns, please do not hesitate to contact us at (703) 885-8970.

Appendix 9
Costing Details for Short-Term

The following costs associated with the short term implementation projects are to be considered as planning level probably costs. A detailed engineering and costing study for each of the projects should be undertaken.

S1: Traffic signal on Central Avenue at entrance to Addition Road Metrorail station

Detailed information and assumptions are not available for this project.

S2: Traffic signal on Central Avenue at Cabin Branch Road

Detailed information and assumptions are not available for this project.

S3: Central High School Sidewalk and Campus Entrance Improvements

CENTRAL AVENUE SHORT TERM IMPROVEMENTS OPINION OF PROBABLE COST

Item	Quantity	Unit	2012 Unit Cost	Total Cost	Assumptions
Mobilization (10%)	1.00	LS	\$29,560.00	\$29,560.00	A lump sum mobilization cost (including mobilization and demobilization) for the project.
	RTD	CY			
Earthwork, Excavation, Grading			\$25.00	\$20,250.00	Assume excavation and grading is required to 2 feet depth, approximately 1 foot depth (provision for sidewalk construction) in sidewalk areas. Assume 100% for sidewalk construction for (100%) of the sidewalk length.
Remove Curb & Gutter	190	LF	\$20.00	\$3,800.00	
Concrete Sidewalk (5" Thickness)	11,420	SF	\$7.50	\$85,650.00	
Curb and Gutter	200	LF	\$70.00	\$14,000.00	
Detectable Warning Materials	48	ST	\$30.00	\$1,440.00	Assume detectable warning materials (dome) at all crossings (including those with existing sidewalks).
Thermoplastic Pavement Marking (all widths up to 24")	170	LF	\$3.00	\$510.00	
24" Thermoplastic Pavement Marking	220	LF	\$6.50	\$1,430.00	
Thermoplastic Pavement Marking (Symbol or Text)	6	EA	\$250.00	\$1,500.00	Assume 6 symbols for the 24" and 24" markings.
Rapid Flash Beacon Assembly (set of 4)	1	EA	\$75,000.00	\$75,000.00	Cost from the utility work items and items in the bid package (see bid package).
High School Sign Relocation	1	EA	\$3,500.00	\$3,500.00	
Utility Pole Relocation	4	EA	\$13,500.00	\$54,000.00	Cost from the utility work items and items in the bid package.
Lump Sum Items					
Construction Survey (25%)	1.00	LS	\$31,662.00	\$31,662.00	
Drainage (5%)	1.00	LS	\$7,907.00	\$7,907.00	
ERS (5%)	1.00	LS	\$10,554.00	\$10,554.00	
Maintenance of Traffic (10%)	1.00	LS	\$21,108.00	\$21,108.00	
Additional Utility Adjustments (10%)	1.00	LS	\$21,108.00	\$21,108.00	
			Subtotal	\$388,000	
			30% Contingency	\$99,900	
			Total Estimated Cost	\$487,900	

Note: This cost estimate is a planning level estimate only.

S5: Corridor-wide Bus Stop Improvements

Detailed information and assumptions are not available for this project.

S6: Davey Street Road Diet

CENTRAL AVENUE SHORT TERM IMPROVEMENTS OPINION OF PROBABLE COST

Item	Quantity	Unit	2012 Unit Cost	Total Cost	
Mobilization (10%)	1.00	LS	\$59,690.00	\$59,690.00	Assume percentage taken total sum of all low items and lump sum items.
	550	CY			Assume curb extensions/traffic reduction area excavated to 2 foot depth, replace with 1 foot depth brick work for sidewalk and all other included in sidewalk price.
Earthwork, Excavation, Grading			\$25.00	\$13,750.00	Assume 1 foot depth excavation and OS replacement of fill at brick crosswalk.
Remove Curb & Gutter	1,280	LF	\$20.00	\$25,600.00	
Milling	6,500	SY	\$8.00	\$52,000.00	Assume 2" depth removal.
Asphalt	740	TOW	\$75.00	\$55,500.00	Assume 2" depth replacement.
Concrete Sidewalk (5" Thickness)	8,250	SF	\$7.50	\$61,875.00	
Aggregate Base	60	CY	\$30.00	\$1,800.00	Assume 0.5 foot depth underneath brick crosswalks.
Brick Paving	2,750	SF	\$15.00	\$41,250.00	Assume 10 foot wide crosswalk area.
Curb and Gutter	1,480	LF	\$70.00	\$103,600.00	
Detectable Warning Materials	90	SF	\$30.00	\$2,700.00	Assume detectable warnings are added at all crossings (including those with existing curb ramps).
Catch Basin Relocation and Pipe Connection	14	EA	\$5,000.00	\$70,000.00	
	5,790	LF			Assume crosswalk parallel lines (including brick crosswalks), and lines for the corridor's length for bike lane installation (keep existing double yellow centerline).
Thermoplastic Pavement Marking (all widths up to 24")			\$3.00	\$17,370.00	
24" Thermoplastic Pavement Marking	630	LF	\$6.50	\$4,095.00	
Thermoplastic Pavement Marking (Symbol or Text)	19	EA	\$250.00	\$4,750.00	Bike lane symbol (arrow and bike symbol counted together as one).
Lump Sum Items					
Construction Survey (15%)	1.00	LS	\$68,144.00	\$68,144.00	
E&S (5%)	1.00	LS	\$22,715.00	\$22,715.00	
Maintenance of Traffic (10%)	1.00	LS	\$45,429.00	\$45,429.00	
Utility Adjustments (10%)	1.00	LS	\$45,429.00	\$45,429.00	
			Subtotal	\$695,700	

S5:

30% Contingency \$208,710
Total Estimated Cost \$905,000

Note: This cost estimate is a planning level estimate only.

S7: Corridor-wide Bus Stop Improvements

Detailed information and assumptions are not available for this project.

S8: Watts Branch Trail Connection

CENTRAL AVENUE SHORT TERM IMPROVEMENTS OPINION OF PROBABLE COST

Item	Quantity	Unit	2012 Unit Cost	Total Cost	
Mobilization (10%)	1.00	LS	\$21,680.00	\$21,680.00	Estimate based on 10% of total project cost for mobilization activities.
	1080	CY			Assume only minimum depth excavation for 3 feet depth, replace with 1 foot depth (wall built for roadway installation) provided in driveway (20%). Landscaping cost associated to 3 feet depth and replaced with 3 feet depth.
Earthwork, Excavation, Grading			\$25.00	\$27,000.00	
Remove Curb & Gutter	700	LF	\$20.00	\$14,000.00	
Eradication of Pavement Marking	3600	LF	\$1.50	\$5,400.00	
Concrete Sidewalk (5" Thickness)	5,440	SF	\$7.50	\$40,800.00	
Curb and Gutter	620	LF	\$70.00	\$43,400.00	
	120	SF			Assume detection warning (see detail in drawings) include 120 SF with existing sidewalk. Assume material covered the full width of the 100 SF area access to Mixed-Use Drive.
Detectable Warning Materials			\$30.00	\$3,600.00	
Catch Basin Relocation and Pipe Connection	5	JA	\$5,000.00	\$25,000.00	
Thermoplastic Pavement Marking (all widths up to 24")	300	LF	\$3.00	\$900.00	
24" Thermoplastic Pavement Marking	500	LF	\$6.50	\$3,250.00	
Seed & Mulch	480	SY	\$3.00	\$1,440.00	
Lump Sum Items					
Construction Survey (15%)	1.00	LS	\$24,719.00	\$24,719.00	
E&S (5%)	1.00	LS	\$8,740.00	\$8,740.00	
Maintenance of Traffic (10%)	1.00	LS	\$16,479.00	\$16,479.00	
Utility Adjustments (10%)	1.00	LS	\$16,479.00	\$16,479.00	
			Subtotal	\$252,400	

30% Contingency \$75,720
Total Estimated Cost \$329,000

Note: This cost estimate is a planning level estimate only.

ACKNOWLEDGEMENTS

Maryland-National Capital Park and Planning Commission

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