

CITY OF PHILADELPHIA

WASHINGTON AVENUE POST-INSTALLATION STUDY

GRAYS FERRY AVENUE TO 4TH STREET

FEBRUARY 23, 2024

Submitted to:

City of Philadelphia
1401 JFK Blvd
Philadelphia, PA 19102

Submitted by:

WSP USA
1700 Market St, Suite 1050
Philadelphia, PA 19103





TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
SECTION 1 - PARKING AND LOADING ANALYSIS.....	6
1.1 INTRODUCTION.....	6
1.2 PARKING/LOADING DATA COLLECTION.....	6
1.3 PARKING/LOADING OPERATIONAL CHARACTERISTICS ..	7
1.3.1 OCCUPANCY.....	7
1.3.2 DURATION & TURNOVER.....	10
1.3.3 ILLEGAL PARKING ACTIVITY	12
1.4 SUMMARY OF FINDINGS.....	16
SECTION 2 - TRAFFIC ANALYSIS	18
2.1 INTRODUCTION.....	18
2.2 TRAVEL TIME ANALYSIS.....	18
2.3 TRAFFIC VOLUME COMPARISON.....	21
2.3.1 TURNING MOVEMENT COUNTS.....	21
2.3.2 ANNUAL DAILY TRAFFIC COUNTS.....	28
2.3.3 BICYCLE VOLUMES	29
2.4 SPEED ANALYSIS	32
2.4.1 SPEED DATA COMPARISON	32
2.4.2 SPEED SLOT OBSERVATIONS.....	34
2.4.3 TURN WEDGE OBSERVATIONS.....	38
2.5 QUEUEING ANALYSIS AT LANE TRANSITIONS.....	38
2.6 VEHICLE AND BICYCLE INTERACTIONS.....	39
2.7 SUMMARY OF FINDINGS.....	42
SECTION 3 - RECOMMENDATIONS	44

APPENDICES

A-1.	PARKING & LOADING OCCUPANCY GRAPHS
A-2.	PARKING & LOADING DURATION AND TURNOVER GRAPHS
A-3.	ILLEGAL PARKING GRAPHS
A-4.	TRAVEL TIME GRAPHS

EXECUTIVE SUMMARY

The purpose of the **Washington Avenue Post-Installation Study** was to collect and analyze data on Washington Avenue and specified parallel routes, and then use this data to compare current-day parking, loading, and traffic conditions to the conditions documented prior to completion of the *Washington Avenue Repaving and Safety Improvement Project* (which was implemented by the City of Philadelphia in 2022). Post-implementation data was collected in the Fall of 2023, as follows:

- Parking/loading data was collected on Washington Avenue between Broad Street and 4th Street, specifically on blocks with regulations implemented as part of the Washington Avenue Repaving and Safety Improvement project.
- Traffic data was collected on Washington Avenue between Grays Ferry Avenue and 4th Street, and at specified locations on two parallel routes identified during the project study phase: Christian Street and Ellsworth Street. Additional traffic collected by DVRPC and provided to WSP was also incorporated into the analyzed.

In addition to the analysis described above, the City of Philadelphia’s Office of Complete Streets (OCS) will be analyzing crash data to evaluate the project’s impacts on traffic safety. However, at the time of this study post-implementation crash data was not available yet. Thus, the crash analysis will be conducted by OCS at a later point once the crash data is available. Similarly, OCS will be conducting an evaluation of the project’s impact on bus operations along the corridor, which will be released separately from this study.

The table below provides a high-level comparison of project outcomes to the original project goals:

PROJECT GOALS	OUTCOME
Increase available daytime parking between 4 th Street and 11 th Street	Positive
Create more loading zones for businesses and customers	Positive / Mixed
Discourage illegal parking behaviors between Broad Street and 4 th Street	Positive / Mixed
Reduce speeding on Washington Avenue to make it safer for all users	Mixed
Install significant traffic calming between Broad Street and 4 th Street without operational impacts to Washington Avenue or parallel roadways	Positive
Increase safety for people riding bikes on Washington Avenue	Positive

Note: Crash analysis is not included in this evaluation due to lack of reliable data. Future analysis including crash analysis is planned for follow-up evaluation when data becomes available.

Key findings and recommendations from the parking/loading and traffic analyses are summarized on the following pages of the Executive Summary. For more detailed discussion of the methodology, analysis, and results, refer to *Section 1 (Parking & Loading Analysis)*, *Section 2 (Traffic Analysis)*, and *Section 3 (Recommendations)* of this report.

PARKING & LOADING ANALYSIS – KEY FINDINGS

Occupancy Rates:

- **When compared with results from the 2017 study, average occupancies for all spaces (parking and loading) are significantly lower in the 2023 post-implementation condition.** In 2017, the average occupancy rates never went below 90% of all spaces. In 2023, the average occupancy rate never rose above 70% of all spaces.
 - Average hourly occupancy rates for on-street parking spaces were between 59-85% on all days except Sunday, where they ranged between 75-95%.
 - Compared to parking spaces, average hourly occupancy rates for loading zone spaces were: (a) significantly lower, which could be expected given the transitory nature of regulated loading areas, and (b) more stable throughout the day.

Parking Duration:

- **The average duration for parking and loading zones are significantly lower in the 2023 post-implementation condition,** with the 2023 average duration at 3.3 hours compared to the 2017 average duration of 7.3 hours.
 - The average duration for on-street parking spaces is 3.9 hours. However, the observed parking durations indicate that cars are generally staying beyond the 2- and 4-hour regulated parking times in the corridor, especially in the 2-hour maximum spaces.
 - Loading zone regulations on the corridor are limited to maximum 30 minutes. Observed durations in loading zones averaged 2.6 hours, indicating that drivers are not following loading zone regulations, using the spots as longer-term loading or parking instead of short-term loading spaces.

Illegal Parking:

- **Illegal parking is down by over 50% corridor-wide, with significantly less double parking and median parking.** However, sidewalk parking instances have increased since 2017.
 - Double parking along the corridor was most prevalent on the 400, 1200, and 1300 blocks. However, instances of double parking are much fewer in 2023 than in 2017. In 2017, the 800 block alone had over 90 instances of double parking over the collection period. In 2023, there were only 18 total instances of double parking for the whole corridor over the collection period.
 - Median parking was most prevalent on the 800 and 900 blocks, and the observed duration for median parked vehicles was almost always under an hour. The instances of median parking dropped significantly compared to the 2017 study.
 - Sidewalk parking instances have increased since 2017 and were concentrated on the 700, 800, and 900 blocks. Sidewalk parking was more common on weekdays than weekends, corresponding with business hours for auto and construction-related businesses. Vehicles parked on the sidewalk during weekdays often stayed in the same spot for multiple hours.

PARKING & LOADING ANALYSIS – RECOMMENDATIONS

Recommendations to improve parking and loading operations along the Washington Avenue corridor are provided below (more detailed is provided in Section 3 of the report):

- Coordinate with the Philadelphia Parking Authority (PPA) to provide additional enforcement of parking and loading regulations along Washington Avenue, with a focus on promoting adequate turnover in loading zones and discouraging sidewalk parking.
- Coordinate with PPA to make sure that Tow-Away Zone signs are installed along the corridor.
- Coordinate with PPA to correctly reinstall parking restriction signage that was incorrectly placed on utility poles instead of new posts along the north side of Washington Avenue between S. 7th Street and Passyunk Avenue.
- Coordinate with Department of Streets to revise the pavement markings and signage in front of 833 Washington Avenue (Giordano Fruit and Produce) to provide additional loading spaces where the fire hydrant was removed.
- Based on the success of the new regulations east of Broad Street, similar regulations west of Broad should be considered to improve occupancy/duration/turnover metrics and reduce instances of illegal parking.

TRAFFIC ANALYSIS – KEY FINDINGS

Travel Times

- **Travel times along Washington Avenue for the AM, PM, and Saturday peak periods, when analyzed as separate east (13th Street to 4th Street) and west (Grays Ferry Avenue to 15th Street) sections, did not result in a statistically significant change due to the implementation of the Selective Road Diet concept.**
- Travel time along Ellsworth Street did not change. Along Christian Street during the weekday PM peak period, there was a statistically significant increase in the eastbound direction with a statistically significant decrease in the westbound direction.

Vehicular Volumes

- AM, PM, and Saturday peak hour volumes along Washington Avenue decreased by 7% to 28%. **The AM peak hour volumes decreased by 20% east of Broad Street and 11% west of Broad Street, while the other peak hours experienced decreases that were generally uniform across the corridor.** AADT also decreased between 16% and 20% at locations where comparisons could be made.
- Based on the available data, **minor volume increases on Carpenter Street and Federal Street east of Broad Street indicate some traffic may have diverted to those streets.** Relatively higher volume decreases in the AM peak hour along Washington Avenue east of Broad may suggest that some motorists diverted to Christian Street, although factors including mode diversion, route diversion, trip time augmentation, and/or trip deferral could also explain the decreases.

Bicycle Volumes

- Average Annual Daily Bike (AADB) volumes along Washington Avenue increased substantially both east and west of Broad Street (62% to 101%). However, **peak hour bike volumes increased primarily on the blocks with protected bike lanes (between 11th Street and 4th Street). On this stretch, volumes increased up to 181%.**

Speed Analysis

- **Preliminary results from the radar gun data indicate that 85% percentile speeds and the percent of vehicles driving above the speed limit decreased both east Broad Street.**
- **Results from the pneumatic tube (ATR) speed data were mixed. Pre- and post-implementation vehicle speeds were found to be similar during weekday hours between 1:00 pm to 6:00 pm; however, the percentage of motorists traveling at or above 30 mph increased in some directions and at some locations.** This may be a function of the balance between street design and signal timing. Specifically, the reduction in lanes east of Broad and the posted speed limit likely contribute to slower speeds, while the revised 90-second signal timing during the daytime hours results in a longer green wave and may contribute to higher speeds when congestion is minimal.
- Other factors may also influence the speed analysis results; for instance, reports have shown that speeding has increased throughout the city post-pandemic, while ATR tube placement by the different collectors (NDS vs. DVRPC) can also influence speed results. Pavement resurfacing can also lead to higher speeds post-implementation, particularly if the previous surface was in poor condition.
- It was observed that between 75% and 83% of the motorists are utilizing the speed slots as designed and as compared to blocks where speed slots do not exist (or did not exist in the pre-implementation condition), **the data shows that speed slots reduced the percentage of vehicles driving at or above the speed limit.**

Queueing at Lane Drops

- The 95th percentile queue attributed to the lane drops are being contained within one block length and are not backing up into adjacent signals.

Vehicle and Bicycle Interactions

- Over the nine hours of observation, no close calls were observed between vehicles turning into driveways and bicyclists. In each of the 39 observed interactions, bicyclists and motorists practiced safe yielding behavior. Thus, the approach sight distances implemented with the design appear to be adequate.

TRAFFIC ANALYSIS - RECOMMENDATIONS

Recommendations to improve traffic operations and safety along the Washington Avenue corridor are provided below (more detailed is provided in Section 3 of the report):

- To help control speeds in this section, the Streets Department consider revising the signals from Front Street to S. 3rd Street to operate 60-second cycle lengths, matching the overnight double-offset operation. The intersection of Washington Avenue at S. 4th Street should remain as a 90-second cycle length due to the lane drop at S. 5th Street.

- Due to the reduction in volumes from the pre-pandemic volume collection effort, the Streets Department should consider extending the times for the double-offset program and extending the side street splits where there is excess capacity along Washington Avenue.
- The Streets Department should consider revising the signal timing along Christian Street west of Broad Street to support a progression at or below the speed limit to discourage speeding. Alternatively, it is understood that the Streets Department is considering conversion of some of these traffic signals to all-way stops. This could also help to control speeding, if the all-way stops meet warrant criteria.
- The status of installing emergency preemption along the corridor should be provided to the stakeholders along the corridor.
- The Streets Department and OTIS should consider reduction of the speed limit to 25 mph along the entirety of Washington Avenue.
- There are several locations where flexible delineators have been removed or were not initially installed by the contractor. The Streets Department and OTIS should coordinate to install/reinstall these flexible delineators.

SECTION 1 – PARKING AND LOADING ANALYSIS

1.1 INTRODUCTION

The purpose of the Parking & Loading Analysis was to (a) collect on-street parking and loading data along Washington Avenue between Broad Street and 4th Street, (b) analyze this data to determine operational characteristics including occupancy, turnover/duration, and instances of illegal parking activity, and (c) compare with pre-implementation conditions prior to project implementation. The methodology used for post-implementation data collection and analysis matches the methodology used in previous Washington Avenue parking and loading analyses for the blocks east of Broad (completed by Urban Engineers, Inc. in 2017) and west of Broad (completed by WSP in 2019).

1.2 PARKING/LOADING DATA COLLECTION

The inventory of post-implementation parking along both sides of Washington Ave identified approximately **175 total regulated parking/loading spaces** between Broad Street and 4th Street. This supply is regulated by several types of signs establishing 2-hour and 4-hour parking zones, 30-minute loading zones, and combined parking/loading zones. Combined parking/loading zones specify loading for certain times/days of the week and parking during times/days when loading is not needed.

Of the total regulated spaces available along Washington Ave, there are 118 on-street parking spaces, 29 loading spaces, and 28 parking and loading spaces. Since on-street parking and loading spaces are not striped within the study area, the number of spaces along each block face was estimated based on the length of the block and the observed number of vehicles parking along the block. In addition, 104 restricted spaces were inventoried. Restricted spaces consist of driveways, corner clearances, and other areas where parking/loading/stopping/standing is not allowed. The location and number of restricted spaces was determined by the consultant team and included in the analysis to enable documentation of illegal parking instances.

WSP staff conducted site visits in September and October of 2023 to collect parking and loading data along both sides of Washington Avenue between Broad St and 4th St. Prior to the site visits, WSP developed field sheets based on the inventory of spaces. The data collection effort consisted of a 12-hour collection period (7:00 AM to 7:00 PM) on Wednesday, Thursday, and Saturday along with an 8-hour collection period (8:00 AM to 4:00 PM) on Sunday. These periods were selected in to match the 2019 study and cover the highest periods of activity in the corridor. The specific times and dates were also selected to avoid any non-representative periods (e.g., schools not in session, traffic lane closures, inclement weather, etc.). *Figure 1* summarizes the data collection schedule.

Figure 1 - Data Collection Schedule

DAY & DATE	START	END TIME	DURATION	WEATHER
Wednesday, 9/20/23	7:00 AM	7:00 PM	12 hrs	Sunny, 65 – 75 deg.
Thursday, 9/21/23	7:00 AM	7:00 PM	12 hrs	Sunny, 65 – 75 deg.
Saturday, 9/30/23	7:00 AM	7:00 PM	12 hrs	Partly Cloudy, 60 – 70 deg.
Sunday, 10/1/23	8:00 AM	4:00 PM	8 hrs	Partly Cloudy, 70 – 80 deg.

Consistent with the 2017 and 2019 parking studies, the parking data collection methodology consisted of walking loops of the corridor every hour to record vehicle license plates for parking spaces and tally instances of illegal parking activity including double parking, median parking, and sidewalk parking. License plate data for curbside activity was collected at hourly intervals for use in calculating occupancy and turnover/duration metrics.

During the data collection period, staff were instructed to take note of any Philadelphia Parking Authority (PPA) officers they encountered along the route and/or tickets they observed on windshields. For almost the entire collection period, staff did not observe any PPA enforcement activity – whether personnel or tickets. Out of the 44 hours that staff walked the corridor, only one PPA officer was observed on the morning of Thursday, 9/21. That same morning, tickets were observed on windshields on the 1200 block, but other than that, no tickets were observed during the collection period.

1.3 PARKING/LOADING OPERATIONAL CHARACTERISTICS

The collected parking data was input into a spreadsheet format and analyzed to determine operational characteristics including occupancy, duration/turnover, and instances of illegal parking activity. Key results from the parking analysis are summarized in this section, while detailed graphs and tables are included as attachments.

1.3.1 OCCUPANCY

Occupancy is calculated by dividing the number of occupied spaces by the number of total spaces at each hourly interval. Average occupancy rates were summarized for each parking/loading area and block face by day of the week, and then aggregated to determine an average occupancy for the corridor. Only parking and loading spaces were included in the corridor occupancy calculations (excluding restricted spaces).

Detailed occupancy calculations were performed on a block-by-block basis for each of the two categories: parking and loading. *Figure 2* shows the average occupancy rate for all parking and loading spaces along the corridor per day per hour from the 2023 study. Graphs showing occupancy by block are included as *Appendix A-1*. In general, it was found that **average occupancy rates for the study area are much lower compared to the rates before the regulations were installed on Washington Ave.**

shows the average occupancy rate for the corridor per day per hour from the 2017 study. The occupancy rates on Washington Ave in 2017 exceeded 90% on all days, whereas in 2023, the occupancy rates never exceeded 70%.

Figure 2 - Average Occupancy for the Corridor (2023)

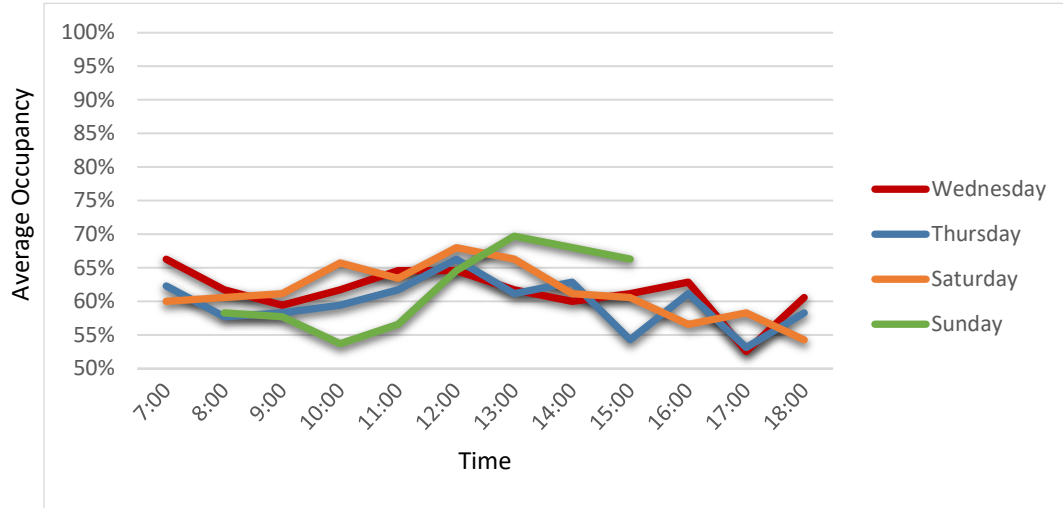
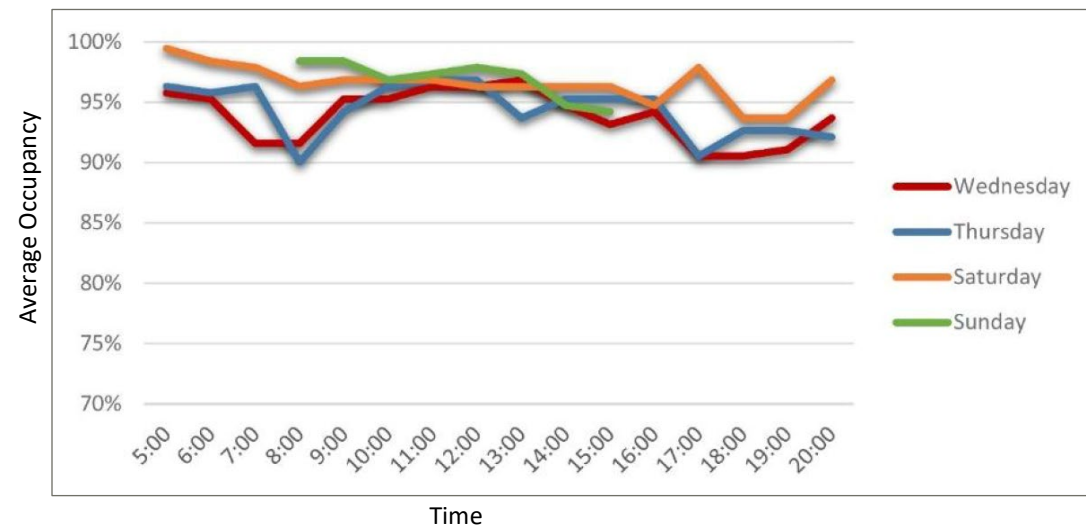


Figure 3 - Average Occupancy for the Corridor (2017)*



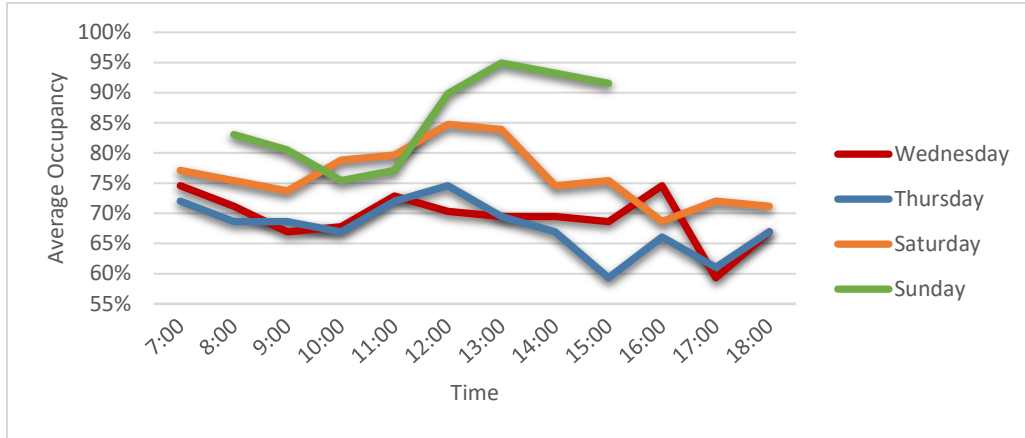
*Note that 2017 occupancy rates were calculated based on 228 unregulated parking spaces and did not include 10 regulated (e.g., loading, disabled) spaces.

Occupancy rates for parking spots varied widely across the corridor over the collection period, ranging from 59% to 95% depending on the day. On average, parking occupancy rates were highest for the 900 and 600 blocks and lowest for the 700 and 500 blocks. Occupancy rates for loading zones varied widely across the corridor and were highly dependent on the use and activity of adjacent businesses. A summary of occupancy trends by day and time is provided below.

ON-STREET PARKING SPACES

Figure 4 shows average occupancy across the corridor for on-street parking spaces. On the two weekdays, occupancy was fairly consistent throughout the day, generally highest (70%-75%) in the late morning and lowest (60%) near the end of the collection period. On Saturday, occupancy was highest in the early to mid-afternoon hours (80%-85%) and lower toward the end of the day (69%-72%). Occupancy on Sunday was generally the highest of all the days, ranging from a low of 75% in the mid-morning to a high of 95% in the afternoon.

Figure 4 - Occupancy Rate for Parking Spaces (Corridor)

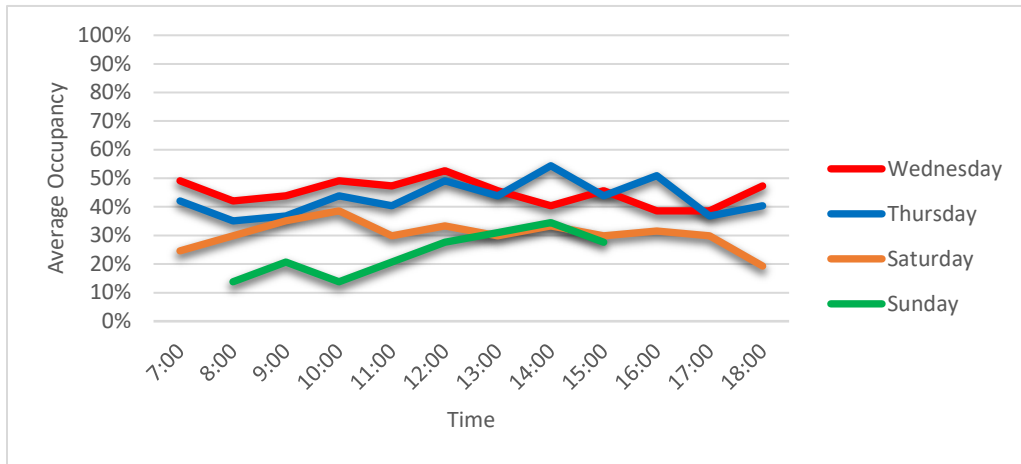


LOADING ZONE SPACES

Figure 5 shows average occupancy across the corridor for on-street loading zone spaces. Compared to the on-street parking spaces, average occupancies for loading zone spaces were: (a) significantly lower, which could be expected given the transitory nature of regulated loading areas, and (b) much more stable throughout the day. It should be noted that the observation of loading zone activity is limited by the collection methodology. There may have been more cars using the loading zones that were not counted since they parked in between the hourly observation times.

On the two weekdays, occupancy was highest (51%) in the middle of the day and otherwise stayed around 38% - 47%. The loading zone occupancy rates for weekend were consistently lower than on the weekends. On Saturday, occupancy stayed between 30% - 39% except at the very beginning and end of the collection period. The occupancy on Sunday was lower than any other day of the week, remaining under 35% for the whole collection period. This result is intuitive, as many businesses that generate loading activity within the study area have shorter hours or are not open on Sundays. It's also important to note there are fewer regulated loading spaces on Sundays, since 11 spaces with combined parking/loading regulations during weekdays convert to parking-only on Sundays.

Figure 5 - Average Occupancy for Loading Spaces (Corridor)



1.3.2 DURATION & TURNOVER

Duration is the observed length of time (in hours) that a vehicle occupies a parking space. Turnover refers to the number of vehicles that occupy a given parking space over the collection period and is inversely related to duration. *Appendix A-2* includes detailed tables showing average durations and turnover by block and parking type for the full collection period.

Figure 6 shows the average durations per block for the 2023 and 2017 studies. **The average durations in 2023 are significantly lower than the average durations from 2017.** In 2017, the average duration for the corridor was 7.3 hours, whereas in 2023, the average duration for the corridor was just 3.3 hours.

Figure 6 - Average Duration for the Corridor in 2023 (left) and 2017 (right)

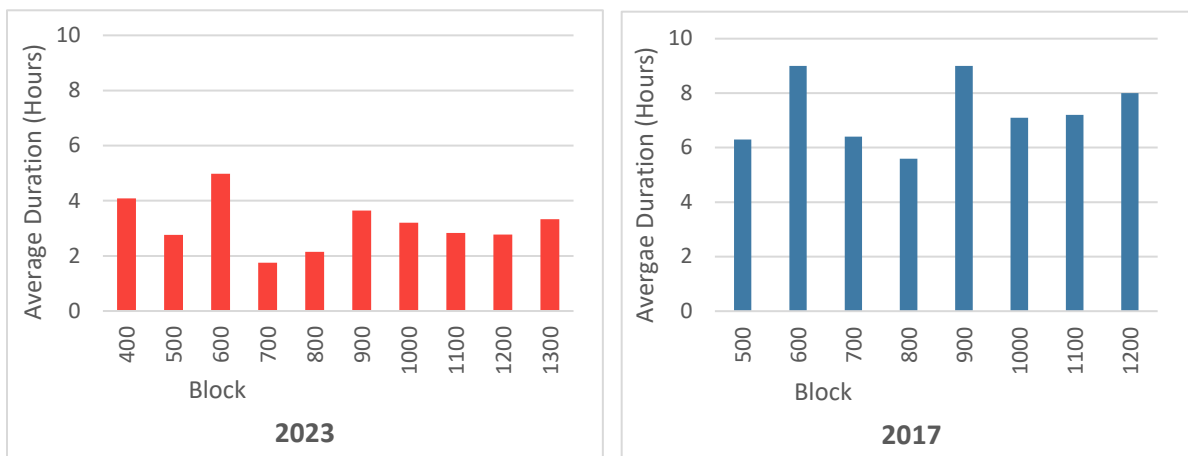
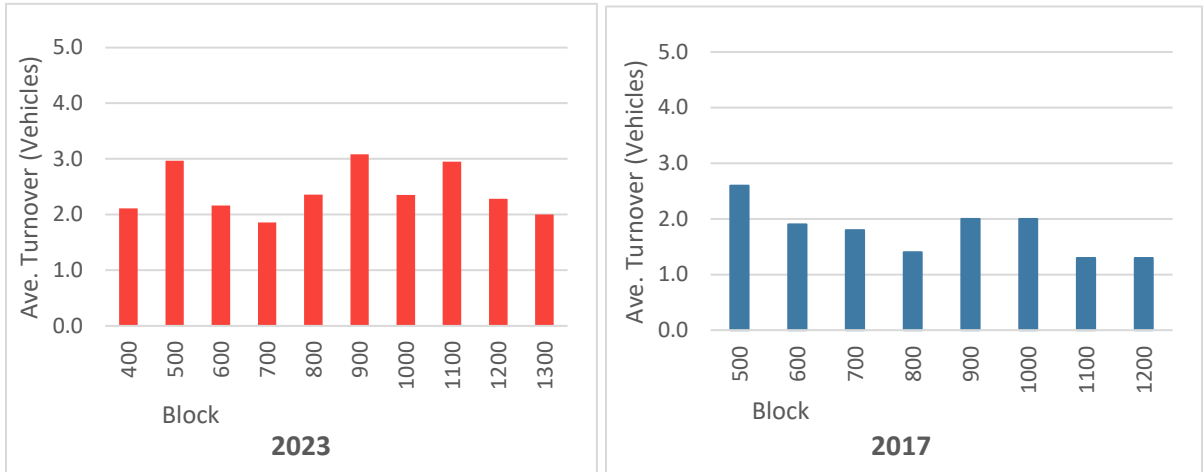


Figure 7 shows the average turnover per block for the 2023 and 2017 studies. The drop in duration would predict a higher turnover in 2023. The average turnover for the corridor is 2.4 vehicles per day in 2023, up from 1.8 vehicles per day in 2017.

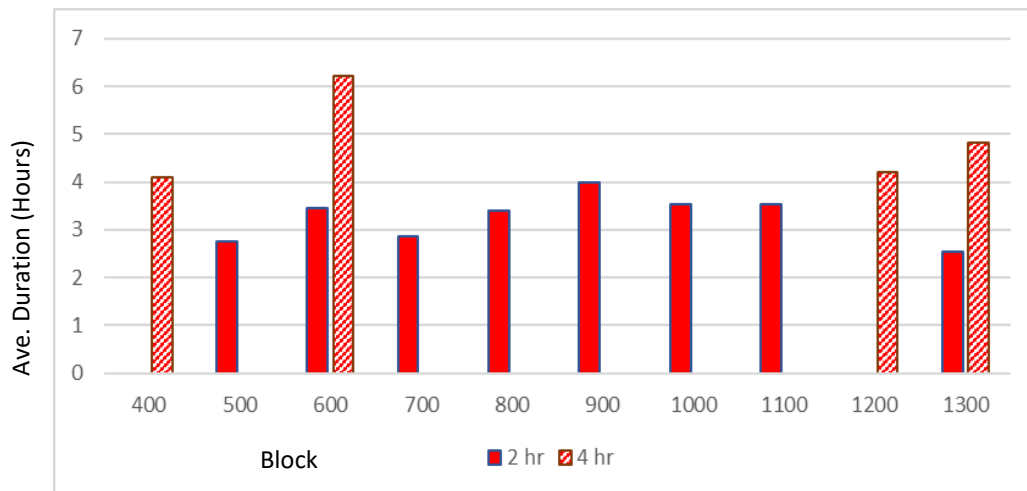
Figure 7- Average Turnover for the Corridor in 2023 (left) and 2017 (right)



ON-STREET PARKING SPACES

Figure 8 provides a summary of average durations and turnover for on-street parking spaces, categorized between spaces regulated by 4-hour maximums and 2-hour maximums. The 600 and 1300 blocks have a mix of 2-hour and 4-hour parking, while the remaining blocks have one or the other. Durations ranged from 2.8 to 5.0 hours with an average of 3.9 hours. The observed parking durations indicate that cars are generally staying beyond the 2- or 4-hour regulated times, especially in the 2-hour maximum spaces.

Figure 8 - Average Duration by Block (Parking Spaces)



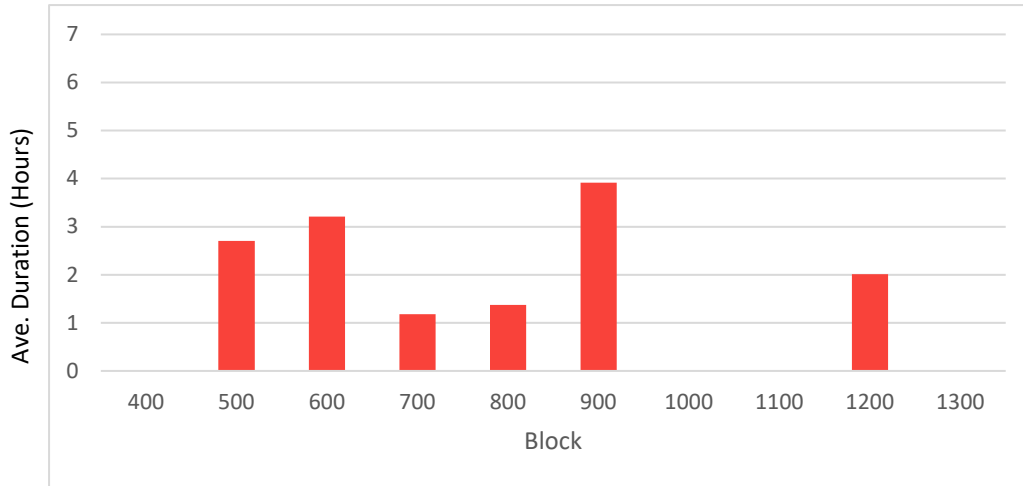
LOADING ZONE SPACES

Figure 9 provides a summary of average durations and turnovers for loading zone spaces, which have a maximum time limit of 30 minutes across the corridor. Durations varied from 1.2 to 3.9 hours with an average of 2.6 hours. The 400, 1000, 1100, and 1300 blocks do not have regulated loading spaces so are not included in the analysis. The higher average durations indicate that drivers

are generally not following loading zone regulations, using the spaces for longer-term loading or parking instead of short-term loading.

Corresponding average turnovers are between 1.5 to 2.9 vehicles per day. Combined, the high duration and low turnover rates indicate that regulated loading zones along Washington Avenue are generally not well utilized and/or enforced. However, in some areas, it was observed that multiple cars used loading zones in between observation times, which is a limitation of the methodology and suggests that actual turnover may be higher than these averages.

Figure 9 – Average Duration by Block (Loading Spaces)



1.3.3 ILLEGAL PARKING ACTIVITY

Three types of illegal parking activity were recorded during the data collection effort: (1) parking in an active lane (i.e. double parking), (2) parking in the center median, and (3) parking on the sidewalk. *Figure 10* lists locations where double parking, median parking, and sidewalk parking were observed regularly on specific blocks.

Figure 10 – Illegal Parking Observations

BLOCK	DESCRIPTION
400	<ul style="list-style-type: none"> ○ On Saturday, there was some illegal parking in restricted areas in front of Sacks Playground to access sports events
500	<ul style="list-style-type: none"> ○ <i>No specific observations for this block</i>
600	<ul style="list-style-type: none"> ○ On both Saturday and Sunday, construction equipment was parked on the south side of the 600 block the entire day, which prevented any normal parking/loading activity
700	<ul style="list-style-type: none"> ○ Very frequent sidewalk parking in front of auto shops on this block (on both sides of the street)
800	<ul style="list-style-type: none"> ○ Construction fencing blocked off loading spaces on the south side between 9th Street and Darien Street during the entire collection period ○ No parking zone and sidewalk on the north side close to 9th Street being used for loading activity associated with the Italian Market ○ Frequent median parking on this block for loading at the Italian market

900	○ Frequent median parking on this block for loading at the Italian market
1000	○ <i>No specific observations for this block</i>
1100	○ <i>No specific observations for this block</i>
1200	○ Trucks consistently parked in parking and restricted zones on the south side of the block (particularly on weekdays)
1300	○ Frequent illegal parking (sidewalk, median, and double-parking) for auto shops on the south side of the block

Figure 11 shows the number of double-parked vehicles by time of day over the entire collection period. Figure 13 and Figure 15 show the same information for median and sidewalk parked vehicles. Graphs showing illegal parking activity for each of the collection days are included as Appendix A-3. License plate data was not collected for illegally parked vehicles; therefore, any observations related to parking durations for double, median, and sidewalk parking are qualitative based on field observations.

DOUBLE PARKING

Double parking along the corridor was greatest on the 400, 1200, and 1300 blocks. This is likely because each of these blocks has multiple lanes in one or both directions, whereas other blocks along the corridor only have one lane in each direction. The observed duration for double parked vehicles was almost always under an hour, often as short as 15 minutes. However, instances of double parking are much fewer in 2023 as compared to 2017. As seen in Figure 12, in 2017, the 800 block alone had over 90 instances of double parking over the collection period. In 2023, there were only 18 total instances of double parking for the whole corridor over the collection period.

Figure 11 - Number of Double-Parked Vehicles by Block (All Days) (2023)

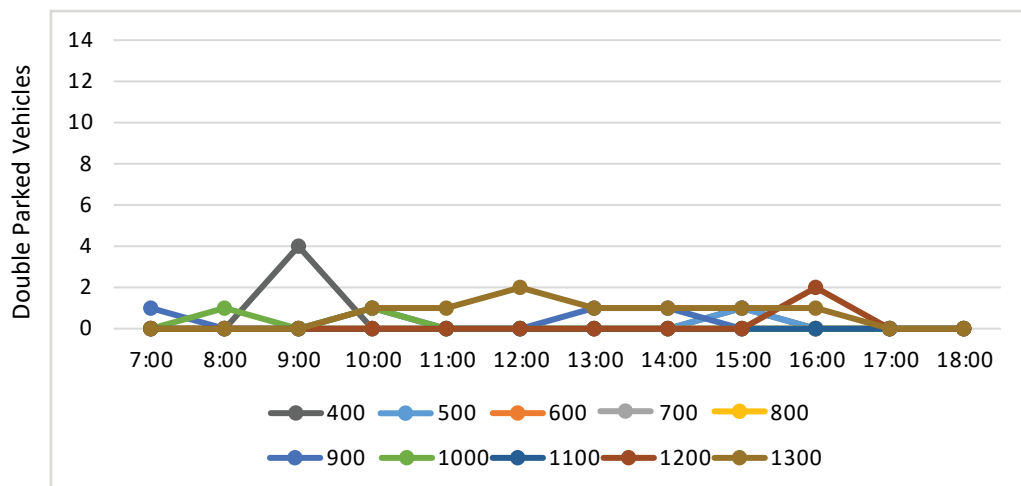
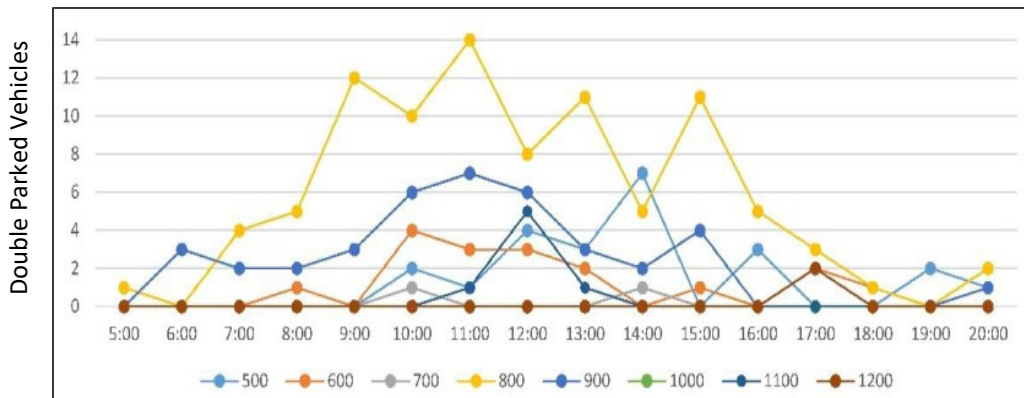


Figure 12 - Number of Double-Parked Vehicles by Block (All Days) (2017)



MEDIAN PARKING

Median parking along the corridor was most prevalent on the 800 and 900 blocks, likely due to drivers loading and unloading their cars from the Italian Market. The observed duration for median parked vehicles was almost always under an hour. The instances of median parking dropped significantly when compared to the 2017 study, shown in Figure 14. Similar to the double-parking on the corridor, the 800 block alone had over 100 instances of median parking over the collection period in 2017. In 2023, there were 65 total instances of median parking over the collection period for the entire corridor.

Figure 13 - Number of Median Parked Vehicles by Block (All Days) (2023)

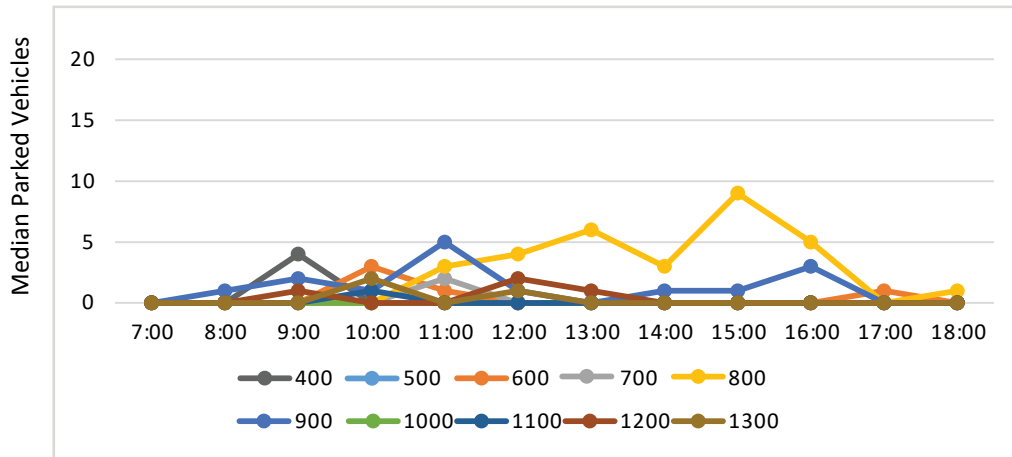
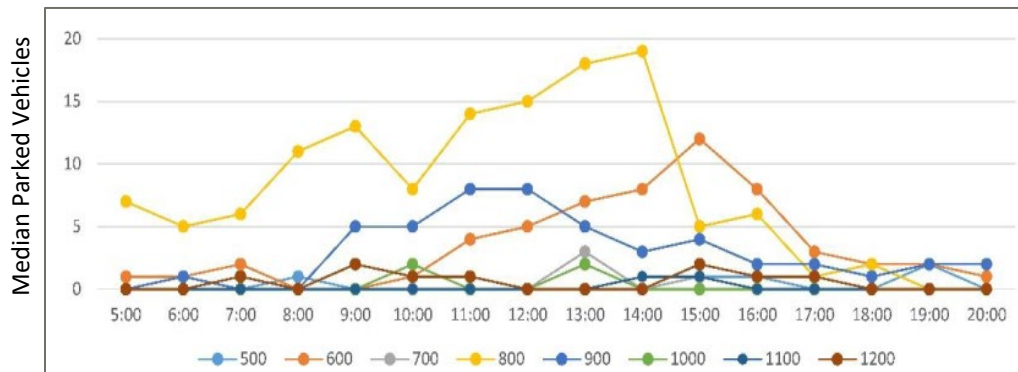


Figure 14 - Number of Median Parked Vehicles by Block (All Days) (2017)



SIDEWALK PARKING

Sidewalk parking was concentrated on the 700, 800, and 900 blocks. The 700-block had a significantly larger number of instances of sidewalk parking, likely due to the auto shops that parked their cars on the sidewalk all day. Sidewalk parking was more prevalent on weekdays than on weekends and was heaviest between 10:00 am and 4:00 pm. This coincides with the operating hours of the primarily auto and construction-related businesses generating the sidewalk parking. Vehicles parking on the sidewalk during weekdays often stayed in the same location for multiple hours or even the entire collection period. Overall sidewalk parking instances have increased from 2017, shown in *Figure 16*.

Figure 15 - Number of Sidewalk Parked Vehicles by Block (All Days) (2023)

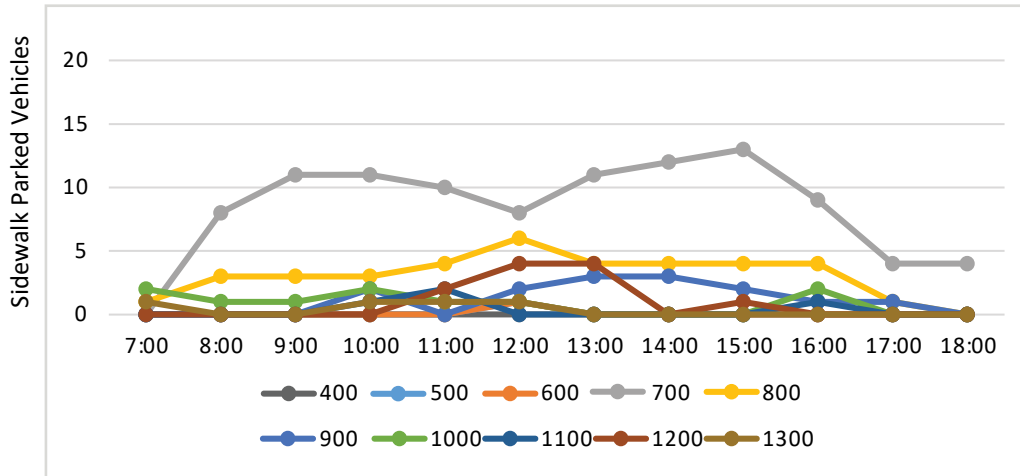
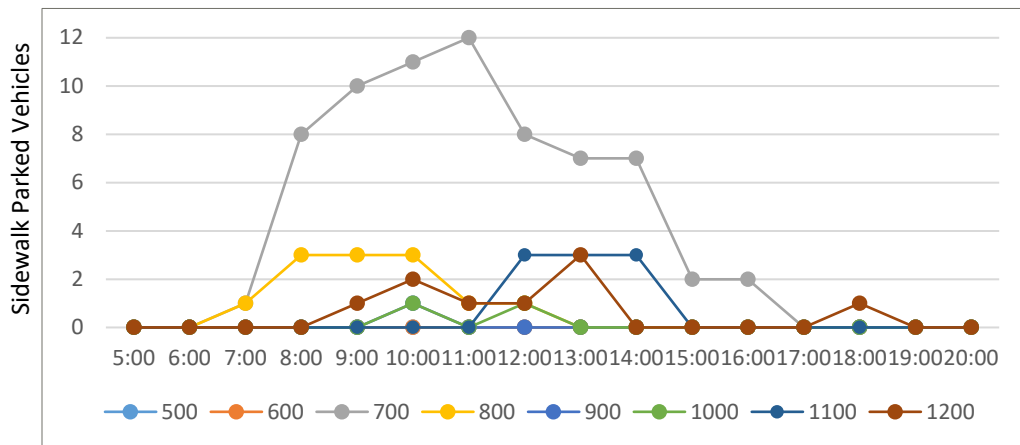


Figure 16 - Number of Sidewalk Parked Vehicles by Block (All Days) (2017)



1.4 SUMMARY OF FINDINGS

The analysis of parking data collected along Washington Avenue between 4th Street and Broad St shows a significant difference between parking and loading usage before and after the 2022 Washington Avenue Repaving and Safety Improvement project. The 2017 study showed high occupancy rates, long average durations, low turnover, and a high number of instances of illegal parking. The 2023 study shows medium occupancy rates, shorter average durations, medium turnover, and a lower number of instances of illegal parking. Specific findings are enumerated in *Figure 17*, and described below:

Occupancy:

- When compared with results from the 2017 study, **average occupancies for all spaces (parking and loading) are significantly lower in the 2023 post-implementation condition**. In 2017, the average occupancy rates never went below 90% of all spaces. In 2023, the average occupancy rate never rose above 70% of all spaces.
 - Average hourly occupancy rates for on-street parking spaces were between 59-85% on all days except Sunday, where they ranged between 75-95%.
 - On both weekdays and weekends, occupancy remained fairly steady throughout the day, typically dropping slightly after 2pm.
 - Compared to parking spaces, average hourly occupancy rates for loading zone spaces were: (a) significantly lower, which could be expected given the transitory nature of regulated loading areas, and (b) more stable throughout the day.
 - Loading zone occupancy rates were consistently lower on weekends than on weekdays, with Sunday occupancy rates under 35% for the entire collection period.

Duration & Turnover:

- The **average duration for parking and loading zones was significantly lower than in 2017**, with the 2023 average duration at 3.3 hours compared to the 2017 average duration of 7.3 hours. Correspondingly, **turnover rates are higher**, at 2.4 vehicles up from 1.8 in 2017.
 - The average duration for on-street parking spaces is 3.9 hours. However, the observed parking durations indicate **that cars are generally staying beyond the 2- and 4-hour regulated parking times in the corridor, especially in the 2-hour maximum spaces**.
 - Loading zone regulations on the corridor are limited to maximum 30 minutes. Observed durations in loading zones averaged 2.6 hours, indicating that **drivers are not following loading zone regulations**, using the spots as longer-term loading or parking instead of short-term loading spaces.

Illegal Parking:

- **Illegal parking is down by over 50% corridor-wide, with significantly less double parking and median parking**. However, **sidewalk parking instances have increased** since 2017.

- Double parking along the corridor was most prevalent on the 400, 1200, and 1300 blocks. The observed duration for double parked vehicles was almost always under an hour, often as short as 15 minutes. However, **instances of double parking are much fewer in 2023 than in 2017**. In 2017, the 800 block alone had over 90 instances of double parking over the collection period. In 2023, there were only 18 total instances of double parking for the whole corridor over the collection period.
- Median parking was most prevalent on the 800 and 900 blocks, and the observed duration for median parked vehicles was almost always under an hour. **The instances of median parking dropped significantly compared to the 2017 study**.
- Sidewalk parking was concentrated on the 700, 800, and 900 blocks, with a significantly higher amount of sidewalk parking on the 700 block (similar to 2017), home to several auto shops. **Sidewalk parking instances have increased since 2017**. Sidewalk parking was more common on weekdays than weekends, corresponding with business hours for auto and construction-related businesses. Vehicles parked on the sidewalk during weekdays often stayed in the same spot for multiple hours.
- **Out of the 44 hours that staff walked the corridor, only one PPA officer was observed to be enforcing regulations (on the morning of Thursday 9/21)**. That same morning, tickets were observed on windshields on the 1200 block, but other than that, no tickets were observed during the entire collection period.

Figure 17 – Summary of Findings

CORRIDOR-WIDE AVERAGES	2017	2023
OVERALL OCCUPANCY RATE	95%	61%
<i>ON-STREET PARKING SPACE OCCUPANCY RATE</i>	<i>95%</i>	<i>67%</i>
<i>LOADING ZONE OCCUPANCY RATE</i>	<i>N/A</i>	<i>44%</i>
OVERALL DURATION	7.3 HOURS	3.3 HOURS
<i>2-HOUR PARKING ZONE DURATION</i>		<i>3.3 HOURS</i>
<i>4-HOUR PARKING ZONE DURATION</i>		<i>4.9 HOURS</i>
<i>LOADING (30 MINUTE) ZONE DURATION</i>		<i>2.6 HOURS</i>
OVERALL TURNOVER	1.8 VEHICLES	2.4 VEHICLES
<i>ON-STREET PARKING TURNOVER</i>		<i>2.5 VEHICLES</i>
<i>LOADING ZONE TURNOVER</i>		<i>2.0 VEHICLES</i>
NUMBER OF ILLEGAL PARKING INSTANCES	542	266
<i>DOUBLE PARKING INSTANCES</i>	<i>182</i>	<i>18</i>
<i>MEDIAN PARKING INSTANCES</i>	<i>259</i>	<i>65</i>
<i>SIDEWALK PARKING INSTANCES</i>	<i>101</i>	<i>183</i>

SECTION 2 – TRAFFIC ANALYSIS

2.1 INTRODUCTION

The Washington Avenue Traffic Study was prepared by WSP in January 2020 to evaluate the feasibility of a Selective Road Diet concept for the Washington Avenue corridor based on updated 2019 and 2020 traffic information. At the time of the 2020 study, the Washington Avenue cross-section featured 5-lanes throughout the study area, with two travel lanes in each direction and a two-way center turn lane. Based on input from numerous public outreach events and coordination with Philadelphia City Council members, changes to lane configurations were only implemented east of Broad Street during the repaving project. This resulted in the following roadway cross sections within the study area:

- A 5-lane cross section between Grays Ferry Avenue and 12th Street
- A transitional 4-lane cross section between 12th Street and 10th Street
- A 3-lane cross section between 10th Street and 5th Street
- A transitional 4-lane section between 5th Street and 4th Street
- A 5-lane cross section east of 4th Street

As follow-up to the implementation in late Fall 2022, the City of Philadelphia requested a before/after implementation traffic study be prepared to compare results. The sections below describe the various metrics that were evaluated.

TRAVEL TIME ANALYSIS

Pre-implementation (2019 and 2020) and post-implementation (2023) travel time runs were conducted along the Washington Avenue corridor from 4th Street to Grays Ferry Avenue, Ellsworth Street from Grays Ferry Avenue to Broad Street, and Christian Street from Grays Ferry Avenue to 4th Street for both the eastbound and westbound (excluding Ellsworth Street) directions to compare the impact of the project. Collection periods are listed in *Figure 18*. Dates in greyed cells highlight the pre-implementation conditions from 2019 and 2020.

Figure 18 - Data Collection Schedule

Corridor	Peak Period	Time Periods	Date
Washington Avenue	AM & PM	7 – 9 AM 4 – 6 PM	Tuesday, April 23, 2019
			Wednesday, April 24, 2019
			Tuesday, October 3, 2023
			Wednesday, October 4, 2023
	Saturday	10 AM – 2 PM	Thursday, October 5, 2023
			Saturday, April 13, 2019
	Sunday	10 AM – 2 PM	Saturday, September 30, 2023
			Sunday, April 14, 2019
Christian Street	AM & PM	7 – 9 AM 4 – 6 PM	Sunday, October 1, 2023
			Thursday, January 30, 2020
			Wednesday, February 12, 2020
			Tuesday, September 20, 2023
			Wednesday, September 21, 2023
Ellsworth Street	AM & PM	7 – 9 AM 4 – 6 PM	Thursday, January 30, 2020
			Tuesday, September 20, 2023
			Wednesday, September 21, 2023

Travel time runs were completed in accordance with the Institute of Transportation Engineer’s (ITE) Manual of Transportation Engineering, utilizing the latest Tru-Traffic software (Version 10.0) via GPS units. If multiple lanes were provided on a roadway, runs were conducted alternatively in the right and left lanes of each direction. If a lane was blocked due to a double-parked vehicle or loading bus, the driver waited until a safe opportunity to pass and then reentered the departed lane. If a motorist slowed down to yield to a pedestrian while turning, the driver stayed in the same travel lane.

After completion of the travel time runs, all GPS data points were verified in Tru-Traffic and subsequently used to calculate the average travel time (including delay) between each intersection. Due to the comparatively small number of data points, comparisons between the data were made using a Mann-Whitney *U* Test¹ at a 90% confidence interval. This statistical test looks at the number of runs and standard deviation to determine whether there has been a statistically significant change between the pre-install and post-install condition. In many cases, the change was not enough to measure as statistically significant. These are shown with a dark gray box. Bolded text indicates where we are confident there is a change in travel time. Results are shown in **Figure 19**, **Figure 20**, and **Figure 21**.

When the corridor is specifically analyzed east of Broad Street where the Selective Road Diet was implemented, the findings indicate that there is no statistically significant change to the travel time. The statistically significant changes along the entire Washington Avenue corridor are primarily due to signal phasing and timing changes at the intersection with Broad Street. Between the pre- and post- implementation travel time data collection periods, the City installed protected/permissive left turn phasing at Broad Street, leading to a 30% decrease in the green time along Washington Avenue at this intersection.

¹ <https://statistics.laerd.com/spss-tutorials/mann-whitney-u-test-using-spss-statistics.php>

Figure 19 - Travel Time Comparisons (East of Broad Street, 13th St to 4th St)

Road	Direction	Peak Period	Time Pre-Install (mins)	Time Post-Install (mins)	Statistically Significant Change?	Change
Washington Ave.	EB	AM	3.54	3.92	No	+0.30 min
		PM	5.00	5.30	No	+0.38 min
		Sat.	5.50	5.18	No	-0.32 min
	WB	AM	3.29	4.21	No	+0.91 min
		PM	3.26	3.78	No	+0.53 min
		Sat.	3.31	4.13	No	+0.82 min

Figure 20 - Travel Time Comparisons (West of Broad Street, Grays Ferry Ave to 15th St)

Road	Direction	Peak Period	Time Pre-Install (mins)	Time Post-Install (mins)	Statistically Significant Change?	Change
Washington Ave.	EB	AM	4.06	4.51	No	+0.45 min
		PM	3.91	4.31	No	+0.40 min
		Sat.	4.56	3.93	No	-0.63 min
	WB	AM	4.65	4.59	No	+0.06 min
		PM	4.64	4.06	No	-0.57 min
		Sat.	3.88	4.46	No	+0.58 min

Figure 21 - Travel Time Comparisons (Entire Corridor)

Road	Direction	Peak Period	Time Pre-Install (mins)	Time Post-Install (mins)	Statistically Significant Change?	Change
Washington Ave.	EB	AM	8.60	9.47	No	+0.87 min
		PM	9.48	11.42	Yes	+1.94 min
		Sat.	9.96	9.10	No	-0.86 min
	WB	AM	8.59	9.40	No	+0.81 min
		PM	8.62	9.21	No	+0.59 min
		Sat.	8.03	10.45	Yes	+2.42 mins
Ellsworth St.	EB	AM	5.00	5.21	No	+0.21 min
		PM	5.94	5.16	No	-0.77 min
Christian St.	EB	AM	10.22	9.74	No	-0.47 min
		PM	9.45	11.26	Yes	+1.82 min
	WB	AM	9.40	10.28	No	+0.88 min
		PM	11.71	10.23	Yes	-1.48 min

Along eastbound Christian Street in the PM peak period, the increased delay occurred mainly in the section between S. 11th Street and S. 4th Street.

Appendix A-4 includes graphs comparing the 25 mph/30 mph running time, the SimTraffic-modeled travel time for the constructed condition, and the pre-implementation and post-implementation travel times summarized above.

2.2 TRAFFIC VOLUME COMPARISON

2.2.1 TURNING MOVEMENT COUNTS

Pre-implementation (2019 and 2020) and post-implementation (2023) turning movement counts were obtained at the following locations:

- 24 signalized intersections along Washington Avenue between 4th Street and Grays Ferry Avenue
- Christian Street at Grays Ferry Avenue
- Christian Street at S. Broad Street
- Christian Street at S. 11th Street
- Ellsworth Street at S. Broad Street

This turning movement count data was collected during the times shown in *Figure 22*. Dates in greyed cells highlight pre-implementation conditions from 2019 and 2020.

Figure 22 - Data Collection Periods

CORRIDOR	PEAK PERIOD	TIME PERIODS	DATE
Washington Avenue	AM & PM	7 – 9 AM	Thursday, April 11, 2019
		4 – 6 PM	Tuesday, October 10, 2023
	Saturday	10 AM – 2 PM	Saturday, April 13, 2019
			Saturday, October 14, 2023 ³
	Sunday	10 AM – 2 PM	Sunday, April 14, 2019
			Sunday, October 15, 2023 ^{4,5}
Christian Street	AM & PM	7 – 9 AM	Wednesday, January 29, 2020 ¹
		4 – 6 PM	Tuesday, October 10, 2023
	Saturday	10 AM – 2 PM	Saturday, October 14, 2023 ²
	Sunday	10 AM – 2 PM	Sunday, October 15, 2023
Ellsworth Street	AM & PM	7 – 9 AM	Wednesday, January 29, 2020 ¹
		4 – 6 PM	Tuesday, October 10, 2023
	Saturday	10 AM – 2 PM	Saturday, October 14, 2023 ²
	Sunday	10 AM – 2 PM	Sunday, October 15, 2023

¹The intersection of S. Broad Street and Ellsworth Street was counted on Tuesday, February 4, 2020.

²The intersection of S. Broad Street and Ellsworth Street was counted on Saturday, October 21, 2023 due to a moving truck blocking Ellsworth Street.

³The intersection of Washington Avenue at S. 10th Street was counted on Saturday, October 21, 2023 due to construction closing S. 10th Street.

⁴The intersection of Washington Avenue at S. 8th Street was counted on Sunday, October 22, 2023 due to equipment failure.

⁵The intersection of Washington Avenue at S. 10th Street was counted on Sunday October 22, 2023 due to construction closing S. 10th Street.

Turning movement counts along Christian Street and Ellsworth Street were not collected over the weekend for the pre-implementation conditions. System peak hours along Washington Avenue were calculated at the times shown in *Figure 23*.

Figure 23 - System Peak Hours

TIME	YEAR	PEAK HOUR
WEEKDAY AM	2019	7:45 AM – 8:45 AM
	2023	7:30 AM – 8:30 AM
WEEKDAY PM	2019	5:00 PM – 6:00 PM
	2023	4:15 PM – 5:15 PM
SATURDAY	2019	12:30 PM – 1:30 PM
	2023	12:15 PM – 1:15 PM
SUNDAY	2019	12:30 PM – 1:30 PM
	2023	12:15 PM – 1:15 PM

While the AM and weekend peak hours are similar pre- and post-pandemic, the PM peak has shifted to earlier in the day. This trends with observations made nationally, where PM peak traffic has been seen to spread across a greater period, but particularly earlier than typically seen pre-pandemic. *Figure 24*, *Figure 25*, *Figure 26*, and *Figure 27* show the comparison of vehicles traveling along Washington Avenue from the pre-implementation turning movement counts completed in 2019 to the post-implementation turning movement counts in 2023. Values represent peak hour volumes that are entering each intersection from the westbound and eastbound directions. At the intersection with Grays Ferry Avenue, the location represented by the volumes is immediately to the east of the intersection.

A comparison between the pre- and post-implementation volumes shows varying results depending on the peak. **In the AM peak hour, volumes decreased by 20% east of Broad Street and 11% west of Broad Street. However, the PM, Saturday, and Sunday peak hours experienced decreases that were generally uniform across the corridor.** Accordingly, it would be a valid conclusion that volumes along Washington Avenue have likely decreased.

It is possible that some of the higher volume reduction along Washington Avenue east of Broad could be attributable to vehicle diversion to parallel routes such as Christian or Ellsworth. However, since the overall volume reduction along Washington Avenue does not show up in totality along the analyzed parallel routes, other factors including mode diversion, route diversion, trip time augmentation, and/or trip deferral could also explain the reduction. It's also important to note that, per PennDOT's Traffic Data Report², a Tuesday in a post-pandemic October (i.e. the post-implementation collection period) would expect to have 2.9% more traffic than a Thursday in April 2019.

² <https://www.penndot.pa.gov/ProjectAndPrograms/Planning/TrafficInformation/Pages/2022-Pennsylvania-Traffic-Data.aspx>

Figure 24 - Volumes Along Washington Avenue (AM Peak Hour)

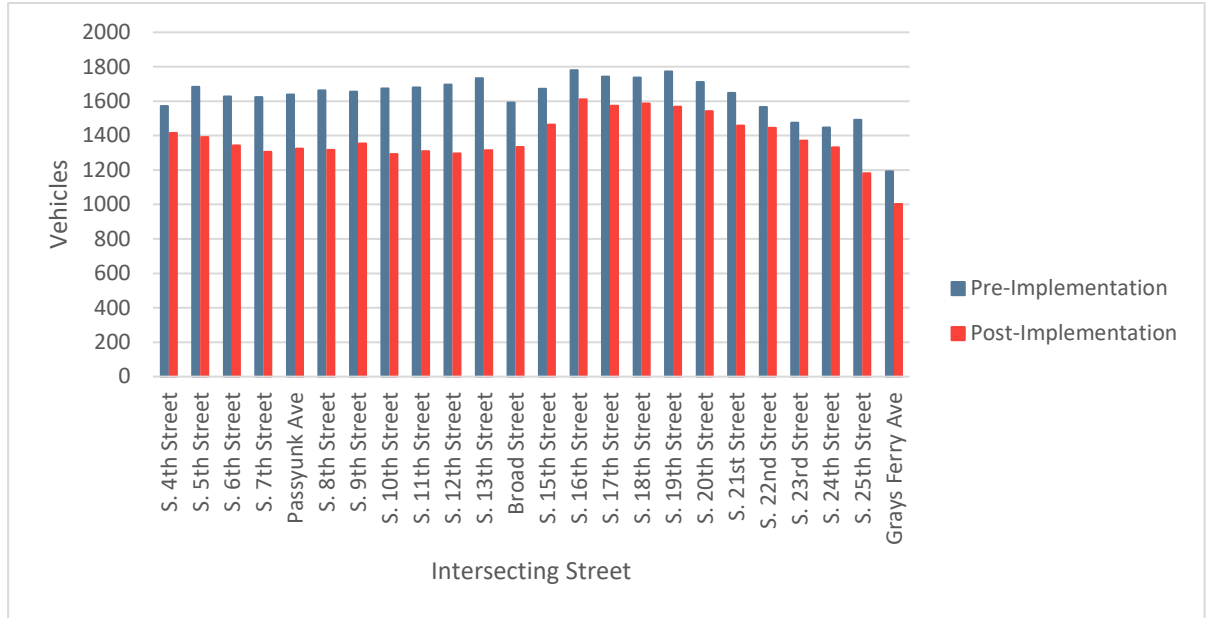


Figure 25 - Volumes Along Washington Avenue (PM Peak Hour)



Figure 26 - Volumes Along Washington Avenue (Saturday Peak Hour)



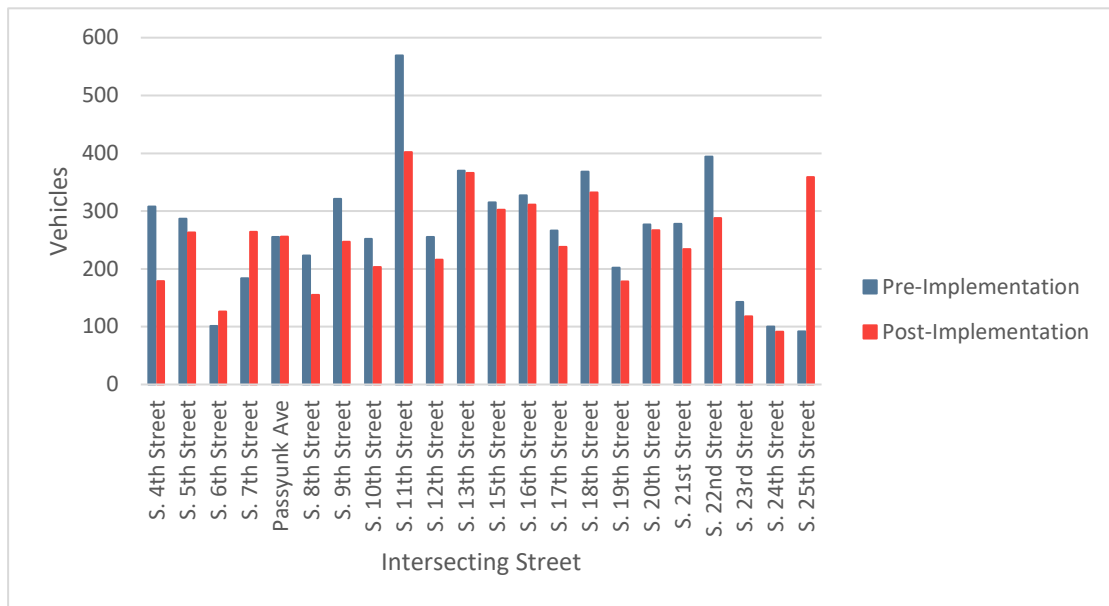
Figure 27 - Volumes Along Washington Avenue (Sunday Peak Hour)



**Note that turning movement counts were not collected at the intersection with S. 9th Street in 2019.*

Figure 28, Figure 29, Figure 30, and Figure 31 show the comparison of vehicles traveling across Washington Avenue from the pre-implementation turning movement counts completed in 2019 to the post-implementation turning movement counts in 2023. Values represent peak hour volumes that are entering each intersection from the side streets (either northbound, southbound, or both directions). The intersections with Broad Street and Grays Ferry Avenue have been removed, as the significantly higher volumes mute the ability to visually compare the other intersections in the figures. As noted for the volumes along Washington Avenue, per PennDOT’s Traffic Data Report³, a Tuesday in a post-pandemic October would expect to have 2.9% more traffic than a Thursday in April 2019. A trend in volumes across all peak hours is not present, but volumes generally decrease in the AM and PM peak hours.

Figure 28 - Volumes Crossing Washington Avenue (AM Peak Hour)



³ <https://www.penndot.pa.gov/ProjectAndPrograms/Planning/TrafficInformation/Pages/2022-Pennsylvania-Traffic-Data.aspx>

Figure 29 - Volumes Crossing Washington Avenue (PM Peak Hour)



Figure 30 - Volumes Crossing Washington Avenue (Saturday Peak Hour)

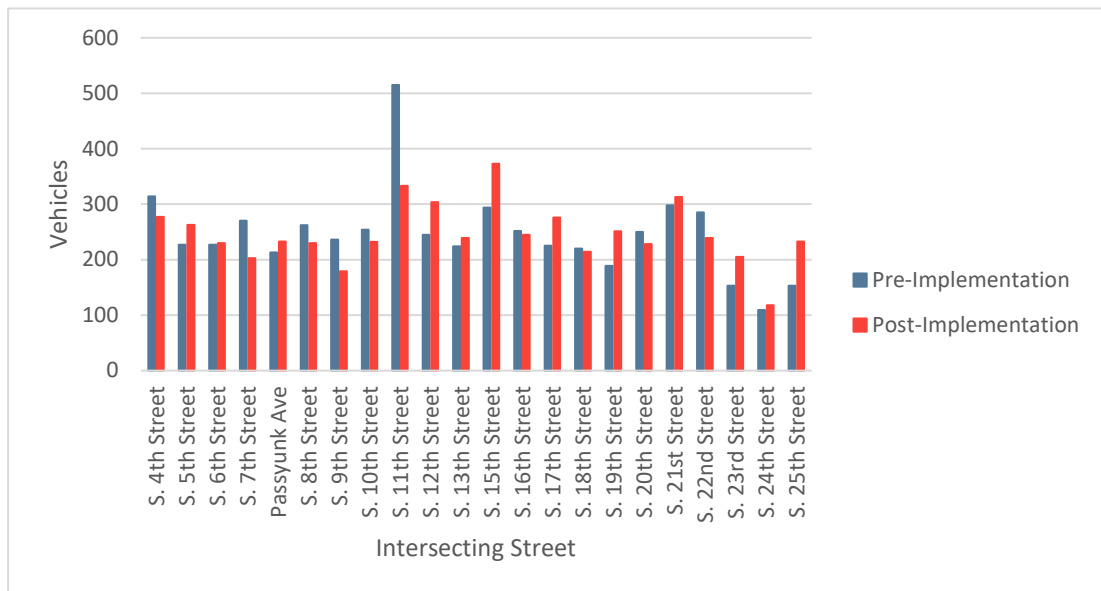


Figure 31 - Volumes Crossing Washington Avenue (Sunday Peak Hour)

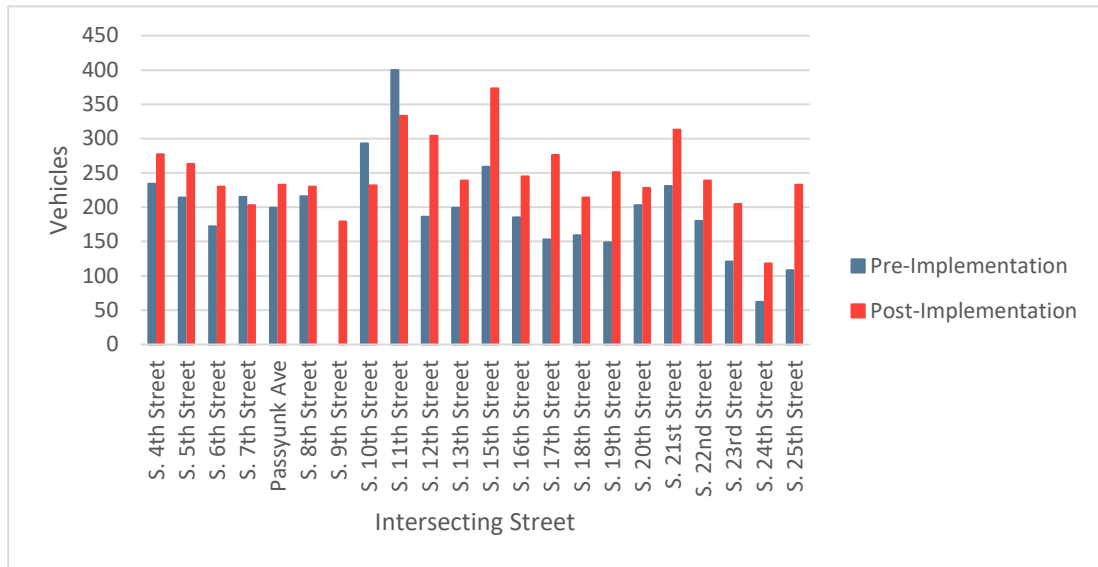


Figure 32 and Figure 33 show that volumes along Christian Street and Ellsworth Street at the studied intersections have also generally decreased with a slight increase of traffic along Christian Street at S. 11th Street. Coupled with the increased travel time along eastbound Christian Street in the PM peak hour that occurs mainly east of S. 11th Street, it is possible that some traffic was diverted from Washington Avenue to Christian Street. As stated earlier, since the overall volume reduction along Washington Avenue does not show up in totality along the analyzed parallel routes, other factors including mode diversion, route diversion, trip time augmentation, and/or trip deferral could also explain the reduction.

Figure 32 - Volumes Along Parallel Route (AM Peak Hour)

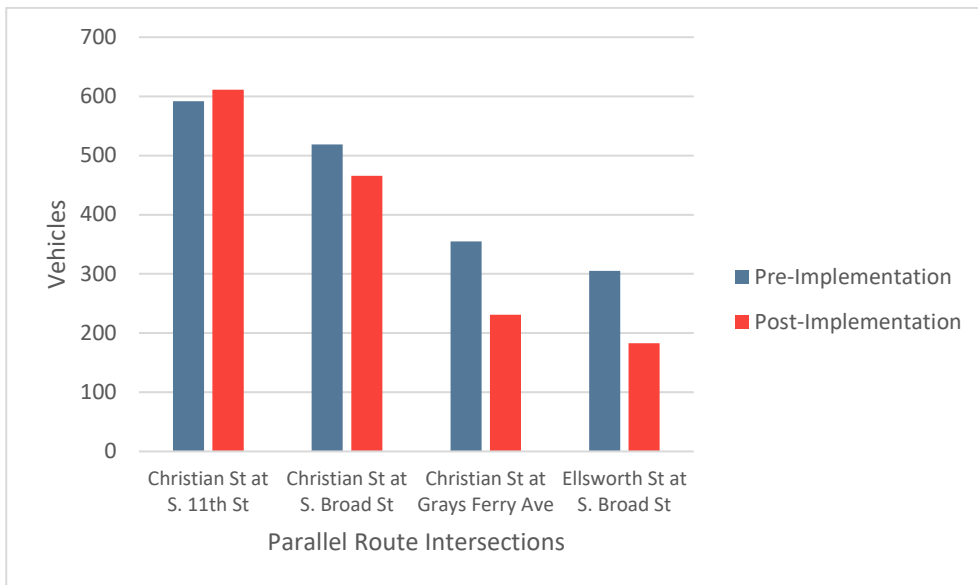
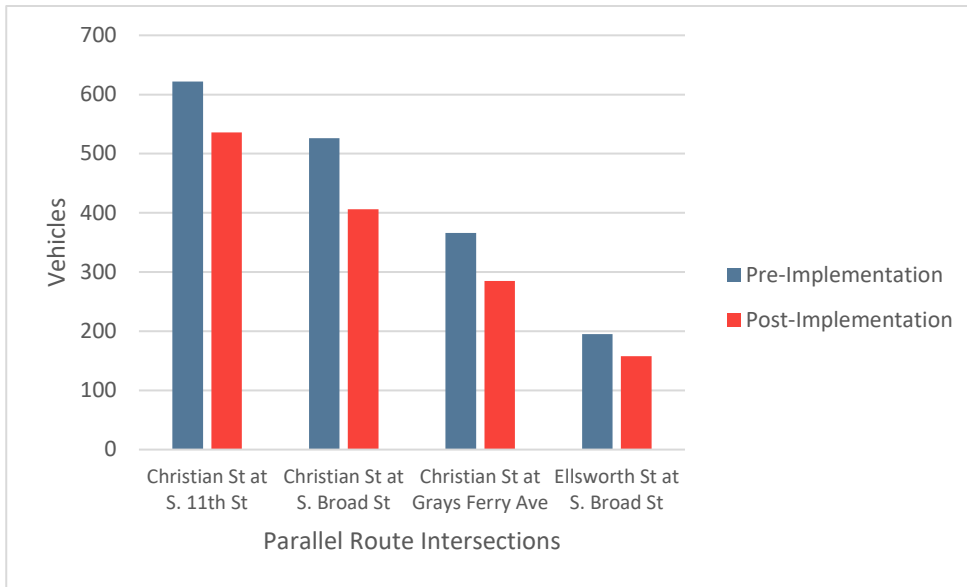


Figure 33 - Volumes Along Parallel Routes (PM Peak Hour)



2.2.2 ANNUAL DAILY TRAFFIC COUNTS

Annual Daily Traffic (ADT) counts were collected in both the pre-implementation condition and post-implementation. Using PennDOT’s Traffic Data Report, Table 355, *Average Day of Week by Month Factors Compiled for Total Vehicles*, the ADT was converted to Annual Average Daily Traffic (AADT). Counts were collected by either the Delaware Valley Regional Planning Commission (DVRPC) or WSP’s traffic count vendor, National Data and Surveying Services (NDS). *Figure 34* displays relevant AADTs collected between 2020 and 2023 along Washington Avenue where comparisons can be made.

Figure 34 - AADT Along Washington Avenue

SECTION	BLOCK	YEAR	SOURCE	EB AADT	WB	AADT	CHANGE
EAST OF BROAD	600	2021	DVRPC	-	-	16,059	+2.8%
		2023	DVRPC	8,615	7,887	16,502	
	1000	2020*	NDS	9,428	8,973	18,401	-16.1%
		2023	DVRPC	7,439	7,991	15,430	
WEST OF BROAD	2000	2020*	NDS	9,885	10,766	20,651	-21%
		2023	DVRPC	8,553	7,763	16,316	

*2020 NDS counts were conducted in February 2020.

When compared to the peak hour volumes, the decrease in AADT along Washington Avenue has a different distribution east and west of Broad Street. Notably, there was a higher decrease in AADT west of Broad Street than east of Broad Street, which is reversed from the volume reduction during peak hours. The reason for this unclear, though it could be at least partially explained by significant changes in land uses west of Broad in recent years. These changes – mainly from light industrial to residential – could act to further reduce volumes outside of the peak hours.

ADT counts were similarly collected along routes parallel to Washington Avenue. *Figure 35* displays relevant AADTs collected between 2019 and 2023 along routes parallel to Washington Avenue where comparisons can be made.

Figure 35 - AADT Along Parallel Routes

SECTION	STREET AND BLOCK	YEAR	SOURCE	EB	WB	AADT	CHANGE
NORTH OF BROAD STREET	1100 Block Carpenter Street (One-way WB)	2022	DVRPC	-	677	677	+27.9%
		2023	DVRPC	-	866	866	
	2000 Block Carpenter Street (One-way EB)	2022	DVRPC	1,447	-	1,447	-6.2%
		2023	DVRPC	1,358	-	1,358	
	2000 Block Christian Street (Two-way)	2020*	NDS	2,467	1,738	4,205	-25.9%
		2023	DVRPC	1,808	1,306	3,114	
SOUTH OF BROAD STREET	1100 Block Federal Street (One-way WB)	2022	DVRPC	-	2,734	2,734	+8.9%
		2023	DVRPC	-	2,978	2,978	
	2000 Block Federal Street (One-way WB)	2022	DVRPC	-	915	915	+96.6%
		2023	DVRPC	-	1,799	1,799	
	2000 Block Ellsworth Street (One-way EB)	2020*	NDS	1,843	-	1,843	-18.8%
		2023	DVRPC	1,497	-	1,497	

*2020 NDS counts were conducted in February 2020.

Based on the available data, it is possible that some traffic may have diverted to Carpenter Street and Federal Street east of Broad Street. However, the significant increase in volumes on the 2000 block of Federal Street suggests that volume differences across the corridor could also be due to construction, increased residential traffic, or changing regional travel patterns, rather than diversion. It is also important to recognize that the pre-implementation 2022 counts east of Broad Street were collected during late June, within two blocks of multiple schools when they were not in session, which could have resulted in lower pre-implementation counts.

2.2.3 BICYCLE VOLUMES

Annual Daily Bicycle (ADB) counts were collected for both the pre-implementation and post-implementation conditions. Using DVRPC’s seasonal and equipment factors, the ADB was converted to Annual Average Daily Bicycle (AADB). Counts were collected by either the DVRPC or WSP’s traffic count vendor, NDS. *Figure 36* displays selected AADBs collected between 2021 and 2023 along Washington Avenue where comparisons can be made.

Figure 36 - AADB Along Washington Avenue

SECTION	BLOCK	YEAR	SOURCE	EB	WB	AAD	CHANGE
EAST OF BROAD STREET	600	2021	DVRPC	-	122	-	N/A
		2023	DVRPC	400	572	972	
	1000/1100	2022	DVRPC	384	207	591	+62.8%
		2023	DVRPC	400	562	962	
WEST OF BROAD STREET	1500	2022	DVRPC	90	209	299	+63.5%
		2023	NDS	240	249	489	
	1800/1900	2021	DVRPC	109	121	230	+100.9%
		2023	NDS	234	228	462	

The data shows that AADB volumes increased substantially along Washington Avenue both east and west of Broad Street. The 2023 post-implementation bicycle counts by NDS also separated bicycle traffic by location of the rider, i.e. whether they were in a travel lane, the bike lane, or the sidewalk. For the counts collected in the 1500, 1600, 1800, and 2100 blocks, 9% to 16% of the total bicyclists

rode on the sidewalk. The 16% value occurred in the 2100 block of Washington Avenue, where the contractor for the new development on the north side of the block has maintained an unpermitted closure of the bicycle lane.

ADB counts were similarly collected along routes parallel to Washington Avenue, but only in the pre-implementation condition. *Figure 37* displays the corresponding AADB for future comparisons.

Figure 37 - AADB Along Parallel Routes

SECTION	STREET AND BLOCK	YEAR	SOURCE	EB AADB	WB AADB	AADB
EAST OF BROAD STREET	1100 Block Carpenter Street	2022	DVRPC	-	46	46
	1100 Block Federal Street (WB One-	2022	DVRPC	-	199	199
WEST OF BROAD STREET	2000 Block Federal Street (WB One-	2022	DVRPC	-	26	26
	2000 Block Carpenter Street (EB	2022	DVRPC	98	-	98

In addition, 2023 peak hour bicycle volumes were extracted from the post-implementation turning movement count data provided by NDS. *Figure 38*, *Figure 39*, *Figure 40*, and *Figure 41* show bicycle volumes at each intersection for the AM, PM, Saturday, and Sunday peaks. **In contrast to AADB, increases in peak hour bike volumes were heavily concentrated on the blocks with protected bike lanes (4th Street to 11th Street), with increases up to 181% depending on the block.** An exception was the post-implementation count on Saturday, which showed a decrease in peak hour bike volumes due to rainy conditions that day.

Figure 38 - Washington Avenue Bicycle Volumes (AM Peak Hour)

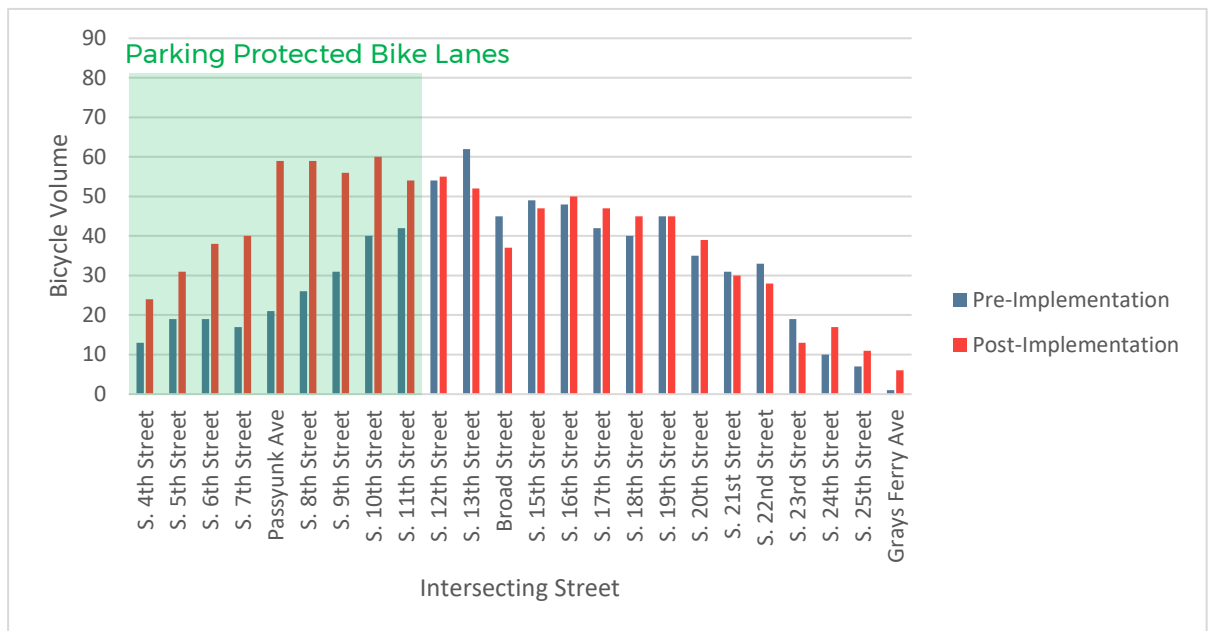


Figure 39 - Washington Avenue Bicycle Volumes (PM Peak Hour)

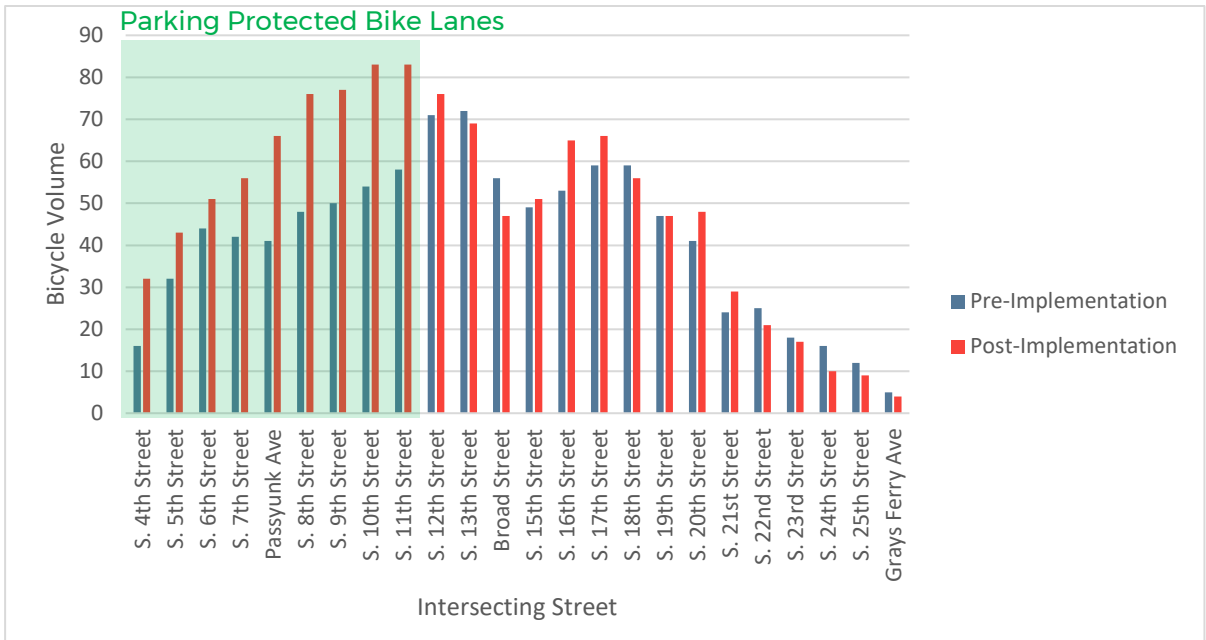
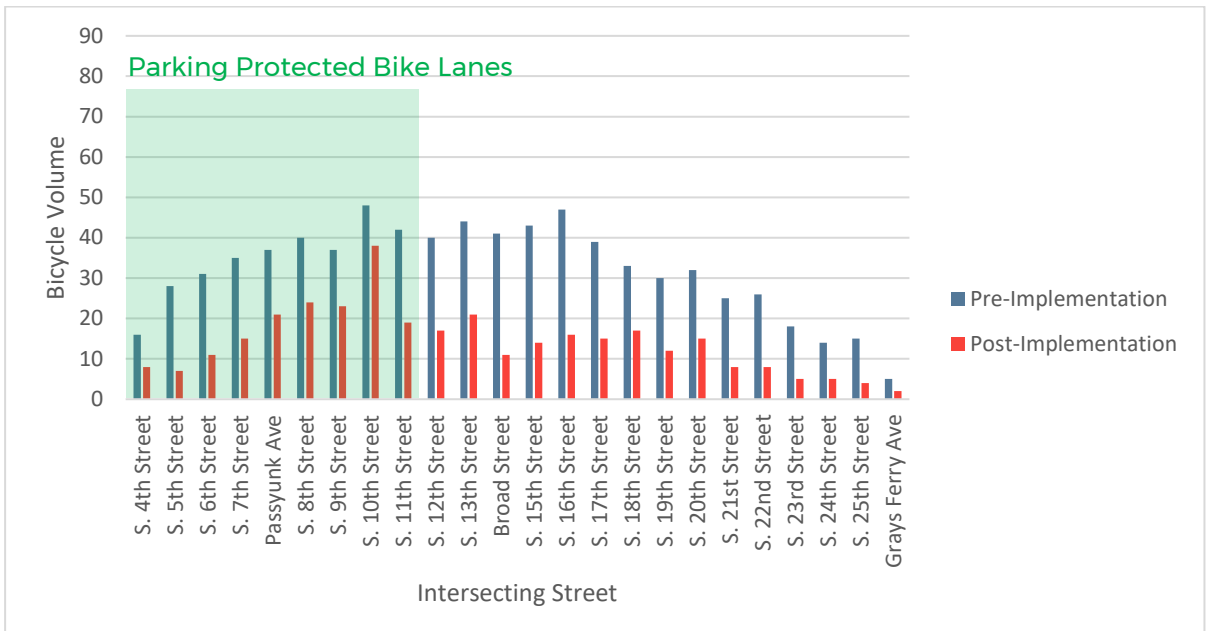
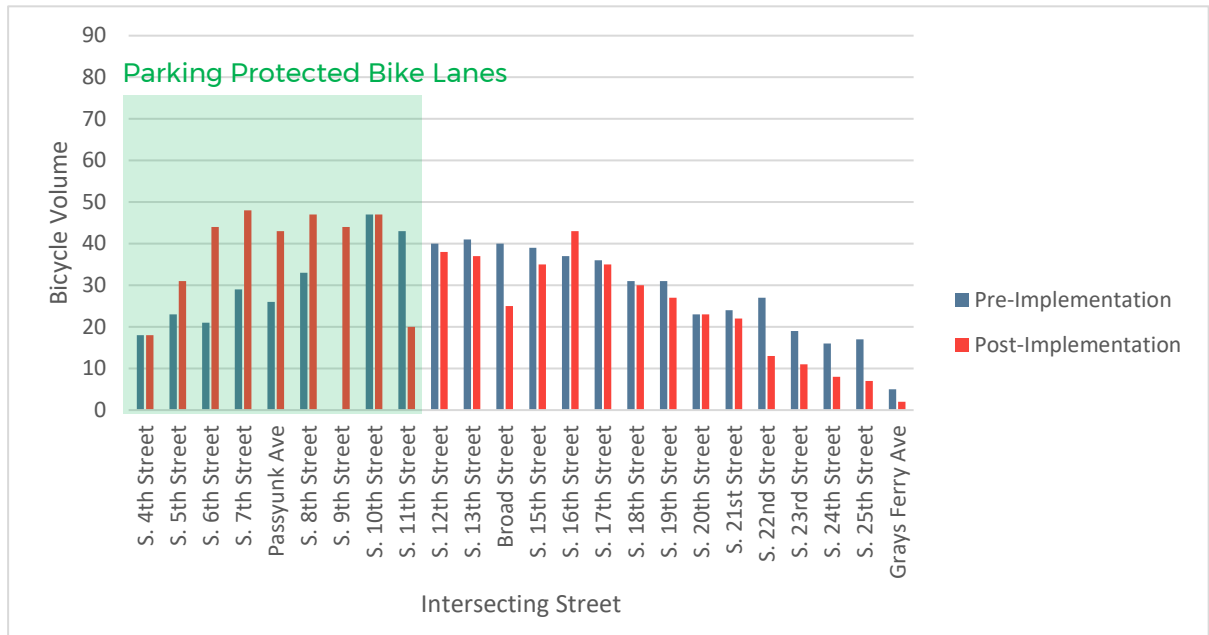


Figure 40 - Washington Avenue Bicycle Volumes (Saturday Peak Hour)



**Note that the post-implementation Saturday data was collected on a day where it rained starting at 11am.*

Figure 41 - Washington Avenue Bicycle Volumes (Sunday Peak Hour)



*Note that turning movement counts were not collected at the intersection with S. 9th Street in 2019.

2.3 SPEED ANALYSIS

2.3.1 SPEED DATA COMPARISON

Speed data was collected in both pre-implementation and post-implementation conditions. Depending on the location, data was collected by either DVRPC, WSP’s traffic count vendor (NDS), or Office of Complete Streets (OCS) staff. The data collected by DVRPC and NDS utilized pneumatic tubes while OCS staff performed their analysis using radar guns.

Results from the DVRPC and NDS pneumatic tube data are mixed, as average speeds increased in some directions but decreased at others. When evaluating the speed analysis results, there are several considerations and caveats:

- Due to the close signalized intersection spacing, location of the data collection tubes can impact the speeds collected. It is unknown if tube locations between vendors were consistent, so caution should be applied to any conclusions drawn from the data. This is especially true west of Broad Street, where the only changes included an improved roadway surface and addition of speed slots at selected locations.
- The road diet, resurfacing, and associated signal timing changes can potentially effect speeds in contrasting ways. While the elimination of a travel lane and the placement of the parallel parking in relation to the travel lane typically would result in a reduction of travel speeds, the resurfacing and increased green wave implemented as part of the signal timing modifications required for acceptable traffic operations could result in an increase in travel speeds.

- The DVRPC data uses speed bins of 31-35 mph, 36-40 mph, etc. while the NDS data uses speed bins of 30-34 mph, 35-39 mph, etc. Therefore, percent of drivers exceeding specific bins in the pre- and post-conditions may not 100% align due to the differences in speed bins; however, the overall findings remain valid.
- Evidence suggests that speeding and dangerous driving have increased across the city since the pandemic, which may influence the findings along Washington Avenue. Severe injury and fatal crashes due to speeding have increased post-pandemic, according to both the Vision Zero Philadelphia Annual Report 2023⁴ and Roosevelt Boulevard Route for Change Program Final Report⁵.

Radar data was collected by OCS staff March 2022, and December 2023. OCS staff tracked speeds of free-flowing vehicles mid-block and were measured midday (between 10am-2pm) during off-peak, free-flowing traffic. Speeds were not measured for vehicles that turned or stopped at an adjacent traffic signal. Generally, the speed limit is 25 mph east of Broad Street and 30 mph west of Broad Street. One hundred data points were collected and analyzed at each location, with *Figure 42* showing the results. **Preliminary results indicate that 85% percentile speeds and the percent of vehicles driving above the speed limit decreased both east and west of Broad Street.**

Figure 42 - Washington Avenue Speed Comparisons (Westbound Direction)

LOCATION	BLOCK	YEAR	85 TH PERCENTILE (MPH)	% ABOVE SPEED LIMIT	% CHANGE (85 TH PERCENTILE)	% CHANGE (ABOVE SPEED LIMIT)
EAST OF BROAD	500	2022	27	31%	0%	-13%
		2023	27	27%		
	1100	2022	32	56%	-19%	-57%
		2023	26	24%		
WEST OF BROAD	1500	2022	27	5%	+11%	+160%
		2023	30	13%		
	1700	2022	28	29%	+4%	-59%
		2023	29	12%		
	2000	2022	32	19%	-22%	-89%
		2023	25	2%		

Speed data was collected by NDS and DVRPC along routes parallel to Washington Avenue, displayed as percentage of vehicles exceeding the 25mph speed limit in *Figure 43*. The 2000 block of Christian Street appears to be somewhat of an outlier where speeding is occurring more frequently than other blocks. A possible explanation is that the signal timing between the intersections of Christian Street at S. 20th Street and Christian Street at S. 21st Street creates relatively poor progression in both directions. Only vehicles at the beginning of the queue at one intersection can proceed through the next intersection because the green band is relatively small. Thus, motorists familiar with the corridor passing through the first intersection during the middle or end of the green indication may

⁴ <https://visionzerophl.com/wp-content/uploads/2023/10/Vision-Zero-Annual-Report-2023.pdf>

⁵ <https://www.phila.gov/media/20210514084533/Route-for-Change-final-report.pdf>

accelerate to make it through the next green signal. This behavior was also observed along eastbound Christian Street between S. 23rd Street and S. 22nd Street. It is recommended that the Streets Department consider adjustments to the signal timing along Christian Street to change the progression to discourage speeding.

Figure 43: Percent of Vehicles Traveling 25mph and Above (Parallel Routes)

LOCATION	BLOCK	YEAR	SOURCE	EB % 25+ MPH	WB % 25+ MPH
NORTH OF WASHINGTON	1100 Block Carpenter St	2023	DVRPC	N/A	0%
	1100 Block Christian Street	2020	NDS	13%	27%
	2000 Block Carpenter St	2022	DVRPC	1%	N/A
	2000 Christian Street	2020*	NDS	32%	2%
		2023	DVRPC	46%	40%
SOUTH OF WASHINGTON	1100 Block Federal Street	2023	DVRPC	N/A	1%
	2000 Block Federal Street	2023	DVRPC	N/A	5%
	2000 Ellsworth Street	2020*	NDS	0%	N/A
		2023	DVRPC	7%	N/A

*2020 NDS counts were conducted in February 2020.

2.3.2 SPEED SLOT OBSERVATIONS

The speed slots/speed cushions that were installed in the 1000, 1100, 1700, and 1800 blocks of Washington Avenue and along S. 5th Street north of Washington Avenue and S. 12th Street south of Washington Avenue were designed to allow motorists to travel over them at or near the posted speed limit. Advisory speed plaques for 25 mph were installed beneath the Speed Cushion warning signs. Accordingly, the correct behavior for motorists would be to slow down a limited amount or not at all. Observations, shown in *Figure 44*, were made for one hour at the speed slots in the 1100 block in the westbound direction and the 1700 block in the eastbound direction of Washington Avenue to observe if drivers applied *no braking*, *light braking*, or *hard braking*. While the observations were subjective, the same person made all observations for consistency. Hard braking was defined as a motorist reducing their speed significantly below the speed limit. It can be assumed that drivers applying no braking were traveling at or below the speed limit and drivers applying light braking were traveling at or slightly above the speed limit. Those motorists that applied hard braking are not traversing the speed slots correctly and point to the need for further education.

Figure 44- Speed Slot Observations (Washington Ave)

BLOCK/DIRECTION	NO BRAKING	LIGHT BRAKING	HARD BRAKING	PERCENTAGE OF MOTORISTS UTILIZING SPEED SLOTS CORRECTLY
1100/Westbound	45	57	34	75%
1700/Eastbound	74	31	21	83%

Figure 45 to Figure 48 indicate the percentage of vehicles traveling above the noted speeds at four blocks along Washington Avenue, two east of Broad Street and two west of Broad Street. The 1000 and 1700 blocks include speed slots. **As compared to blocks where speed slots do not exist (or did not exist in the pre-implementation condition), the data shows that less drivers are exceeding the posted speed and speeds well above the posted speed limit.** Within the 600 block of Washington Avenue, the percentage of vehicles traveling at or above 30 mph between 1:00pm and 6:00pm is essentially equal to the pre-implementation conditions. Since actual volumes are less than the anticipated volumes used in the traffic modeling, there may be an opportunity for the Streets Department to modify the signal timing to further control speed of motorists by extending the operating hours of the overnight double offset operation or providing more green time to the side streets. Figure 49 also clearly shows that along a block with a speed slot (1700 block of Washington Avenue), speeds are lower than along a block without speed slots (2000 block of Washington Avenue).

Figure 45 - Percent of Vehicles Exceeding Identified Speed by Hour (600 Block Washington Avenue, 2023)

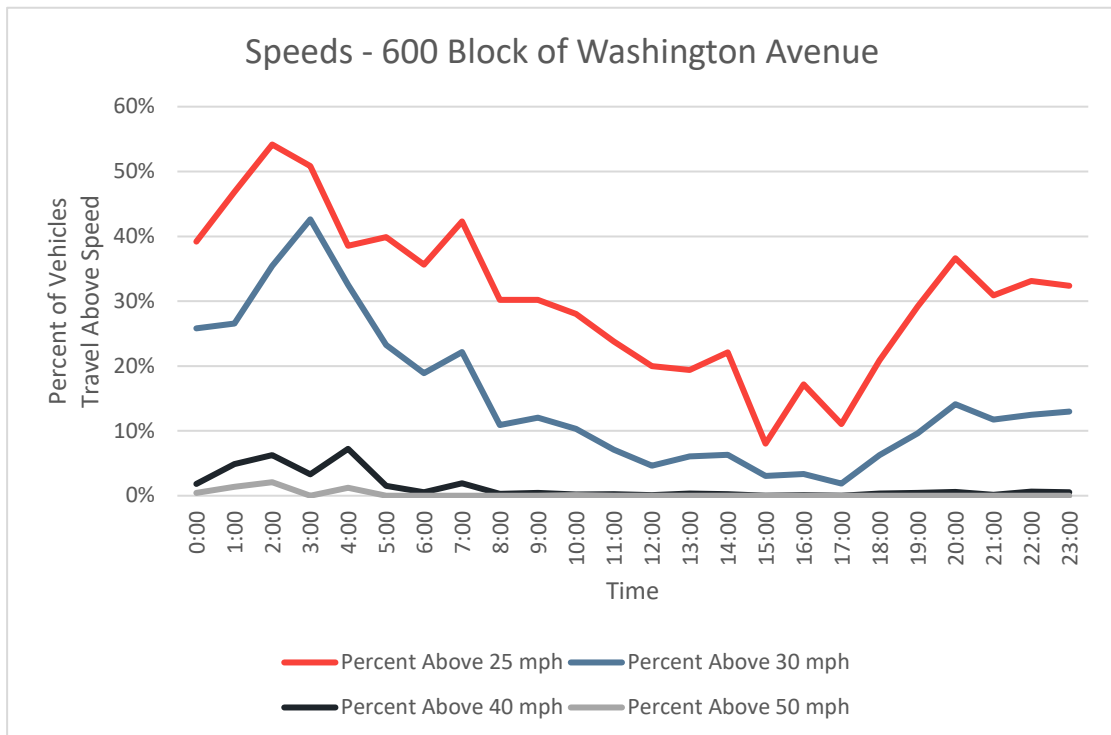


Figure 46 - Percent of Vehicles Exceeding Identified Speed by Hour (1000 Block Washington Avenue, 2023)

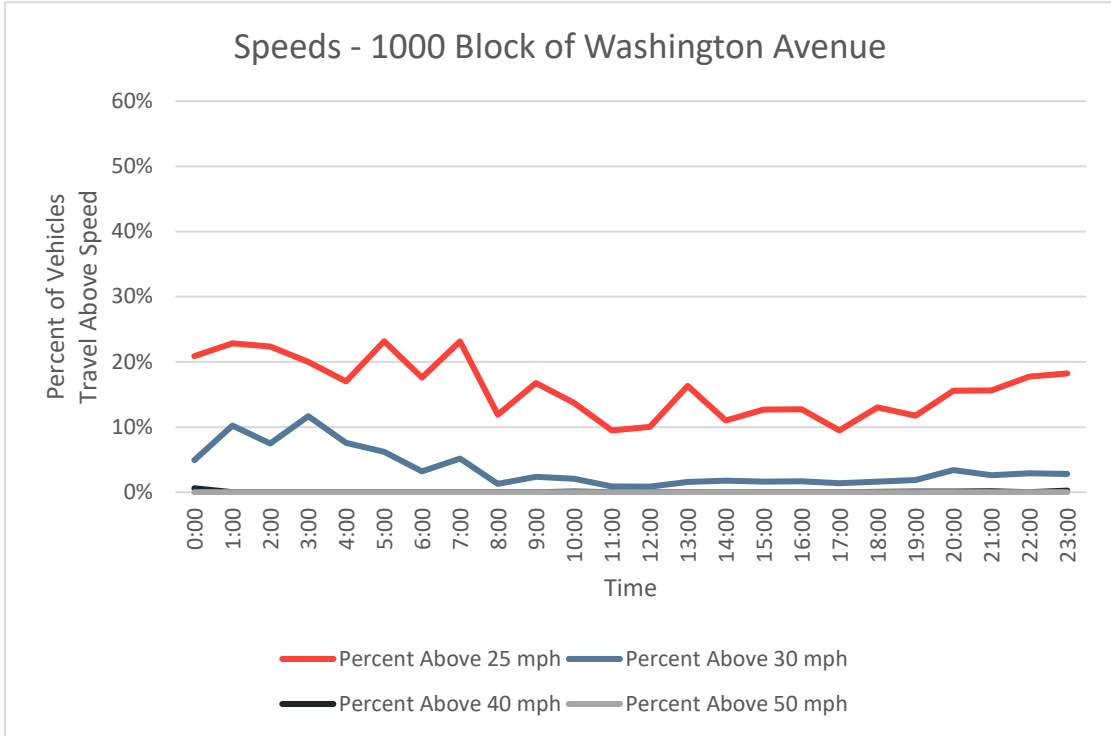


Figure 47- Percent of Vehicles Exceeding Identified Speed by Hour (1700 Block Washington Avenue, 2023)

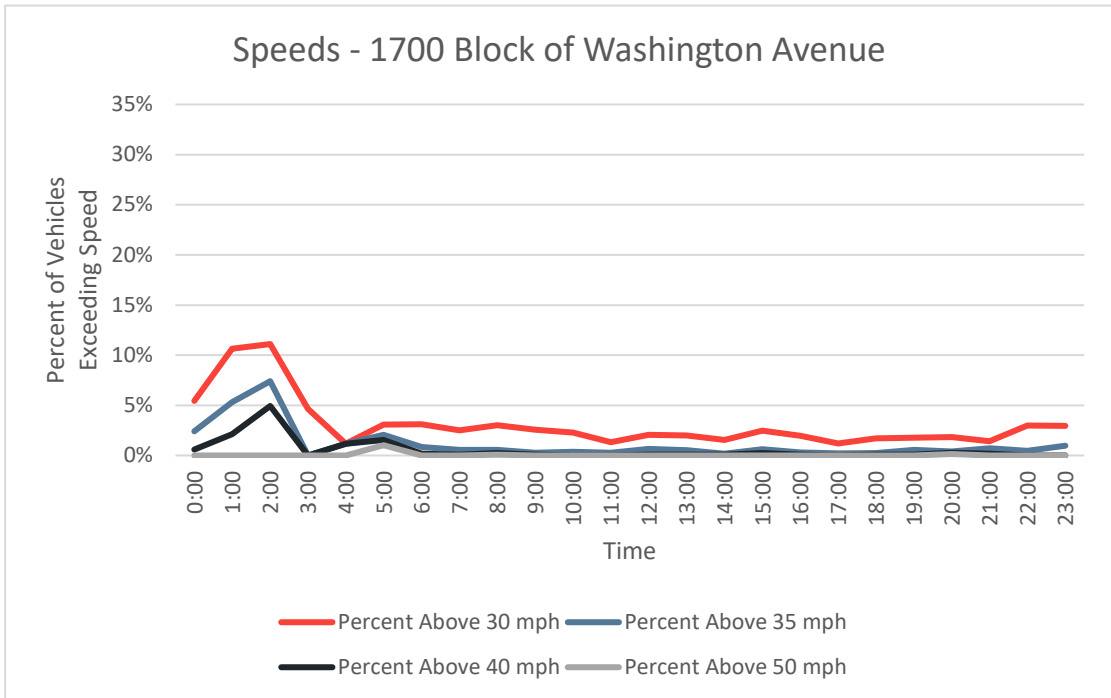


Figure 48 - Percent of Vehicles Exceeding Identified Speed by Hour (2000 Block Washington Avenue, 2023)

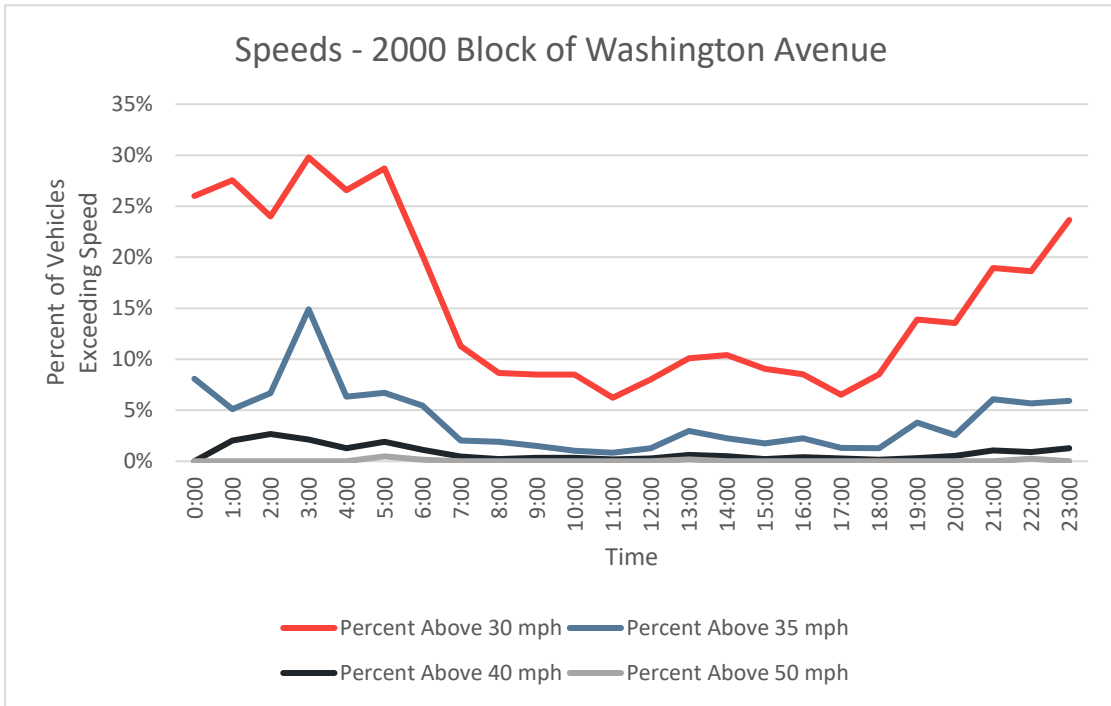
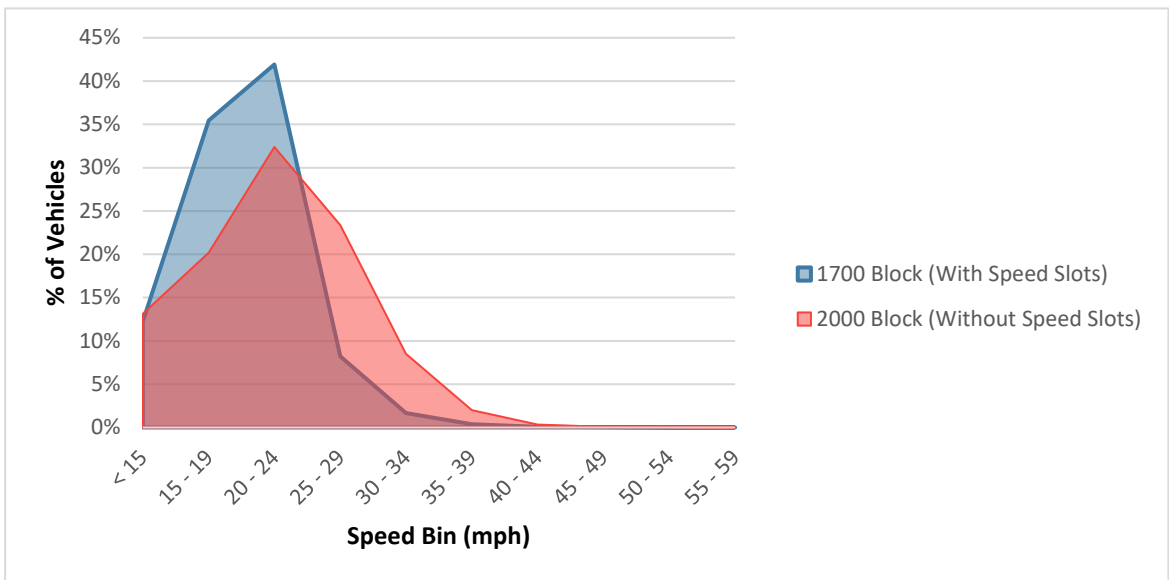


Figure 49 - Percent of Vehicles by Speed Bin (1700 Block and 2000 Block, Washington Ave)



2.3.3 SLOW TURN WEDGE OBSERVATIONS

Turning speed data was collected by OCS staff in March 2023 to measure the impact of slow turn wedges on turning speeds. Turning speeds were measured at two locations where slow turn wedges were installed – Washington Avenue at S. 8th Street and Washington Avenue at S. 7th Street. Turning speeds were also measured at Washington Avenue at S. 10th Street where slow turn wedges were not installed. Speeds were measured midday (between 10am-2pm) during off-peak, free-flowing traffic. The only vehicles that were counted were those making right turns. One hundred data points were collected and analyzed at each location, with [Figure 50](#) showing the results.

Figure 50 - Intersection Turning Speeds

	CONTROL (NO TURN WEDGE)	SLOW TURN WEDGE INSTALLED	
Location	<i>Washington Avenue at S. 10th Street</i>	Washington Avenue at S. 8 th Street	Washington Avenue at S. 7 th Street
Average Speed	17.6 mph	16 mph	14.8 mph
85 th Percentile Speed	22 mph	21 mph	18 mph

Based on the data, the slow turn wedges likely have a slight impact on reducing speeds at the intersections where they are installed. The 18' radii of the curved edge line striping at the intersection was designed to support a 10-mph design turning speed and 40' clear space. The actual clear space at the intersections is approximately 70 feet, which would support sufficient sight distance between a motorist and a bicyclist at a 25-mph turning speed.

To further reduce turning speeds, it is recommended that the Streets Department install a flexible delineator along the edge line striping on the intersection side of the crosswalk. While this design detail was included in the repaving plans, the contractor did not end up installing it.

2.4 QUEUEING ANALYSIS AT LANE TRANSITIONS

In order to transition from a five-lane section to a three/four-lane section in the road diet portion of Washington Avenue, the outermost lanes would either need to merge or be dropped at an intersection. Based on traffic analysis, the outermost lane in the westbound direction was dropped as right-turn lane at northbound S. 5th Street and the outermost lane in the eastbound direction was dropped as a right-turn lane onto southbound S. 12th Street.

Observations regarding queueing during the AM, PM, and Saturday peaks were made at these locations and the results are documented in [Figure 51](#). During the design phase of the project there were concerns that excessive queues may occur due to these lane drops. Queue lengths were observed where the queue was specifically caused by these lane drops.

Figure 51 - Queueing Observations

LOCATION	PEAK	AVERAGE QUEUE (VEH)	95 TH PERCENTILE QUEUE (VEH)	95 TH PERCENTILE QUEUE (FT)	BLOCK LENGTH (FT)
Westbound Washington Avenue at S. 5 th Street	AM	2.1	5.0	125	375'
	PM	3.1	7.0	175	
	Saturday	4.2	11.6	290	
Eastbound Washington Avenue at S. 12 th Street	AM	2.1	6.8	170	350'
	PM	3.8	7.8	195	
	Saturday	4.0	9.0	225	

During the observation periods, queues at both locations were not observed to exceed the block length and extend into the previous block. The maximum allowable queue length at eastbound 12th Street is roughly 350 feet, while the maximum allowable queue length at westbound 5th Street intersection is roughly 375 feet. One standard vehicle is assumed to have a queueing length of 25 feet, but larger trucks may take up significantly more space.

In the highest 95th percentile queue at westbound 5th Street at the Saturday peak, 11.6 standard vehicles would take up an estimated 290 feet, well within the 375-foot limit. At eastbound 12th Street, the highest 95th percentile queue was also observed at the Saturday peak with 9 vehicles. Assuming standard sized vehicles, this queue would only cover 225 feet, again well within the limits.

It is acknowledged that more significant queues can occasionally occur due to downstream effects, such as congestion in the Wing Phat Plaza parking lot. Observations along the corridor indicate when these queues do occur, they are relatively brief and traffic operations return to normal fairly quickly.

2.5 VEHICLE AND BICYCLE INTERACTIONS

During the initial conceptual design of Washington Avenue, the design team developed a memorandum for the City of Philadelphia outlining best practices for intersection design treatments, approach sight distances, and bus stops for parking-protected separated bike lanes. Driveways along the Washington Avenue corridor were then categorized based on the type and intensity of usage, and approach sight distances were determined for each driveway. To measure motorist and bicyclist behavior at sample driveway locations, WSP conducted the following set of observations:

- WSP staff rode a bicycle outfitted with front and rear cameras for three hours, making loops between S. 5th Street to S. 13th Street (approximately 0.68 miles) in the parking protected bike lane to document interactions with motorists turning into or across the bike lane.
- Observed the western-most driveway of Wing Phat Plaza in the 1200 block of Washington Avenue for three hours. This driveway was designed with a 30' approach clear space.
- Observed the driveway for the First Oriental Market in the 500 block of Washington Avenue for three hours. This driveway was designed with a 20' approach clear space.
- Each set of observations was performed during a weekday, generally outside of the peak hours from 1:30 PM to 4:30 PM. The time was selected using DVRPC data with the highest off-peak bicycle volumes on Washington Ave. Observations are tallied in *Figure 52*. The grey box indicates on-bike observations, as opposed to streetside stationary observations.

Figure 52 - Vehicle and Bicycle Interactions at Selected Driveways

OBSERVATION TYPE	LOCATION	TIME AND DATE	VEHICLES MAKING LEFT TURNS IN/OUT	VEHICLES MAKING RIGHT TURNS IN/OUT	VEHICLE YIELDED TO BIKE	BICYCLE YIELDED TO VEHICLE
On-bike Observations	S. 5 TH STREET TO S. 13 TH STREET	1:30 – 4:30pm, Thurs Nov 9th	N/A	N/A	5	3
Stationary at Driveway	WING PHAT PLAZA WESTERN ENTRANCEWAY 1122 WASHINGTON AVE	1:30 – 4:30pm, Weds Nov 9th	67	119	14	7
Stationary at Driveway	FIRST ORIENTAL MARKET DRIVEWAY (BI-DIRECTIONAL) 522 WASHINGTON AVE	1:30 – 4:30pm, Thurs Nov 9th	82	110	6	4

**Note that interactions were defined as any time a vehicle had to yield to a cyclist or a cyclist had to yield to a vehicle.*

Over the nine hours of observation, there were no close calls observed between vehicles turning into the plaza and bicyclists. There was one close call observed that involved a vehicle exiting the Wing Phat Plaza driveway entrance that rolled across the protected bike lane. Included below are two still images from videos recorded while biking the corridor.

Figure 53 - Vehicle yielding to bicyclist while entering the First Oriental Market driveway (Front camera, bicyclist traveling east)



Figure 54 - Vehicle entering driveway at First Oriental Market after yielding to cyclist (Rear camera, bicyclist traveling east)



2.6 SUMMARY OF FINDINGS

The analysis of pre- and post-implementation travel time, volume, and traffic observation data along Washington Avenue yield the following conclusions:

Travel Times:

- **Travel times along Washington Avenue for the AM, PM, and Saturday peak periods, when analyzed as separate east (13th Street to 4th Street) and west (Grays Ferry Avenue to 15th Street) sections, did not result in a statistically significant change due to the implementation of the Selective Road Diet concept.** When analyzed as an entire corridor, there is a statistically significant increase during the weekday PM peak period in the eastbound direction and the Saturday peak period in the westbound direction. Further analysis indicates this increase is due to the signal phasing and timing modifications at S. Broad Street that occurred between the pre- and post-implementation travel time runs.
- Travel time along Ellsworth Street did not change. Along Christian Street during the weekday PM peak period, there was a statistically significant increase in the eastbound direction with a statistically significant decrease in the westbound direction. The increased delay occurred mainly in the section between S. 11th Street and S. 4th Street. **While it is possible that this is a result of some diversion to Christian Street, since volumes along Christian Street were not collected east of S. 11th Street, it is difficult to draw definitive conclusions as to the cause of these changes.**

Vehicular Volumes:

- Data collection indicates that **AM, PM, and Saturday peak hour volumes along Washington Avenue decreased by 7% to 28%. The AM peak hour volumes decreased by 20% east of Broad Street and 11% west of Broad Street, while the other peak hours experienced decreases that were generally uniform across the corridor.**
- AADT also decreased between 16% and 20% at locations where comparisons could be made.
- An overall trend in volumes along the side streets crossing Washington Avenue was not found, but in general, volumes decreased during the AM and PM peak periods, with exceptions at some intersections.
- There were some concerns from the community that a road diet on Washington Avenue would cause diversion of motorists to other parallel streets. Based on the available data, **minor increases on Carpenter Street and Federal Street east of Broad Street indicate some traffic may have diverted to those streets.** Relatively higher volume decreases in the AM peak hour along Washington Avenue east of Broad may suggest that some motorists diverted to Christian Street, although factors including mode diversion, route diversion, trip time augmentation, and/or trip deferral could also explain the decreases.

Bicycle Volumes:

- **Average Annual Daily Bike (AADB) volumes along Washington Avenue increased substantially both east and west of Broad Street (62% to 101%). In contrast to AADB, increases in peak hour bike volumes were heavily concentrated on the blocks with**

protected bike lanes (4th Street to 11th Street), with increases up to 181% depending on the block.

Speed Analysis:

- Preliminary results from the radar gun data indicate that **85% percentile speeds and the percent of vehicles driving above the speed limit decreased east of Broad Street.**
- Results from the pneumatic tube (ATR) speed data were mixed. Pre- and post-implementation vehicle speeds were found to be similar during weekday hours between 1:00 pm to 6:00 pm; however, the percentage of motorists traveling at or in excess of 30 mph increased in some directions and at some locations. This may be a function of the balance between street design and signal timing. Specifically, the reduction in lanes east of Broad and the posted speed limit likely contribute to slower speeds, while the revised 90-second signal timing during the daytime hours results in a longer green wave and may contribute to higher speeds when congestion is minimal. Other factors may also influence these results; for instance, reports have shown that speeding has increased throughout the city post-pandemic, while ATR tube placement by the different collectors (NDS vs. DVRPC) can also influence speed results. Pavement resurfacing can also lead to higher speeds post-implementation, particularly if the previous surface was in poor condition.
- It was observed that between 75% and 83% of the motorists are utilizing the speed slots as designed – maintaining an advisory speed of approximately 25 mph without significantly slowing.
- As compared to blocks where speed slots do not exist (or did not exist in the pre-implementation condition), the data shows that speed slots reduced the percentage of vehicles driving at or above the speed limit.

Queueing at Lane Drops:

- During design, there were some concerns that lane transitions at S. 5th Street and S. 12th Street entering the road diet section could result in excessive queueing along Washington Avenue. **Observations indicate that, at both locations, the 95th percentile queue attributed to the lane drops are being contained within one block length and are not backing up into adjacent signals.** However, queue lengths may briefly exceed a block length due to other factors along the corridor.

Vehicle and Bicycle Interactions:

- To evaluate motorist and bicyclist behavior at sample driveway locations, WSP conducted observations at two high-volume driveways and conducted multiple bicycle rides along the protected bike lane. **Over the nine hours of observation, no close calls were observed between vehicles turning into driveways and bicyclists. In each of the 39 observed interactions, bicyclists and motorists practiced safe yielding behavior.** Thus, the approach sight distances implemented with the design appear to be adequate.

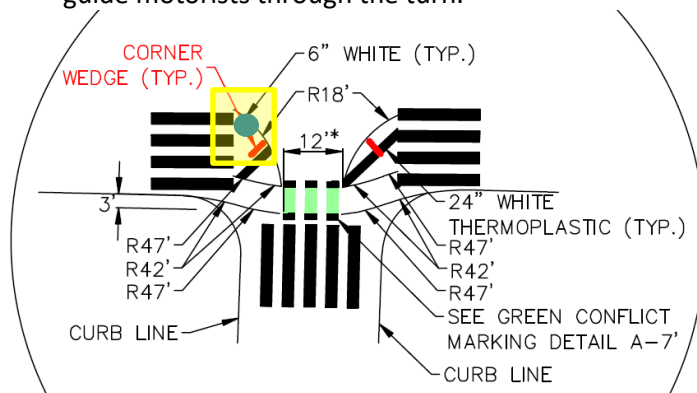
SECTION 3 – RECOMMENDATIONS

In addition to evaluating current operations and comparing them to pre-condition, a component of this study's scope was to identify any potential spot improvements related to signal timing, striping, or signage that would improve operations along the corridor. These recommendations are outlined below:

Parking/Loading/Signage:

- Out of the 44 hours that staff walked the corridor, only one PPA officer was observed to be enforcing the new parking & loading regulation that were established along Washington Avenue between Broad and 4th Street.
 - **Additional enforcement of the regulations is recommended, particularly to ensure adequate turnover in loading zones and discourage sidewalk parking.**
- The approved signage plans included “Tow-Away Zone” signage along the portions of Washington Avenue within Philadelphia City Council District 1. During the repaving project, the Philadelphia Parking Authority (PPA) did not have a sufficient stock of these signs and indicated they would be installed at a later date.
 - **Follow-up is recommended to make sure the Tow-Away Zone signs are installed.**
- At the time striping/signage plans were being developed, a fire hydrant was located in front of 833 Washington Avenue (Giordano Fruit and Produce). Accordingly, a fifteen-foot No Stopping zone was signed on both sides of the fire hydrant. Just prior to the repaving project, the Philadelphia Water Department (PWD) undertook an emergency water main replacement project, which included work in the 800 block of Washington Avenue. Recent field visits have found that as part of that work, PWD permanently removed that fire hydrant.
 - **It is recommended that the City of Philadelphia revise the pavement markings and signage at this location to provide additional parking or loading zones.**
- Parking restriction signage was incorrectly placed on utility poles instead of new posts along the north side of Washington Avenue between S. 7th Street and Passyunk Avenue. The signs posted on the utility poles do not line up with the striping, and vehicles are subsequently parking legally within the driveway clear zone, resulting in insufficient visibility for vehicles turning into the driveway for Mid City Tire & Auto/Safelite Auto Glass.
 - **It is recommended that the City of Philadelphia coordinate with PPA to correctly reinstall the signs.**
- The speed limit was reduced to 25 mph only within the Washington Avenue project limits, inclusive of the Philadelphia City Council District 1 boundaries.
 - **It is recommended that the Streets Department and OTIS consider reduction of the speed limit to 25 mph along the entirety of Washington Avenue.**
- Multiple flexible delineators have been removed and should be replaced at the following locations:
 - On the north side of Washington Avenue, between S. 7th Street and E. Passyunk Avenue.
 - On the south side of Washington Avenue, between S. 8th Street and E. Passyunk Avenue.

- The turning speeds at the intersections with Corner Wedges are higher than the anticipated design speed.
 - It is recommended that a flexible delineator be installed at the highlighted location to guide motorists through the turn.



Traffic Signal Timing/Operations:

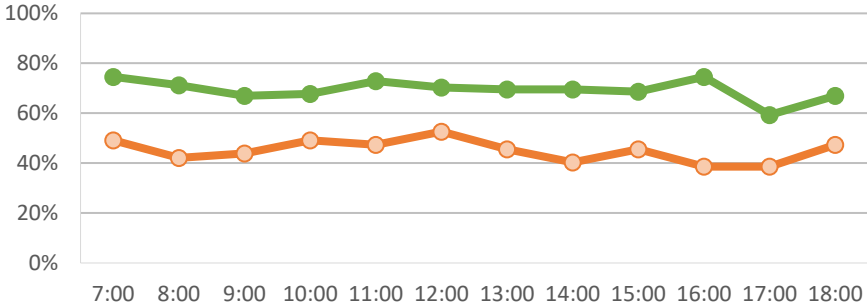
- The traffic signals along Washington Avenue from Front Street to S. 4th Street were retimed as part of the project when implemented in 2022. A 90-second cycle length was utilized during the AM, midday, PM, and weekend operations at these intersections within the five-lane section. Observations indicate that motorists routinely exceed the speed limit in this section due to the excess capacity and green band available.
 - **To help control speeds in this section, it is recommended that the Streets Department consider revising the signals from Front Street to S. 3rd Street to operate 60-second cycle lengths, matching the overnight double-offset operation. The intersection of Washington Avenue at S. 4th Street should remain as a 90-second cycle length due to the lane drop at S. 5th Street.**
- During the weekday, double offset timings were maintained during the weekday overnight hours from 9:00pm to 7:00am and weekend overnight hours from 9:00pm to 9:00am. The daytime hours have a 90 second cycle length that prioritizes the green band; this is necessary for acceptable operations.
 - **Due to the reduction in volumes from the pre-pandemic volume collection effort, the Streets Department should consider extending the times for the double-offset program and extending the side street splits where there is excess capacity along Washington Avenue.**
- Poor signal progression was observed along Christian Street west of Broad Street, potentially encouraging speeding between some intersections.
 - **It is recommended that the Streets Department considering revising the signal timing along Christian Street west of Broad Street to support a progression at or below the speed limit to discourage speeding. Alternatively, it is understood that the Streets Department is considering conversion of some of these traffic signals to all-way stops. This could also help to control speeding, if the all-way stops meet warrant criteria.**
- During public outreach for the Washington Avenue Repaving and Improvement Project, the City of Philadelphia indicated they were pursuing a grant for the installation of emergency preemption along the corridor to facilitate emergency response.
 - **Follow-up on the status of emergency preemption is recommended.**

A-1 OCCUPANCY GRAPHS

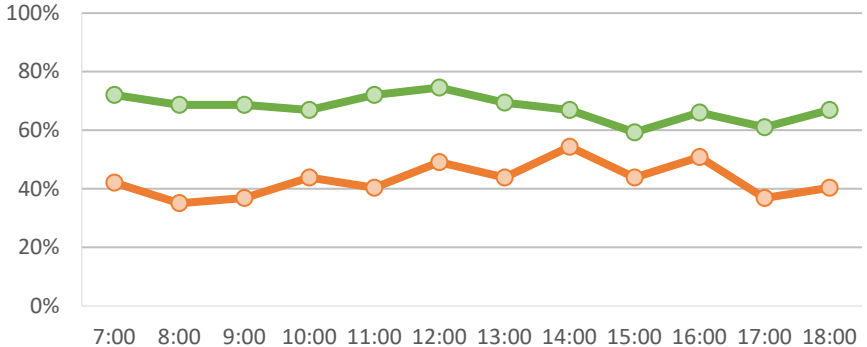
ENTIRE CORRIDOR (BY DAY)

—○— Loading
—○— Parking

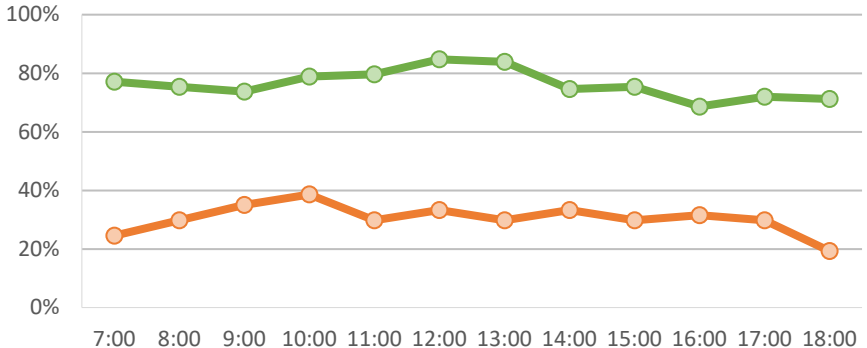
Wednesday
09/20/2023



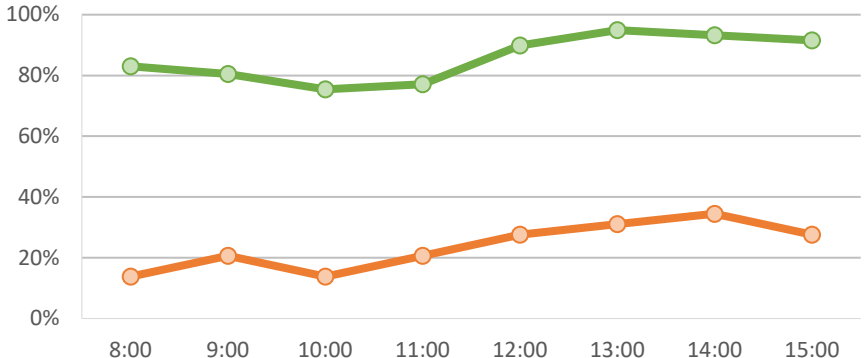
Thursday
09/21/2023



Saturday
09/30/2023



Sunday
10/01/2023

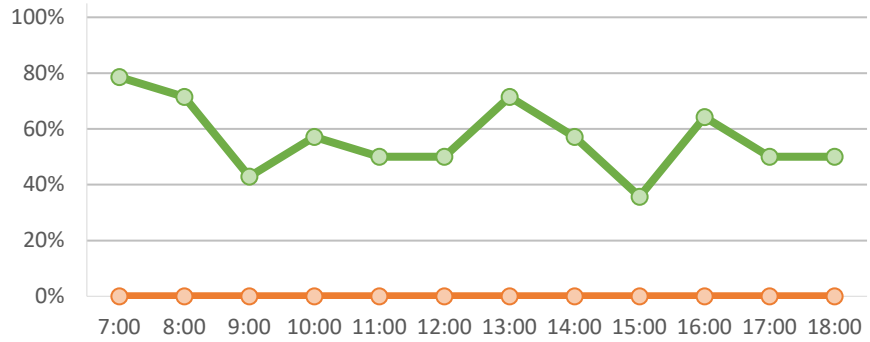


BLOCK-BY-BLOCK

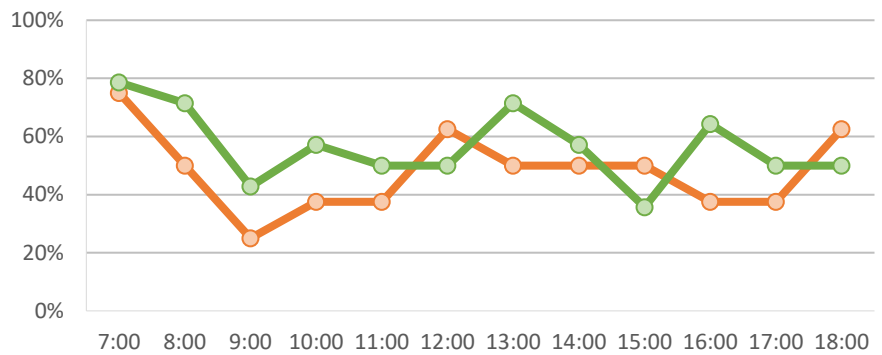
Wednesday 09/20/2023

—●— Loading
—●— Parking

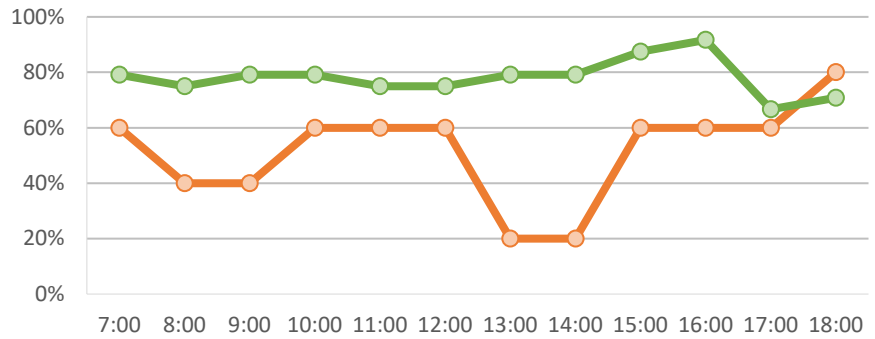
400 Block
 Loading Spots: 0
 Parking Spots: 22



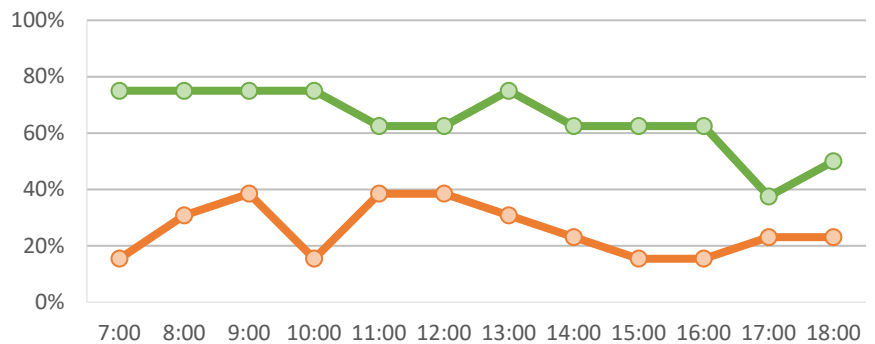
500 Block
 Loading Spots: 8
 Parking Spots: 14



600 Block
 Loading Spots: 5
 Parking Spots: 24



700 Block
 Loading Spots: 13
 Parking Spots: 8



BLOCK-BY-BLOCK

Wednesday 09/20/2023

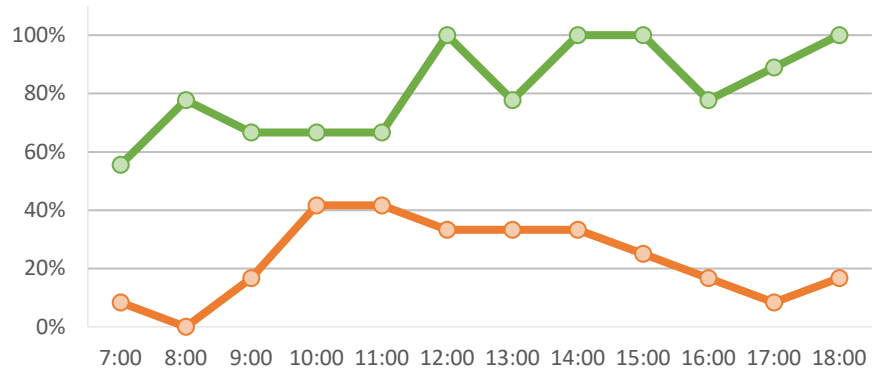
— Loading

— Parking

800 Block

Loading Spots: 12

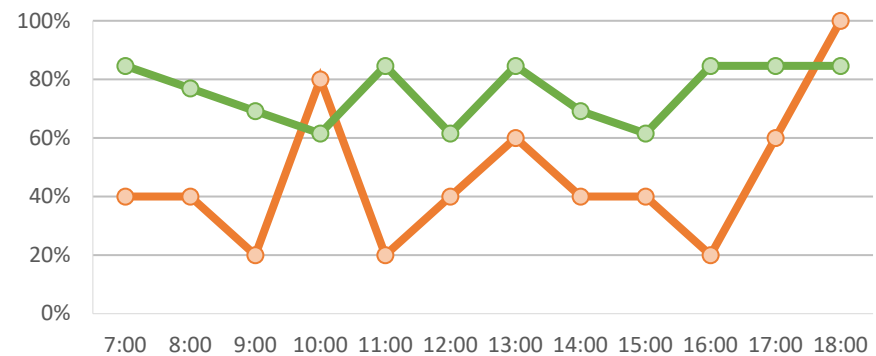
Parking Spots: 9



900 Block

Loading Spots: 5

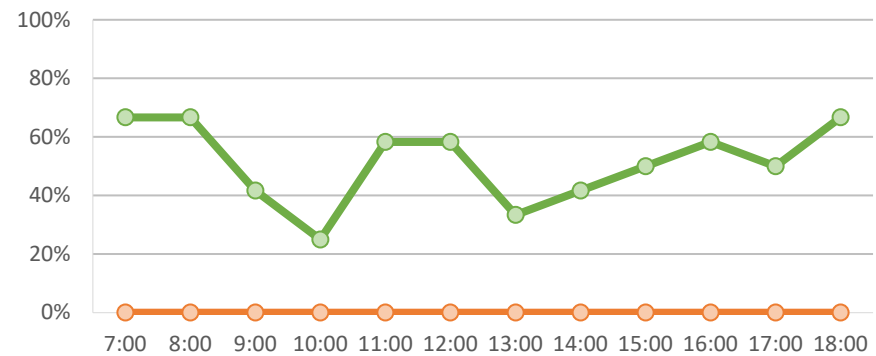
Parking Spots: 13



1000 Block

Loading Spots: 0

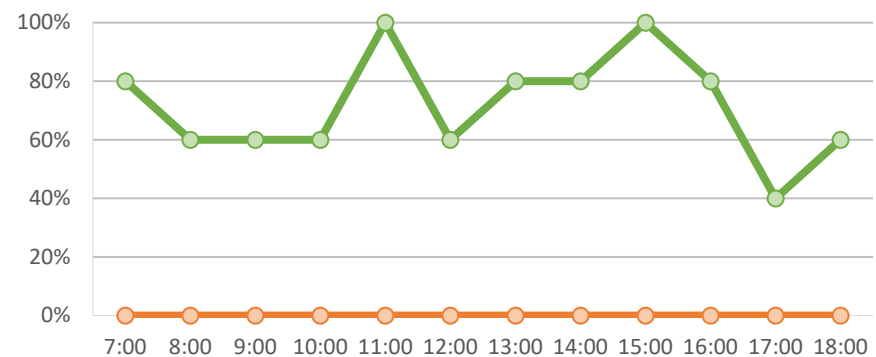
Parking Spots: 12



1100 Block

Loading Spots: 0

Parking Spots: 5

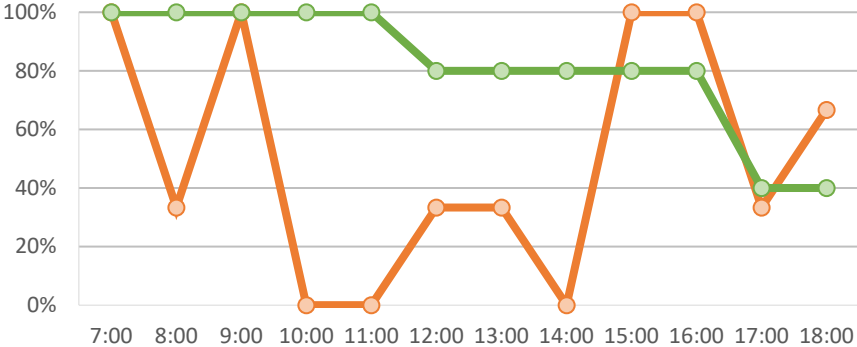


BLOCK-BY-BLOCK

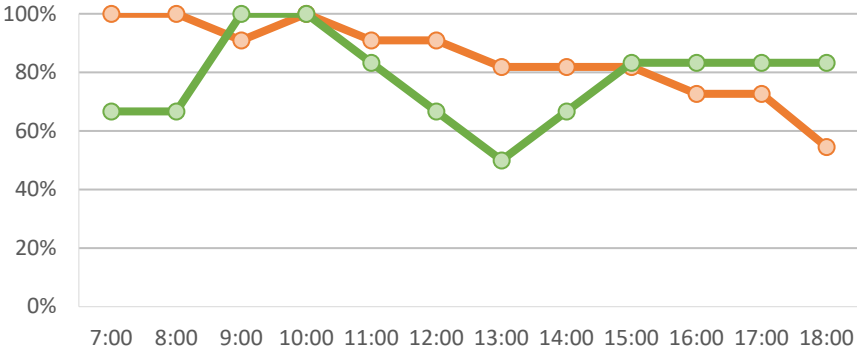
Wednesday 09/20/2023

— Loading
— Parking

1200 Block
Loading Spots: 3
Parking Spots: 5



1300 Block
Loading Spots: 11
Parking Spots: 6



BLOCK-BY-BLOCK

Thursday 09/21/2023

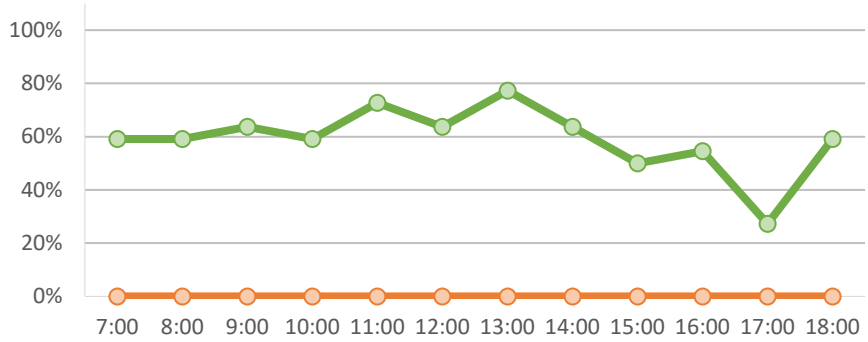
— Loading

— Parking

400 Block

Loading Spots: 0

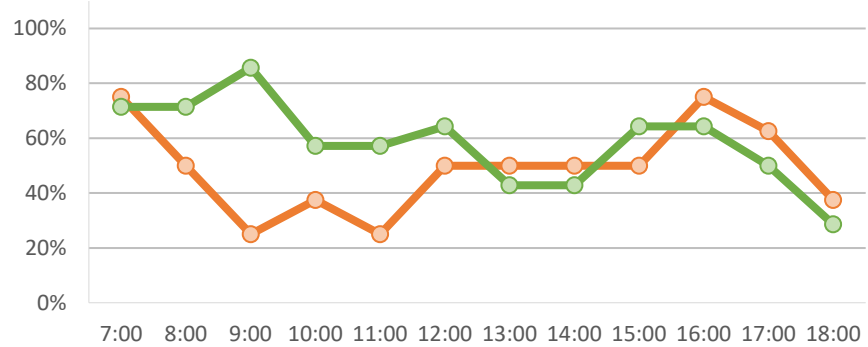
Parking Spots: 22



500 Block

Loading Spots: 8

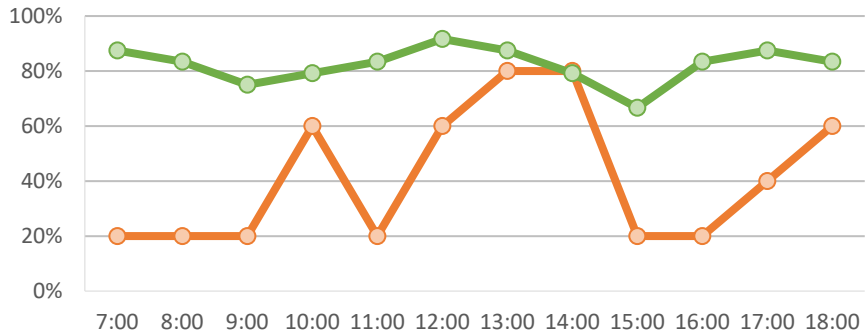
Parking Spots: 14



600 Block

Loading Spots: 5

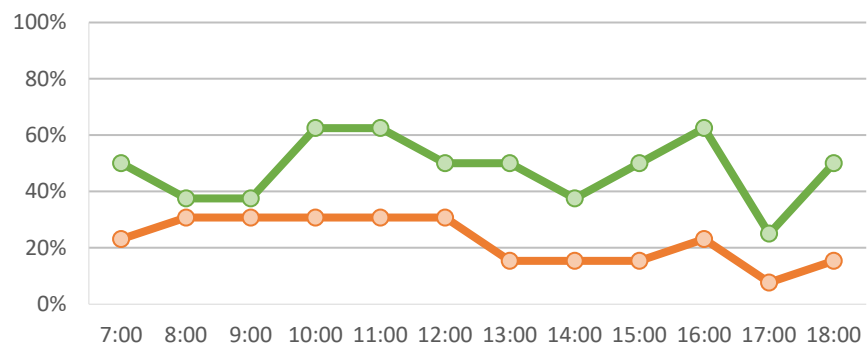
Parking Spots: 24



700 Block

Loading Spots: 13

Parking Spots: 8

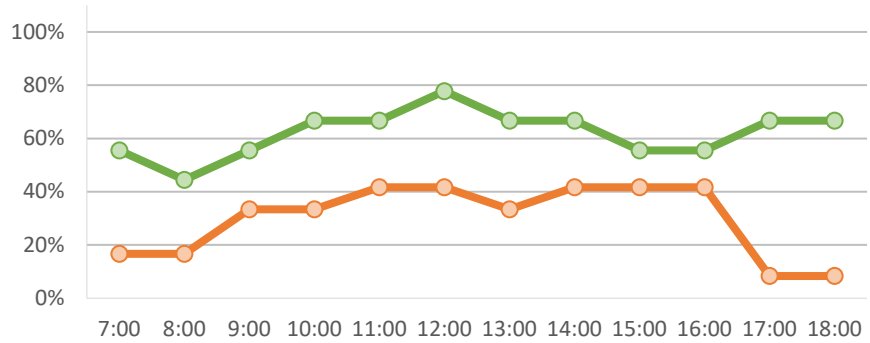


BLOCK-BY-BLOCK

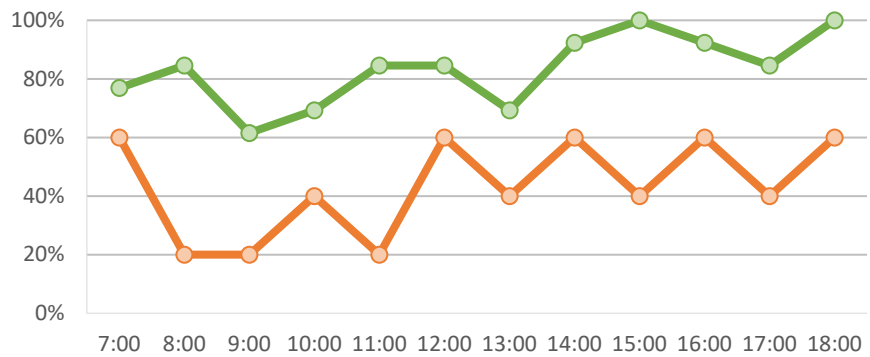
Thursday 09/21/2023

—●— Loading
—●— Parking

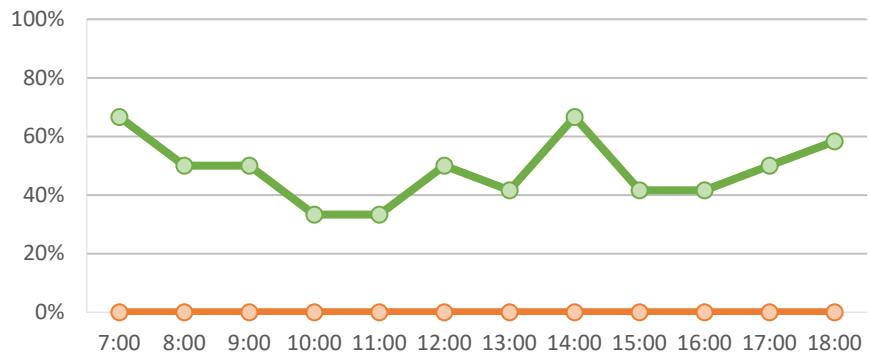
800 Block
 Loading Spots: 12
 Parking Spots: 9



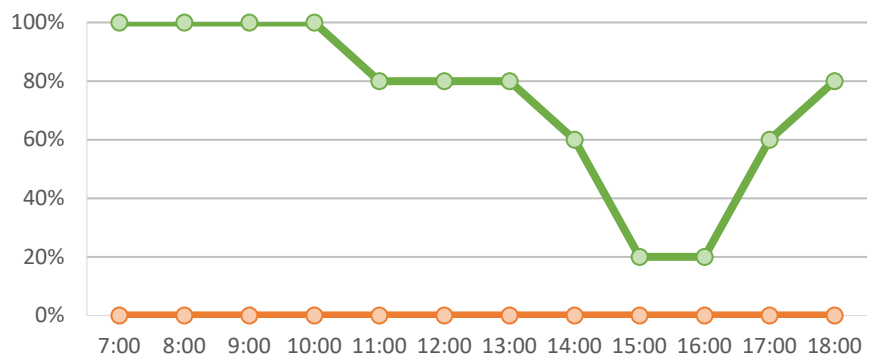
900 Block
 Loading Spots: 5
 Parking Spots: 13



1000 Block
 Loading Spots: 0
 Parking Spots: 12



1100 Block
 Loading Spots: 0
 Parking Spots: 5

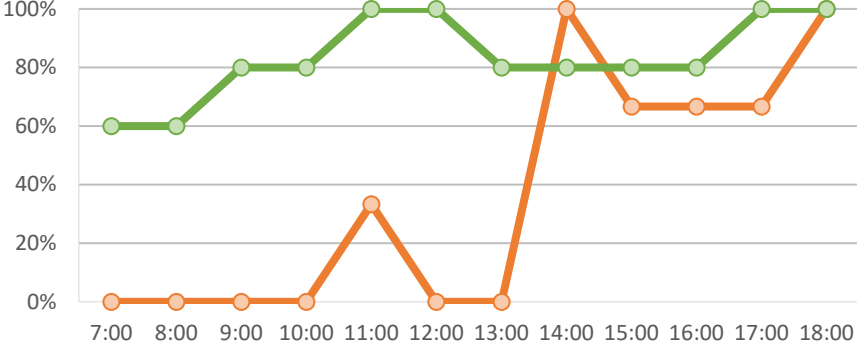


BLOCK-BY-BLOCK

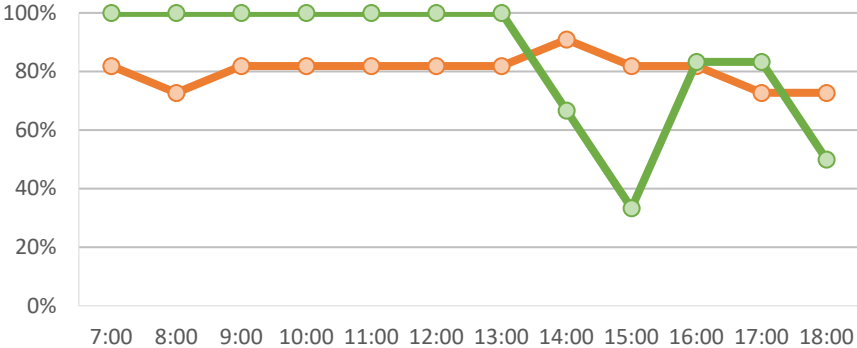
Thursday 09/21/2023

— Loading
— Parking

1200 Block
Loading Spots: 3
Parking Spots: 5



1300 Block
Loading Spots: 11
Parking Spots: 6



BLOCK-BY-BLOCK

Saturday 09/30/2023

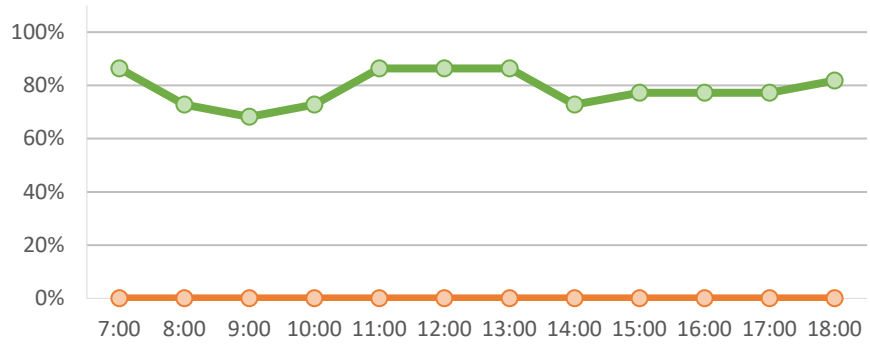
Loading

Parking

400 Block

Loading Spots: 0

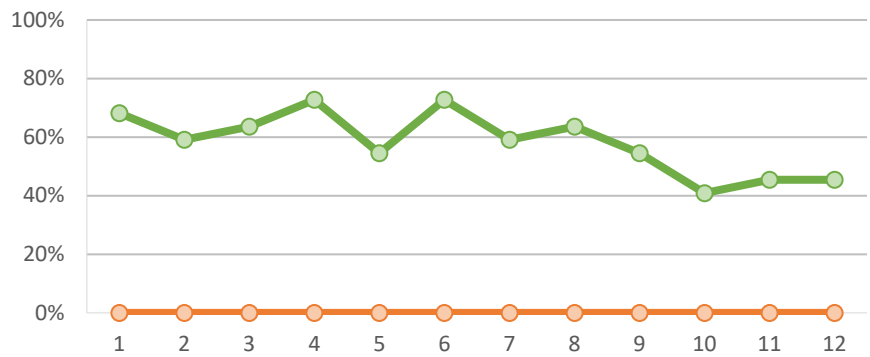
Parking Spots: 22



500 Block

Loading Spots: 0

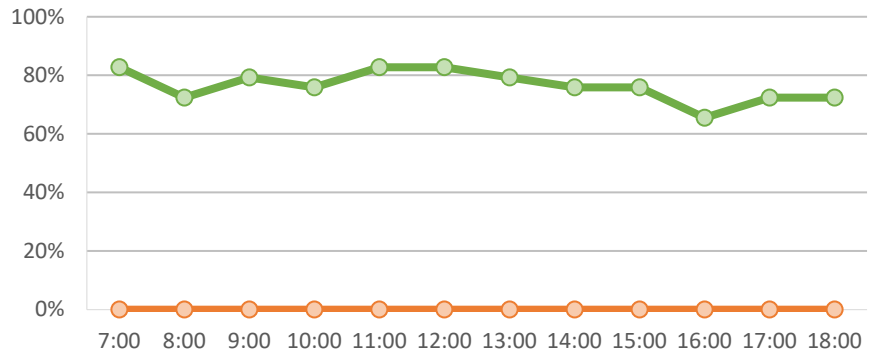
Parking Spots: 22



600 Block

Loading Spots: 0

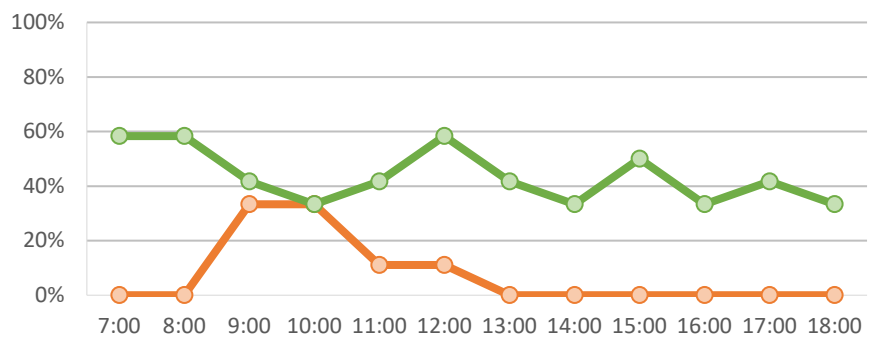
Parking Spots: 29



700 Block

Loading Spots: 9

Parking Spots: 12



BLOCK-BY-BLOCK

Saturday 09/30/2023

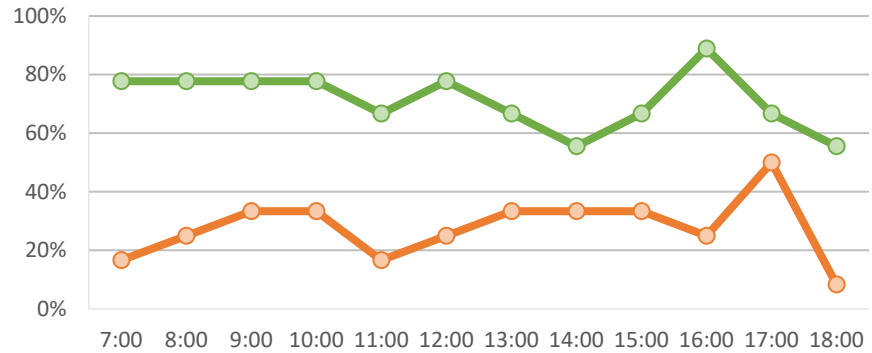
— Loading

— Parking

800 Block

Loading Spots: 12

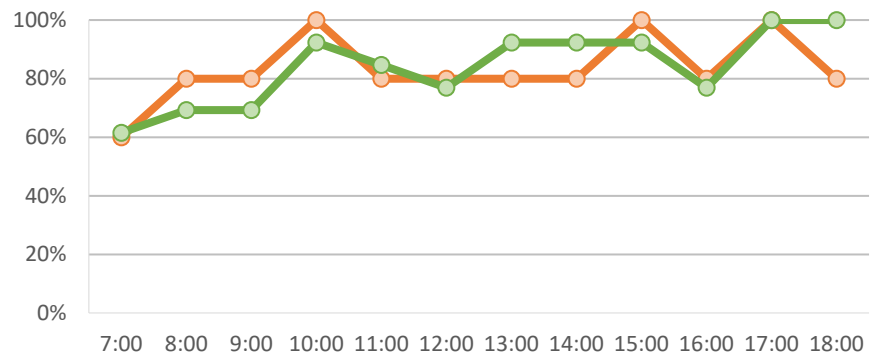
Parking Spots: 9



900 Block

Loading Spots: 5

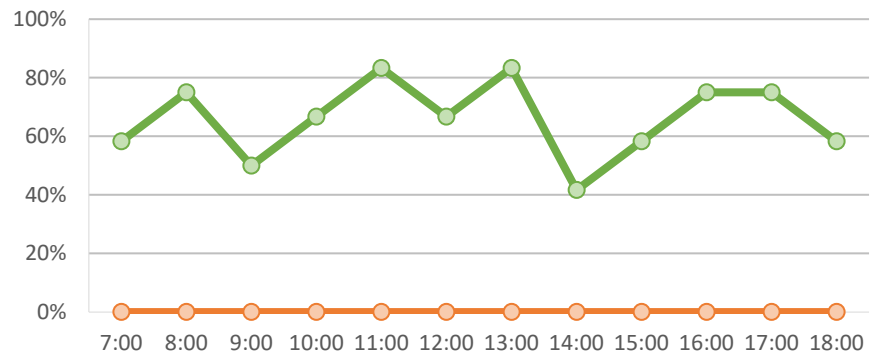
Parking Spots: 13



1000 Block

Loading Spots: 0

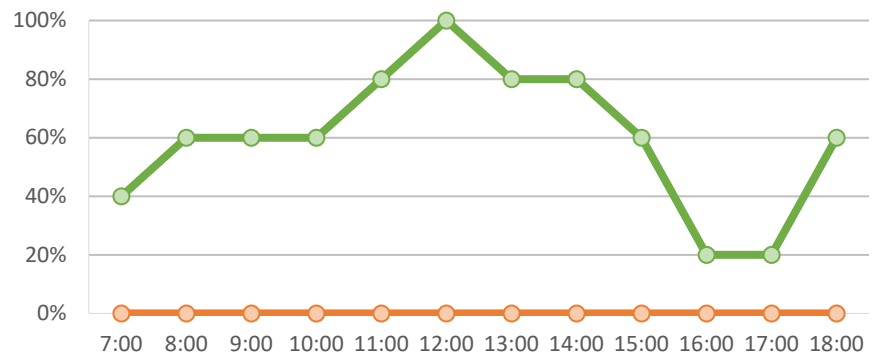
Parking Spots: 12



1100 Block

Loading Spots: 0

Parking Spots: 5



BLOCK-BY-BLOCK

Saturday 09/30/2023

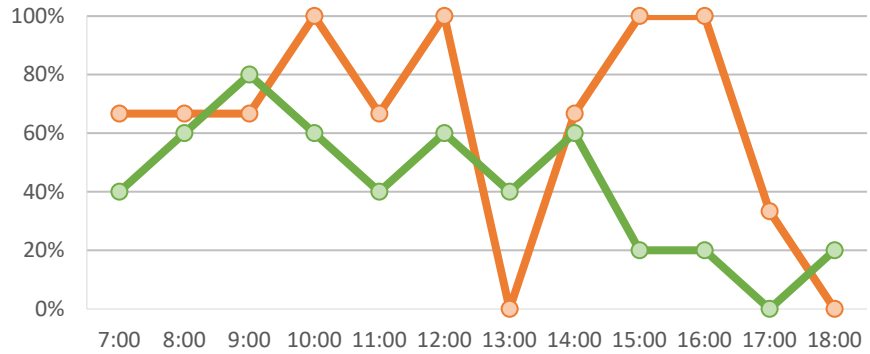
— Loading

— Parking

1200 Block

Loading Spots: 3

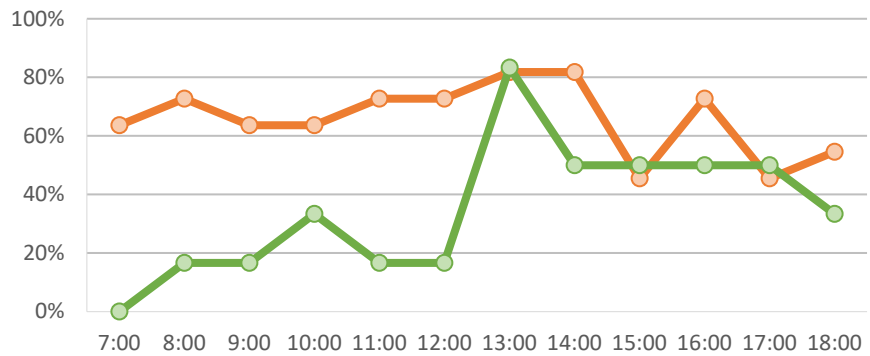
Parking Spots: 5



1300 Block

Loading Spots: 11

Parking Spots: 6

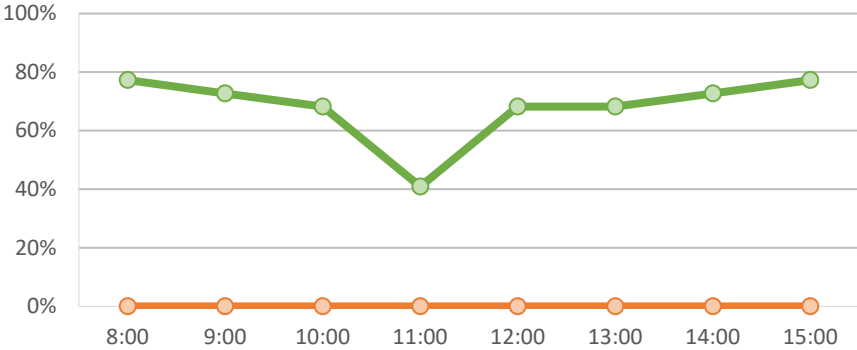


BLOCK-BY-BLOCK

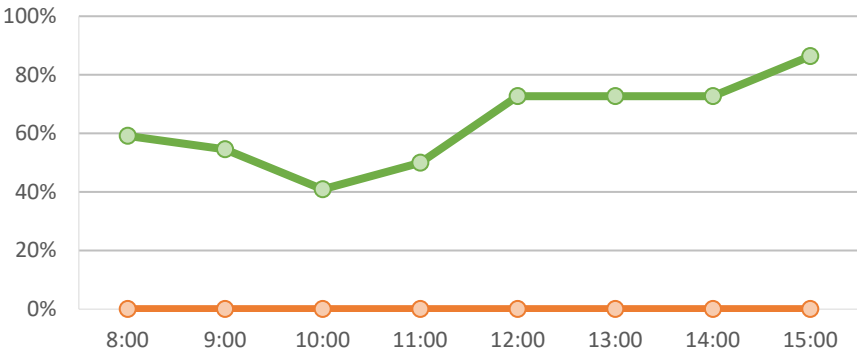
Sunday 10/01/2023

○ Loading
○ Parking

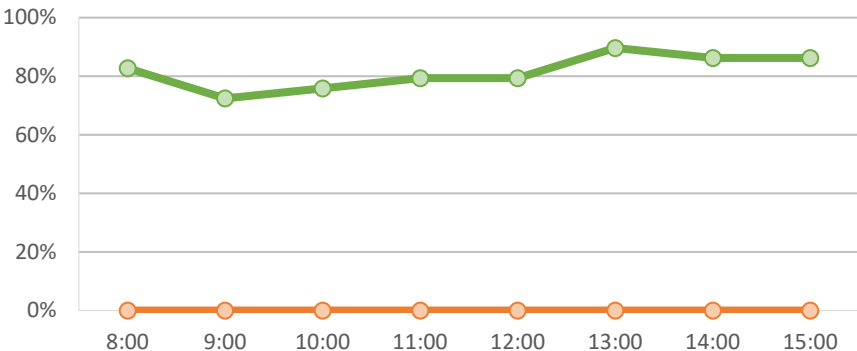
400 Block
Loading Spots: 0
Parking Spots: 22



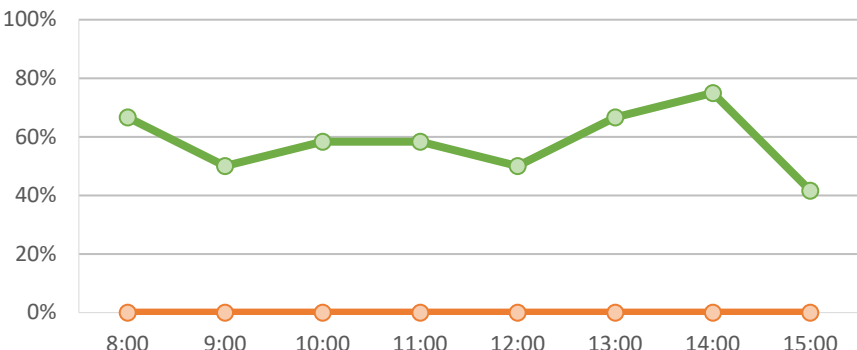
500 Block
Loading Spots: 0
Parking Spots: 22



600 Block
Loading Spots: 0
Parking Spots: 29



700 Block
Loading Spots: 9
Parking Spots: 12



BLOCK-BY-BLOCK

Sunday 10/01/2023

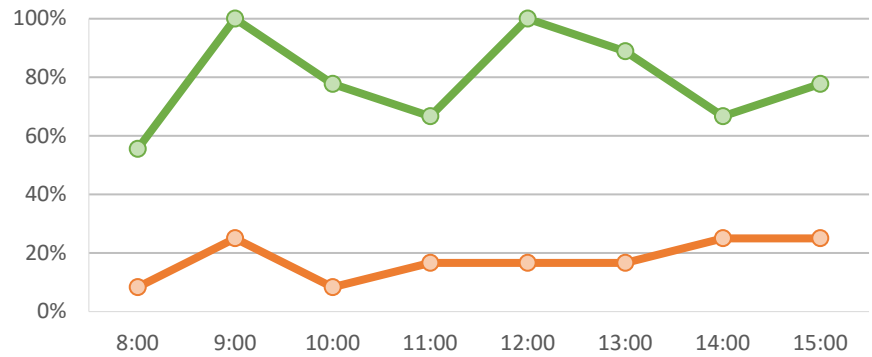
○ Loading

○ Parking

800 Block

Loading Spots: 12

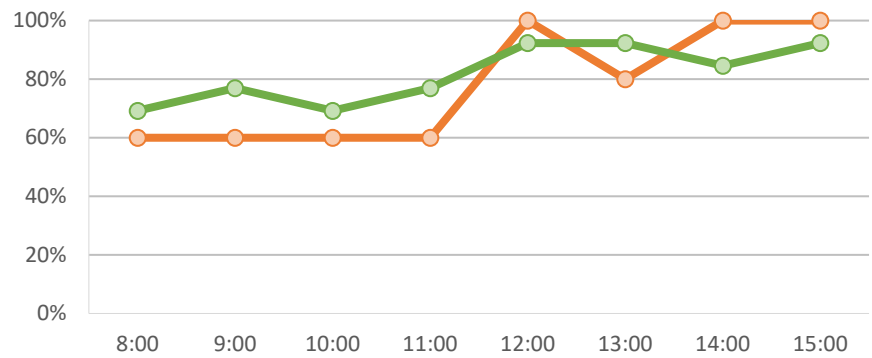
Parking Spots: 9



900 Block

Loading Spots: 5

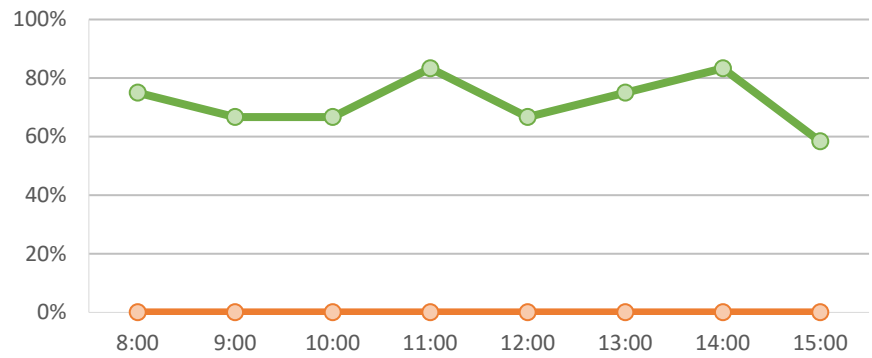
Parking Spots: 13



1000 Block

Loading Spots: 0

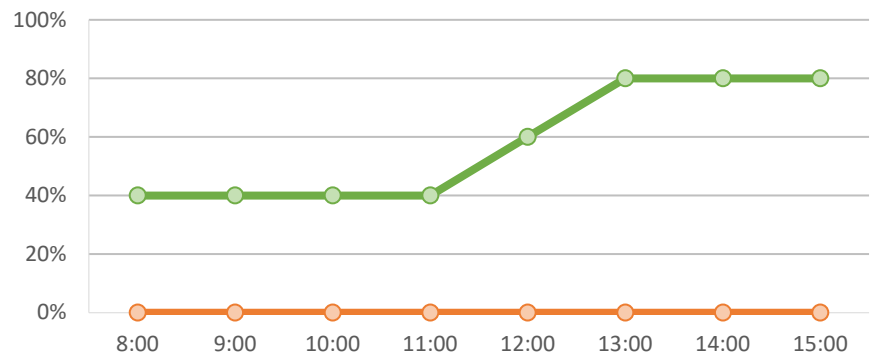
Parking Spots: 12



1100 Block

Loading Spots: 0

Parking Spots: 5

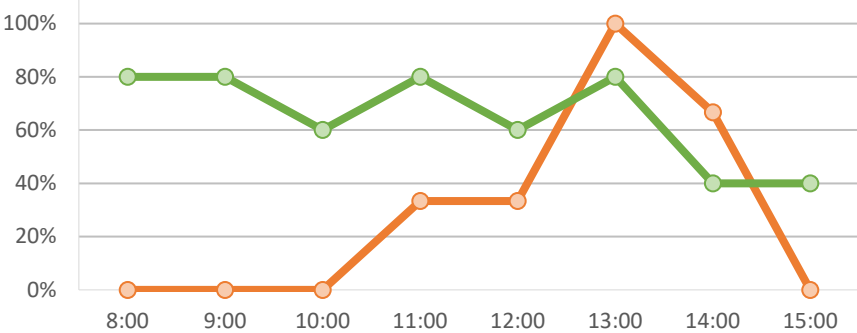


BLOCK-BY-BLOCK

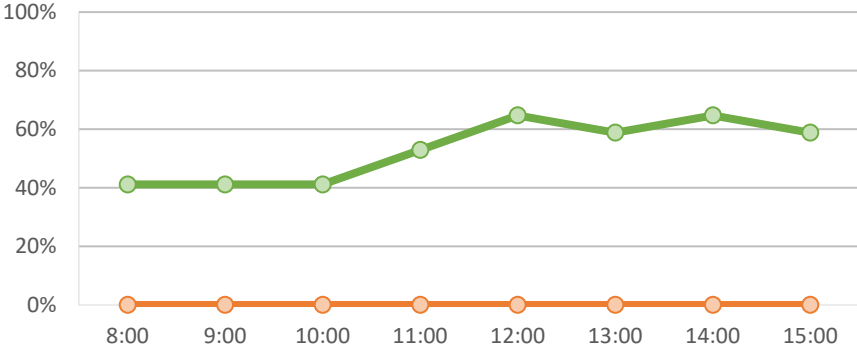
Sunday 10/01/2023

— Loading
— Parking

1200 Block
Loading Spots: 3
Parking Spots: 5



1300 Block
Loading Spots: 0
Parking Spots: 17



A-2 DURATION/TURNOVER TABLES

DURATION

All Days

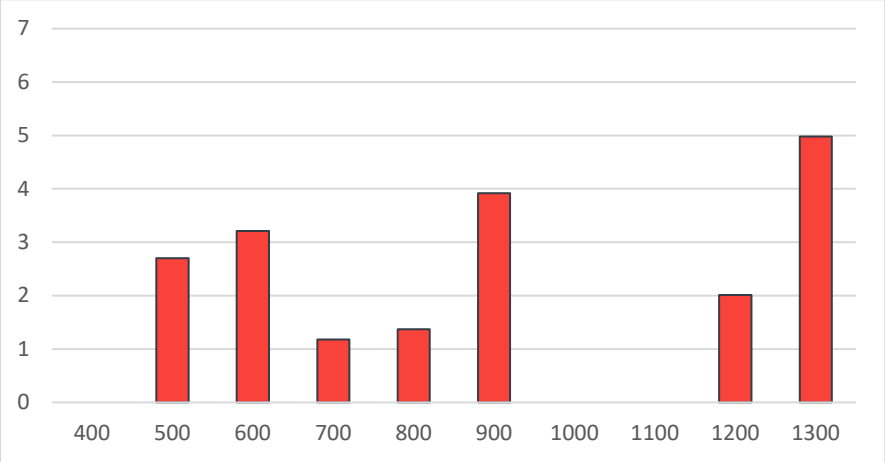
Parking & Loading		
Block	Spaces	Average Duration All Spaces
400	22	4.09
500	22	2.76
600	29	4.98
700	21	1.75
800	21	2.14
900	18	3.65
1000	12	3.20
1100	5	2.83
1200	8	2.77
1300	17	3.33
Corridor	175	3.28

Block	Loading Spaces	All Parking Spaces	2 hr Spaces	4 hr Spaces
400	N/A	4.09	N/A	4.09
500	2.70	2.76	2.76	N/A
600	3.21	4.98	3.47	6.20
700	1.18	2.85	2.85	N/A
800	1.37	3.40	3.40	N/A
900	3.92	4.13	3.99	N/A
1000	N/A	3.54	3.54	N/A
1100	N/A	3.54	3.53	N/A
1200	2.01	4.22	N/A	4.22
1300	4.98	4.56	2.54	4.82
Corridor	2.63	3.92	3.26	4.87

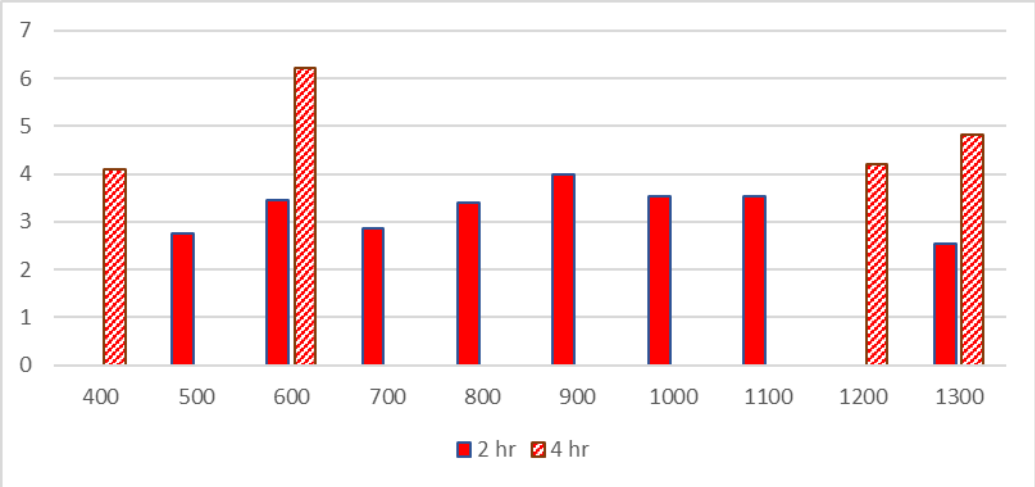
DURATION

All Days

Average Duration (in Hours) for Loading Spaces



Average Duration (in Hours) for Parking Spaces



TURNOVER

All Days

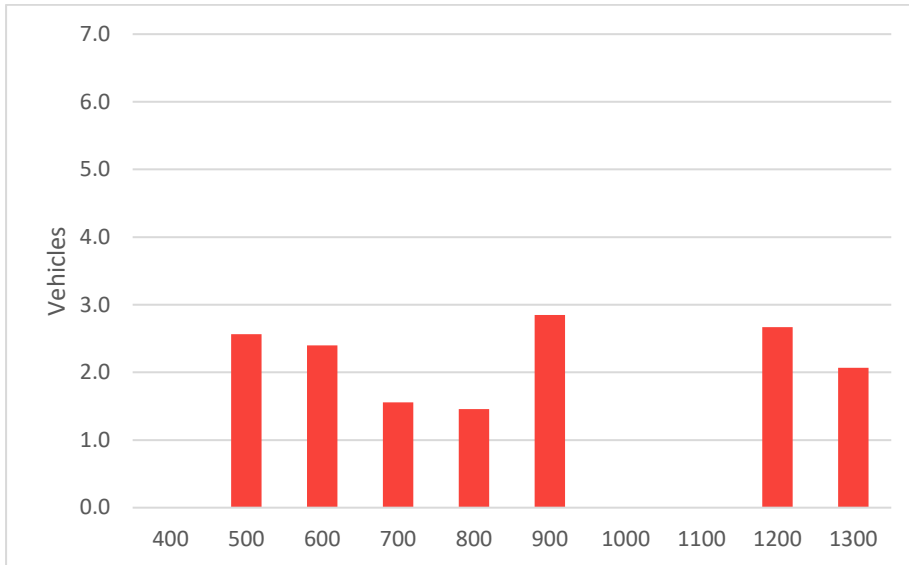
PARKING & LOADING		
Block	Spaces	Average Turnover
400	22	2.1
500	22	3.0
600	29	2.2
700	21	1.9
800	21	2.4
900	18	3.1
1000	12	2.4
1100	5	3.0
1200	8	2.3
1300	17	2.0
Corridor	175	2.4

Block	Loading Spaces	Parking Spaces
400	NA	2.1
500	2.6	3.0
600	2.4	2.2
700	1.6	2.7
800	1.5	3.6
900	2.9	3.2
1000	NA	2.4
1100	NA	3
1200	2.7	2
1300	2.1	2
Corridor	2.0	2.5

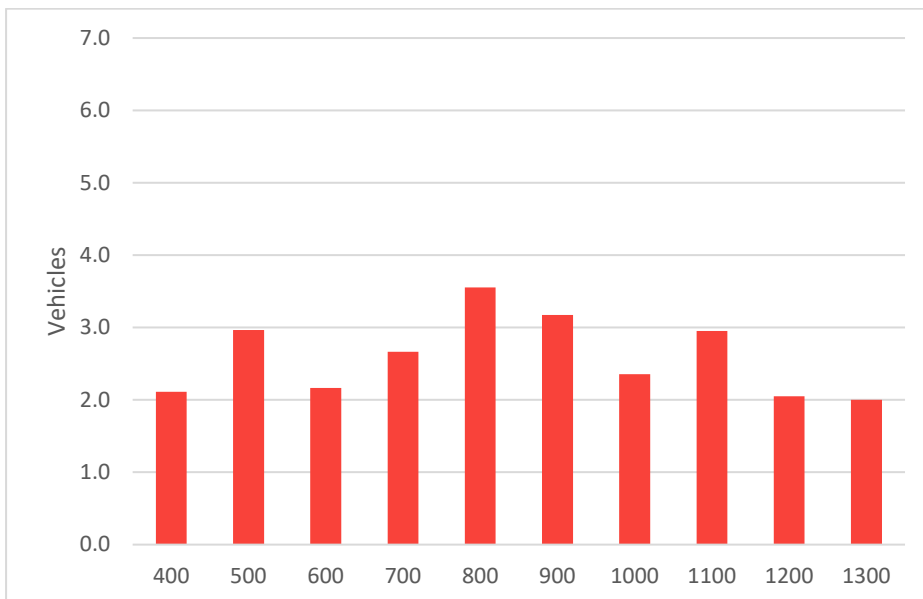
TURNOVER

All Days

Average Turnover for Loading Spaces Chart



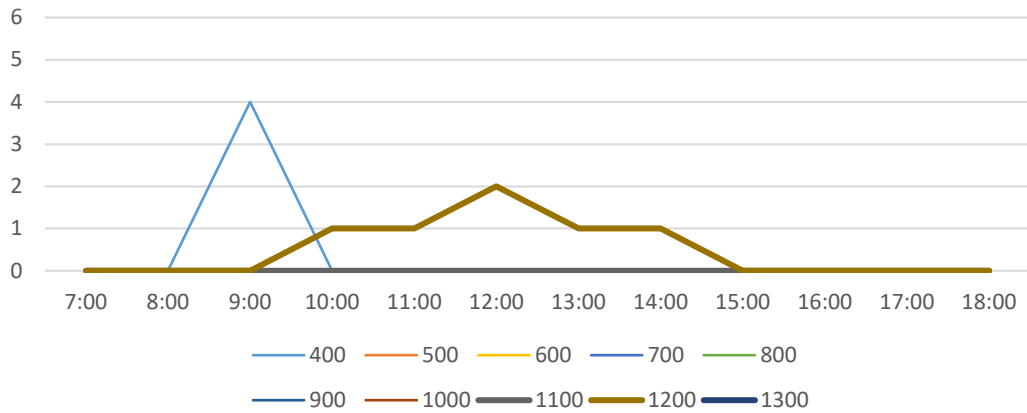
Average Turnover for Parking Spaces Chart



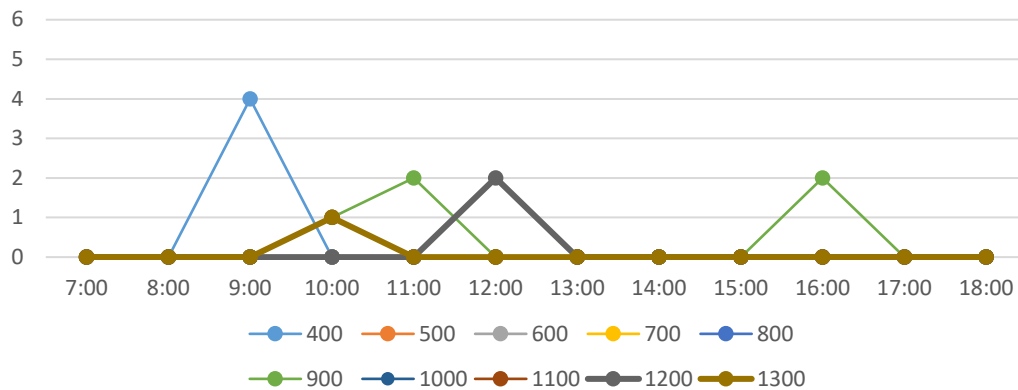
A-3 ILLEGAL PARKING ACTIVITY GRAPHS

ILLEGAL PARKING

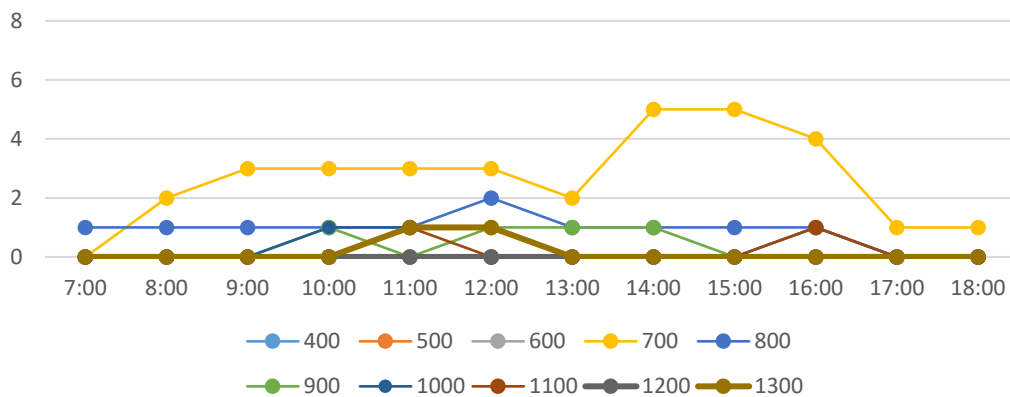
DOUBLE PARKING BY BLOCK - WEDNESDAY 09/20



MEDIAN PARKING BY BLOCK - WEDNESDAY 09/20



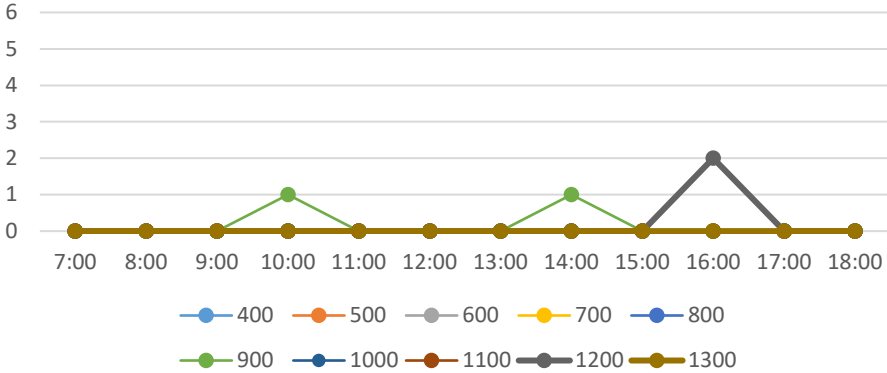
SIDEWALK PARKING BY BLOCK - WEDNESDAY 09/20



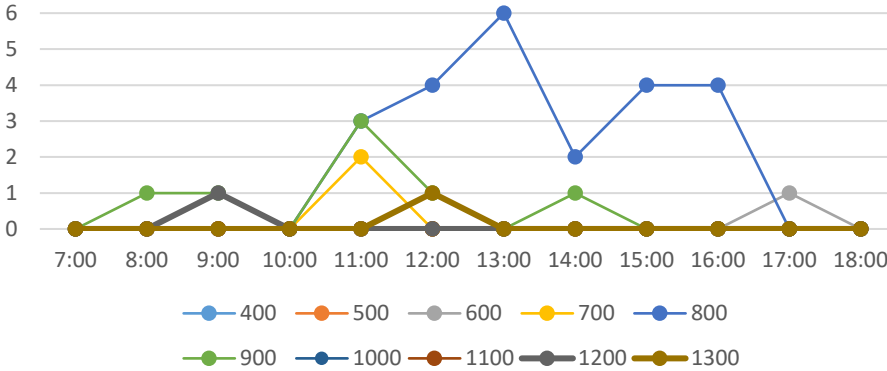
Note: All dates are in 2023

ILLEGAL PARKING

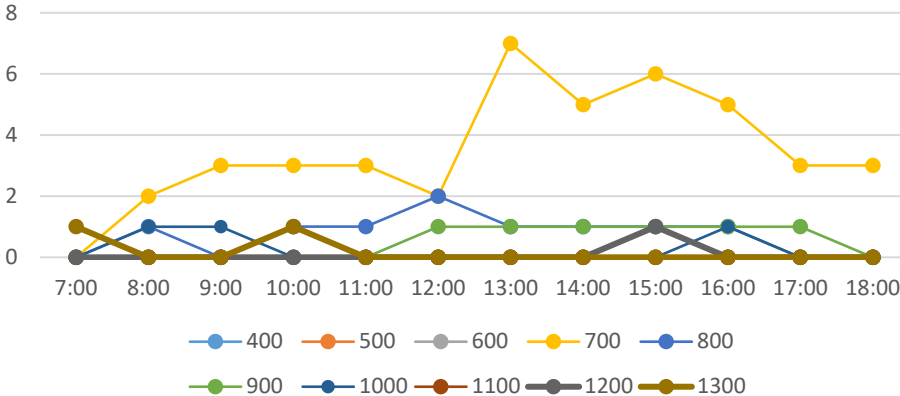
DOUBLE PARKING BY BLOCK - THURSDAY 09/21



MEDIAN PARKING BY BLOCK - THURSDAY 09/21



SIDEWALK PARKING BY BLOCK - THURSDAY 09/21

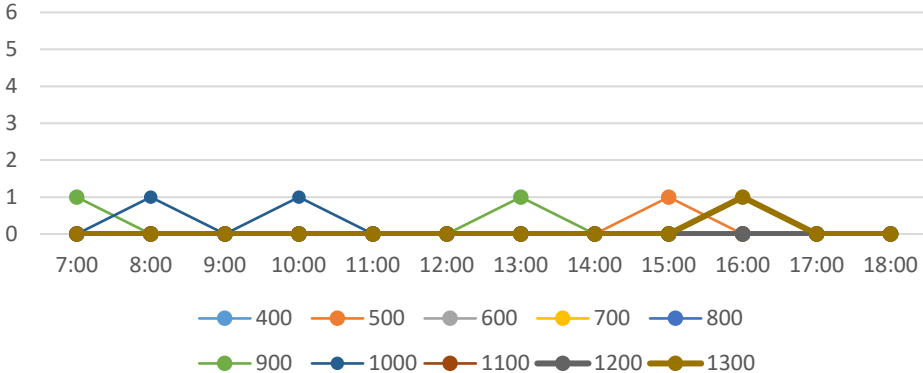


Note: All dates are in 2023

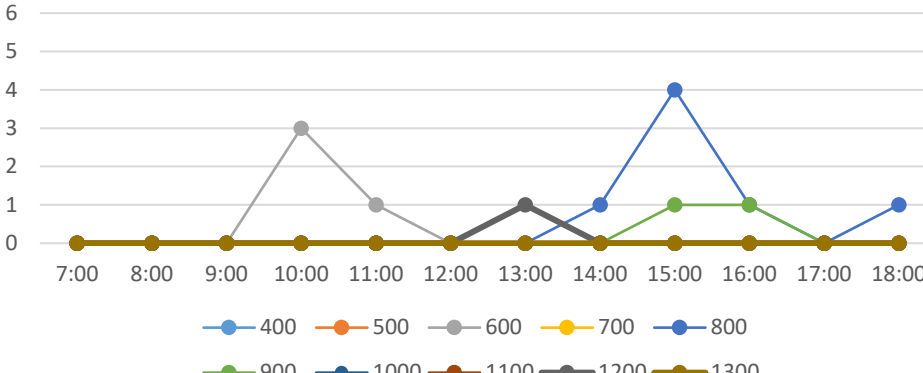


ILLEGAL PARKING

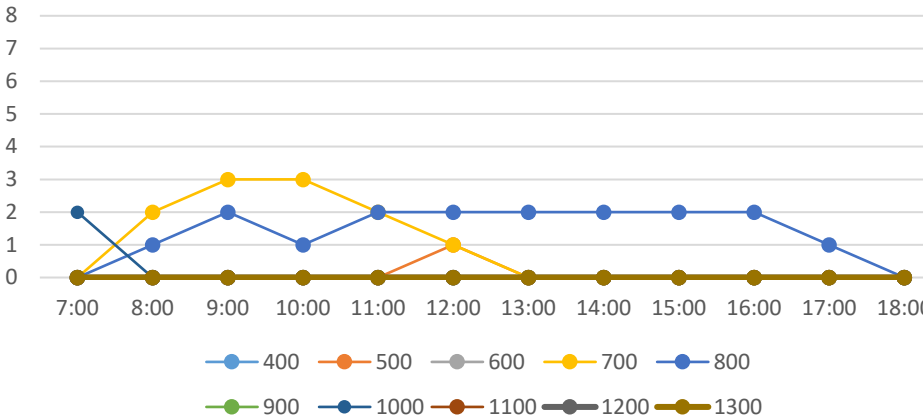
DOUBLE PARKING BY BLOCK - SATURDAY 09/30



MEDIAN PARKING BY BLOCK - SATURDAY 09/30



SIDEWALK PARKING BY BLOCK - SATURDAY 09/30

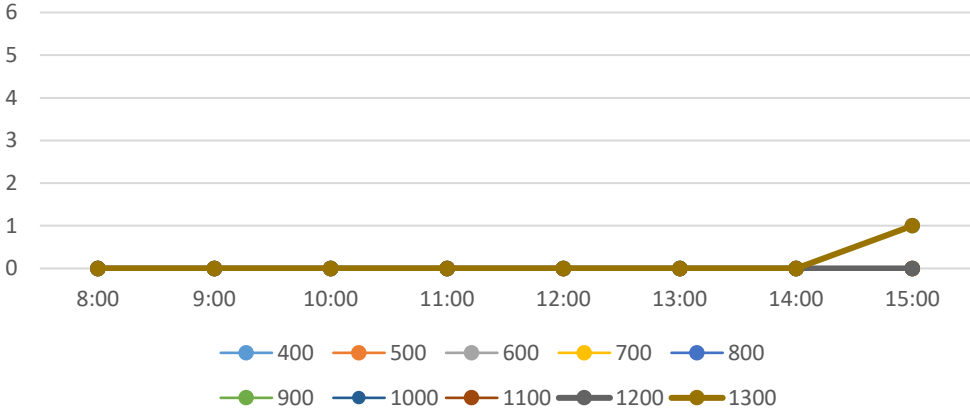


Note: All dates are in 2023

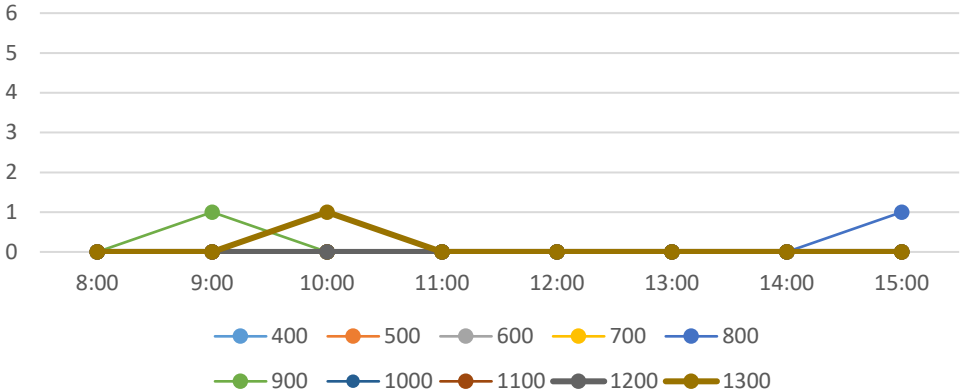


ILLEGAL PARKING

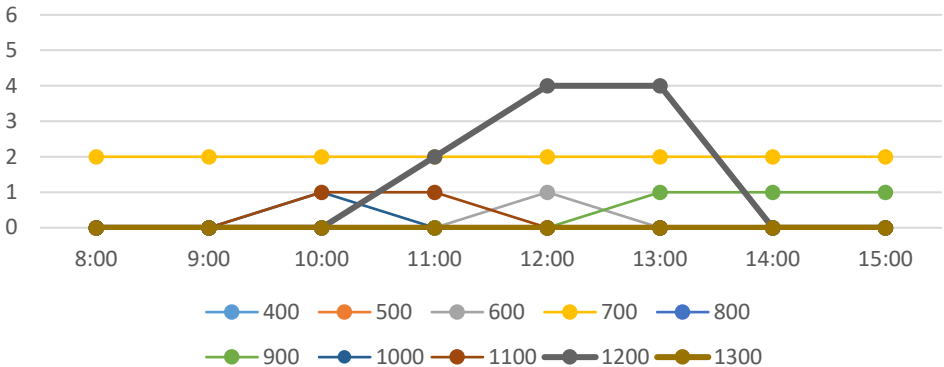
DOUBLE PARKING BY BLOCK - SUNDAY 10/1



MEDIAN PARKING BY BLOCK - SUNDAY 10/1



SIDEWALK PARKING BY BLOCK - SUNDAY 10/1

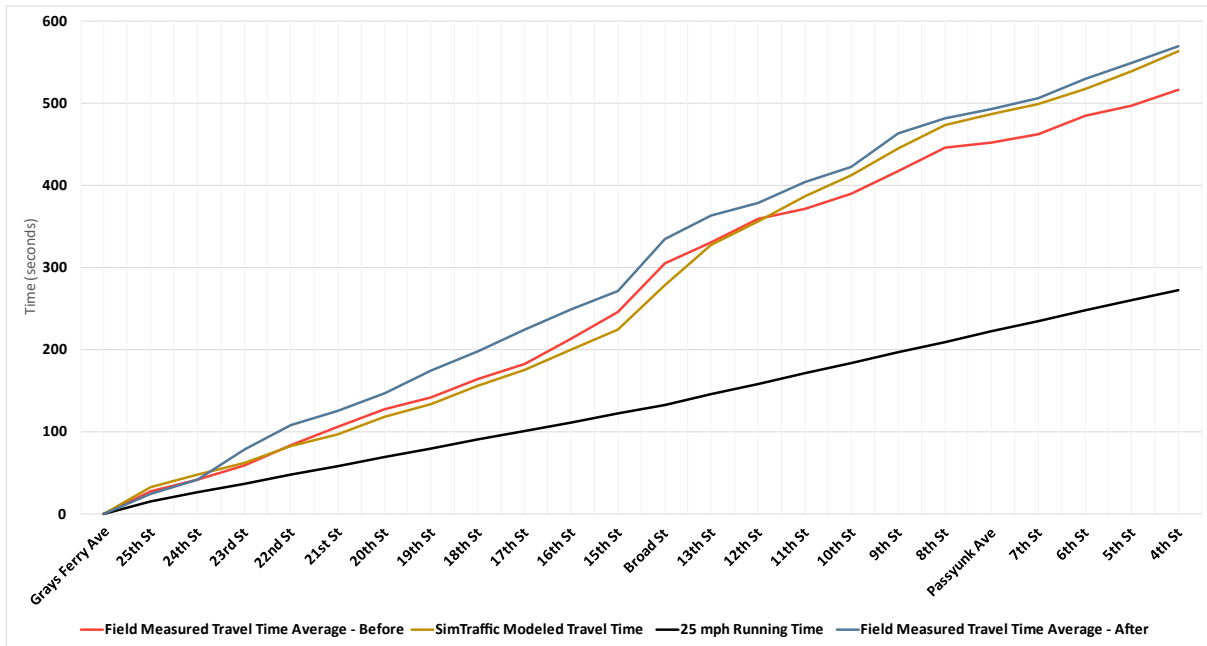


Note: All dates are in 2023

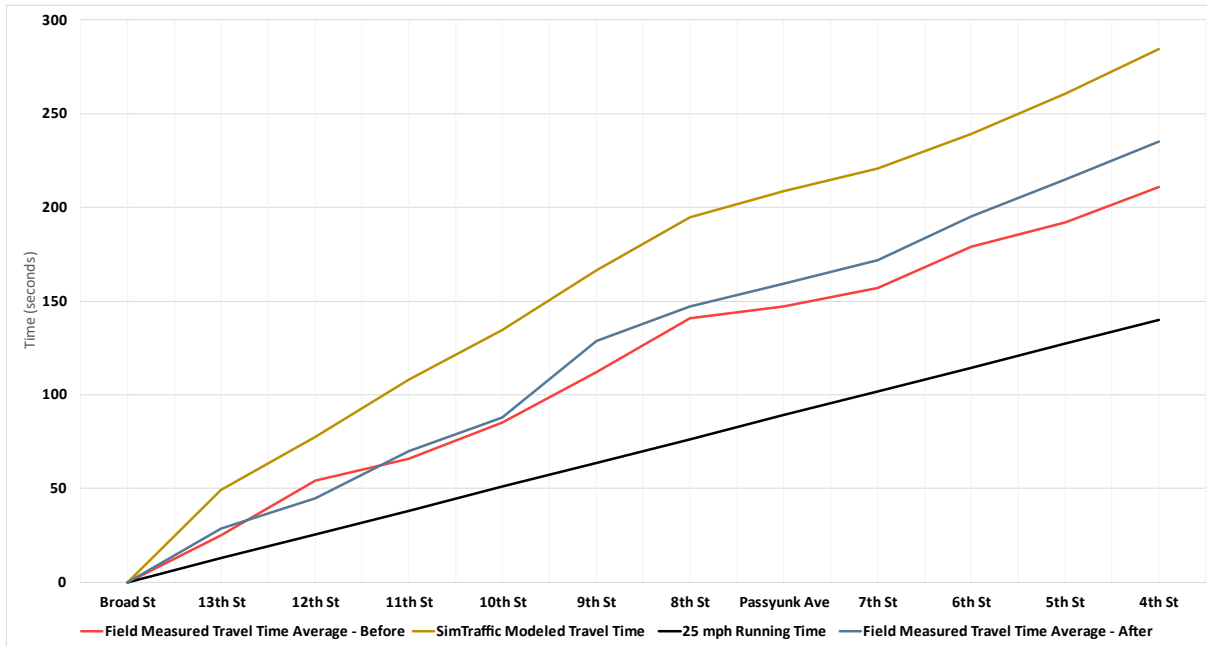


A-4 TRAVEL TIME GRAPHS

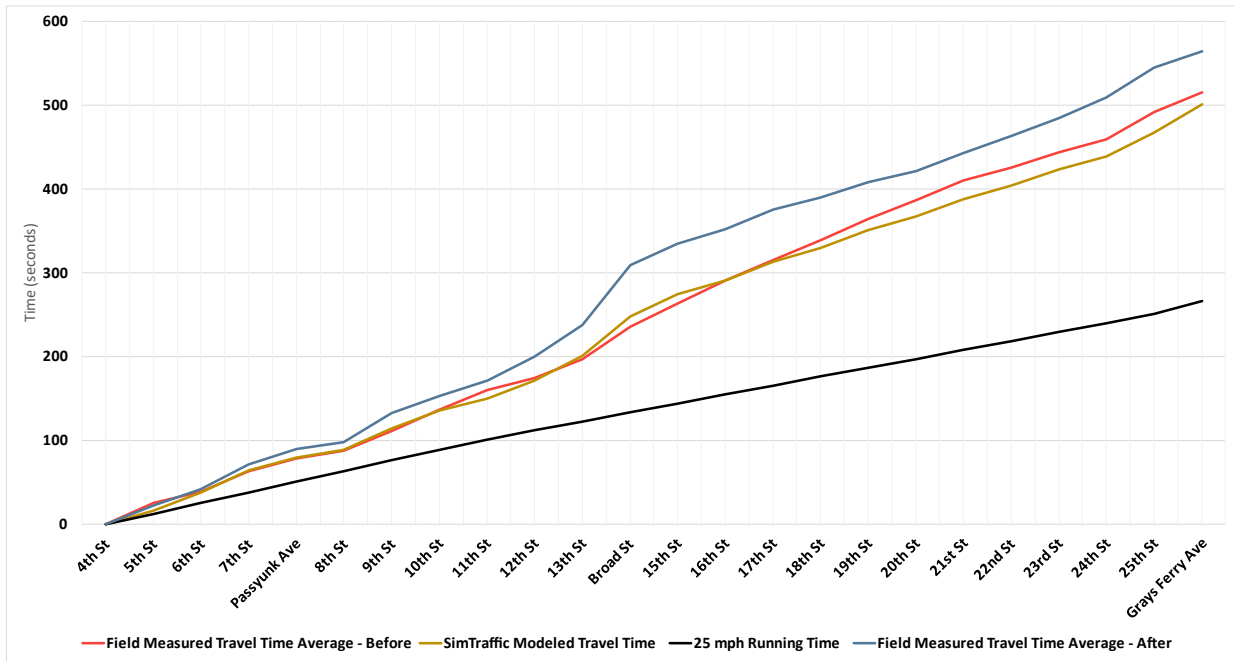
Travel Time - Eastbound AM Peak Period



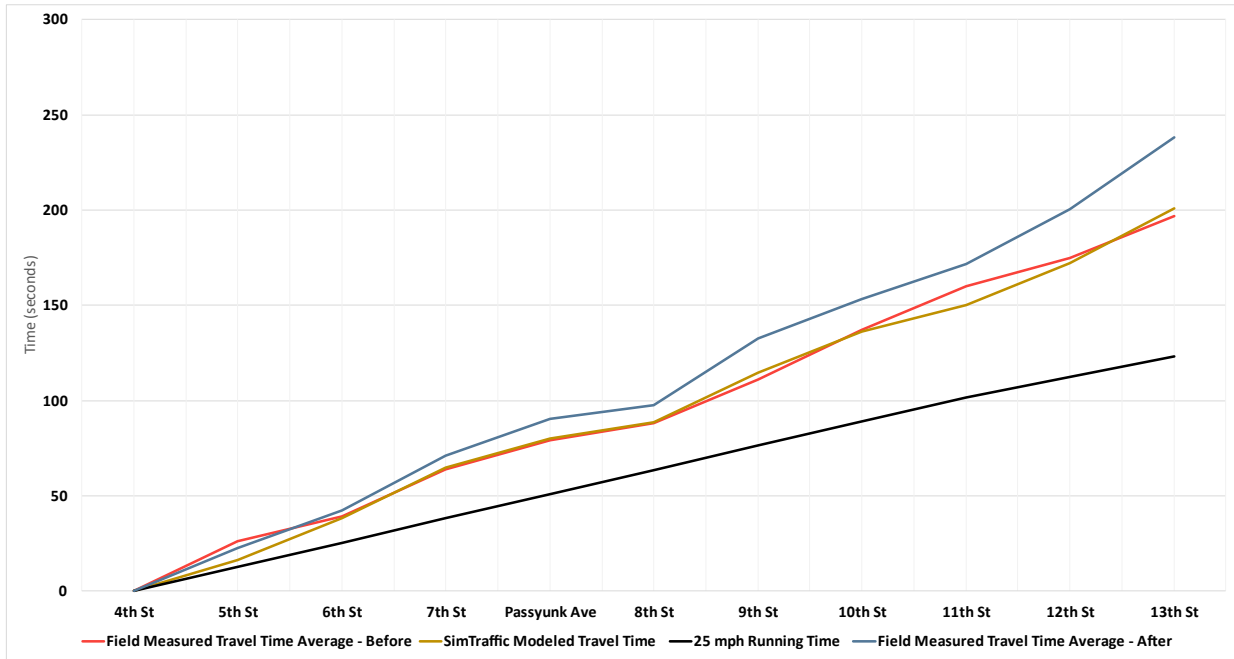
Travel Time - Eastbound AM Peak Period (East of Broad Street)



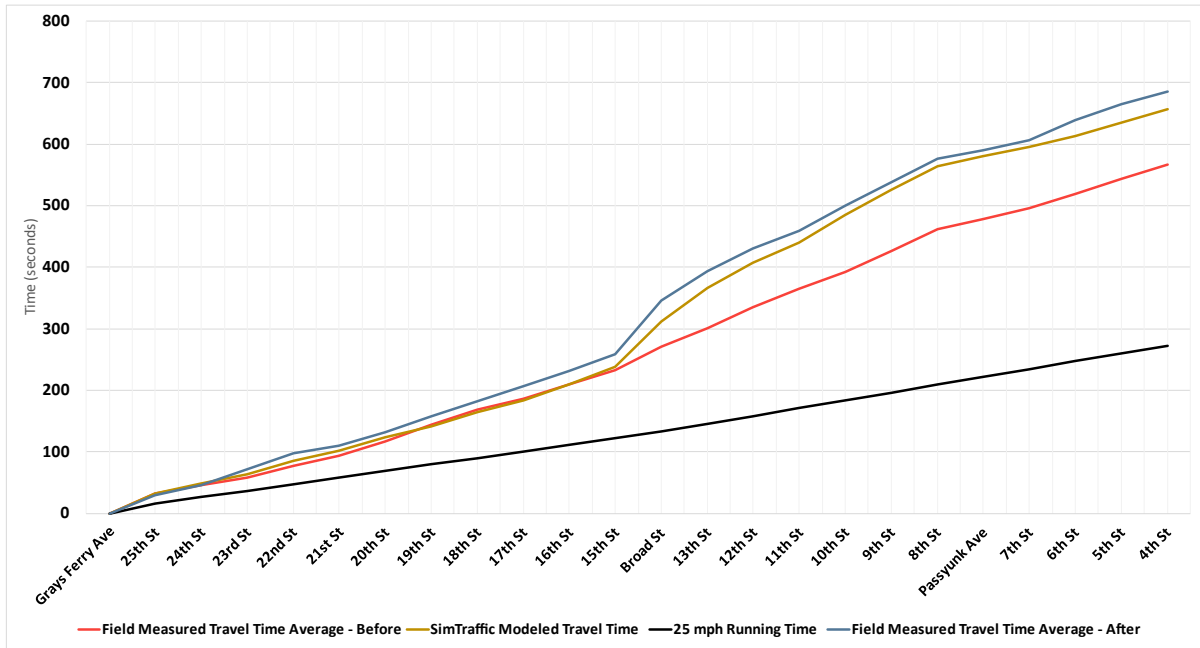
Travel Time - Westbound AM Peak Period



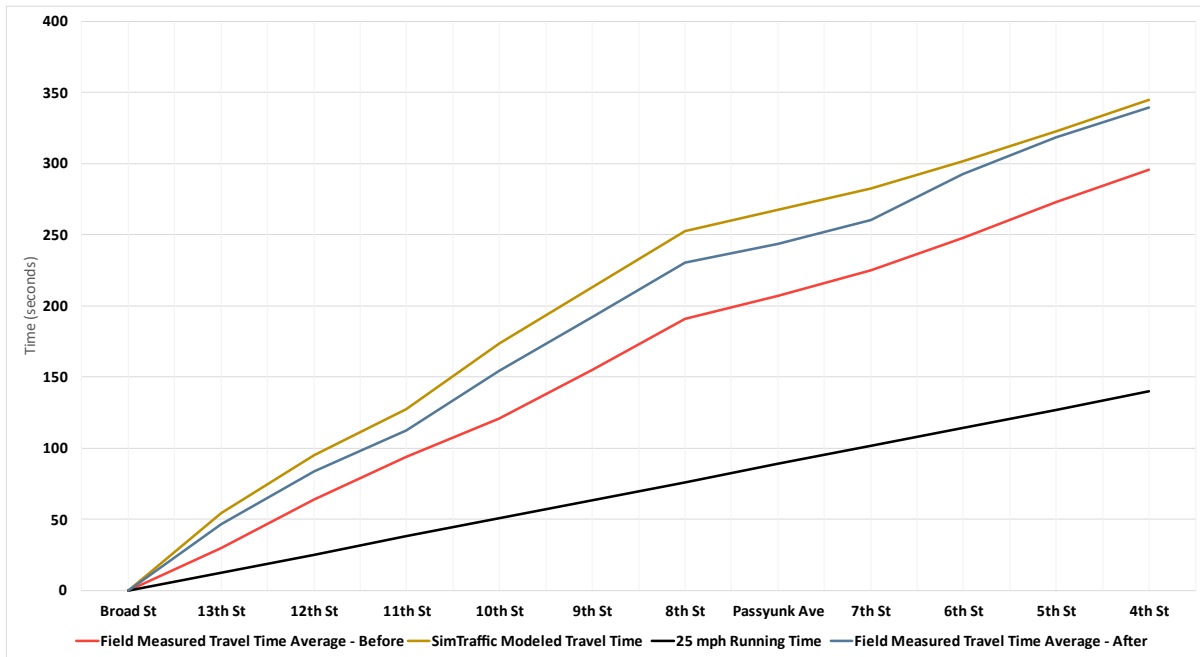
Travel Time - Westbound AM Peak Period (East of Broad Street)



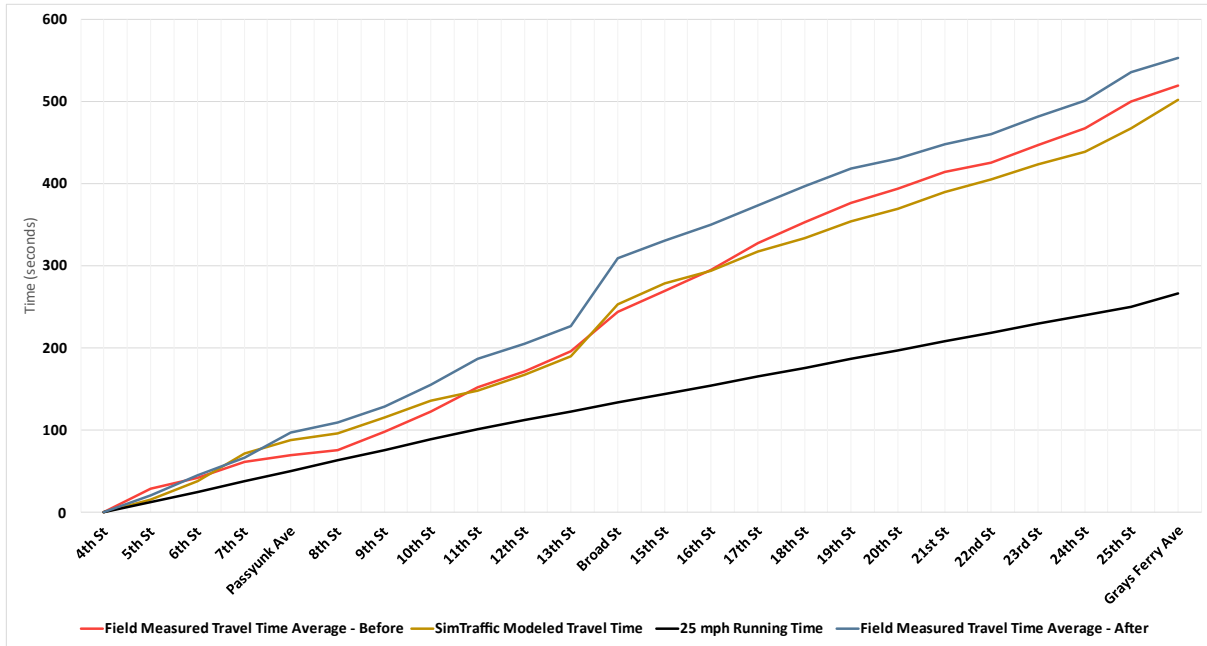
Travel Time - Eastbound PM Peak Period



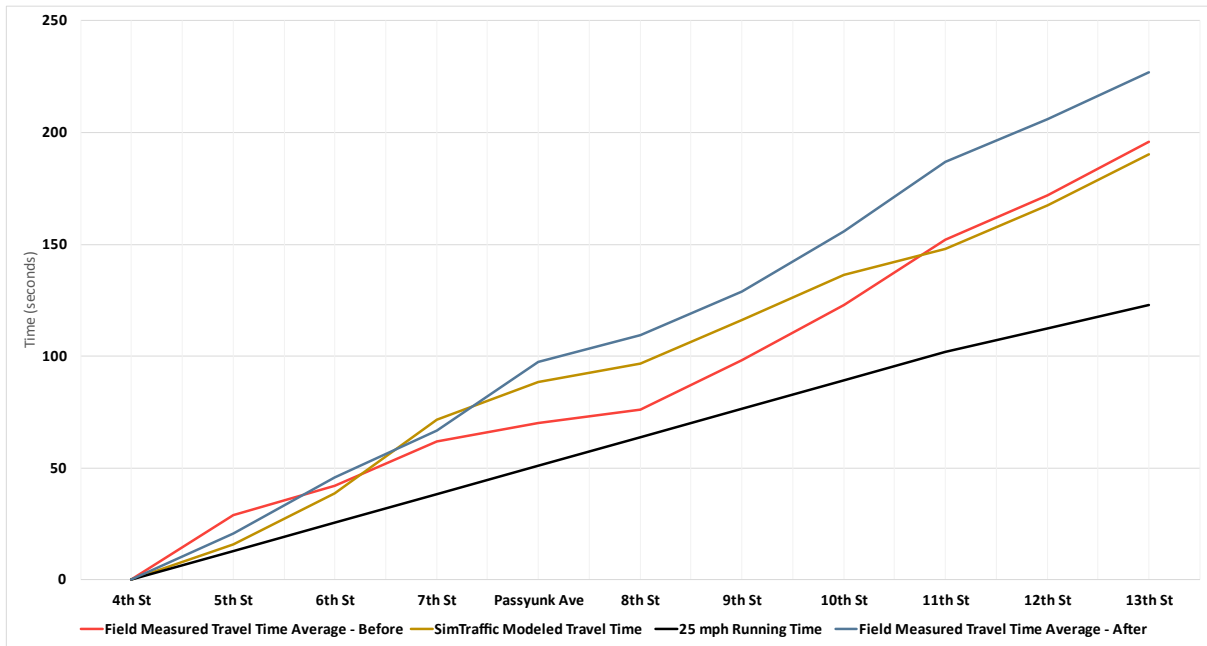
Travel Time - Eastbound PM Peak Period (East of Broad Street)



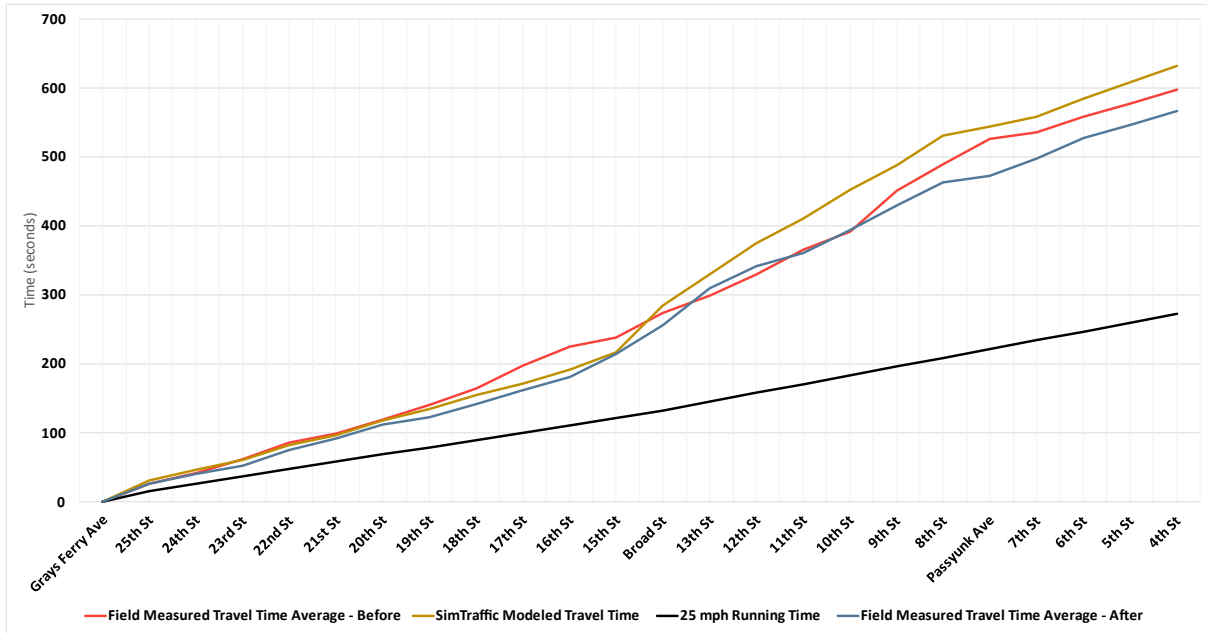
Travel Time - Westbound PM Peak Period



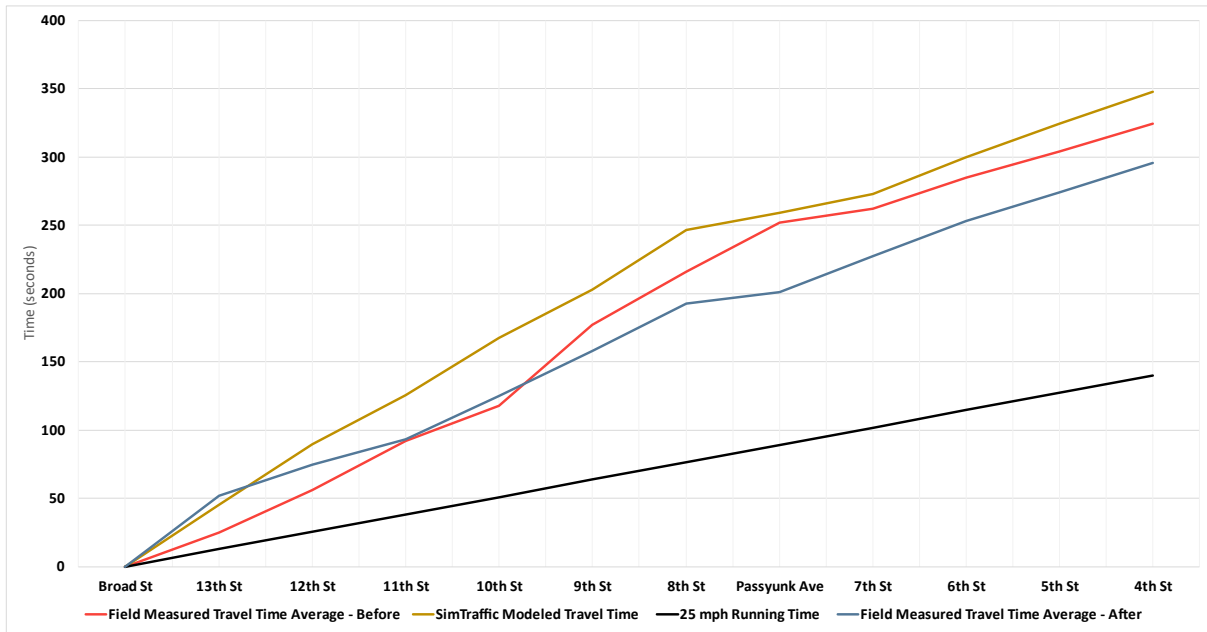
Travel Time - Westbound PM Peak Period (East of Broad Street)



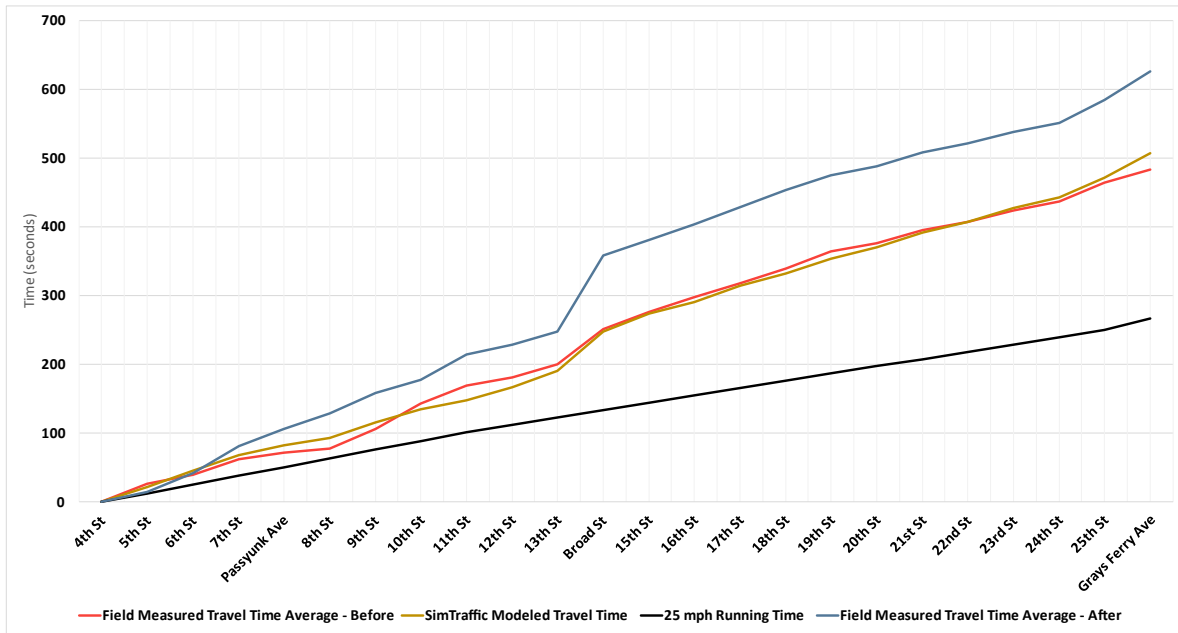
Travel Time - Eastbound Saturday Peak Period



Travel Time - Eastbound Saturday Peak Period (East of Broad Street)



Travel Time - Westbound Saturday Peak Period



Travel Time - Westbound Saturday Peak Period (East of Broad Street)

