Traffic Analysis and Bus Management Recommendations

PFRC Meeting for Stratford and H-B Woodlawn
Wilson Site, 18th Street
May 11, 2016
TRAFFIC ANALYSIS
Presentation Overview

• Review traffic impact analysis of school traffic
  – Includes pipeline developments
  – Includes assumptions about staff and student travel
  – Analyzes peak hour for arrival and dismissal

• Share issues and opportunities for
  – Alternate parent drop-off
  – Vehicular transportation network
What we analyzed...

- Arrival peak hour (8:20-9:20AM)
- Dismissal peak hour (3:15-4:15PM)
- 12 study intersections (see right)
- Vehicular delay, Level of Service and queuing
- Impact of pipeline developments
Pipeline Developments

Property Key
1. Rosslyn Gateway
2. Queens Courts Apartments
3. 1401 Wilson Blvd
4. 1812 N Moore St
5. Central Place
6. Rosslyn Plaza
7. Penzance Property
8. 1776 Wilson Blvd
9. Sedona/Slate Apartments
Calculating Trip Generation

• Trip generation, an estimate of the number of vehicle trips that can be expected, is an essential part of the traffic analysis
• Includes: Students, Buses, Staff, Visitors
• Students, both being dropped off and driving themselves, represent the largest number of trips arriving and leaving the school site
Student Mode Splits

• Looked at three group of students separately
  – Grades 6-8, Grades 9-10, and Grades 11-12
  – Travel choices vary between groups

• Likelihood of mode change from current based on
  – Geographic location of school
  – Improved access to transit
  – Cost of parking for students
  – Student surveys
Mode Splits - Current & Future High School (11th & 12th Grade)

High School (11-12 Grades)

- Current
- Future

231 students (11th & 12th grades)

- Drop-off: Current 30%, Future 17%
- Carpool: Current 2%, Future 10%
- Drive Alone: Current 25%, Future 12%
- School Bus: Current 27%, Future 37%
- Transit: Current 8%, Future 16%
- Walk/Bike: Current 8%
Mode Splits - Current & Future High School (9th & 10th Grades)

231 students (9th&10th grades)
Mode Splits - Current & Future
Middle School (6th - 8th Grades)

253 students (6th-8th grades)
# Vehicle Trip Summary

## Arrival Peak Hour

**HB Woodlawn and Stratford Program at Wilson Site**

<table>
<thead>
<tr>
<th></th>
<th>Arrival Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IN</td>
</tr>
<tr>
<td>Students Drop Offs/Carpool</td>
<td>112</td>
</tr>
<tr>
<td>Students Drive Alone/Carpool</td>
<td>22</td>
</tr>
<tr>
<td>Staff ¹</td>
<td>68</td>
</tr>
<tr>
<td>Visitors</td>
<td>4</td>
</tr>
<tr>
<td>Buses ²</td>
<td>21</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>227</strong></td>
</tr>
</tbody>
</table>

1 – Assumes a 94% drive rate.
2 – Assumes 8 Stratford buses and 13 H-B Woodlawn buses.
3 - Compared to 295 trips at dismissal peak hour. Also, this is approximately 5% fewer trips at the Wilson site than the current arrival peak hour at the current school location.
**Issues and opportunities**

- **Vehicular transportation network**
  - Some intersections may require signal timing changes or additional turn lanes
  - One-way streets and offset intersections limit access somewhat

- **Remote drop-off**
Alternate Parent drop-off

Considerations include:

• Balance of convenience and proximity
• Avoid potential congestion along Quinn Street
• Avoid circuitous routes
• Observe and assess after several months’ experience
Alternate Parent Drop-off

• Parent drop-off analysis includes both:
  – How do students being dropped off ARRIVE?
  – How do parents dropping students off LEAVE?

• Several options being considered:
  - All drop-off on east side of Quinn Street
  - Additional, remote drop-off on Key Blvd, east of Quinn Street
  - Additional, remote drop-off on Quinn Street, north of Key Blvd
Drop-off on Quinn Street ONLY

How do students being dropped off ARRIVE at the site?

112 inbound drop-off trips

45%

25%

20%

10%
Drop-off on Quinn Street ONLY

How do parents dropping off students LEAVE the site?

112 outbound drop-off trips

Drop-off lane
Option: Drop-off on Key Blvd

How do students being dropped off ARRIVE at the site?

Drop-off lane

Alt. drop-off

112 inbound drop-off trips
Option: Drop-off on Key Blvd

How do parents dropping off students LEAVE the site?

112 outbound drop-off trips
Option: Drop-off on Quinn Street

How do students being dropped off ARRIVE at the site?

Alt. drop-off

Drop-off lane

112 inbound drop-off trips
Option: Drop-off on Quinn Street

How do parents dropping off students LEAVE the site?

Alt. drop-off

30%

Drop-off lane

10%

15%

15%

10%
Parent Drop-off Summary

• Location needs to be both convenient for parents and provide a direct and safe connection for students.

• It will be important to observe and assess after school opens.
BUS MANAGEMENT OPTIONS AND RECOMMENDATIONS
Summary of recommendations

• During arrival:
  – Restrict access to 18th Street for Stratford only
  – Restrict parking for both schools

• During dismissal
  – Restrict access to 18th Street for both schools
  – Restrict parking for both schools
BEGAN WITH SORTING OUT THE ARRIVAL AND DISMISSAL SEQUENCING
Current Planning Context for Bus Management

- Planning for 8 buses for Stratford and 13 buses for H-B Woodlawn
- BLPC/PFRC process identified 18th Street as location for drop-off and pick-up
- Stratford starts 30 minutes earlier than H-B Woodlawn
- Per state law: The driver of a vehicle also need not stop when approaching a school bus which is loading or discharging passengers from or onto property immediately adjacent to a school if the driver is directed by a law-enforcement officer or other duly authorized uniformed school crossing guard to pass the school bus. [http://law.lis.virginia.gov/vacode/46.2-859/](http://law.lis.virginia.gov/vacode/46.2-859/)
  - May conclude from this that unless a police officer or uniformed school crossing guard is present, all drivers must stop while buses are unloading or loading on 18th Street.
- Mid-block crossing on 18th Street at Rosslyn Highlands Park will be maintained
7:30 – 8:20 AM

- 8:20 AM H-B Zero Period Bell

- H-B Parent Drop-Off on Quinn St
- Staff Arrival via Parking Driveway
- Parking restrictions on N Quinn St and 18th St N
- Note: Special Ed bus can park in front of field after 9:30AM
### Arrival Timing

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>7:30 AM</td>
<td>Btwn Garage and Mid-Block X-ing</td>
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<tr>
<td>7:35 AM</td>
<td>Btwn Mid-Block X-ing and New St</td>
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<tr>
<td>8:00 AM</td>
<td>Staff Driveway</td>
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<tr>
<td>8:15 AM</td>
<td>Staff Arrival</td>
</tr>
<tr>
<td>8:20 AM</td>
<td>Stratford Buses</td>
</tr>
<tr>
<td>8:30 AM</td>
<td>H-B Buses</td>
</tr>
<tr>
<td>8:45 AM</td>
<td>H-B Parent Drop-off</td>
</tr>
</tbody>
</table>

**8:20 – 9:00 AM**
- 8:20 AM H-B Zero Period Bell
- 8:54 AM Stratford Bell

- Stratford Buses Arrive on 18th St N
- H-B Parent Drop-Off on Quinn St
- Staff Arrival via Parking Driveway
- Parking restrictions on N Quinn St and 18th St N
### Arrival Timing

| Time  | 7:30 AM | 7:35 AM | 7:40 AM | 7:45 AM | 7:50 AM | 7:55 AM | 8:00 AM | 8:05 AM | 8:10 AM | 8:15 AM | 8:20 AM | 8:25 AM | 8:30 AM | 8:35 AM | 8:40 AM | 8:45 AM | 8:50 AM | 8:55 AM | 9:00 AM | 9:05 AM | 9:10 AM | 9:15 AM |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 18th Street |         |         |         |         |         |         |         |         |         |         |         |         | Stratford Buses | H-B Buses |         |         |         |         |         |         |         |
| Between Garage and Mid-Block X-ing |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| Between Mid-Block X-ing and New St |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| Staff Driveway |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| No Parking |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| Quinn Street |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| Between Loading Dock and 18th St |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| No Parking |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |

- H-B Buses arrive on 18th St N
- H-B Parent Drop-Off on Quinn St
- Staff Arrival via Parking Driveway
- Parking restrictions on N Quinn St and 18th St N
### Arrival Timing

<table>
<thead>
<tr>
<th>Time</th>
<th>18th Street</th>
<th>Quinn Street</th>
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<tbody>
<tr>
<td>7:30 AM</td>
<td>Btwn Garage and Mid-Block X-ing</td>
<td>Btwn Loading Dock and 18th St</td>
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<td>7:35 AM</td>
<td>Btwn Mid-Block X-ing and New St</td>
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<tr>
<td>7:40 AM</td>
<td>Staff Driveway</td>
<td>Staff Arrival</td>
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<td>7:45 AM</td>
<td>NO PARKING</td>
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<td>Stratford Buses</td>
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<td>9:35 AM</td>
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- H-B Buses Arrive on 18<sup>th</sup> St N
- H-B Parent Drop-Off on Quinn St
- Parking restrictions on N Quinn St and 18<sup>th</sup> St N

**9:15 – 9:30 AM**

- 9:24 AM H-B First Period Bell
### Dismissal Timing

#### 3:00 - 3:20 PM

- **3:15 PM** H-B Sports Buses Leave

<table>
<thead>
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<th>Time</th>
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<td>3:00 PM</td>
<td>H-B Sports Buses Arrive on 18th St N</td>
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<td>3:05 PM</td>
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<td>3:10 PM</td>
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<td>5:35 PM</td>
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<tr>
<td>5:40 PM</td>
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</tr>
</tbody>
</table>

- Parking restrictions on N Quinn St and 18th St N
### Dismissal Timing

#### 3:25 - 4:00 PM
- 3:36 PM
- Stratford Bell

#### 18th Street
- Between Garage and Mid-Block X-ing
- Stratford Buses
- H-B Sports
- Staff Exiting
- NO PARKING

#### Quinn Street
- Between Loading Dock and 18th St
- NO PARKING

- **Stratford Buses Arrive on 18th St N**
- **Staff Begin Exiting Parking Lot on 18th St N**
- **Parking restrictions on N Quinn St and 18th St N**
**Dismissal Timing**

- H-B Buses Arrive on 18th St N
- Staff Exit Parking Lot on 18th St N
- H-B Parent Pick-Up Begins on Quinn St
- Parking restrictions on N Quinn St and 18th St N

4:00 – 4:20 PM

4:06 PM H-B Bell
Dismissal Timing

- Staff Exit Parking Lot on 18th St N
- Parking restrictions on N Quinn St and 18th St N
Dismissal Timing

- H-B Late Buses Arrive on 18th St N
- Staff Exit Parking Lot on 18th St N
- No Parking on 18th St N

5:15 – 5:40 PM
- 5:30 PM H-B Late Buses Leave

5:15 –
5:40 PM

5:30 PM
H-B Late Buses Leave
KEY CONSIDERATIONS
Key considerations

Student safety and well-being

Neighborhood circulation and access

Student convenience and efficient procedures
RECOMMEND LIMITING ACCESS TO 18TH STREET DURING ARRIVAL AND DISMISSAL
Limiting access to 18th Street during arrival and dismissal

Three options for managing 18th Street
1. Signage and periodic enforcement
2. Signage with police officer directing traffic
3. Open with police officer directing traffic

Limiting access is essential for Stratford arrival and dismissal

Not essential for H-B Woodlawn, but may be practical
How other school systems handle on-street school bus drop-off and pick-up

- Mt. Vernon Community school, Alexandria
  - Drop-off on curb with crossing guard
  - Afternoon pick-up on school grounds
  - Only 1 or 2 special ed buses; arrive at different times
- Various schools in Richmond
  - Drop-off on curb with no crossing guard
  - Motorists do no stop; no enforcement
  - Have been child pedestrian crashes
  - One 1 or 2 special ed buses; arrive at different times
How other school systems handle on-street school bus drop-off and pick-up

Boston – Carter Development School
About 30 students and 8 buses

Space on-site: School dead ends between two streets that connect with street in front of building

All buses arrive about the same time with all staff greeting students and escorting them into building

Buses pull away as students depart

Majority of students are in wheel chairs; few self-propel
AVAILABLE SPACE FOR BUSES ON 18TH STREET
Curb space along 18th Street

Current site plan allows for up to 342 feet of curb space

- Stratford principal does not want to use this space for its students
- H-B Woodlawn principal is comfortable using this space
SOME NEEDS OF THE TWO SCHOOL DIFFER
STRATFORD
Stratford Arrival and Dismissal Curbside Needs

• Need to create a special environment for these students
• Limiting motor vehicle access to 18th Street is key for this
• Restricting parking will increase available space
Stratford Arrival and Dismissal

Buses now line up around driveway circle at school entrance
Stratford Arrival and Dismissal

The arrival ritual: All staff meets students and buses
Stratford Arrival and Dismissal

The Arrival Ritual: part of the overall care for students
Stratford Arrival and Dismissal

Dismissal on April 8, 2016
Stratford Arrival and Dismissal Curbside Needs

- Space for all buses to dwell to unload and load students at the same time for both arrival and dismissal
- Maneuvering space needed for staff to unload and load students, including for wheelchair lifts
- Minimal travel distance between bus and school door
- Linear space of up to 320’ for 8 buses

<table>
<thead>
<tr>
<th>Number</th>
<th>Bus length</th>
<th>Maneuvering length</th>
<th>Total length</th>
<th>Total length of all buses</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>25’ or 30’</td>
<td>10’</td>
<td>35’ min 40’ max</td>
<td>280’ min 320’ max</td>
</tr>
</tbody>
</table>
Recommendations for Stratford Arrival and Dismissal

- Recreate the current environment for Stratford students at Wilson site
  - Limited access to 18th Street and parking restrictions
  - All buses staged at one time on 18th Street
  - Build a flush curb

- Options not considered feasible:
  - Use space east of mid-block crossing: Too far for students to travel
  - Buses arrive in two waves: Due to contract times, staff may not be available
Potential bus staging configurations

Double-stacked

Diagonal parking
H-B WOODLAWN ARRIVAL/DISMISSAL
H-B Woodlawn Arrival

- A total of 13 buses arrive at different times, unload and depart
- Multiple buses may arrive and unload at the same time, but bus dwell time is short
- Close the street or police officer directs traffic
H-B Woodlawn Dismissal Needs

- Space for multiple buses to wait for dismissal and students to board
- Adequate space needed for students waiting for bus
- Space in front of Rosslyn-Highlands park is closer to H-B Woodlawn entrance
- Linear space need is 650’ for 13 buses

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<thead>
<tr>
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<th>Maneuvering length</th>
<th>Total length</th>
<th>Total length of all buses</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>40’</td>
<td>10’</td>
<td>50’</td>
<td>650’ (13 buses)</td>
</tr>
</tbody>
</table>
Recommendation for H-B Woodlawn Dismissal

Continue limited access to the street after Stratford dismissal

• Requires two waves of buses
• Several potential configurations
• Parking restrictions

Option offering limited benefit:

• No access restrictions to the street
• Requires 3 waves of buses
• Minimal time difference for 3 waves of buses
Recommendation for H-B Woodlawn Dismissal

- All buses wait for dismissal on 18th Street:
  - All headed eastbound
  - Half in parking lane
  - Half in travel lane
- Limited access to 18th Street
- Parking restrictions
- Three potential staging configurations
H-B Dismissal: Potential staging configurations

- Double-stacked, same side of street as school
- Double-stacked, both sides of street
- Diagonal parking, same side of street as school
Not recommended: Open access to 18th Street

- Use existing curb space for up 5 or 6 buses at one time
- Dismiss students in three groups, depending on waiting buses
- Stage buses off-site
- Police officer directs traffic
- Parking restrictions
RECOMMENDATIONS BASED ON STRATFORD NEEDS AND STUDENT SAFETY
Key considerations

★ Importance of replicating special environment for Stratford students
Summary of recommendations

• During arrival:
  – Restrict access to 18th Street for Stratford only
  – Restrict parking for both schools

• During dismissal
  – Restrict access to 18th Street for both schools
  – Restrict parking for both schools
Recommendations are based on current information and site plan; plan needs to be re-evaluated and refined after school opens.