

Traffic Management Plan and Queuing Analysis
Lakehill Preparatory School Z145-235
2720 Hillside Drive, Dallas, TX
October 27, 2015

Introduction:

The Lakehill Preparatory School is located on the northeast corner of Hillside Drive and Westlake Avenue. The school has been in operation on the current site since 1971. The school currently has 423 students in grades K through 12. The school is proposing to add two expansions to the existing buildings on campus, which will modify circulation through the main parking and loading area. The school is also proposing to expand the student body to 500 students.

The following table shows the distribution of students for the 2014-2015 school year, and for the proposed maximum of 500 students:

Grade	2014/2015 Students	Maximum Students	Start Time	Dismissal Time
Kindergarten	26	32	8:15 AM	3:00 PM
1 st Grade	37	36		
2 nd Grade	32	36		
3 rd Grade	34	36		
4 th Grade	30	36		
Lower School Subtotal	159	176		
5 th Grade	36	38	8:00 AM	3:30 PM
6 th Grade	34	38		
7 th Grade	38	43		
8 th Grade	41	45		
Middle School Subtotal	149	164		
9 th Grade	30	40	8:00 AM	3:30 PM
10 th Grade	33	40		
11 th Grade	30	40		
12 th Grade	22	40		
Upper School Subtotal	115	160		
Lakehill Total	423	500		

Existing Campus Circulation and Observations:

The current campus has two loading areas. The Main Loading Area is on the northwest corner of the building, in the main parking lot. It has two paths, entered from either the northern or middle driveways on Hillside Drive. The middle driveway is opposite Vickery Boulevard, and its path leads through the courtyard and then out either to Blanch Circle or Hillside Drive. The northern driveway path leads across the north side of the building and then out to Blanch Circle. Combined queuing positions number approximately 22 in both parts of the Main Loading Area. The Gym Loading Area is north of the gymnasium, accessed via the fire lane from Westlake Avenue, and then exiting out to Blanch Circle.

School drop-off and pick-up conditions were observed on February 10 and 12, 2015. The school days were reported to be typical in all respects. Additional observations were made with neighborhood members, City commissioners, and City staff in May 2015.

Parents are instructed in the drop-off and pick-up procedures with handouts with text and exhibits for each grade level.

For the morning drop-off time period, all students are dropped off in the Main Loading Area adjacent to the parking lot. Middle and Upper School students arrive for the 8:00 AM start, and Lower School for the 8:15 start. Vehicles enter from Hillside Drive, deposit students in the loading area, and then exit to Blanch Circle or Hillside Drive. Vehicles are directed to exits by the security officer who manages the campus circulation. Drop-off flow is smooth but the multiple entry paths can lead to friction between vehicles. The maximum observed queue was approximately 22 vehicles, split equally between the two paths through the Main Loading Area. Entering and exiting vehicles had a short-lived negative effect on Hillside Drive when vehicles could not be immediately received into the campus. There were only brief delays to through vehicles. Radar speed readings during the May observation showed most vehicles travelling between 20 and 25 MPH on Hillside Drive at Vickery Boulevard. No vehicle was observed at over 29 MPH. Perceived speed along Hillside Drive is higher due to the narrowness of the roadway.

For the afternoon pick-up time period, the Lower School students are dismissed at 3:00 PM using the Gym Loading Area. Drivers respected the school's instruction to enter only from westbound Westlake Avenue. Maximum queue was observed to be 23 vehicles at the 3:00 PM time when dismissals began. With vehicles only being queued to the north edge of the gym building prior to the dismissal and 16 vehicles able to be queued on the campus, this meant 7 vehicles were queued on westbound Westlake Avenue. Since the queue was confined to one direction, and the Westlake Avenue traffic volume is minimal, this queuing in the public street did not present a significant negative impact to the traffic conditions. Non-school vehicles travelling in either direction could still proceed. The pick-up operation uses the standard modern procedure of placards in vehicles, and a traffic administrator matching vehicles with students at multiple loading positions. The Lower School queue was out of the street by 3:10 PM and the loading operation was essentially done by 3:15 PM. After picking up students, the vehicles could easily exit to Blanch Circle.

The Middle and Upper Schools performed the pick-up operations in the two parts of the Main Loading Area. The Middle School vehicles enter at the north driveway to Hillside Drive and pass across the north side of the building, then exit to Blanch Circle. The Upper School vehicles enter at the middle driveway opposite Vickery Boulevard and travel through the courtyard area, then are directed to exit either to Blanch Circle or Hillside Drive by the security officer. Maximum observed queue was approximately 18 vehicles just after the 3:30 PM

dismissal, and the main pick-up rush was completed by 3:42. Some vehicles briefly queued along Hillside Drive, causing minor delay to through traffic.

Proposed Campus Circulation:

The expansion of the campus buildings will remove the courtyard portion of the Main Loading Area, leaving only one drop-off or pick-up path. A new east-west connection will be constructed south of the school building, allowing internal access between the eastern driveway and the main loading area. In addition to providing additional queue space within the campus, the east-west connection allows entering vehicles to be more balanced between Hillside Drive and Westlake Avenue and still reach the Main Loading Area.

The circulation for the Main Loading Area will be to enter at the southern driveway on Hillside Drive, travel north along the western edge of the building, then turn east to the loading area. Entry to the campus will be from northbound Hillside Drive only. A second circulation path will be to enter from Westlake Avenue, travel west on the new east-west connector, and then join the northbound path. Exit will be to Blanch Circle. The northbound leg of this path is doublestacked for additional queuing positions within the campus.

The two paths to Main Loading area provide a total of 1,020' of queuing distance, which accommodates 51 vehicles. This queue is made up of the main lane from Hillside Drive to the loading area (480'), the northbound doublestacked lane (200'), and the east-west connector (340'). This queuing distance does not include the 160' between the east-west connector and Westlake Avenue, which would also be available in the PM pick-up time period. The 1,020' of available queuing is a 130% increase in available queuing from the current 440', a change from 22 positions to 51. Besides the additional queuing distance within the site, the Main Loading Area should operate more efficiently since there is only one path in the loading vicinity, removing decision points and the crossing conflict where the current paths intersect.

The Gym Loading Area will operate as it does currently, with the loading area extended northwards to expand the number of vehicles able to queue on the site up to 25. Entry from Westlake Avenue can be from either direction.

Student drivers and faculty parking on campus will enter from the northern driveway on Hillside Drive. Student drivers will exit back to Hillside Drive at the same point, while faculty exiting from the new northeast parking lot will join the exit path to Blanch Circle. The parking entry/exit to Hillside Drive is separated from the loading area traffic flow by cones.

One traffic officer will be positioned at the Westlake Avenue entry, and another will be positioned along Hillside Drive during the drop-off and pick-up periods. The Westlake Avenue officer will control the entry and ensure that Westlake Avenue through traffic is not impeded by entering maneuvers. The Hillside Drive officer will control drop-off/pick-up entries at the southern driveway and parking entry/exit at the northern driveway. Both officers will act assertively to reduce the impact on the public street traffic by the school traffic maneuvers.

Proposed TMP Operation:

The proposed TMP for the expanded campus uses the same start and end times as the current operation, and modifies the circulation as noted above. For 8:00 AM arrival, Upper School student drop-offs enter from Westlake Avenue, travel through the longer circulation path, and are dropped off in the Main Loading Area. At the same time, Middle School student drop-offs enter from Westlake Avenue, split from the Upper School path to continue north, and are dropped off at the Gym Loading Area. For 8:15 AM arrival, Lower School drop-offs enter from northbound Hillside Drive, travel north within the campus, and are dropped off in the Main Loading Area.

The Lower School dismissal is accommodated at the Gym Loading Area at 3:00 PM. Vehicles arriving prior to dismissal should be queued up to the north edge of the loading area, to maximize the usable queue within the site. Vehicles queue and then arrive at the Gym Loading Area, where they are matched with students by the traffic administrator, aided by placards in each vehicle. Students are assisted into the vehicle at each loading station by the staff. Vehicles then exit to Blanch Circle.

The Middle School and Upper School dismissal occurs at 3:30 PM using the Main Loading Area. Upper School vehicles enter from Westlake Avenue and queue across the east-west connector. Middle School vehicles enter from northbound Hillside Drive. Vehicles arriving prior to dismissal can queue within the path shown on the TMP. Vehicles queue and then arrive at the Main Loading Area, where they are matched with students by the traffic administrator. Vehicles then exit to Blanch Circle.

Queuing Analysis:

Based on observations of queuing at other public and private schools in the DFW area, KHA uses a design standard for projecting pick-up queue demands at schools. In the normal KHA design standard, the expected maximum queue in vehicles is equal to 20% of the largest number of students dismissed at one time, or 1 vehicle per 5 students. Students using buses or walking/biking are deducted from the student number since they do not attract personal vehicles to the campus. This method accounts for the differences in how schools divide up the pick-up time period, as some dismiss all students in one group and therefore have higher vehicle demands in a short time period, while some spread out the dismissals over two or more groups. The projected queue formula can be stated as:

$$(\text{Students dismissed in time period} - \text{Students using other modes}) * \text{Vehicles/Student} = \text{Number of vehicles in queue}$$

The observations of the existing conditions showed that Lakehill generates fewer queued vehicles than the typical school campus. The maximum queue for the Lower School was 23 vehicles when dismissing 159 students, for a rate of 1 vehicle per 7 students. The maximum queue for the Middle and Upper School was 18 vehicles when dismissing 264 students (including student drivers), for a rate of 1 vehicle per 14+ students. For a conservative analysis, the Middle and Upper School future queues will be calculated with a rate of 1 vehicle per 10 students.

The peak queue for the Gym Loading Area will occur at 3:00 PM with the Lower School dismissal of 176 students. 176 students being dismissed translates to a queue of 25 vehicles, or 500' of queuing distance. The Gym Loading Area now has 500' of queuing distance available, so the maximum queue should be accommodated without extending onto Westlake Avenue.

The peak queue for the Main Loading Area will occur at 3:30 PM with the Middle School and Upper School dismissals of 324 students. After deductions for student drivers, this translates to a maximum queue of 24

vehicles between the two groups, or 480' of queuing distance. This queue can be comfortably be accommodated within the 1,020' of queuing distance available. For the specific groups, the 16 vehicles in the maximum Middle School queue can be accommodated within the 480' of main lane queue between Hillside Drive and the Main Loading Area, before consideration of the doublestacked queue lane. The 8 vehicles in the maximum Upper School queue can be accommodated within the east-west connector's 340' of available queue, or within the doublestacked queue lane. With 30 minutes between dismissals for the Lower School and the Middle/Upper Schools, there is no overlap of the exiting paths to Blanch Circle.

The following table shows the dismissal groups for each loading area, and resulting queuing conditions.

Pick-Up Queuing Summary - Main Loading Area								
Group Grades Dismissed	Dismissal Time	Students Dismissed	Bus / Bike / Walk	Student Drivers	Parent Pickup	Maximum Queue	Available Queue	Surplus (Deficiency)
Middle School 5, 6, 7, 8	3:30 PM	164	0	0	164	16 Vehicles 320'	24 Vehicles 480'	8 Vehicles 160'
Upper School 9, 10, 11, 12	3:30 PM	160	0	80	80	8 Vehicles 160'	17 Vehicles 340'	9 Vehicles 180'

Middle/Upper School Queue Demand = 1 per 10 students based on observations.

Doublestacked area (200', 10 Vehicles) available for use by either group in addition to the above available queue.

Pick-Up Queuing Summary - Gym Loading Area								
Group Grades Dismissed	Dismissal Time	Students Dismissed	Bus / Bike / Walk	Student Drivers	Parent Pickup	Maximum Queue	Available Queue	Surplus (Deficiency)
Lower School K, 1, 2, 3, 4	3:00 PM	176	0	0	176	25 Vehicles 500'	25 Vehicles 500'	0 Vehicles 0'

Lower School Queue Demand = 1 per 7 students based on observations.

Sidewalk on Westlake Avenue:

Two site plans are still in consideration to address the issue of providing a sidewalk on the north side of Westlake Avenue between Hillside Drive and the southeast boundary of the site. The south side of Westlake Avenue currently has a sidewalk. The new sidewalk on the north side of Westlake Avenue would be the code minimum 3' sidewalk, and would take up much of the current landscaped area between the curb and the property line.

The school will be constructing new sidewalks on the north and west sides of the site, along Blanch Circle and Hillside Drive. No sidewalks currently exist on those blocks.

The City would normally require a sidewalk along the north side of Westlake Avenue as well. However, the residents adjacent to the site have indicated that a sidewalk is not preferable on the north side of Westlake Avenue.

From a transportation perspective, a sidewalk on the north side of Westlake Avenue would add something to the overall pedestrian connectivity options in the vicinity. However, due to the specific context of the area, the additional sidewalk is not a significant improvement to connectivity or safety. The narrowness of the feasible sidewalk is a negative, as well as the fact that it would end abruptly at the southeast corner of the site.

Sidewalks are somewhat rare in the Lakewood area, and this is touted as a positive by some neighborhood residents. While some pedestrians may feel threatened by having to share space with vehicles on the paved

spaces, the lack of sidewalks can also keep vehicle speeds down by having mixed traffic in the street, and contributes to the unique Lakewood atmosphere that has developed over many decades.

Having a sidewalk does largely address the vulnerable feeling of some pedestrians, giving them a dedicated path separate from vehicles. The change to connectivity and safety is very significant when adding a sidewalk to a link that does not have one. This could be considered to be a positive change in most cases, even if it somewhat subjectively detracts from the traditional Lakewood atmosphere in this vicinity. Given appropriate crossing opportunities, the difference to connectivity and safety is much smaller when adding a second sidewalk on the other side of a street from an existing sidewalk.

Therefore, it can be concluded that the addition of sidewalks to Blanch Circle and Hillside Drive by the school is a positive change, and will provide options to pedestrians that were previously unavailable on those blocks. However, the addition of a sidewalk to the north side of Westlake Avenue, parallel to the existing sidewalk on the south side of the street, does not provide a significant improvement to conditions in that block that would overcome the opposition from the adjacent residents. The existing sidewalk already provides a meaningful and appropriate pedestrian accommodation along Westlake Avenue. There should not be a requirement for a second sidewalk if the neighborhood is in opposition.

Summary:

This TMP defines the drop-off and pick-up procedures for Lakehill Preparatory School once the site is modified in accordance with the proposed plan. The proposed master plan and this TMP provide a significant improvement in on-site queue storage over the existing operations. The TMP vehicle routes provide an available queue distance within the site that is greater than the projected maximum expected queue for the school's operations. With the TMP operating as shown, the school traffic should not need to queue vehicles in the ROW of any City street. The property owner/school administrator is responsible for the administration of the TMP and minimizing the impact of the vehicle queue on the City streets. Only uniformed police officers should be allowed to direct and control traffic operating within the public right-of-way.

Based on the vehicle queuing analysis conducted and the resulting Traffic Management Plan, I, Scot A. Johnson, P.E. #92615, certify that the results indicate that no queuing of vehicles dropping off or picking up students at Lakehill will extend onto City of Dallas rights-of-way as a result of internal queuing constraints.

No queuing is allowed in City of Dallas ROW. In order to ensure that all queuing of vehicles is completely accommodated on school property, Lakehill administrative officials should implement the proposed Traffic Management Plan, monitor the operation on a continuing basis, and if any vehicle queuing should begin to occur on public right-of-way, take the necessary action to mitigate it.

Prepared by:
Kimley-Horn and Associates, Inc.
Scot A. Johnson, P.E., PTOE
12750 Merit Drive, Suite 1000
Dallas, TX 75251
(972) 770-1300

