OTIS
Office of Transportation, Infrastructure, & Sustainability
CITY OF PHILADELPHIA

Memorandum

Date: July 2020

Re: Washington Avenue Analysis – Summary of Findings

Statement of Purpose

This document provides a summary of traffic analysis performed on Washington Avenue as part of the 2019-2020 Washington Avenue Repaving and Safety project; the attached technical appendix provides detailed information on the analysis results.

Project Overview

The City of Philadelphia has been working with a multitude of partners to plan for the future of Washington Avenue since Spring 2013. We have studied parking, loading, traffic operations, driving behavior, and reached out to hundreds of stakeholders.

The City is repaving Washington Avenue in 2021. Repaving is a chance to change the design of the roadway and make it safer for people walking, driving, riding transit, and biking. We can also make sure parking and loading on Washington Avenue work well for local businesses and neighbors. This project responds to what we have heard from the community since 2013 and gives us the opportunity to:

- Create a smoother street
- Create safer and shorter pedestrian crossings
- Improve parking and loading operations
- Reduce illegal parking such as double parking
- Decrease weaving, speeding, and aggressive driving
- Keep people bicycling safer by separating them from moving traffic
- Preserve space for trucks and buses to turn
- Design travel lanes that match the changing corridor

List of Studies and Analysis

The City of Philadelphia is committed to making informed design decisions based upon appropriate engineering analysis and community input. The City of Philadelphia completed the following traffic analysis and studies as part of the Washington Avenue design process:

1. We gathered data on existing traffic conditions to see how traffic is currently operating on Washington Avenue.
2. We observed how people are actually using Washington Avenue today using an Origin-Destination study. Specifically, we wanted to know if people were using Washington Avenue to travel all the way across town, for only a few blocks, or some combination .
3. We modeled multiple different roadway options to make sure that nothing we proposed would add significant travel time for people driving .
4. We analyzed how existing parking and loading on Washington Avenue is working (or not working) and how double-parking and median parking impact traffic flow along Washington Avenue.
5. We looked at what might happen to streets like Christian and Ellsworth due to changes on Washington Avenue . We wanted to make sure that the proposed layouts would not add significant traffic to nearby neighborhood streets that act as parallel routes for Washington Avenue.

Existing Travel Time

The City of Philadelphia collected traffic counts along Washington Avenue in April 2019 for traffic analysis. Because we know that Washington Avenue is a used throughout the week , we took weekday counts and Saturday and Sunday counts. Right now, Washington Avenue is busiest during the weekday evening rush hour, so we used that as our test – anything that worked during the weekday evening rush hour should work the rest of the time because that's when traffic is the highest on Washington Avenue.

We also looked at how long it takes to drive along Washington Avenue today from 4th Street to Grays Ferry Avenue (which are the limits of the project). We wanted to know how long it takes right now so we could make sure we weren't making the drive significantly longer with any of the options we were looking at. We did this on weekdays and the weekend. Here is what we found:

- Today, during the weekday morning rush hour, it takes about 8.5 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
- Today, during the weekday evening rush hour, it takes about 8.5 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
- Today, on Saturdays, the roadway is busiest between 10am and 2pm. During these hours, it takes between 8 and 10 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.

These average travel times translate to an average of 21 seconds a block to travel along Washington Avenue during the busiest times of the day on weekdays and weekends. We used 21 second per block travel time as a baseline for evaluating impacts of the three options for the future.

Future Travel Time

We used the morning and evening peak hours - when things are already the slowest - to evaluate the maximum potential impact of all three roadway design options on Washington Avenue. Essentially, we looked at the worst-case scenario.

Any changes that we make to Washington Avenue will include traffic signal optimization. This is a fancy way of saying that all the lights will be re-timed to create a smoother, more consistent driving experience. Right now, someone driving along Washington Avenue will likely get through two green lights before they reach a red light and have to stop. This creates a kind of stop-and-go traffic flow that can be frustrating to some drivers, and cause people to try to "beat the light" by driving quickly or erratically. With signal re-timing, traffic lights will have a more even flow, so drivers will have longer stretches of green lights before they reach a red. These changes will be coordinated with the traffic signal at Broad Street to create a consistent traffic flow across all of Washington Avenue and keep that intersection working well for drivers.

We also know that changes in the number of lanes on Washington Avenue will result in some cars that use it today diverting to other streets. In our models, we assumed that 10% of existing traffic will switch from Washington Avenue if the 3-lane option is implemented; 5% of existing traffic will switch from Washington Avenue if the mixed cross-section is implemented, and 0% of existing traffic will switch from Washington Avenue if the4-lane cross-section is implemented. (For a detailed explanation of what these diversions would mean for streets like Christian and Ellsworth, please see the "Parallel Route Analysis" section in this document.)

Here is what we found:

- **Option A: 3-lane cross-section[1]**
    - In the morning, it will take about 8.5 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
    - In the evening, it will take between 8 and 9.5 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
    - *This is an average travel time of 21.5 seconds a block, which is an increase of only 0.5 seconds per block.*
- **Option B: 4-lane cross-section[2]**
    - In the morning, it will take about 10 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
    - In the evening, it will take between 9.5 and 10.5 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.

[1] Travel time analysis for the 3-lane Cross Section assumes that 10% of vehicles that use Washington Avenue today will divert to other streets after the roadway is reconfigured. For anticipated impacts on nearby neighborhood streets, see the "Parallel Route Analysis" section of this document.
[2] Travel time analysis for the 4-lane Cross Section assumes none of the vehicles that use Washington Avenue today will divert to other streets after the roadway is reconfigured. If some vehicles do diver, these travel times will probably be a little faster.

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    - *This is an average travel time of 25 seconds a block, which is an increase of only 4 seconds per block.*
- **Option C: mixed cross-section[3]**
    - In the morning, it will it will take about 9.5 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
    - In the evening, it will take between 9 and 11 minutes for a car to travel between Grays Ferry Avenue and 4th Street in either direction.
    - *This is an average travel time of 24.5 seconds a block, which is an increase of only 3.5 seconds per block.*

It's important to remember that these are the rush-hour numbers. During the rest of the day, travel time should remain the same, or even decrease because of the signal optimization and the parking and loading changes that are planned no matter what layout is chosen.

Origin/Destination Analysis

An Original/Destination analysis shows how people driving actually use Washington Avenue. Where do they turn onto Washington Avenue? How long do they drive along Washington Avenue? How far do people go out of their way to use Washington Avenue? Do they go all the way from the Delaware River to Grays Ferry Avenue, or do they only drive on Washington Avenue for a few blocks? In short, it looks at how Washington Avenue is actually being used by the people who drive on it.

The analysis shows that most of the cars that drive along Washington Avenue come from either northbound Grays Ferry Avenue or southbound Christopher Columbus Boulevard, which isn't very surprising. What is surprising, though, is how many of those people leave Washington Avenue before Broad Street:

- **In the mornings:**
    - Half of the eastbound cars that come to Washington Avenue from Grays Ferry Avenue leave Washington before Broad Street.
    - Half of the westbound cars that come to Washington Avenue from Columbus Boulevard leave Washington Avenue before 5th Street.
- **In the evenings:**
    - Half of the eastbound cars that come to Washington Avenue from Grays Ferry Avenue leave Washington before 15th Street.
    - Half of the westbound cars that come to Washington Avenue from Columbus Boulevard leave Washington Avenue before 7th Street.

[3] Travel time analysis for the Mixed Cross Section assumes that 5% of vehicles that use Washington Avenue today will divert to other streets after the roadway is reconfigured. For anticipated impacts on nearby neighborhood streets, see the "Parallel Route Analysis" section of this document.

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It turns out that only 5% to 10% of people who use Washington Avenue use it as a cross-town corridor. In fact, most people are only using Washington Avenue for a few blocks at a time. That's why understanding the travel time per block was so important.

Parallel Route Analysis

As we mentioned in the "Future Travel Times" section, above, the travel time models we looked at assume that some drivers who use Washington Avenue today will choose to drive on other streets after the roadway is reconfigured:

- Travel time estimates for the 3-lane cross section assume that 10% of drivers will use other roads.
- Travel time estimates for the mixed cross-section assume that 5% of drivers will use other roads.
- Travel estimates for the 4-lane cross section assume that everyone who uses Washington Avenue today will continue to use it (in other words – that 0% of drivers will chose different roads).

A lot of the people we spoke to leading up to this project asked whether reducing the number of vehicle travel lanes on Washington Avenue would mean more traffic on neighborhood streets, particularly Christian and Ellsworth streets. We wanted to make sure we understood the potential impacts of diversions , so we modeled them.

We decided to look at what would happen if 10% of all the cars on Washington Avenue during rush hour decided to use Christian Street and Ellsworth Street on the same day at the same time. Because Philadelphia's street grid provides multiple route options, it's very unlikely that this scenario would occur in real life – people will likely choose different streets to get where they're going. For example, someone could choose to take Bainbridge Street instead of Christian Street to go east or west in the same general area.

Additionally, Washington is the largest arterial between Center City and Snyder Avenue. People will that currently divert significant distances to travel east-west might choose to stay on closer crosstown routes. But because neighbors indicated that Christian and Ellsworth Streets are the closest parallel routes to Washington Avenue, we took a look at what would happen if all of the diverted cars shifted to those two streets. .

We needed to understand how Christian and Ellsworth Streets currently function to understand the impact a 10% diversion from Washington Avenue would have, so we took traffic counts at multiple locations on both streets. Right now, Ellsworth Street is only using about 44% of its capacity, and Carpenter Street is using between 58% and 76% of its capacity. That means that both roadways can handle additional traffic without becoming gridlocked.

When we take 10% of Washington Avenue's peak hour traffic and moved it to Christian and Ellsworth Streets, Ellsworth ends up using 54% of its available capacity, and Christian ends up using between 71% and 93%. That 93% is only located at the intersection of Christian Street and Grays Ferry Avenue, where cars would have to wait an additional 8.6 seconds before getting through the intersection.

So, even in the worst-case scenario - imagining that 10% of Washington Avenue's peak-hour traffic moved to Christian or Ellsworth Streets on the same day at the same time - there should be pretty minimal impacts on those parallel routes. The only intersection that had any real change was at Christian Street and Grays Ferry Avenue, and even there that change was only 8 additional seconds at the intersection, which is still under its full capacity.

Conclusion

The City is repaving Washington Avenue in 2021. Repaving is a chance to change the design of the roadway and make it safer for people walking, driving, riding transit, and biking. We can also make sure parking and loading on Washington Avenue works well for local businesses and neighbors.

The City of Philadelphia is committed to making informed design decisions based upon appropriate engineering analysis and community input. This project responds to what we have heard from the community since 2013 and aims to address the many safety and functional concerns of businesses, neighbors, and other Washington Avenue users.

Through data collection, traffic analysis, and study, the City of Philadelphia developed three possible roadway configurations for Washington Avenue between Grays Ferry Avenue and Columbus Boulevard: a 3-lane cross-section, a 4-lane cross-section, and a mixed cross-section. The City of Philadelphia performed extensive analysis to understand the impacts of each of these three options, including existing traffic conditions, existing parking and loading, where people are coming from and going to, how travel time along Washington Avenue will change, and impacts to nearby parallel streets.

Each option has its strengths, and each has its drawbacks. Fundamentally, we believe that any of the three concepts presented to the public will address many (if not all) of the issues currently present on Washington Avenue, with minimal negative impacts on travel time, and with positive impacts on safety, parking and loading operations, and overall corridor function.

Notes on the Technical Appendices

The Technical Appendices included with this summary memo include studies and analysis dating back to 2017. In some cases, the information contained in these appendices does not reflect current analysis. In some cases, recommendations contained in these analyses were investigated but not pursued by the city. The following list notes some of these instances. Notes pointing out instances such as these have also been added to the Appendices themselves where appropriate.

TA-1 Washington Avenue West Side Parking and Loading Study

- *Potentially personal vehicle identification data has been removed from some photographs in this document.*

TA-2 Washington Avenue East Side Parking and Loading Study

- *Potentially personal vehicle identification data has been removed from some photographs in this document.*

TA-3 Washington Avenue Traffic Study Report

- *The analysis contained in this document is only for the 3-lane option. The analysis presented here led to the development of the 4-lane and mixed-lane options, which were analyzed separately using the same methodology, data, and model calibrations. Information about analysis for the 4-lane and mixed-lane configurations can be found in document TA-6 Washington Avenue OD & Parallel Route Analysis Memo.*

TA-4 Washington Avenue OD & Parallel Route Analysis Memo

- *None*