

Research Report  
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TRAFFIC FLOW AND SAFETY  
EVALUATION OF  
FAYETTE COUNTY SCHOOLS  
Part II

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## **EXECUTIVE SUMMARY**

In cooperation with Fayette County Schools, an evaluation of traffic flow and safety was conducted at school sites in Fayette County. The purpose of this evaluation was to identify potential safety risks currently existing at selected schools, recommend actions to reduce risks, and to decrease traffic congestion in and around school properties.

This report is a continuation of the traffic and safety project submitted to Fayette County Schools in September 1996. For this project, three schools were identified by Fayette County Schools as having traffic flow or safety problems that could benefit from detailed evaluation. The three schools were Clays Mill Elementary, Yates Elementary and Dunbar High. The responses to a survey questionnaire were compiled and used in these investigations. An on-site investigation was conducted at these three schools and an evaluation was completed by assessing the current conditions and offering recommendations for improvements. A set of maps was also prepared explaining any changes recommended for each of the school properties.



## **1.0 INTRODUCTION**

In cooperation with Fayette County Schools, an evaluation of traffic flow and safety was conducted at school sites in Fayette County. The purpose of this evaluation was to identify potential safety risks currently existing at selected schools in the district, recommend actions to reduce risks, and to decrease traffic congestion in and around school properties. The evaluation was completed in two main phases. First, each school in the district was asked to complete a written questionnaire. Second, three schools were identified by Fayette County Schools as having severe traffic flow or safety problems in need of further evaluation. The three schools identified were Clays Mill Elementary, Yates Elementary and Dunbar High. An on-site investigation was conducted at these three schools and an evaluation was completed by assessing the current conditions and offering recommendations for improvements. This report is a continuation of a traffic and safety project submitted to Fayette County Schools in September 1996 when an analysis was conducted at Cardinal Valley Elementary, Russell Elementary, Lexington Traditional Middle, Tates Creek Middle, Henry Clay High and Tates Creek High Schools.

## **2.0 PROCEDURE**

In order to gain an understanding of the Fayette County school district's traffic flow and safety issues, several levels of investigation were undertaken. First, a written questionnaire was submitted to each of the 52 elementary, middle, high and alternative school principals. Each school principal was asked to personally complete the survey and to share copies of the survey with the school's site-based council. This enabled the people most directly involved with the school to discuss and report any traffic safety concerns.

In the survey, each participant was requested to rank the seriousness of specific issues related to traffic safety. The issues included traffic flow, parking, pedestrian traffic and student loading/unloading areas. The traffic safety questionnaire also requested written comments concerning traffic safety and congestion problems. A sample of the survey questionnaire provided to the schools is included in Appendix A of this report. Summaries of the surveys returned by Clays Mill Elementary and Yates Elementary Schools are located in Appendix B of this report. Because Dunbar High School did not return any of the written surveys or any comments on traffic flow and safety, no summary for Dunbar is included in the Appendix.

The second level of investigation undertaken involved detailed analysis of three schools identified as having traffic flow or safety problems in need of additional attention. As previously noted, these schools are Clays Mill Elementary, Yates

actual traffic flow situation at each of these chosen schools, a number of visits to the school sites were conducted during the months of December 1996 and January 1997. During the first visit to each of these schools, a brief interview was held with the school's principal or the person most directly involved with traffic control. These interviews, along with the written surveys, provided valuable information concerning problem areas to consider both on and near the school property.

Observations were also conducted at each school during both the morning and afternoon peak traffic periods. Videotapes and photographs were used to document the conditions during the peak periods as well as the general layout of the school property. The specific elements considered at each school included:

- ▶ school zone signs
- ▶ traffic control devices
- ▶ crosswalks and crossing guards
- ▶ entry, exit and travel-way dimensions
- ▶ bus drop-off and pick-up locations
- ▶ number of buses during peak
- ▶ parent drop-off and pick-up locations
- ▶ number of parents during peak
- ▶ number of student drivers (high schools only)
- ▶ student pedestrian safety
- ▶ staff and student parking

These considerations, along with others specific to each school site, provided a comprehensive understanding of the traffic and safety situation at each of the three schools investigated.

### **3.0 RESULTS**

Through the school surveys, interviews and direct observance of the school flow patterns, a number of traffic flow and safety concerns were identified at each school. These are issues that should be addressed in order to improve traffic flow and safety at the schools. The most realistic and reasonable suggestions are discussed below, along with a number of expansive, long-term projects.

The following sections include suggestions for safety improvements at each of the three schools selected for evaluation by Fayette County Schools. However, the process of investigation and analysis described for each school below could also be used to evaluate the traffic flow and safety issues at any other school in Fayette County. The evaluation process for any school site could be initiated by considering the

concerns of the people who are most involved with the school. For this reason, summaries of all the survey questionnaires returned for each school are included in Appendix B of the "Traffic Flow and Safety Evaluation of Fayette County Schools" report submitted to Fayette County Schools in September 1996. A total of 191 parents and school staff responded to the survey questionnaire, representing 30 of Fayette County's 52 schools.

Every school in the Fayette County School district could benefit from the standardization of all signs and pavement markings on school property. Drivers often develop conditioned responses to familiar elements of the driving environment. Therefore, drivers traversing school properties are more likely to respond to signs and markings which are consistent with those seen on public streets and roadways. The Manual on Uniform Traffic Control Devices (MUTCD), compiled by the United States Department of Transportation, features the standard signs, markings and regulations for all highways open to public travel. Throughout the evaluation of the three schools below, reference is made to specific signs and markings described in the MUTCD. This manual may also be used as a reference for traffic flow and safety improvements at any other school evaluated.

#### **4.0 YATES ELEMENTARY SCHOOL**

Yates Elementary School is located in an area with high traffic volumes in northeast Lexington. The front of the school faces New Circle Road and its single access point is unsignalized. The traffic and safety problems which currently exist at Yates can mainly be attributed to the school's location. These problems may be worsened by changes planned for the area in the next few years. Redistricting of the area will add students from seven new neighborhoods near Todds Road. Due to this addition, a marked increase in parent and bus traffic can be expected during the morning drop-off and afternoon pick-up peak periods. Plans to expand New Circle Road to six lanes with a two-way turning lane will also have a significant impact on the safety of the school's main access point. The New Circle Road project is expected to be awarded by January 1998 and will take approximately two years to complete.

#### **4.1 INTERVIEW**

On January 8, 1997, an interview was conducted with the principal of Yates Elementary School, Dr. Jerome Johnson. Dr. Johnson's survey questionnaire is not summarized here because the comments he made were reiterated and expanded upon during his interview. During this time, Dr. Johnson discussed his traffic safety concerns and suggestions for improvements. Dr. Johnson stated that his primary traffic and safety concern for Yates is congestion in front of the school during afternoon

dismissal time. Waiting parents often park in the fire lane, on grass medians and curbs, and in areas marked with "No Parking" signs. He feels that these improperly parked vehicles restrict flow within the school property and create difficulty for buses trying to exit the school. Because these parents do not wait at the designated pick-up point, students are often unable to use the sidewalk and crosswalk to reach waiting parents.

Dr. Johnson is also concerned about the safety risks involved with the school's access point on New Circle Road. His opinion is that the intersection is already potentially dangerous for vehicles both entering and leaving the school property and that this problem will only be exacerbated by the widening of New Circle Road. According to Dr. Johnson, redistricting plans for Yates will also increase safety risks at the school entrance by adding approximately 100 new students to the school. In order to alleviate safety risks, Dr. Johnson suggests adding a flashing caution light at the school entrance. He also suggests creating a new entrance to the rear of the school and a drop-off / pick-up area for parents in the current rear parking area.

#### **4.2 OBSERVATION**

The morning peak period, considered to be the most congested 15 minutes before school started (from 8:05 a.m. to 8:20 a.m.), was observed on January 7, 1997. During this time, six school buses, 44 parents, 20 teachers and four day care vans were observed in front of the school. Because the buses unloaded directly onto the sidewalk, no hazards were observed in this area. The majority of the parents unloaded students at the designated crosswalk which leads to the front entrance of the school. Other parents parked in the front lot and walked with students to the building. While students are forced to cross the bus lane to reach the school building from the parking area drop-off point, the crossing is controlled with a chain-link fence so that students may only cross at one, well-marked point. For these reasons, no hazards were observed in the parent drop-off area. Students were also supervised in the front lot by a teacher or the principal until 8:30 a.m.

The afternoon peak was considered to be the most congested during the fifteen minutes after school dismissed or from 3:15 p.m. until 3:30 p.m. During this period, six buses, 21 parents, three teachers and four day care vans were observed leaving the school. Parents began arriving for dismissal prior to 3:00 p.m. and lined up along the front curb, on the grass median, along the service area driveway, and in the front parking area. "No Parking" signs in front of the school and along the service driveway were disregarded and parent traffic made it difficult for buses to exit the bus lane. While parent traffic in the front parking area blocked teachers' vehicles, the congestion lasted for only 15 to 20 minutes after dismissal. The majority of students used the designated crosswalk to reach waiting parents, and most of the improperly

parked parents walked their students back to waiting vehicles. The students were supervised by a teacher and the principal for approximately 15 minutes after dismissal.

The entrance to the school was also observed during the morning and afternoon peak traffic periods. With parents, teachers and buses beginning to arrive prior to 8:00 a.m., the school traffic conflicted with rush hour traffic on New Circle Road. Without a signal in front of the school, vehicles turning left into and out of the school property were forced to rely on gaps in the New Circle Road traffic. While Yates dismisses before the onset of the evening rush hour, the afternoon school traffic still contended with the regular traffic flow on New Circle Road. Currently, overhead school warning signs (MUTCD sign 55-1) are located approximately 600 feet prior to the school entrance northbound on New Circle Road and 325 feet prior to the school exit southbound on New Circle Road. These signs call for 25 m.p.h. speeds during the school's peak access times.

Because there is no public sidewalk directly accessing the school property, student pedestrian traffic is a major concern for Yates Elementary. Currently, student walkers enter and exist the school through a gate in the 12-foot fence separating the school property from the rear of Continental Square Apartments. Students must walk through the apartment complex to Continental Square, along a road which connects to Eastland Parkway. A crossing guard is present at the corner of Eastland Parkway and Continental Square for thirty minutes before and after school. While no hazards to the student pedestrians were observed in this area, a public sidewalk should be available to provide access to the school property.

The projected growth in Yates Elementary's student body can be expected to increase both parent and teacher parking demand at the school. In order to gain an understanding of the current parking situation, a parking count was taken on January 7, 1997. As of 8:45 a.m. on this particular day, 12 of the 48 regular spaces and all three of the marked handicap spaces available in the front parking area remained unoccupied. In the rear parking area, 15 of the 26 available spaces were also unoccupied. While it may seem that Yates has an excess of parking spaces, it is important to note that this count may have been taken before the arrival of all the staff members.

Observation of the morning and afternoon peak traffic periods and of the general school property identified a number of safety and traffic flow problems at Yates Elementary School. These issues are listed below:

- ▶ parents park illegally in front of the school, creating difficulty for bus traffic
- ▶ access to school property from New Circle Road is hazardous
- ▶ flashing 25 m.p.h. signs are ineffective in slowing traffic on New Circle Road

- ▶ no public sidewalk directly accesses the school property with students walking through an apartment complex to and from school

Consideration of these problem areas may ease the traffic safety and congestion problems which currently exist at Yates Elementary School.

### **4.3 RECOMMENDATIONS**

A number of traffic and safety concerns have been identified at Yates Elementary School. These are issues that must be addressed in order to improve the vehicular traffic flow and the safety of the students accessing the school. The majority of the identified safety problems focus around the school's main entrance point on New Circle Road. Through better use of the school's property, these safety problems can be significantly reduced.

The first step toward increased traffic safety at Yates Elementary School should be the creation of a second access point to the school property. This second point of entry and exit should be located so that school traffic has access to a signalized intersection feeding New Circle Road. In order to create this second entrance, the rear driveway on the south side of the school could be extended to meet the northern end of Martha Court or the midpoint of Hisle Way. Because Martha Court meets Eastland Parkway, school traffic using the rear entrance could gain access to New Circle Road at the signalized intersection with Eastland Parkway. Hisle Way is currently separated from Sunshine Lane with a guardrail-type barrier. With this barrier removed, school traffic could also access New Circle Road by using the traffic signal at the intersection of Sunshine Lane and New Circle Road. While either route is possible, the Martha Court route provides a better environment for school vehicle traffic and pedestrians. Sunshine Lane is a light industrial area and has a lot of heavy truck traffic and maneuvering. A new point of entry to the school property would eliminate much of the safety risk involved with the current school entrance.

The driveway connecting the school with Martha Court should be designed for bidirectional flow and speed humps should be installed. It is important to note that there is a difference between speed humps and speed bumps. Speed humps are approximately 12-feet in length and gradually rise to 3 or 4 inches in the center of the hump. Speed bumps are approximately 6-inches in length and rise to 3 or 4 inches in the center of the bump. Speed humps have been shown to be safer than speed bumps and cause less damage to vehicles. Consideration should also be given to bus traffic and design criteria necessary to route buses through the new access. The new driveway should be constructed with an adjacent sidewalk, so that student pedestrians have a safe and well-defined walkway from the school building to the neighboring public street. In this way, pedestrians would no longer be forced to cross private property to

reach Eastland Parkway.

If a new rear entrance is built, some changes should be made to the current drop-off and pick-up scheme at the school. The rear teacher parking area should be converted to a drop-off / pick-up lane for parents and day care vans. The direction of flow in the parking area should be reversed so that parents entering from the rear of the school would turn right into the first driveway of the rear lot. In order to make this clear to parents, directional arrows (white in color) should be painted on the pavement. To maintain parking for teachers in this area, the angled parking spaces must be restriped to match the new traffic flow direction. With approximately 30-feet of width at all points in the rear lot, adequate space should be available for both parked vehicles and parent traffic.

The current bus drop-off and pick-up lane in front of the school should be maintained in order to completely separate the bus and parent traffic at the school. If the new rear entry is constructed, buses may enter the school from either the front or rear. However, the driveway immediately adjacent to the south corner of the school building currently measures only 14-feet in width. In order to maintain 2-way traffic through this driveway, opposing vehicles would have to alternate through the constricted area. The installation of a "one lane driveway" sign (MUTCD sign W5) would help to make drivers more aware of this problem. Consideration could be given to restricting traffic to buses only if moving from the rear of the school to the front.

The current configuration of the front lot only allows room for buses to exit the property onto New Circle Road because of the turning radius requirements. Therefore, bus drivers who need to move south on New Circle Road should be instructed to turn right out of the school, turn left on Industry Road, turn left again on Eastland Parkway and access New Circle Road at the signalized intersection. A long-term solution to this problem would be to construct a bus lane from the current service area on the north side of the school building. This lane would cross the rear school yard to meet the exit onto Martha Court. A second option would be to connect the rear service area with Sunshine Lane, the next adjacent road which is signalized at New Circle Road. The current front area of the school could also be altered to allow room for buses to loop around and use the rear school exit, assuming this rear exit is constructed.

Consideration should also be given to the future parking needs for Yates Elementary. If large parking increases are expected to accompany the school's redistricting, a new parking lot should be constructed adjacent to the new rear driveway. The expense of constructing a parking lot will be relatively insignificant if it is done during the construction of the new rear access driveway. Regardless of the parking decisions made, several spaces in front of the school should be marked for "Visitors Only" with signs or with paint on the pavement. Throughout the school campus, all pavement markings should be standardized using the MUTCD manual.

For example, both the yellow directional arrows and the blue crosswalk in front of the school should be painted white.

Other options for improving the traffic and safety conditions at Yates Elementary exist but require further study. One such option would be to install a signal at the front entrance of the school and New Circle Road. A number of warrants for traffic signal installation have been established and a complete installation analysis should be conducted before considering this option. Consideration could also be given to the construction of a second front entrance onto New Circle Road. This access should be an entrance only and would approach the school just past Wendy's restaurant. Access to the existing easement connecting the school property to Meade Court could also be pursued. In order to maintain the Meade Court property owner's security fence, consideration could be given to an automatic gate system which would only be operational during school hours. In order to reduce the safety risk involved with student pedestrians and an automatic gate, a school crossing guard could be assigned to the gate during the morning, noon and afternoon peak periods.

## **5.0 CLAYS MILL ELEMENTARY SCHOOL**

Clays Mill Elementary School is located in a suburban area and is bounded by Clays Mill Road to the east, Mary Queen School to the south, Southland Park to the west and private property to the north. The only entrance and the exit to the school are located on Clays Mill Road. Due to the inadequate amount of vehicle storage in the school's parent and bus pick-up/drop-off lanes, peak period traffic often backs onto Clays Mill Road. The traffic congestion in front of the school creates hazardous conditions on Clays Mill Road and often delays buses in entering the school pick-up area during the afternoon peak.

### **5.1 SURVEY RESULTS**

The principal, teachers and parents of Clays Mill Elementary School completed and returned three written surveys. According to the survey results, a major traffic flow or safety problem is perceived by all three of the survey participants. The number of participants ranking each specific traffic and safety issue is shown below where 1 is the least serious ranking and 5 is the most serious ranking. The rankings show that the majority of the survey participants find that parent pick-up of students and the resulting conflict with bus flow is the most serious traffic and safety problem at Clays Mill. Other serious concerns include traffic flow in and out of the school property and pupil loading and unloading areas in front of the school. Moderate concern is indicated for parking on school property and the safety of students walking to and from school. The least emphasis is placed on street parking in the vicinity of the school property.

		Ranking				
		1	2	3	4	5
A.	Traffic flow in and out of the school property	0	0	0	1	2
B.	Parking on school property	0	0	2	1	0
C.	Parking on streets in vicinity of school property	2	0	1	0	0
D.	Pupil loading and unloading areas	0	0	0	1	2
E.	Parent pick-up of students and resulting conflict with bus flow	0	0	0	0	3
F.	Safety of students walking to and from school	0	1	2	0	0

All three of the survey participants provided written comments with all of the comments citing the lack of separation of parent and bus flow as a major concern. Currently, most parents use the inner parking area as the drop-off/pick-up point for students, requiring students to cross the bus lane. According to the survey comments, some parents do not cross the lane with students, forcing them to cross alone. The survey comments also indicate that some parents use the bus lane for student drop-off and pick-up, disregarding the stop arms on the school buses.

The survey participants also provided comments on a number of other topics. Two of the respondents mention congestion on Clays Mill Road during the morning and afternoon peak periods and one mentions the frequency of rear-end accidents due to the back-up. Two of the participants think that the proximity of Clays Mill, Lexington Catholic High School and Mary Queen School exacerbates the traffic problem and one includes a suggestion to install a flashing school sign indicating three schools in the vicinity. Speed on Clays Mill Road is a concern for one of the participants and two of the surveys suggest the construction of a separate lane for cars or buses.

## 5.2 INTERVIEW

On January 8, 1997, a brief interview was conducted with the assistant

principal of Clays Mill Elementary School, Mrs. Haydon. During this time, Mrs. Haydon discussed her traffic safety concerns and a few suggestions for improvement. Mrs. Haydon stated that Clays Mill's main traffic problem involves congestion in and around the school property at afternoon dismissal time. Waiting parents line up in the front parking area and along the right side of the bus lane. Often, waiting parents prevent buses from reaching the student pick-up area. Parents waiting in the parking area also block teachers' vehicles and other parents who are ready to leave. These parents leave vehicles unattended in the parking area in order to cross the bus lane to pick-up waiting students.

Mrs. Haydon also expressed concern over the lack of flow on the school property during the morning and afternoon peak periods. Because emergency vehicles were not able to approach the school during a recent medical emergency, she feels that emergency services should have access to the school at all times. Mrs. Haydon is also concerned with the lack of staff parking at Clays Mill School. According to Mrs. Haydon, 85 staff members are present every day at the school and are not accommodated by the school's 80 spaces. The excess vehicles are often parked along the grass medians or front curb of the school building. Mrs. Haydon also stated that the lack of a crossing guard in front of the school creates a hazard for student pedestrians.

### **5.3 OBSERVATION**

The morning peak period, considered to be the most congested 15 minutes prior to the start of school (8:25 a.m. to 8:40 a.m.), was observed on December 19, 1996. During this time, seven school buses, 78 parents, five teachers and two day care vehicles were observed in front of the school. Because the buses unload directly onto the sidewalk, no hazards were observed in this area. The majority of the parents parked temporarily in the front parking area and walked with students across the bus lane. Without a crosswalk from the parking area to the school building, students crossing the bus lane alone were placed in a hazardous situation. A number of parents also used the bus lane for student drop-off and disregarded the extended stop-arms on unloading buses. While parents are instructed by the school to use the inner parking lane for drop-off and pick-up of students, the bus and parents lanes are not marked with signs to indicate proper usage or with directional arrows to indicate flow directions.

Student pedestrians approaching from the south were assisted by a crossing guard at the intersection of Clays Mill Road and Holly Hill for 30 minutes before school started. While the vehicle traffic was heavy during this time, drivers seemed to respond well to the guard and to notice the pedestrian traffic. Once students entered the school property at the south end of the school, they were able to follow a sidewalk

directly to one of the rear doors. Student pedestrians approaching from the north were assisted by a crossing guard at the corner of Cardinal Lane and Clays Mill Road. Once these students entered the school property, they were able to follow a sidewalk which runs adjacent to the bus lane. However, this sidewalk ends at the rear parking driveway and picks up again in front of the school's gymnasium. There is not a crosswalk present to guide the students across the driveway or to alert drivers to the possible presence of pedestrians.

The afternoon peak was considered to be the most congested 15 minutes after school dismissed or from 3:40 p.m. until 3:55 p.m. During this period, five buses, 54 parents, 13 teachers and five day care vehicles were observed in front of the school. Parents began arriving for dismissal prior to 3:15 p.m. and lined up in the front parking area as well as in the bus lane. During the peak time period, waiting parents and buses backed onto Clays Mill Road and caused traffic to come to a standstill. Parents waiting in the front parking area blocked teachers' vehicles and other parents who were ready to leave. While most of the parents walked from the parking area to help students cross the bus lane, a few parents just motioned students across in front of the buses. This behavior is particularly dangerous because of the parents who also use the bus lane for afternoon pick-up. Without a designated crosswalk between the school and the parking area, drivers are not as aware of crossing students as they should be.

While the survey questionnaires complained of traffic conflict between the three schools (Clays Mill Elementary, Lexington Catholic High School and Mary Queen School) in the area, this was not observed during the morning or afternoon peak periods. The starting and dismissal times for the three schools are staggered to prevent the conflict of traffic flow during the morning drop-off and afternoon pick-up periods. These times are listed below:

<b>School Name</b>	<b>Beginning Time</b>	<b>Dismissal Time</b>
Lexington Catholic High School	7:50 a.m.	3:15 p.m.
Mary Queen School	8:00 a.m.	2:50 p.m.
Clays Mill Elementary	8:55 a.m.	3:35 p.m.

While some of the traffic from the three schools may overlap, the peak periods are separated enough to prevent major conflicts with Clays Mill's traffic.

In order to gain an understanding of the parking problem at Clays Mill

Elementary, a parking count was taken on December 19, 1996. As of 9:15 a.m. on this particular day, 46 vehicles were present in the front parking area, 19 vehicles were parked in the lot adjacent to the gymnasium and another 6 vehicles were parked in the rear lot. With a total of 80 regular parking spaces and 3 handicapped parking spaces on the school property, not all of the spaces were filled at this particular time. However, it is important to note that this count may have been taken before the arrival of all of the staff members. Another point to remember when considering this count is that there is no provision made for parent or visitor parking anywhere on the school campus.

Observation of the morning and afternoon peak traffic periods and of the general school property identified a number of safety and congestion problems. These issues are listed below:

- ▶ vehicle storage in parent and bus lanes is inadequate for peak periods
- ▶ school congestion backs onto Clays Mill and restricts entrance for buses
- ▶ parent and bus traffic is poorly separated
- ▶ students must cross bus lane to reach school from parent drop-off area
- ▶ staff, parent and visitor parking is insufficient

Consideration of these problem areas may ease the traffic safety and congestion problems which currently exist at Clays Mill Elementary School.

#### **5.4 RECOMMENDATIONS**

A number of traffic and safety concerns have been identified at Clays Mill Elementary School. These are issues that must be addressed in order to improve the vehicular traffic flow and the safety of the students accessing the school. The majority of the identified safety problems focus around the school's congestion problems and main access point on Clays Mill Road. Through better use of the school's property, these safety problems can be significantly reduced.

The first step toward increased traffic safety at Clays Mill Elementary School should be the construction of a parent driveway which is completely separate from the bus lane. The entrance to the new driveway should be located across from Holly Hill Drive and should be clearly marked with "entrance only" signs (MUTCD sign R6-2) on both sides of the driveway. The driveway should also be designed for single-direction, 2-lane flow in order to allow for maximum storage of parent vehicles. The driveway should be connected to the current bus exit and marked with a "yield" sign (MUTCD sign R1-2) in order to give buses the right-of-way. A "do not enter" sign (MUTCD sign R5-1) should be placed at the intersection of the driveway and the bus lane to indicate

that the lane is intended for entrance only from Clays Mill Road. The connection of the parent driveway and the bus lane should occur past the point at which buses stop for loading and unloading. Creating a new point of entry and increased storage for vehicles accessing the school property would eliminate much of the safety risk involved with back-ups at the current school entrance.

If a new parent entrance is built, some changes should be made to the current drop-off and pick-up scheme at the school. First, the small playground area on the school's front lawn must be relocated to the rear of the school. Then, the student loading zone for parent vehicles should be located just east of the school's northeast door. A sidewalk should be constructed to lead from this door to the new driveway to provide students direct access to waiting parents, without having to cross the bus lane. This sidewalk should also run the length of the driveway and join with the school's south door sidewalk before reaching Clays Mill Road. The current drop-off and pick-up lane for buses should be maintained in order to completely separate parent and bus flow at the school.

As emphasized by the interview with Mrs. Haydon, parking on school property is a major concern for Clays Mill's 85 staff members. With a few minor changes, parallel parking may be added along the right side of the inner parking lane and along the right side of the bus lane. However, adding parking in these areas will only increase the congestion already present in and around the front of the school. Parallel parking along these lanes would be possible if the new driveway is constructed. With all parent traffic removed to the new parent lane, the width of the current lanes could be reduced with marked parallel parking spaces.

Consideration should also be given to the future parking needs for Clays Mill Elementary. The expense of constructing a new parking lot could be significantly reduced if it is coordinated with the construction of the new access driveway. The lot could be located on the school's front lawn between Clays Mill Road and the new parent driveway. Entrance to the lot should be created from the parent driveway with the lot exiting into the current bus lane. If a new access driveway and a new parking lot are constructed in the grass area between the school and Clays Mill Road, then additional provisions may need to be made to accommodate drainage requirements in that area. Regardless of the parking decisions made, several spaces in front of the school should be marked for "Visitors Only" with signs or with paint on the pavement. Throughout the school campus, all pavement markings should be standardized using the MUTCD manual. White directional arrows should be installed to help regulate flow within the campus. Similarly, white crosswalks should connect all pedestrian routes which cross driveways and lanes within the campus.

entrance created for the stadium construction. The suggested permanent site would enter the parking area at the east end of the student parking lot and would be extended from the southmost parking travel lane. It was noted by the council that the permanent site construction would require large amounts of cut and fill to level the grade in this area.

## **6.2 OBSERVATION**

The morning peak period, determined to be between 7:15 a.m. and 7:30 a.m., was observed on December 17, 1996 and again on February 10, 1997 in order to verify the morning congestion. During the first observation, 11 buses, 180 students, 51 teachers and 72 parents were observed entering the school property. The bus drop-off area is located at the south end of the school and is completely separated from other vehicular traffic. Therefore, no pedestrian safety hazards were observed in this area. The parent drop-off area is located at the front curb of the school and students are unloaded directly onto the sidewalk. Again, no pedestrian risks were identified in this area.

Potential pedestrian hazards do occur on Man O' War Boulevard, however, when northbound parents stop in the far travel lane to drop off students. First, parents take the risk of being hit from behind by vehicles moving in the travel lane. Second, these students must cross four lanes of traffic to reach the school property. Because no sidewalks approach the school from the front, students are forced to walk through the grass or along with the vehicular traffic in order to reach the school building. These students are placed in a potentially hazardous situation.

The morning traffic congestion problem which occurs in front of the school can be attributed to the design of the school's entrance. The majority of the morning traffic (231 of the 314 vehicles observed) were turning into the school's parking area. In order to access the parking area once inside the school property, a left turn must be made at the parking area's entrance. This left turn can only be made, however, when a gap in the exiting parent and bus traffic occurs. Because the parking area's turning lane has a capacity of approximately 4 to 5 vehicles, the remainder of the vehicles waiting to enter the parking lot are delayed on Man O' War Boulevard. In some instances, drivers cannot make the left turn during the green arrow phase because of drivers waiting to turn left into the parking area. For this reason, both the left and right turning lanes into the school are filled to capacity and overflow into the travel lanes.

The approximate delay times for entering the school from each direction were recorded on February 10, 1997. When approaching the school from the east, delay was measured to be approximately 8 minutes. When approaching from the west, the delay

## **6.0 DUNBAR HIGH SCHOOL**

Dunbar High School is located on a 4-lane, 45 m.p.h. arterial in south Lexington and its single access point is signalized. The school property is bounded on three sides by private farm land and by Man O' War Boulevard on the fourth side. With very little pedestrian traffic approaching the school, a large number of parent, student and staff vehicles as well as buses must all be maneuvered in and out of the school's single access point. Morning and afternoon peak periods at the school create congestion and potentially hazardous back-ups on Man O' War Boulevard.

### **6.1 TRAFFIC SAFETY COMMITTEE MEETING**

On December 4, 1996, Dunbar High School's informal Traffic Safety Committee met to discuss the traffic safety problems currently occurring at the school. During the meeting, council members communicated several traffic flow and safety concerns as well as a few suggestions for improvements. While many different problems were discussed during the meeting, all of the comments focused on one main subject: the school's single access point. According to the council members, congestion from the school backs onto Man O' War Boulevard during the morning peak period. Queues of vehicles waiting to turn into the school extend past the turning lanes and block travel lanes of Man O' War. Because Dunbar starts at 7:45, the school traffic interferes with the morning rush hour traffic on Man O' War Boulevard.

The school's congestion creates several problems which pose safety risks to those entering and exiting the school property as well as to other travelers on Man O' War. First, traffic extending past the turn lane and stopped in the travel lane of Man O' War creates the potential for rear-end accidents. Second, students and parents approaching from the east on Man O' War often pass the school, make a u-turn maneuver at the first median break and then turn right into the school. According to one parent present at the meeting, several students have been involved in minor accidents when making this maneuver. Third, students who leave home in enough time to get to school are often tardy due to the traffic congestion approaching the entrance. Therefore, these students often make poor or reckless driving decisions in order to get to school on time. Finally, a council parent is concerned that an emergency evacuation or other such event would not be possible with the current access configuration.

In order to alleviate some of these safety risks, the council expressed great interest in opening a second access to the school property. The council suggested a temporary and a permanent site for the new access, both of which would exit onto Cave Hill Lane which intersects Man O' War Boulevard directly across from Fort Harrods Drive. The suggested temporary site would enter the parking area at the temporary

was about 5 minutes. Possibly due to this difference in delay times, many vehicles approaching from the east were observed passing the school, making a u-turn at the first median break and waiting to turn right into the school. Even though a "no u-turn" sign is posted at this median break, both students and parents were observed making this maneuver. Observations showed that this maneuver is potentially hazardous as the u-turning vehicle must cross the fairly high-speed left travel lane.

The afternoon peak period was observed on December 18, 1996. The most congested 15 minutes after school dismissed was from 2:30 p.m. until 2:45 p.m. During this time, 29 buses, 65 parents, four teachers and 187 students were observed leaving the school. As in the morning, the afternoon loading of buses and parent vehicles on campus was routine and uneventful. However, students moving from the building to the parking area did face one potential hazard. There is no marked crosswalk for students to use when crossing the bus entrance and exit lane to reach the parking area. The dispersion of the parked vehicles took approximately 30 minutes after school dismissal. While 30 minutes may seem like an extended period of time, traffic flowed at a regular pace out of the school property.

Observation of the morning and afternoon peak traffic periods provided insight into the flow and safety problems existing at Dunbar High School. The primary traffic concern involves the school's single access point and the resulting congestion on Man O' War Boulevard. The steps involved in the congestion problem are outlined below:

- ▶ design of the school entrance prevents smooth flow into the school
- ▶ waiting vehicles queue into travel lanes of Man O' War Boulevard
- ▶ delays create potentially hazardous driving situations

Consideration of the cause of this congestion process may decrease the traffic flow and safety problems which currently exist at Dunbar High School.

### **6.3 RECOMMENDATIONS**

As shown by the peak traffic observations, the majority of Dunbar High School's traffic flow and safety problems occur during the morning drop-off period. In order to alleviate the traffic congestion which currently occurs at Dunbar and the surrounding area, a number of alternatives should be considered. Each of the possible solutions discussed are designed to remove the queuing traffic from Man O' War Boulevard by increasing flow into the school property.

The most direct and permanent way to increase traffic flow into the school property would be to construct a second school access point. In order to provide immediate relief to the morning traffic problem, a temporary access point should be

established at the current stadium construction entrance at the east end of the parking area. This entrance connects the school parking area with Cave Hill Lane, which intersects with Man O' War Boulevard. Cave Hill Lane is located directly across from Fort Harrods Drive.

The next step in establishing a second access point should be to evaluate the installation of a traffic signal at the intersection of Man O' War and Cave Hill Lane. The installation of a traffic signal would reduce the potential risks involved with dismissing both students and buses from this exit. Cave Hill Lane should also be upgraded to safely accommodate school traffic and buses. Currently, Cave Hill narrows just before the temporary access point and would not provide sufficient turning radius for school buses. Finally, the bus lane should be connected to this exit so that bus traffic is not forced to circle back through the school property in order to exit at a traffic signal.

There are also several less expansive suggestions for easing Dunbar's traffic and safety problems. First, the left and right turn lanes in front of the school could be extended to provide increased storage capacity. Second, a "do not block" sign (MUTCD sign R10-7) could be installed to prevent parents and buses from blocking vehicles waiting to turn into the parking area. Third, the break in the median which allows left turns into the parking area could be permanently closed. In this way, any vehicles wishing to enter the parking lot would flow around the median and into the lot without queuing. One drawback to this alternative may be the weaving zone created when exiting parents and buses merge with entering parkers. Fourth, consideration could be given to connecting the outer bus lane with the parking area, providing an alternative route for vehicles to reach the parking area. This alternative, however, would route traffic through the path of students crossing from the parking lot to the school building.

To maintain order on the school property, in parking lots and through traffic flow areas, a number of safety features should be installed. A sidewalk should be constructed so that pedestrians may approach the school from the main entrance without walking through grass or travel lanes. A white crosswalk (MUTCD Figure 3-14) should mark pedestrian travel from the parking area to the school building. The crosswalk will help to direct students to cross the current bus lane at one particular point and will also draw the attention of drivers to the presence of pedestrians. Finally, the school's yellow directional areas should be repainted in the standard white color.

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1. Manual on Uniform Traffic Control Devices for Streets and Highways. U. S. Department of Transportation, Federal Highway Administration, Washington, D. C. 1988 Edition.
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## **APPENDIX A**

## QUESTIONNAIRE

### EVALUATION OF TRAFFIC FLOW AND SAFETY AT FAYETTE COUNTY SCHOOLS

1. Name of School: \_\_\_\_\_
2. Address/Street Location: \_\_\_\_\_
3. Relationship to School (teacher, parent, bus driver, other): \_\_\_\_\_
4. Do you perceive a traffic safety or congestion problem at your school?  
Yes (major problem) \_\_\_\_\_ No \_\_\_\_\_  
Yes (moderate problem) \_\_\_\_\_  
Yes (minor problem) \_\_\_\_\_ Do Not Know \_\_\_\_\_
5. What are the specific issues related to traffic safety or congestion where improvements could be made? Rank, by circling the number, the following cited problems at schools with 1 for the least serious and 5 for the most serious.

A. Traffic flow in and out of school property.	1 2 3 4 5
B. Parking on school property.	1 2 3 4 5
C. Parking on streets in the vicinity of the school property.	1 2 3 4 5
D. Pupil loading and unloading areas.	1 2 3 4 5
E. Personal vehicle usage by students.	1 2 3 4 5
F. Parent pick-up of students and resulting conflict with bus flow.	1 2 3 4 5
G. Safety of students walking to and from school.	1 2 3 4 5
H. Other issues or problems.	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
- Elaborate and discuss in detail any of the problems of greatest concern to you.
6. Briefly describe the most common types of accidents or near accidents related to traffic flow and congestion which have occurred on school property or adjacent streets.
7. Please list specific suggestions for improvements in traffic flow and safety at your school.

**APPENDIX B**

# CLAYS MILL ELEMENTARY SCHOOL

## QUESTIONNAIRE RESULTS

Number of Returned Surveys: 3

**Do you perceive a traffic safety or congestion problem at your school?**

<u>YES (major)</u>	<u>YES (moderate)</u>	<u>YES (minor)</u>	<u>NO</u>	<u>Don't Know</u>
3	0	0	0	0

**What are the specific issues related to traffic safety or congestion where improvements could be made? (Rank 1 is least serious, Rank 5 is most serious)**

	<u>Ranking</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
A. Traffic flow in and out of school property	0	0	0	1	2
B. Parking on school property	0	0	2	1	0
C. Parking on streets in the vicinity of school property	2	0	1	0	0
D. Pupil loading and unloading areas	0	0	0	1	2
E. Personal vehicle usage by students	not applicable				
F. Parent pick-up of students and resulting conflict with bus flow	0	0	0	0	3
G. Safety of students walking to and from school	0	1	2	0	0

### **Other Complaints / Suggestions:**

- congestion in a.m. and p.m. due to proximity of Clays Mill, Lexington Catholic and Mary Queen schools
- no separate pick-up lanes for buses and cars, students cross between buses to reach waiting parents
- install flashing school zone sign indicating three schools in the vicinity

## YATES ELEMENTARY SCHOOL

### QUESTIONNAIRE RESULTS

Number of Returned Surveys: 1

**Do you perceive a traffic safety or congestion problem at your school?**

<u>YES (major)</u>	<u>YES (moderate)</u>	<u>YES (minor)</u>	<u>NO</u>	<u>Don't Know</u>
0	0	0	1	0

**What are the specific issues related to traffic safety or congestion where improvements could be made? (Rank 1 is least serious, Rank 5 is most serious)**

	<u>Ranking</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
H. Traffic flow in and out of school property	1	0	0	0	0
B. Parking on school property	1	0	0	0	0
C. Parking on streets in the vicinity of school property	1	0	0	0	0
D. Pupil loading and unloading areas	1	0	0	0	0
E. Personal vehicle usage by students	not applicable				
F. Parent pick-up of students and resulting conflict with bus flow	1	0	0	0	0
G. Safety of students walking to and from school	1	0	0	0	0

#### **Other Complaints / Suggestions:**

- install a stop/ caution light on New Circle Road at school entrance