# Report on Regional Traffic Analysis and Forest Drive Traffic Studies

Presentation to the City of Annapolis Planning Commission
July 7, 2016

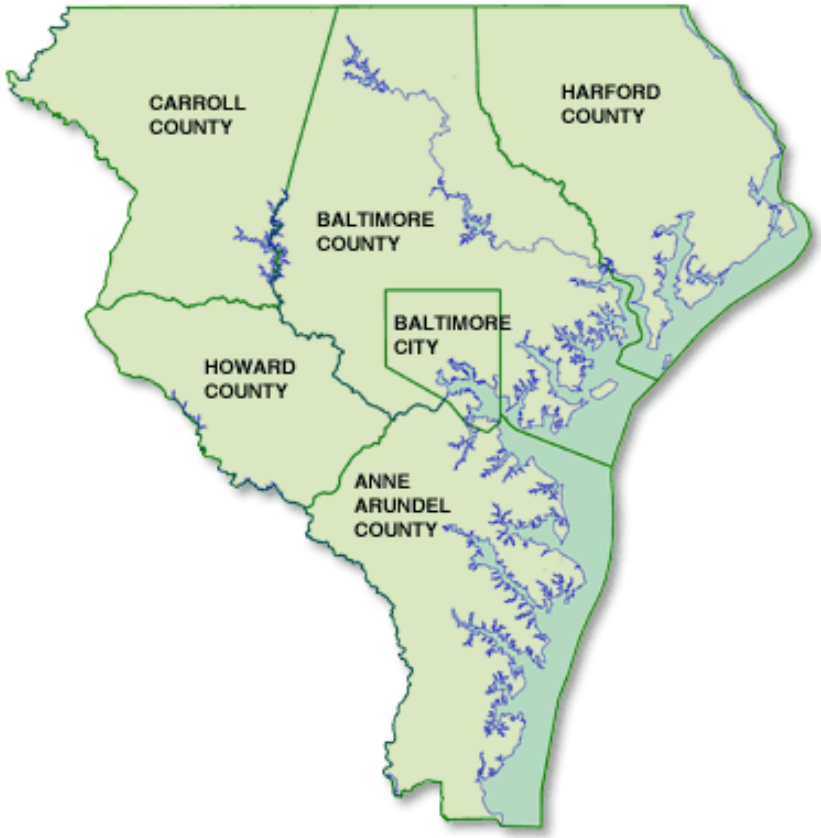
Sally Nash
Pete Gutwald

# Report on Regional Traffic Analysis and Forest Drive Traffic Studies

1. Regional Approach
   - BMC/BRTB
   - Regional Model
2. Corridor Studies
3. Traffic Impact Studies

# Regional Approach—The BMC

Baltimore Metropolitan Council




The Baltimore Metropolitan Council was formed in 1992.

It is a nonprofit organization that works with the region's elected executives to identify mutual interests and develop collaborative strategies, plans and programs that will help improve the quality of life and economic vitality.

# The Baltimore Regional Transportation Board

The BRTB is the federally designated Metropolitan Planning Organization for transportation planning in the Baltimore region.

The BRTB is staffed and coordinated through the Baltimore Metropolitan Council.

@maximize2040

maximize2040

A PERFORMANCE-BASED TRANSPORTATION PLAN

for a greater Baltimore Region

# Traffic Analysis Zone (TAZ)

The unit of geography most commonly used in conventional transportation planning models. The size of a zone varies, but for a typical metropolitan planning software, a zone of under 3000 people is common.

Zones are constructed by census block information. Typically these blocks are used in transportation models by providing socio-economic data including:

- number of automobiles per household
- household income
- employment

# Regional Planning Districts and Transportation Analysis Zones

# State Highway Administration

The Traffic Monitoring System (TMS) Team administers the Maryland State Highway Administration's Traffic Monitoring Program. The program is responsible for the collection, processing, analysis, summarization, and dissemination of Maryland highway traffic data and is supported by a comprehensive, user friendly, management information computer database system.

**MARYLAND DEPARTMENT OF TRANSPORTATION**
**STATE HIGHWAY ADMINISTRATION**
**DATA SERVICES ENGINEERING DIVISION**
**ANNUAL AVERAGE DAILY TRAFFIC (AADT) 2009-2015**

**Anne Arundel**

As of: 06/21/2016

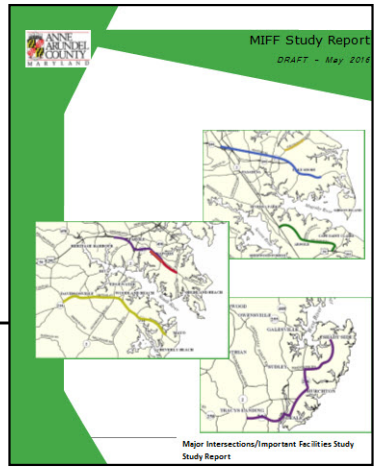
| ROUTE | ROADNAME | LOCATION | BEGIN MP | END MP | LOCATION_DESCRIPTION | AADT 2009 | AADT 2010 | AADT 2011 | AADT 2012 | AADT 2013 | AADT 2014 | AADT 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 5455 | NATIONAL BUSINESS PKWY | S2011020262 | 1.75 | 1.94 | BROCK BRIDGE RD TO MD 175 | | | | | | ***13,510*** | 13,861 |
| CO 5459 | NAJOLES RD | S2011020794 | 0.00 | 0.88 | DICUS MILL RD TO BENFIELD BLVD | | | ***4,040*** | 4,011 | 4,022 | 4,013 | 4,124 |
| CO 5461 | VETERANS HWY | S2012021530 | 0.07 | 1.77 | MD 178 TO MD 3C | | | | | ***11,200*** | 11,171 | 11,462 |
| CO 5461 | VETERANS HWY | S2009020037 | 1.77 | 4.33 | MD 3 C TO MD 3 BU | | | | | ***19,070*** | 19,011 | 19,512 |
| CO 5463 | N BESTGATE RD | S2011020772 | 0.08 | 0.28 | MD 70C (BACK) TO RIDGELY AVE | | | ***7,450*** | 7,391 | 7,412 | 7,393 | 7,594 |
| CO 5464 | FOREST DR | B0768 | 0.00 | 0.77 | MD 665 (BACK)/BYWATER RD TO MD 387 | 39,131 | 39,372 | ***36,530*** | 36,241 | 36,312 | ***33,510*** | 34,381 |
| CO 5464 | FOREST DR | B0769 | 0.77 | 1.73 | MD 387 TO FOREST HILLS AVE | 41,361 | 41,612 | ***37,790*** | 37,491 | 37,572 | ***34,910*** | 35,821 |
| CO 5464 | FOREST DR | B0770 | 1.73 | 2.29 | FOREST HILLS AVE TO HILLSMERE DR | 30,221 | 30,402 | ***28,140*** | 27,921 | 27,982 | ***29,040*** | ***31,110*** |

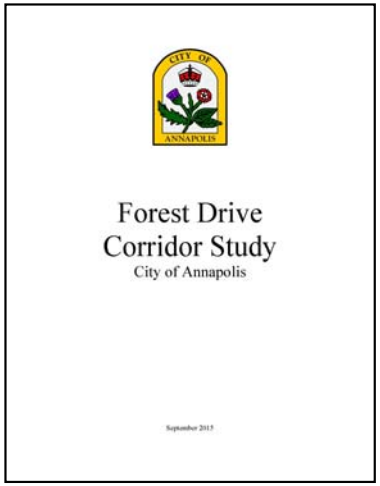
# Corridor Studies

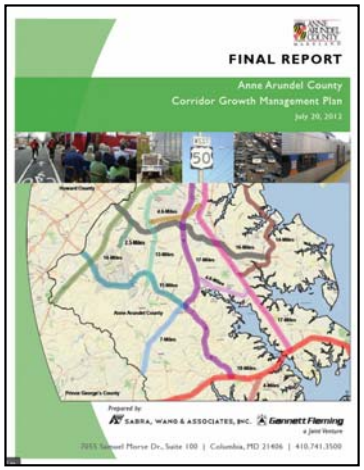
A corridor study is a targeted analytical study that addresses specific needs of a corridor or particular geographic area.

# Corridor Studies

- Major Intersections and Important Facilities Study (Underway) Anne Arundel County, 2016
- Forest Drive Corridor Study (Needs updating) City of Annapolis P&Z, 2014
- Corridor Growth Management Plan (Approved) Anne Arundel County, 2012



# Major Intersections and Important Facilities Study

This study looks at seven key corridors County-wide using the regional model. The corridors in City limits are Forest Drive from Chinquapin Round Road to Bay Ridge Avenue (2.5 miles) and MD 665 (Aris T. Allen Boulevard) from US 50 to Chinquapin Round Road (2.7 miles).

**Recommendations**:

**Transit**

- Extension of MTA commuter bus service from Riva Rd. to Bay Ridge Ave.
- Explore Bus Rapid Transit or Light Rail Transit service from Annapolis Town Center
- Improve transit amenities including bus shelters and real time bus information

**Bicycle and Pedestrian**

- Add bike lanes on Forest D. including segment from MD 2 to Chinquapin Round Rd.
- Construct missing sidewalk connections

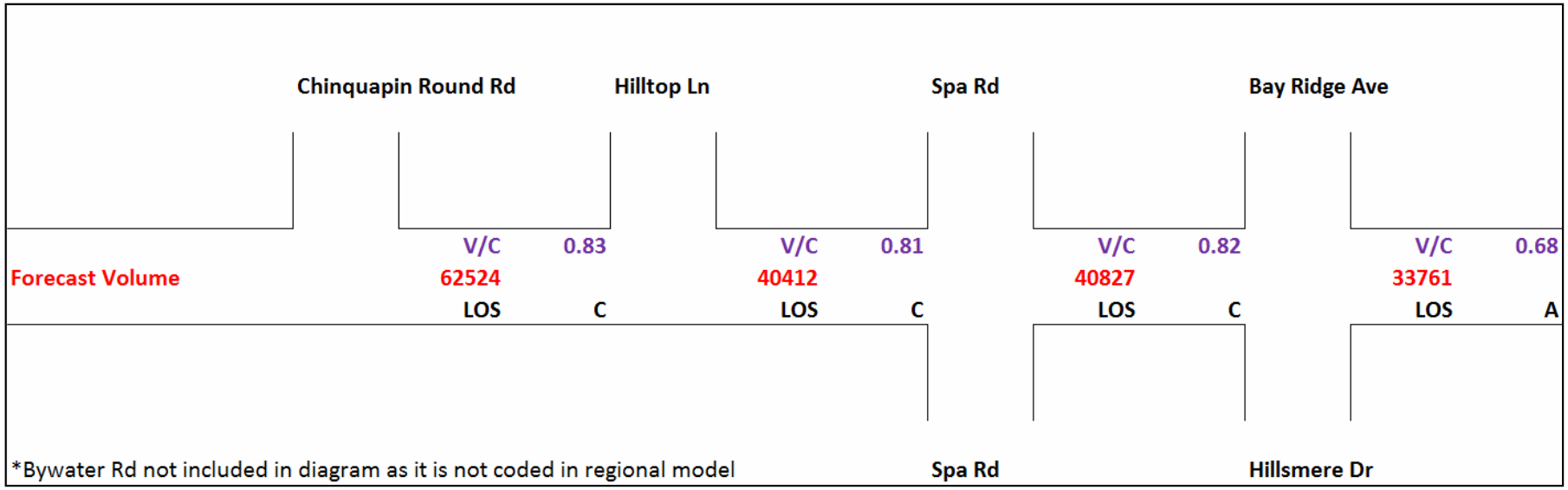
**Land Use**

- Allow for increased density and transit-oriented development in Town Center area
- Future development should occur in New Urbanism fashion with complete streets network

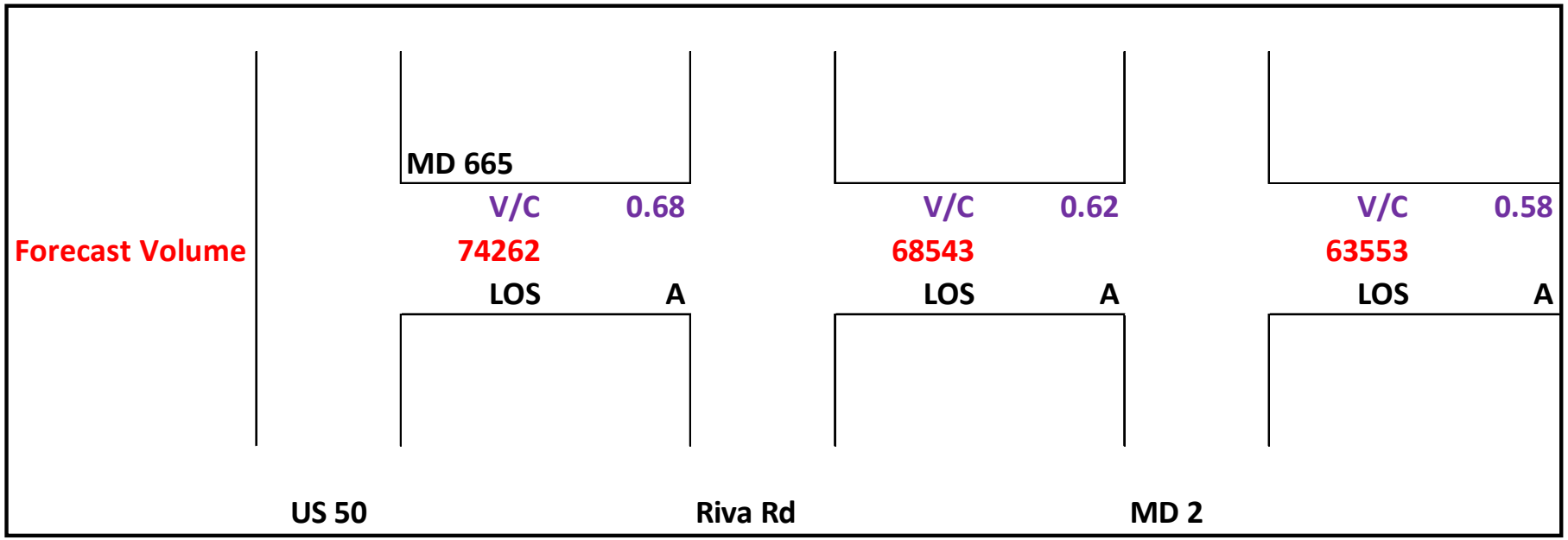
**Toolbox Elements**

- Signal System coordination and optimization
- Real Time Travel Time Information on Changeable Message Signs
- Special Event/Evacuation signal timing plan
- Access Management Plan

# Forest Drive 2035 AADT and LOS




# MD 665 2035 AADT and LOS



# Forest Drive Corridor Study

This study uses Synchro and SimTraffic Software. It is a hybrid between a corridor study and a traffic impact study.

Synchro: Macroscopic analysis that uses HCM analysis methodology for capacity calculations.

SimTraffic: Microscopic model.

1. Stop & Shop
2. Quiet Waters Preserve
3. Village Greens
4. Rocky Gorge
5. Bay Village
6. 1503 Forest Drive
7. Crystal Springs
8. Rodgers Property

NOT TO SCALE

TRAFFIC CONCEPTS, INC.
325 Gambrills Road
Suite B
Gambrills, Maryland 21054
410-923-7101

Background Development Locations

**FOREST DRIVE CORRIDOR ANALYSIS – HCM 2000 RESULTS**
**September 2015**
**Prepared By: Traffic Concepts, Inc.**


| INTERSECTION | EXISTING CONDITION | | FUTURE CONDITION NO IMPRS | | FUTURE CONDITION APF IMPRS | | FUTURE CONDITION ALL IMPRS | |
|---|---|---|---|---|---|---|---|---|
| | AM | PM | AM | PM | AM | PM | AM | PM |
| Forest Drive @ Chinquapin Round Rd | | | | | | | | |
| Eastbound | 14.9(B) | 23.3(C) | 15.5(B) | 32.0(C) | 15.5(B) | 32.0(C) | 13.3(B) | 20.6(C) |
| Westbound | 11.8(B) | 20.5(C) | 11.6(B) | 24.7(C) | 11.7(B) | 26.0(C) | 8.7(A) | 18.8(B) |
| Southbound | 34.3(C) | 38.7(D) | 40.1(D) | 41.5(D) | 40.1(D) | 41.5(D) | 38.7(D) | 39.5(D) |
| Overall Intersection | 15.5(B) | 25.2(C) | 16.3(B) | 30.8(C) | 16.4(B) | 31.4(C) | 13.9(B) | 23.5(C) |
| Forest Drive @ Bywater Road | | | | | | | | |
| Eastbound | 67.9(E) | 65.0(E) | 68.9(E) | 63.7(E) | 68.9(E) | 63.7(E) | 68.9(E) | 63.7(E) |
| Westbound | 70.9(E) | 0.0(A) | 70.9(E) | 0.0(A) | 70.9(E) | 0.0(A) | 70.9(E) | 0.0(A) |
| Northbound | 15.0(B) | 8.6(A) | 58.0(E) | 13.2(B) | 58.9(E) | 13.0(B) | 56.7(E) | 11.6(B) |
| Southbound | 12.2(B) | 8.7(A) | 15.8(B) | 31.4(C) | 15.8(B) | 31.4(C) | 16.2(B) | 16.3(B) |
| Overall Intersection | 19.0(B) | 12.3(B) | 43.5(D) | 26.3(C) | 43.9(D) | 26.2(C) | 42.9(D) | 17.6(B) |
| Forest Drive @ S Cherry Grove Ave | | | | | | | | |
| Eastbound | 6.2(A) | 10.0(A) | 6.2(A) | 83.1(F) | 6.2(A) | 82.1(F) | 6.3(A) | 9.5(A) |
| Westbound | 7.0(A) | 15.2(B) | 8.9(A) | 14.8(B) | 8.6(A) | 13.9(B) | 8.1(A) | 16.7(B) |
| Northbound | 60.9(E) | 61.2(E) | 61.8(E) | 61.8(E) | 61.8(E) | 61.8(E) | 61.8(E) | 61.8(E) |
| Southbound | 66.4(E) | 108.6(F) | 67.9(E) | 132.3(F) | 67.9(E) | 132.3(F) | 67.9(E) | 85.4(F) |
| Overall Intersection | 9.6(A) | 15.7(B) | 11.0(B) | 53.9(D) | 10.8(B) | 53.1(D) | 10.6(B) | 15.9(B) |
| Forest Drive @ Hilltop Lane | | | | | | | | |
| Eastbound | 14.3(B) | 5.4(A) | 14.4(B) | 3.8(A) | 14.4(B) | 4.9(A) | 15.4(B) | 6.6(A) |
| Westbound | 8.9(A) | 12.5(B) | 12.5(B) | 16.9(B) | 20.0(B) | 15.3(B) | 11.3(B) | 20.0(B) |
| Southbound | 45.8(D) | 35.4(D) | 46.0(D) | 35.3(D) | 46.0(D) | 35.3(D) | 46.0(D) | 35.3(D) |
| Overall Intersection | 17.0(B) | 13.2(B) | 18.2(B) | 13.2(B) | 21.5(C) | 13.3(B) | 18.1(B) | 15.6(B) |
| Forest Drive @ Proposed Access for Crystal Springs | | | | | | | | |
| Eastbound | N/A | N/A | N/A | N/A | 5.0(A) | 8.9(A) | 7.1(A) | 10.0(B) |
| Westbound | N/A | N/A | N/A | N/A | 2.5(A) | 12.7(B) | 0.6(A) | 12.6(B) |
| Northbound | N/A | N/A | N/A | N/A | 68.5(E) | 81.0(F) | 63.9(E) | 81.0(F) |
| Overall Intersection | N/A | N/A | N/A | N/A | 6.0(A) | 17.6(B) | 5.5(A) | 18.6(B) |

**FOREST DRIVE CORRIDOR ANALYSIS – HCM 2000 RESULTS**
**September 2015**
**Prepared By: Traffic Concepts, Inc.**


| INTERSECTION | EXISTING CONDITION | | FUTURE CONDITION NO IMPRS | | FUTURE CONDITION APF IMPRS | | FUTURE CONDITION ALL IMPRS | |
|---|---|---|---|---|---|---|---|---|
| | AM | PM | AM | PM | AM | PM | AM | PM |
| Forest Drive @ Spa Road | | | | | | | | |
| Eastbound | 13.5(B) | 5.8(A) | 17.3(B) | 32.7(C) | 20.4(C) | 7.7(A) | 23.7(C) | 8.1(A) |
| Westbound | 21.3(C) | 4.8(A) | 46.0(D) | 10.7(B) | 31.6(C) | 12.9(B) | 15.7(B) | 11.9(B) |
| Northbound | 80.7(F) | 82.2(F) | 116.9(F) | 109.9(F) | 82.0(F) | 94.1(F) | 60.6(E) | 94.1(F) |
| Southbound | 78.5(E) | 73.0(E) | 97.5(F) | 93.5(F) | 97.5(F) | 82.3(F) | 67.8(E) | 82.3(F) |
| Overall Intersection | 30.1(C) | 17.1(B) | 49.5(D) | 37.6(D) | 39.6(D) | 24.3(C) | 28.0(C) | 24.2(C) |
| Forest Drive @ Gemini Drive | | | | | | | | |
| Eastbound | 62.7(E) | 62.2(E) | 62.7(E) | 62.2(E) | 62.7(E) | 62.2(E) | 62.7(E) | 62.2(E) |
| Westbound | 58.3(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) |
| Northbound | 2.2(A) | 7.2(A) | 7.9(A) | 13.5(B) | 3.8(A) | 2.1(A) | 2.9(A) | 10.5(B) |
| Southbound | 3.7(A) | 1.3(A) | 4.3(A) | 1.6(A) | 5.1(A) | 2.5(A) | 3.9(A) | 2.1(A) |
| Overall Intersection | 5.5(A) | 5.4(A) | 8.7(A) | 9.1(A) | 6.8(A) | 5.4(A) | 5.8(A) | 8.3(A) |
| Forest Drive @ Youngs Farm Road | | | | | | | | |
| Eastbound | 64.7(E) | 66.7(E) | 64.5(E) | 65.2(E) | 64.5(E) | 65.2(E) | 64.5(E) | 65.2(E) |
| Westbound | 65.8(E) | 66.8(E) | 66.1(E) | 65.3(E) | 66.1(E) | 65.3(E) | 66.1(E) | 65.3(E) |
| Northbound | 1.9(A) | 1.0(A) | 3.3(A) | 4.4(A) | 2.8(A) | 1.6(A) | 2.3(A) | 2.7(A) |
| Southbound | 1.6(A) | 2.8(A) | 2.4(A) | 1.5(A) | 2.0(A) | 2.7(A) | 3.4(A) | 1.9(A) |
| Overall Intersection | 2.8(A) | 2.5(A) | 3.9(A) | 3.1(A) | 3.4(A) | 2.6(A) | 3.8(A) | 2.6(A) |
| Forest Drive @ Tyler Avenue | | | | | | | | |
| Eastbound | 9.4(A) | 4.0(A) | 10.3(B) | 1.9(A) | 11.6(B) | 6.5(A) | 10.0(B) | 1.4(A) |
| Westbound | 5.1(A) | 1.5(A) | 6.3(A) | 1.6(A) | 7.0(A) | 2.3(A) | 7.5(A) | 1.6(A) |
| Northbound | 65.2(E) | 64.3(E) | 65.8(E) | 64.4(E) | 65.8(E) | 64.4(E) | 65.8(E) | 64.4(E) |
| Southbound | 53.0(D) | 58.9(E) | 52.6(D) | 59.4(E) | 52.6(D) | 59.4(E) | 52.6(D) | 59.4(E) |
| Overall Intersection | 10.3(B) | 5.9(A) | 11.2(B) | 4.5(A) | 12.1(B) | 7.4(A) | 11.7(B) | 4.2(A) |
| Forest Drive @ Annapolis Neck Road | | | | | | | | |
| Eastbound | N/A | N/A | N/A | N/A | 2.7(A) | 1.3(A) | 1.8(A) | 2.3(A) |
| Westbound | N/A | N/A | N/A | N/A | 3.1(A) | 2.0(A) | 5.0(A) | 2.0(A) |
| Northbound | N/A | N/A | N/A | N/A | 68.5(E) | 67.8(E) | 68.5(E) | 67.8(E) |
| Southbound | N/A | N/A | N/A | N/A | 57.2(E) | 62.0(E) | 57.2(E) | 62.0(E) |
| Overall Intersection | N/A | N/A | N/A | N/A | 5.4(A) | 3.1(A) | 6.1(A) | 3.6(A) |

**FOREST DRIVE CORRIDOR ANALYSIS – HCM 2000 RESULTS**
**September 2015**
**Prepared By: Traffic Concepts, Inc.**


| INTERSECTION | EXISTING CONDITION | | FUTURE CONDITION NO IMPRS | | FUTURE CONDITION APF IMPRS | | FUTURE CONDITION ALL IMPRS | |
|---|---|---|---|---|---|---|---|---|
| | AM | PM | AM | PM | AM | PM | AM | PM |
| Forest Drive @ Spa Road | | | | | | | | |
| Eastbound | 13.5(B) | 5.8(A) | 17.3(B) | 32.7(C) | 20.4(C) | 7.7(A) | 23.7(C) | 8.1(A) |
| Westbound | 21.3(C) | 4.8(A) | 46.0(D) | 10.7(B) | 31.6(C) | 12.9(B) | 15.7(B) | 11.9(B) |
| Northbound | 80.7(F) | 82.2(F) | 116.9(F) | 109.9(F) | 82.0(F) | 94.1(F) | 60.6(E) | 94.1(F) |
| Southbound | 78.5(E) | 73.0(E) | 97.5(F) | 93.5(F) | 97.5(F) | 82.3(F) | 67.8(E) | 82.3(F) |
| Overall Intersection | 30.1(C) | 17.1(B) | 49.5(D) | 37.6(D) | 39.6(D) | 24.3(C) | 28.0(C) | 24.2(C) |
| Forest Drive @ Gemini Drive | | | | | | | | |
| Eastbound | 62.7(E) | 62.2(E) | 62.7(E) | 62.2(E) | 62.7(E) | 62.2(E) | 62.7(E) | 62.2(E) |
| Westbound | 58.3(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) | 58.0(E) |
| Northbound | 2.2(A) | 7.2(A) | 7.9(A) | 13.5(B) | 3.8(A) | 2.1(A) | 2.9(A) | 10.5(B) |
| Southbound | 3.7(A) | 1.3(A) | 4.3(A) | 1.6(A) | 5.1(A) | 2.5(A) | 3.9(A) | 2.1(A) |
| Overall Intersection | 5.5(A) | 5.4(A) | 8.7(A) | 9.1(A) | 6.8(A) | 5.4(A) | 5.8(A) | 8.3(A) |
| Forest Drive @ Youngs Farm Road | | | | | | | | |
| Eastbound | 64.7(E) | 66.7(E) | 64.5(E) | 65.2(E) | 64.5(E) | 65.2(E) | 64.5(E) | 65.2(E) |
| Westbound | 65.8(E) | 66.8(E) | 66.1(E) | 65.3(E) | 66.1(E) | 65.3(E) | 66.1(E) | 65.3(E) |
| Northbound | 1.9(A) | 1.0(A) | 3.3(A) | 4.4(A) | 2.8(A) | 1.6(A) | 2.3(A) | 2.7(A) |
| Southbound | 1.6(A) | 2.8(A) | 2.4(A) | 1.5(A) | 2.0(A) | 2.7(A) | 3.4(A) | 1.9(A) |
| Overall Intersection | 2.8(A) | 2.5(A) | 3.9(A) | 3.1(A) | 3.4(A) | 2.6(A) | 3.8(A) | 2.6(A) |
| Forest Drive @ Tyler Avenue | | | | | | | | |
| Eastbound | 9.4(A) | 4.0(A) | 10.3(B) | 1.9(A) | 11.6(B) | 6.5(A) | 10.0(B) | 1.4(A) |
| Westbound | 5.1(A) | 1.5(A) | 6.3(A) | 1.6(A) | 7.0(A) | 2.3(A) | 7.5(A) | 1.6(A) |
| Northbound | 65.2(E) | 64.3(E) | 65.8(E) | 64.4(E) | 65.8(E) | 64.4(E) | 65.8(E) | 64.4(E) |
| Southbound | 53.0(D) | 58.9(E) | 52.6(D) | 59.4(E) | 52.6(D) | 59.4(E) | 52.6(D) | 59.4(E) |
| Overall Intersection | 10.3(B) | 5.9(A) | 11.2(B) | 4.5(A) | 12.1(B) | 7.4(A) | 11.7(B) | 4.2(A) |
| Forest Drive @ Annapolis Neck Road | | | | | | | | |
| Eastbound | N/A | N/A | N/A | N/A | 2.7(A) | 1.3(A) | 1.8(A) | 2.3(A) |
| Westbound | N/A | N/A | N/A | N/A | 3.1(A) | 2.0(A) | 5.0(A) | 2.0(A) |
| Northbound | N/A | N/A | N/A | N/A | 68.5(E) | 67.8(E) | 68.5(E) | 67.8(E) |
| Southbound | N/A | N/A | N/A | N/A | 57.2(E) | 62.0(E) | 57.2(E) | 62.0(E) |
| Overall Intersection | N/A | N/A | N/A | N/A | 5.4(A) | 3.1(A) | 6.1(A) | 3.6(A) |

# Traffic Impact Studies

A traffic study is a detailed examination and analysis of a transportation system supported by data collection.

The process is as follows:

- A study starts with the identification and definition of a transportation problem, followed by data collection and analysis.
- A study is typically performed to explore a specific aspect of, or question about, a transportation system

*--Institute of Transportation Engineers*

# Warrant for a Traffic Impact Study

A key trigger for conducting a traffic impact study is "trip generation." The trip generation of a proposed development is the number of inbound and outbound vehicle trips expected to be generated by the proposed development during an average day or during a peak period. A project must have a traffic impact study if:

- The proposed development and/or additions to existing structure is expected to generate **four hundred daily trips** or more based upon trip generation rates published in the latest edition of the *Trip Generation Manual*, published by the Institute of Transportation Engineers (ITE)
- There are current traffic problems or issues in the project area
- The proposed entrances and exits from the site are too close to an intersection

The report shall be prepared under the supervision of a registered professional civil engineer (PE) or Professional Transportation Planner (PTP).

# Definitions

- Average Daily Traffic
- Capacity
- Existing Traffic
- Peak Period
- Traffic Impact
- Trip
- Trip assignment
- Trip distribution
- Trip generation
- Volume-to-Capacity Ratio (V/C)

# Structure of a Study

Existing Conditions

- Traffic counts & analysis
- Existing Lane Configuration Sketch

Background Conditions, without site

- Annual Growth in traffic to build year, if appropriate.
- Traffic generated by other approved developments.
- Background Analysis (Background Traffic = Existing Traffic + Growth in Existing Traffic + Approved Development)
- Background analysis with approved projects

Projected Conditions, with site

- Traffic generated by the proposed development (i.e. site generated traffic) at build out, and/or at any significant stage of development.
- Total Traffic Analysis (Total Traffic = Existing + Growth + Approved Development + Site Generated)
- Analyze total traffic with improvements

Conclusions/Recommendations

- Explain results of analysis
- The consultant shall suggest reasonable improvements to mitigate the site traffic impacts.

# Existing Conditions

Existing traffic volume should be based on current count information.

Average three- to seven-day machine counts should be used to determine daily and peak volumes along roadway segments and peak hour turning movement counts should be used to determine peak intersection volumes.

Peak hour turning movement counts should be based on the highest four 15-minute intervals for AM and PM from a 72-hour period of counts. Where the AM and PM peak periods are well-established for a particular intersection(s) as a result of regular traffic volume counts 72-hour period of traffic counts may not be required.

Other peak periods may be specified in addition to, or in place of, the morning/evening peak periods under the following conditions:

- peak period traffic in the study area occurs at different time of the day (noon time, weekdays)
- unusual peaking characteristics of the proposed development (e.g. theater).
- Where appropriate, seasonal factors may be used to adjust actual traffic counts with the approval of the Department of Planning & Zoning.

# Background Traffic

Also called non-site traffic, background traffic volume refers to the amount of traffic that will be on the roadway network in the project area without the proposed development.

Sources of background traffic include:

- a 4% annual growth in traffic to build year or historic growth trend along the corridor
- traffic generated by other approved developments

# Projected Conditions

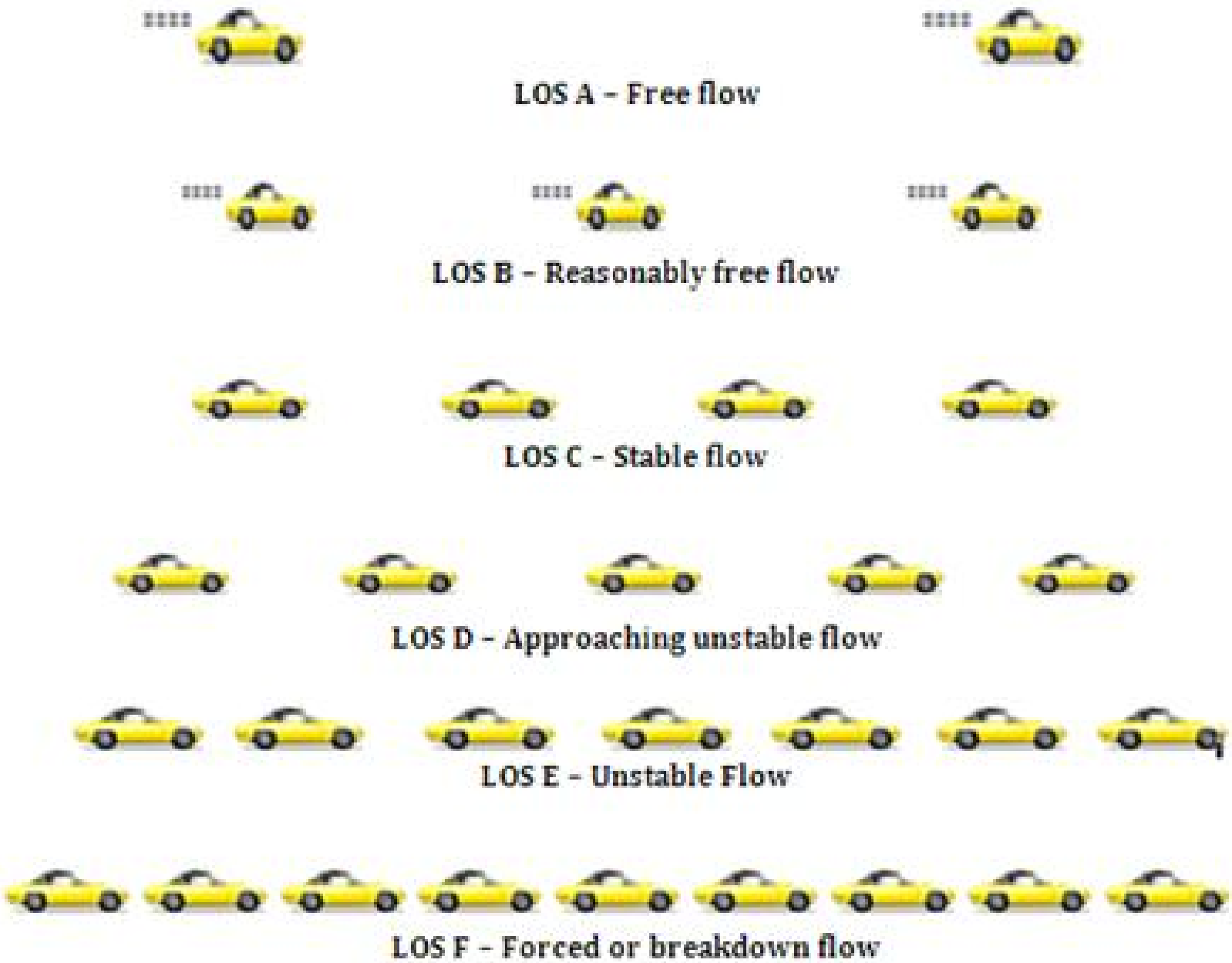
- Traffic generated by the proposed development (i.e. site generated traffic) at build out, and/or at any significant stage of development.
- Total Traffic Analysis (Total Traffic = Existing + Growth + Approved Development + Site Generated)
- Analyze total traffic with improvements

# Level of Service

A qualitative measure describing operational conditions within a traffic stream. Generally described in terms of such factors as

- speed and travel time,
- delay,
- freedom to maneuver,
- traffic interruptions,
- comfort and convenience, and
- safety

Levels of Service (LOS) at signalized intersections are defined in terms of average control delay per vehicle, (also called signal delay). Delay is a measure of driver discomfort, frustration, fuel consumption and lost of travel time. Delay is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio (the amount of green time given to an approach) and the v/c ratio for the lane group.




http://www.roads.maryland.gov/Index.aspx?PageId=828

# Mitigation

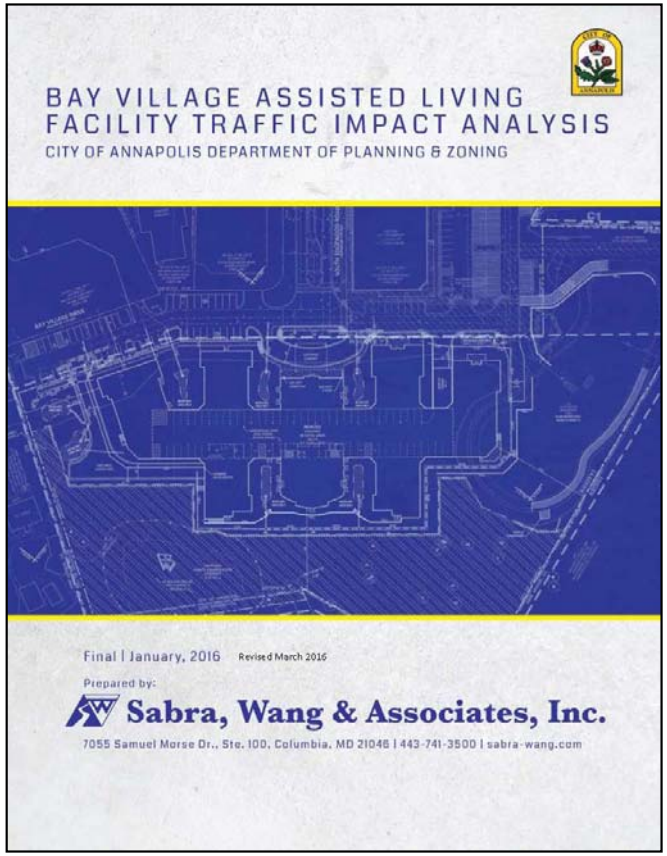
Mitigation means the construction and/or funding of roadway and/or improvements to off-site road facilities by the developer.

Improvements are required if the proposed development brings the level of service to a D or below. If the LOS already is D or below, the proposed development cannot further degrade the LOS.

# Traffic Impact Studies for Proposed Projects on and near Forest Drive

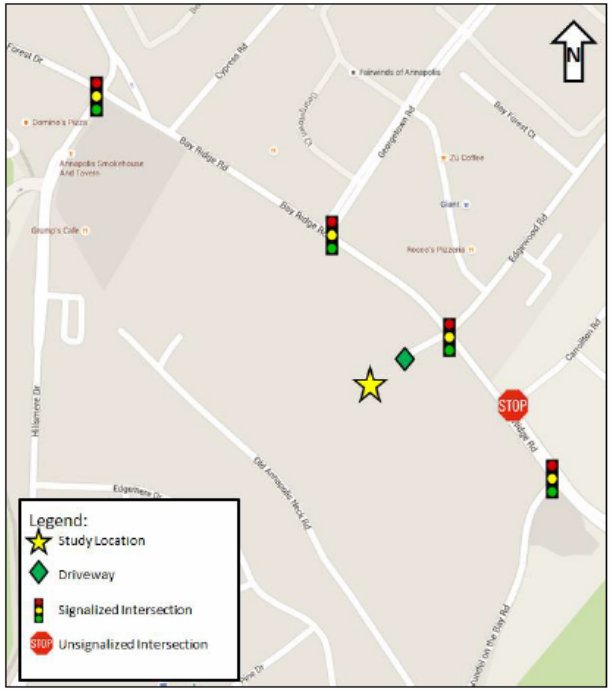
- Traffic Impact Analysis for the Bay Village Assisted Living Development/979 Bay Village Drive (Accepted), 2016
- Rodgers Property Traffic Impact Study/Bembe Beach Road (Needs updating pending application review), 2014
- Quiet Waters Preserve Traffic Impact Study/Annapolis Neck Road (Accepted), 2014
- Stop and Shop/948 Bay Ridge Road (Accepted), 2013
- Crystal Springs Traffic Impact Study (Needs updating pending application review), 2012

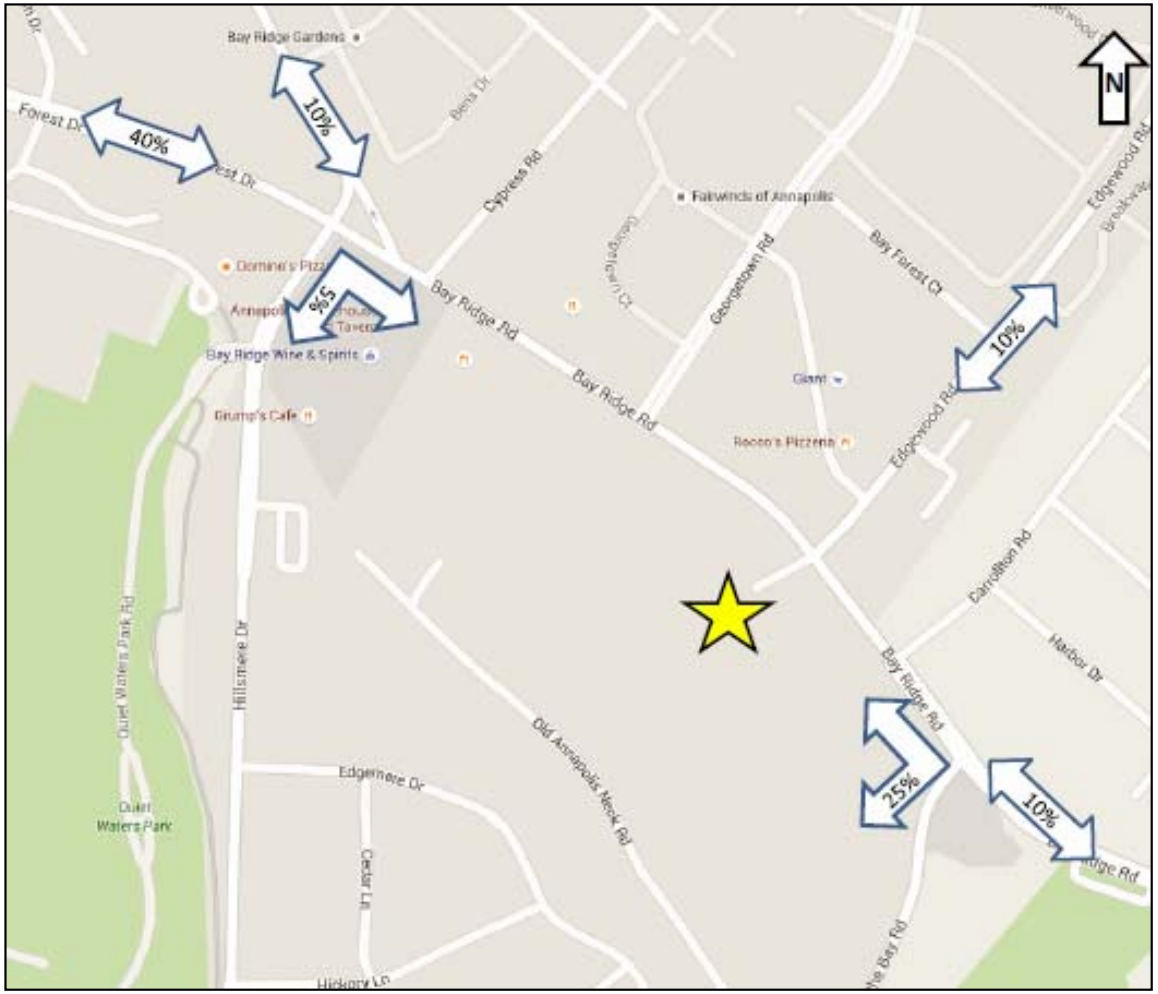
# Example: Bay Village Assisted Living Development / 979 Bay Village Drive



A 92,020 square feet Bay Village Assisted Living development is proposed on the site. The development will house 88 units, and will include 24 surface parking spaces and 66 underground spaces. The project is expected to be completed by 2017.

# Example: Bay Village Assisted Living Development / 979 Bay Village Drive



# Example: Bay Village Assisted Living Development / 979 Bay Village Drive

**Table 2: Existing Conditions Analysis**

| # | Intersection | Movement | Existing - AM (PM) {Saturday} | | | |
|---|---|---|---|---|---|---|
| | | | Level of Service | Delay/Veh (sec) | Volume/Capacity Ratio | 95th Percentile Queue Length (ft) |
| 1 | Bay Ridge Rd & Bay Ridge Ave / Hillsmere Dr | **Overall** | **D (D) {D}** | **39.4 (37.0) {36.4}** | **0.65 (0.71) {0.62}** | - |
| | | Eastbound | C (C) {C} | 24.7 (30.8) {25.9} | 0.46 (0.60) {0.58} | 340 (485) {386} |
| | | Westbound | D (C) {C} | 37.1 (22.2) {30.1} | 0.64 (0.54) {0.53} | 199 (200) {205} |
| | | Northbound | E (E) {D} | 55.2 (56.8) {51} | 0.72 (0.70) {0.61} | 364 (251) {288} |
| | | Southbound | E (E) {D} | 60.8 (58.2) {48.3} | 0.64 (0.69) {0.78} | 140 (155) {156} |
| 2 | Bay Ridge Rd & Georgetown Rd | **Overall** | **B (B) {B}** | **11.8 (11.7) {18.0}** | **0.62 (0.57) {0.79}** | - |
| | | Eastbound | A (A) {B} | 6.6 (5.7) {12.5} | 0.62 (0.59) {0.80} | 180 (179) {576} |
| | | Westbound | A (A) {A} | 5.5 (5.7) {8.0} | 0.48 (0.33) {0.45} | 196 (141) {251} |
| | | Southbound | E (E) {D} | 65.7 (63.0) {54.9} | 0.45 (0.16) {0.61} | 174 (136) {391} |
| 3 | Bay Ridge Rd & Edgewood Rd | **Overall** | **B (C) {C}** | **18.0 (25.4) {25.5}** | **0.56 (0.75) {0.74}** | - |
| | | Eastbound | B (B) {B} | 13.5 (15) {15.3} | 0.57 (0.64) {0.73} | 170 (147) {183} |
| | | Westbound | B (B) {C} | 11.8 (18.9) {26.9} | 0.46 (0.33) {0.47} | 150 (108) {190} |
| | | Northbound | E (F) {F} | 66.5 (183.7) {96.1} | 0.29 (1.04) {0.76} | 50 (106) {80} |
| | | Southbound | D (D) {D} | 72.7 (53.1) {39.4} | 0.32 (0.21) {0.67} | 136 (130) {142} |
| 4 | Bay Ridge Rd & Carrollton Rd | Southbound | C (B) {A} | 16.8 (12.5) {8.3} | 0.27 (0.12) {0.05} | 75 (49) {47} |
| 5 | Bay Ridge Rd & Arundel on the Bay Rd | **Overall** | **B (A) {A}** | **17.3 (9.9) {9.3}** | **0.70 (0.50) {0.40}** | - |
| | | Eastbound | B (A) {A} | 10.0 (6.6) {5.7} | 0.35 (0.48) {0.32} | 165 (173) {133} |
| | | Westbound | C (B) {A} | 21.7 (13.5) {9.3} | 0.50 (0.30) {0.28} | 158 (142) {107} |
| | | Northbound | C (B) {B} | 20.5 (15.3) {16.6} | 0.82 (0.52) {0.52} | 379 (210) {205} |
| 6 | Bay Village Dr & Edgewood Rd | Eastbound | A (A) {A} | 0.0 (0.0) {0.0} | 0.00 (0.00) {0.00} | 0 (0) {0} |
| | | Westbound | A (A) {A} | 0.0 (0.0) {0.0} | 0.00 (0.00) {0.00} | 0 (0) {0} |
| | | Southbound | A (A) {A} | 7.2 (7.4) {7.5} | 0.03 (0.03) {0.03} | 40 (47) {50} |

# Example: Bay Village Assisted Living Development / 979 Bay Village Drive

**Table 5: Future Total Traffic Conditions Analysis**

| # | Intersection | Movement | 2017 No-Build - AM (PM) {Saturday} | | | | 2017 Build - AM (PM) {Saturday} | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Level of Service | Delay/Veh (sec) | Volume/Capacity Ratio | 95th Percentile Queue Length (ft) | Level of Service | Delay/Veh (sec) | Volume/Capacity Ratio | 95th Percentile Queue Length (ft) |
| 1 | Bay Ridge Rd & Bay Ridge Ave / Hillsmere Dr | **Overall** | **D (D) {D}** | **40.8 (40.7) {38.2}** | **0.69 (0.77) {0.73}** | **-** | **D (D) {D}** | **40.8 (41.0) {38.0}** | **0.70 (0.78) {0.73}** | **-** |
| | | Eastbound | C (D) {C} | 26.3 (36.5) {29.8} | 0.53 (0.85) {0.72} | 359 (603) {452} | C (D) {C} | 26.3 (36.9) {30.3} | 0.56 (0.86) {0.73} | 382 (608) {482} |
| | | Westbound | D (C) {C} | 40.7 (28.2) {33.3} | 0.72 (0.61) {0.64} | 196 (208) {202} | D (C) {C} | 40.8 (29) {32.4} | 0.74 (0.62) {0.64} | 195 (206) {206} |
| | | Northbound | E (E) {D} | 55.9 (57) {51.9} | 0.72 (0.73) {0.61} | 344 (257) {302} | E (E) {D} | 56 (57) {51.5} | 0.67 (0.70) {0.72} | 374 (264) {312} |
| | | Southbound | E (E) {D} | 60.3 (58.8) {48.8} | 0.62 (0.73) {0.83} | 145 (160) {155} | E (E) {D} | 60.3 (58.9) {48.8} | 0.61 (0.69) {0.73} | 138 (154) {153} |
| 2 | Bay Ridge Rd & Georgetown Rd | **Overall** | **B (B) {B}** | **11.8 (11.7) {19.7}** | **0.68 (0.65) {0.86}** | **-** | **B (B) {B}** | **11.7 (11.6) {19.9}** | **0.68 (0.65) {0.87}** | **-** |
| | | Eastbound | A (A) {B} | 6.6 (7.4) {15} | 0.68 (0.67) {0.86} | 201 (278) {304} | A (A) {B} | 6.6 (7.3) {15.2} | 0.68 (0.68) {0.87} | 200 (260) {439} |
| | | Westbound | A (A) {A} | 5.9 (4.8) {7.7} | 0.53 (0.37) {0.52} | 243 (177) {224} | A (A) {A} | 5.7 (4.8) {7.7} | 0.53 (0.37) {0.52} | 229 (193) {263} |
| | | Southbound | E (E) {E} | 68.2 (63.0) {63.0} | 0.55 (0.16) {0.73} | 178 (138) {360} | E (E) {E} | 68.2 (63.0) {64.1} | 0.55 (0.16) {0.74} | 176 (157) {444} |
| 3 | Bay Ridge Rd & Edgewood Rd | **Overall** | **B (C) {C}** | **18.9 (28.6) {27.0}** | **0.61 (0.81) {0.79}** | **-** | **B (C) {C}** | **19.2 (34.6) {32.0}** | **0.62 (0.93) {0.86}** | **-** |
| | | Eastbound | B (B) {B} | 13.3 (19.3) {17.8} | 0.62 (0.70) {0.79} | 184 (184) {199} | B (C) {C} | 13.5 (24.0) {21.6} | 0.63 (0.77) {0.85} | 177 (169) {200} |
| | | Westbound | B (C) {C} | 14.6 (20.6) {29.8} | 0.51 (0.39) {0.56} | 188 (124) {218} | B (C) {C} | 14.8 (24.9) {34.9} | 0.52 (0.43) {0.63} | 183 (123) {224} |
| | | Northbound | E (F) {F} | 67.0 (224.6) {97.0} | 0.29 (1.15) {0.76} | 50 (103) {75} | E (F) {F} | 67.1 (245.7) {140.9} | 0.35 (1.29) {0.96} | 56 (112) {93} |
| | | Southbound | D (D) {D} | 50 (52.4) {38.2} | 0.32 (0.38) {0.67} | 143 (135) {148} | D (D) {D} | 50.2 (53.9) {38.6} | 0.35 (0.43) {0.68} | 171 (147) {161} |
| 4 | Bay Ridge Rd & Carrollton Rd | Southbound | C (B) {A} | 18.6 (13.7) {8.3} | 0.30 (0.14) {0.05} | 71 (47) {49} | C (B) {A} | 18.6 (13.8) {8.3} | 0.30 (0.14) {0.05} | 98 (53) {50} |
| 5 | Bay Ridge Rd & Arundel on the Bay Rd | **Overall** | **B (B) {B}** | **19.7 (10.6) {10.1}** | **0.75 (0.56) {0.48}** | **-** | **B (B) {B}** | **19.8 (10.1) {10.3}** | **0.75 (0.57) {0.48}** | **-** |
| | | Eastbound | B (A) {A} | 10.7 (7.3) {6.7} | 0.39 (0.55) {0.40} | 161 (204) {158} | B (A) {A} | 10.6 (6.4) {7.1} | 0.40 (0.56) {0.40} | 162 (188) {159} |
| | | Westbound | C (B) {B} | 22.0 (15.0) {11.3} | 0.54 (0.36) {0.34} | 163 (140) {123} | C (B) {B} | 22.1 (15.2) {11.3} | 0.54 (0.37) {0.34} | 173 (151) {122} |
| | | Northbound | C (B) {B} | 25.5 (15.4) {15.7} | 0.88 (0.57) {0.57} | 418 (237) {242} | C (B) {B} | 25.8 (15.3) {15.8} | 0.88 (0.58) {0.57} | 411 (246) {267} |
| 6 | Bay Village Dr & Edgewood Rd | Eastbound | A (A) {A} | 0.0 (0.0) {0.0} | 0.00 (0.00) {0.00} | 0 (0) {0} | A (A) {A} | 7.2 (7.3) {7.4} | 0.01 (0.02) {0.02} | 22 (38) {40} |
| | | Westbound | A (A) {A} | 0.0 (0.0) {0.0} | 0.00 (0.00) {0.00} | 0 (0) {0} | A (A) {A} | 0.0 (0.0) {0.0} | 0.00 (0.00) {0.00} | 0 (0) {0} |
| | | Southbound | A (A) {A} | 7.2 (7.4) {7.5} | 0.03 (0.03) {0.03} | 43 (48) {47} | A (A) {A} | 7.0 (7.4) {7.5} | 0.04 (0.07) {0.11} | 48 (49) {49} |

# Example: Bay Village Assisted Living Development / 979 Bay Village Drive

**Summary of Findings**

- The proposed site will have its primary full movement entrance from a garage driveway off of Bay Village Drive. The site has direct access to Bay Ridge Road via Edgewood Road.
- Existing Traffic Counts were conducted in the late Fall of 2015. No intersections currently have a failing Level of Service (LOS). The northbound approach of Edgewood Road at Bay Ridge Drive is currently failing.
- Background developments and regional growth in through traffic were evaluated to analyze the 2017 No-build condition.
- A total of 16 AM peak hour trips, 32 PM peak hour trips, and 29 Saturday peak hour trips are expected for the proposed Assisted Living Center.
- The study area intersections continue to have an acceptable LOS in the 2017 No-Build and 2017 Build scenarios. Changes in intersection queue lengths throughout the overall study area, due to the development and background conditions, are negligible.
- The northbound approach of Edgewood Road and Bay Ridge Road continues to fail in the PM and Saturday time frames for Year 2017 No-Build and 2017 Build scenarios, as well as for the existing conditions scenario, despite short queue lengths. Given the very low volume and the short 95% queue lengths for the northbound approach, no mitigation is recommended

# Questions?

Contact Information:

snash@annapolis.gov
pgutwald@annapolis.gov