



WELLS + ASSOCIATES

MEMORANDUM

TO: George Phillips, AICP
Senior Transportation Planner
Loudoun County Office of Transportation Services

COPY: Ms. Joanna C. Beitzel
Arris Montessori Academic Services, LLC

Robert Sevila
Sevila, Saunders, Huddleston & White, P.C.

FROM: Christopher Turnbull

DATE: June 22, 2009

SUBJECT: Arris Montessori School Traffic Impact Analysis
44675 Cape Court # 189-3 - Special Exception
Loudoun County, Virginia

INTRODUCTION

Arris Montessori Academic Services, LLC is seeking a Special Exception (SPEX) to permit a private school with up to 175 students within the Beaumeade Technology Campus in Ashburn, Virginia. Beaumeade Technology Campus is located north of Waxpool Road (Route 625) and west of Loudoun County Parkway (Route 607). Access to the school is provided primarily from Cape Court, a local roadway that intersects Loudoun County Parkway.

The building is built and zoned Planned Development-Industrial Park (PD-IP) with an approved Special Exception to allow all office use. Arris Montessori School LLC is seeking a Special Exception (SPEX) to permit a private school to occupy 12,300 square feet (SF) of the building.

For purposes of this analysis, the school was assumed to be operational by September 2009.

This memorandum has been prepared to document the transportation impacts associated with the Special Exception.

The traffic analysis was conducted in accordance with Loudoun County's Facilities Standards Manual (FSM) and through discussions with the Loudoun County Office of Transportation Services (OTS). A scope of work letter is provided in Attachment A. The study intersection per the scoping letter is Loudoun County Parkway (Route 607) and Cape Court.

BACKGROUND DATA

Public Road Network

Regional access to the site is provided by Loudoun County Parkway (Route 607). Local and primary access to the site is provided by Cape Court. Secondary access is provided by Beaumeade Circle through interparcel connections.

Loudoun County Parkway (Route 607) in the vicinity of the study intersection is a four-lane, median-divided roadway with a posted speed limit of 45 mph. Right and left turn pockets are provided at the study intersection.

Cape Court is a two-lane undivided local road which provides access to a portion of the Beaumeade Technology campus. At its intersection with Loudoun County Parkway, Cape Court is controlled by a stop sign for Cape Court.

The existing lane usage and traffic control is shown on Figure I.

Existing Traffic Counts

Existing AM and PM peak hour traffic counts were completed by Wells + Associates on Thursday, June 11, 2009 at the study intersection.

The counts are included in Attachment B and summarized on Figure I.

The counts indicate that the AM peak hour occurred between 7:30 and 8:30 AM and the PM peak hour occurred between 5:00 and 6:00 PM. Loudoun County Parkway (Route 607) presently carries 1,072 AM peak hour trips and 1,379 PM peak hour trips just south of the intersection. 714 (67%) of all motorists travel southbound in the morning and 951 (69%) travel northbound in the evening.

Hazardous Locations

A review of the study area revealed no apparent hazardous locations.

ANALYSIS

Existing Levels of Service

Existing intersection levels of service were calculated based on the existing lane use and traffic control, traffic volumes shown on Figure 1, and the 2000 Highway Capacity Manual (HCM) capacity analysis methodology. The results are presented in Attachment C and summarized in Table 1.

Level of Service (LOS) “D” is the minimum acceptable level of service in Loudoun County, Virginia, according to the FSM.

As shown in Table 1, each of the critical movements at the unsignalized study intersection currently operate at acceptable levels of service during both the AM and PM peak hours.

Background Trip Generation

To establish future background conditions, trips generated by vacant office space within the subject building including full enrollment of another private school (Ideal Schools) were estimated and assigned to the local roadway network. Ideal Schools occupies a suite within the building and received a special exception in 2008 to allow for a 60 student private school.

Based on a review of the site, approximately 11,790 square feet of the subject office building is currently unoccupied. In addition, Ideal Schools’ enrollment included 12 of the 60 students based information provided by the school. Additional trips for the vacant office space and 48 Ideal School students were estimated using standard Institute of Transportation Engineers (ITE), 7th Edition, Trip Generation rates and/or equations and shown on Table 2.

These additional office and school trips would generate a total of 72 AM peak hour and 100 PM peak hour trips.

Trip Distribution Analysis

The distribution of background and site generated peak hour trips was determined based on existing trips accessing Cape Court, the local roadway network, and engineering judgment. It is estimated that approximately thirty five (35) percent of background and site traffic generated trips would approach the site from the north on Loudoun County Parkway, and sixty-five (65) percent from the south on Loudoun County Parkway.

The above noted background trips were assigned to the public roadway network according to the directional distribution. These trips were then added to existing peak hour trips to yield total background peak hour traffic forecasts and shown on Figure 2.

Background Levels of Service

Background peak hour intersection levels of service were analyzed based on the existing lane usage and traffic control shown on Figure 1, total background traffic forecasts shown on Figure 2, and the 2000 HCM intersection capacity analysis methodology. The results are presented in Attachment C and summarized in Table 1.

As shown in Table 1, each of the critical movements at the unsignalized study intersection would continue to operate at acceptable levels of service during both the AM and PM peak hours under total future conditions.

Site Trip Generation Analysis

The number of trips generated by the proposed Arris Montessori School was estimated based on standard Institute of Transportation Engineers (ITE), 8th Edition, Trip Generation rates and/or equations and rates determined by W+A for a similar facility. The similar facility is the Holly Brook Montessori School located in Fairfax, Virginia. Data for this school has recently been provided for a study in the Dulles South area. The observed rates were used for the AM peak hour and the ITE rates used for the PM peak hour to provide a conservative approach to the analysis of future conditions. The resulting trip generation analysis is shown on Table 2.

The proposed school with 175 students is estimated to generate approximately 178 total trips during the AM peak hour and 107 total trips during the PM peak hour.

COMPLIANCE WITH VDOT CHAPTER 527 GUIDELINES

Based on the trip generation analysis, the Montessori School use proposed with the special exception is estimated to generate less than the 250 peak hour trips and 2,500 daily trip thresholds and would therefore be exempt from the Chapter 527 Guidelines.

Site Traffic Assignments

The site-generated traffic volumes for the school were assigned to the public roadway network according to the directional distribution described above. The resulting site generated traffic assignments are shown on Figure 2.

Total Future Traffic Forecasts

The site traffic assignments shown on Figure 2 were added to total background peak hour forecasts to yield total future traffic forecasts also shown on Figure 2.

Total Future Levels of Service

Total future peak hour intersection levels of service were analyzed based on the existing lane usage and traffic control shown on Figure 1, the total future traffic forecasts shown on Figure 2, and the 2000 HCM intersection capacity analysis methodology. The results are presented in Attachment C and summarized in Table I.

As shown in Table I, each of the critical movements at the unsignalized study intersection would continue to operate at acceptable levels of service during both the AM and PM peak hours under total future conditions.

Table I

Arris Montessori School

Peak Hour Intersection Levels of Service⁽¹⁾

| Intersection/Link | Control | Approach/ Movement | <u>Existing Conditions</u> | | <u>Background</u> | | <u>Total Future</u> | |
|---|---------|-----------------------|----------------------------|---------------------|---------------------|---------------------|----------------------|---------------------|
| | | | AM | PM | AM | PM | AM | PM |
| Route 607 (Loudoun County Parkway)/ Cape Court | STOP | EBLR NBL | B [12.4] A [9.6] | B [13.0] A [8.3] | B [13.4] A [9.9] | C [15.2] A [8.3] | C [17.4] B [10.6] | C [18.8] A [8.5] |

Note:

(1) Numbers in brackets [] indicate delay in seconds per vehicle for stop-controlled intersections.

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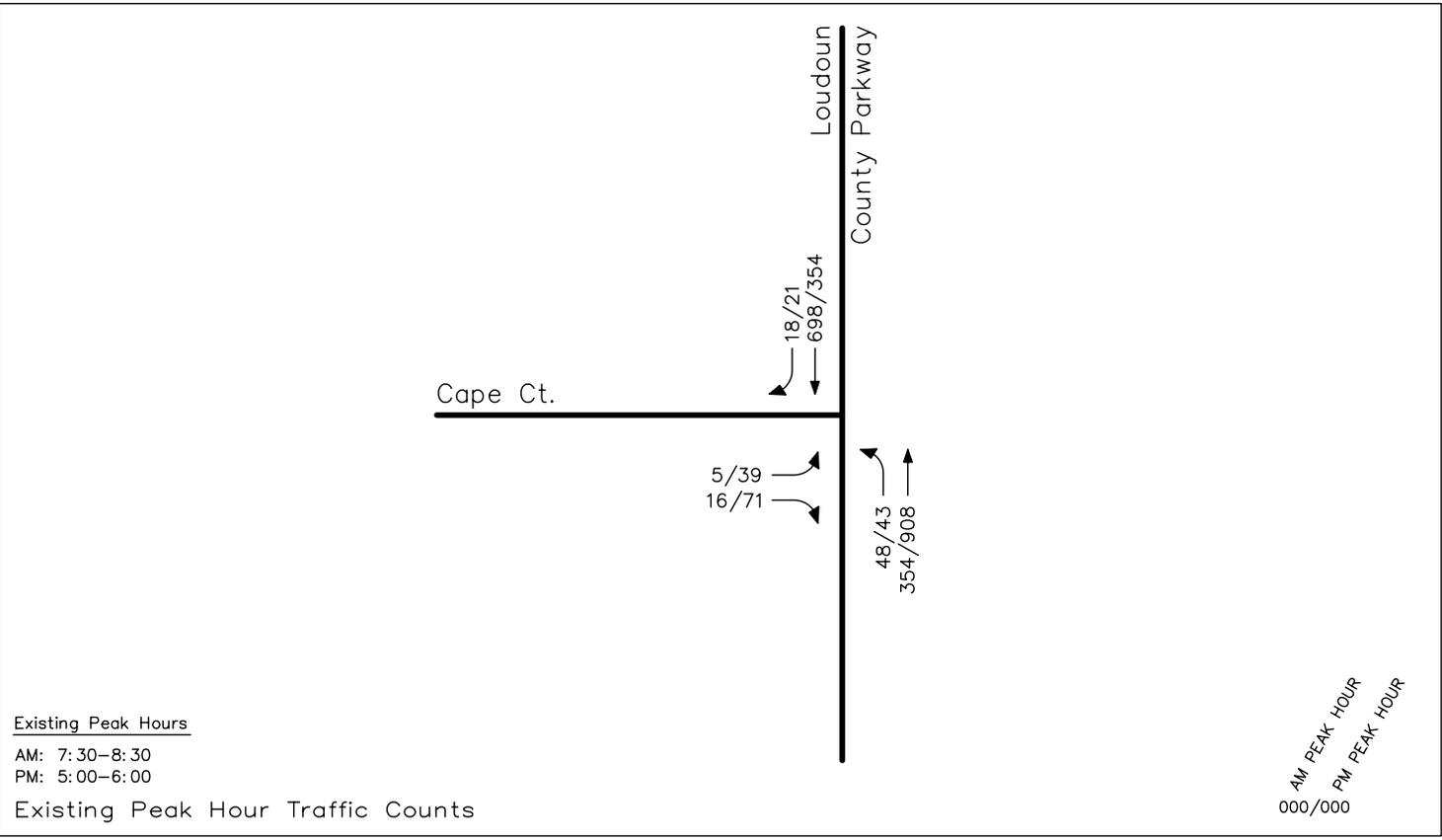
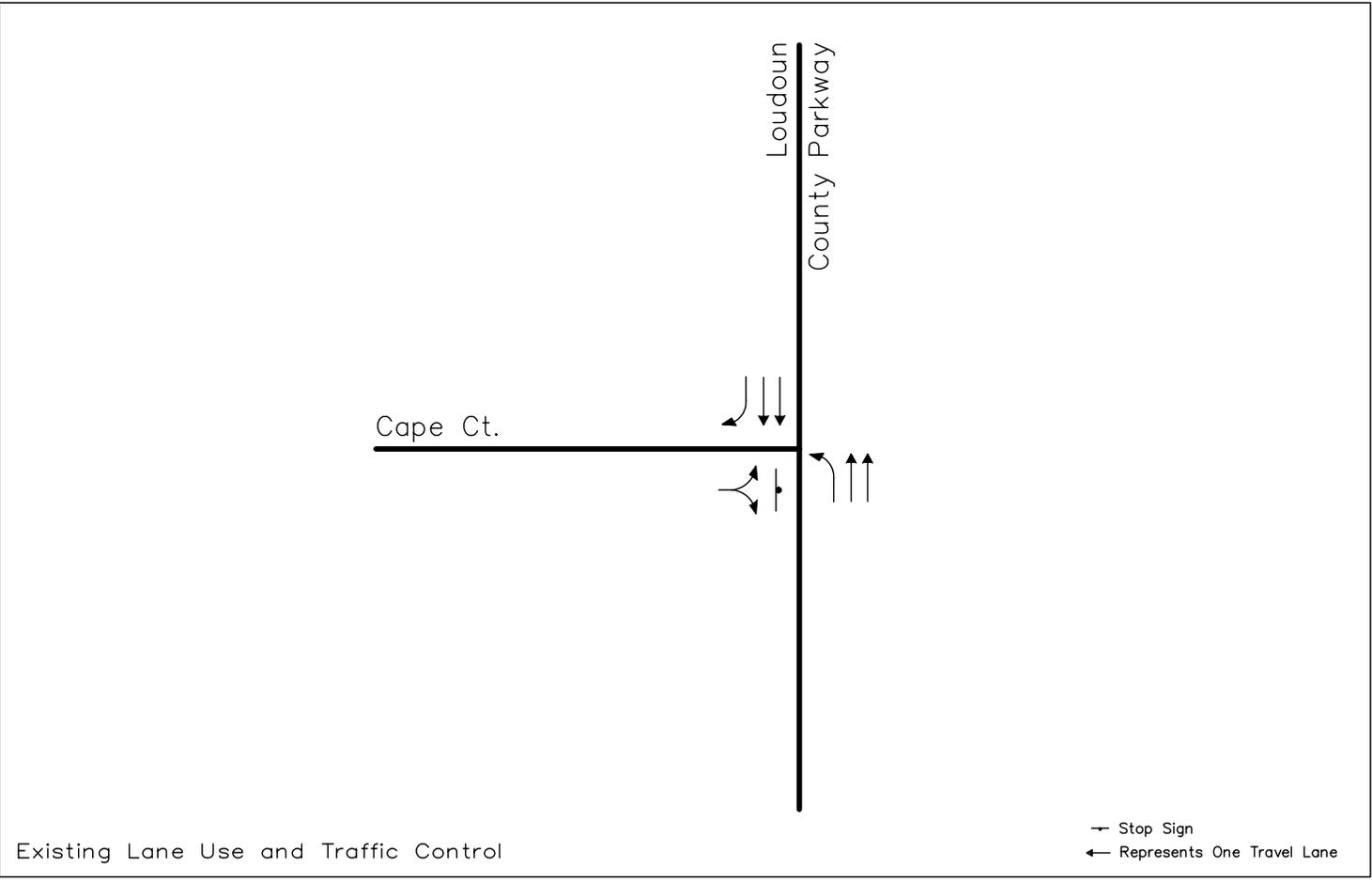


Figure 1



Table 2
Arris Montessori School
Background Trips

| Land Use Options | ITE ⁽¹⁾ Code | Amount | Units | AM Peak Hour | | | PM Peak Hour | | | Average Daily Traffic |
|-------------------------------|----------------------------|--------|----------|--------------|-----------|-----------|--------------|-----------|------------|--------------------------|
| | | | | In | Out | Total | In | Out | Total | |
| Office | 710 | 11,790 | SF | 30 | 4 | 34 | 16 | 76 | 92 | 257 |
| Ideal Schools | 536 | 48 | Students | <u>23</u> | <u>15</u> | <u>38</u> | <u>3</u> | <u>5</u> | <u>8</u> | <u>119</u> |
| Total Background Trips | | | | 53 | 19 | 72 | 19 | 81 | 100 | 376 |

Note: (1) Trip estimates based on rates and equations published in the Institute of Transportation Engineers Trip Generation, 8th Edition.

Table 3
Arris Montessori School
Site Trip Generation Comparison

| Land Use | ITE ⁽¹⁾ Code | Amount | Units | AM Peak Hour | | | PM Peak Hour | | | Average Daily Traffic |
|---------------------------------|----------------------------|--------|----------|--------------|------|-------|--------------|-----|-------|--------------------------|
| | | | | In | Out | Total | In | Out | Total | |
| Private School ^(2,3) | 534 | 175 | Students | 96 | 82 | 178 | 50 | 57 | 107 | 434 |
| | | | Rate | 0.55 | 0.47 | | | | | |

Notes:

- (1) Trip estimates based on rates and equations published in the Institute of Transportation Engineers Trip Generation, 8th Edition
- (2) AM Peak hour reflects independent trip rates collected by W+A which reflects higher trips than ITE. PM Peak hour reflects peak hour of generator which would occur before the commuter PM peak hour.
- (3) ADT rate from ITE Land Use Code 536 (Private School K-12).

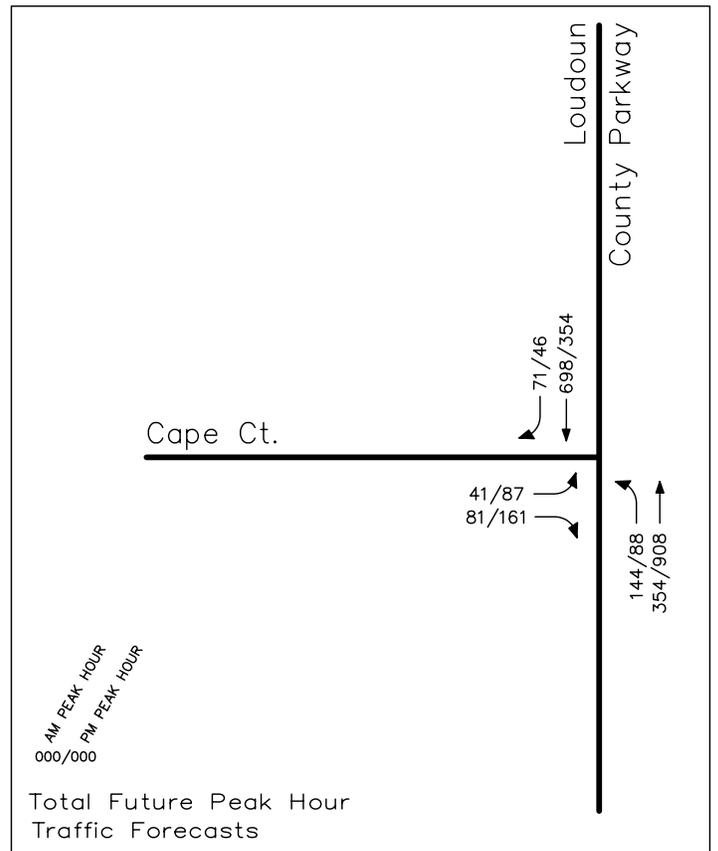
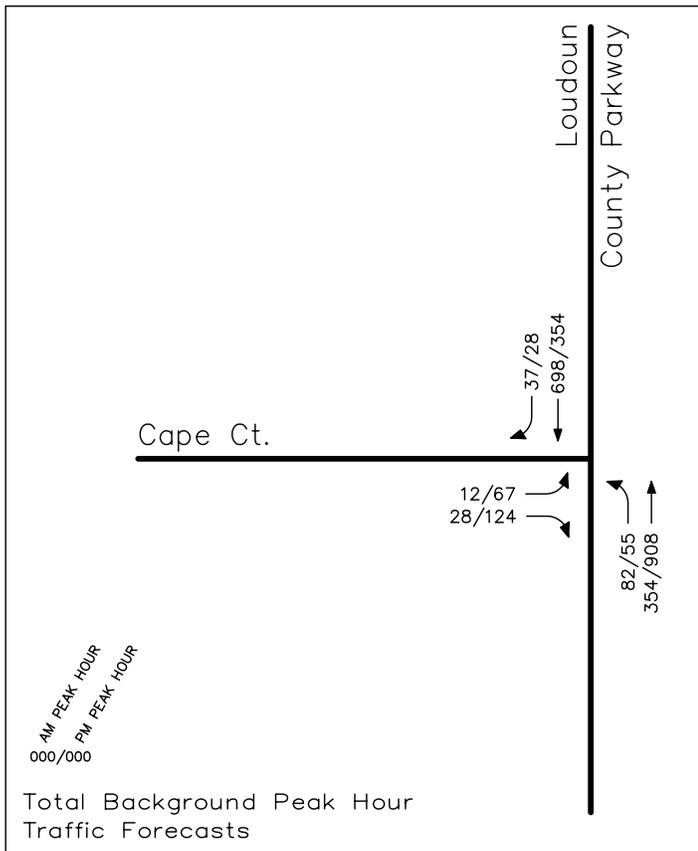
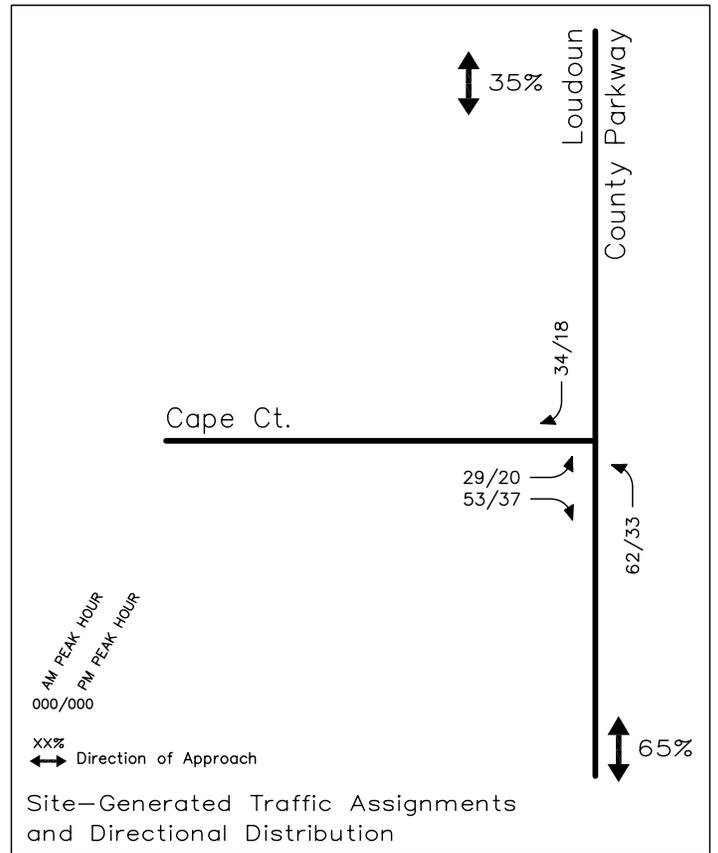
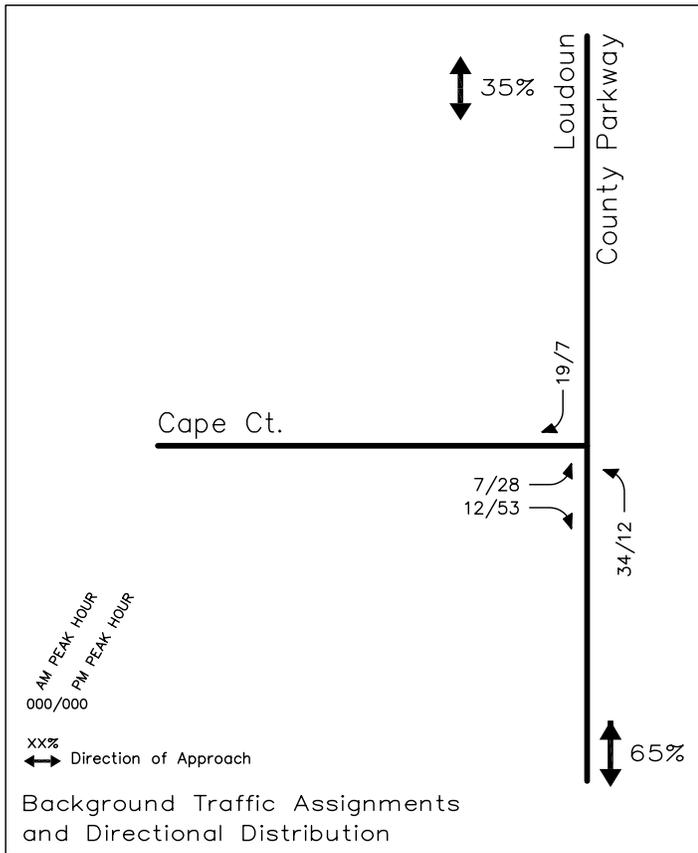


Figure 2



CONCLUSION

The conclusions of this TIA are as follows:

1. The proposed SPEX would have no adverse transportation impacts at the study intersection with the project.
2. The anticipated trips of the Arris Montessori School would ultimately add a total of 178 AM peak hour and 107 PM peak hour trips to the local roadway network.
3. The study intersection would operate at an acceptable LOS "C" or better under total future traffic conditions including additional trips generated by vacant space within the complex and full enrollment by Ideal Schools.

Attachments:

A – Scope of Work Letter

B – Existing Traffic Counts

C – Existing Levels of Service Worksheets

D - Background Level of Service Worksheets

E – Total Future Levels of Service Worksheets

Attachment A
Scope of Work Letter



WELLS + ASSOCIATES

VIA EMAIL

June 5, 2009

George Phillips, AICP
Senior Transportation Planner
Loudoun County Office of Transportation Services
1 Harrison Street, SE
Third Floor
Leesburg, Virginia 20175

Subject: Arris Montessori School
44675 Cape Court #189-3 Special Exception
Traffic Scope of Work
Loudoun County, Virginia

Dear Mr. Phillips,

As requested, the following is a proposed scope of work for the Arris Montessori School School Special Exception to be filed by Arris Academy, LLC:

- The study area/intersection is Loudoun County Parkway at Cape Court.
- Traffic counts will be taken at Loudoun County Parkway at Cape Court for the peak hours.
- The trip generation method used is rates and/or equations from the Institute of Transportation Engineers (ITE) Trip Generation 8th Edition for Private School (LU Code 534).
- Level Of Service (LOS) analysis will be conducted for existing conditions and for future conditions with the school.
- No background traffic or growth will be considered because occupancy is anticipated to occur this year. (Sept. 2009)

- Site trips will be distributed based on existing traffic patterns.
- LOS analysis will be conducted using Synchro/SimTraffic.
- Identify any hazardous conditions in the study area.
- A statement of mitigation of traffic impacts will be provided, if required.
- The project does not trigger the VDOT 527 requirements and a letter will be provided for your use and file.

Please provide any changes to this traffic scope or your concurrence.

Should you have any questions, please contact me at (703) 443-1442.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Chris Turnbull', with a large, sweeping underline that extends across the width of the signature.

Christopher Turnbull
Principal Associate

Copy: Joanna Beitzel – Arris Montessori Academic Services, LLC.
Robert Sevila – Sevila, Saunders, Huddleston & White, P.C.

Attachment B
Existing Traffic Counts

Attachment C

Existing, Background, and Total Future
Levels of Service Worksheets

HCM Unsignalized Intersection Capacity Analysis

1: Cape Ct & Loudoun County Pkwy

6/19/2009



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|--------|------|--------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 5 | 16 | 48 | 354 | 698 | 18 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 5 | 17 | 52 | 385 | 759 | 20 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | Raised | | Raised | |
| Median storage veh | | | 1 | | 1 | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1055 | 379 | 778 | | | |
| vC1, stage 1 conf vol | 759 | | | | | |
| vC2, stage 2 conf vol | 297 | | | | | |
| vCu, unblocked vol | 1055 | 379 | 778 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 98 | 97 | 94 | | | |
| cM capacity (veh/h) | 325 | 618 | 834 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 23 | 52 | 192 | 192 | 379 | 379 | 20 |
| Volume Left | 5 | 52 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 17 | 0 | 0 | 0 | 0 | 0 | 20 |
| cSH | 509 | 834 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.04 | 0.06 | 0.11 | 0.11 | 0.22 | 0.22 | 0.01 |
| Queue Length 95th (ft) | 4 | 5 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 12.4 | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | | | |
| Approach Delay (s) | 12.4 | 1.1 | 0.0 | | | | |
| Approach LOS | B | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 0.6 | | |
| Intersection Capacity Utilization | 36.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis

1: Cape Ct & Loudoun County Pkwy

6/19/2009



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|--------|------|--------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 39 | 71 | 43 | 908 | 354 | 21 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 42 | 77 | 47 | 987 | 385 | 23 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | Raised | | Raised | |
| Median storage (veh) | | | 1 | | 1 | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 972 | 192 | 408 | | | |
| vC1, stage 1 conf vol | 385 | | | | | |
| vC2, stage 2 conf vol | 587 | | | | | |
| vCu, unblocked vol | 972 | 192 | 408 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 88 | 91 | 96 | | | |
| cM capacity (veh/h) | 364 | 817 | 1148 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 120 | 47 | 493 | 493 | 192 | 192 | 23 |
| Volume Left | 42 | 47 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 77 | 0 | 0 | 0 | 0 | 0 | 23 |
| cSH | 567 | 1148 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.21 | 0.04 | 0.29 | 0.29 | 0.11 | 0.11 | 0.01 |
| Queue Length 95th (ft) | 20 | 3 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 13.0 | 8.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | | | |
| Approach Delay (s) | 13.0 | 0.4 | 0.0 | | | | |
| Approach LOS | B | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 1.2 | | |
| Intersection Capacity Utilization | 38.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis

1: Cape Ct & Loudoun County Pkwy

6/19/2009



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|--------|------|--------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 12 | 28 | 82 | 354 | 698 | 37 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 13 | 30 | 89 | 385 | 759 | 40 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | Raised | | Raised | |
| Median storage (veh) | | | 1 | | 1 | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1129 | 379 | 799 | | | |
| vC1, stage 1 conf vol | 759 | | | | | |
| vC2, stage 2 conf vol | 371 | | | | | |
| vCu, unblocked vol | 1129 | 379 | 799 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 96 | 95 | 89 | | | |
| cM capacity (veh/h) | 303 | 618 | 819 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 43 | 89 | 192 | 192 | 379 | 379 | 40 |
| Volume Left | 13 | 89 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 30 | 0 | 0 | 0 | 0 | 0 | 40 |
| cSH | 471 | 819 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.09 | 0.11 | 0.11 | 0.11 | 0.22 | 0.22 | 0.02 |
| Queue Length 95th (ft) | 8 | 9 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 13.4 | 9.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | | | |
| Approach Delay (s) | 13.4 | 1.9 | 0.0 | | | | |
| Approach LOS | B | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 37.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis

1: Cape Ct & Loudoun County Pkwy

6/19/2009



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|--------|------|--------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 67 | 124 | 55 | 908 | 354 | 28 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 73 | 135 | 60 | 987 | 385 | 30 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | Raised | | Raised | |
| Median storage veh | | | 1 | | 1 | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 998 | 192 | 415 | | | |
| vC1, stage 1 conf vol | 385 | | | | | |
| vC2, stage 2 conf vol | 613 | | | | | |
| vCu, unblocked vol | 998 | 192 | 415 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 79 | 83 | 95 | | | |
| cM capacity (veh/h) | 352 | 817 | 1140 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 208 | 60 | 493 | 493 | 192 | 192 | 30 |
| Volume Left | 73 | 60 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 135 | 0 | 0 | 0 | 0 | 0 | 30 |
| cSH | 558 | 1140 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.37 | 0.05 | 0.29 | 0.29 | 0.11 | 0.11 | 0.02 |
| Queue Length 95th (ft) | 43 | 4 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 15.2 | 8.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | A | | | | | |
| Approach Delay (s) | 15.2 | 0.5 | 0.0 | | | | |
| Approach LOS | C | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 2.2 | | |
| Intersection Capacity Utilization | 43.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis

1: Cape Ct & Loudoun County Pkwy

6/19/2009



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|------|--------|--------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 41 | 81 | 144 | 354 | 698 | 71 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 45 | 88 | 157 | 385 | 759 | 77 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | Raised | Raised | |
| Median storage veh | | | | 1 | 1 | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1264 | 379 | 836 | | | |
| vC1, stage 1 conf vol | 759 | | | | | |
| vC2, stage 2 conf vol | 505 | | | | | |
| vCu, unblocked vol | 1264 | 379 | 836 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 83 | 86 | 80 | | | |
| cM capacity (veh/h) | 260 | 618 | 794 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 133 | 157 | 192 | 192 | 379 | 379 | 77 |
| Volume Left | 45 | 157 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 88 | 0 | 0 | 0 | 0 | 0 | 77 |
| cSH | 422 | 794 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.31 | 0.20 | 0.11 | 0.11 | 0.22 | 0.22 | 0.05 |
| Queue Length 95th (ft) | 33 | 18 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 17.4 | 10.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | B | | | | | |
| Approach Delay (s) | 17.4 | 3.1 | 0.0 | | | | |
| Approach LOS | C | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|----------------------|---|
| Average Delay | 2.6 | | |
| Intersection Capacity Utilization | 44.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

HCM Unsignalized Intersection Capacity Analysis

1: Cape Ct & Loudoun County Pkwy

6/19/2009



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|------------------------|------|------|------|--------|--------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 87 | 161 | 88 | 908 | 354 | 46 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 95 | 175 | 96 | 987 | 385 | 50 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | Raised | Raised | |
| Median storage veh | | | | 1 | 1 | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1070 | 192 | 435 | | | |
| vC1, stage 1 conf vol | 385 | | | | | |
| vC2, stage 2 conf vol | 685 | | | | | |
| vCu, unblocked vol | 1070 | 192 | 435 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 70 | 79 | 91 | | | |
| cM capacity (veh/h) | 318 | 817 | 1121 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|
| Volume Total | 270 | 96 | 493 | 493 | 192 | 192 | 50 |
| Volume Left | 95 | 96 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 175 | 0 | 0 | 0 | 0 | 0 | 50 |
| cSH | 527 | 1121 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.51 | 0.09 | 0.29 | 0.29 | 0.11 | 0.11 | 0.03 |
| Queue Length 95th (ft) | 72 | 7 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 18.8 | 8.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | A | | | | | |
| Approach Delay (s) | 18.8 | 0.8 | 0.0 | | | | |
| Approach LOS | C | | | | | | |

| Intersection Summary | | | |
|-----------------------------------|-------|-----|------------------------|
| Average Delay | | 3.3 | |
| Intersection Capacity Utilization | 46.5% | | ICU Level of Service A |
| Analysis Period (min) | 15 | | |