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PHASE II TRAFFIC CIRCULATION STUDY

FOR THE

BOROUGH OF WILKINSBURG

IN COOPERATION WITH **WILKINSBURG COMMUNITY
DEVELOPMENT CORPORATION**

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I. Introduction**A. Purpose of Report and Study Objective**

The purpose of this report is to study additional intersections and expand the study area of the original traffic circulation study performed for the Borough of Wilkinsburg. The goal of both Phase I and the Phase II study is to determine the feasibility of the strategic elimination of one-way streets within the Borough of Wilkinsburg. The Pennsylvania Department of Transportation (PennDOT) Publication 212, *Official Traffic Control Devices* states that the removal of an existing restriction may be warranted if one of the following applies:

- (1) A study indicates that none of the engineering and traffic study warrants
- (2) The condition that originally justified the restriction no longer exists.

The following guidance on establishing a one-way street is provided in the same publication:

- (1) The traffic flow can be accommodated in both directions. Whenever possible, an adjacent parallel street should be used to form a one-way couplet.
- (2) The street has a reasonable number of intersections for entrance to or exit from the one-way street or one-way system.
- (3) The roadways at the terminal points of the one-way street provide satisfactory transitions to and from the two-way operation.
- (4) There will be a reduction of intersection delays.
- (5) Existing bus routes can be satisfactorily accommodated.
- (6) Emergency vehicles can reasonably and expeditiously reach their destinations.

This study evaluates the roadway network and establishes performance measures during the weekday peak hours to determine if the existing one-way roads in the study area are needed to adequately serve the traffic demand. Based on the findings of the traffic analysis, recommendations were developed to provide the following:

- Strategic conversion of one-way roads to two-way
- Network connectivity
- Traffic calming
- Bicycle facilities and connections to existing infrastructure
- Potential for the consolidation of bus routes

II. Existing Conditions

The study area, as defined by the Wilkinsburg Community Development Corporation (WCDC) includes the Wilkinsburg grid network, bounded by Hill Street to the north, Swissvale Avenue to the east, Rebecca Avenue to the south, and Pennwood Avenue to the west. Intersections not included in the original Phase I study are the focus of this study. **Figure 1** shows the study area, and Phase II study intersections.

A. Study Roadways

Ardmore Boulevard

Ardmore Boulevard or State Route 8 is a two-way, two to four lane arterial with a posted speed limit of 25 mph. No parking is allowed on either side of the street through the study area. Sidewalks are provided on the west side of the road, while no bicycle infrastructure is provided. The primary land uses along Ardmore Boulevard are residential and commercial.

Rebecca Avenue

Rebecca Avenue is a one-way (eastbound), single lane local road with a posted speed limit of 25 mph and parking on both sides. The curb to curb width on Rebecca Avenue is 30-feet. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along the road are residential to the east of Center Street and commercial and institutional to the west of Center Street. No pavement markings are provided to delineate parking and travel lanes.

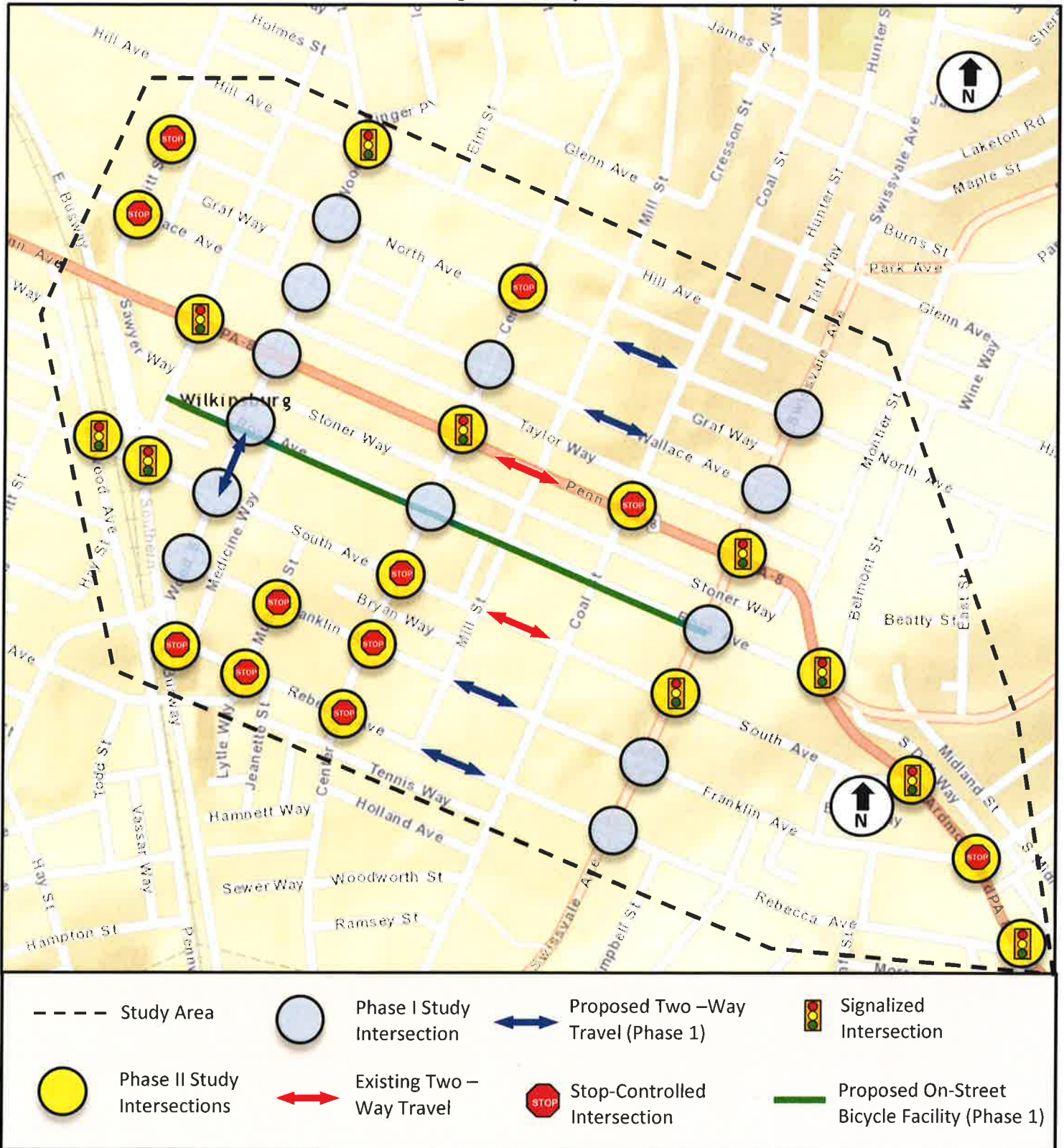
Franklin Avenue

Franklin Avenue is a one-way (westbound), single lane local road with a posted speed limit of 25 mph and parking on both sides. The curb to curb width on Franklin Avenue is 30-feet. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along the road are residential to the east of Mulberry Street and institutional to the west of Mulberry Street. No pavement markings are provided to delineate parking and travel lanes.

South Avenue

South Avenue is a two-way, two-lane local road with a posted speed limit of 25 mph, and 15 mph during school peak hours. On-street parking is provided on the south side of the road and restricted on the north side between Wood Street and Swissvale Avenue. Metered parking is provided on the north side to the west of Wood Street. The curb to curb width on South Avenue is 30-feet. Sidewalks are provided on both sides. While no bicycle infrastructure is provided, South Avenue is identified as an on-street bike route by *Bike Pittsburgh*. The primary land uses along the road are residential to the east of Center Street and institutional and commercial to the west of Center Street. No pavement markings are provided to delineate travel lanes, while marked parking spots are located between Hay Street and Wood Street.

Figure 1 – Study Area



Ross Avenue

Ross Avenue is a one-way (eastbound), single lane local road with a posted speed limit of 25 mph. Parking is provided on both sides of the street, east of Center Street. The curb to curb width on Ross Avenue is 30-feet. Metered parking is provided on the north side of Ross Avenue west of Center Street, while parking is restricted on the south side. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along the road are residential to the east of Center Street and commercial and institutional to the west of Center Street. No pavement markings are provided to delineate travel lanes, while marked parking spots are located to the west of Medicine Way.

Penn Avenue

Penn Avenue or State Route 8 is a two-way, two-lane arterial with a posted speed limit of 25 mph. Metered parking is provided on both sides of the street through the study area. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along Penn Avenue are commercial and mixed use. Pavement markings are provided to delineate travel lanes and metered parking spots.

Wallace Avenue

Wallace Avenue is a one-way (westbound) single lane local road between Wood Street and Swissvale Avenue, and a two-way, two-lane road west of Wood Street. Wallace Avenue has a posted speed limit of 15 mph. Parking is provided on the south side of the street and parking is restricted on the north side. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along Wallace Avenue are residential, commercial, and institutional. No pavement markings are provided to delineate parking and travel lanes.

North Avenue

North Avenue is a one-way (eastbound) single lane local road between Wood Street and Swissvale Avenue, and a two-way, two-lane road west of Wood Street with parking on both sides of the street. North Avenue has an assumed speed limit of 25 mph, as no speed limit signs are posted. The curb to curb width is 30-feet. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along North Avenue are residential and institutional.

Swissvale Avenue

Swissvale Avenue is a two-way north/south road with two to four lanes and a posted speed limit of 25 mph. Swissvale Avenue is a Borough road to the south of Penn Avenue and State Route 2058 to the north of Penn Avenue. The curb to curb width is 45-feet. Parking is provided on both sides of the road along the two-lane sections and restricted along the four-lane sections. Sidewalks are provided on both sides, while no bicycle infrastructure is provided. The primary land uses along Swissvale Avenue are commercial and residential. Pavement markings are provided to delineate travel lanes and mandatory turning movements.

Wood Street

Wood Street is a single lane one-way (north) local road to the south of Penn Avenue and a two-lane, two-way road to the north of Penn Avenue. Penn Avenue has an assumed speed limit of 25 mph, as no speed limit signs are posted. The curb to curb width is 30-feet south of Penn Avenue and 35-feet north of Penn Avenue. Metered parking is provided on both sides of the road. Sidewalks are also provided on both sides, while no bicycle infrastructure is provided. The primary land uses along the road are commercial. Pavement markings are provided to delineate travel lanes and parking spaces.

Data Collection

Turning movement counts were conducted at the study intersections as well as multiple intersections throughout the Borough between the dates of April 29, 2014 and May 6, 2014 on Tuesdays, Wednesdays, and Thursdays. The traffic counts were conducted during the AM peak period of 7:00 AM – 9:00 AM and the PM peak period of 4:00 PM and 6:00 PM. Cars, heavy vehicles, and pedestrians were classified separately. The AM peak hour generally occurred between 7:45 AM – 8:45 AM, while the PM peak hour occurred between 4:00 PM – 5:00 PM. All traffic data is included in the Phase I study appendix while raw traffic count data for the additional Phase II intersections are attached as **Appendix A**.

In addition to the turning movements conducted, the following data were collected/verified in the field:

- Roadway widths
- Approximate roadway grades
- Existing parking/circulation patterns
- Existing Signing
- Lane configurations
- Curb ramp conditions
- Signal controller type
- Existing signal phasing/timings.

Appendix B contains Traffic Signal Permit plans and photos of Phase II study intersections.

B. Regional Travel Patterns

To assist in the reassignment of traffic volumes in a one to two-way scenario for study roadways, regional travel patterns were identified. Travel Demand Data including a select link analysis was provided by the Southwestern Pennsylvania Commission (SPC) Metropolitan Planning Organization. Included in the data were link Average Annual Daily Traffic (AADT), land uses, and origins/destinations.

The results of the select link analysis showed the majority of the trips originating from/to the east/west of Wilkinsburg, and utilizing Penn Avenue and South Avenue through the Borough. Combined with the

traffic count data and field observations, the Port Authority parking lots for the Busway were identified as a major destination for traffic in the morning, and a major generator of traffic in the evening. The other major regional travel pattern identified was north/south trips utilizing Wood Street and Swissvale Avenue. Relatively few daily trips are destined to land uses located southwest of Wilkinsburg. Travel Demand Model data from the SPC is included in the Phase I Traffic Circulation study.

C. Pedestrian and Bicycle Facilities

An inventory of pedestrian and bicycle facilities were conducted at each study intersection/roadway selected for detailed analysis. Sidewalks are provided on both sides of each study roadway. No bicycle facilities are currently provided through the study area. However, conceptual plans for the contraflow bicycle lane proposed on Ross Avenue were developed alongside the Phase II traffic circulation study. **Appendix C** includes the conceptual design plans.

III. **One-Way to Two-Way Conversion**

The primary purpose of this report is to project and evaluate operating conditions within the expanded (from Phase I) study area following the conversion of the existing one-way roads within the Borough to two-way. As discussed in Section II, regional travel demand data and a select link analysis from the SPC was provided to aid in the development of two-way volumes based on existing travel patterns. Additionally, assumptions were made on the limits of two-way travel to minimize cut-through traffic and expensive intersection/signal modification on roadways outside of the Borough's central grid network. **Table 1** outlines the recommended limits of the two-way conversions of existing one-way roads within the Borough.

Table 1 – Two-Way Conversion Limits

Road Name	Existing One-Way Direction	Proposed Western Limit of 2-Way Conversion	Proposed Eastern Limit of 2-Way Conversion
North Avenue	Eastbound	Wood Street (existing two-way to the west)	Swissvale Avenue
Wallace Avenue	Westbound	Wood Street (existing two-way to the west)	Swissvale Avenue
Franklin Avenue	Westbound	Wood Street	Swissvale Avenue
Rebecca Avenue	Eastbound	Spur to Wood Street	Swissvale Avenue
Wood Street	North	Rebecca Avenue (Southern Limit)	Penn Avenue (existing two-way to the north)

Based on the results of the Phase I study, Ross Avenue was not recommended for two-way conversion due to the high potential for increased cut-through traffic diverting from Penn Avenue. Additionally, Ross Avenue was chosen to accommodate a bicycle facility that would remove space that could otherwise be allocated to a travel lane in the opposite direction; therefore, Ross Avenue was analyzed as one-way in this study.

A. Traffic Volume Assignment Methodology**Westbound Traffic**

To reduce the potential for cut-through traffic and avoid expensive intersection modifications along SR 8 to the east, Swissvale Avenue was assumed as the eastern terminus for the one- to two-way conversions. Based on these limits, the traffic volume assignment to the new direction of travel was based on a reassignment/diversion of existing turning movements on Swissvale Avenue. For the purpose of this study, vehicles turning from Swissvale Avenue to travel west were assumed to continue to destinations west of the study area. Westbound through traffic was diverted and redistributed to the new two-way paths as follows:

- 50% through trips diverted from Franklin Avenue
- 33.3% through trips diverted from South Avenue
- 33.3% through trips diverted from Penn Avenue
- 33.3% through trips diverted from Wallace Avenue

Eastbound Traffic

Unlike Swissvale Avenue to the east, the western limit of the study area does not have a defining road which serves the majority of inbound traffic that can take advantage of new two-way streets; therefore the reassignment projections of vehicles did not rely on diverting and reassigning turning movements, but rather diverting regional through trips entering the network to take advantage of alternate routes to Penn Avenue, South Avenue, and Rebecca Avenue. Because North Avenue and Ross Avenue have low volumes and do not provide a direct connection to the west, no trips were diverted from these roads. Westbound through traffic was diverted and redistributed to the new two-way paths as follows:

- 25% through trips diverted from Penn Avenue
- 25% through trips diverted from South Avenue
- 25% through trips diverted from Rebecca Avenue

Southbound Traffic

For projecting the traffic volumes that will utilize Wood Street if it were two-way, the traffic volumes on parallel routes in the new direction (southbound) were analyzed. It was assumed that providing for southbound travel on Wood Street would divert traffic from the parallel routes as follows:

- 50% through trips diverted from Center Street
- 50% through trips diverted from Hay Street

Appendix E includes figures showing the diversion and reassignment of volumes from existing roadways to the new direction of travel on the roads being studied for two-way conversion.

B. Intersection Capacity Analysis

Utilizing the existing traffic count data, peak hour intersection capacity analyses were performed for the study intersections using the HCM 2010 methodology, as applied by *PTV Vistro* traffic modeling software. The Highway Capacity Manual (HCM) assigns a Level of Service (LOS) designation between "A" and "F" to intersection operations. LOS "A" designates very good operating conditions, while LOS "F" denotes excessive delay. **Table 2** shows the guidelines used for designating Levels of Service at signalized and unsignalized intersections.

Table 2 – HCM 2010 LOS Criteria

LOS	Control Delay (s/vehicle)		
	Volume/Capacity Ratio ≤ 1.0		v/c > 1.0
	Unsignalized ¹	Signalized	
A	≤ 10	≤ 10	N/A
B	> 10 and ≤ 15	> 10 and ≤ 20	N/A
C	> 15 and ≤ 25	> 15 and ≤ 35	N/A
D	> 25 and ≤ 35	> 25 and ≤ 55	N/A
E	> 35 and ≤ 50	> 35 and ≤ 80	N/A
F	> 50	> 50	ANY

¹ The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

The detailed results of the existing and proposed conditions analysis during the AM peak hour are shown in **Table 3**. **Table 4** shows the results of the PM peak hour analysis. Detailed capacity analysis worksheets are attached as **Appendix D**.

Table 3 – AM Peak Hour Intersection Capacity Analysis

Intersection Name	Control Type	Alternative							
		Existing AM Peak Hour				Two-Way Conversions AM Peak Hour			
		Worst Movement	V/C	Delay (s/veh)	LOS	Worst Movement	V/C	Delay (s/veh)	LOS
North Avenue at Pitt Street	All-way stop	SBT		7.6	A	WBL		8.7	A
Wallace Avenue at Pitt Street	All-way stop	WBT		9.5	A	SBR		9.4	A
South Avenue at Pennwood Avenue and Hay Street	Signalized	NBL	0.52	22.2	C	NBL	0.52	22.2	C
Hay Street at South Avenue	Signalized	SBR	0.35	24.5	C	SBR	0.34	25.5	C
Penn Avenue at Hay Street	Signalized	SBT	0.64	17.6	B	SBR	0.61	16.7	B
Hill Avenue at Wood Street	Signalized	WBL	0.27	15.5	B	WBL	0.31	17.8	B
Rebecca Avenue at Wood Street	Two-way stop	SBL	0.00	9.7	A	SBL	0.00	9.5	A
Rebecca Avenue at Mulberry Street	All-way stop	SBT		8.7	A	SBT		8.8	A
Franklin Avenue at Mulberry Street	All-way stop	WBT		17.8	C	WBT		15.8	C
Franklin Avenue at Center Street	All-way stop	WBT		14.1	B	WBT		12.8	B
South Avenue at Center Street	All-way stop	WBT		15.4	C	WBT		14.2	B
Rebecca Avenue at Center Street	All-way stop	EBT		7.5	A	EBT		7.5	A
Penn Avenue at Center Street	Signalized	NBT	0.56	14.9	B	NBT	0.55	14.6	B
North Avenue at Center Street	Two-way stop	SBL	0.02	10.2	B	SBL	0.03	11.6	B
Penn Avenue at Coal Street	Two-way stop	NBL	0.10	47.3	E	NBL	0.08	37.3	E
Penn Avenue at Swissvale Avenue	Signalized	SBL	0.67	21.9	C	SBL	0.66	24.8	C
Ardmore Blvd at Penn Ave	Signalized	NBT	0.40	55.7	E	NBT	0.40	56.8	E
Ardmore Blvd at South Ave	Two-way stop	WBL	0.51	11.3	B	WBL	0.49	10.8	B
Ardmore Blvd at Franklin Ave	Signalized	WBL	0.57	22.3	C	WBL	0.53	22.1	C
Ardmore Blvd at Rebecca Ave	Signalized	EBR	0.45	5.1	A	EBT	0.49	8.4	A
South Avenue at Swissvale Avenue	Signalized	SBT	0.63	20.6	C	SBT	0.63	20.7	C

Table 4 – PM Peak Hour Intersection Capacity Analysis

Intersection Name	Control Type	Alternative							
		Existing PM Peak Hour				Two-Way Conversions PM Peak Hour			
		Worst Movement	V/C	Delay (s/veh)	LOS	Worst Movement	V/C	Delay (s/veh)	LOS
North Avenue at Pitt Street	All-way stop	SBT		7.7	A	SBT		7.9	A
Wallace Avenue at Pitt Street	All-way stop	EBT		8.6	A	EBT		10.7	B
South Avenue at Pennwood Avenue and Hay Street	Signalized	NBL	0.42	25.0	C	NBL	0.36	24.2	C
Hay Street at South Avenue	Signalized	SBR	0.23	14.3	B	SBL	0.19	14.1	B
Penn Avenue at Hay Street	Signalized	SBT	0.56	17.3	B	SBL	0.46	14.9	B
Hill Avenue at Wood Street	Signalized	WBL	0.46	14.9	B	WBL	0.52	16.3	B
Rebecca Avenue at Wood Street	Two-way stop	SBL		11.4	B	SBL		10.6	B
Rebecca Avenue at Mulberry Street	All-way stop	EBT		9.2	A	EBT		8.3	A
Franklin Avenue at Mulberry Street	All-way stop	WBT		7.4	A	EBT		7.9	A
Franklin Avenue at Center Street	All-way stop	WBT		7.5	A	EBT		8.1	A
South Avenue at Center Street	All-way stop	EBT		9.9	A	EBT		8.9	A
Rebecca Avenue at Center Street	All-way stop	EBT		9.6	A	EBT		8.6	A
Penn Avenue at Center Street	Signalized	SBT	0.63	17.5	B	NBT	0.53	14.5	B
North Avenue at Center Street	Two-way stop	SBL	0.02	11.8	B	SBL	0.02	12.1	B
Penn Avenue at Coal Street	Two-way stop	SBL	0.22	84.5	F	SBL	0.15	53.6	F
Penn Avenue at Swissvale Avenue	Signalized	SBL	0.73	24.2	C	SBL	0.69	46.7	D
Ardmore Blvd at Penn Ave	Signalized	WBR	0.56	25.1	C	WBR	0.56	24.8	C
Ardmore Blvd at South Ave	Two-way stop	EBT	0.49	23.2	C	EBT	0.26	17.1	C
Ardmore Blvd at Franklin Ave	Signalized	SBT	0.68	12.8	B	SBT	0.61	10.9	B
Ardmore Blvd at Rebecca Ave	Signalized	EBR	0.41	16.6	B	EBR	0.44	51.6	D
South Avenue at Swissvale Avenue	Signalized	EBT	0.30	14.8	B	EBT	0.26	13.9	B

AM Peak Hour Results

The results of the AM peak hour analysis show no significant degradation in delay or level of service at any of the intersections. The majority of study intersections analyzed show an improvement in average vehicular delay. The reason for projected operational improvement is primarily due to vehicles diverting from busier, congested routes to new two-way routes. No travel lanes are being removed, while additional travel lanes are being added; therefore the overall study network will have additional capacity relative to existing conditions.

PM Peak Hour Results

The results of the PM peak hour analysis show the majority of the intersections analyzed improving in average vehicular delay or LOS, while two intersections are projected to operate with movements that will be degraded significantly. Assuming the "hard-coded" diversion assumptions in this study, the following intersections are projected to be impacted negatively:

- Penn Avenue at Swissvale Avenue
- Rebecca Avenue at Ardmore Boulevard

At the intersection of Penn Avenue at Swissvale Avenue, the primary diversions utilizing this intersection are eastbound vehicles utilizing Wallace Avenue as an alternative to Penn Avenue, but destined to Penn Avenue or Ardmore Boulevard to the east. These vehicles were assumed to travel southbound on Swissvale Avenue and turn left on Penn Avenue, Ross Avenue, South Avenue, or Rebecca Avenue.

Because the two-way conversions will be a new condition with zero existing demand, the future demand will be dictated by what can be served; i.e., if the southbound left-turn from Swissvale Avenue to Penn Avenue does not receive adequate green-time, then vehicles will not divert from Penn Avenue to utilize the new two-way option on Wallace Avenue.

By maintaining existing signal timings, the two-way streets will meet the goal of providing better accessibility to local residents and businesses, while discouraging through traffic diversions from existing through-routes such as Penn Avenue and South Avenue. However, to ensure that diversions can be served adequately if they do occur, improved PM Peak Hour signal timings were modeled at the intersections of Penn Avenue at Swissvale Avenue and Rebecca Avenue at Ardmore Boulevard. The results of the signal optimization at these intersections are shown in **Table 5**.

Table 5 – PM Peak Hour Mitigation Analysis

Intersection Name	Control Type	Alternative							
		Two-Way Conversions PM Peak Hour (Existing Signal Timing)				Two-Way Conversions PM Peak Hour (Optimized Signal Timing)			
		Worst Movement	V/C	Delay (s/veh)	LOS	Worst Movement	V/C	Delay (s/veh)	LOS
Penn Avenue at Swissvale Avenue	Signalized	SBL	0.69	55.6	E	SBL	0.64	25.0	C
Ardmore Blvd at Rebecca Ave	Signalized	EBR	0.44	51.6	D	EBR	0.44	19.0	B

The optimization of the signal timings at the intersections shown in Table 4 decreases the projected delays to levels similar to existing conditions. However, these changes are not recommended prior to two-way conversion, but rather post conversion and through monitoring of the change in travel patterns. Currently the signal timings favor Penn Avenue and South Avenue as the primary through-routes. If vehicles do utilize the new two-way alternatives to pass through the Borough, then signal timing changes may be warranted.

C. Transit Routes

A review of the transit routes through the study area was conducted to analyze the potential impact or benefit to transit operations resultant from the two-way conversion of study roadways. No changes from the Phase I study are projected. **Table 6** shows the bus routes serving the Borough of Wilkinsburg. The detailed bus route maps are included in Phase I of the Traffic Circulation Study.

Table 6 – Port Authority Bus Routes in Wilkinsburg

Number Designation	Name of Route	Study Roadways Utilized
61 A, 61 B	North Braddock, Braddock – Swissvale	Wood Street, Ross Avenue, South Avenue, Swissvale Avenue
P68, 68	Braddock Hills Flyer, Braddock Hills	Wood Street, South Avenue, Wallace Avenue, Swissvale Avenue
P 71, 71	Swissvale Flyer, Edgewood Town Center	Wood Street, Wallace Avenue
71D	Hamilton	Wood Street, Wallace Avenue
79	East Hills	Wallace Avenue, Ross Avenue, Swissvale Avenue
P78, 78	Oakmont Flyer / Oakmont	Wallace Avenue, Ross Avenue, Swissvale Avenue
86	Liberty	Wood Street, Wallace Avenue
P2	East Busway Short	South Avenue

Based on the capacity analyses and acceptable levels of service projected, none of the bus routes through Wilkinsburg are projected to be significantly impacted by two-way conversions. Following the two-way conversions of existing one-way roads, the potential exists for consolidated bus routes/stops. Currently many bus routes utilize Wallace Avenue and Ross Avenue as one-way pairs. If both of these roadways are to be converted to two-way, the Port Authority would have flexibility in modifying existing routes to better serve their riders.

D. Traffic Signal Warrant Analysis

Traffic Signal Warrant Analyses were conducted for the projected two-way traffic volumes. In addition to the revised analysis, a review was conducted of a PennDOT *Preliminary Traffic Signal Removal Analysis Summary*, from July, 2013. The traffic turning movement data collection for this project included two-hours during the AM peak, and two hours during the PM peak; therefore the signal warrants analyzed for this report do not include the typical 13-hours of data needed to analyze for 4-hour and 8-hour volume warrants. However, based on the peak period data, engineering judgment was used to determine if the other hours may or do not likely meet the traffic signal warrants analyzed. The results of the traffic signal warrant analyses for the two-way projected volumes are summarized in **Table 7**. The detailed traffic signal warrant analysis sheets for two-way volumes are attached as **Appendix F**.

Table 7 – Signal Warrant Analysis Summary

#	Intersection	Existing	Meet any Warrants with 2-way Traffic?	Notes
1	North Avenue at Pitt Street	All-way stop	No	
2	Wallace Avenue at Pitt Street	All-way stop	No	
3	South Avenue at Pennwood Avenue and Hay Street	Signalized	Yes	Not analyzed for removal due to complex geometry
4	Hay Street at South Avenue	Signalized	Yes	Not analyzed for removal due to complex geometry
5	Penn Avenue at Hay Street	Signalized	Yes	
6	Hill Avenue at Wood Street	Signalized	Yes	Meets PM peak hour. 13-hour count may be needed.
7	Rebecca Avenue at Wood Street	Two-way stop	No	
8	Rebecca Avenue at Mulberry Street	All-way stop	No	
9	Franklin Avenue at Mulberry Street	All-way stop	No	
10	Franklin Avenue at Center Street	All-way stop	No	
11	South Avenue at Center Street	All-way stop	No	
12	Rebecca Avenue at Center Street	All-way stop	No	
13	Penn Avenue at Center Street	Signalized	Yes	
14	North Avenue at Center Street	Two-way stop	No	
15	Penn Avenue at Coal Street	Two-way stop	No	Consider one-way operation on Coal Street to address crash problem
16	Penn Avenue at Swissvale Avenue	Signalized	Yes	
17	Ardmore Blvd at Penn Ave	Signalized	Yes	Not analyzed for removal due to complex geometry
18	Ardmore Blvd at South Ave	Two-way stop	Yes	Meets PM peak hour. 13-hour count may be needed.
19	Ardmore Blvd at Franklin Ave	Signalized	Yes	
20	Ardmore Blvd at Rebecca Ave	Signalized	Yes	
21	South Avenue at Swissvale Avenue	Signalized	Yes	

The results of the signal warrant analyses show the signals analyzed in the study will likely meet signal warrants with two-way traffic. No stop controlled intersections are projected to meet signal warrants under two-way conditions.

IV. Findings and Recommendations

Based on the findings of the traffic analysis, recommendations were developed to provide the following:

- Strategic conversion of one-way roads to two-way
- Traffic Signal Removal, Retainage and/or Upgrade
- Network connectivity
- Traffic calming
- Bicycle facilities and connections to existing infrastructure
- Potential for the consolidation of bus routes

The traffic analysis projects that the conversion of all study roadways from one-way to two-way will result in acceptable conditions at all study intersections. The limits of two-way conversions in the Phase I study are recommended to remain as they were

A. Lane Configuration Recommendations

Locations where new directions of travel are recommended were modeled with single shared through/turn lanes. Where the roadway width does not allow for an existing lane configuration (separate turn lane) due to the new direction of travel, the existing lane configuration was changed in the model to reflect a single shared through/turn lane. The results of the analysis show acceptable performance at all study intersections utilizing the modified lane geometry.

B. Bicycle Facility Recommendations

To connect to the Ross Avenue bicycle lane proposed in Phase I, and designed to a conceptual level alongside this study, a north/south facility is recommended to expand the bicycle network. The north/south roadways between Swissvale Avenue and Wood Street may be considered relatively comfortable to bike on due to their low volume. However, Swissvale Avenue is not as comfortable, but is wider and lacks on-street parking in many areas. A north/south buffered two-way cycle track is recommended on Swissvale Avenue through the Borough limits. The most cost-effective way to implement this is through pavement markings and flex-posts, although more permanent treatments can be used as a buffer between vehicles and bicycles.

Reversing the one-way vehicular flow from northbound to southbound so that traffic is approaching a (future) redeveloped train station (versus driving away from the station) may be a consideration prior to concept level plan advancement to final design.

C. Signal Removal Recommendations

No signal removals are recommended as part of this Phase II study. However, the intersection of Hill Avenue at Wood Street potentially does not meet the volume warrants for a signal. If the Borough of Wilkinsburg or the public desires the removal of this signal, a 13-hour turning movement count is recommended so that the analysis has the necessary 8-hours minimum of data.

It should be noted that the Borough has applied for ARLE grant funding to remove three (3) traffic signals as recommended in Phase 1 of this Traffic Circulation Study.

D. Other Recommendations

In correspondence with the WDCD and the Borough of Wilkinsburg, there was discussion on the previous removal of the signal at Penn Avenue and Coal Street, and the resulting problem in operations including crashes from vehicles turning from Coal Street. A signal warrant analysis was run for this intersection and it does not meet signal warrants. However, since this is a low-volume street, if crashes are a problem, the parallel roadways of Swissvale Avenue and Center Street could handle the traffic turning from Coal Street to Penn Avenue. A potential solution would be to convert Coal Street to one-way northbound from Penn Avenue to Wallace Avenue (proposed to be two-way), and one-way southbound from Penn Avenue to Franklin Avenue (proposed to be two-way). These conversions would allow vehicles to turn into Coal Street from Penn Avenue, but would restrict any turns from Coal Street to Penn Avenue. Based on the low existing volumes utilizing Coal Street, the diversions are not projected to have a large impact on operation or delay, while increasing the safety at the intersection.

