Photo Source: DVRPC

REVIVING VINE

復興萬安街

改進萬安街多種交通方式的連接

REVIVING VINE

Improving Multimodal Connections On Vine Street

SEPTEMBER 2018

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

The Delaware Valley Regional Planning Commission

is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

DVRPC is funded through a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

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Photo Source: DVRPC

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Photo Source: DVRPC

INTRODUCTION

PURPOSE AND NEED

The Vine Street Expressway, or I-676, is a six-lane sunken federal interstate highway bordered by service roads and abutting properties in Center City, Philadelphia. Together, the Vine Street Expressway and its service roads encompass 13 lanes of fast-moving traffic, which bifurcate many communities along its entire length.

This division has created years of challenges, including difficult pedestrian and bicycle crossings, the separation of institutions from residents, chronic vacancy and blighted surface lots fronting the Vine Street local lanes, and a growing concern over local air pollution in residential and business communities near this transportation facility.

In light of these issues, this project aims to increase neighborhood connections by enhancing multimodal, inclusive mobility options in the Vine Street corridor. By improving safety and rebalancing roadway uses, the recommendations outlined in this report intend to empower residents and visitors to reclaim Vine Street as a safe, attractive, and community-oriented public space; pedestrian safety is the core concern.

The primary strategy to meet these goals is a proposed "road diet," or lane reconfiguration, that strategically repurposes vehicular travel lanes on Vine Street local to create a multimodal streetscape. This lane reconfiguration is complemented by additional recommendations to decrease crossing distances for pedestrians, reduce vehicle speeds, and create inviting open spaces. All of these recommendations seek to mitigate the negative impacts of the expressway.

BACKGROUND

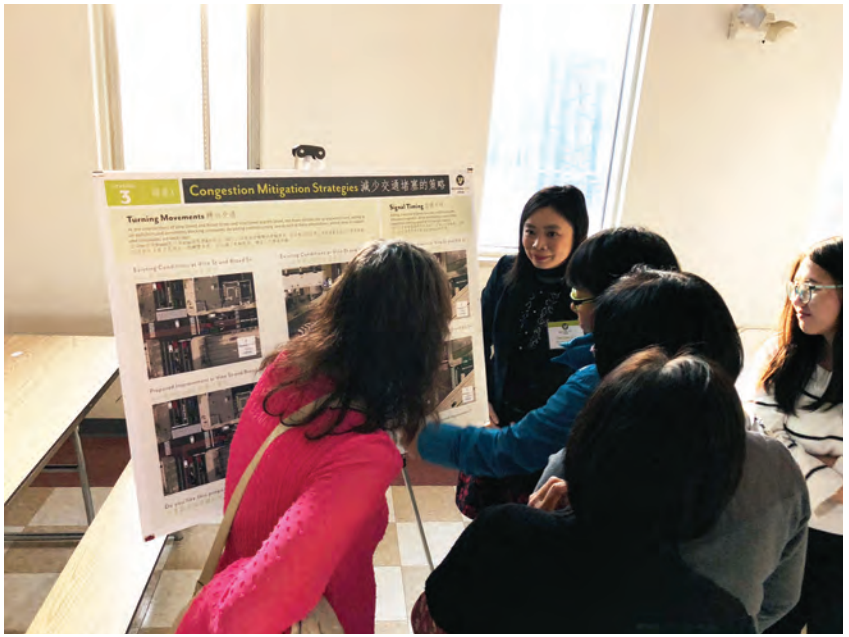
The Vine Street Expressway has been a focus of community organizing since its inception. The original highway design, proposed in 1966, threatened community institutions such as Franklin Square and Holy Redeemer Chinese Catholic Church and School. Residents successfully petitioned for a new design that would preserve these institutions, but the final configuration still disrupted the traditional Chinatown neighborhood and created a barrier between the present-day Chinatown business district and the Callowhill and Chinatown North communities. The Vine Street local service roads increase the footprint of the expressway and widen this barrier further.

A number of recent planning initiatives have begun to address this division, including the Philadelphia 2035 Central District Plan, U.S. Department of Transportation (USDOT) Every Place Counts Design Challenge, Chinatown Connections—Safe Routes to School, and Chinatown Neighborhood Plan. Recommendations in this report build on and complement goals and proposals identified through these efforts; key recommendations that were considered are outlined in Appendix A.

PUBLIC INVOLVEMENT

On April 12, 2018, the Delaware Valley Regional Planning Commission (DVRPC) hosted a public open house in partnership with the Philadelphia Chinatown Development Corporation (PCDC) and the City of Philadelphia at Holy Redeemer Chinese Catholic Church and School. DVRPC staff presented initial recommendations for the study area, and attendees shared feedback and additional ideas through conversations with facilitators, voted for their top five proposed improvements, and completed a written exit survey. All written materials were available in English and Traditional Chinese, and translation services were available during the meeting in Cantonese, Mandarin, and Spanish. Over 60 community members attended the event, and 45 completed an exit survey (Appendix C).

After the public open house, DVRPC developed and promoted an online survey in English and Chinese to reach additional members of the community. PCDC staff also promoted the online and written surveys in person at local community events. In total, 70 online surveys and 43 additional written surveys were completed after the open house. A detailed analysis of survey results, qualitative feedback, and demographic information on survey participants, is presented in Appendix D and E.



Above and below: Community members share ideas with facilitators at the public open house. Source: DVRPC, 2018

STUDY AREA DESCRIPTION

The study area for this project includes Vine Street local (the eastbound and westbound one-way service roads adjacent to the Vine Street Expressway) between 8th Street and Broad Street, and the numbered cross streets connecting these two service roads from 8th Street to 13th Street (Figure 1). This segment of Vine Street borders the Chinatown neighborhood and the Callowhill and Chinatown North neighborhoods, in Center City, Philadelphia. Local institutions and community services include Hahnemann University Hospital; the Philadelphia Convention Center; Franklin Square; Asian Arts Initiative; PCDC; and several churches, schools, and senior and residential communities. Franklin Square is the primary park space in the study area; the plaza on the 10th Street expressway overpass provides an additional outdoor gathering space.

This study area aligns with the recent *Chinatown Neighborhood Plan* (8th Street to 13th Street) and the *UDSOT Every Place Counts Design Challenge* (7th Street to 13th Street). Due to their greater complexity and role in the larger transportation network, improvements to 7th Street and Broad Street were considered out of scope for this study. However, future study along Vine Street west of Broad Street and east of 8th Street would further promote a safer, more multimodal corridor.

LAND USE AND UPCOMING DEVELOPMENT

Surface parking and transportation are the predominant land uses along the study area (Figure 2). Commercial uses are also abundant, although there are few active storefronts on Vine Street. North of Vine Street, the predominant land uses shift from residential and commercial to industrial, utility, and vacant lots.

Although currently characterized by surface parking, vacancies, and other low-intensity uses, the area is experiencing growing development pressure. Several residential and mixed-use projects are anticipated, under construction, or recently completed (Figure 3). The redevelopment

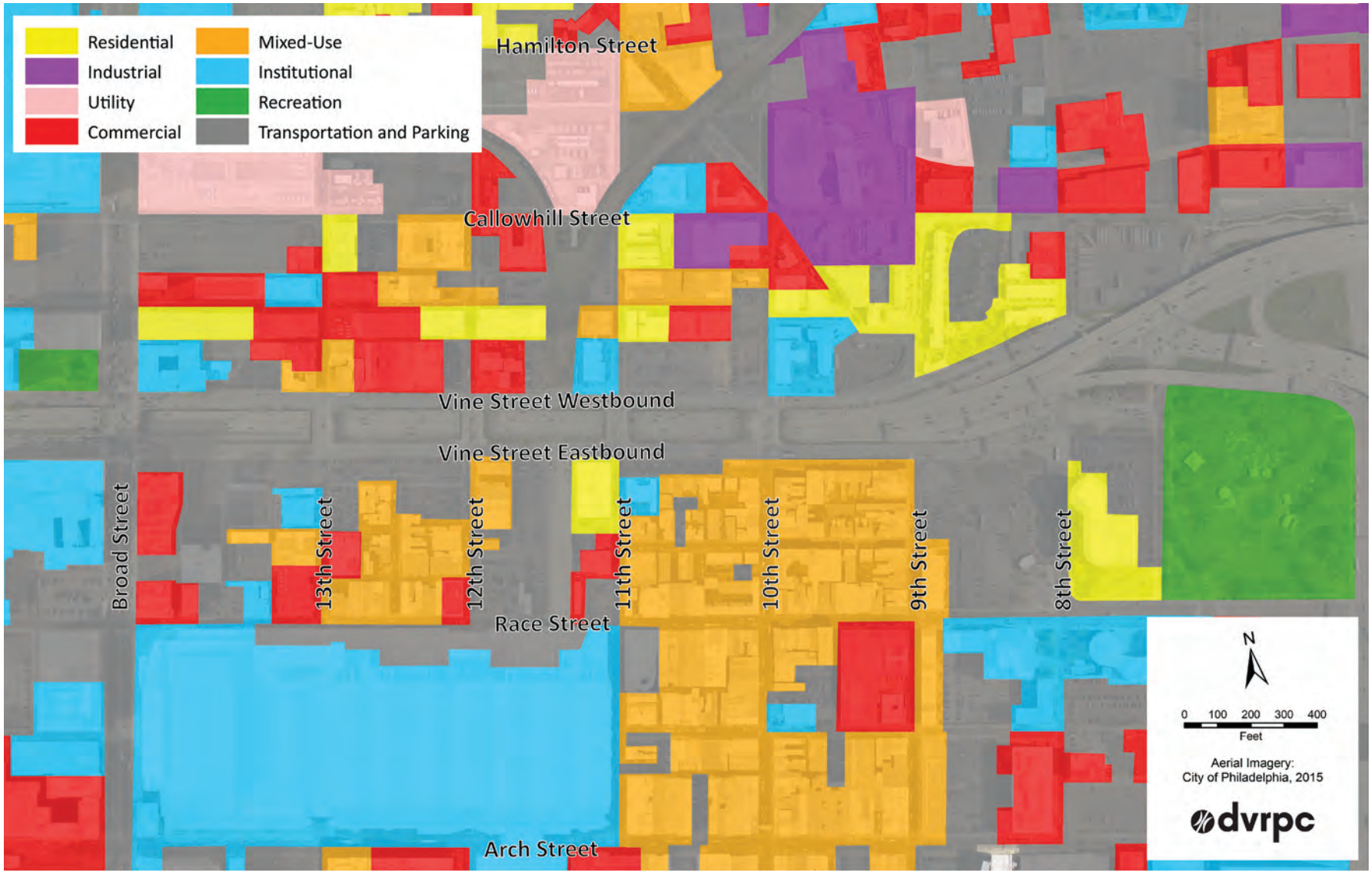
of former Philadelphia and Reading Railroad elevated tracks into a linear park, the Rail Park, is likely to generate additional growth in residential, commercial, and visitor activity.

The current configuration of Vine Street presents a barrier between the growing Chinatown and Callowhill communities. The Eastern Tower community center, Rail Park, and increasing community programming of the 10th Street Plaza promise to generate additional pedestrian and bicycle traffic on and across Vine Street. Safer connections are needed between these amenities, residences, transit stops, and other community institutions, such as Franklin Square and the vibrant Chinatown business district. Rebalancing roadway uses will benefit current and future residential and business communities on both sides of the expressway.

FIGURE 1: STUDY AREA

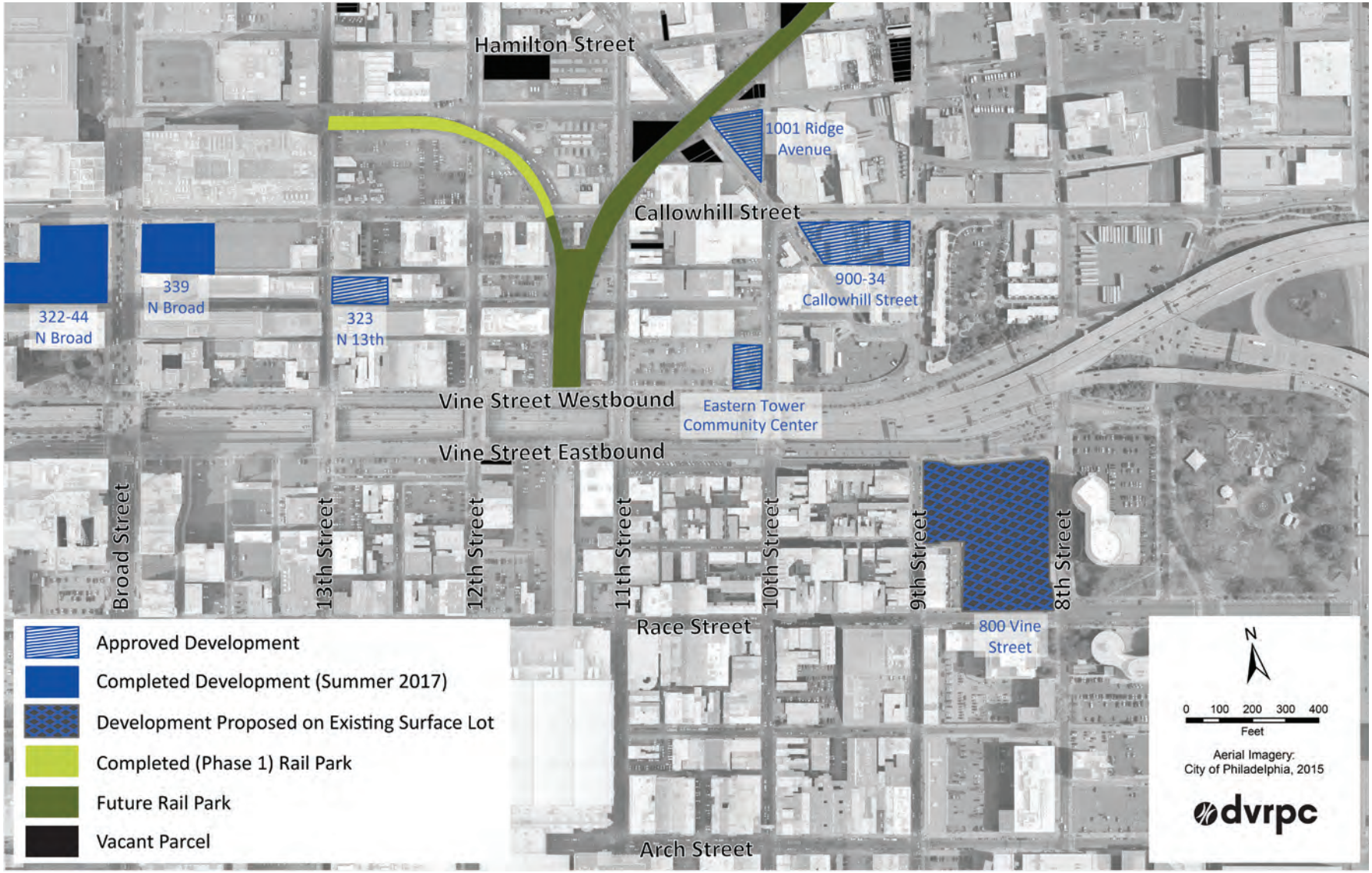
Source: DVRPC, 2018

FIGURE 2: LAND USE



Sources: Philadelphia City Planning Commission, 2016

FIGURE 3: NEW AND UPCOMING DEVELOPMENTS



Sources: Philadelphia City Planning Commission 2017; DVRPC, 2018

DEMOGRAPHICS

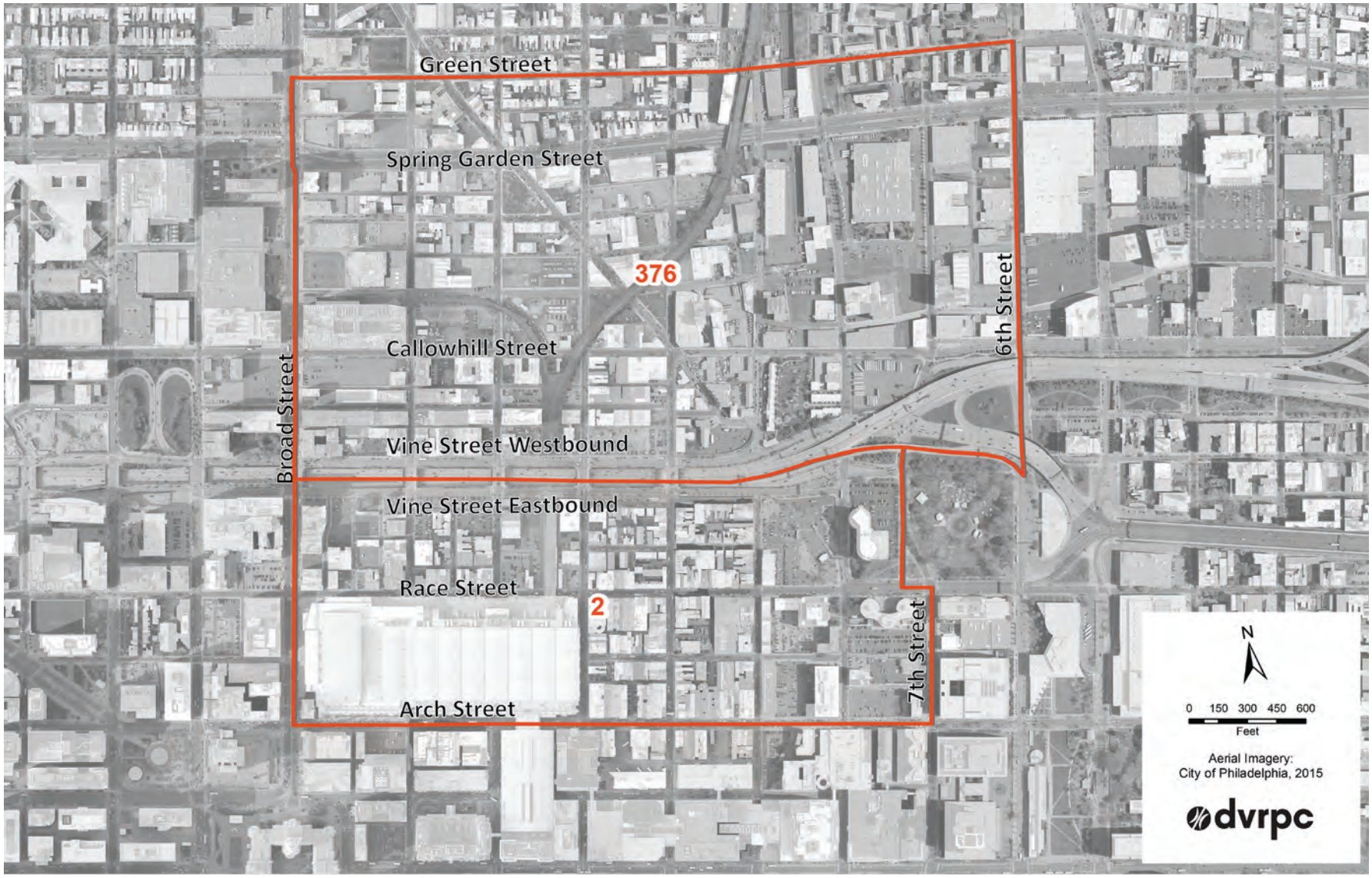
The study area transects two census tracts: Census Tract 2 and Census Tract 376 (Figure 4). These tracts were analyzed using DVRPC's Indicators of Potential Disadvantage (IPD) dataset, an equity analysis tool for complying with Title VI and environmental justice guidelines in transportation planning. IPD examines nine indicator variables related to equity and environmental justice and compares individual census tracts to the nine-county DVRPC region.

Results for equity variables are summarized in Figure 5, with detailed results listed in Appendix B. Both study area tracts rank well above average for residents with Limited English Proficiency and Foreign Born residents, and both rank above average for Racial Minority and Low-Income populations. These indicators align with the area's historical role as a predominantly Asian immigrant community.

In addition to equity variables, commuting mode share was analyzed for workers living in the study area and workers employed in the study area. Figure 6 compares these patterns to all workers living in the City of Philadelphia. Workers living in the study area are much more likely to walk to work and much less likely to drive to work than residents of other neighborhoods in the city. They are also slightly more likely to ride a bicycle to work and slightly less likely to take public transportation.

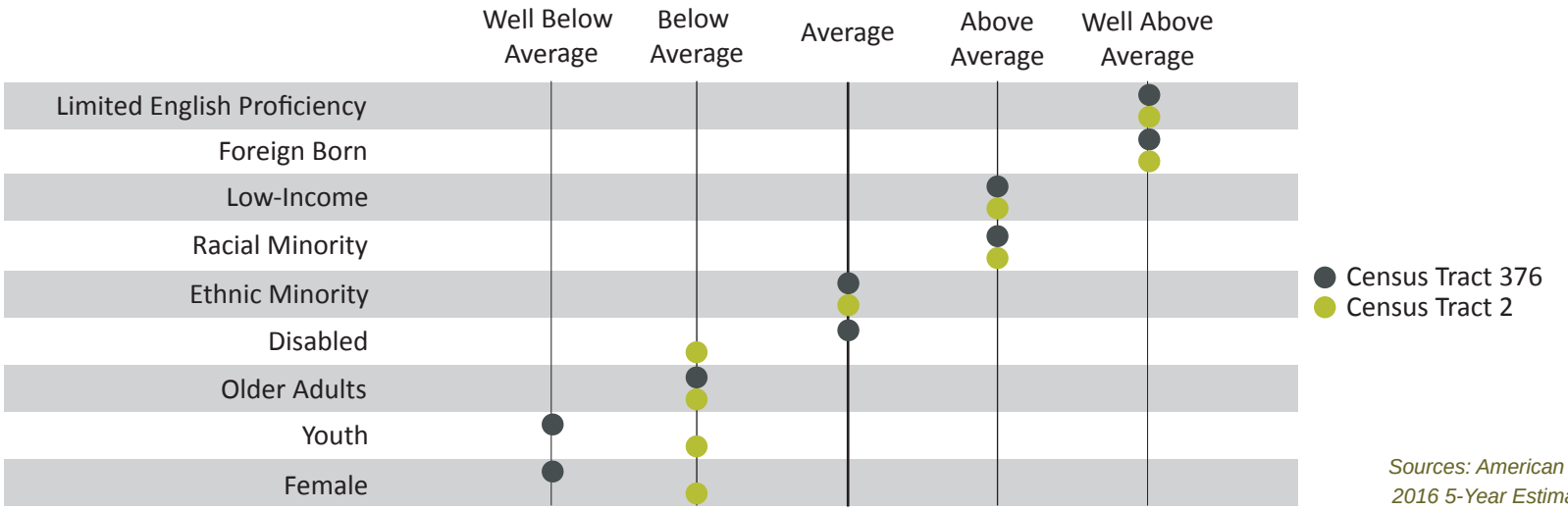
On the other hand, workers who are employed in the study area are about as likely as other Philadelphia residents to drive to work but also more likely to take public transit. The diversity of mode choices for workers living in or employed in the study area underscores the need for a strong multimodal transportation network.

FIGURE 4: CENSUS TRACTS



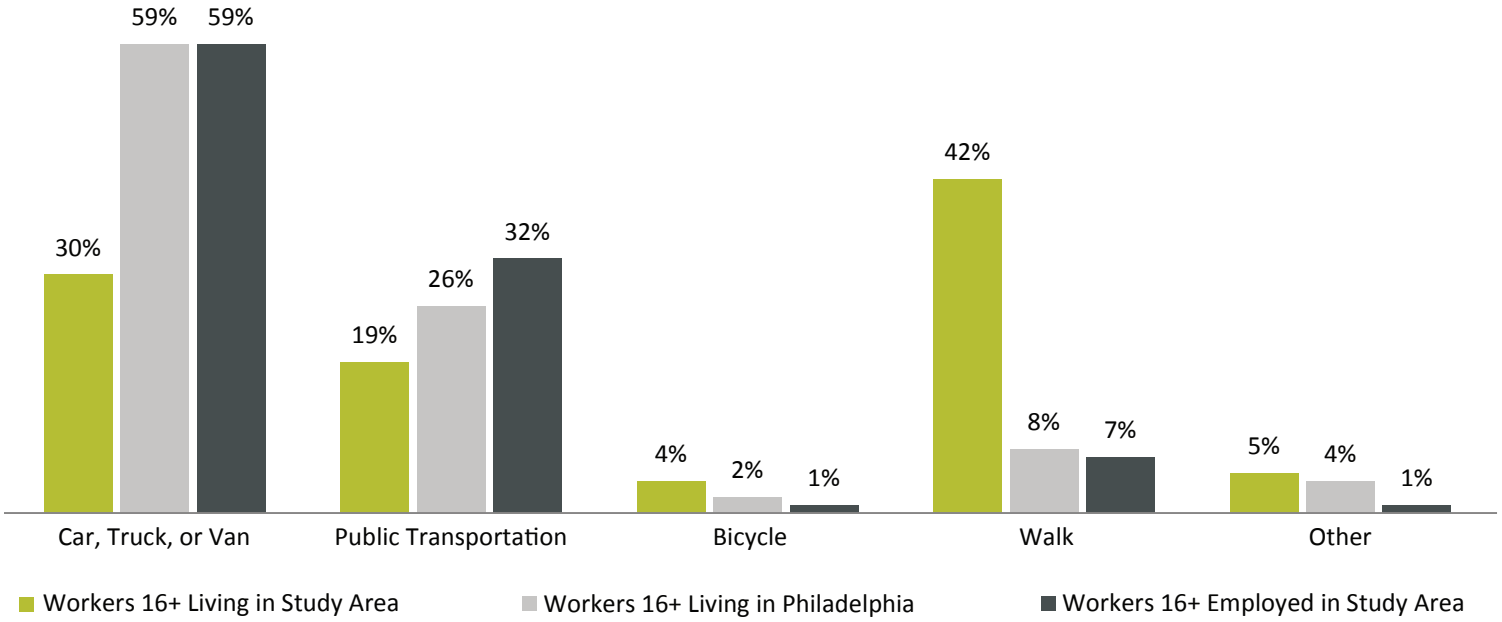
Source: U.S. Census Bureau, 2010

FIGURE 5: EQUITY ANALYSIS



Sources: American Community Survey 2016 5-Year Estimates; DVRPC, 2017

FIGURE 6: COMMUTING MODE SHARE



Sources: Census Transportation Planning Products 2010 5-Year Dataset; DVRPC, 2018

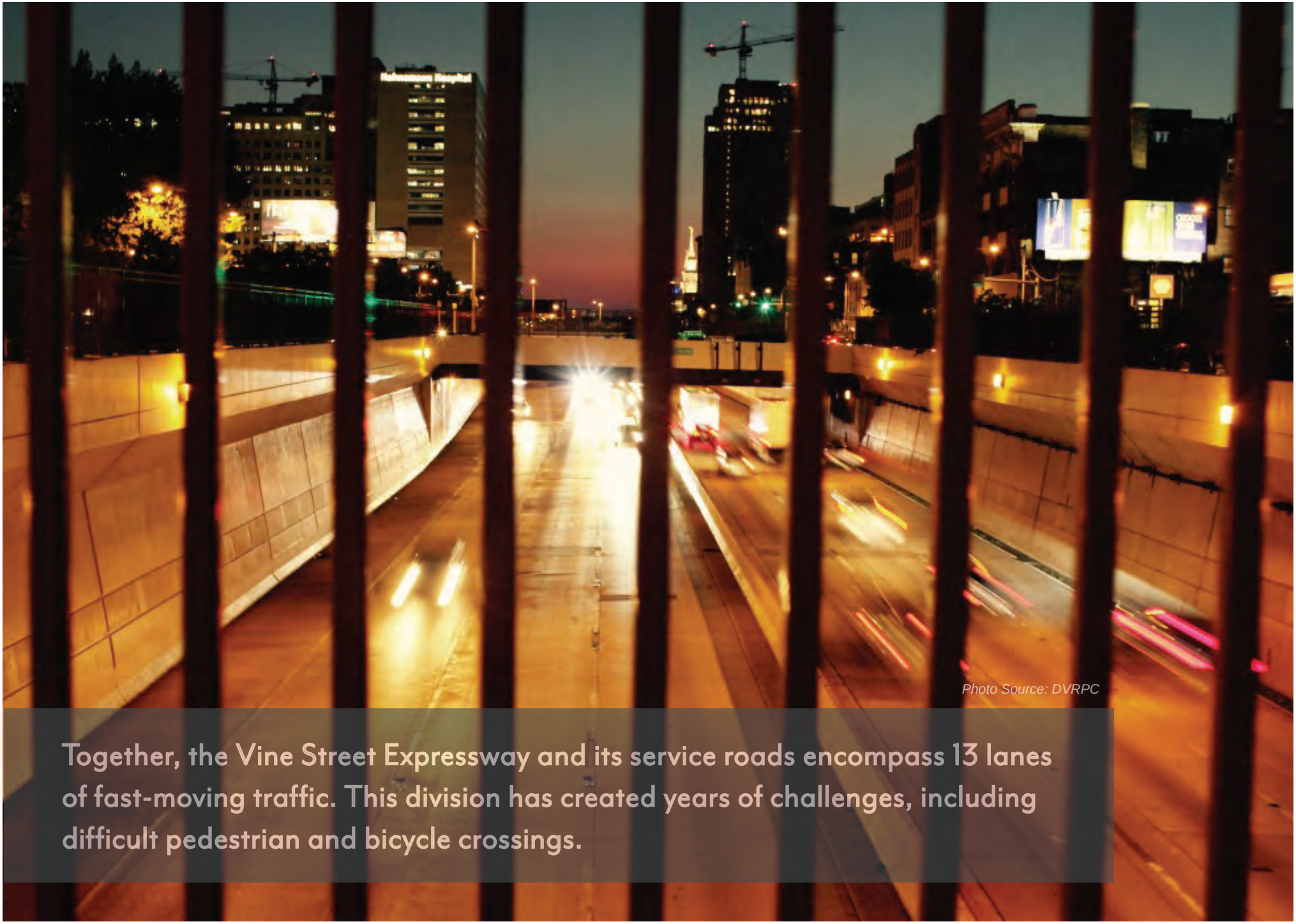


Photo Source: DVRPC

Together, the Vine Street Expressway and its service roads encompass 13 lanes of fast-moving traffic. This division has created years of challenges, including difficult pedestrian and bicycle crossings.

TRANSPORTATION NETWORK

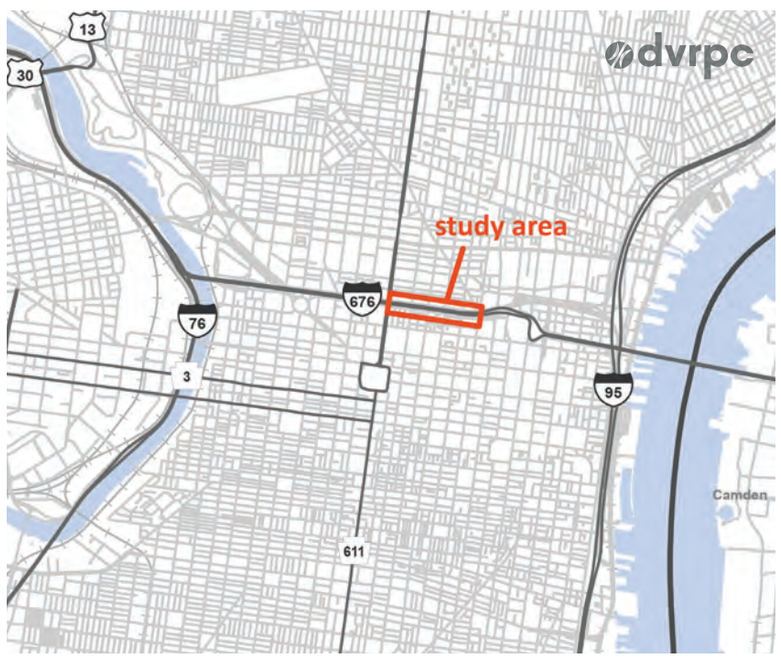
STREET NETWORK

Vine Street Local

The primary focus of this study, Vine Street local, consists of two one-way urban arterials that connect to I-676 but also accommodate local traffic. Vine Street westbound consists of two travel lanes at 8th Street and expands to three travel lanes and one parking/turning lane after 9th Street (Figure 7). Between 10th Street and Broad Street, the street cartway is 45.5 feet wide.

Vine Street eastbound consists of three travel lanes between Broad Street and 11th Street and is 34 feet wide. Between 11th Street and 9th Street, there are two travel lanes and one lane for authorized parking, utilized by the local police precinct and headquarters. Approaching 8th Street, Vine Street eastbound expands to four lanes, channelized by a pedestrian island (Figure 7).

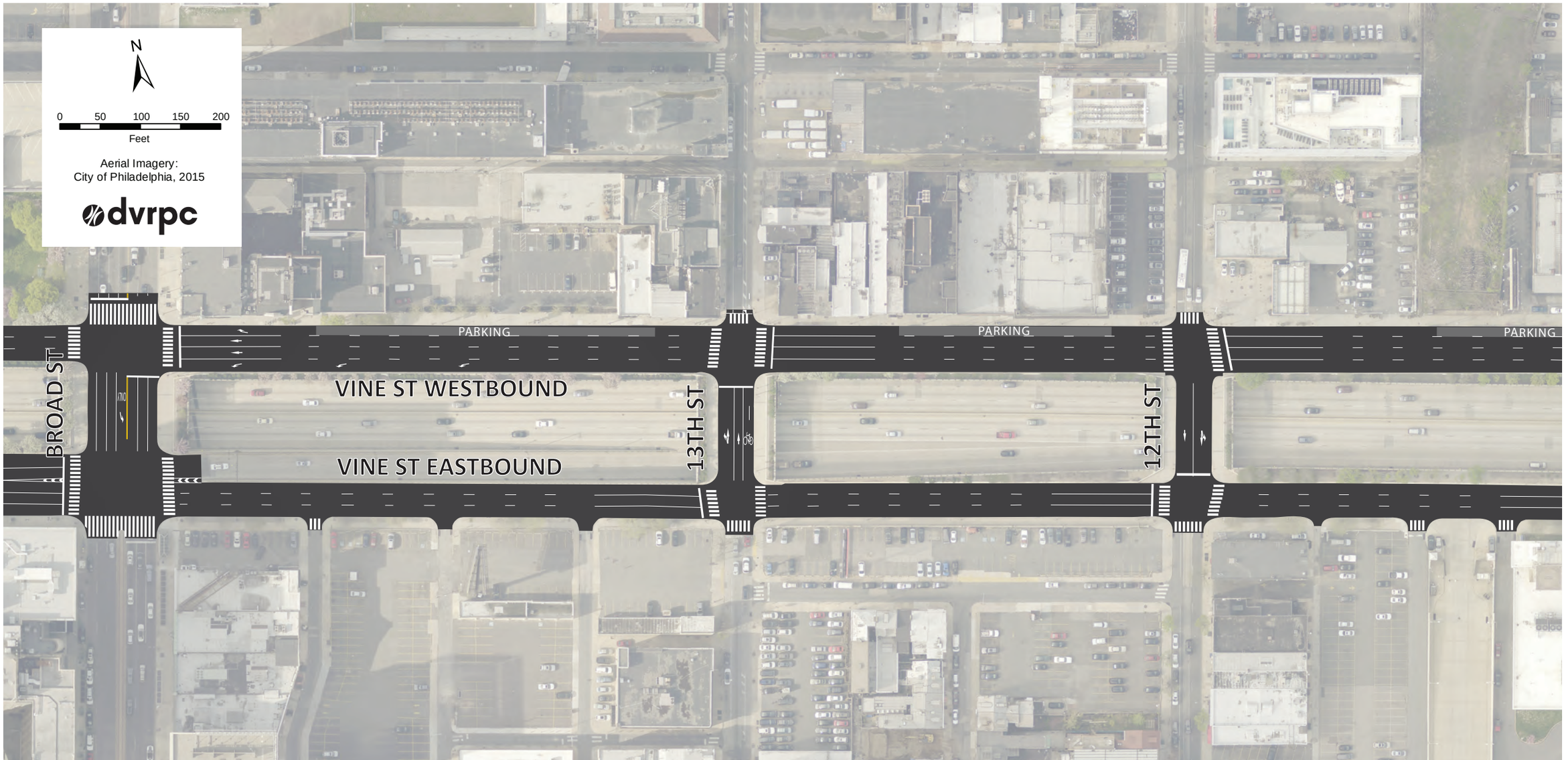
Within the study area, Vine Street connects to I-676 via a westbound on-ramp and eastbound off-ramp at 8th Street, and an eastbound on-ramp at Broad Street.

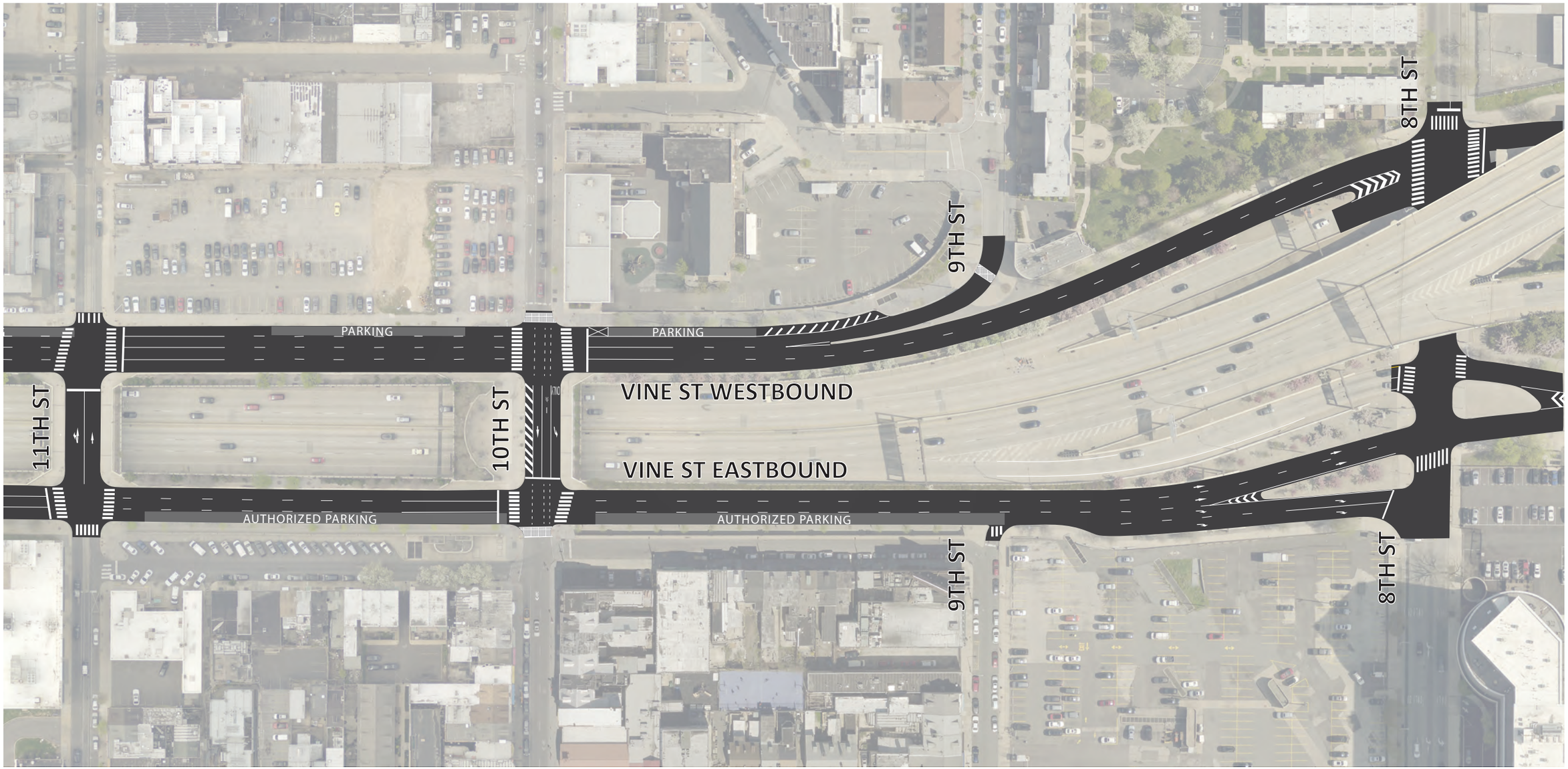


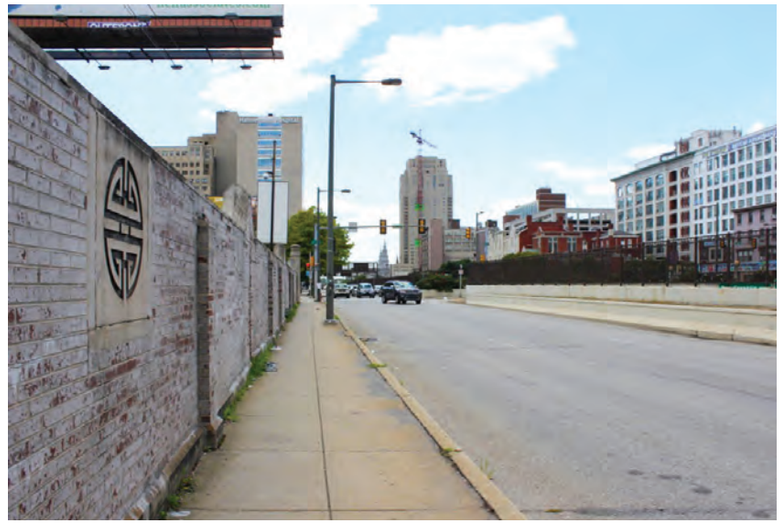
Left: Vine Street local abuts the Vine Street Expressway (I-676), providing a critical path through Center City, Philadephia. Source: DVRPC, 2018
Below: Ninth Street merges into Vine Street westbound in front of Holy Redeemer Chinese Catholic Church and School. Source: DVRPC, 2017

FIGURE 7: EXISTING LANE CONFIGURATION

Source: DVRPC, 2018




PARKING
PARKING
11TH ST
10TH ST
VINE ST WESTBOUND
VINE ST EASTBOUND
AUTHORIZED PARKING
AUTHORIZED PARKING
9TH ST
8TH ST
9TH ST
8TH ST



Above: The sidewalk between 11th and 12th streets on Vine Street eastbound is seven feet wide, and the presence of a brick wall creates an even narrower walking space. Source: DVRPC, 2017
Below: Many of the curb ramps in the study area are not compliant, and several have drainage issues that make it difficult for pedestrians to cross. Source: DVRPC, 2017

Numbered Cross Streets

The numbered cross streets in the study area (8th to 13th) are classified as city neighborhood streets. Each cross street is one way and accommodates one to two travel lanes. Even-numbered streets are southbound, and odd-numbered streets are northbound. Tenth, 11th, 12th, and 13th streets provide passage over the sunken portion of I-676 via Pennsylvania Department of Transportation (PennDOT)-owned bridges. Each cartway is 35 feet wide, with a through lane and a turning lane. Eighth Street provides a passage under the raised portion of I-676.

The configuration of 9th Street stands out among these cross streets. It is the only cross street in the study area that does not provide a connection across I-676. Between Callowhill Street and Vine Street westbound, vehicular traffic is southbound rather than northbound. The two 9th Street intersections are also the only unsignalized intersections in the study area, with a ramp approach to Vine Street westbound, and a stop sign at Vine Street eastbound.

Broad Street

Broad Street is classified as a civic/ceremonial street and provides a key high-volume connection over I-676. On the expressway overpass, Broad Street includes three northbound through lanes, three southbound through lanes, and one left-turn lane for Vine Street and expressway-bound vehicles.

PEDESTRIAN CONDITIONS

Vine Street westbound and Vine Street eastbound each have a sidewalk on the north and south sides, respectively; there are no east-west sidewalks adjacent to the expressway. Each expressway overpass and underpass has a sidewalk on both sides.

Sidewalk width varies from block to block (Figure 8). The *Philadelphia Complete Streets Design Handbook* recommends a width of 12 feet for sidewalks along urban arterials, such as Vine Street, with additional width for sidewalks adjacent to a vertical barrier, such as a wall. Seven of the sidewalk segments along Vine Street do not meet these minimum sidewalk width standards, and three segments may feel even narrower to pedestrians because of the brick wall on portions of Vine Street eastbound. This brick wall was added to mitigate expressway-related noise pollution identified in the environmental impact statement for this

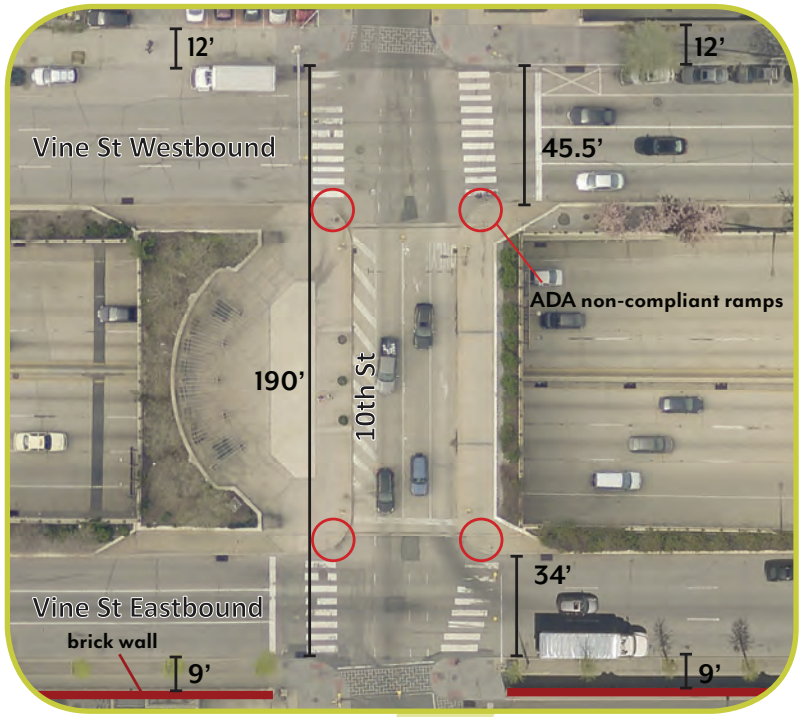


FIGURE 8: PEDESTRIAN CONDITIONS

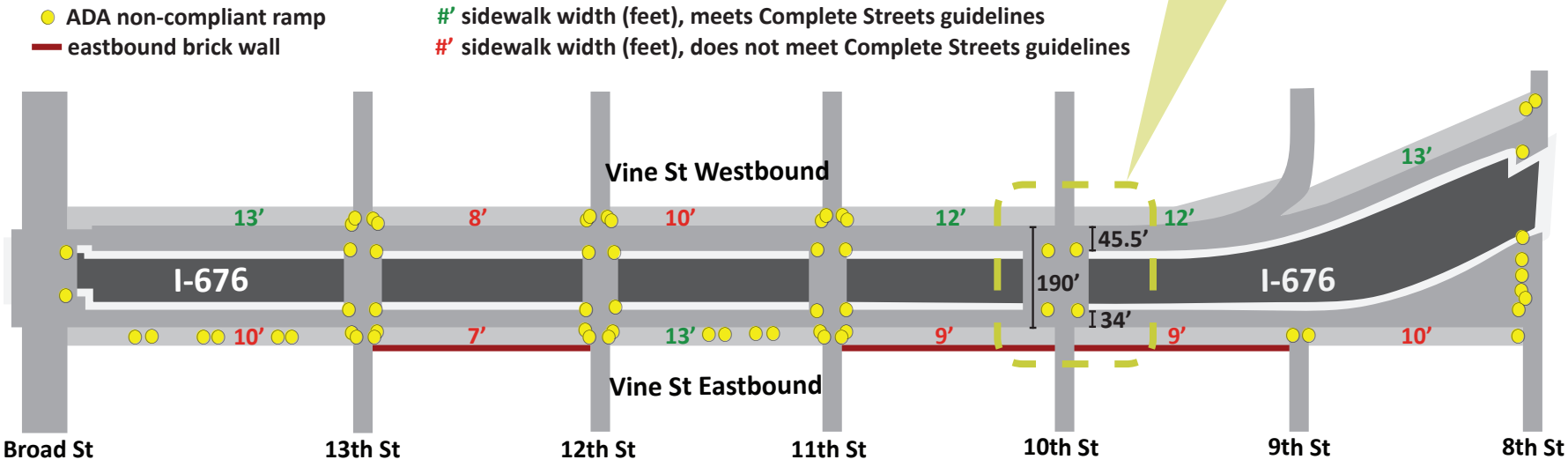
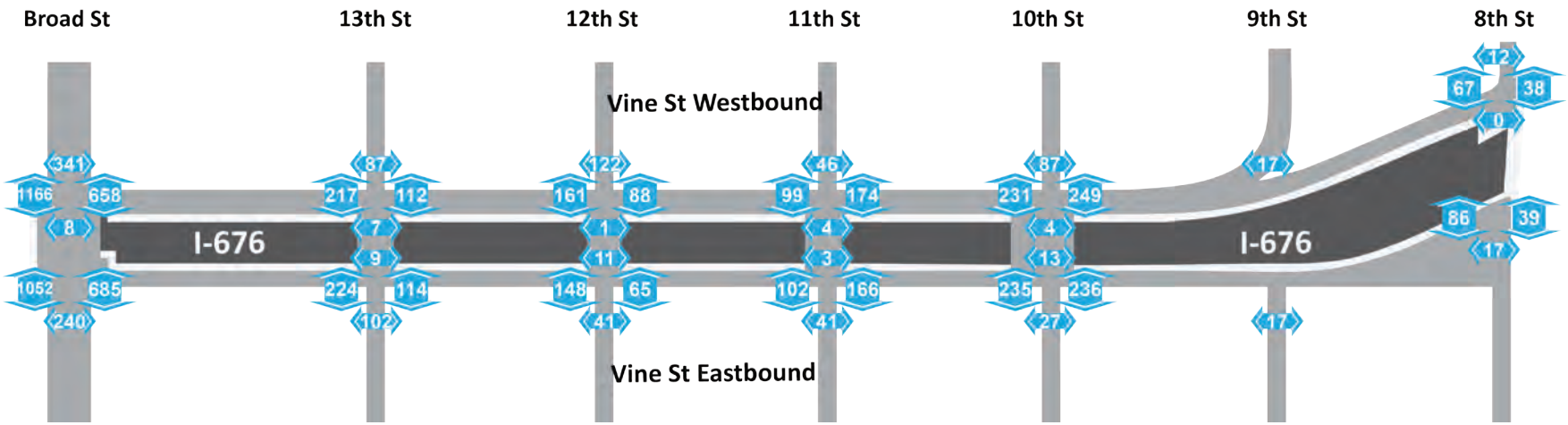
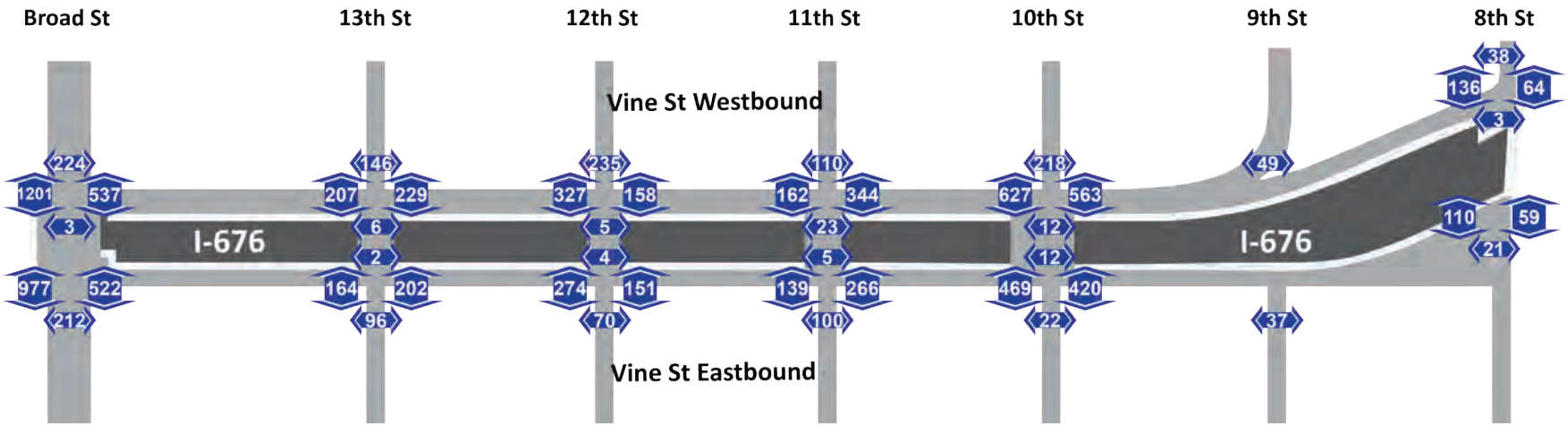


FIGURE 9: PEDESTRIAN VOLUMES, WEEKDAY PEAK HOURS*

NUMBER OF PEDESTRIANS CROSSING, 6:00–9:00 AM



NUMBER OF PEDESTRIANS CROSSING, 3:00–6:00 PM



**Vine Street westbound counts were taken on Wednesday, February 8, 2017. Vine Street eastbound counts were taken on Tuesday, February 14, 2017. Counts are meant to represent a typical weekday at peak periods of vehicular traffic. Source: DVRPC, 2017*

portion of I-676. However, the wall also contributes to an uninviting pedestrian environment along Vine Street eastbound and could be improved upon to better balance the needs of pedestrians and local residents.

All permitted pedestrian crossings in the study area are marked with a crosswalk, though some of these markings are faded. The total crossing distance at most intersections is 190 feet, including 45.5 feet across Vine Street westbound and 34 feet across Vine Street eastbound. Most curb ramps are not Americans with Disabilities Act (ADA) compliant due to an excessively steep slope, lack of a detectable warning surface, or both. The curb ramps on expressway overpasses are particularly steep, and many have drainage or severe cracking issues that create challenges for mobility-impaired pedestrians.

A crossing guard assists pedestrians crossing Vine Street eastbound at 10th Street. In the background, Eastern Tower is being constructed. Source: DVRPC, 2018

Lastly, the study area does not have street furniture, pedestrian-scale lighting, or similar amenities that make streets safe, comfortable, and attractive for pedestrians. The 10th Street Plaza has some seating, but the plaza is isolated from other public gathering spaces by long crossing distances, steep ramps, and inadequate lighting. Street trees are abundant on some blocks, but others have no trees or landscaping.

Despite these conditions, Vine Street local and its cross streets are heavily utilized by pedestrians. Hundreds of pedestrians cross Vine Street in the AM and PM peak hours (6:00–9:00 AM and 3:00–6:00 PM) on a typical weekday, with the highest volumes on 10th Street or Broad Street (Figure 9). East-west crossings are also common. Pedestrian counts show that a greater number of pedestrians use the westbound service road, perhaps because there are more businesses, residences, and community institutions. In addition, Vine Street westbound boasts wider sidewalks and on-street parking that buffers pedestrians from vehicle traffic. Improving walking conditions and decreasing crossing distances could encourage greater pedestrian activity throughout the corridor.

BICYCLE NETWORK

Two bicycle lanes intersect the study area: one northbound on 13th Street and one southbound on 10th Street (Figure 10). The 13th Street lane is a buffered, right-side lane from South Street to Hamilton Street. The 10th Street lane is a protected left-side lane from Callowhill Street to Vine Street eastbound, where it changes to sharrows. Both lanes connect to a westbound lane on Callowhill Street and westbound sharrows on Arch Street. However, there are no connecting eastbound bicycle lanes within a quarter-mile of the study area. The absence of an eastbound connection isolates Vine Street from nearby attractions and open spaces, such as the Delaware waterfront and Franklin Square Park.

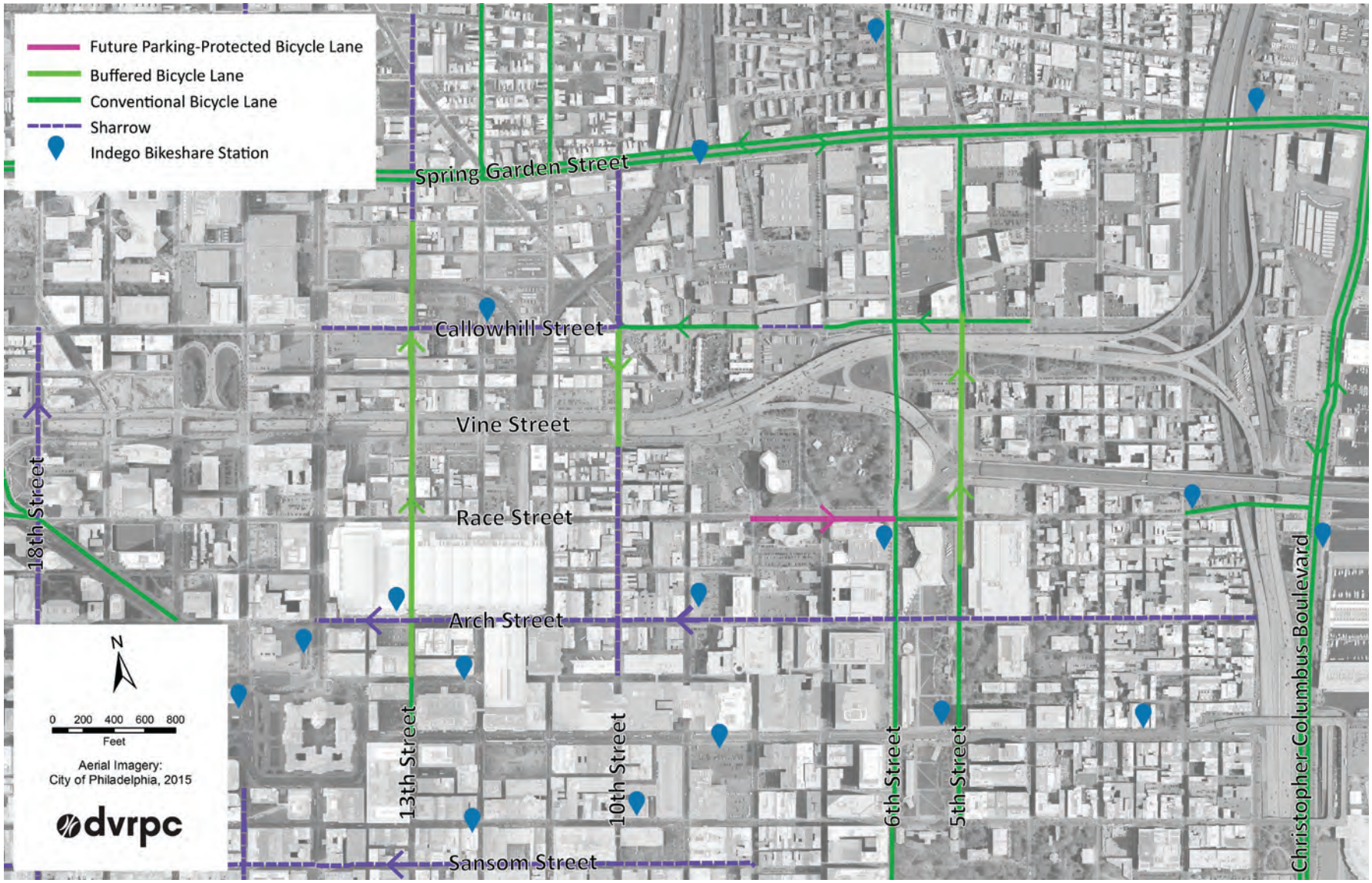
On the 13th Street overpass, bicycle and vehicle lane markings are almost completely faded away, creating confusion for bicyclists and drivers. On the 10th Street overpass, the bicycle lane changes from a left-side lane to a lane placed between a through lane and a left-turn lane. This configuration can help prevent conflicts between bicyclists and left-turning vehicles, but due to faded markings the bicycle lane is frequently used heavily by vehicles.

There are five Indego bikeshare stations within a quarter-mile of the study area; four of these are south of Vine Street. Bicyle racks in the study area are limited to two on Vine Street westbound between 12th Street and 13th Street.

During the AM and PM weekday peak, bicycle movement across Vine Street is most common on 10th Street and 13th Street where bicycle lanes are available (Figure 11). On 13th Street, the majority of bicyclists cross Vine Street on the east side of the street where the lane is located. On 10th Street, the majority of bicyclists cross Vine Street on the east side where the lane is located, but a significant number of crossings are made on the west side away from the lane, suggesting the 10th Street lane is less clear and usable for bicyclists. A smaller number of bicyclists travel along Vine Street, perhaps due to the absence of bicycle infrastructure and high vehicle volume and speed.

Vehicles frequently use the 10th Street bicycle lane due in part to low-visibility markings. Source: DVRPC, 2018

FIGURE 10: BICYCLE NETWORK



Source: DVRPC, 2018

FIGURE 11: BICYCLE VOLUMES, WEEKDAY PEAK HOURS*

NUMBER OF BICYCLISTS CROSSING, 6:00–9:00 AM

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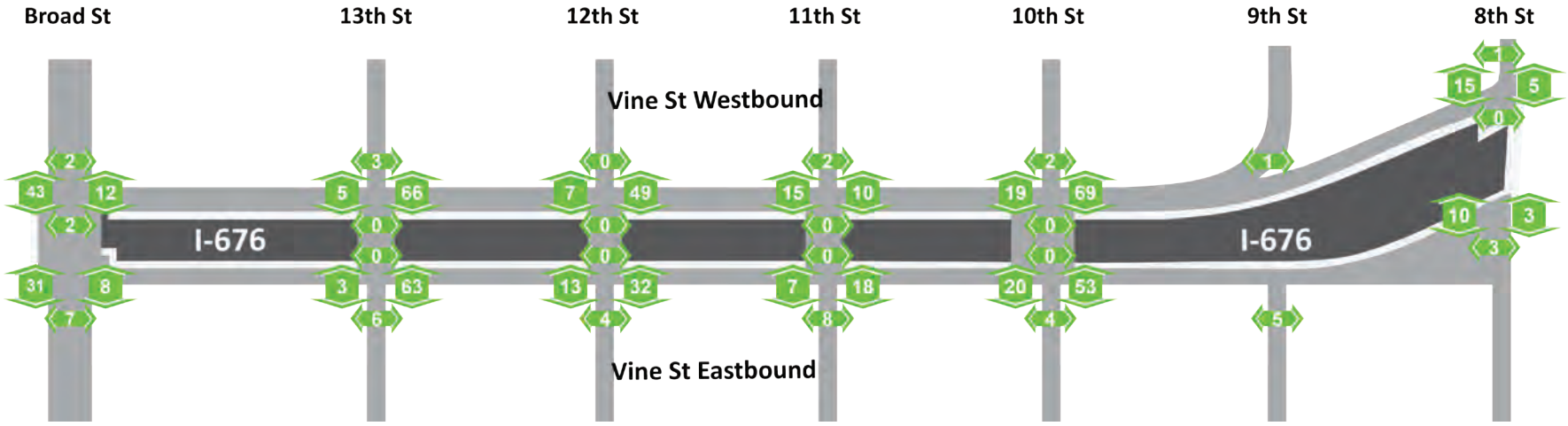

NUMBER OF BICYCLISTS CROSSING, 3:00–6:00 PM

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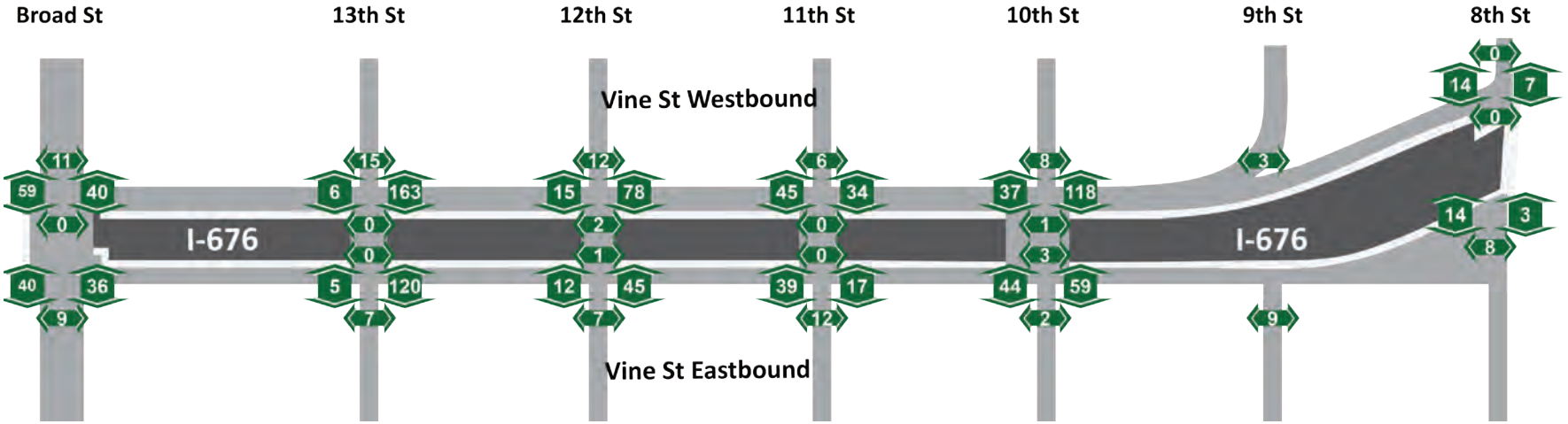


**Vine Street westbound counts were taken on Wednesday, February 8, 2017. Vine Street eastbound counts were taken on Tuesday, February 14, 2017. Counts are meant to represent a typical weekday at peak periods of vehicular traffic. Source: DVRPC, 2017*

TRANSIT SERVICE

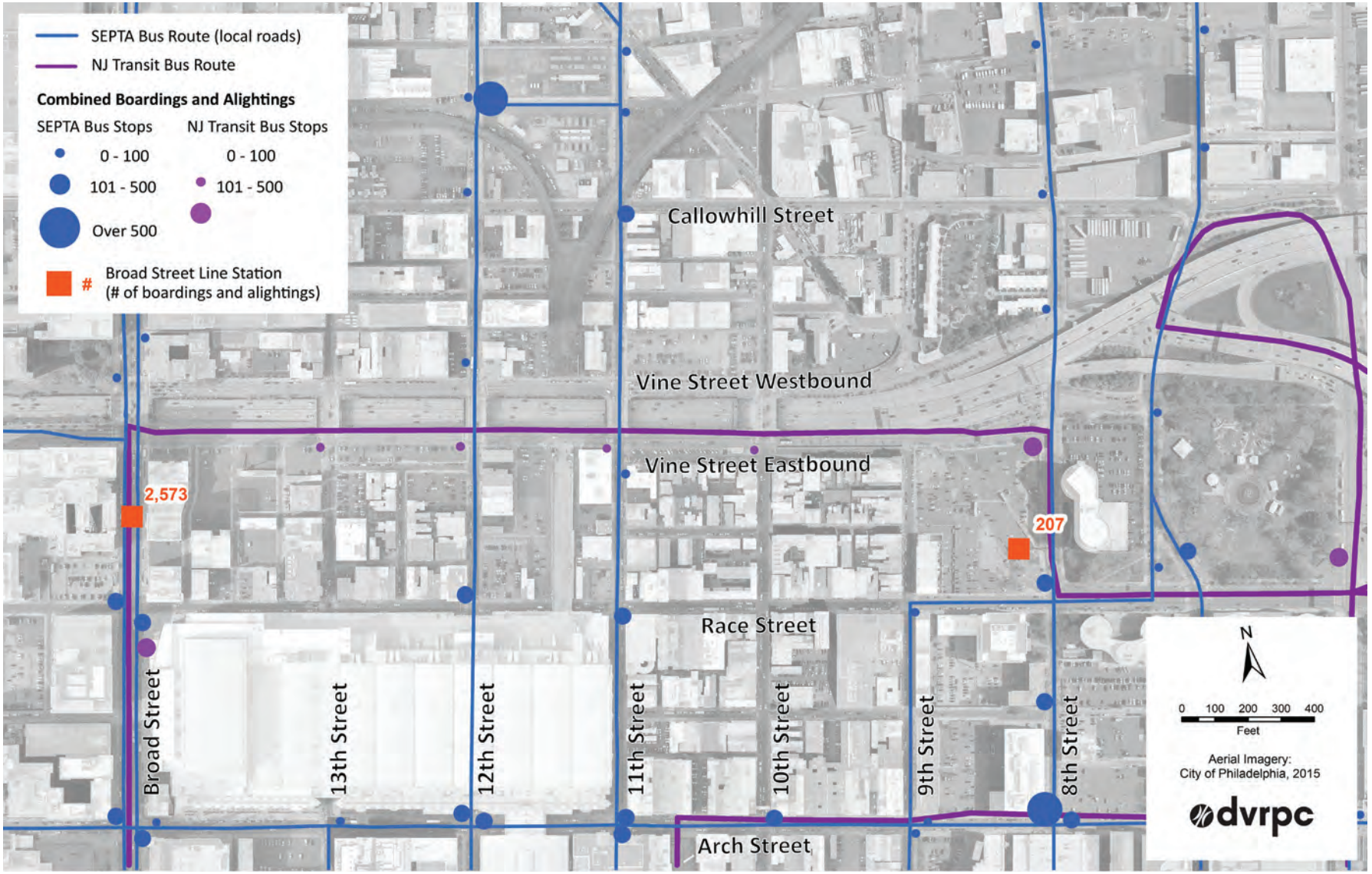
Vine Street eastbound accommodates nine New Jersey Transit (NJ Transit) bus routes (400, 401, 402, 404, 406, 408, 409, 410, 412), with stops on 13th, 12th, 11th, 10th, and 8th streets (Figure 12). Of these stops, 8th Street has the largest number of combined boardings and alightings on an average weekday. During the weekday afternoon peak hour (4:45–5:45 PM), 21 NJ Transit buses operate along Vine Street.

No Southeastern Pennsylvania Transportation Authority (SEPTA) bus routes operate along Vine Street local in the study area, but SEPTA routes cross Vine Street at Broad Street, 12th Street, 11th Street, and 8th Street. Two Broad Street Line subway stations are located south of Vine Street, and high-volume SEPTA bus stops are located north and south of Vine Street.

There are currently no bus shelters, dedicated bus lanes, or bus bays on Vine Street local. Buses stop in-lane for curbside pickups. Some buses have been observed picking up passengers from the center lane, likely to avoid authorized vehicles and vehicles parked illegally in the right lane. This creates a safety issue for riders, who must then cross a travel lane to board or alight. The addition of bus-specific infrastructure in the corridor would alleviate this problem and create a more comfortable environment for riders.

A bus rider crosses a travel lane to board at 11th Street. Source: DVRPC, 2018

FIGURE 12: TRANSIT NETWORK AND VOLUMES



Sources: SEPTA, 2016; NJ Transit, 2017; DVRPC, 2018

VEHICLE VOLUMES AND SPEEDS

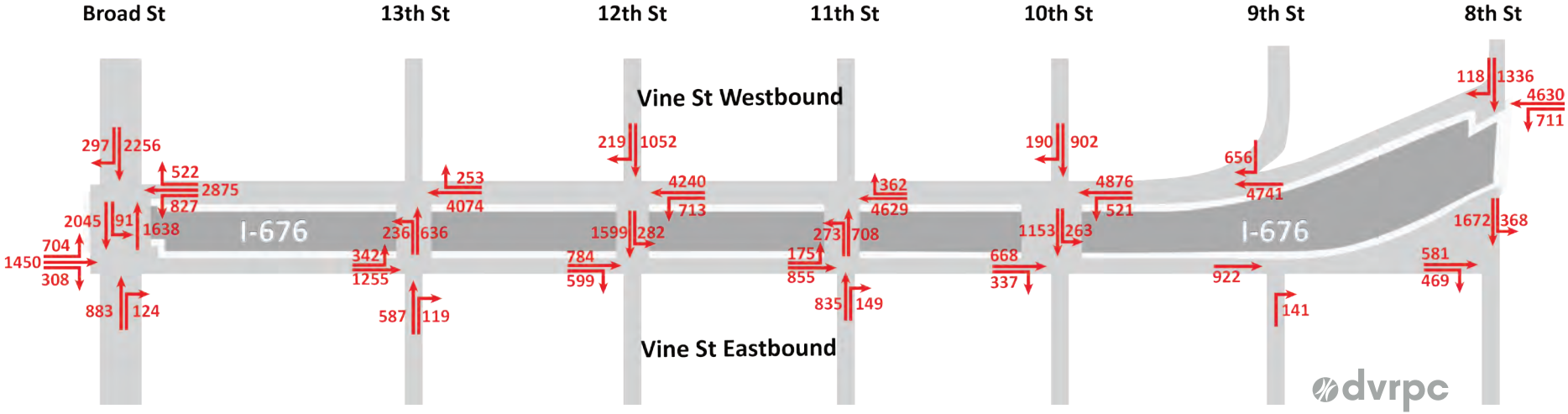
Vehicle turning movement counts (TMCs) were conducted at each intersection during morning and evening weekday peak hours in the study area to inform traffic modeling (Figure 13). In addition, mid-block vehicle counts and speeds were collected between 8th Street and 13th Street in each direction over a 24-hour mid-week period (Figure 14).

Vine Street westbound has higher vehicle volumes than Vine Street eastbound in both the AM and PM peaks. Vine Street westbound has greater volumes in the morning compared with the evening peak, while Vine Street eastbound, as well as northbound and southbound cross streets, have greater volumes in the afternoon compared with the morning peak.

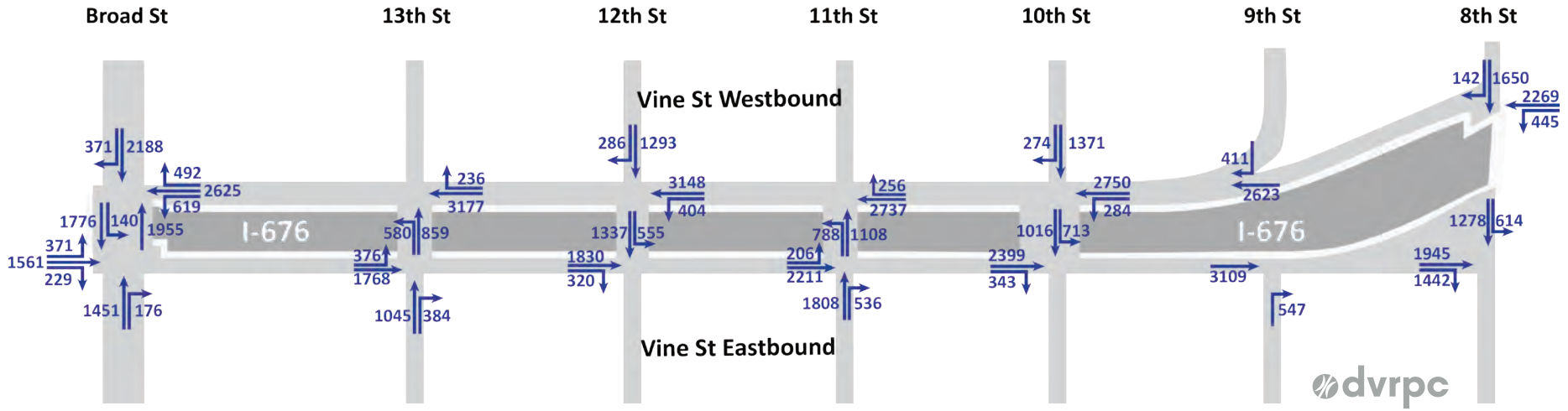
The speed limit throughout the study area is 25 miles per hour. There are two 15-mile-per-hour school zones on Vine Street westbound approaching Broad Street and 10th Street during school opening, closing, and recess. On seven out of 10 blocks where speeds were recorded, more than half of counted vehicles were traveling above 25 miles per hour. On all five westbound blocks, more than 10 percent of vehicles were traveling 35 miles per hour or faster—more than 10 miles per hour above the speed limit. On three of these, more than 20 percent of vehicles were traveling 35 miles per hour or faster. Excessive speeding is most common between 9th Street and 12th Street on Vine Street westbound.

FIGURE 13:TMCS, WEEKDAY PEAK HOURS*

NUMBER OF VEHICLES, 6:00–9:00 AM (RIGHT, STRAIGHT, OR THROUGH)

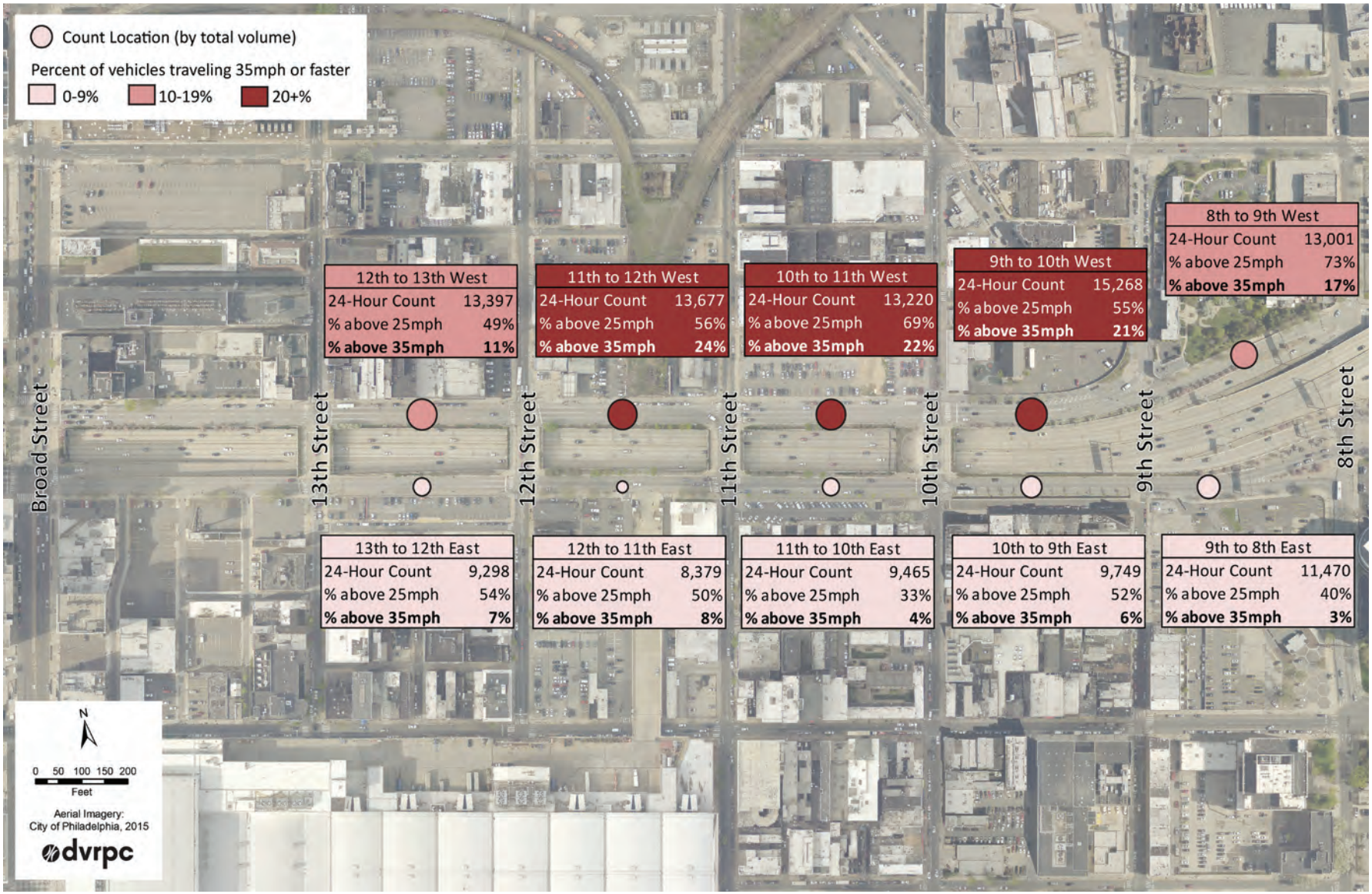


NUMBER OF VEHICLES, 3:00–6:00 PM (RIGHT, STRAIGHT, OR THROUGH)



**Vine Street westbound counts were taken on Wednesday, February 8, 2017. Vine Street eastbound counts were taken on Tuesday, February 14, 2017. Counts are meant to represent a typical weekday at peak periods of vehicular traffic. Source: DVRPC, 2017*

FIGURE 14: MID-BLOCK VEHICLE SPEED AND VOLUME COUNTS, WEEKDAY 24-HOUR PERIOD*



All speed counts were taken on Wednesday, October 11, 2017, or Wednesday, November 1, 2017, from 12:00 AM to 11:59 PM. Speed counts are meant to represent a typical weekday 24-hour period. Source: DVRPC, 2017

Photo Source: DVRPC

Reviving Vine aims to increase neighborhood connections by enhancing multimodal, inclusive mobility options in the Vine Street corridor. By improving safety and rebalancing roadway uses, the recommendations will empower residents and visitors to reclaim Vine Street as a safe, attractive, and community-oriented public space.

RECOMMENDATIONS

DESIGN CONCEPT

The main features of the proposal are:

- removal of an eastbound travel lane between Broad and 11th streets;
- removal of a westbound travel lane between 9th and 12th streets;
- signalization and redesign of intersection geometry at 9th Street and Vine Street westbound;
- redesign of intersection geometry at 8th Street and Vine Street eastbound with bus amenities;
- sidewalk expansion, curb extensions, and pedestrian islands to reduce crossing distances; and
- a protected eastbound cycle track to connect the corridor to the wider bicycle network.

Figure 15 illustrates the proposed design concept. ADA-compliant curb ramps would be installed at all currently non-compliant intersections in the project area, and all crosswalks would be repainted in durable materials. Existing metered on-street parking would be preserved, while authorized-only street parking would be repurposed pending the relocation of the nearby police headquarters and precinct.

Vehicle Lane Reconfiguration

Vehicle lane reconfiguration, sometimes referred to as a “road diet,” involves redesigning or repurposing lanes currently designated for vehicles to create a safer, multimodal streetscape. The proposed design includes the removal of one vehicle travel lane on Vine Street eastbound from Broad Street to 11th Street and one vehicle travel lane on Vine Street westbound from 9th Street to 12th Street. The primary recommendation is to repurpose this roadway space for pedestrian, bicycle, and transit uses.

The lane reconfiguration proposal also includes the redesign of the Vine Street eastbound and 8th Street intersection. The proposed new design replaces the existing median with an expanded sidewalk. This treatment reduces the number of pedestrian crossings and the total crossing distance from the southwestern corner of Vine Street eastbound and 8th Street to the overpass.

The intersection of Vine Street westbound and 9th Street would also be redesigned, squaring the existing merge ramp to a "T" intersection and adding a traffic signal.

Restriping would ensure that all travel lanes are 11 feet wide and parking lanes are 8 feet wide.

FIGURE 15.1: PROPOSED LANE RECONFIGURATION, BROAD TO 13TH STREET

Source: DVRPC, 2018

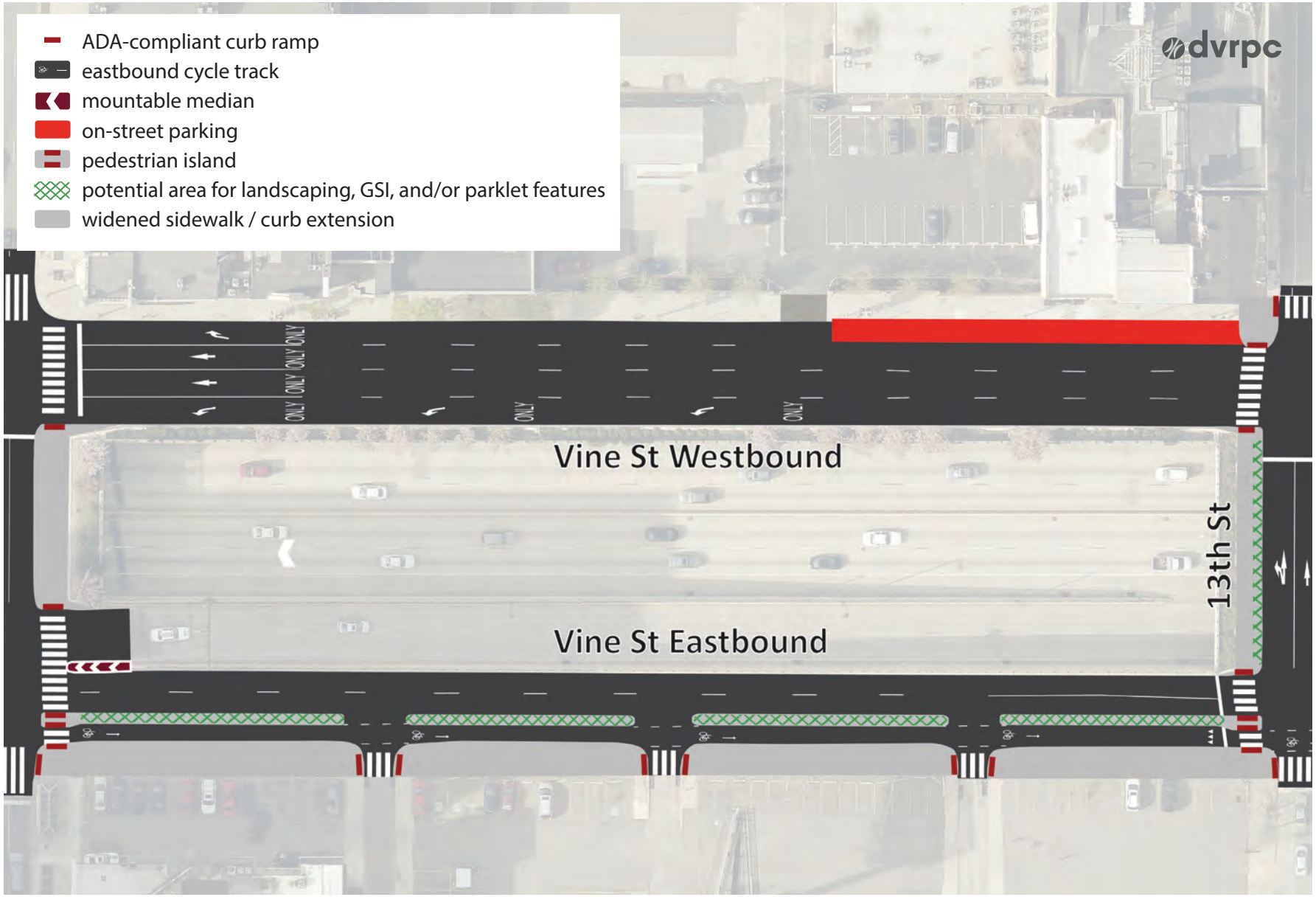


FIGURE 15.2: PROPOSED LANE RECONFIGURATION, 13TH TO 12TH STREET

Source: DVRPC, 2018

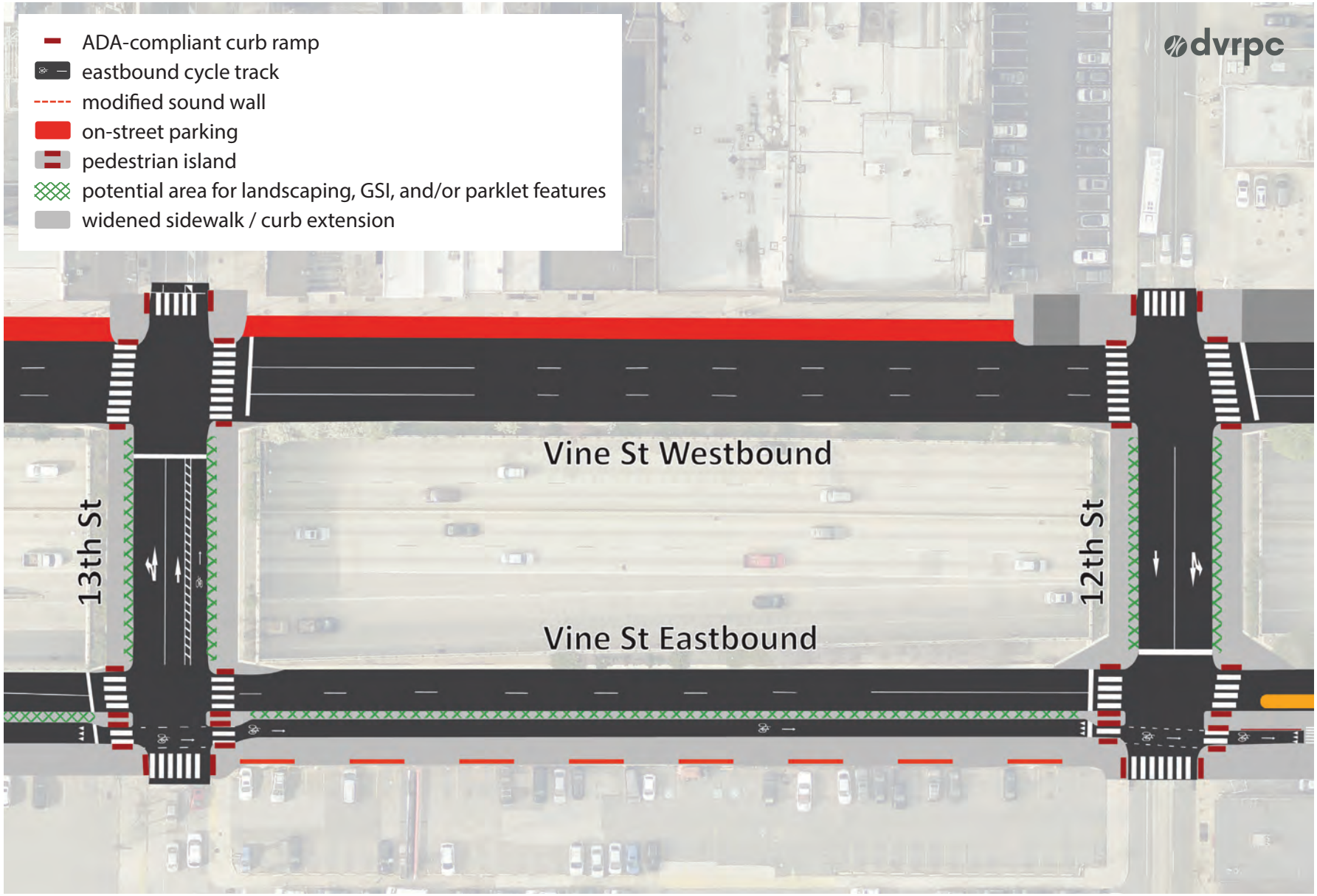


FIGURE 15.3: PROPOSED LANE RECONFIGURATION, 12TH TO 11TH STREET

Source: DVRPC, 2018

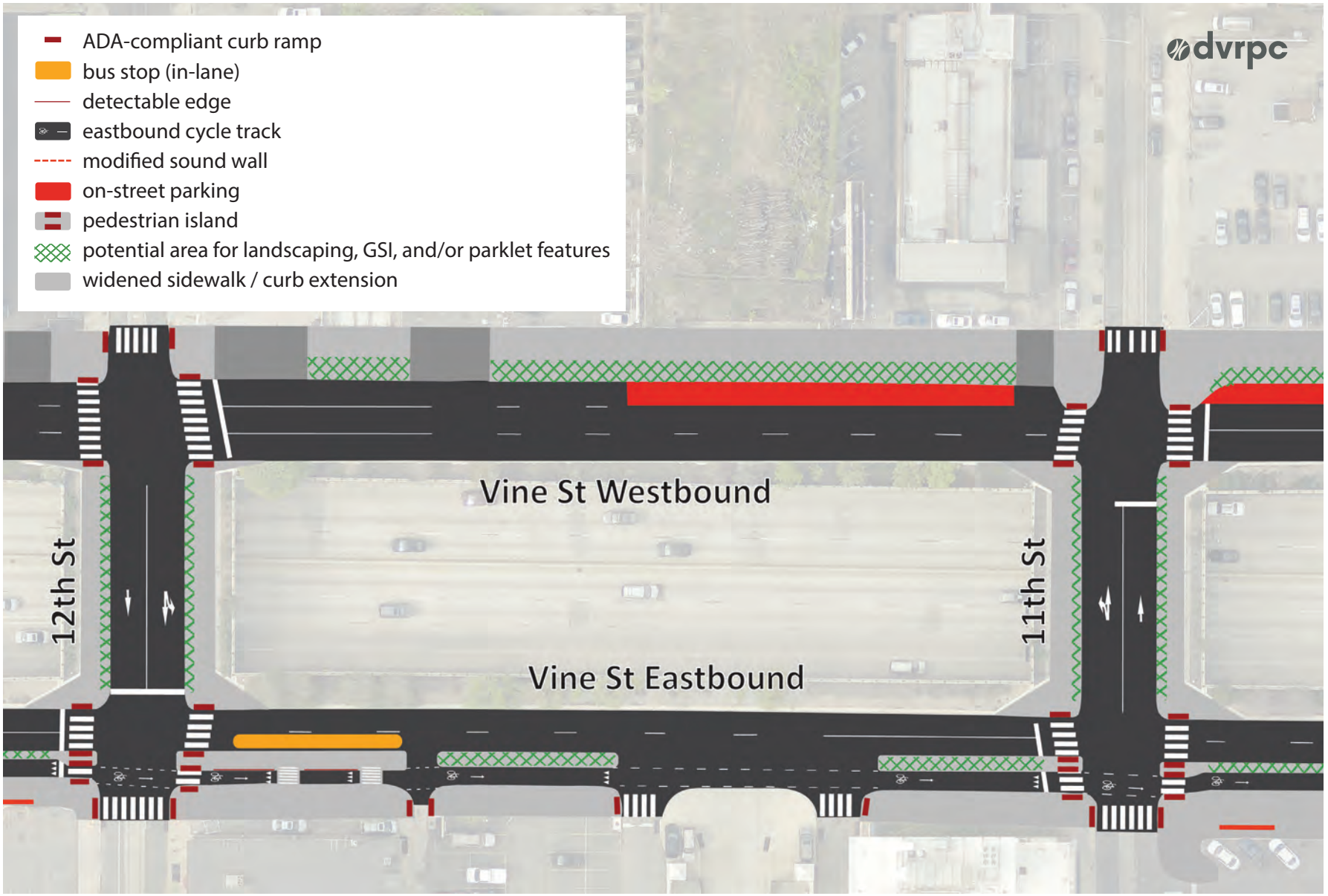


FIGURE 15.4: PROPOSED LANE RECONFIGURATION, 11TH TO 10TH STREET

Source: DVRPC, 2018

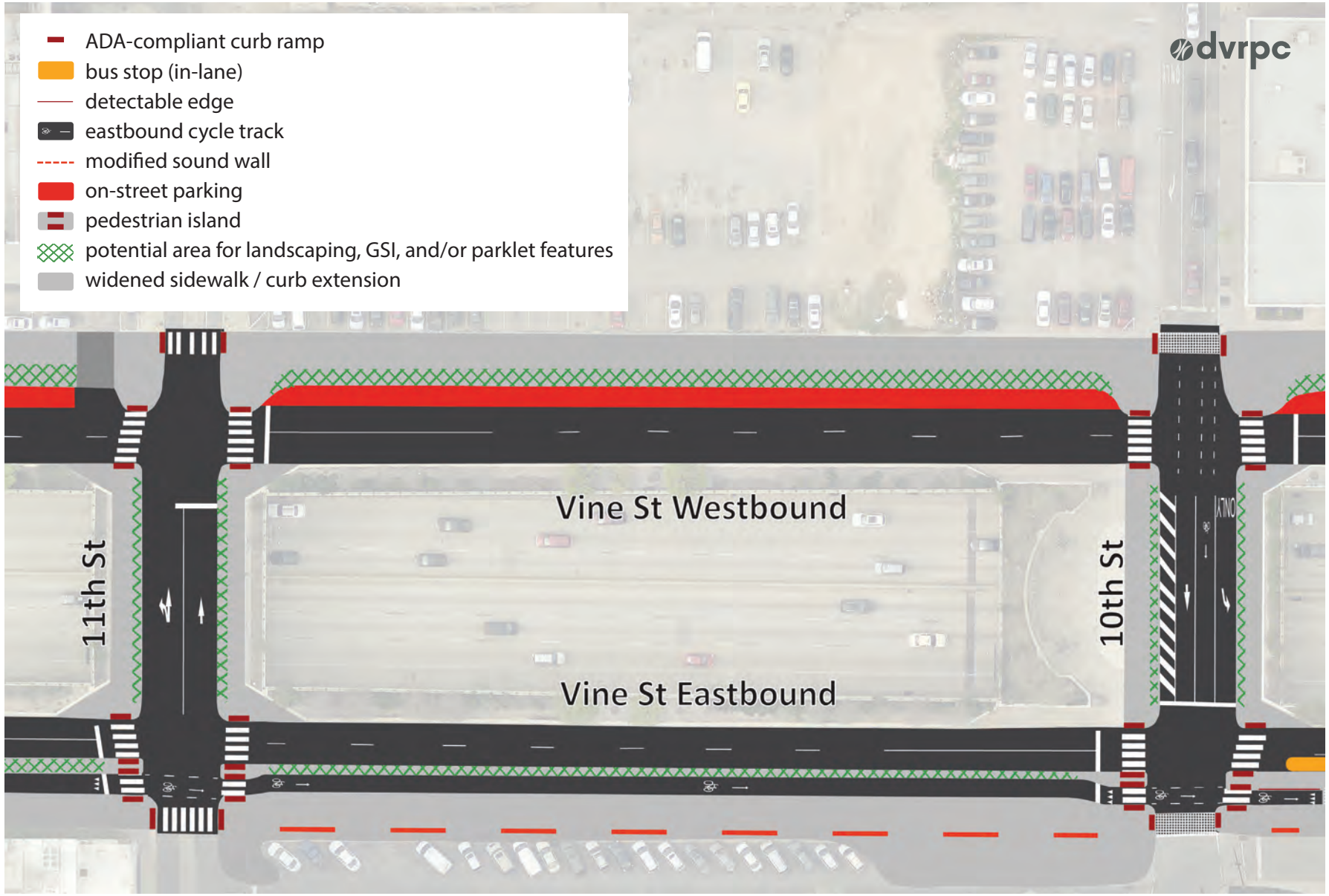


FIGURE 15.5: PROPOSED LANE RECONFIGURATION, 10TH TO 9TH STREET

Source: DVRPC, 2018

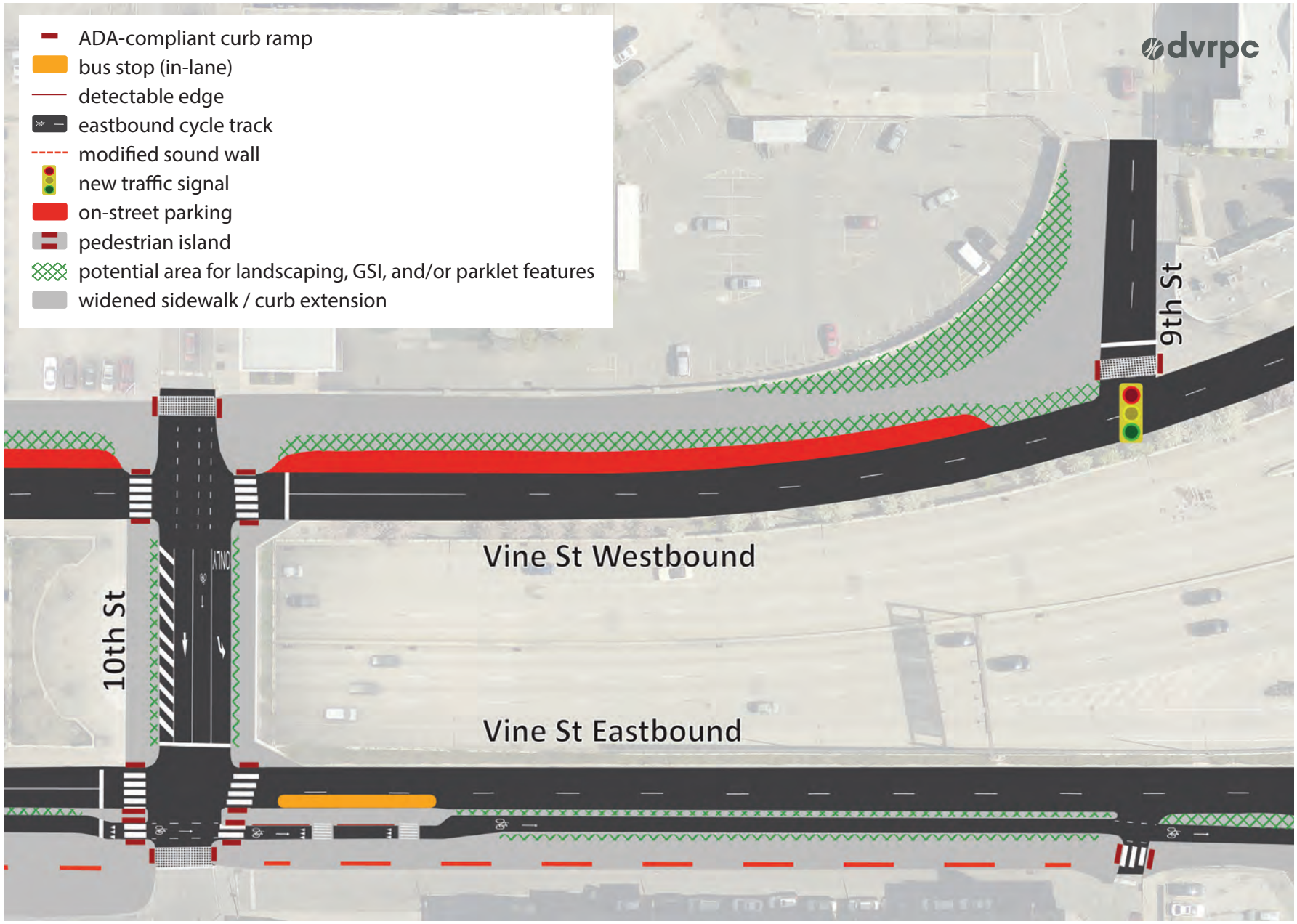
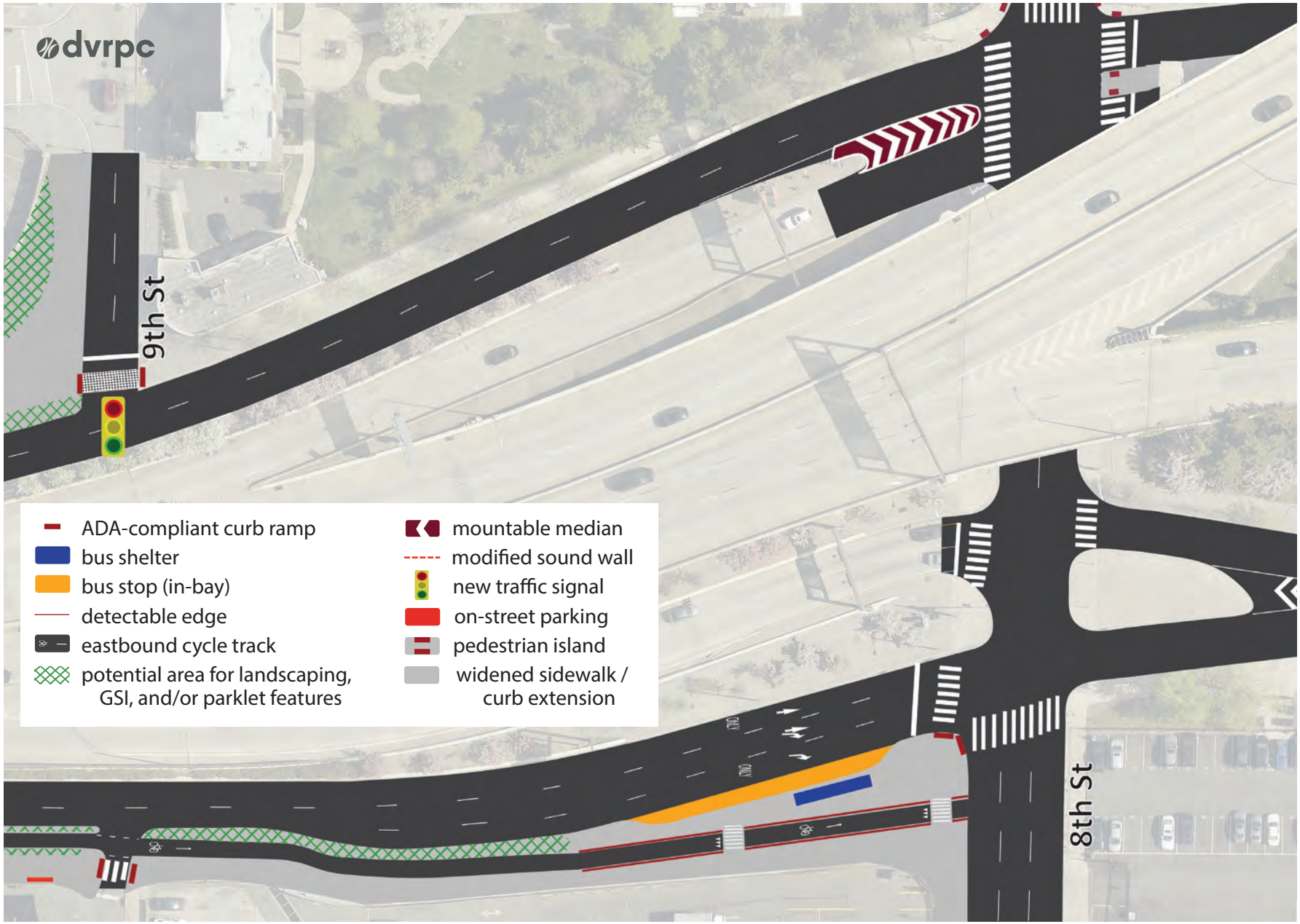


FIGURE 15.6: PROPOSED LANE RECONFIGURATION, 9TH TO 8TH STREET

Source: DVRPC, 2018



WESTBOUND LANE RECONFIGURATION

On Vine Street westbound, the right travel lane would be removed between 9th Street and 12th Street, and existing on-street parking would be shifted one lane south (Figures 16, 17, and 18). This lane removal would end just after the future Rail Park, maintaining a service lane for the automotive service businesses on Vine Street westbound and 12th Street.

The intersection of Vine Street westbound and 9th Street would be redesigned as a signalized "T" to reduce speeds and weaving behavior, which facilitates the remaining lane removals (Figures 19, 20, and 21).

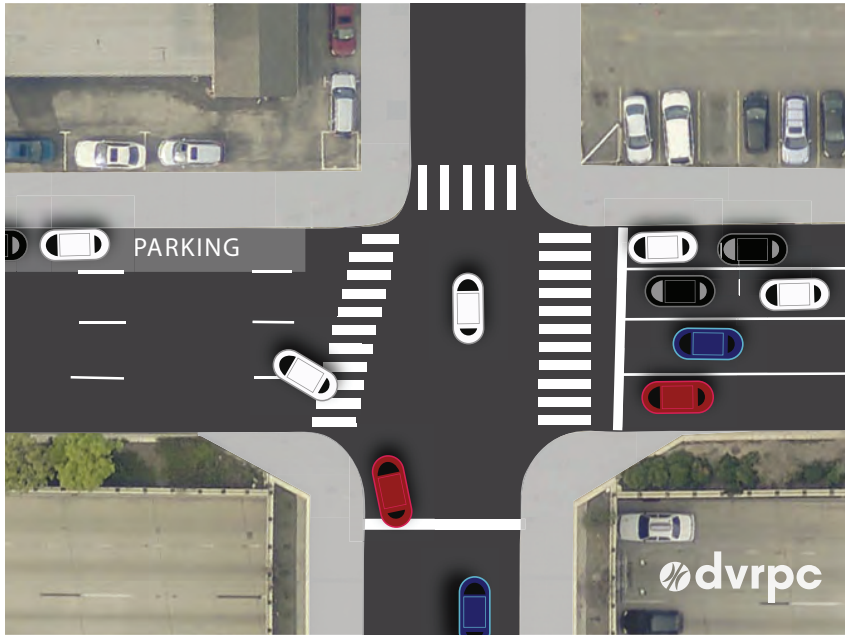
All travel lanes would be narrowed to 11 feet, and parking lanes would be narrowed to 8 feet (Figures 18 and 22). "Bulbout" curb extensions would be placed at all crossings with on-street parking to minimize crossing distances and calm traffic (Figure 17).

Reclaimed roadway space on Vine Street westbound would be used to provide widened sidewalks connecting to existing and future gathering spaces, including the 10th Street Plaza, Holy Redeemer, Eastern Tower community center, and Rail Park. New sidewalk space could feature landscaping, green stowmwater infrastructure, and parklet features where appropriate. Between 9th Street and 10th Street, three to four on-street parking spaces could also be added (Figure 21).

While a road diet is not feasible between 12th Street and Broad Street, lane narrowing would add 3.5 feet of sidewalk width between 12th Street and 13th Street, and 1.5 feet between 13th Street and Broad Street.

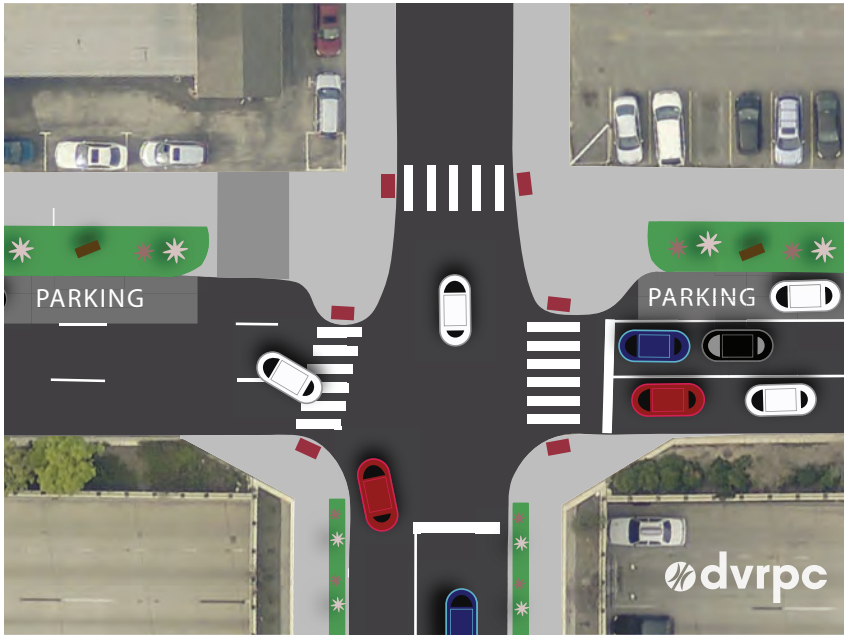
Figure 22 illustrates the proposed westbound lane configuration at a typical cross section.

FIGURE 16: 11TH AND VINE WESTBOUND, EXISTING



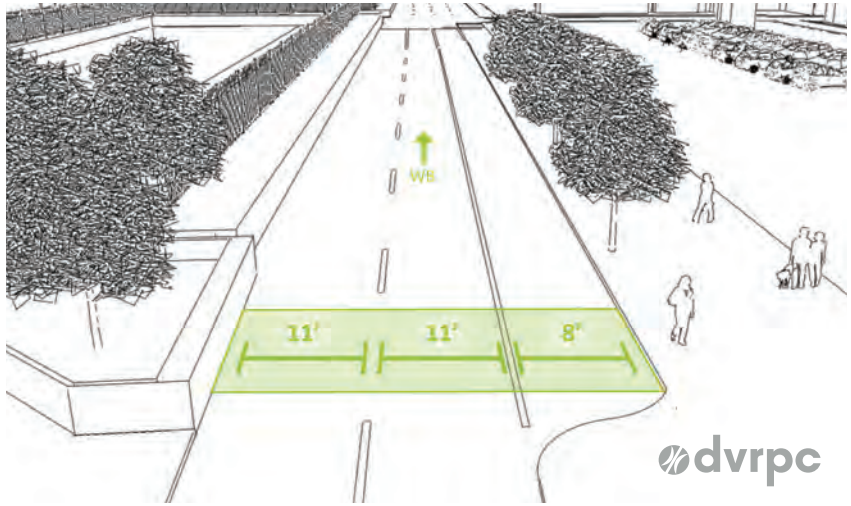
Source: DVRPC, 2018

FIGURE 17: 11TH AND VINE WESTBOUND, PROPOSED



Source: DVRPC, 2018

FIGURE 18: 11TH AND VINE WESTBOUND, PROPOSED (STREET VIEW)



Source: DVRPC, 2018

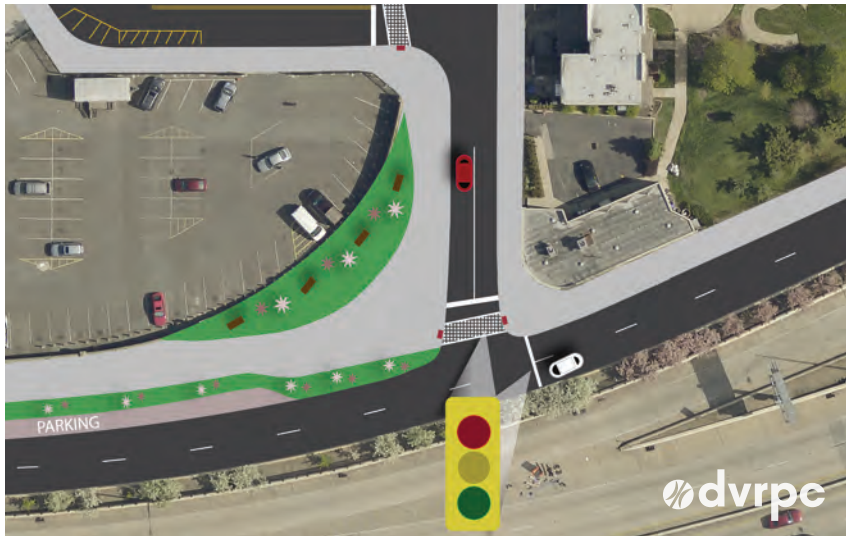
FIGURE 19: 9TH AND VINE WESTBOUND, PROPOSED (STREET VIEW)

Source: DVRPC, 2018

FIGURE 20: 9TH AND VINE WESTBOUND, EXISTING

Source: DVRPC, 2018

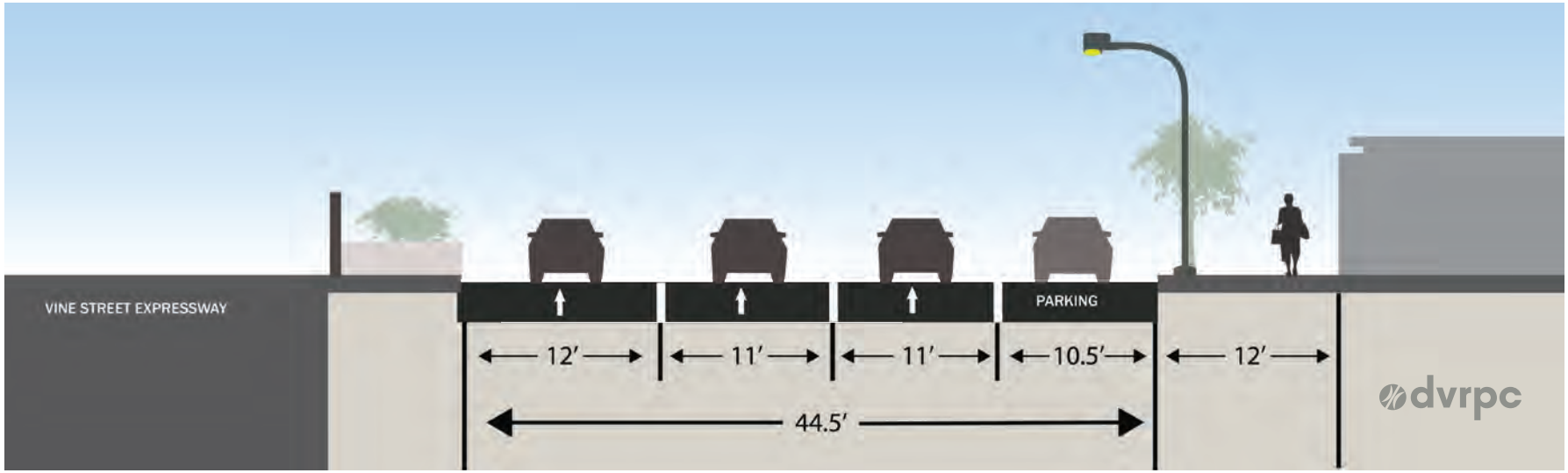
FIGURE 21: 9TH AND VINE WESTBOUND, PROPOSED



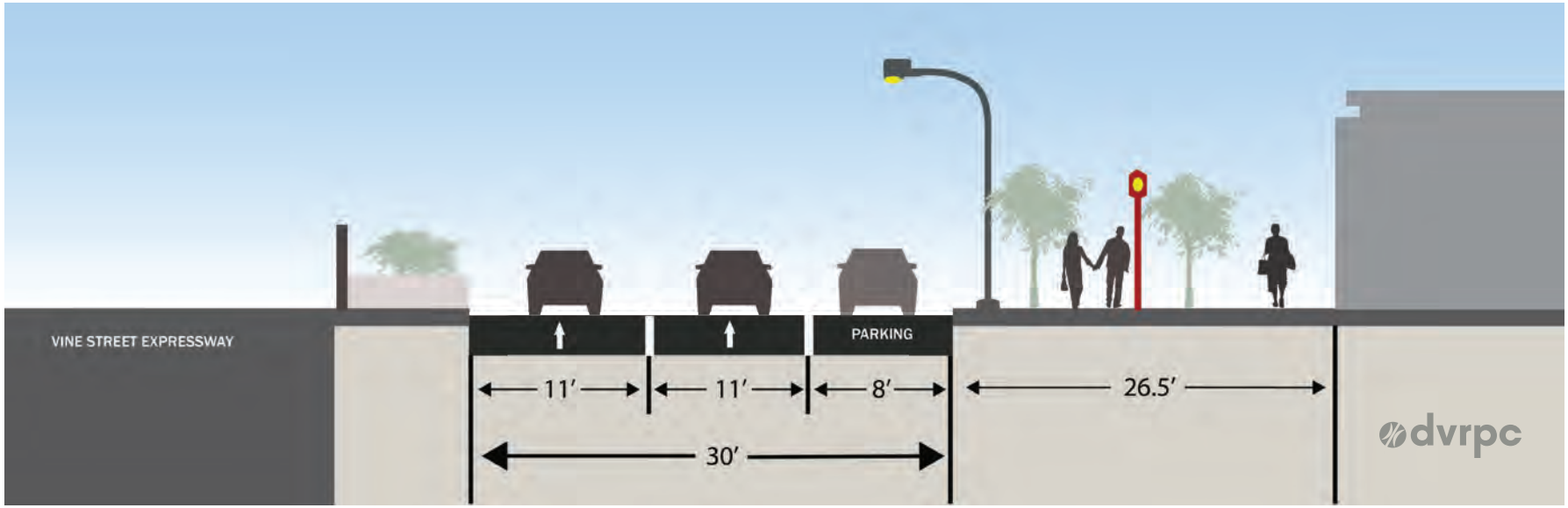
Source: DVRPC, 2018

FIGURE 22: LANE RECONFIGURATION CROSS SECTION: VINE STREET WESTBOUND BETWEEN 11TH AND 12TH STREETS

EXISTING



PROPOSED



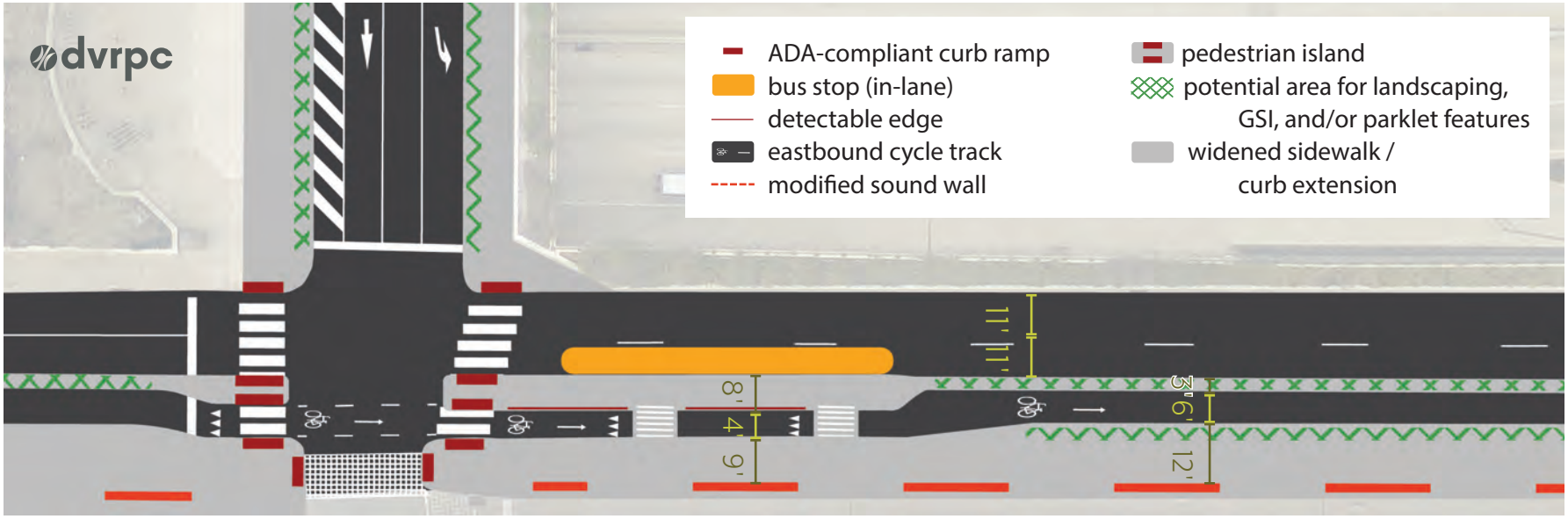
Source: DVRPC, 2018

EASTBOUND LANE RECONFIGURATION

On Vine Street eastbound, the rightmost travel lane would be removed between Broad Street and 11th Street, and the remaining travel lanes would be narrowed to 11 feet, reducing the vehicle cartway width from 34 feet to 22 feet. Between 11th Street and 9th Street, the existing authorized parking lane would be removed when the police headquarters and precinct relocate; the existing two travel lanes would be narrowed to 11 feet. The 12 feet of width reclaimed from this reconfiguration would be converted to an eastbound cycle track six feet wide with a buffer ranging from two to six feet wide, depending on existing sidewalk width (Figure 23). Between Broad Street and 12th Street, where the existing sidewalk is especially narrow, the cycle track buffer would be two feet wide wide and the sidewalk would be widened by four feet. Between 12th Street and Broad Street, where sidewalk width already meets the minimum requirement, the buffer could be as wide as six feet. The cycle track buffer could be protected by flexible delineator posts in the short term, and in the long term could be protected by more durable posts, landscaping, or green stormwater infrastructure.

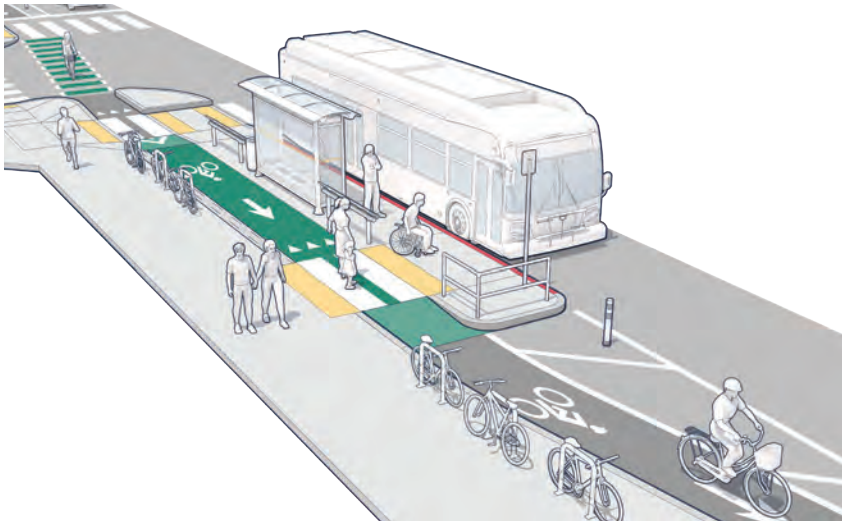
NJ Transit bus stops would be consolidated to improve service and minimize potential conflicts between bus riders and bicyclists. The existing stops at 13th Street and 11th Street would be removed. At 12th Street and 10th Street, bus stops would be moved to the far side of the intersection, and curb extension bus stops would be installed. At each curb extension bus stop, the cycle track would be routed behind the stop, raised to curb level, and narrowed to four feet, encouraging bicyclists to yield to pedestrians boarding and alighting the bus (Figures 23 and 24).

FIGURE 23: 10TH AND VINE EASTBOUND, PROPOSED



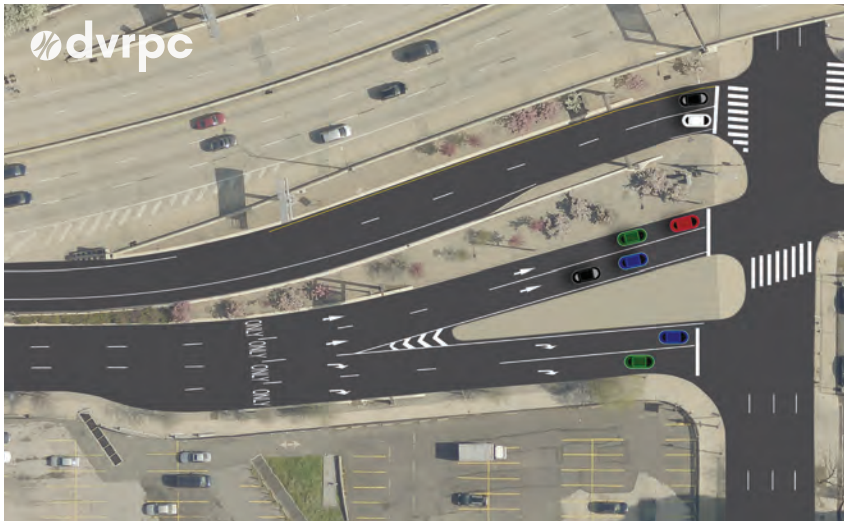
Source: DVRPC, 2018

FIGURE 24: CURB EXTENSION BUS STOP WITH CYCLE TRACK



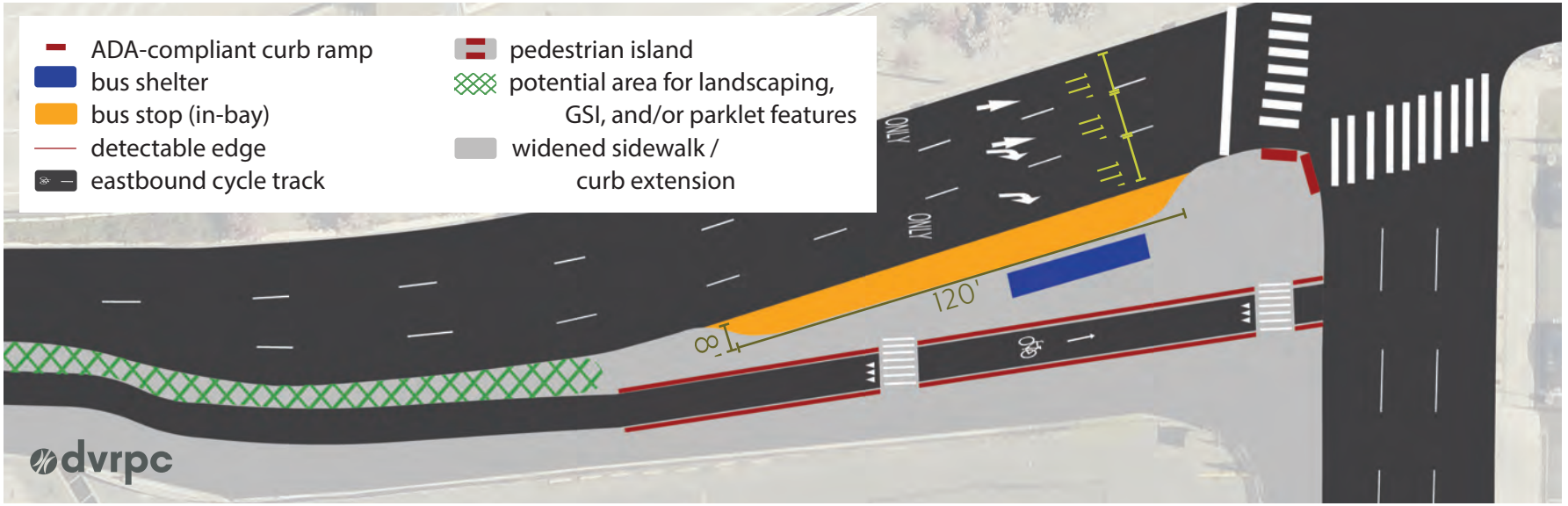
Source: Multimodal Corridor Guidelines, AC Transit, Toole Design Group, 2018

FIGURE 25: 8TH AND VINE EASTBOUND, EXISTING



Source: DVRPC, 2018

FIGURE 26: 8TH AND VINE EASTBOUND, PROPOSED



Source: DVRPC, 2018

Between 9th Street and 8th Street, the existing median would be removed. The rightmost right-turn lane would be removed, and the remaining right-turn lane would shift to be adjacent to the existing through lanes. The center lane would change from through-only to right-or-through to provide necessary traffic flexibility. All lanes would be narrowed to 11 feet, reducing the crossing distance to 33 feet and creating room for a widened sidewalk and curb extension bus stop. A bus bay would be added for the 8th Street stop to provide adequate time for passenger boardings without delaying traffic, and a bus shelter would be installed (Figures 25 and 26). The final design of the curb extension must provide an adequate turning radius for buses and other large vehicles turning right onto 8th Street.

At 8th Street, eastbound bicyclists will need to turn right to access the forthcoming protected Race Street bicycle lane. The city should explore the feasibility of a bicycle facility on 8th Street between Vine Street and Race Street to facilitate this movement and calm traffic. Additionally, further consideration should be given to connecting the cycle track beyond Broad Street toward the bicycle facilities on Benjamin Franklin Parkway.

Figure 27 illustrates the proposed eastbound lane configuration at a typical cross section.

OTHER MULTIMODAL IMPROVEMENTS

In addition to lane reconfiguration, several changes are recommended to make the corridor a safer, more attractive, and more community-oriented public space. These recommendations work hand in hand with lane reconfiguration to improve multimodal options on Vine Street.

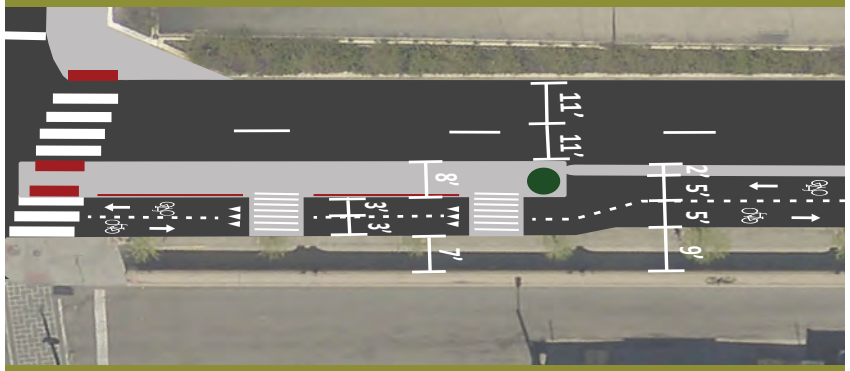
Pedestrian Islands

Pedestrian islands are recommended along the Vine Street eastbound cycle track to separate bicycle, pedestrian, and vehicular traffic (Figure 15). Additionally, pedestrian islands should be constructed in the eastern crosswalk at 8th Street and Vine Street westbound (Figures 28 and 29). The western crosswalk cannot accommodate pedestrian islands without obstructing turning radii for trucks and buses.

Cycle Track Alternatives

The *Philadelphia Complete Streets Handbook* recommends a minimum width of six feet for a one-way cycle track, and 12 feet for a two-way cycle track, with a two-to-three-foot buffer from traffic. On Vine Street eastbound, a one-way cycle track would meet this requirement except at each bus stop, where the lane would narrow to four feet. Sidewalks would be widened, and bus stop platforms would be 8 feet wide as required by ADA. However, this design does not provide a natural eastbound and westbound pair. Vine Street westbound cannot accomodate a bicycle lane because the removal of a travel lane is not feasible between 12th Street and Broad Street.

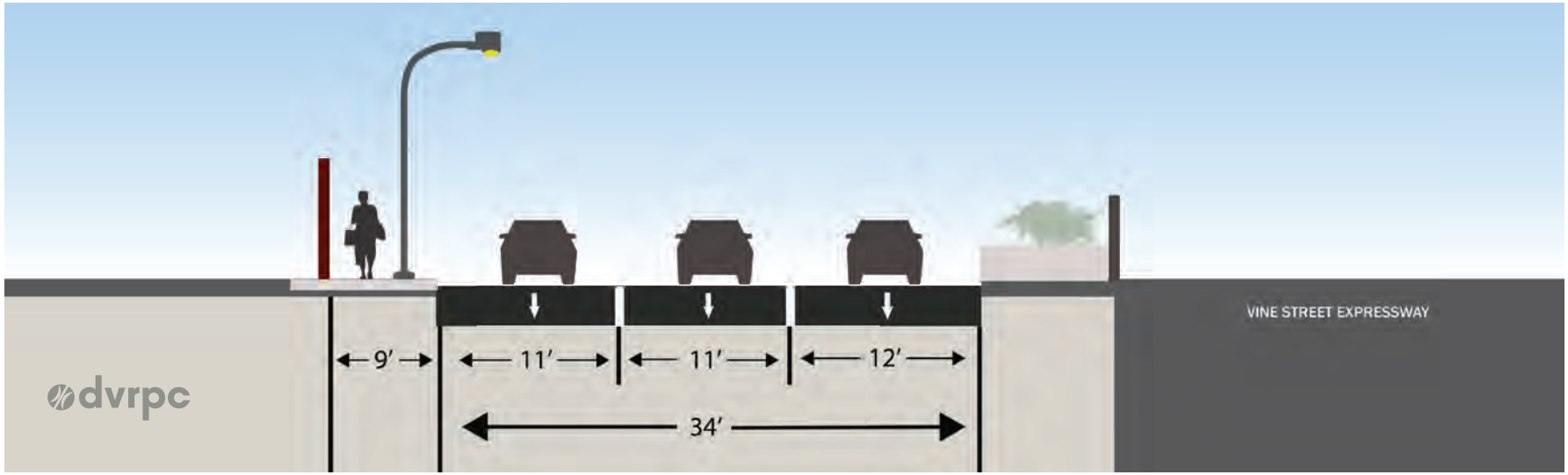
An alternative design providing a westbound facility would feature a two-way cycle track on Vine Street eastbound. This cycle track would be 10 feet wide (two five-foot lanes), narrower than the recommended minimum width. At each bus stop, the cycle track would narrow to six feet (two three-foot lanes), and two feet would be removed from the sidewalk width. Sidewalk widening would not be feasible. This alternative requires significant tradeoffs to the comfort of the bicycle and pedestrian facilities. Additionally, bicyclists would cross intersections against traffic on a one-way street, creating a conflict with vehicles turning right on red. This alternative design would require further analysis for feasibility.



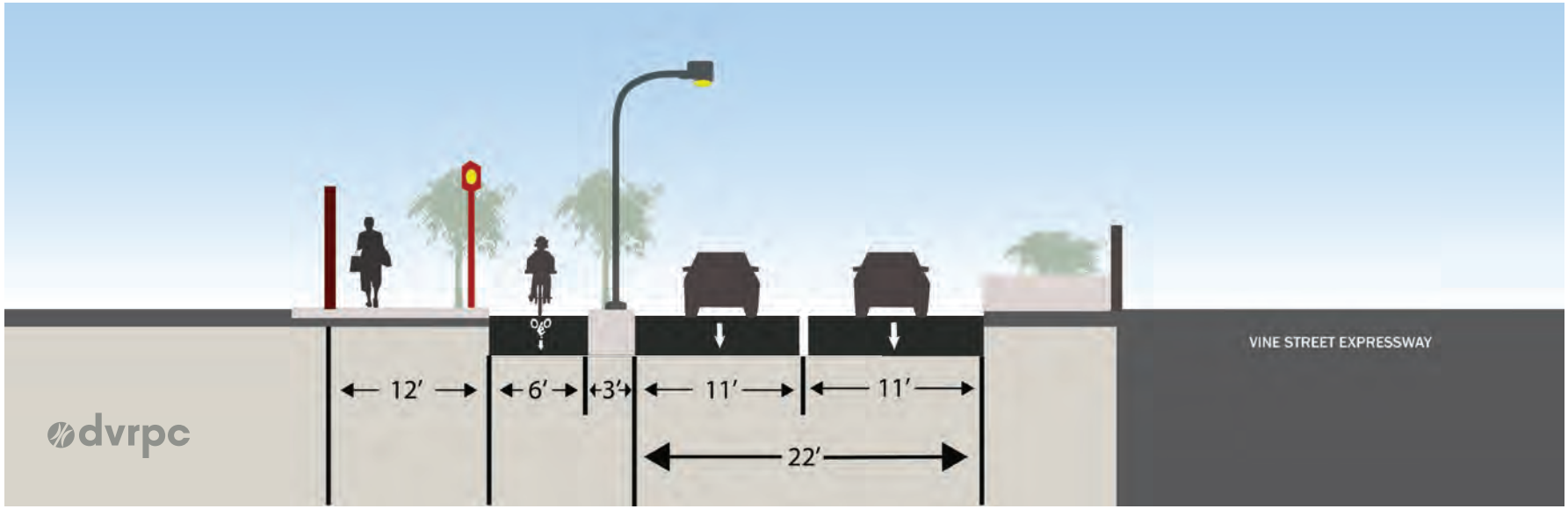
Source: DVRPC, 2018

FIGURE 27: LANE RECONFIGURATION CROSS SECTION: VINE STREET EASTBOUND BETWEEN 10TH AND 9TH STREETS

EXISTING



PROPOSED



Source: DVRPC, 2018

Mountable Medians at Expressway On-Ramps

Currently, expressway-bound vehicles make very wide turns from 8th Street onto the westbound expressway on-ramp, and from Broad Street onto the eastbound expressway on-ramp. These wide turns enable high turning speeds and reduce safety for pedestrians using the crosswalks. Because trucks and buses use these on-ramps, raised medians extending to the crosswalk are not feasible. Instead, mountable medians would encourage smaller vehicles to make tighter, slower turns while larger vehicles would be able to mount the curb if necessary (Figure 29).

Landscaping and Green Stormwater Infrastructure (GSI)

The removal of travel lanes creates the potential for new public gathering spaces, particularly on the widened Vine Street westbound sidewalks. These spaces should include landscaping to provide shade and comfort in an area that lacks abundant green space. The city should examine whether GSI is feasible on widened sidewalks and in the buffer of the eastbound cycle track. Additionally, the existing landscaping adjacent to the expressway is decades old and in need of repair. Improvements to this landscaping would beautify the corridor while providing more robust screening of the expressway.

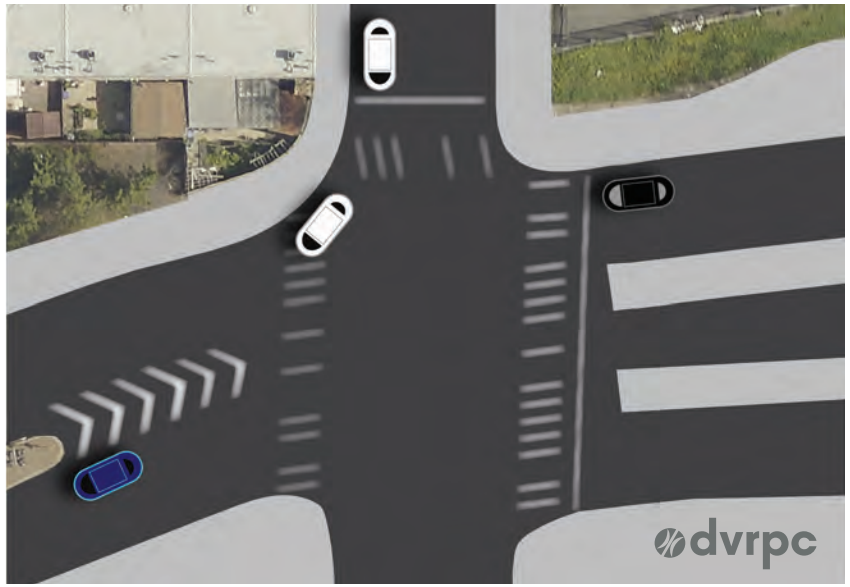
Improvements to Existing Bicycle Lanes

The bicycle lanes on the 10th Street and 13th Street overpasses should be repainted in durable, highly visible materials and should be well maintained to ensure safety for bicyclists and drivers. The 13th Street bicycle lane should be protected by heavy planters to provide additional separation from the vehicle lanes (Figure 30).

Pedestrian-Scale Lighting

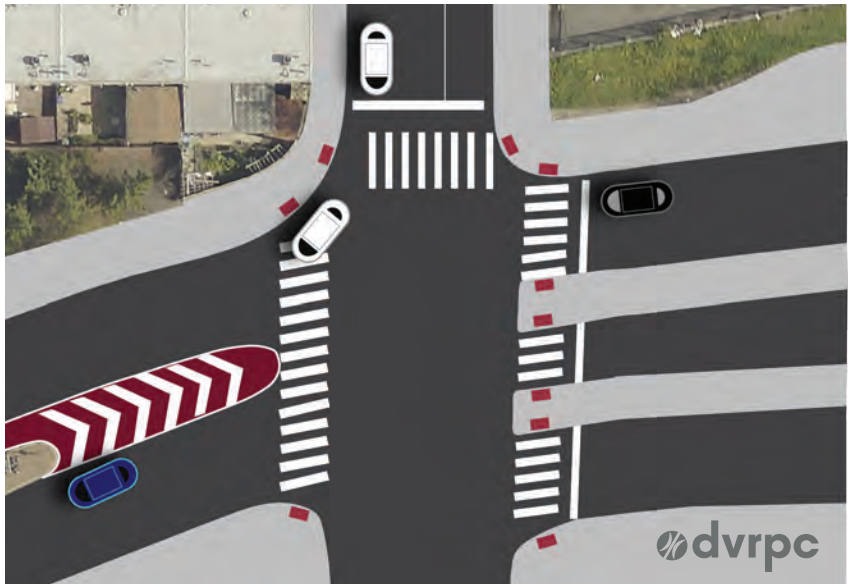
Lighting should be placed throughout the corridor to improve visibility, safety, and cohesion with neighboring communities at the pedestrian scale. Red street lanterns that match those in the Chinatown business

FIGURE 28: 8TH AND VINE WESTBOUND, EXISTING



Source: DVRPC, 2018

FIGURE 29: 8TH AND VINE WESTBOUND, PROPOSED



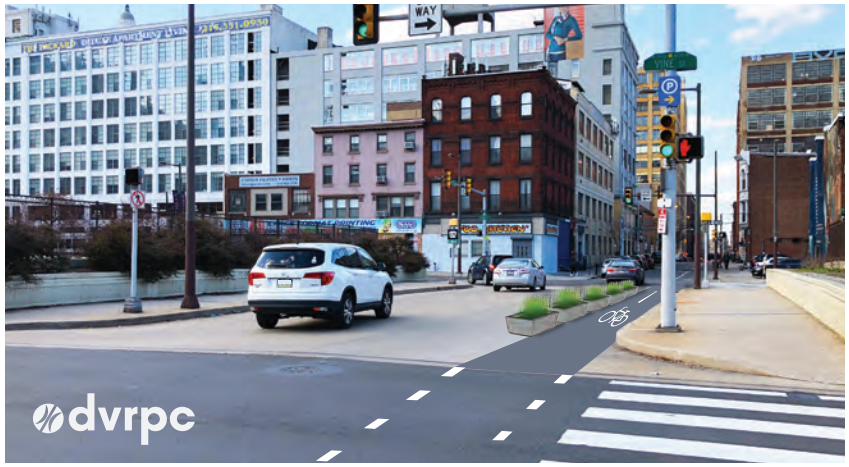
Source: DVRPC, 2018

district and Chinatown North would signal a continuous neighborhood across the expressway (Figure 31). Additionally, lighting should be improved under the 8th Street expressway overpass. A creative design could improve the aethetics and character of the underpass, similar to the lighting installed under the Spring Garden station. A comprehensive lighting plan addressing placement, funding and maintenance should be developed for the corridor in partnership with local community groups.

Wall Modification

The brick wall lining parts of Vine Street eastbound was built to mitigate expressway noise, but today it acts as a barrier between communities and contributes to a narrow and unattractive pedestrian space. Removing part or all of the existing wall and replacing it with a more permeable, landscaped buffer would beautify the corridor and create a wider, more inviting sidewalk. The final design should be developed in partnership with the local community and could include portions of the existing wall or its cultural and aesthetic elements; for example, the Chinatown medallions could be incorporated into the improved sidewalk.

FIGURE 30: 13TH STREET BICYCLE LANE IMPROVEMENTS



Source: DVRPC, 2018

Speed Limit Signs

Currently, there is only one speed limit sign in the study area, marking the 15-mile-per-hour school zone during opening, closing, and recess. Speed limit signs should be installed on Vine Street eastbound just after Broad Street, and on Vine Street westbound just after 8th Street.

Rail Park Entrance

The existing PennDOT-owned parking lot at 1125 Vine Street could be converted to an additional Rail Park entrance and community space. This space would better connect Vine Street with the Rail Park and increasing community activity on Pearl Street, and could host pop-up programming, food trucks, and other amenities.

Creative Placemaking

Parklet features, wall replacement, underpass lighting, and other project elements are excellent candidates for creative placemaking: partnering with local organizations and the wider community to design and program public space. Involving community groups such as PCDC, Asian Arts

FIGURE 31: PEDESTRIAN-SCALE LIGHTING

Source: DVRPC, 2018

Underpass lighting at Spring Garden Station. Source: DVRPC, 2018

Initiative, Pennsylvania Horticultural Society, and Mural Arts Philadelphia throughout the design process can help preserve community character while improving public spaces for residents and visitors.

Expressway Capping

A full or partial capping of the expressway has been a long-standing community goal. The city should examine the feasibility of expressway capping, including possible cap locations, cost and timeframe, funding sources, and how the space should be used. Community engagement will be a critical component of cap planning.

Off-Peak Leading Pedestrian Intervals (LPIs)

LPIs allow pedestrians to enter a crosswalk several seconds before the green phase for vehicles, enhancing their visibility and reinforcing their right-of-way over vehicles. LPIs are not feasible during peak hours when combined with the proposed lane reconfiguration, but could be implemented at 8th, 10th, 11th, 12th, and 13th streets during off-peak hours. Off-peak LPI feasibility at Broad Street may require further study but could significantly improve safety for pedestrians there.

Crossing Time and Crossing Distance

Pedestrians typically traverse crossngs at a pace of 3.5 feet per second, and this is the nationally accepted standard for crosswalk design. However, this pace may be difficult for some pedestrians, including the elderly or mobility-impaired. Reducing the minimum crossing pace at an intersection increases safety and comfort for all pedestrians and creates a more inclusive streetscape.

Minimum crossing paces can be improved by increasing crossing time, reducing crossing distance, or both. The recommended improvements in this report, including lane narrowing and bulbout curb extensions, significantly reduce crossing distance at several intersections. This will reduce minimum crossing pace even where crossing time decreases slightly (at Vine Street westbound and 10th, 11th, 12th, and 13th Streets).

For example, pedestrians crossing Vine Street westbound at 10th Street must currently cross 44.5 feet in 29 seconds, at a minimum pace of 1.5 feet per second. In the proposed design, pedestrians will cross 22 feet in 26 seconds, at a minimum pace of 0.9 feet per second.

In the proposed design, all crosswalks meet the national standard of 3.5 feet per second, and most require a crossing pace no faster than 2.0 feet per second. Additional features such as pedestrian islands further increase comfort and safety while crossing.

Increased Off-Peak Crossing Time

Like LPIs, additions to northbound and southbound green signal phases are not feasible during the peak hours, but may be feasible at some locations during the off-peak. Adding three to five seconds of green time for north-south crossings could improve the pedestrian experience where lane removal is not possible, particularly at 8th Street and Vine Street westbound, where the eastern crossing is 80 feet long and requires a crossing pace of three feet per second.

CONGESTION MITIGATION IMPROVEMENTS

To prevent excessive vehicle delay and related challenges for pedestrians and residents, several congestion mitigation strategies are recommended in conjunction with lane removal.

Turning Movement Change: Vine Street Westbound and Broad
To mitigate queuing in the single left-turn lane on Vine Street westbound, one through lane should be changed to a left-or-through lane (Figures 32 and 33). Clear signage and pavement markings should be installed to ensure vehicles make this movement safely.

Turning Movement Change and Bus Stop Consolidation: Vine Street Westbound and 8th Street
To mitigate queuing in the single right-turn lane serving both Vine Street local and the expressway ramp, the center through lane should be changed to allow a through movement or a right turn onto the expressway ramp. The existing right-or-through lane would no longer allow a through movement (Figures 34 and 35). Clear signage and pavement markings should be installed to ensure vehicles make this movement safely.

Because the rightmost lane would no longer allow a through movement, the existing bus stop at the northwest corner of the intersection would be removed to prevent buses from weaving to and from the curb. Removing this fairly low-ridership bus stop would improve pedestrian safety and vehicular movement. It would also improve bus performance, as SEPTA Route 47 buses currently experience frequent delays at this intersection due to queuing in the right lane. Riders who currently board at this stop would shift to the Callowhill Street stop 350 feet to the north.

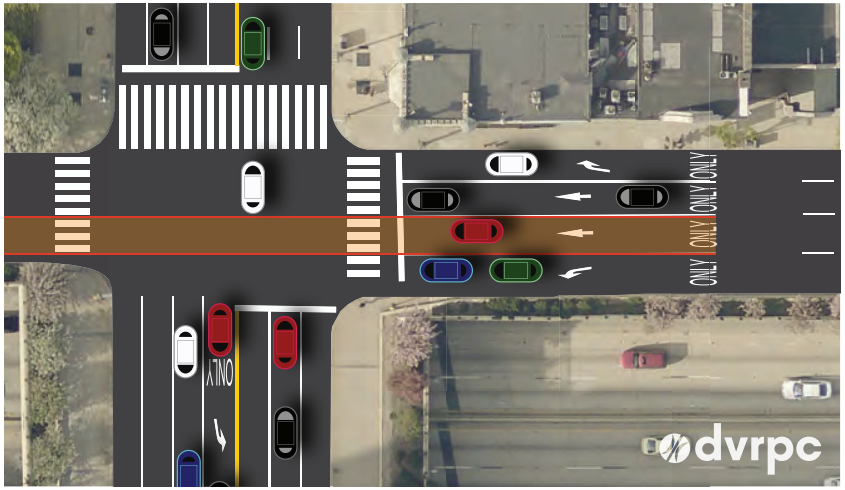
To prevent confusion, this stop's northbound pair at 7th Street and Vine Street would also be eliminated. This stop is also low-ridership and prone to congestion. Northbound riders would shift to the Race Street stop 475 feet to the south.

Signal Timing Change: Vine Street Westbound and 8th Street
This recommendation addresses the excessive queuing approaching the expressway ramp at Vine Street westbound and 8th Street. Two seconds would be added to the green phase for westbound traffic during evening peak hours and removed from southbound traffic (Figures 34 and 35). Although this improvement is independent from the lane reconfiguration, it can help alleviate spillback beyond 7th Street during the morning and evening peak hours. Currently, queuing at the ramp negatively affects pedestrian movements at this intersection because vehicles block the western crosswalk, forcing pedestrians to weave around vehicles.

Signal Timing Change: Vine Street Westbound and 10th, 11th, 12th, and 13th Streets
The removal of a travel lane between 9th Street and 12th Street increases vehicle delay throughout Vine Street westbound. To mitigate this delay, the westbound green phases at 10th, 11th, 12th, and 13th streets should be increased by three seconds during the morning and evening peak hours. This signal timing change reduces crossing time for pedestrians crossing Vine Street, but the reduction is more than offset by the shorter crossing distances.

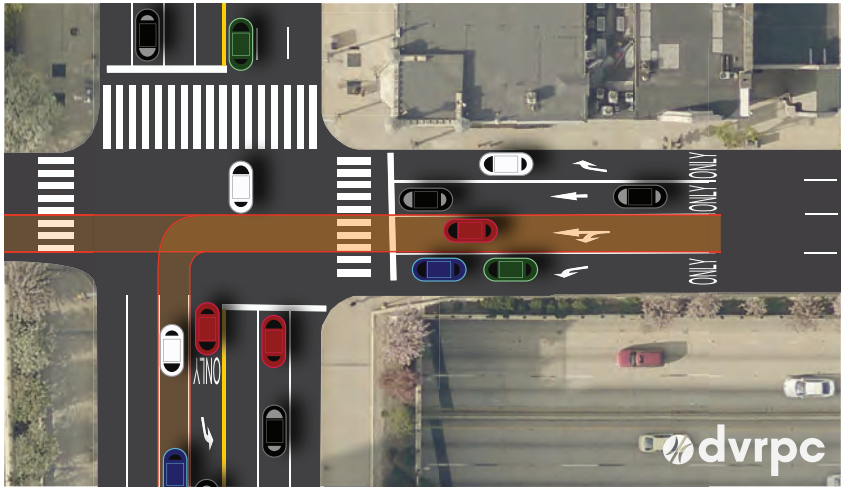
Westbound On-Street Parking: Flexible Spaces
The proposed lane reconfiguration does not require the removal of any metered on-street parking spaces. However, the future Rail Park, Eastern Tower community center, and other developments will likely increase the number of passenger pickups and dropoffs occurring in the corridor. To prevent taxis and other vehicles from stopping in-lane for pickups and dropoffs, one or two existing parking spaces per block could be converted to flexible spaces, accommodating pickups and dropoffs during the day and providing parking at night.

FIGURE 32: BROAD AND VINE WESTBOUND, EXISTING MOVEMENTS



Source: DVRPC, 2018

FIGURE 33: BROAD AND VINE WESTBOUND, PROPOSED MOVEMENTS

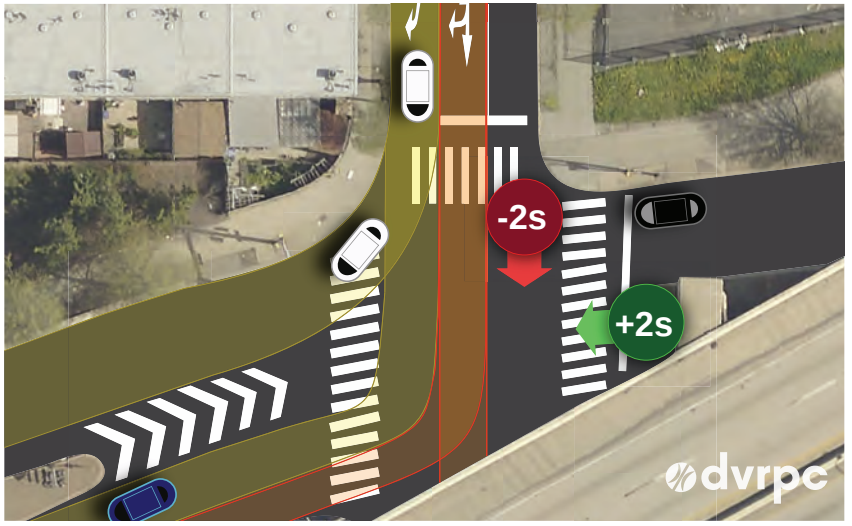


Source: DVRPC, 2018

FIGURE 34: 8TH VINE WESTBOUND, EXISTING MOVEMENTS

Source: DVRPC, 2018

FIGURE 35: 8TH AND VINE WESTBOUND, PROPOSED MOVEMENTS



Source: DVRPC, 2018

IMPROVEMENT ANALYSIS

PEDESTRIAN, BICYCLE, AND TRANSIT

Two key pedestrian issues in the study area identified by the community are high vehicle speeds and difficulty crossing Vine Street. The traffic-calming benefits of road diets, including lower vehicle speeds and reduced crashes, are endorsed by the USDOT Federal Highway Administration (*Road Diet Informational Guide*). Lane reconfiguration and supplementary recommendations, such as curb bulbouts, off-peak LPIs and pedestrian islands, also create shorter, safer crossings. **Crossing distances across Vine Street westbound at 10th Street, 11th Street, and 12th Street decrease from 45.5 feet to 22 feet under the proposed scenario.**

Sidewalk widening, improved landscaping, pedestrian-scale lighting, and other improvements will create a more attractive pedestrian environment that repairs the disruptive effect of the expressway. Table 1 shows the differences in sidewalk width before and after the proposed widenings.
All but one sidewalk segment would meet the minimum recommended width of 12 feet.

Additional sidewalk width could be gained on Vine Street eastbound between 13th and 12th Streets, and between 11th and 9th Streets, if a substantial portion of the brick wall is removed. However, the wall was installed to mitigate sound from Vine Street for nearby residents, and substantial community outreach must be conducted to better understand the tradeoffs of a potential wall redesign. Removing a traffic lane on Vine Street eastbound, as proposed, would also reduce traffic noise and offset the impact of wall modification.

The proposed widened and beautified sidewalks on Vine Street westbound connect key community spaces, including PCDC, Holy Redeemer, the 10th Street Plaza, and the future Eastern Tower and Rail Park. Community involvement in the design of these facilities can preserve and enhance the unique community character of the neighborhood.

The bicycle lanes on 10th Street and 13th Street provide critical northbound and southbound connections, but the study area lacks facilities for eastbound and westbound bicyclists. An eastbound connection is particularly important, as the distance between the nearest eastbound bicycle lanes on Spring Garden Street and Pine Street is over a mile (westbound facilities on Arch Street and Callowhill Street are a third of a mile apart). **The proposed bicycle lane will improve safety for bicyclists, connect storefronts and community institutions to the larger bicycle network, and provide a buffer between pedestrian space and vehicular traffic.**

The addition of curb extension bus stops will provide a safe place for bus riders to wait, and for bus drivers to pick up passengers directly from the curb without weaving into and out of traffic. At 8th Street, a bus shelter will provide safety and comfort at the highest-volume stop, and a bus bay will prevent vehicle queuing behind buses making longer stops. Bus stop consolidation and far-side, in-lane pickup will reduce delay for bus drivers and other vehicles. Lastly, improvements to pedestrian and bicycle infrastructure will assist transit riders making multimodal connections.

TABLE 1: SIDEWALK WIDTHS

SIDEWALK SEGMENT	CURRENT WIDTH	PROPOSED WIDTH
8TH TO 9TH, WB	13'	13'
9TH TO 10TH, WB	12'	UP TO 26.5
10TH TO 11TH, WB	12'	UP TO 26.5'
11TH TO 12TH, WB	10'	12'—26.5'
12TH TO 13TH, WB	8'	12'
13TH TO BROAD, WB	13'	14.5'
BROAD TO 13TH, EB	10'	12'
13TH TO 12TH, EB	7'	11'
12TH TO 11TH, EB	13'	13'
11TH TO 10TH, EB	9'	12'
10TH TO 9TH, EB	9'	12'
9TH TO 8TH, EB	10'	12'—15'

TRAFFIC OPERATIONS

Based on the project traffic simulation, the proposed design concept maximizes improvements for pedestrians, bicyclists, and transit riders with minimal disruption to vehicular traffic flow.

VISSIM traffic simulation software was used to determine the existing traffic volume, queue length, delay, and overall level of service (LOS) at each intersection, based on TMCs conducted in 2017. LOS and related measures were also evaluated for a Future No Build (2025) Scenario, which accounts for population and employment growth anticipated in 2025, as well as recently completed and approved developments in the study area. Finally, performance measures were evaluated for a Future Build (2025) Scenario, which applies Future No Build vehicle volumes to the recommended roadway configuration. Figures 36 through 38 show the intersection-level LOS in the AM and PM peak hours for each scenario, and Appendix F shows all measures at the intersection level, as well as each intersection approach.

Under Existing Conditions, all intersections perform at an LOS C or better in both the morning and evening peak (Figure 36). In Future No Build (2025), two intersections reach an LOS D in the morning peak, two intersections reach an LOS D in the evening peak, and one intersection reaches a level E (Figure 37). Problematic intersections are centered on Broad Street and 8th Street and are partly caused by high volumes of vehicles accessing the expressway (Appendix F). The Future Build Scenario was developed to avoid worsening traffic flow at these unstable intersections, and in some cases the proposed design has a positive impact on traffic flow. **All intersections perform at LOS D or higher under the proposed scenario** (Figure 38). However, expressway approaches remain problematic and may require congestion mitigation measures outside the scope of this report.

A number of alternative build scenarios were evaluated for feasibility before finalizing the roadway configuration proposed in this report.

Explanation of Performance Measures

Volume—Volume is the total number of vehicles approaching an intersection from a given street segment in a given time period.

Queue Length—Queue length describes the lineup of vehicles waiting to enter an intersection due to a red light, stop sign, or other obstruction. It is the distance between the intersection and the furthest vehicle waiting to enter. The value given is the average queue length approaching an intersection across a series of time intervals.

Delay—Delay is the average amount of time, in seconds, that it takes a vehicle passing through an intersection beyond what would be experienced in a free-flow condition. The value given is the average for all vehicles completing the movement.

Level of Service (LOS) – LOS are letter grades assigned to various degrees of delay. An LOS of "A" corresponds with free-, or near free-flowing conditions, while an "F" score corresponds with a breakdown in traffic flow.

The goal in traffic operations is not to achieve an LOS of A, but to create conditions that maintain stable traffic flow that typically is achieved within the LOS range of A to C. If existing conditions are LOS D or lower the aim should be to maintain conditions within that letter grade.

The first alternative tested was the removal of a travel lane in each direction throughout the entire corridor. However, this configuration led to extremely unstable traffic operations. Performance measures for this scenario could not be recorded reliably due to severe instability, but several intersections would have received an LOS E or lower. Three other configurations were evaluated, and were found to be feasible, but would have had a smaller benefit for pedestrian and bicyclists.

These alternatives and their LOS scores are summarized in Appendix G.

FIGURE 36: LOS, EXISTING CONDITIONS

Source: DVRPC, 2018

FIGURE 37: LOS, FUTURE NO BUILD (2025)

Source: DVRPC, 2018

FIGURE 38: LOS, FUTURE BUILD (2025)

Source: DVRPC, 2018

IMPLEMENTATION

PROJECT PHASING

The recommendations in this report can be implemented in three phases, based on the scale of required design and construction and other factors. The installation of ADA-compliant curb ramps will take place across phases as the adjacent roadway is improved.

Phase 1

This phase includes measures that can be taken in the short term as funding is secured. These recommendations will have minimal impact on traffic operations and do not require large-scale design or construction.

- Consolidate NJ Transit bus stops.
- Repaint faded crosswalks and faded bicycle lane markings.
- Add speed limit signs.
- Pilot longer north-south crossing times and LPIs during off-peak hours.
- Add protective planters or flexible delineator posts to the 13th Street bicycle lane.
- Initiate design phases for the 9th Street "T" intersection, Vine Street eastbound between 9th Street and 8th Street, pedestrian islands, and curb extension bus stops.
- Coordinate with the Friends of the Rail Park and PennDOT concerning the conversion of 1125 Vine Street to a Rail Park entrance.
- Install interim pedestrian bulbouts on Vine Street westbound near on-street parking. These will shorten the crossing distance by one lane until lane removal and permanent curb extension are implemented. Interim bulbouts can be painted with protective bollards and planters. A pilot can be placed at 10th Street and later expanded to other intersections.
- Launch a creative placemaking project to engage the community in designing and implementing improved sidewalks, parklets, underpass lighting, and wall modification.

Phase 2

This phase includes medium-term recommendations that require a somewhat larger amount of design, construction, or community engagement. Phase 2 also includes an interim eastbound bicycle lane pending the removal of the authorized parking lane on Vine Street eastbound between 11th Street and 9th Street.

- Replace the rightmost travel and parking lane on Vine Street eastbound between Broad Street and 9th Street with an interim eastbound bicycle lane. The interim bicycle lane can be six feet wide and feature a painted six-foot buffer and flexible bollards, but will require shared bus-bicycle spaces at 12th Street and 10th Street, and between 9th Street and 8th Street.
- Install pedestrian islands in the eastern crosswalk at Vine Street westbound and 8th Street.
- Install mountable medians near the expressway on-ramps.
- Modify brick wall on Vine Street eastbound based on community-driven design.
- Install community-designed underpass lighting at 8th Street.
- Install pedestrian-scale lighting throughout the corridor.

Phase 3

This phase includes longer-term recommendations that require large-scale design and construction.

- Reconstruct Vine Street eastbound between 9th Street and 8th Street, removing the pedestrian median and a travel lane, adding a bus bay and extending the curb.
- Install a one-way eastbound cycle track between 9th Street and 8th Street, including landscaping, buffers, and a pedestrian crossing.
- Install a bus shelter at the 8th Street bus stop.
- Install curb extension bus stops and pedestrian islands on Vine Street eastbound.
- Enhance the eastbound bicycle buffer with landscaping or green stormwater infrastructure.
- Reconstruct the intersection at Vine Street westbound and 9th Street, and install a signal.
- Replace the rightmost travel lane on Vine Street westbound between 9th Street and 12th Street with on-street parking. Replace the existing parking lane with an extended sidewalk. Add permanent curb extensions at crosswalks with on-street parking.
- Install landscaping, seating, and other parklet features on extended sidewalk based on community-driven design.
- Evaluate options for a partial expressway cap.

FUNDING

A number of funding sources are available to local governments for multimodal improvements to the transportation network and for creative placemaking initiatives. Potential grant opportunites for this project include:

- Transportation Alternatives Set-Aside Program;
- Safe Routes to School Program;
- Congestion Mitigation and Air Quality Improvement Program;
- Pennslyvannia Department of Community and Economic Development Multimodal Transportation Fund;
- People for Bikes Community Grants;
- Community Transportation Development Fund;
- Surface Transportation Block Grant Program;
- Transit Reseach Demonstration Program;
- National Endowment for the Arts Our Town Grant;
- ArtPlace America National Creative Placemaking Fund; and
- Knight Foundation Knight Cities Challenge.

MAINTENANCE

Amenities, such as parklet features, landscaping, and pedestrian-scale lighting, will require ongoing maintenance after installation. The city should partner with local community groups and non-profit organizations to ensure a sustainable maintenance plan is in place. These groups should also have a role in design, installation, and community outreach. Potential partner organizations include:

- Philadelphia Chinatown Development Corporation;
- Friends of the Rail Park;
- Pennsylvania Horticultural Society;
- Center City District;
- Callowhill Neighborhood Association;
- Asian Arts Initiative; and
- Mural Arts Philadelphia.

SUMMARY AND NEXT STEPS

The proposed design for Vine Street local between Broad Street and 8th Street would change Vine Street eastbound to a two-lane road with a protected bicycle lane and curb extension bus stops. The design would change Vine Street westbound to a two-lane road between 9th Street and 12th Street and extend the existing sidewalk, creating room for parklet features and beautification. These improvements would connect neighborhoods across the Vine Street Expressway and provide a safer, more comfortable experience for pedestians, bicyclists, and transit users. Traffic operations would not be significantly impacted and vehicular speeding would likely decline, creating a safer environment for all roadway users.

Next steps include continued outreach to the local community and other stakeholders to finalize the design. Phase 1 improvements may be implemented as soon as funding is secured, while Phase 2 and Phase 3 improvements will require additional coordination, community outreach, and design.

The Philadelphia Water Department should be consulted regarding the feasibility of green stormwater infrastructure in the bicycle lane buffer and in areas where the sidewalk will be expanded. Philadelphia Parks and Recreation and the Pennsylvania Horticultural Society should provide input on improvements to existing landscaping, as well as future landscaping installation and maintenance.

Lastly, further study is needed to address community and stakeholder concerns that were outside the scope of this project. These include traffic congestion and safety concerns on Broad Street, and traffic congestion approaching the I-676 on-ramp at 8th Street.

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APPENDIX A: PREVIOUS PLANNING EFFORTS

2035 CENTRAL DISTRICT PLAN (2013)

Philadelphia 2035, the city's comprehensive plan, is organized around three themes, "Thrive, Connect, and Renew." The Central District Plan highlights the role of Complete Streets in connecting communities, and highlights Vine Street local as a priority for implementing "low-cost safety and traffic-calming measures to tame speeds."

LADDERS OF OPPORTUNITY—EVERY PLACE COUNTS DESIGN CHALLENGE (2016)

In July 2016, USDOT held a workshop for community members and stakeholders to reimagine the Vine Street corridor. Capping the expressway was a popular idea among community members, but a full cap was determined to be infeasible due to light and ventilation requirements. Participants identified the key goals behind a full cap—including increased open space, landscaping, and "safe connections and mobility for all"—and considered alternative solutions to meet these goals. The proposed solutions from this exercise are outlined in a report; they include lane reconfiguration, the addition of bicycle lanes, sidewalk bulbouts to reduce crossing distances, additional streetscaping (e.g., landscaping, lighting, and street furniture), and partial expressway capping.

Reviving Vine addresses a number of the next steps identified in USDOT's Design Challenge report, particularly in the near and mid term:

Near Term

- Enhance crosswalks at existing pedestrian crossings on Vine Street local.
- Implement traffic-calming techniques and speed limit signs.
- Determine bike and pedestrian counts around school routes and opportunities for safer crossings.

Mid Term

- Initiate a Vine Street local lane reconfiguration alternatives study to determine feasibility and impacts. Depending on the feasibility, investigate the use of temporary landscaping, wayfinding, benches, line striping, and parklets to pilot the reduction of lanes.
- Begin a design process for lane reconfiguration and cycle track concepts.

CHINATOWN CONNECTIONS—SAFE ROUTES TO SCHOOL (2017)

Developed by PCDC, *Chinatown Connections* focuses on providing safe connections, particularly for children and seniors, to public spaces and community institutions. The study focuses on the difficulty of crossing Race Street and Vine Street to access the neighborhood's limited open spaces, such as Franklin Square.

CHINATOWN NEIGHBORHOOD PLAN (2017)

Interface Studio prepared the 2017 *Chinatown Neighborhood Plan* for PCDC. Interface studio and PCDC conducted extensive community engagement for its development. The plan identifies goals and recommendations for a wider Chinatown area, including Callowhill and Chinatown North. The scope of the plan is comprehensive, including housing, economic development, and community life elements.

The "Connectivity" element, which addresses ways to better unify the community across Vine Street, is directly relevant to this report. The plan proposes the following primary traffic-calming measures: lane reconfiguration, curb bulbouts, a "T" configuration at 9th Street and Vine Street westbound, and the addition of a cycle track or widened sidewalks to replace vehicles lanes. The plan also calls for improvements to the pedestrian environment, such as improved lighting, landscaping, removal of the brick wall on Vine Street eastbound, and the creation of "gateway" plazas at key entry points to the community. Traffic-calming and streetscape improvements are broken into phases, which culminate in a proposed full expressway cap in the long term.

APPENDIX B: EQUITY ANALYSIS

TABLE B1: EQUITY ANALYSIS VARIABLES

	CENSUS TRACT 2	MARGIN OF ERROR	CENSUS TRACT 376	MARGIN OF ERROR
Population	2,563	± 457	3,058	± 432
Youth	12.5%	± 3.6%	9.3%	2.9%
Older Adults	8.8%	± 4.0%	6.4%	1.6%
Female	45.4%	± 4.7%	42.5%	6.3%
Racial Minority	67.8%	± 14.2%	52.0%	8.1%
Ethnic Minority (Hispanic)	4.3%	± 5.6%	12.4%	9.9%
Foreign Born	37.3%	± 11.0%	26.5%	10.6%
Limited English Proficiency	30.5%	± 8.0%	20.3%	8.6%
Disabled	6.9%	± 5.2%	12.3%	4.8%
Low Income	51.9%	± 16.2%	52.3%	11.2%

Sources: American Community Survey, 2016 5-Year Estimates; DVRPC, 2018

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APPENDIX C: PUBLIC OPEN HOUSE EXIT SURVEY

HELP US REVIVE VINE STREET.
project feedback

REVIVING VINE
dvrpc

1. Of the recommendations presented, rank the top 5 most important to you. Write a number (1-5) next to each choice, where 1 is the most important:

__ Congestion Mitigation (Turning movement and signal timing changes to ease traffic congestion.)
__ Road Diet (The removal of a travel lane.)
__ Lane Narrowing (Reducing the width of travel lanes.)
__ Speed Limit Signs
__ Bicycle Lane Maintenance
__ Wider Sidewalks
__ Pocket Parks
__ New Eastbound Bicycle Lane
__ Curb Extensions (Areas of expanded curbing that reduce pedestrian crossing distance.)
__ ADA-Compliant Ramps (Curb ramps that are compliant with the Americans with Disabilities Act.)
__ Crosswalks and Pedestrian Islands
__ Lighting
__ Rail Park Entrance
__ Replacement of Wall with Landscaping
__ Partial Expressway Capping (Covering a portion of the expressway to create new space for other uses.)

2. Are there other changes you would like to see to improve safety, mobility, and neighborhood connections in the study area?

3. Are there any other comments you would like to share?

flip over →

Source: DVRPC, 2018

TRANSPORTATION INFORMATION

How frequently do you DRIVE, WALK, BIKE, or USE A BUS STOP on Vine Street local between Broad Street and 8th Street? *(please check)*

4. Drive	__ Every day	__ 2-6 times per week	__ Once per week	__ Once per month	__ Never
5. Walk	__ Every day	__ 2-6 times per week	__ Once per week	__ Once per month	__ Never
6. Bike	__ Every day	__ 2-6 times per week	__ Once per week	__ Once per month	__ Never
7. Use a bus stop	__ Every day	__ 2-6 times per week	__ Once per week	__ Once per month	__ Never

8. Which path do you usually take to WALK across Vine Street between Broad Street and 8th Street? *(please check)*

__ Broad Street
__ 13th Street
__ 12th Street
__ 11th Street
__ 10th Street
__ 9th Street
__ 8th Street
__ I do not walk across Vine Street

OPTIONAL DEMOGRAPHIC INFORMATION

Help us understand who is participating in this open house!

9. What is the zip code of your primary residence? _____

10. What is the zipcode of your primary workplace? _____

11. What is your age range? *(please check)*
__ Under 18 years | __ 18-34 years | __ 35-64 years | __ 65-74 years | __ 75 years and over

12. Do you or does anyone in your household have a disability that requires mobility assistance, such as a cane, walker, scooter, or wheelchair? *(please check)*
__ Yes | __ No | __ Prefer not to answer

13. Are you of Spanish/Hispanic/Latino origin? *(please check)*
__ Yes | __ No | __ Prefer not to answer

14. With which race do you identify? *(please check)*
__ American Indian, Native American, or Alaska Native
__ Asian/Pacific Islander
__ Black/African American
__ White/Caucasian
__ Other or more than one race
__ Prefer not to answer

15. How did you hear about this meeting? *(please check)*
__ Paper flyer or poster
__ DVRPC e-newsletter or website
__ Philadelphia Chinatown Development Corporation e-newsletter or website
__ Social media (Facebook, Twitter, etc.)
__ Local newspaper
__ Through my school, church, or other community organization (please specify): _____
__ Word of mouth
__ Other: _____

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APPENDIX D: PUBLIC OPEN HOUSE EXIT SURVEY RESULTS

PAPER SURVEY OVERVIEW

The same paper survey was distributed at the public meeting and through local outreach by PCDC volunteers (see Appendix C). At the public meeting on April 12, 2018, 45 respondents completed the survey. PCDC collected 43 additional surveys through its outreach efforts. The response rate for all questions ranged from 58 percent to 99 percent. Twenty-seven of the 88 respondents completed the survey in Chinese.

MODE SHARE

Walking was the most popular transportation mode through the study area, followed by driving (Figure D1). Seventy-seven percent of respondents walk through the study area at least once per week, while 50 percent of respondents drive through the study area at least once per week.[1] At the same time, 43 percent of respondents never drive through the study area, while 45 percent of respondents walk through the study area every day. Thirty-one percent of respondents take the bus at least once per week, while 12 percent bicycle through the area at least once per week. The bicycle share in this survey sample is very low, particularly when compared with the peak-hour bicycle counts collected for this study. Therefore, it is possible that bicyclists are underrepresented in this survey sample.

FIGURE D1: MODE SHARE, PAPER SURVEY RESPONDENTS

[1]The number of respondents varied for the driving, walking, biking, and bus stop questions. Seventy participants provided information on driving, 56 on walking, 51 on biking, and 53 on using a bus stop.

Source: DVRPC, 2018

TABLE D1: IMPROVEMENT RANKING

RANK	RECOMMENDED IMPROVEMENT	SCORE
1	Congestion Mitigation	198
2	Wider Sidewalks	128
3	Road Diet	123
4	Partial Expressway Capping	114
5	Lighting	110
5	Crosswalk Improvements and Pedestrian Islands	110
6	Speed Limit Signs	102
7	Replacement of Wall with Landscaping	84
8	Pocket Parks	67
9	Curb Extensions	60
10	ADA Ramps	58
11	Rail Park Entrance	56
12	New Eastbound Bicycle Lane	52
13	Existing Bicycle Lane Improvements and Maintenance	51
14	Lane Narrowing	45

RANKING OF RECOMMENDED IMPROVEMENTS

Survey respondents were asked to rank the five most important improvements of the 15 presented at the public meeting. They numbered their five preferred improvements, using "1" to indicate the most important and "5" to indicate the least important. The responses were converted to scores and aggregated to produce a final rank. Because some respondents indicated equal preference for more than one improvement, these responses were given a score of "3." All responses were analyzed, weighted, and scored in unison. The results of this ranking exercise are shown in Table D1. Congestion Mitigation was ranked most important, even though many survey respondents do not drive frequently or never drive. Respondents may feel that congestion creates an uncomfortable walking environment, or could be confusing congestion mitigation with a reduction in vehicle volumes. This interpretation is further supported by the fact that Wider Sidewalks, which would increase pedestrian space and comfort, ranked second. Furthermore, some responses to the open-ended questions suggest that respondents are concerned about traffic volumes.

OPEN-ENDED RESPONSES

While some respondents skipped short-answer questions, the vast majority of respondents answered the open-ended questions. This high response rate suggests that many respondents have thought about these neighborhood issues before, and they are enthusiastic about sharing their ideas. While the majority of the open-ended responses suggested improvements that were proposed by DVRPC, some new ideas emerged.

For example, the most shared opinion was that additional crossing guards would make the area safer for pedestrians. Because Chinatown has many local businesses, many respondents were concerned about economic vitality and believed that beautification, signage, and roadway safety improvements would help attract more visitors to the area. Gateway

signage was suggested by a few respondents, with one recommending, "[a]rchway entrances/signages at overpasses as people enter different neighborhoods (ex. "Callowhill" at 13th St.)." Other signage was also recommended to "educate or bring awareness to drivers, bicyclists, pedestrians that there are multiple users of public roads." Furthermore, a couple of respondents believed that the lack of connection across Vine Street on 9th Street hurts businesses.

With specific regard to transportation issues, many respondents cited roadway flooding at 10th Street, and some wrote that they would like traffic volumes to decrease.

DEMOGRAPHIC DATA

Of the respondents who provided their home and work zip codes, a third reside, and two-thirds work, in zip code 19107, which contains the study area and the core of the Chinatown neighborhood. About half of respondents are in the 35–64 age range, and 22 percent are 65 years or older. Fifteen percent have a disability requiring mobility assistance, or have someone in their household with a disability. Eighty-six percent identify as Asian/Pacific Islander, and 6 percent identify as Spanish/Hispanic/Latino (Table D2).

TABLE D2: DEMOGRAPHIC DATA, PAPER SURVEY RESPONDENTS

HOME ZIP CODE	RESPONSES: 76
19107	36%
19145	14%
19114	9%
19123	5%
19148	5%
19106	4%
19121	3%
19128	3%
19146	3%
19149	3%
Other	12%

WORK ZIP CODE	RESPONSES: 62
19107	66%
19103	6%
19122	5%
19102	3%
19147	3%
Other	20%

AGE	RESPONSES: 79
Under 18 years	8%
18– 34 years	22%
35–64 years	49%
65+ years	22%

HOUSEHOLD DISABILITY[2]	RESPONSES: 62
No	85%
Yes	15%

[2]Response to survey question: Do you or does anyone in your household have a disability that requires mobility assistance, such as a cane, walker, scooter, or wheelchair?

RACE	RESPONSES: 78
Asian/Pacific Islander	86%
White/Caucasian	10%
American Indian/Native American/Alaskan Native	1%
Black/African American	1%
Other or more than one race	2%

HISPANIC, LATINO, OR SPANISH ORIGIN	RESPONSES: 62
No	94%
Yes	6%

Source: DVRPC, 2018

APPENDIX E: ONLINE SURVEY RESULTS

ONLINE SURVEY OVERVIEW

DVRPC received tremendous project feedback at the public meeting, but the project team wanted to ensure it received feedback from stakeholders who were not in attendance. Therefore, an online survey was created and posted for 31 days from May 1, 2018, through June 1, 2018. Online survey respondents were prompted to react to images of the proposed recommendations presented at the public meeting on April 12, 2018. For each recommendation, respondents answered the question, "Do you like this proposed improvement? (yes/no)," and were invited to share comments. Similarly to the paper survey, the online survey included questions about preferred transportation mode and respondent demographics. Seventy individuals took the survey, and the typical response rate for each question varied from 77 percent to 100 percent of respondents.

MODE SHARE

Walking was the most popular transportation mode through the study area, followed by driving (Figure E1). Eighty-one percent of respondents walk through the study area at least once per week, while 56 percent drive through the study area at least once per week.[3] At the same time, 25 percent of respondents never drive through the study area, while 36 percent of respondents walk through the study area every day. Twenty-eight percent of respondents take the bus at least once per week, while 40 percent bicycle through the area at least once per week. Compared with the paper survey respondents, bicycling was much more popular among online survey respondents.

FIGURE E1: MODE SHARE, ONLINE SURVEY RESPONDENTS

[3]The number of respondents varied for the driving, walking, biking, and bus stop questions. Fifty-two participants provided information on driving, 59 on walking, 52 on biking, and 53 on using a bus stop.

Source: DVRPC, 2018

CONGESTION MITIGATION

Eighty-three percent of respondents liked the proposed turning movement and signal timing changes at Broad Street and Vine Street westbound and 8th Street and Vine Street westbound. Seventeen percent of respondents did not like the recommended changes. Some respondents indicated that these improvements do not seem to alleviate dangerous conditions for pedestrians, particularly at Broad Street. Those that believed this improvement did not sufficiently address pedestrian needs recommended a few main improvements: signal timing changes, travel lane removal, and curb extensions. In response to the recommended signal timing changes at 8th Street and Vine Street westbound, one respondent requested that DVRPC "ensure pedestrian crossing time is long enough to allow people who walk slowly," a consideration that was factored into the development of this recommendation.

ROAD DIET

The second question asked respondents' whether they liked the recommended road diet on Vine Street eastbound between Broad and 11th streets and Vine Street westbound between 9th and 12th streets. The question also asked respondents' opinions on the complementary traffic signal installation at 9th Street and Vine Street westbound and curb extension at 8th Street and Vine Street eastbound. Of the 65 individuals who answered this question, 85 percent agreed with the recommended road diets, and 15 percent did not like the recommendations. Overall, the feedback was positive, and many respondents agreed that the road diet would make the intersections safer, improve pedestrian and bicyclist safety along the corridor, and increase pedestrian space and comfort. Respondents seemed divided in their opinions on the proposed new traffic signal at 9th Street and Vine Street westbound. Some like the current configuration and believe a signal is unnecessary, while others believe a signal would make this merge safer. Some expressed a desire for the road diet to extend beyond 12th Street to Broad Street on the westbound side. On the other hand, other respondents were concerned that the proposed lane reconfiguration would increase travel time, congestion, and aggressive driving. Based on the traffic analysis results, a road diet to Broad Street would not be feasible, and the proposed recommendations would not negatively impact intersection performance.

TRAFFIC CALMING

The survey prompted respondents to provide feedback on the following three traffic-calming measures: lane narrowing, speed limit signs, and improved bicycle lane markings. Sixty-three individuals responded to this question. Eighty-one percent liked the lane narrowing and speed limit sign installation measures, and 90 percent liked the improved maintenance of bicycle facilities to make them more visible. All of the comments received regarding these recommendations were positive, with respondents citing improved safety for bicyclists and pedestrians being a major advantage of the recommendations. Some respondents did highlight that speed limit signs are often ignored. However, the study area does not have any speed limit signs so this measure could make a noticeable difference.

POSSIBILITIES FOR RECLAIMED ROADWAY SPACE

The online survey presented a few possibilities for the space reclaimed from the implementation of a road diet: pocket parks on Vine Street westbound, wider sidewalks on both service roads, and an eastbound bicycle lane. Of the 63 individuals that responded to this question, 87 percent liked the pocket parks and eastbound bicycle lane, and 84 percent liked the wider sidewalks. While many were enthusiastic about the installation of pocket parks, several were concerned about the future maintenance of these green spaces. Furthermore, many suggested implementing GSI as part of the landscaping improvements.

PEDESTRIAN IMPROVEMENTS

One question asked for feedback on three specific pedestrian improvements: curb extensions, ADA ramp upgrades, and improved crosswalk maintenance and pedestrian islands at 8th Street and Vine Street westbound. Of the 61 individuals who responded to this question, 85 percent liked the curb extensions, 93 percent agreed that the upgrade of ADA ramps should be a priority, and 87 percent liked the improved crosswalk markings and pedestrian islands. Through the comments received, respondents demonstrated overwhelming agreement that ADA ramp compliance throughout this corridor is a priority.

OPEN SPACE AND BEAUTIFICATION

The online survey presented numerous recommendations for beautification along the corridor, including a new Rail Park entrance, pedestrian-scale lighting along Vine Street and under the expressway bridge at 8th Street, the removal of the wall on Vine Street eastbound, and partial expressway capping. Sixty individuals responded to this question. Ninety-three percent liked the proposed new Rail Park entrance on Vine Street westbound, 92 percent liked the pedestrian-scale lighting, 88 percent liked the wall removal, and 90 percent liked the partial expressway capping. Respondents' comments were overwhelmingly positive, and suggestions were made to make the lighting and Rail Park entrance design elements reflect the Chinatown neighborhood.

OTHER FEEDBACK

Approximately one-half of respondents provided additional comments, as well as feedback on changes they would like to see on Vine Street to improve safety, mobility, and neighborhood connections. Most expressed approval of the DVRPC recommendations, such as removing the wall on Vine Street eastbound, adding bicycle facilities, providing more community spaces, and ensuring ADA compliance. Some comments suggested that more community and small-scale commercial land uses abutting this corridor are necessary to revive the area. As this study was transportation focused, land use changes were mentioned, although no specific recommendations were made for future land use in the study area. Some comments identified the need for greater traffic and safety improvements at the intersection of Broad Street and Vine Street. While Broad Street was outside the scope of this project, future study is needed to alleviate community concerns at this intersection. Lastly, several respondents emphasized the importance of preserving and enhancing the Chinatown community character through signage and other design elements.

DEMOGRAPHIC DATA

Of the respondents who provided their home and work zip codes, 16 percent reside and 35 percent work in zip code 19107, which contains the study area and the core of the Chinatown neighborhood. Compared with paper survey participants, online survey participants are somewhat less likely to live or work in the study area zip code, but many live or work in the zip codes immediately adjacent: 19106, 19107, 19123, and 19147. Online survey respondents were also younger on average than paper survey respondents, with 50 percent in the 18–34 age range and only 5 percent 65 years or older. However, no online respondents were under 18, an age group that was underrepresented in both survey formats. Fifty-five percent identify as white, 38 percent identify as Asian/Pacific Islander,

TABLE E1: DEMOGRAPHIC DATA, ONLINE SURVEY RESPONDENTS

and 3 percent identify as Spanish/Hispanic/Latino (Table E1).

HOME ZIP CODE	RESPONSES: 57
19123	25%
19107	16%
19147	14%
19103	9%
19146	5%
19128	4%
19130	4%
19148	4%
Other	24%

WORK ZIP CODE	RESPONSES: 52
19107	35%
19106	12%
19123	10%
19103	10%
19104	8%
19112	4%
19102	4%
Other	20%

AGE	RESPONSES: 60
Under 18 years	0%
18–34 years	55%
35–64 years	45%
65+ years	5%

HOUSEHOLD DISABILITY[4]	RESPONSES: 59
No	90%
Yes	10%

[4]Response to survey question: Do you or does anyone in your household have a disability that requires mobility assistance, such as a cane, walker, scooter, or wheelchair?

RACE	RESPONSES: 57
White/Caucasian	55%
Asian/Pacific Islander	38%
Other or more than one race	5%
American Indian/Native American/Alaska Native	2%
Black/African American	2%

SPANISH/HISPANIC/LATINO ORIGIN	RESPONSES: 58
No	97%
Yes	3%

Source: DVRPC, 2018

APPENDIX F: DETAILED PERFORMANCE MEASURES

Tables F1–F3 present detailed performance measures at the intersection and approach level for the Existing, Future No Build, and Future Build scenarios. AM values represent results for the morning peak hour, 8:00 AM–9:00 AM on a typical weekday. PM values represent results for the evening peak hour, 4:45 PM–5:45 PM.

Performance measures were calculated in VISSIM using DVRPC traffic counts collected in 2017. Additional vehicle volumes in the Future No Build and Future Build scenarios were calculated using DVRPC regional forecasts, anticipated development data from the Philadelphia City Planning Commission, and methods from the Institute of Transportation Engineers Trip Generation Manual. All values represent the average of eight simulation iterations.

TABLE F1: EXISTING CONDITIONS (2017) PERFORMANCE MEASURES

Source: DVRPC, 2018

Intersection	Approach	Volume	Queue	Delay	LOS
Vine EB & Broad	EB	1624	121.6	34.50	C
	NB	662	129.7	53.59	D
	SB	1237	88.9	9.96	A
	All	**3523**	**105.3**	**29.48**	**C**
Vine EB & 13th	NB	316	30.2	28.23	C
	EB	606	16.2	9.60	A
	All	**922**	**23.2**	**16.00**	**B**
Vine EB & 12th	SB	808	39.6	13.44	B
	EB	565	12.4	7.75	A
	All	**1373**	**26.0**	**11.11**	**B**
Vine EB & 11th	NB	441	40.6	27.37	C
	EB	444	6.4	4.41	A
	All	**885**	**23.5**	**15.84**	**B**
Vine EB & 10th	SB	597	29.3	12.32	B
	EB	461	9.4	6.23	A
	All	**1058**	**19.3**	**9.65**	**A**
Vine EB & 9th	NB	56	0.0	1.15	A
	EB	451	0.0	0.44	A
	All	**507**	**0.0**	**0.52**	**A**
Vine EB & 8th	SB	822	48.5	21.26	C
	EB Local	507	39.8	46.39	D
	EB Ramp	667	86.5	34.46	C
	All	**1996**	**53.6**	**32.09**	**C**
Vine WB & Broad	SB	991	88.6	34.48	C
	NB	614	15.7	5.26	A
	WB	1619	199.0	41.07	D
	All	**3224**	**101.1**	**32.32**	**C**
Vine WB & 13th	NB	354	24.1	17.66	B
	WB	1641	53.5	14.06	B
	All	**1995**	**38.8**	**14.69**	**B**
Vine WB & 12th	SB	564	52.3	29.87	C
	WB	1887	62.8	14.05	B
	All	**2451**	**57.6**	**17.70**	**B**
Vine WB & 11th	NB	424	8.9	4.93	A
	WB	1956	36.0	8.75	A
	All	**2380**	**22.5**	**8.07**	**A**
Vine WB & 10th	SB	456	55.1	30.58	C
	WB	2099	25.0	5.61	A
	All	**2555**	**40.1**	**10.06**	**B**
Vine WB & 9th	WB	1772	0.1	1.82	A
	SB	327	0.0	2.13	A
	All	**2099**	**0.0**	**1.87**	**A**
Vine WB & 8th	WB Local	1711	61.7	13.94	B
	WB Left	258	7.4	11.22	B
	WB Ramp	1055	34.1	16.09	B
	SB	912	82.4	31.15	C
	All	**3936**	**46.4**	**18.33**	**B**

Intersection	Approach	Volume	Queue	Delay	LOS
Vine EB & Broad	EB	1683	107.5	31.28	C
	NB	837	185.3	56.40	E
	SB	906	61.4	12.56	B
	All	**3426**	**94.5**	**32.51**	**C**
Vine EB & 13th	NB	519	35.0	19.65	B
	EB	741	30.7	15.63	B
	All	**1260**	**32.9**	**17.29**	**B**
Vine EB & 12th	SB	665	21.4	9.12	A
	EB	789	28.6	13.27	B
	All	**1454**	**25.0**	**11.38**	**B**
Vine EB & 11th	NB	830	56.9	21.06	C
	EB	879	20.3	7.62	A
	All	**1709**	**38.6**	**14.15**	**B**
Vine EB & 10th	SB	567	11.7	5.06	A
	EB	1000	69.3	21.80	C
	All	**1567**	**40.5**	**15.74**	**B**
Vine EB & 9th	NB	151	0.0	3.49	A
	EB	1148	0.4	3.20	A
	All	**1299**	**0.2**	**3.23**	**A**
Vine EB & 8th	SB	723	78.2	29.01	C
	EB Local	1294	80.6	36.70	D
	EB Ramp	212	23.5	28.48	C
	All	**2229**	**66.0**	**33.43**	**C**
Vine WB & Broad	SB	870	70.3	33.39	C
	NB	568	7.5	3.36	A
	WB	1326	111.3	37.49	D
	All	**2764**	**63.0**	**29.25**	**C**
Vine WB & 13th	NB	474	13.1	7.63	A
	WB	1195	64.3	21.29	C
	All	**1669**	**38.7**	**17.42**	**B**
Vine WB & 12th	SB	620	27.5	14.54	B
	WB	1237	41.6	14.35	B
	All	**1857**	**34.5**	**14.43**	**B**
Vine WB & 11th	NB	711	7.9	3.03	A
	WB	1078	44.6	19.02	B
	All	**1789**	**26.3**	**12.67**	**B**
Vine WB & 10th	SB	574	53.7	20.56	C
	WB	1071	34.3	13.36	B
	All	**1645**	**44.0**	**15.87**	**B**
Vine WB & 9th	WB	939	0.0	0.72	A
	SB	133	0.0	1.23	A
	All	**1072**	**0.0**	**0.78**	**A**
Vine WB & 8th	WB Local	888	25.5	11.23	B
	WB Left	157	7.3	18.03	B
	WB Ramp	1322	170.0	44.62	D
	SB	933	112.8	38.31	D
	All	**3300**	**78.9**	**32.59**	**C**

TABLE F2: FUTURE NO BUILD (2025) PERFORMANCE MEASURES

Source: DVRPC, 2018

Intersection	Approach	Volume	Queue	Delay	LOS
Vine EB & Broad	EB	1768	167.5	40.91	D
	NB	706	166.6	61.75	E
	SB	1316	106.2	10.23	B
	All	**3790**	**132.4**	**34.21**	**C**
Vine EB & 13th	NB	341	35.1	31.13	C
	EB	651	24.3	12.67	B
	All	**992**	**29.7**	**19.00**	**B**
Vine EB & 12th	SB	874	45.6	13.67	B
	EB	608	12.6	7.82	A
	All	**1482**	**29.1**	**11.28**	**B**
Vine EB & 11th	NB	480	43.8	27.63	C
	EB	477	6.1	4.01	A
	All	**957**	**24.9**	**15.87**	**B**
Vine EB & 10th	SB	644	32.0	12.62	B
	EB	498	10.0	6.20	A
	All	**1142**	**21.0**	**9.81**	**A**
Vine EB & 9th	NB	61	0.0	1.21	A
	EB	488	0.0	0.49	A
	All	**549**	**0.0**	**0.57**	**A**
Vine EB & 8th	SB	887	57.2	23.61	C
	EB Local	550	42.6	46.48	D
	EB Ramp	722	133.4	48.52	D
	All	**2159**	**68.9**	**37.85**	**D**
Vine WB & Broad	SB	1060	106.1	37.71	D
	NB	660	16.7	4.97	A
	WB	1727	314.1	53.87	D
	All	**3447**	**145.6**	**39.55**	**D**
Vine WB & 13th	NB	379	38.6	24.70	C
	WB	1758	96.8	22.03	C
	All	**2137**	**67.7**	**22.50**	**C**
Vine WB & 12th	SB	612	65.1	33.95	C
	WB	2030	96.1	18.55	B
	All	**2642**	**80.6**	**22.12**	**C**
Vine WB & 11th	NB	461	10.5	5.78	A
	WB	2105	58.4	12.83	B
	All	**2566**	**34.5**	**11.56**	**B**
Vine WB & 10th	SB	491	65.6	32.35	C
	WB	2262	50.3	8.13	A
	All	**2753**	**58.0**	**12.46**	**B**
Vine WB & 9th	WB	1914	10.9	5.04	A
	SB	351	0.0	3.05	A
	All	**2265**	**5.4**	**4.72**	**A**
Vine WB & 8th	WB Local	1852	83.4	16.00	B
	WB Left	277	8.1	11.88	B
	WB Ramp	1124	40.6	17.93	B
	SB	982	107.3	36.08	D
	All	**4235**	**59.8**	**20.90**	**C**

Intersection	Approach	Volume	Queue	Delay	LOS
Vine EB & Broad	EB	1875	125.0	32.76	C
	NB	908	346.6	89.64	F
	SB	995	73.3	12.94	B
	All	**3778**	**137.6**	**41.32**	**D**
Vine EB & 13th	NB	578	40.8	20.53	C
	EB	820	36.2	16.90	B
	All	**1398**	**38.5**	**18.40**	**B**
Vine EB & 12th	SB	739	23.4	9.06	A
	EB	876	30.9	13.12	B
	All	**1615**	**27.1**	**11.27**	**B**
Vine EB & 11th	NB	924	67.9	22.47	C
	EB	977	26.8	9.43	A
	All	**1901**	**47.4**	**15.77**	**B**
Vine EB & 10th	SB	626	13.0	5.16	A
	EB	1108	83.7	23.24	C
	All	**1734**	**48.4**	**16.73**	**B**
Vine EB & 9th	NB	165	0.0	8.78	A
	EB	1267	5.7	10.28	B
	All	**1432**	**2.8**	**10.10**	**B**
Vine EB & 8th	SB	778	103.5	34.81	C
	EB Local	1431	143.6	46.44	D
	EB Ramp	231	26.0	28.56	C
	All	**2440**	**104.6**	**41.04**	**D**
Vine WB & Broad	SB	949	106.5	43.25	D
	NB	621	8.1	3.34	A
	WB	1476	137.0	40.26	D
	All	**3046**	**83.9**	**33.71**	**C**
Vine WB & 13th	NB	524	14.0	7.65	A
	WB	1332	83.7	24.60	C
	All	**1856**	**48.9**	**19.82**	**B**
Vine WB & 12th	SB	692	32.2	15.28	B
	WB	1380	47.4	15.26	B
	All	**2072**	**39.8**	**15.28**	**B**
Vine WB & 11th	NB	795	8.7	3.05	A
	WB	1200	51.7	19.95	B
	All	**1995**	**30.2**	**13.22**	**B**
Vine WB & 10th	SB	635	63.6	21.53	C
	WB	1192	39.8	14.03	B
	All	**1827**	**51.7**	**16.63**	**B**
Vine WB & 9th	WB	1045	0.0	0.86	A
	SB	148	0.0	1.36	A
	All	**1193**	**0.0**	**0.92**	**A**
Vine WB & 8th	WB Local	991	28.6	11.55	B
	WB Left	174	14.5	31.51	C
	WB Ramp	1347	393.1	81.65	F
	SB	989	260.5	89.95	F
	All	**3501**	**174.2**	**61.19**	**E**

TABLE F3: FUTURE BUILD (2025) PERFORMANCE MEASURES

Source: DVRPC, 2018

Intersection	Approach	Volume	Queue	Delay	LOS
Vine EB & Broad	EB	1767	148.7	37.37	D
	NB	707	166.8	61.80	E
	SB	1334	72.7	9.58	A
	All	**3808**	**108.3**	**32.20**	**C**
Vine EB & 13th	NB	345	32.3	27.72	C
	EB	658	21.3	10.56	B
	All	**1003**	**26.8**	**16.47**	**B**
Vine EB & 12th	SB	878	41.8	12.56	B
	EB	613	18.0	10.02	B
	All	**1491**	**29.9**	**11.53**	**B**
Vine EB & 11th	NB	481	43.8	27.82	C
	EB	480	5.8	3.88	A
	All	**961**	**24.8**	**15.87**	**B**
Vine EB & 10th	SB	645	33.3	13.18	B
	EB	499	9.9	6.25	A
	All	**1144**	**21.6**	**10.15**	**B**
Vine EB & 9th	NB	61	0.0	1.22	A
	EB	490	0.0	0.66	A
	All	**551**	**0.0**	**0.72**	**A**
Vine EB & 8th	SB	888	62.5	25.42	C
	EB Ramp	719	133.1	47.83	D
	EB Local	527	62.0	47.38	D
	All	**2134**	**64.6**	**38.29**	**D**
Vine WB & Broad	SB	1061	112.8	39.20	D
	NB	660	16.6	4.76	A
	WB	1767	169.8	37.57	D
	All	**3488**	**99.7**	**31.89**	**C**
Vine WB & 13th	NB	391	21.8	14.98	B
	WB	1787	49.9	12.75	B
	All	**2178**	**35.8**	**13.15**	**B**
Vine WB & 12th	SB	611	63.3	32.56	C
	WB	2053	98.9	14.89	B
	All	**2664**	**81.1**	**18.96**	**B**
Vine WB & 11th	NB	461	10.5	5.59	A
	WB	2127	73.9	12.11	B
	All	**2588**	**42.2**	**10.95**	**B**
Vine WB & 10th	SB	492	80.4	37.73	D
	WB	2281	60.8	7.84	A
	All	**2773**	**70.6**	**13.14**	**B**
Vine WB & 9th	WB	1931	86.8	21.58	C
	SB	351	29.1	26.61	C
	All	**2282**	**38.6**	**22.35**	**C**
Vine WB & 8th	WB Local	1869	100.0	20.00	C
	WB Left	277	8.1	12.25	B
	WB Ramp	1126	41.6	18.09	B
	SB	983	65.2	28.28	C
	All	**4255**	**53.7**	**20.91**	**C**

Intersection	Approach	Volume	Queue	Delay	LOS
Vine EB & Broad	EB	1874	126.5	33.00	C
	NB	906	350.2	92.63	F
	SB	992	87.3	13.40	B
	All	**3772**	**148.2**	**42.21**	**D**
Vine EB & 13th	NB	578	40.8	20.86	C
	EB	820	48.2	18.55	B
	All	**1398**	**44.5**	**19.51**	**B**
Vine EB & 12th	SB	740	22.0	8.46	A
	EB	876	33.6	12.78	B
	All	**1616**	**27.8**	**10.81**	**B**
Vine EB & 11th	NB	924	67.6	22.71	C
	EB	977	32.6	11.06	B
	All	**1901**	**50.1**	**16.72**	**B**
Vine EB & 10th	SB	626	15.4	6.14	A
	EB	1109	57.0	16.87	B
	All	**1735**	**36.2**	**13.01**	**B**
Vine EB & 9th	NB	166	0.0	7.94	A
	EB	1270	5.1	11.17	B
	All	**1436**	**2.5**	**10.80**	**B**
Vine EB & 8th	SB	801	58.1	19.16	B
	EB Ramp	231	25.6	28.16	C
	EB Local	1426	163.2	38.05	D
	All	**2458**	**82.6**	**30.98**	**C**
Vine WB & Broad	SB	946	127.3	49.58	D
	NB	619	7.6	2.95	A
	WB	1478	135.8	38.81	D
	All	**3043**	**90.2**	**34.88**	**C**
Vine WB & 13th	NB	524	15.4	8.40	A
	WB	1333	66.6	20.14	C
	All	**1857**	**41.0**	**16.83**	**B**
Vine WB & 12th	SB	691	34.7	16.31	B
	WB	1382	116.9	25.73	C
	All	**2073**	**75.8**	**22.60**	**C**
Vine WB & 11th	NB	795	10.4	3.75	A
	WB	1201	40.4	12.86	B
	All	**1996**	**25.4**	**9.24**	**A**
Vine WB & 10th	SB	635	63.6	21.80	C
	WB	1191	34.2	9.66	A
	All	**1826**	**48.9**	**13.88**	**B**
Vine WB & 9th	WB	1047	12.7	5.71	A
	SB	148	14.1	25.43	C
	All	**1195**	**8.9**	**8.14**	**A**
Vine WB & 8th	WB Local	990	24.3	10.08	B
	WB Left	173	4.9	9.95	A
	WB Ramp	1438	305.1	62.32	E
	SB	1031	79.9	32.30	C
	All	**3632**	**103.6**	**37.08**	**D**

APPENDIX G: BUILD ALTERNATIVES

The roadway configuration recommended in this report was developed through an iterative microsimulation process. The first alternative tested was the removal of two traffic lanes, one in each direction, from Broad Street to 8th Street eastbound and from 9th Street to Broad Street westbound. However, this configuration caused excessive vehicle delays to the extent that resulting performance measures were not valid.

Four feasible build alternatives were developed and presented to the project steering committee. In Build Scenario 1, a traffic lane is removed on Vine Street eastbound from Broad Street to 8th Street, and no westbound lanes are removed.

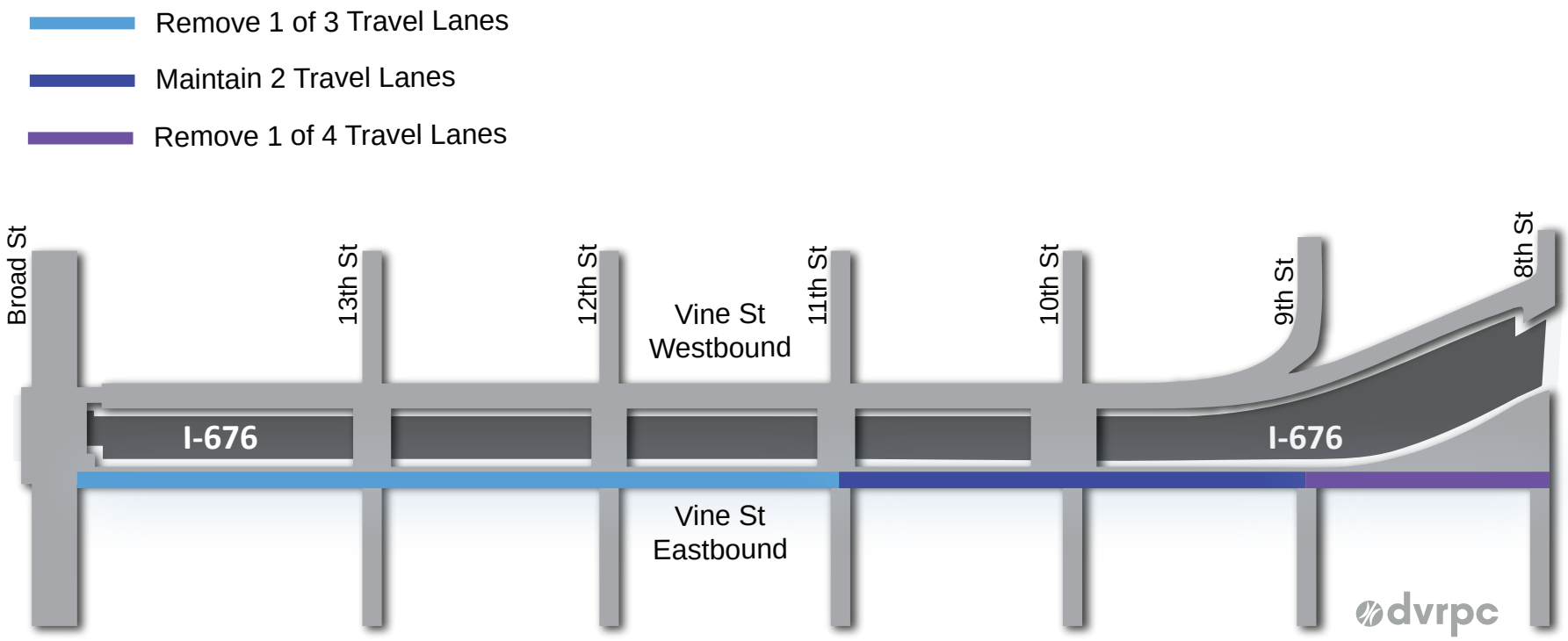
In Build Scenario 1A, a traffic lane is removed in the eastbound direction and three-second LPIs are added at 10th, 11th, 12th, and 13th streets.

In Build Scenario 2, an eastbound lane is removed, and a westbound lane is removed between 11th Street and 13th Street, with adjustments to signal timing to prevent excessive vehicle delay.

In Build Scenario 3, an eastbound lane is removed, a westbound lane is removed between 9th Street and 12th Street, adjustments to signal timing are made to prevent excessive vehicle delay, and the intersection of Vine Street westbound and 9th Street is reconfigured as a signalized "T" intersection.

All four of these scenarios were determined by the steering committee to have acceptable effects on traffic performance measures, and Build Scenario 3 was determined to have the largest impact on achieving project goals. Therefore, Build Scenario 3 was adopted as the preferred design.

FIGURE G1: BUILD SCENARIO 1 CONCEPT

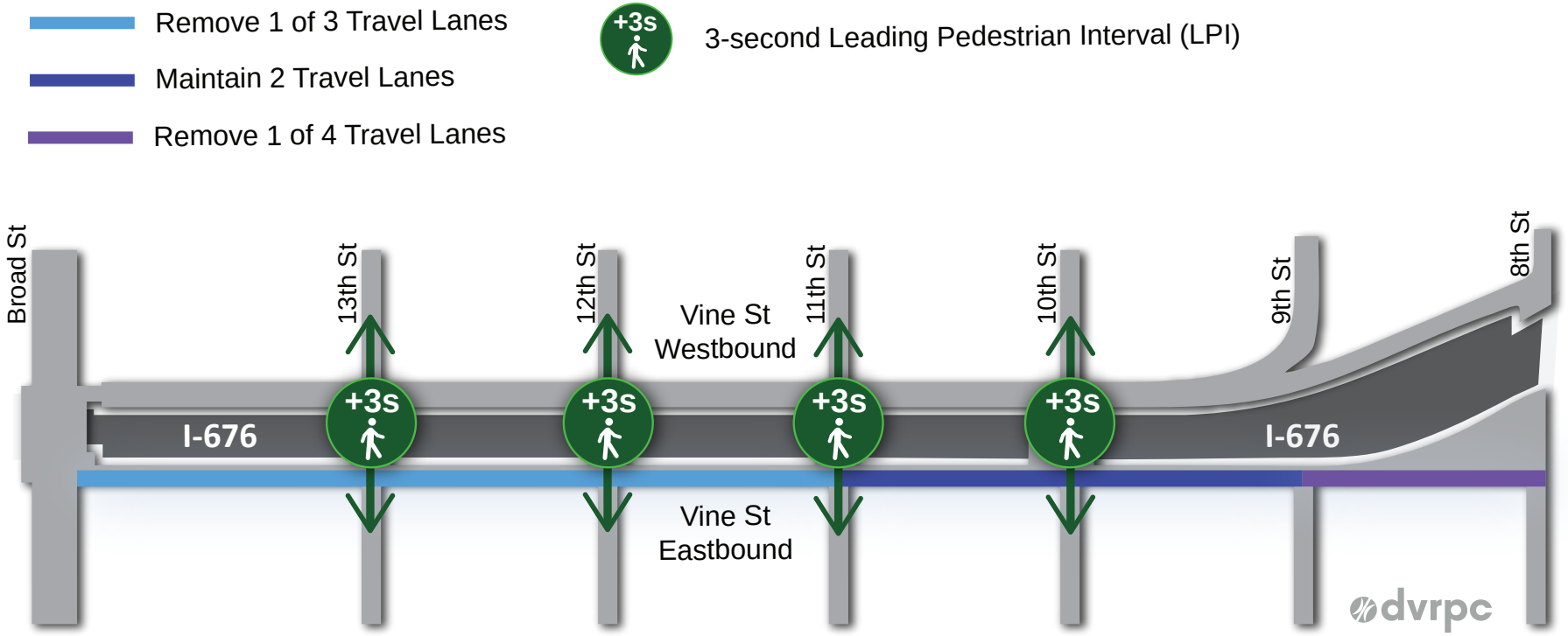


Source: DVRPC, 2018

FIGURE G2: BUILD SCENARIO 1 LOS

Source: DVRPC, 2018

FIGURE G3: BUILD SCENARIO 1A CONCEPT

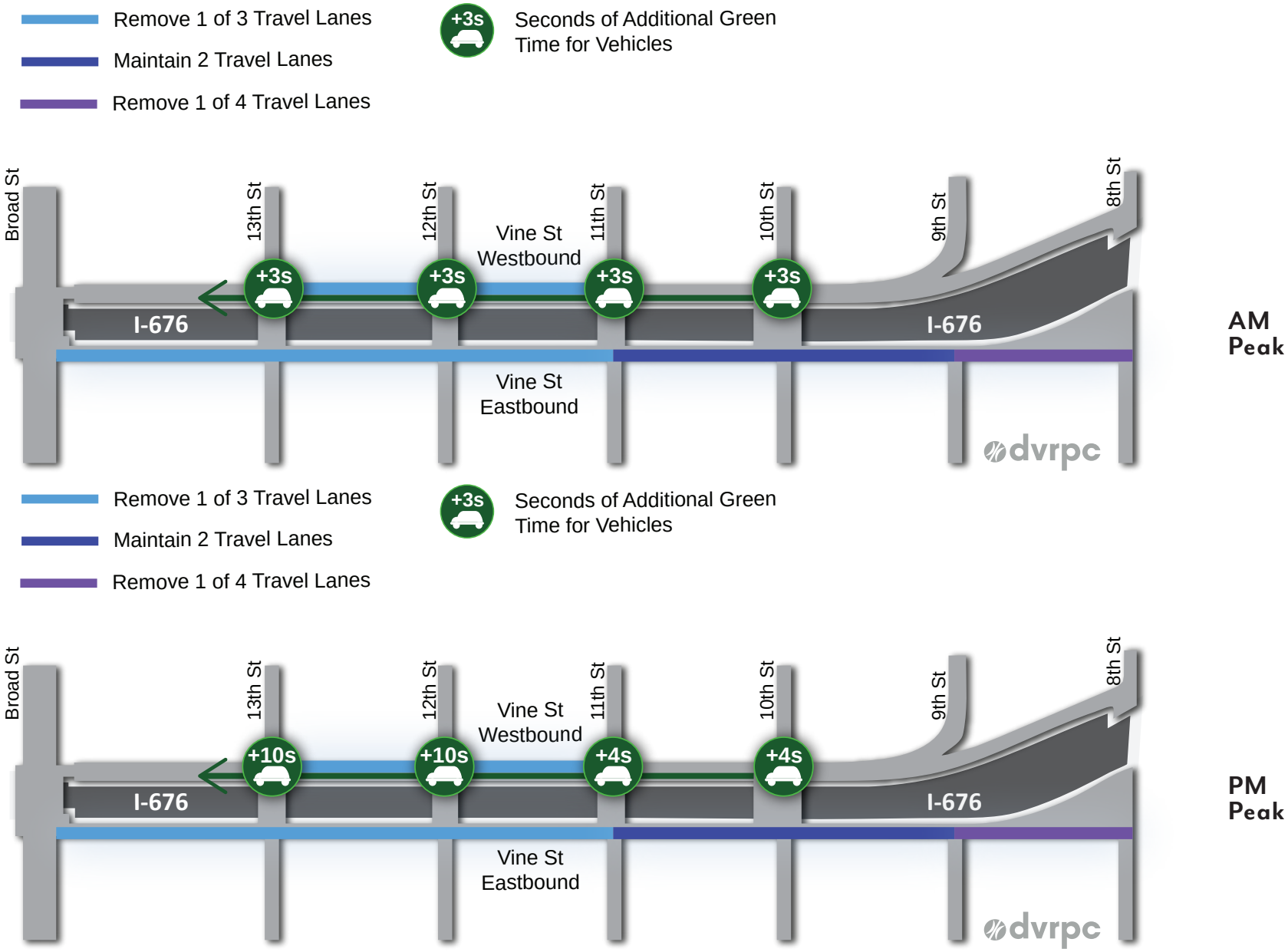


Source: DVRPC, 2018

FIGURE G4: BUILD SCENARIO 1A LOS

Source: DVRPC, 2018

FIGURE G5: BUILD SCENARIO 2 CONCEPT

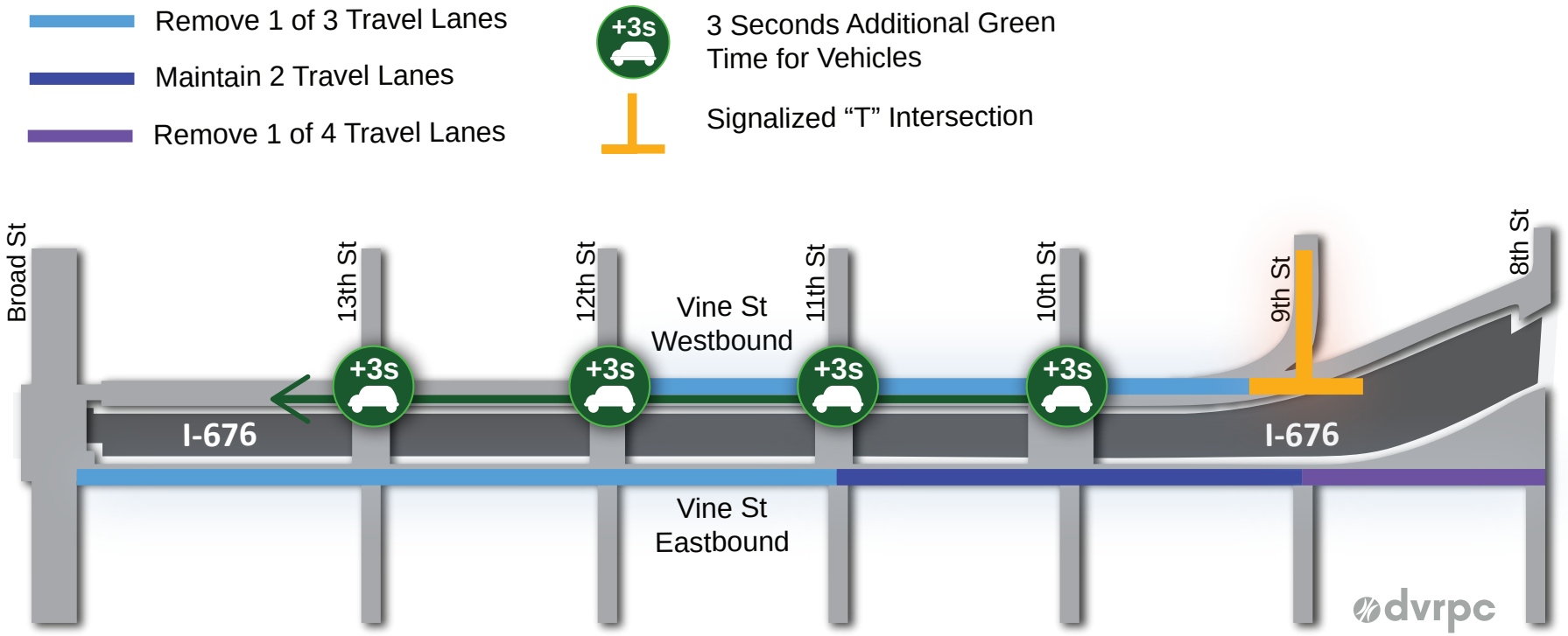


Source: DVRPC, 2018

FIGURE G6: BUILD SCENARIO 2 LOS

Source: DVRPC, 2018

FIGURE G7: BUILD SCENARIO 3 CONCEPT (PREFERRED ALTERNATIVE)



Source: DVRPC, 2018

FIGURE G8: BUILD SCENARIO 3 LOS (PREFERRED ALTERNATIVE)

Source: DVRPC, 2018

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ABSTRACT

TITLE

Reviving Vine: Improving Multimodal Connections on Vine Street

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GEOGRAPHIC AREA COVERED

Vine Street local service roads (eastbound and westbound) between 8th Street and Broad Street in Philadelphia, PA

ABSTRACT

This study evaluated the feasibility of a "road diet" or lane reconfiguration on Vine Street local to create a safer, more accessible multimodal streetscape. The proposed lane configuration is complemented by additional recommendations to decrease pedestrian crossing distances, reduce vehicle speeds, and create inviting open spaces. All of these recommendations seek to mitigate the negative impacts of the Vine Street Expressway and adjoining roads in response to community concerns.

KEY WORDS

Complete Streets, Multimodal, Road Diet, Pedestrian, Bicycle, Accessibility, Chinatown, Vine Street

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