SIDWELL FRIENDS SCHOOL
TRAFFIC IMPACT STUDY
WASHINGTON, D.C.

Prepared for:
Sidwell Friends School

Prepared by:
Wells & Associates, LLC

January 2004

BZA
Case No. 17149
Exhibit No. 10

Board of Zoning Adjustment
District of Columbia
CASE NO. 17149
EXHIBIT NO. 10

SIDWELL FRIENDS SCHOOL
TRANSPORTATION STUDY
WASHINGTON, D.C.

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Section 1
INTRODUCTION

Overview

Sidwell Friends School (Sidwell) is a PK-12, co-educational, Quaker day school that was founded in 1883. The Lower School is located on a five-acre campus on Edgemoor Lane in Bethesda, Maryland. The Middle and Upper Schools are located on a 15-acre campus at 3825 Wisconsin Avenue in the Tenleytown section of Northwest Washington, D.C., as shown on Figure 1-1.



As shown on Figure 1-2, the Wisconsin Avenue Campus is comprised of the Earl G. Harrison Jr. Upper School Building; the Middle School (Zavitz) Building; Kogod Center for the Arts; Richard Walter Goldman Memorial Library; Zartman House (administrative building); Sensner Building (maintenance services and school store); the Wannan and Kenworthy Gymnasiums; three athletic fields; eight tennis courts; and a six-lane track.

The Washington Home and Friendship Station Post Office are located immediately north, and adjacent to, the Sidwell campus. Hearst Elementary School and Hearst Recreation Center are located west of the campus, across 37th Street.

The Fannie Mae national headquarters and McLean Gardens are located west of the campus, across Wisconsin Avenue. Another building occupied by Fannie Mae, the James Johnson Building, is located on the east side of Wisconsin Avenue, immediately adjacent to Sidwell.

During the 2003-2004 school year, 342 students are enrolled in the Middle School and 459 students are enrolled in the Upper School. A total of 801 students are enrolled at the Wisconsin Avenue campus. Sidwell currently employs 172 full time educators on its DC Campus.

As shown on Figure 1-3, Sidwell proposes to construct: (1) renovate and expand the Middle School, (2) renovate the Arts Center, (3) construct a new gym and convert some existing athletic space to art uses, and (4) construct a new Quaker Meeting House. A 196-space underground parking structure is proposed beneath the existing athletic field. Approximately 31 on-site drop-off/pick-up spaces will be provided in one lane on the ground level beneath the athletic field. As proposed, these spaces are provided adjacent to the travel lane on the garage level.

Access to the garage is proposed via a new entrance that would be aligned opposite Rodman Street. Egress will continue via the existing exit shared with the post office and the James Johnson Building (Fannie Mae). A one-way service drive is proposed between the Johnson Building and the new parking deck.

Sidwell is currently operating under a 1996 BZA Order that limits the number of staff to 190 and the number of students to 780. The school is proposing to increase the enrollment cap to 825 students. No change is proposed to the current staff cap.

This report presents an analysis of existing transportation conditions on and around the Sidwell campus, an analysis of 2006 no-build conditions, and an analysis of 2006 conditions with changes resulting from the proposed building additions, renovations, increased student enrollment, and revised access on Wisconsin Avenue.

Conclusions

The conclusions of this study are as follows:

1. The current 801 students and 172 faculty and staff generate 630 inbound vehicle-trips during the AM peak hour, 251 outbound vehicle-trips during the PM ***school*** peak hour, and 239 outbound vehicle-trips during the PM ***street*** peak hour.

2. The commuter traffic peak hours on Wisconsin Avenue begin at 7:30 AM and 5:15 PM. The Sidwell peak hours begin at 7:15 AM and 3:15 PM.

3. Sidwell traffic accounts for seven percent to 16 percent of all traffic on Wisconsin Avenue during the AM peak hour and three percent to seven percent during the PM peak hour.

   A southbound advance left turn phase should be implemented at the Wisconsin Avenue/Rodman Street intersection to accommodate traffic entering the school campus via the proposed entrance.

4. Sidwell traffic accounts for 38 percent of traffic on 37th Street during the AM peak hour and eight percent during the PM peak hour.

5. Increasing enrollment from 801 to 825 students would add 11 to 31 vehicle-trips during the school and street peak hours. This small number of trips is not significant.

6. Currently, approximately four percent of students utilize public transportation to travel to/from school.

7. The observed average auto occupancy was 1.26 students per vehicle during the AM peak hour and 1.46 students per vehicle during the PM peak hour.

8. Approximately 27 percent of upper school students drive to school.

9. During the AM peak hour, nearly half of the student drop-offs occur on 37th Street. During this time, traffic flowed smoothly along 37th Street and the drop-off lane operated well.

10. During the PM hour, only16 percent of the pick-ups occurred on 37th Street. In contrast to the AM peak hour, 37th Street was congested during the PM peak hour due to the fact that Hearst Elementary School dismisses at approximately the same time as Sidwell Friends Middle School. Consideration should be given to altering the Middle School dismissal time so that it does not coincide with the Hearst Elementary School dismissal.

11. Currently, 192 parking spaces are provided on-site. Under the proposed plan, 212 parking spaces would be provided.

12. The proposed new drop-off/pick-up lane on Wisconsin Avenue would increase on-site queueing/stacking capacity to two times the existing capacity.

13. The proposed Sidwell traffic plan would, for the first time, provide both full movement access to and egress from Wisconsin Avenue at two signalized intersections.

14. A southbound advance left turn phase is recommended at the Wisconsin Avenue/Rodman Street intersection to accommodate traffic turning left into the proposed new drop-off/pick-up lane from southbound Wisconsin Avenue.



Figure 1–1
Site Location

North
Schematic

Sidwell Friends School
Washington, D.C.

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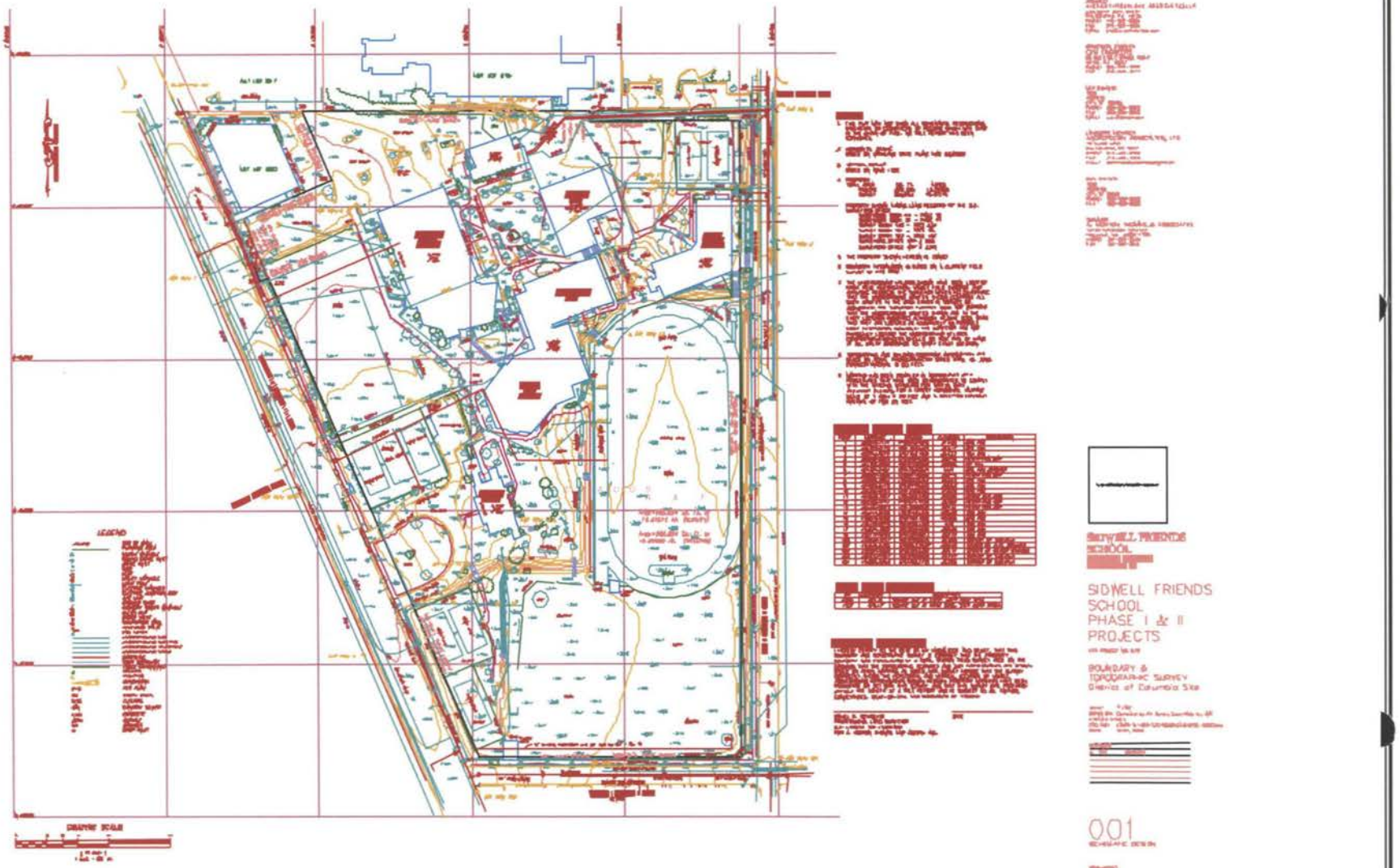


Figure 1–2
Existing Site Plan

North Schematic

Sidwell Friends School
Washington, D.C.

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Figure 1–3
Proposed Site Plan

North
Schematic

Sidwell Friends School
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Section 2
BACKGROUND DATA

Public Road Network

A connected network of public streets serves the Sidwell Campus. Access to the campus is provided by Wisconsin Avenue and 37th Street. Existing lane use and traffic control in the study area are shown on Figure 2-1.



Wisconsin Avenue, Looking South, at Rodman Street

Wisconsin Avenue is a six-lane, undivided, principal arterial that extends from downtown Washington to Chevy Chase and beyond. The posted speed limit is 15 miles per hour (mph) when children are present. No other speed limit signs are posted on Wisconsin Avenue in the study area.

During the commuter peak periods from 7:00 AM to 9:30 AM and from 4:00 PM to 6:30 PM three lanes operate in the inbound and outbound directions. During all other times of day, two lanes operate in each direction and curb parking is permitted on both sides of the street.



Sidwell, the Friendship Station Post Office, and the James Johnson Building (Fannie Mae) Share a Driveway on Wisconsin Avenue

37th Street is a two-lane, 30-foot wide, local street with a posted speed limit of 15 mph when children are present. No other speed limit signs are posted on 37th Street in the study area. Curb parking is permitted along both sides of the street with numerous restrictions.



37th Street, Looking North, at Quebec Street

Upton Street is a two-lane, 30-foot wide, local street with a posted speed limit of 25 mph. Upton Street extends from west of Wisconsin Avenue to Reno Road.



Upton Street, Looking West, at 37th Street

Upton Street is controlled by stop signs at 37th Street and by a traffic signal at Wisconsin Avenue. Left turns from Upton Street onto Wisconsin Avenue, southbound are prohibited.

Quebec Street is a two-lane, 30-foot wide, local street that extends from Wisconsin Avenue to 34th Street. The posted speed limit is 25 mph.



Quebec Street, Looking West, at Wisconsin Avenue

Tilden Street, east of 37th Street is a two-lane local street.



Tilden Street, Looking East, at 37th Street

Transit Services and Facilities

Overview. Sidwell is served by both Metrobus and Metrorail.

Metrobus. Routes 30, 32, 34, and 36 provide Metrobus service on Wisconsin Avenue. Bus stops are located on the east and west sides of Wisconsin Avenue in front of the school.



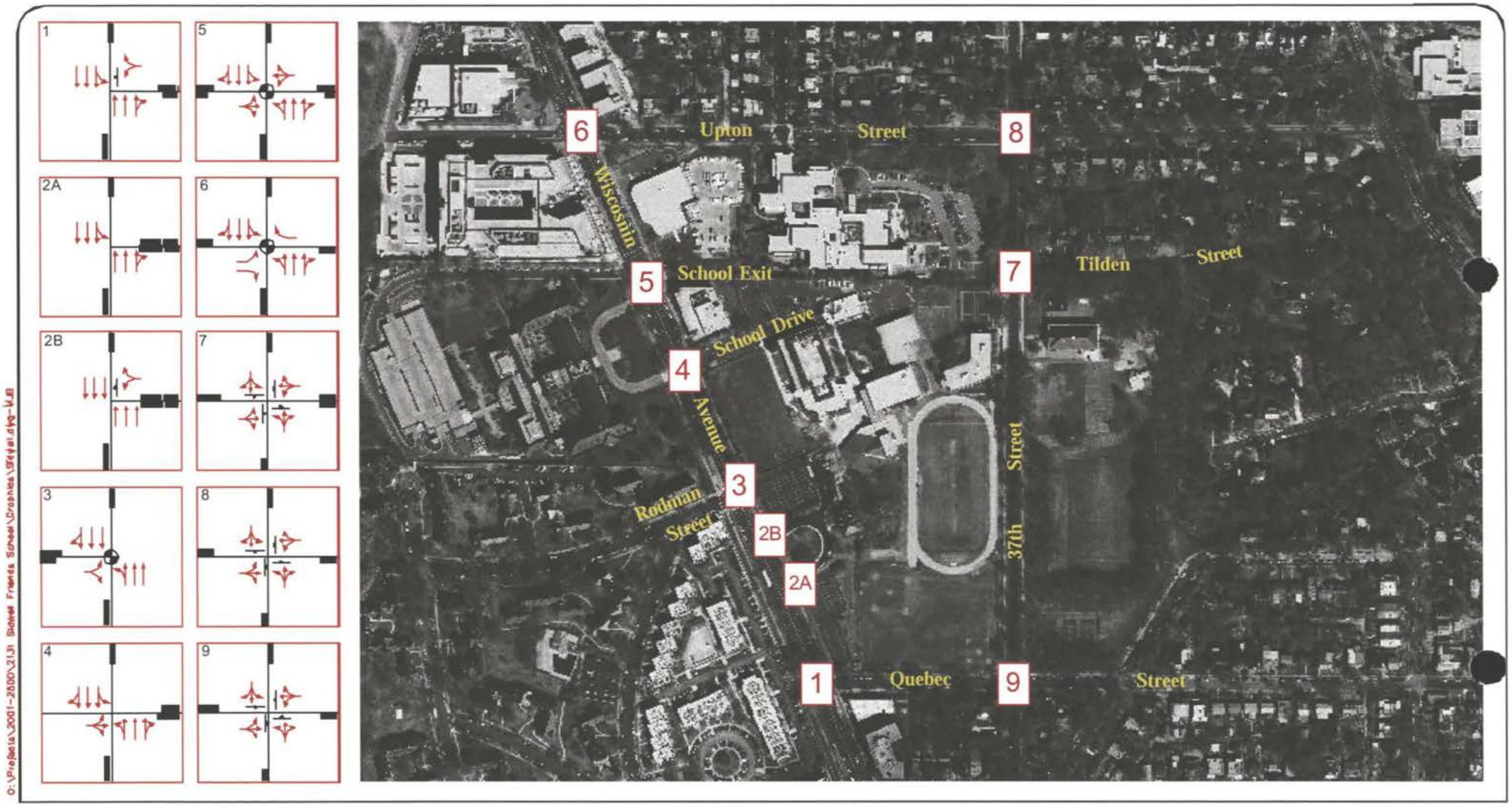


Figure 2–1
Existing Lane Use and Traffic Control

Represents One Travel Lane
Signalized Intersection
Stop Sign

North
Schematic

Sidwell Friends School
Washington, D.C.

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Metrorail. The Red Line provides access to Sidwell via nearby stations at the UDC-Van Ness Metrorail station (which is located six blocks, or 0.7 miles, to the northeast), the Cleveland Park station (which is located seven blocks, or one mile, to the southeast), and the Tenleytown station (which is located 9-½ blocks, or 0.6 miles, to the north). Connection with the H2 and H4 Metrobus routes are provided at the Cleveland Park station.

Other Transit Services. Sidwell contracts with private school bus services to transport a small number of students.



Private School Bus Service

Parking

On-Site Parking Inventory. Presently, there are 192 parking spaces on the Sidwell campus, in the following locations:

Middle School Lot:	50 spaces
Upper School Lot:	115 spaces
Zartman Circle:	16 spaces
Zartman Lot:	11 spaces
Total:	192 spaces

On-Street Parking Inventory. Curb parking is permitted at most times of day on Wisconsin Avenue, 37th Street, and Quebec Street, as shown on Figure 2-2.

Curb parking is permitted during off-peak hours on both sides of Wisconsin Avenue. Curb parking is prohibited during the commuter peak periods from 7:00 AM to 9:30 AM and from 4:00 PM to 6:30 PM.

In front of the Sidwell Middle School, curb parking on the west side of the street is prohibited from 8:00 AM to 4:00 PM on school days.

In front of the Hearst Elementary School, which is located directly across 37th Street from the Sidwell Middle School, parking on the east side of the street is also prohibited from 8:00 AM to 4:00 PM on school days. South of the Hearst Elementary School, parking on the east side of the street is restricted to 15-minute parking from 8:00 AM to 9:30 AM and from 2:30 PM to 4:00 PM on school days.

Curb parking on Upton Street is permitted at all times of day on the south side of Upton Street, while parking on the north side of Upton Street is restricted to two-hour parking from 7:00 AM to 8:30 PM, Monday through Friday, with the exception of Zone 3 permit holders.

Curb parking is on Quebec Street permitted at all times on the north side between Wisconsin Avenue and 37th Street and on the south side between 37th Street and 34th Street. On the south side between Wisconsin Avenue and 37th Street and on the north side between 37th Street and 34th Street parking is restricted to two hours from 7:00 AM to 8:30 PM, Monday through Friday, except for Zone 3 permit holders.

Curb parking is permitted at all times of day on the south side of Tilden Street, while parking on the north side is restricted to two hour parking from 7:00 AM to 8:30 PM, Monday through Friday, with the exception of Zone 3 permit holders.

According to the District of Columbia's Municipal Regulations, two off-site parking spaces per every three teachers and other employees are required for junior high schools. For high schools, two parking spaces per every three teachers and other employees plus either one space for each 20 classroom seats or one space for each ten seats in the largest auditorium, gymnasium or area usable for public assembly, whichever is greater. Based on a staff cap of 190 employees and a seating capacity of

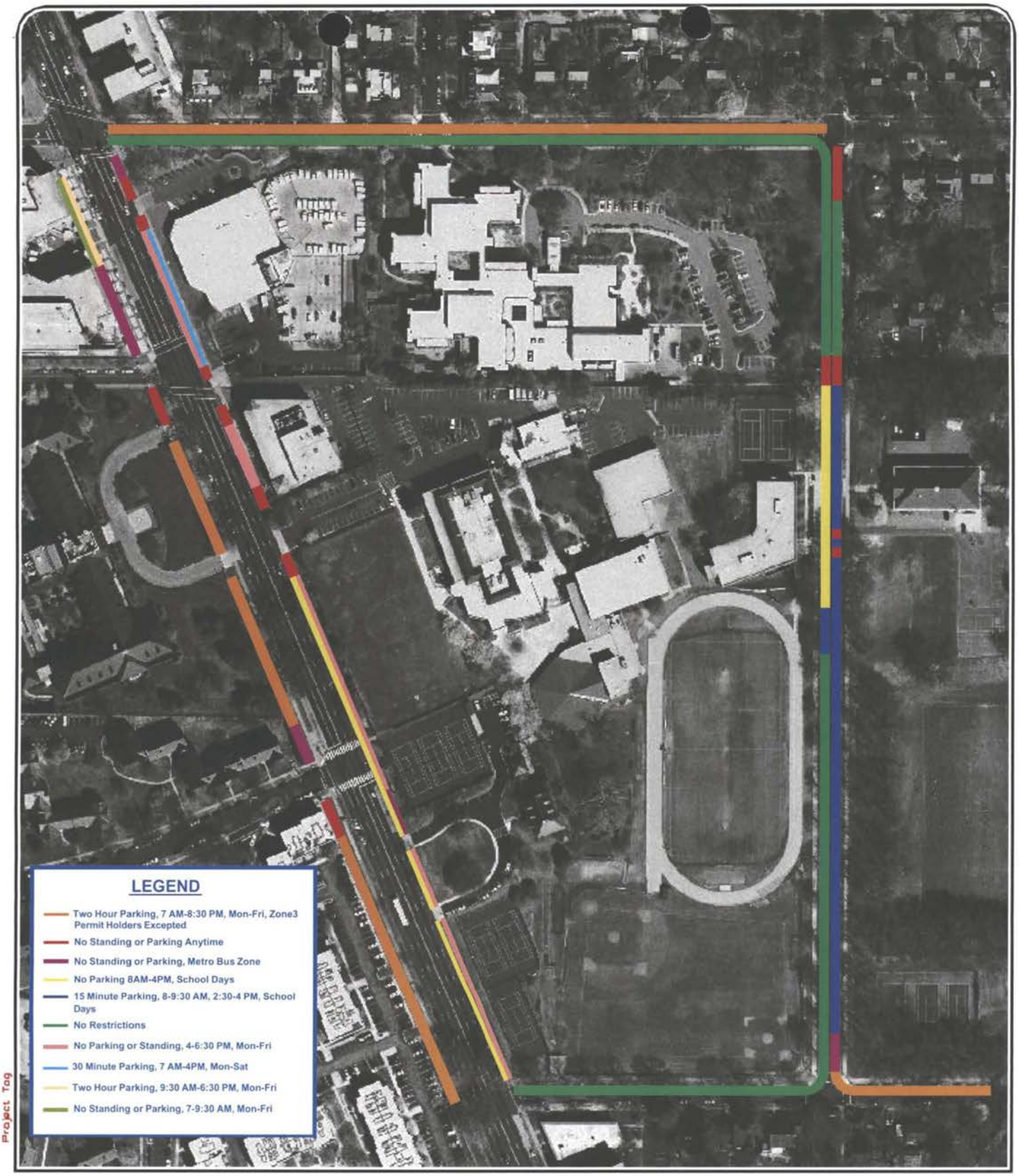


Figure 2–2
Curb Parking Inventory

North
Schematic

Project Name
Project Location

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616 in the proposed gym, 189 spaces would be required.

Field Data Collection

Wells & Associates: conducted manual turning movement counts, pedestrian counts, and average vehicle occupancy counts; observed traffic flows and queuing intersection; and measured mode splits on and around the Sidwell campus in October 2003, as described in detail below.The following home and away athletic events were scheduled on October 1 when the majority of the field data were collected:

1. Boys/girls, 7th/8th grade away cross country (2:45 PM).
2. 7th/8th grade away field hockey (2:45 PM).
3. 7th/8th grade home unlimited football (2:30 PM).
4. 7th/8th grade home "A" soccer (2:30 PM).
5. Girls 7th/8th away grade "B" soccer (2:45 PM).
6. Girls varsity home tennis (4:00 PM).
7. 7th/8th grade home tennis (2:30 PM).
8. Girls varsity away volleyball (5:30 PM).
9. Girls junior varsity away volleyball (4:15 PM).

Intersection Traffic Counts

Vehicular Traffic. Manual turning movement counts were conducted by Wells & Associates on Wednesday, October 1, 2003, from 6:30 AM to 9:30 AM and from 2:00 PM to 7:00 PM, at the following intersections:

1. Wisconsin Avenue/Quebec Street.
2. Wisconsin Avenue/Zartman House Driveway.
3. Wisconsin Avenue/Rodman Street.
4. Wisconsin Avenue/Sidwell Entrance Driveway.
5. Wisconsin Avenue/Sidwell Exit Driveway/Post Office Driveway/Johnson Building (Fannie Mae) Driveway.
6. Wisconsin Avenue/Upton Street.
7. 37th Street/Tilden Street.
8. 37th Street/Upton Street.
9. 37th Street/Quebec Street.

The commuter traffic peak hours on Wisconsin Avenue began at 7:30 AM and 5:15 PM. The Sidwell peak hours began at 7:15 AM and 3:15 PM. The Sidwell peak hours occurred 15 minutes early than the street peak hour in the morning and two hours earlier than the street peak hour in the afternoon. Since the Sidwell and commuter morning peak hours overlap by 45 minutes, only one morning peak hour was analyzed. However, during the afternoon, the Sidwell peak hour and street peak hour were analyzed separately.

The Sidwell and street AM and PM peak hour vehicular traffic volumes are presented in Appendix A and summarized on Figure 2-3.

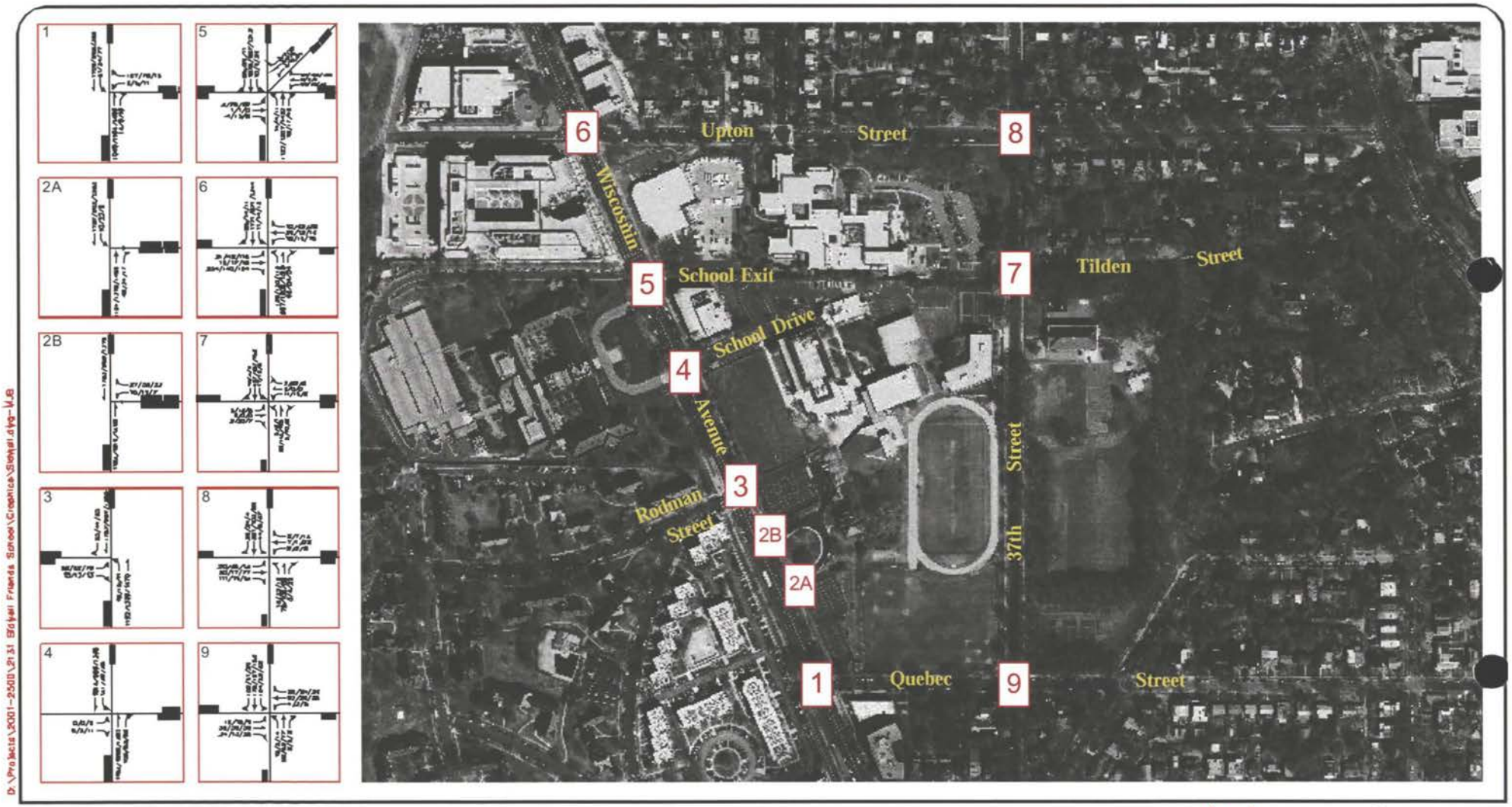
Pedestrian Traffic. Wells & Associates also conducted manual counts of the number of pedestrians crossing each leg of the study intersections concurrently with the vehicular traffic counts. The pedestrian counts are included in Appendix B and summarized on Figure 2-4.

Auto Occupancy

Sidwell students were dropped-off and picked up at the following locations:

1. Wisconsin Avenue parking lot.
2. Zartman House Driveway.
3. 37th Street (in front of the Middle School), and
4. Upton Street/37th Street intersection.

Accordingly, vehicles were observed at each of these locations on Wednesday, October 1, 2003, from 6:30 AM to 9:30 AM and from 2:00 PM to 7:00 PM. (Supplemental data were collected on October 30, 2003 from 7:00 AM to 9:00 AM and from 2:00 PM to 6:00 PM).



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Figure 2-3
Existing Vehicular Traffic Volumes

North
Schematic

Sidwell Friends School
Washington, D.C.

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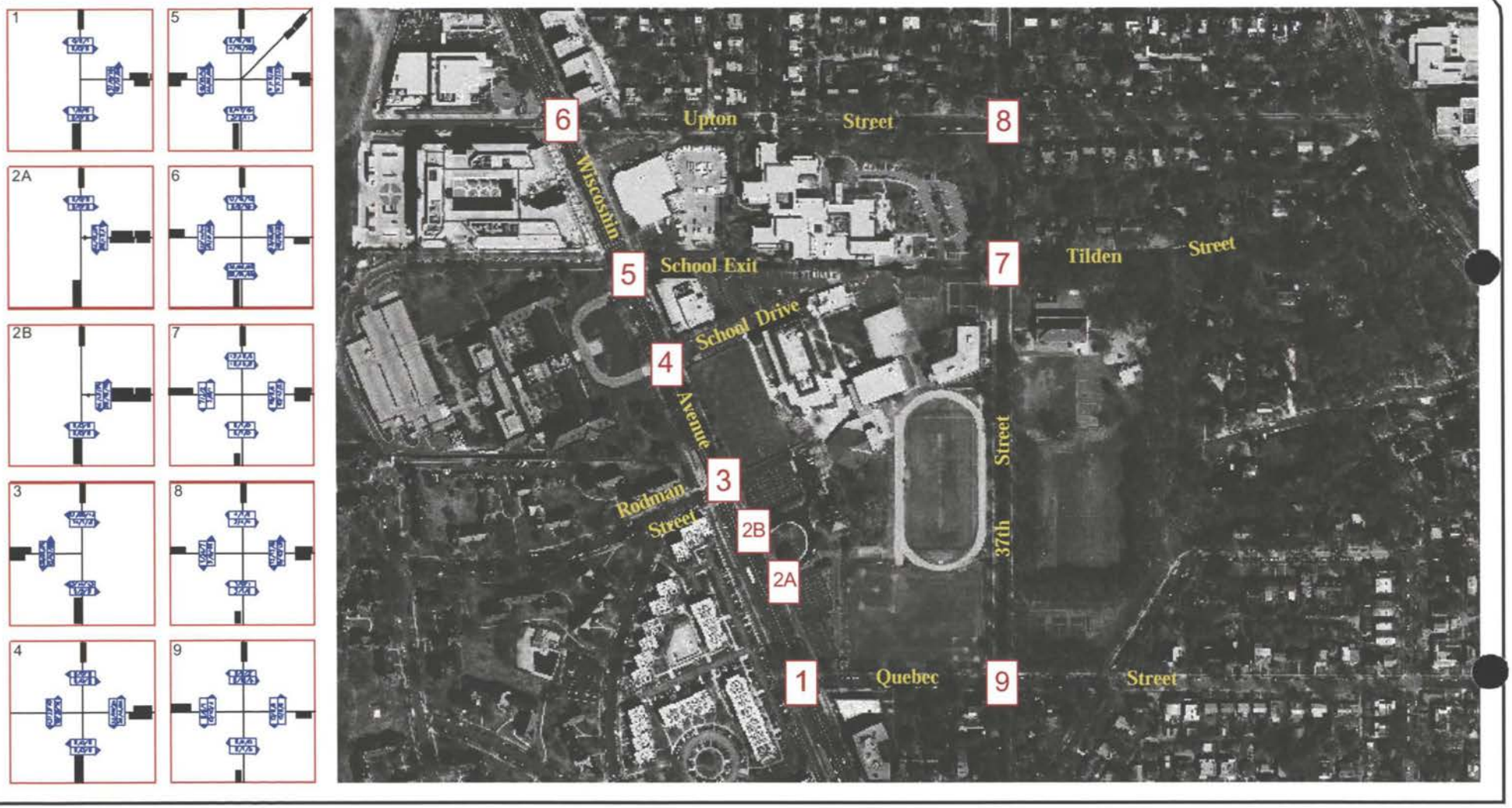


Figure 2-4
Existing Pedestrian Counts

X/X/X
X/X/X Pedestrian Volumes

North
Schematic

Sidwell Friends School
Washington, D.C.

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Afternoon Pick Up at 37th Street/Upton Street

During these time periods, the number of students arriving or departing in each vehicle was recorded. Overall, the average auto occupancy was 1.26 students per vehicle during the morning peak period, and 1.46 students per vehicle during the afternoon peak period.

Parking Occupancy Counts

The number of vehicles parked on the Sidwell campus was counted by Wells & Associates on Wednesday, October 1, 2003.

Peak occupancy in the morning occurred at around 8:45 AM when a total of 133 spaces (or 69 percent of all spaces) were occupied in the main parking lots and the Zartman lot and circle. Fifty-nine (59) spaces were vacant at this time.

Peak occupancy in the afternoon occurred around 3:30 PM when 161 spaces (or 84 percent of all spaces) were occupied on campus. Thirty-one (31) spaces were vacant at that time.

Queuing

Queuing was also observed at the drop-off/pick-up area in the Wisconsin Avenue parking lot. The number of vehicles, queued from the stop sign, were observed and recorded. During the AM peak period, the maximum observed queue (per lane) was nine vehicles. During the PM peak hour, the maximum observed queue (per lane) was five vehicles. However, during the PM peak hour, traffic was observed picking up students adjacent to the Upper School building. During the AM peak hour, students were dropped-off in the two lanes in front of the Upper School building. Currently, a queuing capacity of 17 vehicles exists in the Wisconsin Avenue parking lot.



Morning Drop Off at Sidwell's Entrance on Wisconsin Avenue

Mode Split

Table 2-1 summarizes the various modes of transportation that were observed at Sidwell's Wisconsin Avenue Campus.

Table 2-1
Observed Mode Split

Mode	Percent	
	AM	PM
Auto	90%	86%
Bicycle	0%	0%
Metrobus	2%	3%
Other Bus or Van	2%	1%
Walk	6%	10%



Sidwell Metrobus Stop

The most significant disparity between the AM and PM peak hours occurred in the percentage of walkers and the percentage of automobiles. The increase in number of walkers during the PM peak hour can be attributed to the fact that after school dismissal, a significant number of students counted as walkers were attending off-site athletic events (i.e. at the soccer field east of 37th Street). Upon completion of the event(s), these students likely utilized another mode of transportation, such as the automobile, for their trips home.

Section 3
Student Transportation Surveys

Overview

Students at the Upper School were surveyed by the school during the week of April 21, 2003 to identify current transportation patterns. Students were asked about their mode of transportation, vehicle occupancy, and parking locations. A copy of the survey form is included in Appendix C.

Approximately 79 percent of the Upper School population (362 students) completed the surveys. Students were asked about their transportation behavior during the previous week. Approximately one percent of the respondents indicated that they were absent during the week in question.

Summary of Findings

The findings of these surveys were as follows:

Student Arrival Mode Split. As shown in Table 3-1, the most popular arrival modes for all students, in descending order, were:

1. On average, approximately 89 percent of students surveyed arrived by car.
2. Of those arriving by car, approximately 30 percent drove. Approximately 70 percent were passengers.
3. On average, approximately five percent of students arrived by Metrobus or Metrorail.
4. On average, approximately four percent of students walked to school.
5. Approximately one percent of the students used a bus/van service other than Metrobus.
6. Less than one percent of students bicycled to school.

Table 3-1
Surveyed Student Mode Split

Mode	Percent
Absent	1%
Auto	89%
Bicycle	1%
Metrobus/Metrorail	4%
Other Bus or Van	1%
Walk	4%

Note that the mode splits reported in the student surveys were generally comparable to the observed mode splits, with the exception of walking and public transit. The observed mode split for Metrobus was lower than the surveyed mode split; while the observed mode split for walking was higher than the surveyed mode split. This can be explained by the fact that students utilizing Metrorail were not explicitly counted during the observation periods. These students were, therefore, counted as walkers.

Parking Locations. Student parking locations were somewhat dispersed. As shown in Table 3-2, the most popular parking locations in descending order were as follows:

1. A majority of student drivers, 52 percent, parked on 37th Street.
2. Approximately 12 percent of student drivers parked in the McLean Garden parking lot.
3. Approximately ten percent of student drivers parked on Wisconsin Avenue and on Quebec Street.
4. Approximately eight percent of student drivers parked on 38th Street, while five percent parked on Tilden Street.
5. Minimal student drivers parked on Rodman Street, 39th Street, and Upton Street.

Table 3-2
Student Parking Locations

Location	Percent
37th Street	52%
38th Street	8%
39th Street	2%
McLean Gardens	12%
Quebec Street	10%
Rodman Street	1%
Tilden Street	5%
Upton Street	0%
Wisconsin Avenue	10%

Arrival Vehicle Occupancy. According to the survey, the average student vehicle occupancy was 1.75 students per vehicle.

Section 4
ANALYSIS

Existing Levels of Service

Existing levels of service (LOS) were calculated at each of the study intersections based on the existing lane use and traffic controls shown on Figure 2-1, existing vehicular and pedestrian traffic counts shown on Figures 2-3 and 2-4, and existing traffic signal timings (obtained from DDOT) utilizing the Synchro5 Traffic Signal Coordination Software and the Highway Capacity Manual (HCM) methodology. The results are presented in Appendix D and summarized in Table 4-1.

Table 4-1 indicates that all intersections in the study area currently operate at an acceptable LOS "D" or better at all times of day, except for the Zartman House driveway and Quebec Street.

Motorists currently experience delays turning out of the Zartman House driveway onto Wisconsin Avenue during the AM peak hour and the PM street peak hour. This driveway currently operates near capacity at a LOS "E" during these peak hours. During the PM school peak hour, the Zartman House approach operates at an acceptable LOS "D".

Likewise, motorists currently experience delays turning from Quebec Street onto Wisconsin Avenue during the PM Street peak hour. During this time period, Quebec Street currently operates at a LOS "F". During the AM peak hour and the PM school peak hour, the Quebec Street approach operates at a LOS "C".

Field observations indicate that motorists exiting the Zartman Drive and Quebec Street rely on gaps in Wisconsin Avenue traffic created by traffic signals at Rodman and Porter Streets.

Table 4-1
Existing Levels of Service

Intersection/ Approach	AM Street Peak	PM School Peak	PM Street Peak
Wisconsin Avenue/Quebec Street			
SBL	A	A	A
WB	C	C	F [121.0]
Wisconsin Avenue/Zartman House Driveway			
SBL	A	A	A
WB	E	D	E
Wisconsin Avenue/Rodman Street			
NB	B	B	B
SB	B	A	A
EB	C	C	C
Overall	B	A	A
Wisconsin Avenue/ Campus Entrance			
SBL	A	A	A
EB	C	B	B
Wisconsin Avenue/Campus Exit/Post Office Driveway/Johnson Building (Fannie Mae) Driveway			
NB	A	B	C
SB	A	A	A
EB	C	C	C
WB	D	C	C
Overall	A	B	B
Wisconsin Avenue/Upton Street			
NB	A	B	A
SB	B	B	C
EB	C	C	C
WB	C	C	C
Overall	B	B	B
37th Street/Tilden Street			
NB	A	A	A
SB	B	A	A
EB	A	A	A
WB	A	A	A
Overall	B	A	A
37th Street/Upton Street			
NB	A	A	A
SB	B	A	A
EB	A	A	A
WB	A	A	A
Overall	B	A	A
37th Street/Quebec Street			
NB	A	A	A
SB	B	A	A
EB	A	A	A
WB	A	A	A
Overall	B	A	A

Observations of the study intersections along 37th Street revealed that traffic is currently experiencing more delay than predicted by the HCM methodology. This delay is attributable to the fact that numerous vehicles stop to drop-off/pick-up students along 37th Street. This problem is compounded by the near coincident Hearst Elementary School and Sidwell Middle School start and dismissal times. The HCM results indicate that adequate capacity is available for the existing volume of traffic.

Existing Sidwell Vehicle-Trip Generation

As shown in Table 4-2, the current 801 students and 172 faculty and staff generate the following numbers of vehicle-trips during the peak hours:

Table 4-2
Sidwell School Peak Hour Vehicle-Trip Generation

Time Period	Number of Vehicles		
	Enter	Exit	Total
AM Peak Hour	630	411	1,041
PM School Peak Hour	202	251	453
PM Street Peak Hour	142	239	381

Note that in the afternoon the number of trips generated by the school is distributed over a longer period of time than the morning. This is to be expected due to the number of after school activities that occur on typical school days.

Currently, the Wisconsin Avenue Campus has an enrollment of 801 students. Based on existing traffic counts at the Campus, which included parents/guardians, employees, students, and visitors, Sidwell currently generates 1.30 trips per student during the AM peak hour, 0.57 trips per student during the PM peak hour of the school, and 0.48 trips per student during the PM peak hour of the street.

Background Traffic Forecasts

Regional Growth. In order to account for regional traffic growth outside the immediate site vicinity, an annual growth rate of one percent, compounded annually, was applied to existing traffic counts.

Pipeline Developments. Several developments along the Wisconsin Avenue Corridor are currently planned and/or under construction.

4500 Wisconsin Avenue, which is located on Wisconsin Avenue, north of the Sidwell campus, will consist of 80,000 S.F. of retail space and 185 apartments. The project is scheduled for completion by the end of 2004.

4600 Wisconsin Avenue, located one block north of River Road, is a 100-unit condominium development. Completion of the project is planned for late 2006 or early 2007.

4800 Wisconsin Avenue, which is located on Wisconsin Avenue north of the Sidwell campus, will consist of 191 apartments and 3,424 S.F. of commercial space. It is planned for completion in 2005.

A 50-unit condominium development is proposed in the northeast quadrant of the Wisconsin Avenue/Calvert Street intersection. The development is planned for completion in late 2006 or early 2007.

A residential development consisting of 209 condominium units is proposed on Wisconsin Avenue at Albemarle Street above the Tenleytown Metro Station. City Line at Tenley is currently under construction and is planned to be complete in 2004.

Georgetown Day High School, which is located northwest of Sidwell at 4200 Davenport Street, proposes to add 15 students and 14 full-time faculty and staff.

The existing Washington Clinic located at 4501 Western Avenue will be developed with a 3,000 square foot day care center and 125 condominiums.

The proposed redevelopment of the WMATA Northwest Bus Garage, located at the intersection of Wisconsin Avenue and Jennifer Street, will consist of 90,000 S.F. of retail space and 540 apartments.

Located in Montgomery County on Wisconsin Avenue between Willard and Western Avenues, the proposed Wisconsin Place re-development will consist of nearly 124,000 S.F. of retail space, a 40,000 square foot grocery store, 450,000 S.F. of office space, and 275 apartments.

Friendship Commons, which is also located in Montgomery County, will be developed with nearly 300,000 S.F. of office space, 300 multi-family residential units, and 200 residential townhouses.

Chevy Chase Center is proposed to be redeveloped with 122, 209 S.F. of office space and 191,639 S.F. of retail space.

It is anticipated that these pipeline projects would generate a total of 2,520 AM peak hour trips and 3,318 PM peak hour trips.

Trip assignments for 4800 Wisconsin Avenue and 4600 Wisconsin Avenue were taken from their respective traffic impact studies, which were conducted by Wells & Associates. Information regarding the development programs and completion dates for Calvert and Wisconsin and City Line at Tenley were taken from the Development Activity in Greater Downtown Washington , DC – 2nd Quarter Report, compiled by the Downtown DC Business Improvement District, as recommended by DDOT. Trip generation, distribution, and assignments for these developments were conducted in accordance with standard Institute of Transportation Engineers (ITE) rates and/or equations. Trip assignments for the remaining developments were taken from the *4800 Wisconsin Avenue Traffic Impact Study.*

Traffic assignments for the pipeline developments are summarized on Figure 4-1. The background traffic volumes for the study area, including regional growth and traffic resulting from the pipeline developments, are shown on Figure 4-2.

Background Future Levels of Service

Future conditions capacity analyses, without the increase in Sidwell enrollment or the renovation, were performed at the study intersections for the 2006 AM peak hour, PM school peak hour, and PM street peak hour. These analyses were based on the intersection lane use and traffic control shown on Figure 2-1; the background traffic forecasts shown on Figure 4-2; and existing traffic signal timings (obtained from DDOT) utilizing the Synchro 5 Traffic Signal Coordination Software and the Highway Capacity Manual (HCM) methodology. The results are presented in Appendix E and summarized in Table 4-2.

In 2006, without the proposed renovation/ expansion, the study intersections along 37th Street will continue to operate at the same levels of service as existing conditions.

The Wisconsin Avenue intersections with Rodman Street, the Sidwell entrance driveway, the Sidwell exit/Post Office/Johnson Building (Fannie Mae) driveway, and Upton Street will experience only minor increases in delay on certain approaches.

Quebec Street, at its intersection with Wisconsin Avenue, is projected to operate at capacity during the AM peak hour in addition to the PM street peak hour.

The Zartman House exit driveway is projected to continue to operate at capacity with increased delay during the AM peak hour and PM street peak hour.

Site Trip Generation Analysis

To determine the number of additional trips that will be generated under the proposed enrollment cap, site-specific trip generation rates were used. The site-specific generation rates, which were calculated based on the total number of vehicles entering and exiting the school (parents/guardians, employees, and visitors), account for the number of additional trips that would be generated by not only an increase in the number of students (allowed under the proposed cap), but also an increase in the number of faculty/staff, which is allowed under the current cap.

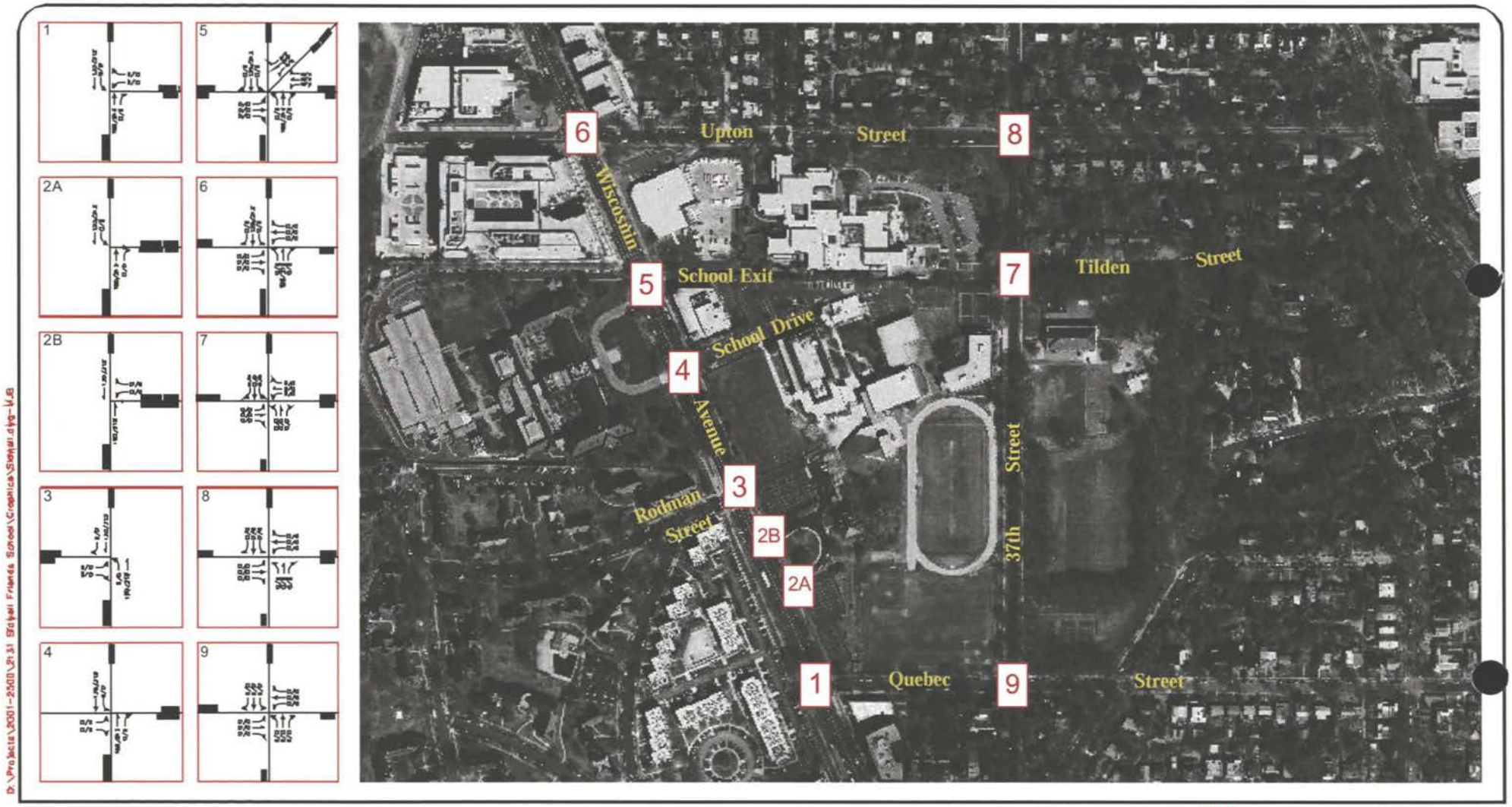


Figure 4–1
Traffic Assignments for Pipeline Developments

Sidwell Friends School
Washington, D.C.

WELLS & ASSOCIATES, LLC

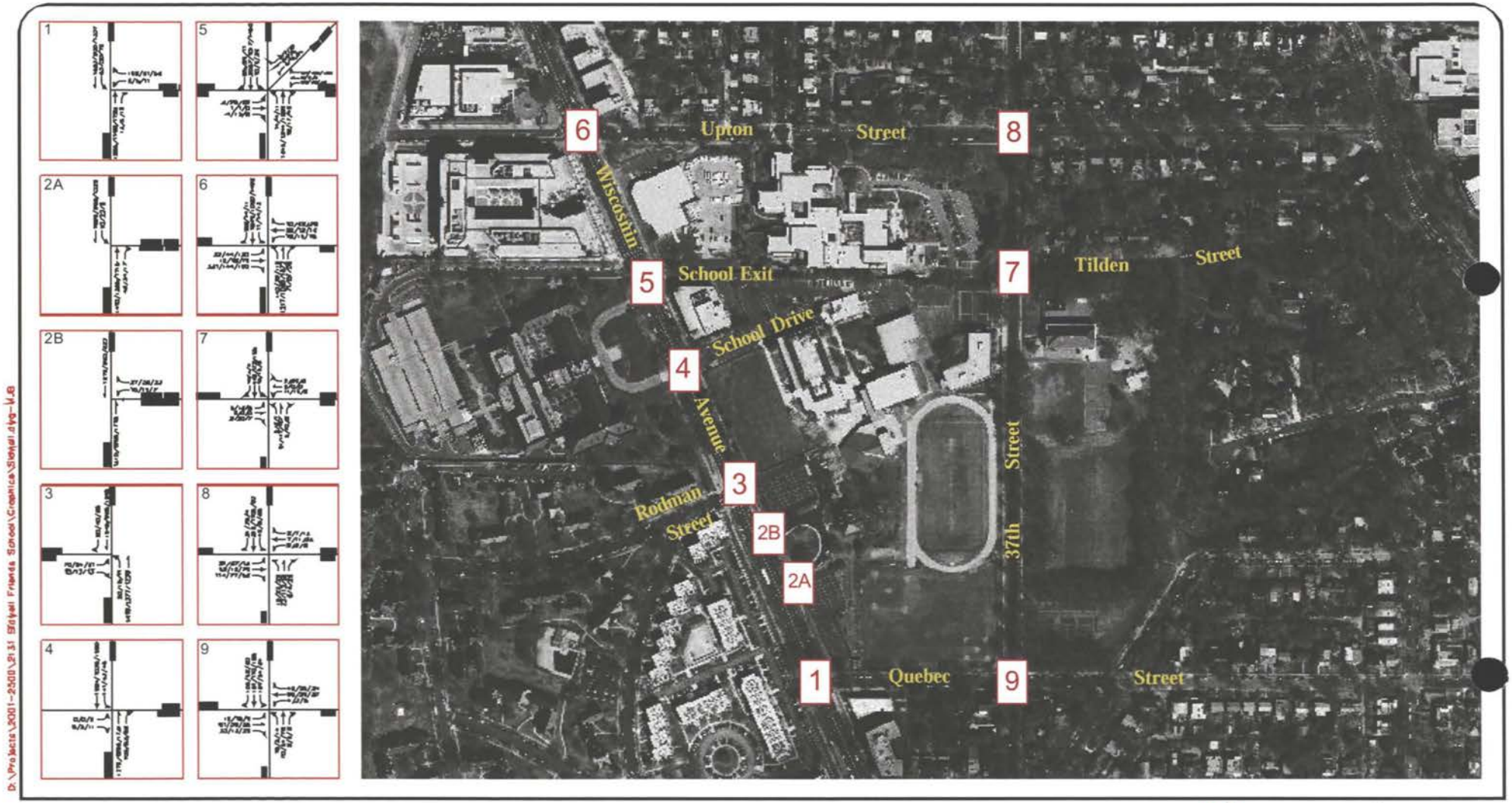


Figure 4-2
2006 Background Traffic Volumes

Sidwell Friends School
Washington, D.C.

WELLS & ASSOCIATES, LLC

Table 4-3
Future Levels of Service

Intersection/ Approach	2006 Background Conditions			2006 Conditions with Renovation		
	AM Peak	PM School Peak	PM Street Peak	AM Peak	PM School Peak	PM Street Peak
Wisconsin Avenue/Quebec Street						
SBL	A	A	A	A	A	A
WB	E	C	F [243.8]	E	C	F [244.7]
Wisconsin Avenue/Zartman House Driveway						
SBL	A	A	A	A	A	A
WB	F [95.7]	D	F [71.9]	F [76.6]	D	F [71.0]
Wisconsin Avenue/Rodman Street[1]						
NB	B	B	B	B	B	B
SB	C	A	A	B	A	A
EB	C	C	C	C	C	C
Overall	B	A	A	B	B	B
Wisconsin Avenue/ Campus Entrance						
SBL	B	A	A	NA	NA	NA
EB	C	B	C	C	B	C
Wisconsin Avenue/Campus Exit/Post Office Driveway/the Johnson Building (Fannie Mae) Driveway						
NB	A	B	C	A	B	C
SB	A	A	B	A	A	B
EB	C	C	C	C	C	C
WB	D	C	C	D	C	C
Overall	A	B	B	A	B	B
Wisconsin Avenue/Upton Street						
NB	A	B	B	A	B	B
SB	C	B	C	C	B	C
EB	C	C	C	C	C	C
WB	C	C	C	C	C	C
Overall	B	B	C	B	B	C
17th Street/Tilden Street						
NB	A	A	A	A	A	A
SB	B	A	A	B	A	A
EB	A	A	A	A	A	A
WB	A	A	A	A	A	A
Overall	B	A	A	B	A	A
37th Street/Upton Street						
NB	A	A	A	A	A	A
SB	B	A	A	B	A	A
EB	A	A	A	A	A	A
WB	A	A	A	A	A	A
Overall	B	A	A	B	A	A
37th Street/Quebec Street						
NB	A	A	A	A	A	A
SB	B	A	A	B	A	A
EB	A	A	A	A	A	A
WB	A	A	A	A	A	A
Overall	B	A	A	B	A	A

[1] For 2006 Conditions with Renovation, a southbound advance left turn phase was modeled.

Accordingly, an additional 31 AM peak hour vehicle-trips, 14 school PM peak hour vehicle-trips, and 11 street PM peak hour vehicle-trips would be generated. (See Table 4-4).

Table 4-4
Site Trip Generation Summary[1]

	Enter	Exit	Total
AM Peak	19	12	31
PM Peak (School)	6	8	14
PM Peak (Street)	4	7	11

[1] Based on site-specific rates with number of students as the independent variable.

Assuming the same mode splits that currently exist on Campus, Table 4-5 summarizes the breakdown of additional students arriving by each mode of transportation.

Table 4-5
New Student Trips by Mode

	AM	PM
Auto	22	22
Bicycle	0	0
Metrobus/Metrorail	1	1
Shuttle	0	0
Walk	1	1

Trip Distribution Analysis

The distribution of trips was determined based on the existing traffic patterns in the vicinity of the Sidwell Wisconsin Avenue Campus.

Approximately 67 percent of site-generated vehicle-trips will exit to the north, while approximately 33 percent of exiting vehicles will be oriented to the south. An estimated 46 percent of arrivals will come from the north, while an estimated 54 percent will be oriented from the south.

Site Traffic Assignments

The vehicle-trips generated by the proposed project were assigned to the roadway network according to the distributions described above. The resulting traffic assignment is summarized on Figure 4-3.

Existing site traffic related to Sidwell's Wisconsin Avenue campus were re-routed to reflect the proposed changes to the Wisconsin Avenue entrance. Additionally, existing site trips were re-routed to reflect approximately one-third of drop-offs/pick-ups occurring on 37th Street. Approximately one-tenth of the drop-offs/pick-ups were assumed to continue on the Zartman House driveway. The remaining drop-off/pick-up traffic was assumed to occur at the proposed main site entrance.

Total Future Traffic Forecasts

The future traffic volumes without the proposed project, shown on Figure 4-2, were combined with the site traffic assignments shown on Figure 4-3 to yield the total future traffic forecasts shown on Figure 4-4.

Sidwell traffic accounts for seven percent to 16 percent of traffic on Wisconsin Avenue during the AM peak hour and three percent to seven percent during the PM peak hour. On 37th Street, Sidwell traffic accounts for 38 percent of traffic during the AM peak hour and eight percent during the PM peak hour.

Total Future Levels of Service

Future conditions capacity analyses, with the proposed renovation/expansion were performed at the study intersections for the 2006 AM peak hour, PM school peak hour, and PM street peak hour. These analyses were based on the intersection lane use and traffic control shown on Figure 2-1; the total future traffic forecasts shown on Figure 4-4; and existing traffic signal timings (obtained from DDOT)

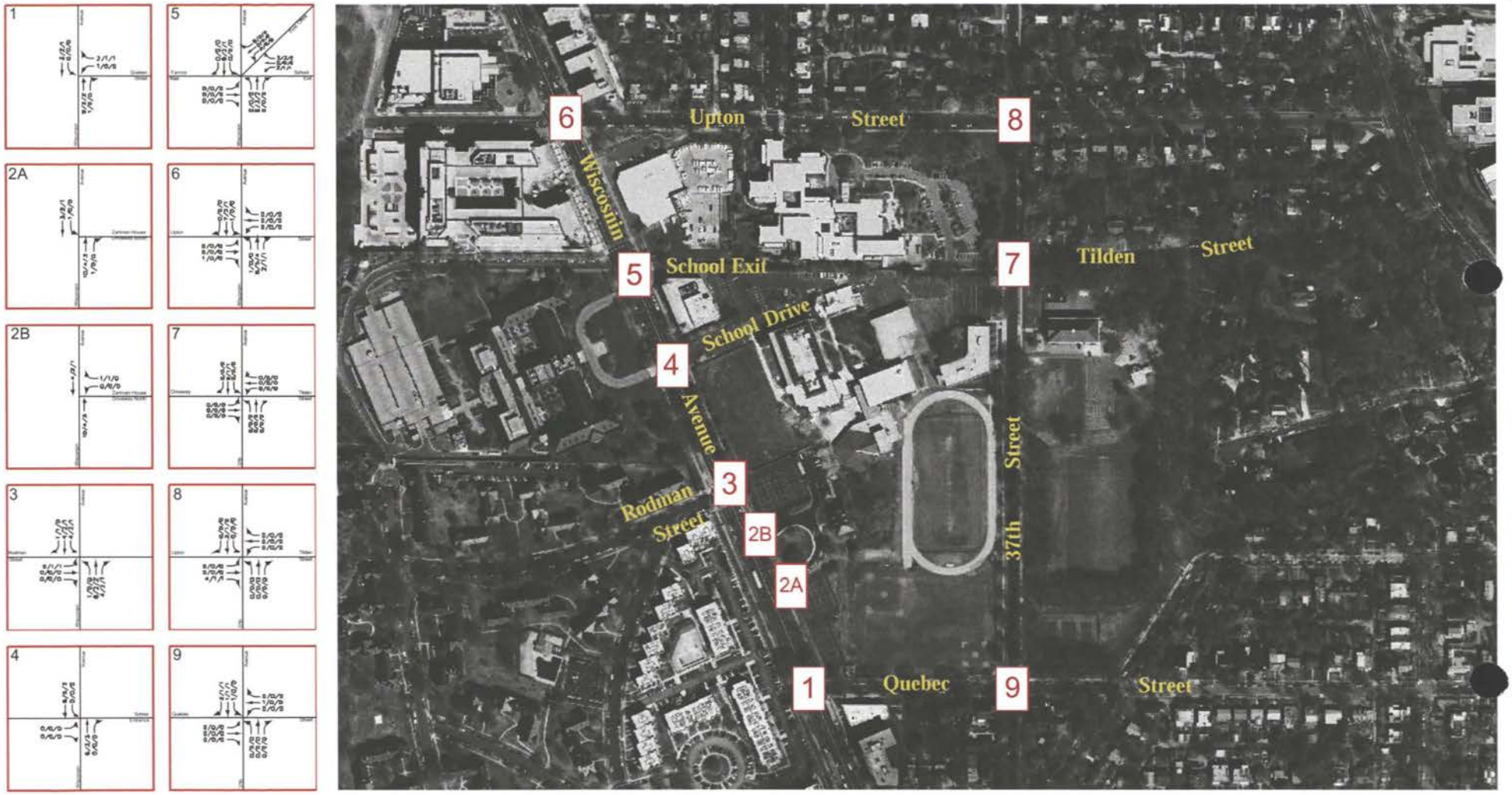


Figure 4–3
Site Trip Assignment–Sidwell Renovation

North
Schematic

Sidwell Friends School
Washington, D.C.

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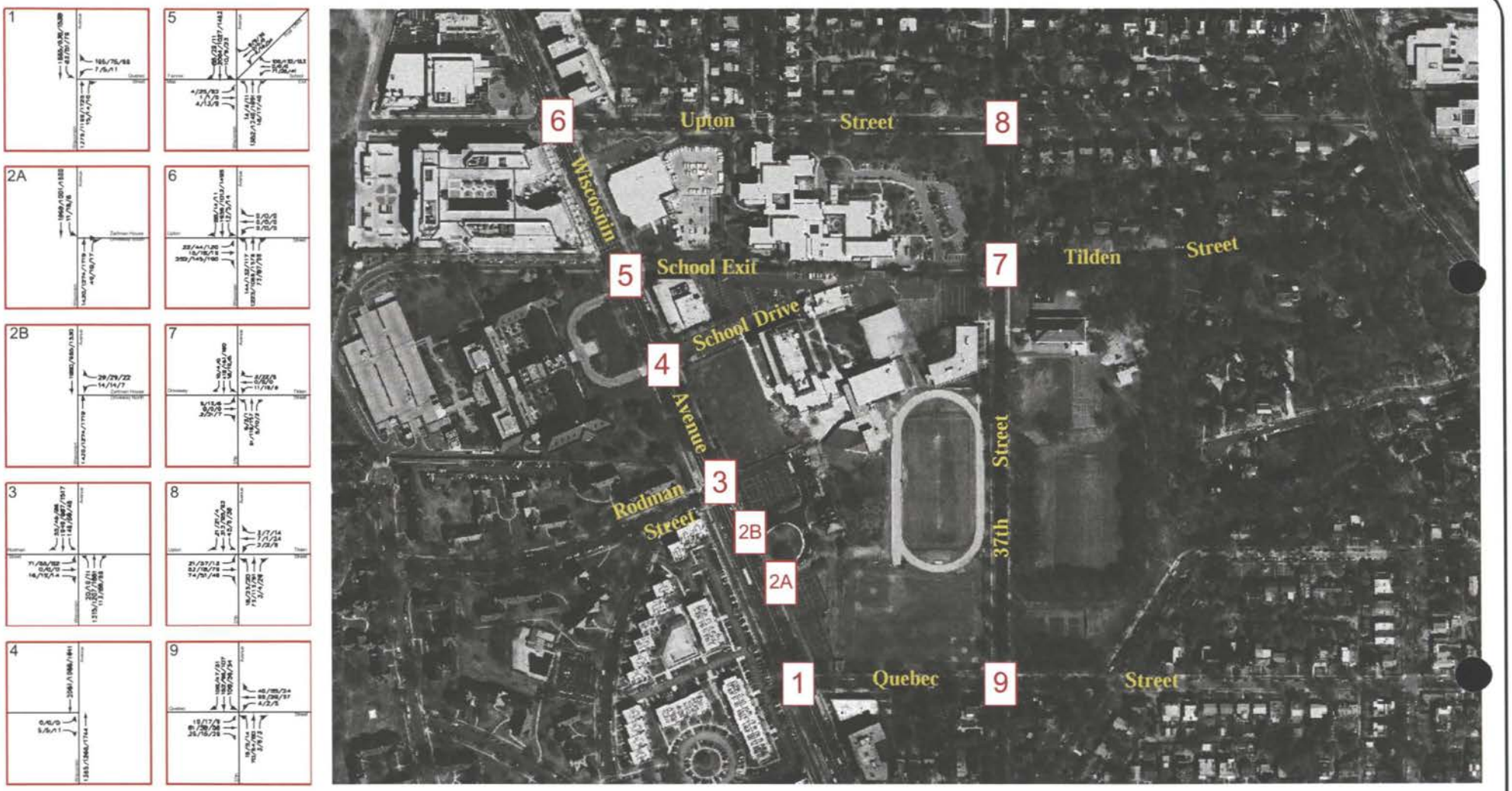


Figure 4–4
2006 Traffic Volumes with Sidwell Renovation

AM PEAK HOUR
SCHOOL PEAK HOUR
PM PEAK HOUR
000/000/000

North
Schematic

Sidwell Friends School
Washington, D.C.

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utilizing the Synchro 5 Traffic Signal Coordination Software and the Highway Capacity Manual (HCM) methodology. The results are presented in Appendix F and summarized in Table 4-2.

In 2006 with the proposed renovation/expansion, levels of service at each approach of the study intersections will remain unchanged from background conditions. A southbound advance left turn phase is recommended at the Wisconsin Avenue/Rodman Street/Sidwell intersection. Each approach to this intersection would operate at an acceptable LOS "C" or better at all times. The intersection would operate at an overall LOS "B".

Section 5
CONCLUSIONS

The conclusions of this study are as follows:

1. The current 801 students and 172 faculty and staff generate 630 inbound vehicle-trips during the AM peak hour, 251 outbound vehicle-trips during the PM ***school*** peak hour, and 239 outbound vehicle-trips during the PM ***street*** peak hour.

2. The commuter traffic peak hours on Wisconsin Avenue begin at 7:30 AM and 5:15 PM. The Sidwell peak hours begin at 7:15 AM and 3:15 PM.

3. Sidwell traffic accounts for seven percent to 16 percent of all traffic on Wisconsin Avenue during the AM peak hour and three percent to seven percent during the PM peak hour.

   A southbound advance left turn phase should be implemented at the Wisconsin Avenue/Rodman Street intersection to accommodate traffic entering the school campus via the proposed entrance.

4. Sidwell traffic accounts for 38 percent of traffic on 37th Street during the AM peak hour and eight percent during the PM peak hour.

5. Increasing enrollment from 801 to 825 students would add 11 to 31 vehicle-trips during the school and street peak hours. This small number of trips is not significant.

6. Currently, approximately four percent of students utilize public transportation to travel to/from school.

7. The observed average auto occupancy was 1.26 students per vehicle during the AM peak hour and 1.46 students per vehicle during the PM peak hour.

8. Approximately 27 percent of upper school students drive to school.

9. During the AM peak hour, nearly half of the student drop-offs occur on 37th Street. During this time, traffic flowed smoothly along 37th Street and the drop-off lane operated well.

10. During the PM hour, only16 percent of the pick-ups occurred on 37th Street. In contrast to the AM peak hour, 37th Street was congested during the PM peak hour due to the fact that Hearst Elementary School dismisses at approximately the same time as Sidwell Friends Middle School. Consideration should be given to altering the Middle School dismissal time so that it does not coincide with the Hearst Elementary School dismissal.

11. Currently, 192 parking spaces are provided on-site. Under the proposed plan, 212 parking spaces would be provided.

12. The proposed new drop-off/pick-up lane on Wisconsin Avenue would increase on-site queueing/stacking capacity to two times the existing capacity.

13. The proposed Sidwell traffic plan would, for the first time, provide both full movement access to and egress from Wisconsin Avenue at two signalized intersections.

14. A southbound advance left turn phase is recommended at the Wisconsin Avenue/Rodman Street intersection to accommodate traffic turning left into the proposed new drop-off/pick-up lane from southbound Wisconsin Avenue.