

COMMUNITY DISCUSSION PAPER

DETERMINATION OF ACCESS RESTRICTION ELIGIBILITY

LUXMANOR COMMUNITY

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Montgomery County Department of Transportation
Division of Traffic Engineering and Operations
Traffic Engineering and Studies Section
100 Edison Park Drive, 4th Floor
Gaithersburg, Maryland 20878

240-777-2190



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I. INTRODUCTION

Executive Regulation 17-94AM “Through Traffic Volume Access Restrictions in Residential Areas” was authorized to aid in the County’s efforts to “enhance neighborhood traffic safety and maintain ‘livable’ residential environments by providing a procedure for reducing excessive volumes of through traffic.” The policy attempts to balance the needs of all impacted parties while maintaining the efficient and appropriate use of County streets.

The Department of Transportation assists communities in developing a *Through Traffic Volume Management Plan* by designing and evaluating the impacts of access restrictions. The Department then reports its preliminary assessment in a “Community Discussion Paper (CDP)”, which will serve as the basis for discussions with residents and other potentially impacted parties. The purpose of this CDP is to determine access restriction eligibility for the Luxmanor community, as well as evaluate proposed access restrictions.

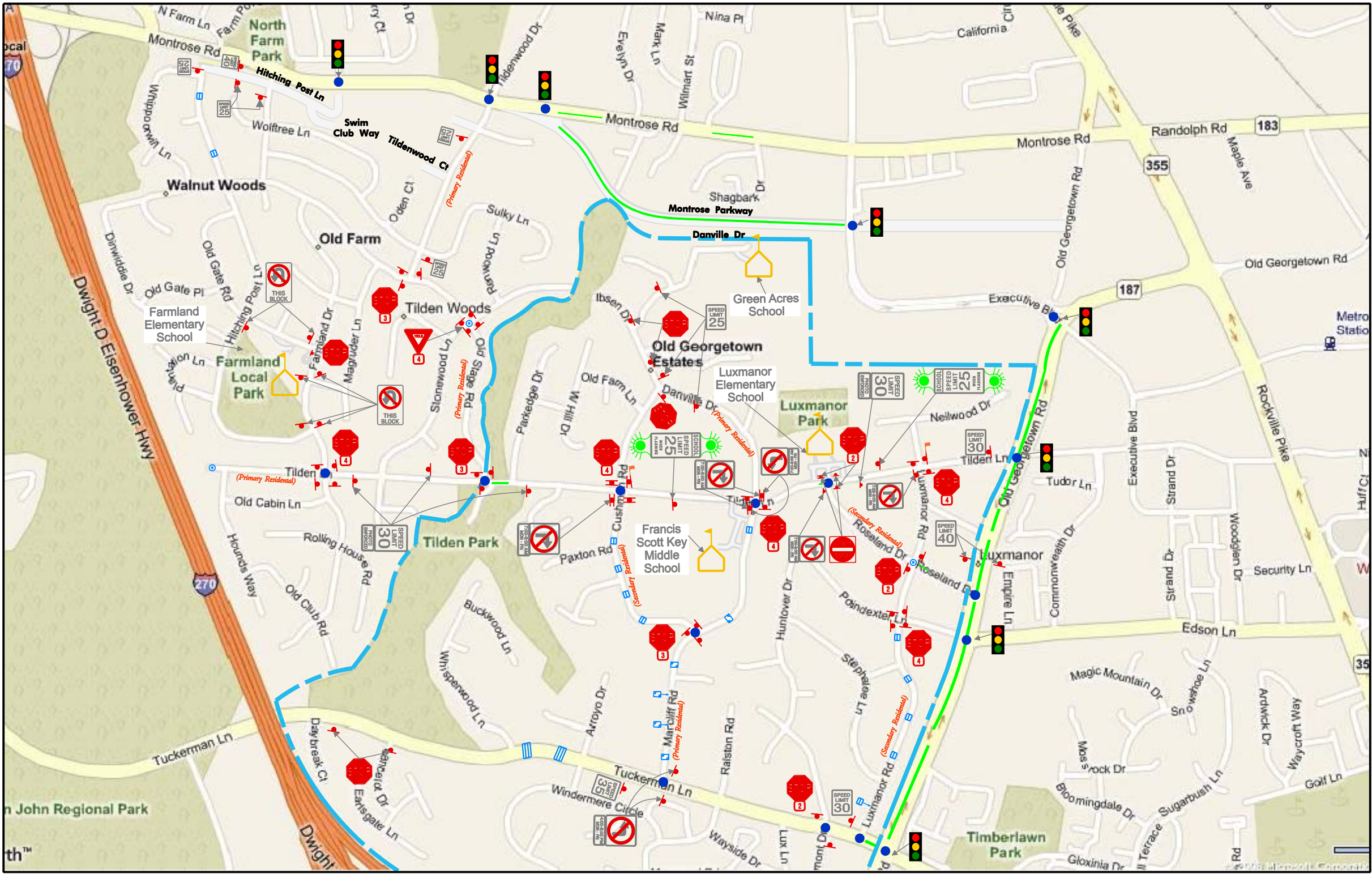
II. STUDY AREA LOCATION AND PURPOSE

The community is represented by the Luxmanor Citizens Association. Letters to the County from the community expressed concerns regarding non-local traffic in the community. Residents believe that non-local drivers are using Marcliff Road as an attempt to avoid congestion and delay associated with conditions on Old Georgetown Road (MD 187) and Tuckerman Lane. The roadway network that is the focus of this study includes Tilden Lane and Marcliff Road. Local residents perceive that Marcliff Road-Tilden Lane are primarily being used as cut-through routes through the community.

The purpose of the study is to document the volume of non-local through traffic utilizing the local streets to avoid congestion on Old Georgetown Road, and, if eligible, develop an access restriction plan and assess the impact to the roadway network and community resources. This paper summarizes the results of a technical analysis including existing conditions, traffic volumes, capacity analysis, license plate surveys, travel time and field observations.

The Luxmanor community is located in North Bethesda, MD, generally bounded on the north by Montrose Parkway, to the east by Old Georgetown Road (MD 187); to the south by Tuckerman Lane; and on the west by the east branch of the Cabin John Creek. The traffic shed¹ of affected local streets include: Tilden Lane, Cushman Road, Luxmanor Road and Marcliff Road. An area map is shown below in **Figure 1**.

¹ By definition a traffic shed is “a system of interconnected roadways within a neighborhood or portion of a residential community feeding into one or more arterials or major highways”.



LEGEND

- Landscaped Median
- (Primary Residential) — Roadway Classification
- — Study Intersection
- — Residential Traffic Circle
- ▨ — Rumble Strips
- ▭ — Standard speed hump
- ▭ — Flat Top speed hump
- Sign Post
- Sign post with flag
- Luxmanor Citizens Assoc Boundary and Traffic Shed
- 2 — Number of Signs at Intersections
- ▭ — School

III. EXISTING CONDITIONS ANALYSIS

A. Roadway Network, Land Use, Community Resources and Existing Restrictions

The following section describes the study area roadway network and its characteristics, existing land use mixture, community resources such as public spaces, and vehicular access restrictions that are already in place, if any.

Marcliff Road and Tilden Lane are classified as primary residential roadways and Luxmanor Road, Roseland Drive and Cushman Road are classified by the County as secondary residential roadways. The secondary residential roadways, with widths between 18 – 24 feet, are generally below the current design standards such as roadway width, drainage design, pedestrian accommodations, etc. There are no Metro or Ride-On bus routes or stops located within the community, though, there are Ride-On bus routes with bus stops along Old Georgetown Road and Tuckerman Lane; however, there are several school bus stops for students attending local schools.

The study roadways are a combination of open- and closed-section roadways. Several pedestrian connections exist, with sidewalks provided along some study area roadways. Intersections within the community are generally controlled by stop signs, with two intersections controlled by yield signs. Traffic signals are provided at two intersections exiting the community: Tilden Lane at Old Georgetown Road and Poindexter Lane at Old Georgetown Road.

Land uses within the community are primarily residential. However, there are several institutional uses including:

- The Tilden Center, a holding school for Middle Schools that are being renovated elsewhere in the County on the southwest corner of Tilden Lane and Marcliff Road; (all students either bused or driven to school)
- Luxmanor Elementary School on the north side of Tilden Lane at Roseland Drive;
- Farmland Elementary School on the south side of Old Gate Road between Hitching Post Lane and Farmland Drive;
- Green Acres School near the northern terminus of Danville Drive (this school is a private school and all students are either bused or driven to school)

Existing traffic restrictions within the community include:

- “No Right Turn 7:00-9:30 AM Monday-Friday” restriction on eastbound Tilden Lane at Cushman Road, Marcliff Road/Danville Drive, Roseland Drive and Luxmanor Road;
- “No Left Turn 7:00-9:00 AM Monday-Friday” restriction on westbound Tilden Lane at Marcliff Road/Danville Drive;
- “No Left Turn 4:00-6:00 PM Monday-Friday” restriction on eastbound Tuckerman Lane at Marcliff Road;

- “No Through Trucks” (7,000 lbs GVW) restrictions are posted on Tildenwood Drive south of Montrose Parkway, and Marcliff Road north of Tuckerman Lane
- “ No Through Movement” on westbound Poindexter Lane at Old Georgetown Road and Edson Lane;
- Multi-way stop control along Tilden at Cushman Road, Marcliff Road/ Danville Drive and Luxmanor Road

Existing traffic calming within the community includes:

- Speed humps along Cushman Road, Marcliff Road, Luxmanor Road and Hitching Post Lane
- Residential traffic circle at Luxmanor Road/ Roseland Drive
- Bump outs/ median island combination along WB Tilden Lane at Roseland Drive

B. Traffic Volumes

Recent traffic data for several intersections within the study area was obtained from the State Highway Administration’s traffic count database. Directional 96-hr traffic volume counts (two locations) for select roadways within the community and peak period traffic data were collected at seven study intersections in October and November 2008. **Table 1** summarizes the peak hour bi-directional traffic volumes along the key residential roadway segments. **Figure 2** shows the existing peak hour traffic volumes at the study intersections. Detailed traffic data is included in **Appendix B**.

Table 1. Peak Hour Bi-Directional Traffic Volumes AM (PM)

<i>Roadway</i>	<i>Primary Direction (Northbound or Eastbound)</i>	<i>Secondary Direction (Southbound or Westbound)</i>	<i>Total Peak Hour Volume Both Directions</i>	<i>Total Average Daily Volume</i>
Marcliff Rd south of Cushman Rd	84 (86)	81 (131)	165 (217)	1775
Luxmanor Rd north of Roseland Dr	19 (35)	19 (27)	38 (62)	710
Tilden Lane west of Old Georgetown	190 (168)	143 (303)	333 (471)	4700

MONTROSE RD

FARM HAVEN DR

HITCHING POST LN

FARMLAND DR

TILDENWOOD DR

TILDEN LN

OLD STAGE RD

MONTROSE PKWY

JEFFERSON ST

MONTROSE RD

EXECUTIVE BLVD

KEY
 000 - AM PEAK HOUR VOLUMES
 (000) - PM PEAK HOUR VOLUMES
 [000] - SATURDAY PEAK HOUR VOLUMES

NOT TO SCALE

0+21

TUCKERMAN LANE

CUSHMAN RD

MARCLIFF RD

ROSEMONT DR

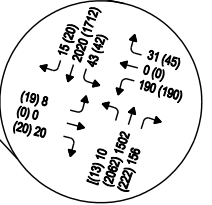
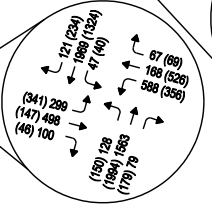
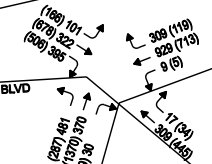
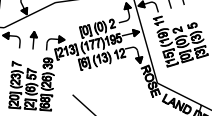
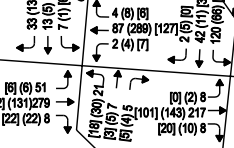
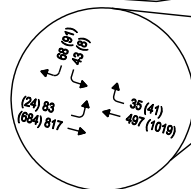
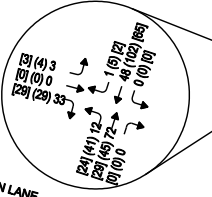
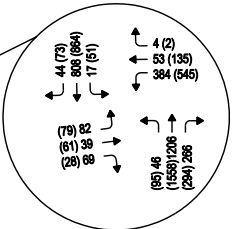
ROSE LAND DR

EDSON LANE

ROCKVILLE PIKE

LUXMANOR RD

OLD GEORGETOWN RD



C. Capacity Analysis

The Critical Lane Volume Analysis (CLV) methodology was used to evaluate capacity and level of service for the selected intersections during the AM and PM peak hours. Performance measures of effectiveness include critical lane volume, volume-to-capacity ratio, and level of service.

The critical volume for each peak period is found by combining the critical lane volumes for the NB/SB movements and EB/WB movements. The critical lane volumes indicate the highest volume for a given approach lane configuration in a given direction. The volume-to-capacity ratio (v/c ratio) is the ratio of current flow rate to the capacity of the facility. This ratio is often used to determine how sufficient capacity is on a given roadway. Generally speaking, a ratio of 1.0 indicates that the roadway is operating at capacity. A ratio of greater than 1.0 indicates that the facility is failing as the number of vehicles exceeds the roadway capacity.

The level of service (LOS) is a letter designation that corresponds to a certain range of roadway operating conditions. The levels of service range from *A* to *F*, with *A* indicating the best operating conditions and *F* indicating the worst, or a failing, operating condition. Level of service thresholds are summarized in **Table 2**, the results of the capacity analyses are summarized in **Table 3**. Detailed capacity worksheets are included in **Appendix C**.

Table 2. CLV Level of Service Parameters

LOS	Volume (veh)	Expected Problems at Intersection
A	≤ 1000	Very low delay
B	>1000 and ≤ 1150	Short delay
C	>1150 and ≤ 1300	Number of vehicles stopping is significant
D	>1300 and ≤ 1450	Influence of congestion becomes more noticeable
E	>1450 and ≤ 1600	Limits of capacity, moderate to excessive delay
F	>1600	Oversaturated traffic conditions, excessive delay

(Source: MD State Highway Administration.)

Table 3. Summary of Existing Intersection Capacity Analysis AM (PM)

Intersection	Critical Lane Volume	Volume-to-Capacity Ratio	Level of Service
MD 187 @ Executive Blvd	1371 (1271) [-]	0.86 (0.79) [-]	D (C) [-]
MD 187 @ Tilden Ln/Nicholson Ln	842 (1137) [-]	0.53 (0.71) [-]	A (B) [-]
MD 187 @ Poindexter Ln/Edson Ln	1043 (1187) [-]	0.65 (0.74) [-]	B (C) [-]
MD 187 @ Tuckerman Ln	1385 (1233) [-]	0.87 (0.77) [-]	D (C) [-]
Tuckerman Ln @ Marcliff Rd	1094 (1183) [-]	0.68 (0.74) [-]	B (C) [-]
Tilden Ln @ Cushman Rd	420 (357) [191]	0.26 (0.22) [0.12]	A (A) [A]
Tilden Ln @ Marcliff Rd/Danville Dr	468 (513) [347]	0.29 (0.32) [0.22]	A (A) [A]
Tilden Ln @ Roseland Dr/Luxmanor Elementary School Exit	289 (362) [283]	0.18 (0.23) [0.18]	A (A) [A]
Marcliff Rd @ Cushman Rd	121 (181) [123]	0.08 (0.11) [0.08]	A (A) [A]

D. Non-Local Traffic

A license plate survey was performed along Tilden Lane and Marcliff Road on October 15 and 16, 2008 between 6:30 AM – 8:30 AM and 4:30 – 6:30 PM and on November 1 between 12:00 PM – 2:00 PM. The purpose of the study is to determine the percentage of non-local traffic currently utilizing the neighborhood streets, i.e. those vehicles without either an origin or destination within the defined traffic shed. License plate numbers recorded in the field were entered into a database to perform a matching screen test between community suggested origin-destination pairs. The results of the license plate survey, summarized in **Table 4**, indicate that *only one location exceeded more than a 25% match of through traffic – 49% (79 vehicles) on Marcliff Road south of Cushman during the PM peak period.* Detailed license plate survey data is included in **Appendix D**.

Table 4. Summary of License Tag Origin-Destination Survey

Origin	Destination	Survey Date & Time of Day	Direction	Non-Local% Match of Destination from Origin	2-hour Peak Period Matching Volume	Origin Peak Period 2-hr Volume	Destination Peak Period 2-hr Volume	Origin Average Daily Traffic (ADT)	Destination Average Daily Traffic (ADT)
Tilden Ln (West of Old Georgetown Rd)	Marcliff Rd (South of Cushman Rd)	10/16/2008 AM	WB to SB	13.3%	18	343	135	4700	1775
Tilden Ln (West of Old Georgetown Rd)	Marcliff Rd (South of Cushman Rd)	10/16/2008 PM	WB to SB	49.1% ¹	79	757	161	4700	1775
Tilden Ln (West of Old Georgetown Rd)	Marcliff Rd (South of Cushman Rd)	11/1/2008 SAT	WB to SB	22.7%	42	463	185	-	-

¹ – During one of the two PM peak period hours (4:30 P.M. to 5:30 P.M.), the non-local match was calculated to be 54% along Marcliff Road

E. Travel Time Analysis

Detailed field investigations of travel times and mileage along the existing neighborhood streets, and along the adjacent primary roadways were performed using in-vehicle GPS-based probes during the AM and PM peak hours in November, 2008. A minimum of two runs were performed on each route in each direction. The starting and ending points were the same for each route and compare a likely cut-through route with the same trip on arterials. **Figure 3** illustrates the routes traveled.

- **Route 1** followed MD 187 (from the intersection with Tilden Lane) and Tuckerman Lane (to the intersection with Arroyo Drive);
- **Route 2** followed Tilden Lane (from the intersection with MD 187), Marcliff Road and Tuckerman Lane (to the intersection with Arroyo Drive);
- **Route 3** followed Tilden Lane (from the intersection with MD 187), Luxmanor Road, and Tuckerman Lane (to the intersection with Arroyo Drive);
- **Route 4** followed Tilden Lane (from the intersection with MD 187), Cushman Road, Marcliff Road and Tuckerman Lane (to the intersection with Arroyo Drive)

Figure 3. Travel Time Routes



The summary of travel time runs is shown in **Table 5**; detailed travel time worksheets are included in **Appendix E**.

Findings indicate travel times for Route 2 are advantageous over Route 1 by approximately 1 minute in the AM peak hour and approximately 2 minutes in the PM peak hour. ***This route is currently prohibited in the AM based on the existing access restrictions.*** It should also be noted that congestion was observed in the PM peak period along SB MD 187 approaching the I-270 ramps south of Tuckerman Lane extending back towards Roseland Drive; a reported traffic delay on I-270 NB contributed to the queue on MD 187 SB.

Table 5. Summary of Peak Hour Travel Times AM (PM)

Route	Direction of Route	Time in seconds	Distance (miles)
1	SB	247.3 (331.3)	1.31
2	SB	197.7 (229.0)	1.15
3	SB	181.7(283.3)	1.19
4	SB	289.3 (275.7)	1.28

F. Field Observations and School Enrollment Data

A Professional Traffic Engineer observed the study area in the vicinity of the two neighborhood schools which effect the possible cut through traffic route (Luxmanor Elementary School and Tilden Center holding School) on October 28th and 29th, 2008 during the morning peak school hours, specifically focusing on driver behavior, traffic patterns and queues, geometry, and overall traffic operations. The following summarizes the observations:

In the vicinity of Luxmanor Elementary School (School Enrollment: 350 Students):

- The western access to the school premises is located approximately 185’ west of Roseland Drive and the eastern access is located approximately 165’ east of Roseland Drive;
- The central egress intersects with Tilden Lane at Roseland Drive;
- A crossing guard efficiently facilitated traffic movement at the intersection of Tilden Lane, Roseland Drive and the Luxmanor School exit;
- The crossing guard occasionally stopped traffic on Tilden Lane to allow pedestrians to cross the intersection and for vehicles to exit the school premises;
- Traffic queues of up to five vehicles in the WB direction were observed along Tilden Lane when the crossing guard stopped traffic;
- Automobile traffic entered the school premises at the west entrance and buses entered at the east entrance located east Roseland Drive;

- Traffic queues were observed along WB and EB Tilden Lane approaching the west entrance to the school; the roadway is wide enough, though, to allow thru traffic to pass queued traffic;

In the vicinity of the Tilden Center holding school (School Enrollment: 738 Students):

- Access to the school premises is via a driveway on the south side of Tilden Lane 385' west of Marcliff Road/Danville Road;
- Egress from the school premises is via a driveway on the west side of Marcliff Road 250' south of Tilden Lane. An additional access point is located another 565' south providing access to a parking lot;
- A six-vehicle queue was observed on WB Tilden Lane approaching the school entrance on Tilden Lane; WB through vehicles were able to pass along the right;
- A seven-vehicle queue was observed on SB Danville Road approaching Tilden Lane and quickly dissipated while minor traffic volume was observed along Marcliff Road;
- Cars and buses were provided enough room to pass each other, if necessary, along the service road;
- No traffic queues were observed at or near any of the entrances and exits of the school premises;

IV. ACCESS RESTRICTION ELIGIBILITY ANALYSIS

According to Executive Regulation 17-94AM, the eligibility requirements and satisfaction thereof are summarized below in **Table 6**. The evaluation primarily focused on Tilden Lane and Marcliff Road.

Table 6. Summary of Access Restriction Eligibility Analysis

Criteria	Description	Luxmanor Existing Condition	Satisfied?	
			Tilden Ln	Marcliff Rd ¹
Street Classification	Access volume restrictions limited to tertiary, secondary and primary residential streets	All of the study streets in the Luxmanor community are classified as primary- or secondary-residential streets	Yes	Yes
Measured Traffic Volumes	A minimum two-directional volume: ≥ 400 vehicles per hour for at least one hour of a weekday peak or off-peak time period on a primary street with one unobstructed travel lane in each direction ≥250 vehicles per hour on a non-primary residential street with one unobstructed travel lane in each direction ≥100 vehicles per hour on any residential street with one unobstructed travel lane serving both directions.	Both Tilden and Marcliff exceed the minimum thresholds for any of the street categories	Yes	Yes
Estimated Non-Local Traffic	Non-local traffic must exceed 50% of the highest hourly volume, as documented by a license plate survey	Tilden Lane: 16% Marcliff Road: 54% ...of surveyed traffic is non-local	No	Yes

¹ – Marcliff Road is assumed to provide one unobstructed travel lane

Findings

The Luxmanor community in Montgomery County petitioned for a determination of access restriction eligibility to address a perceived cut-through traffic problem. The results of a technical analysis confirm the following findings:

- Several of the local neighborhood streets, such as Luxmanor Road, Marcliff Road and Cushman Road already have traffic calming devices in place;
- Within the study area boundaries, the land use is predominantly residential, and includes four school facilities;
- Several traffic restrictions currently exist within the community including “No Right Turn” and “No Left Turn” signs during specific time periods;

- Based on the capacity analysis results under the existing conditions, the intersections within the neighborhood grid network operate with adequate Levels of Service (LOS) *D* or better;
- One origin-destination pair was documented to exceed 50% non-local traffic: Tilden Lane west of Old Georgetown and Marcliff Road south of Cushman, which had a non-local match of 49% (79 vehicles) during the PM peak period; with one of the two evening hours matching 54%.
- Based on the above findings, Marcliff Road is eligible for access restrictions as developed and evaluated through a community discussion paper.

V. Access Restriction Plan Impact Analysis

An access restriction plan must balance the needs of both the neighborhood and the prevailing traffic conditions. An access restriction plan may not include traffic calming measures such as speed humps or small traffic circles, nor does it permit a complete roadway closure. The plan may include signs and/ or physical barriers that “establish turn or entry restrictions, one-way residential streets, or mandatory turns”.

The evaluation of access plans should include the consideration of impact of *diverted traffic* on other roadways such as residential and arterial streets, impact on *access to public facilities and community resources* such as schools, parks, libraries, religious institutions or shopping centers, and lastly *compatibility with area Master Plans*.

A. Preliminary Restriction Plan

The proposed plan is designed to compliment the current access restrictions to further limit through access for commuter and non-local cut-through traffic on roadways in the Luxmanor community, while maintaining access for local residences and businesses in the community. The proposed recommendations include the following:

- Remove the “No Left Turn 7:00-9:00 AM Monday-Friday” sign on westbound Tilden Lane at Marcliff Road/Danville Drive
- Install a new sign reading “No Left Turn 7:00-9:00 AM and 4:00-6:00 PM Monday-Friday” on westbound Tilden Lane at Marcliff Road/Danville Drive

B. Impact to Other Roadways

It is assumed that 100% of the left turning traffic (54 vehicles from Figure 2) on westbound Tilden Lane at Marcliff Rd in the PM peak hour will be diverted to Old Georgetown Rd and then Tuckerman Lane. Though, it is possible that some motorists may also use Cushman Road and Luxmanor Road due to the relative similarity in travel times as documented in Table 5. However, due to the existing speed humps and additional stop signs on both roadways it is felt that either of these routes would be more circuitous than Marcliff Road or Old Georgetown Road.

It should also be noted that this restriction will also impact local homeowners along Marcliff returning home in the evening as westbound left-turns from Tilden Lane will be the second location with restricted access during this time period (after eastbound left-turns from Tuckerman Lane), which may cause additional inconvenience. ***Since all turns into Marcliff Road in the evening peak hours will be right turns, this may create u-turn movements along Tilden or Tuckerman.***

This additional diverted volume was added to the existing CLV volume for each affected intersection and is summarized below in **Table 7**. The results indicate that the ***additional diverted traffic volumes would not impact existing levels of service at any of the adjacent critical intersections during either peak hour.***

Table 7. Future External Intersection Capacity Analysis AM (PM)

Intersection	Existing Critical Lane Volume	Existing Level of Service	Future Critical Lane Volume	Future Level of Service
MD 187 @ Tilden Ln/Nicholson Ln	842 (1137)	A (B)	842 (1137)	A (B)
MD 187 @ Poindexter Ln/Edson Ln	1043 (1187)	B (C)	1043 (1187)	B (C)
MD 187 @ Tuckerman Ln	1385 (1233)	D (C)	1385 (1233)	D (C)
Tuckerman Ln @ Marcliff Rd	1094 (1183)	B (C)	1094 (1237)	B (C)

C. Impact to Public and Community Facilities

The proposed access and turn restrictions are only limited to peak hours to discourage through commuter traffic, but even during those hours maintain direct access to the schools in the Luxmanor community. The new restriction will prevent those who travel WB on Tilden Ln and turn left at Marcliff Rd in the PM hours from accessing the Tilden Center holding school from the driveways on Marcliff Rd. These travelers will be able to access the school by continuing WB on Tilden Lane and turning left at the driveway on Tilden Lane for the middle school.

D. Master and Sector Plan Compatibility

The additional access restriction proposed does not interfere with any of the elements in the 1992 North Bethesda Master Plan. The plan does propose a Class III bicycle facility along Luxmanor Road and bike lanes along Tilden Lane.

VI. SUMMARY AND RECOMMENDATION

The Luxmanor community in Montgomery County petitioned for a determination of access restriction eligibility to address a perceived cut-through traffic problem. The results of a technical analysis confirm the following findings:

- Field-measured travel times along both the adjacent arterials and neighborhood streets during peak hours indicate savings in travel time and distance for non-local traffic to cut-through the Luxmanor community from MD 187 to Tuckerman Lane via neighborhood streets; this route is already access restricted in the AM peak hours but not in PM peak hours.

- Marcliff Rd meets the County's requirements for access restrictions.
- A proposed addition to current access restriction was not found to significantly impact adjacent roadways, communities, public facilities, or community resources and was found to be consistent with the area Master Plan.

It is therefore recommend to proceed with the new access restriction measures proposed for the Luxmanor community.