RECOMMENDATIONS

List of Recommendations

Addressing Community Impacts

Maintenance

Long-term Issues

Founders Bridge, Hartford, Connecticut

Boulder, Colorado

Key Pedestrian and Bicycle Improvements

Key community recommendations include wider sidewalks and a raised crosswalk to provide better access to the Schuylkill River Trail ramp.

List of Recommendations

1. Install a Crosswalk at the Schuylkill River Trail

A crosswalk is required at the Schuylkill River Trail in order to allow all bridge users to reach the ramp to the trail. If a crosswalk is not provided, it is likely that pedestrians will jaywalk across the bridge. For instance, a family with a stroller will likely attempt to reach the ramp to the trail, rather than carry the stroller down the steps, tempting them to cross the bridge to reach the ramp. If a crosswalk is not provided it is also likely that bikes will ride on the sidewalk, because only the westbound side of the bridge has a ramp to the trail. Bicyclists coming from the trail and wishing to ride eastbound over the bridge will likely ride down the sidewalk rather than walk their bicycles. Consider a raised crosswalk to enforce a lower design speed for the bridge and to provide for efficient traffic movement. A refuge island will provide a two-stage crossing process and help calm traffic. Alternatively, consider a traffic signal to protect the crossing and to enforce speed limits.

2. Vary the Design for Each Section of the Bridge

The South Street Bridge is really several different bridges joined together. Parts of the bridge are over water, parts are over land, and portions cross over railroad tracks. Therefore, the character and design of the bridge can and should be different for each section. The proposed plan shows how the cross section and design details could be different for each section of the bridge, because of the unique conditions for each span.

3. Relocate the Crash Barrier to Protect Bicycles and Pedestrians

A low concrete safety and metal safety barrier should be installed between the travel lanes and the bicycle lane on the portion of the bridge over the river. This barrier should allow for using a lighter architectural railing at the edge of the bridge, because the barrier will serve as the crash-tested railing for vehicles.

4. Widen the Sidewalks

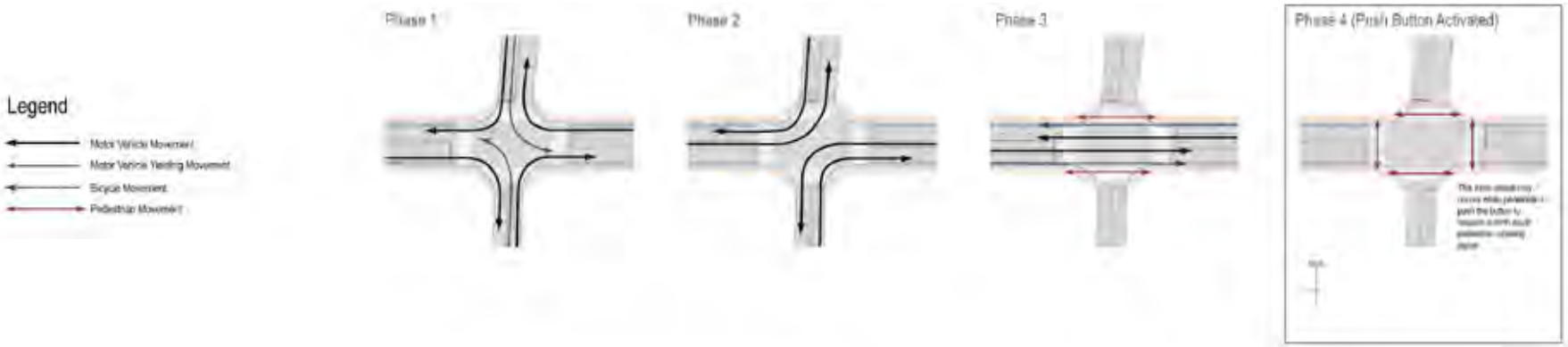
Sidewalks should be widened where possible to the Center City standard of at least 12 feet. The current 9-foot sidewalks are too narrow for future pedestrian volumes that are likely given development proposals and shifting demographics. The added width will also increase the feeling of safety for pedestrians. In areas where the bike lane is adjacent to the sidewalk but behind a median or curb, a slightly narrower sidewalk will suffice because it is better buffered from traffic.

5. Make Intersections Easier to Cross

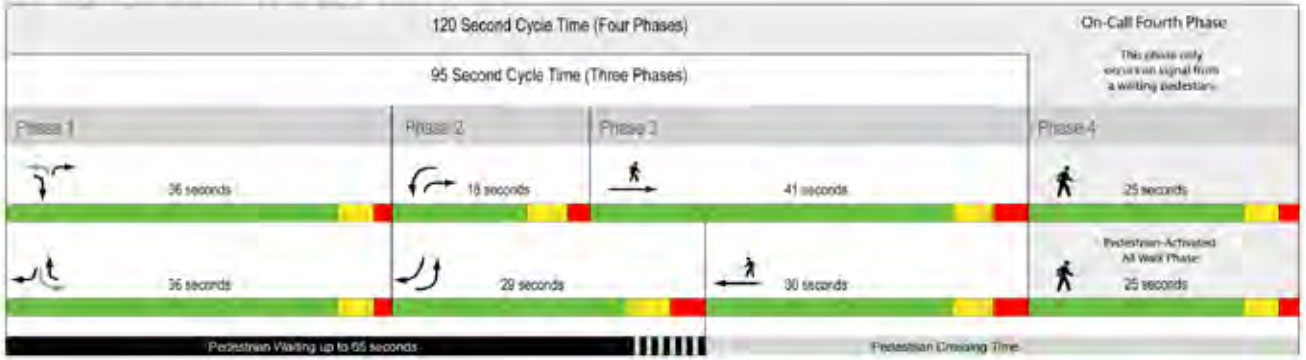
Consider reducing the curb radius to shorten the crossing distance (and improve motorist yielding behavior for traffic exiting I-76). Trucks and motorists should transition from expressway driving style to Center City style and maneuvers. Consider pedestrian refuges at the Schuylkill River Trail and intersections.

Relocating the Crash Barrier

Many bridges place the crash barrier adjacent to the sidewalk. Because of the low design speed of the bridge, a low-level barrier is probably sufficient. A combination railing (concrete and steel) offers an unobtrusive solution. Note that this report recommends placing the crash barrier between the motor vehicle lanes and the bicycle lanes.

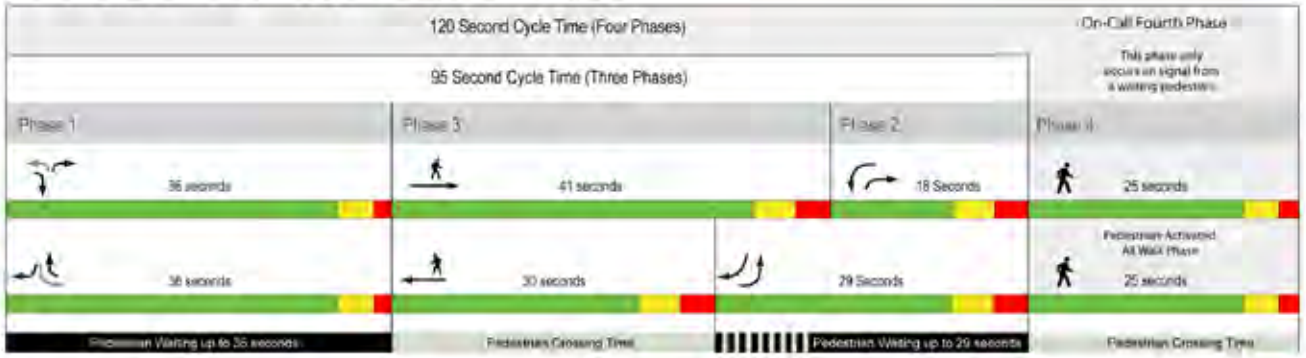


Currently Proposed Afternoon Peak Signal Phasing Plan



Up to 44% Reduction in Waiting Time for Pedestians

Reduced Pedestrian Waiting Time Signal Phasing Plan (WRT Proposal)



6. Maintain Lane Count of Existing Bridge

The participants at the community charrette clearly wanted more space for pedestrians and bicycles. This can only be accomplished by reducing the number of lanes. Fortunately, our analysis indicates that the fifth lane at the I-76 ramps is likely to underperform, and is a good candidate for elimination. A redesigned bridge that maintains the existing number of lanes would still allow sufficient space for emergency vehicle access and traffic flow.

7. Reduce Pedestrian Waiting Times

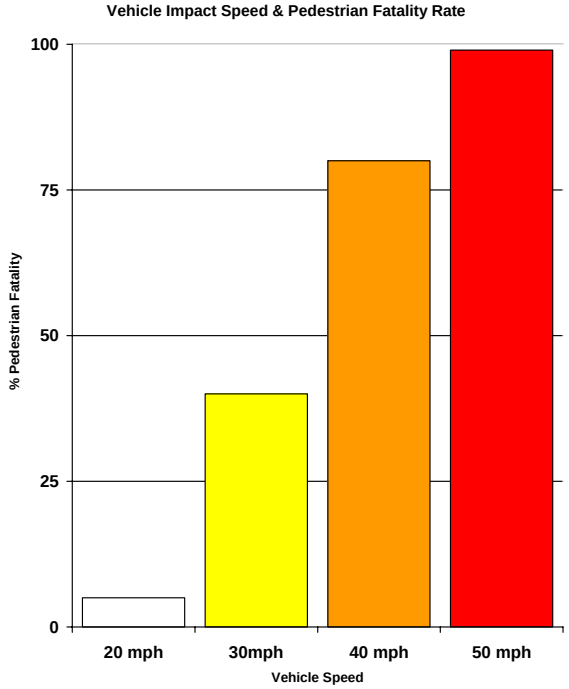
The current signal plan has pedestrians wait up to 65 seconds to cross the road at the I-76 ramps traveling east-west, and up to 95 seconds to cross north-south. These long wait times encourage jay-walking. It is not possible to reduce the waiting time for north-south crossings without significant changes to the signal phasing plan, however, relatively fewer pedestrians cross in that direction. The dominant east-west crossing movement could be significantly enhanced, however, by rearranging the signal phasing scheme to separate the two pedestrian crossing phases, as shown in the diagram in this report. This will reduce the waiting time for east-west crossings up to 44% during the four-phase (120 second) cycle without significantly affecting vehicular capacity.

8. Slow the Vehicle Travel Speed

Higher speeds result in a higher likelihood of pedestrian fatalities. The bridge design speed should be no more than **25 mph**. A lower design speed allows for urban geometries and lighter crash barriers.

Travel speeds can be controlled using the following techniques:

- Maintaining only two through lanes (as exists today) prevents aggressive motorists from passing vehicles obeying the speed limit.
- Reducing turn radii forces motorists to slow down in corners, increasing safety.
- Installing raised crosswalks, for example at the Schuylkill River Trail, enforces the design speed of the road and prioritizes pedestrians.
- A speed sensitive traffic light can turn red when traffic is speeding.
- Red-light cameras can be used to enforce traffic laws.



Source: USDOT

Speed Kills

Pedestrians hit by a car traveling 30 miles per hour have a 45% chance of dying. Lower speeds offer significant decreases in pedestrian fatalities. Traffic calming measures, including reducing the number of lanes, can help keep traffic speeds to an acceptable level.

Pittsburgh: Flower baskets line the bridges over the Allegheny River and gateway streets have planted medians and are paved with brick.

9. Keep the "Kink"

Changing the bridge design to preserve the 150 year old masonry approach ramp would be a significant design change. Yet, this change may be worth pushing for because of the value of the historic resource and the fact that the sharper curve helps to calm traffic. It is assumed that avoiding the demolition of the existing structure could provide significant cost savings. The arches underneath the ramp could even be reused, perhaps as restaurant or craft space as has been done in other cities. If the kink is eliminated due to the difficulty in modifying the bridge design, then the roadway should have traffic calming elements to prevent motorists from operating at an unsafe speed around the more generous curvature.

10. Install Bus Stop Safety Islands at the SEPTA Regional Rail Station

Install bus safety islands at the University City Regional Rail station. Bus stop safety islands prevent buses from pulling into bike lanes or discharging passengers into the bike lane - both dangerous conditions.

11. Reduce the Threat of Crime

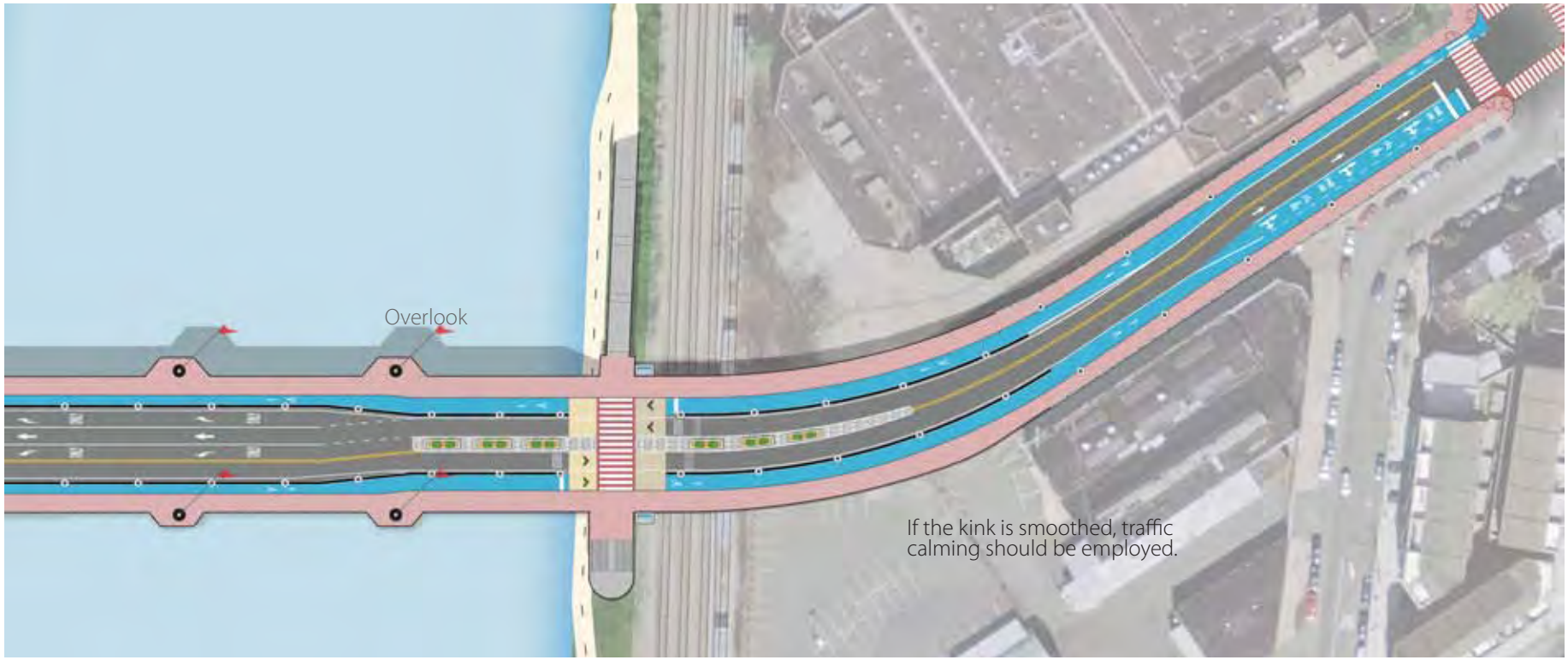
Pedestrians feel vulnerable crossing the bridge at night. There was particular concern about providing hiding places, so it is important to keep sight lines clear. Consider installing security cameras. The overlooks must be designed to reduce the perceived threat to personal safety.

12. Install Pedestrian-oriented Lighting

Use pedestrian-oriented fixtures and consider installing the lighting at the sidewalk curb (or on a crash railing between the sidewalk and the travel lanes) instead of outside of the bridge railing. Lighting at the curb helps to buffer the sidewalk from vehicles. Light poles can also have flower baskets and banners that celebrate the community.

13. Install a Median Gateway to the University of Pennsylvania

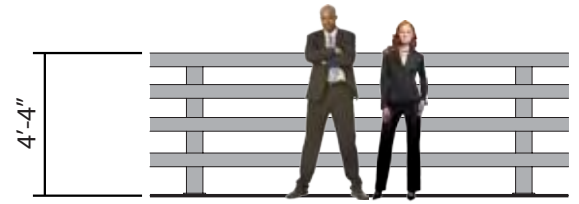
Install a median refuge on the west side of the Convention Avenue intersection to provide an attractive gateway to the University of Pennsylvania and a space for pedestrian safety.



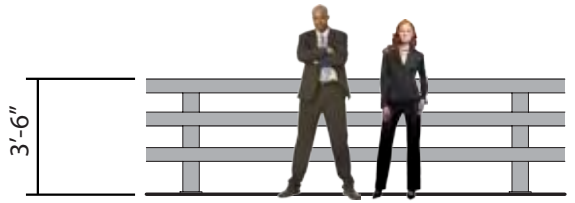
New crosswalk at the Schuylkill River Trail allows eastbound bicyclists and families with strollers to reach the ramps from the other side of the bridge. Wider bike lanes allow for left turns. A median provides a refuge for crossing the bridge in stages and an attractive gateway to the neighborhood.

Modifying FHWA approved bridge railings:

The recently constructed bridge in the top photo (Boulder Colorado) is on a state highway. The bridge uses a modified Wyoming railing (similar to the one shown at left) approved by FHWA and crash tested. Decorative panel inserts were added that recall the historic bridge it replaced, and the posts were encased in concrete with pedestrian lighting for an attractive appearance.



Railing height is too high for most bridge users.



Vehicular-oriented design

Pedestrian-oriented design

Left Top:

The bridge railing as shown in the proposed plans is extremely high (52 inches) for a sidewalk condition.

Left Center:

A standard-height railing (42 inches) will offer better views and a more pleasant pedestrian environment. But the proposed railing design is still quite dominant visually. A more subtle railing would be preferred.

Left Bottom:

Installing a crash barrier between the vehicle lanes and the bike lanes and sidewalk will allow for an architectural railing at the edge, as shown in the lower diagram.

14. Use a Pedestrian-scaled Bridge Railing

The proposed railing is 52 inches high which is taller than some bridge users and higher than most sidewalk bridge railings.

The standard railing height of 42" is recommended. The primary purpose of a high railing is to protect bicyclists, but bicyclists will be riding in the bike lane behind a curb.

Instead of the proposed Massachusetts "S-3" Railing, use an ornamental railing in areas that do not require a crash-tested design. The ornamental railing should recall visually the old railing and similar pedestrian railings throughout the city.

In locations where a crash-tested railing is required, consider using a railing that emphasizes the vertical posts, rather than the horizontal rail. Ideally, the railing should be modified to resemble a more traditional bridge railing through the FHWA waiver application process.

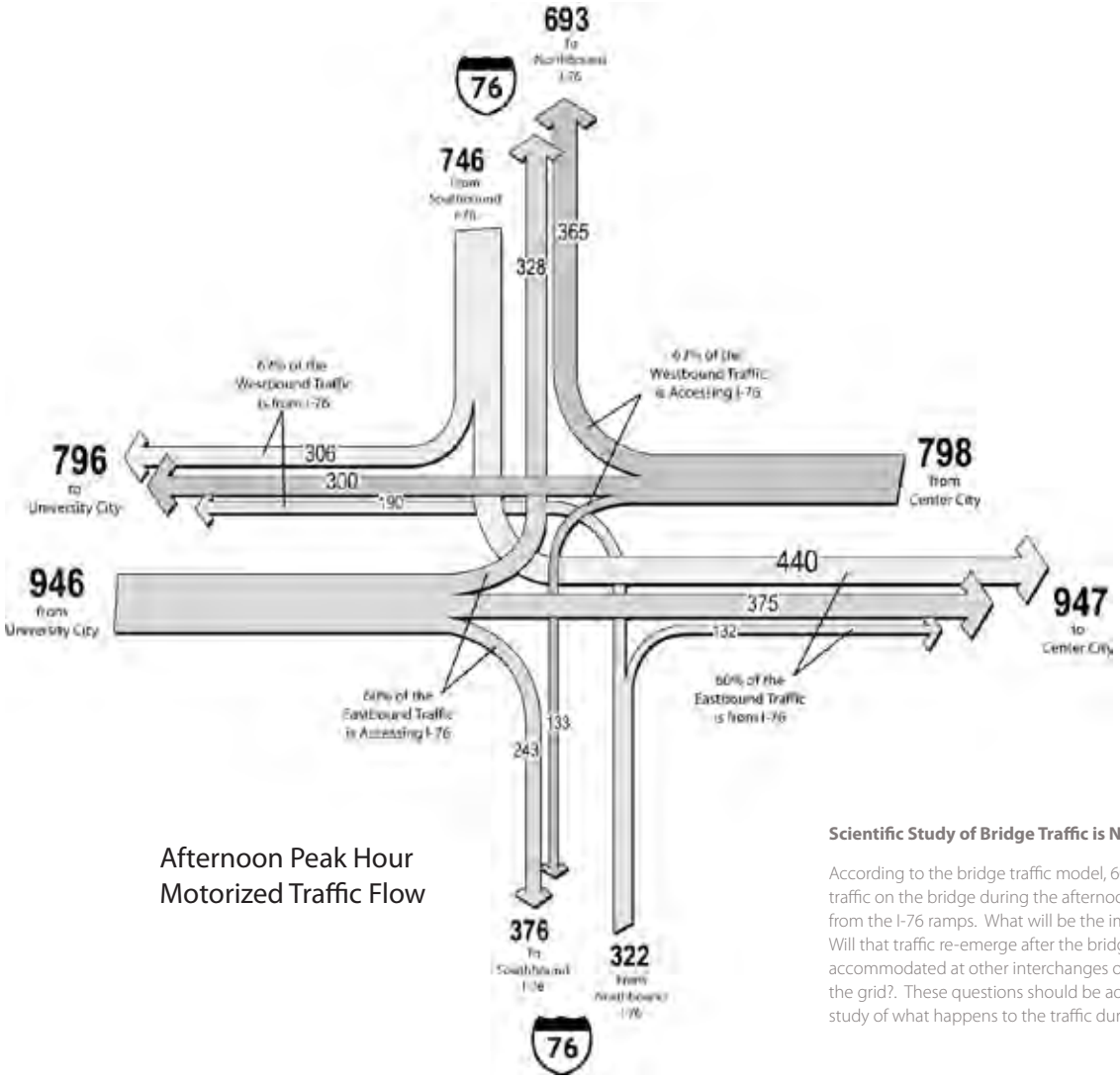
For the viaduct on the western end of the bridge, consider a removable combination rail with concrete base and metal top rail powder coated or painted black. Eventually, parts of this railing will be removed when the Penn development happens.

15. Use Pavers or Scored and Tinted Concrete to Reduce the Perceived Width and Length of the Bridge

Sidewalk pavers help to create a human scale and break up the apparent width of the bridge deck. Textured pavement near crosswalks helps to define the crosswalk Consider tinted concrete in selected locations to break up the length of the bridge. Consider painted or tinted bike lanes to visually demarcate the bike lane.

16. Redesign the Overlooks and Eliminate the Metallic Towers

Charrette participants found the towers to be visually out of character with the neighborhood and a potential security risk. Instead of the towers, consider designing the overlook as a place to sit and observe the skyline or the river (e.g. fishing). Provide seating facing both the skyline and the sidewalk. Consider using taller, special light fixtures to mark the overlooks. Consider using flag poles and/or vertical sculpture to mark the overlooks. Consider architectural lighting integrated into the piers to create a dramatic presence on the river.



Afternoon Peak Hour
Motorized Traffic Flow

Scientific Study of Bridge Traffic is Needed

According to the bridge traffic model, 60 percent of the motorized traffic on the bridge during the afternoon peak hour is heading to or from the I-76 ramps. What will be the impact of closing the bridge? Will that traffic re-emerge after the bridge re-opens? Could it be accommodated at other interchanges or be dispersed throughout the grid?. These questions should be addressed as part of a scientific study of what happens to the traffic during the bridge closure.

17. Use a Transparent Barrier Over Electrified Railroad Tracks

Consider using a transparent architectural barrier over the railroad electric catenary. Given that this is a prominent place to view the skyline, maintaining views is critical. Other jurisdictions have used transparent barriers over Amtrak tracks.

18. Move Drains out of Bike Lanes

The drain inlets should be under the sidewalk to provide a smooth surface for the bike lane, lessening the chance for crashes. If this is not possible, drainage grates should be oriented perpendicular to the direction of bicycle travel so as to prevent cyclists from getting their wheels caught in the grates.

19. Contract-out Snow Removal

Snow and ice in bike lanes and on sidewalks can lead to injury and limit the utility of the Bridge during inclement weather. The City should contract with the University City District, Center City District, or another entity to provide snow removal on the Bridge.

20. Create Gateways to Penn and Center City

The bridge is a major point of entry to the University of Pennsylvania for all travel modes. The existing bridge surface has no landscape or amenities that create the gateway effect, and most of the bridge surface is devoted to vehicle lanes. The design should, instead, allow for landscape elements such as planters on the bridge, wider sidewalks and wider bike lanes.

21. Plan for Future Development

On the western side of the bridge, Penn plans to construct fields and buildings facing the bridge, essentially converting it into a normal city street. Therefore the bridge should be designed to be easily transformed into a city street by removing the railing and possibly widening the sidewalk. Since most streets in University City have trees, the bridge would ideally be designed to allow for trees as well. On-street parking may be desirable in the future to access the proposed playing fields and buildings and to calm traffic.

22. Install Planters

Planters provide an opportunity for visual interest for pedestrians and motorists. Original concepts for the bridge presented to the Art Commission included options which included planters on the bridge, but these were removed during later design stages. The coalition would request that planters be added back to the bridge design, as shown in the concept plan.

23. Consider Commercial Uses on the Bridge

More than one participant suggested that it would be great to have a small coffee shop on the bridge itself. The view is unbeatable. Alternatively, kiosks could provide services to bridge users. While this is not directly a transportation recommendation, there are precedents for providing a space for retail adjacent to and under bridges. Also, kiosk vending is also a possibility.

Addressing Community Impacts

Create Detours for all Modes and Support Local Businesses During Construction

During construction, most vehicular traffic will be rerouted over the Walnut and Chestnut Street bridges via 22nd, 23rd, 33rd and 34th Streets. The City should ensure that there are adequate detours for all modes - including bicycles - during construction. SEPTA should consider a loop to link Southwest Center City neighborhoods with Penn and the hospitals in University City.

The City should support South Street businesses during construction by advertising how to access South Street West businesses, The Philadelphia School, and the Schuylkill River Park.

Study the Impact of Bridge Closure on Traffic Patterns and Local Neighborhoods

Sixty percent of the traffic on the bridge during peak hour is accessing the Schuylkill Expressway and several older homes on South Street suffer structural damage stemming from large trucks. While the bridge is closed, traffic will not be able to exit or enter the highway at South Street. This is a perfect opportunity to conduct a study to measure the impact on nearby Schuylkill Expressway interchanges, and to study the impact of large trucks. When bridges have been closed in the past in other cities, the overall traffic volumes often remain unchanged — traffic that formerly used the bridge often disappeared. The bridge closure may serve to make the case for limiting access for large trucks, closing the on-ramps to the highway, and perhaps even closing the off-ramps. It is important not to miss this opportunity to investigate the impacts of closing the ramps and limiting truck traffic, so a detailed study should be designed now.

Maintenance Issues

Several important maintenance issues were raised by bridge stakeholders:

If planters are incorporated on the bridge, who maintains them?

We suggest that the maintenance of planters could be handled in a similar fashion as other important roads in the city, such as Delaware Avenue, which is maintained by Philadelphia Green/ Pennsylvania Horticultural Society in contract with authorities.

If the bicycle lane is behind a barrier, will road grit and snow accumulate in the bike lane?

The community design includes a bicycle lane that is separated from traffic in certain locations behind a crash-tested railing. This railing could be mounted to a curb median which would help block road grit from spreading, or it could be a combination rail with a solid base which would also block the spread of road grit. In any event, regular sweeping of the bike lane by a sidewalk sweeper such as that owned and operated by the University City District would help keep the bike lane free of road grit. Snow must be removed in a timely way using specialized equipment. Ideally, this would be contracted out to an organization that is plowing and maintaining area sidewalks.

How will bridge enhancements such as flagpoles and sculptural elements be maintained?

Flag poles, if used, could potentially be maintained and monitored by local organizations, (e.g. perhaps the ROTC at Penn). Sculptural elements could potentially be maintained by a similar manner to other areas of the city — for example, the glass and stone pylons at the intersection of Broad Street and Washington Avenue.

Long-term Issues

The redevelopment happening in this area of the city, coupled with the expansion of bicycle culture is likely to create increasing numbers of bicyclists and pedestrians. Ultimately, it may be warranted to repurpose the space on the bridge to provide more space for bicycles, should volumes continue to grow. Therefore, the design should be flexible enough to allow for such an eventuality.

Likewise, as mentioned above, the University of Pennsylvania plans to develop its holdings on both sides of the bridge. This fact argues for designing this portion of the bridge to be able to transform into a city street with minimal reconfiguration.

The reconstruction of the South Street Bridge has also revealed the fact that the infrastructure along the Schuylkill River could be significantly improved to support the revitalization and redevelopment of the riverfront. For example, while the Schuylkill Expressway provides a degree of regional access, its design also creates a liability. Existing interchanges are dangerous and congested. The expressway cuts the western bank of the river off from the city and creates environmental impacts. The expressway is often congested during peak hours, providing a low level of service.

PennDOT is currently studying the interchanges on the Schuylkill Expressway, however, a deeper ivnestigation is required for this section of the river. Instead of considering just the design of the existnig interchances, the overall circulation pattern should be analyzed within the context of an urban design and development plan for the Schuylkill River. The potential exists to redesign the circulation of the area to improve travel conditions and accessibility for all users, while also creating access to the river for the first time.

For these reasons, the time is ripe for a complete replanning of the infrastructure on the Schuylkill River, in order to plan for its evolution and modernization.

PLANS AND SECTIONS

Plan Comparisons

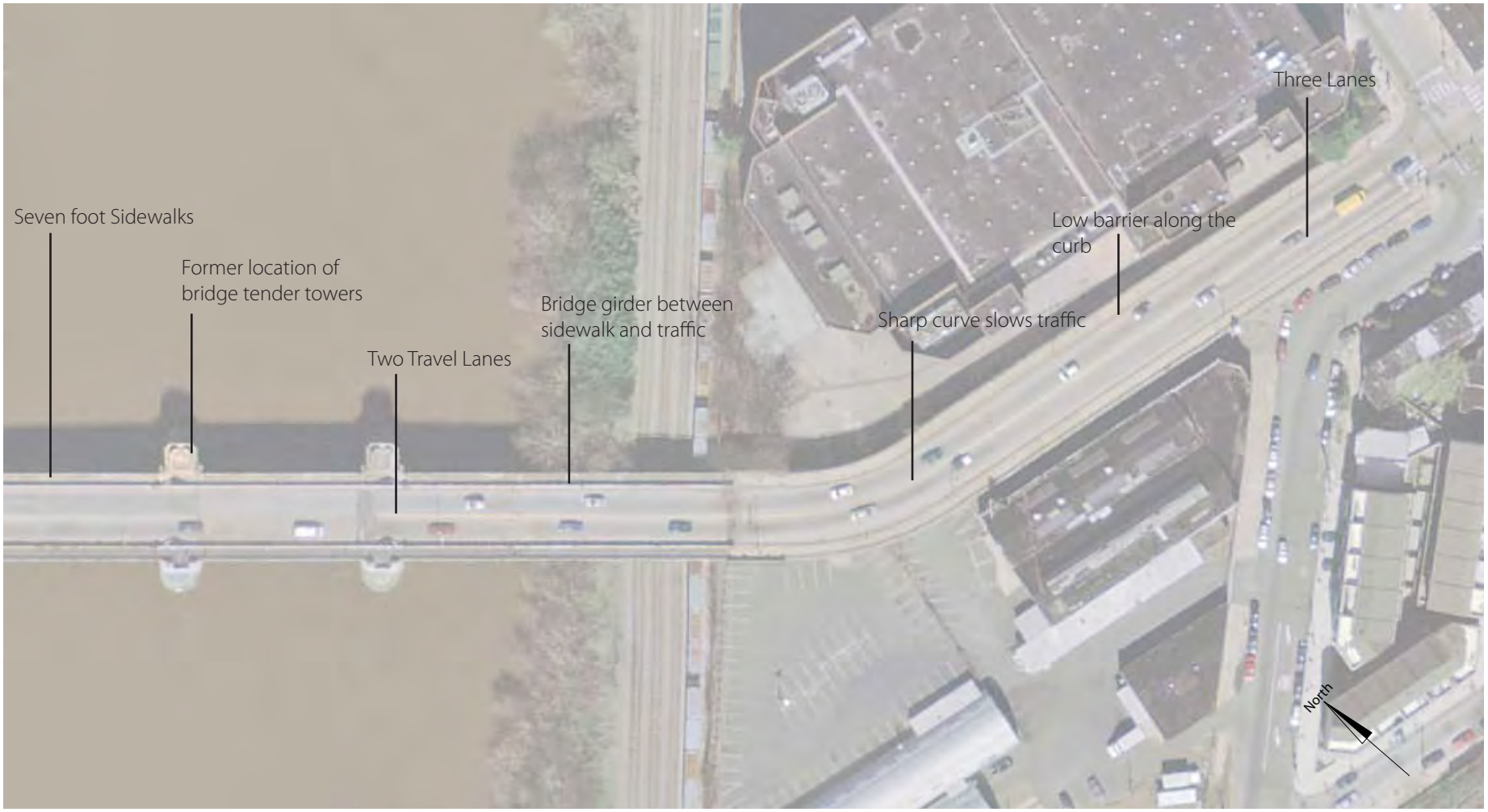
Section Comparisons

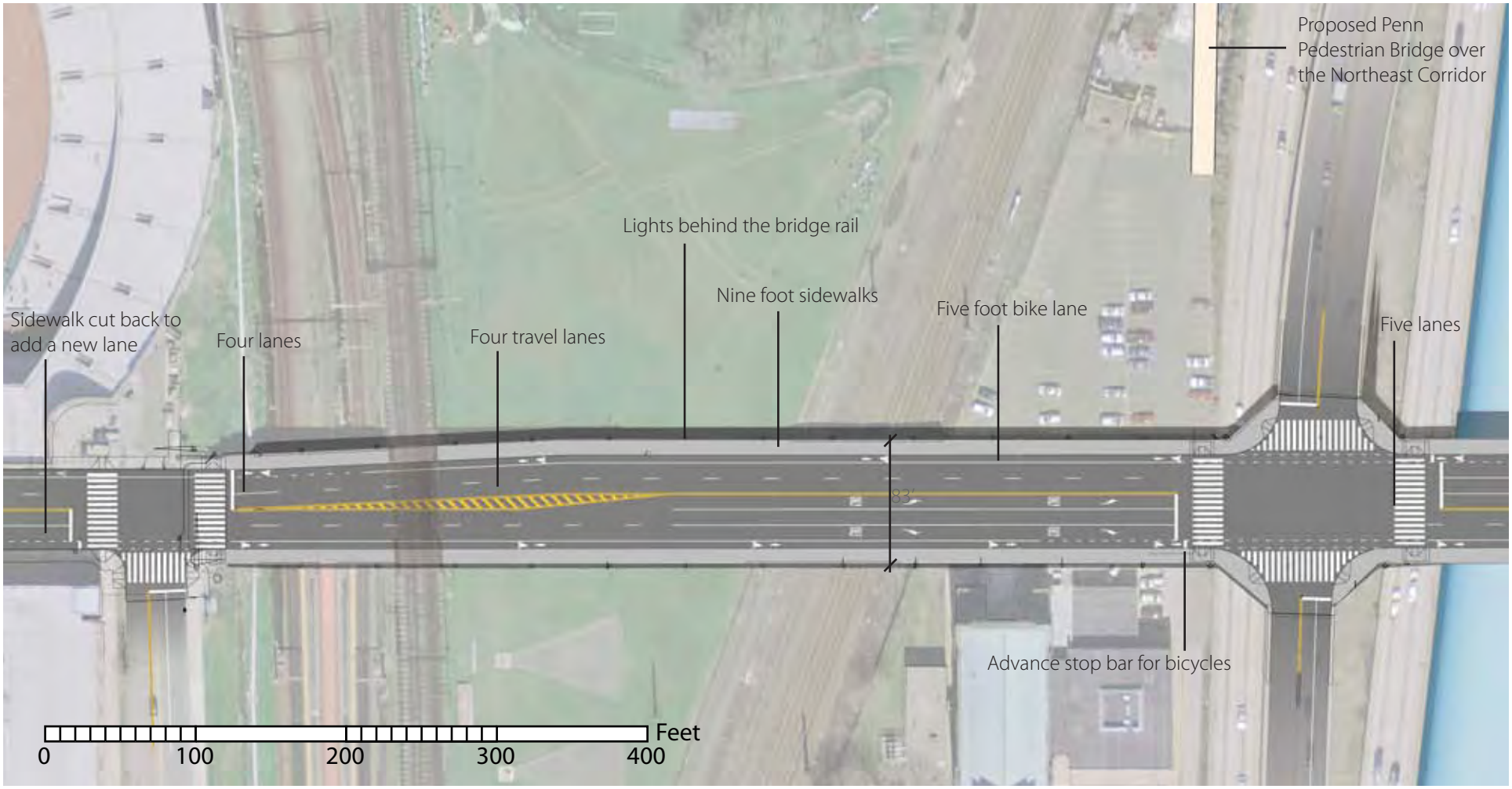
Plan Comparisons

Existing Bridge

The existing bridge has two to four lanes, but where there are more lanes they are very narrow. Sidewalk widths vary with a maximum of nine feet. There are not bikes on the bridge. The intersection with the I-76 ramps is difficult to cross on foot because of high volumes of turning traffic.

EXISTING BRIDGE

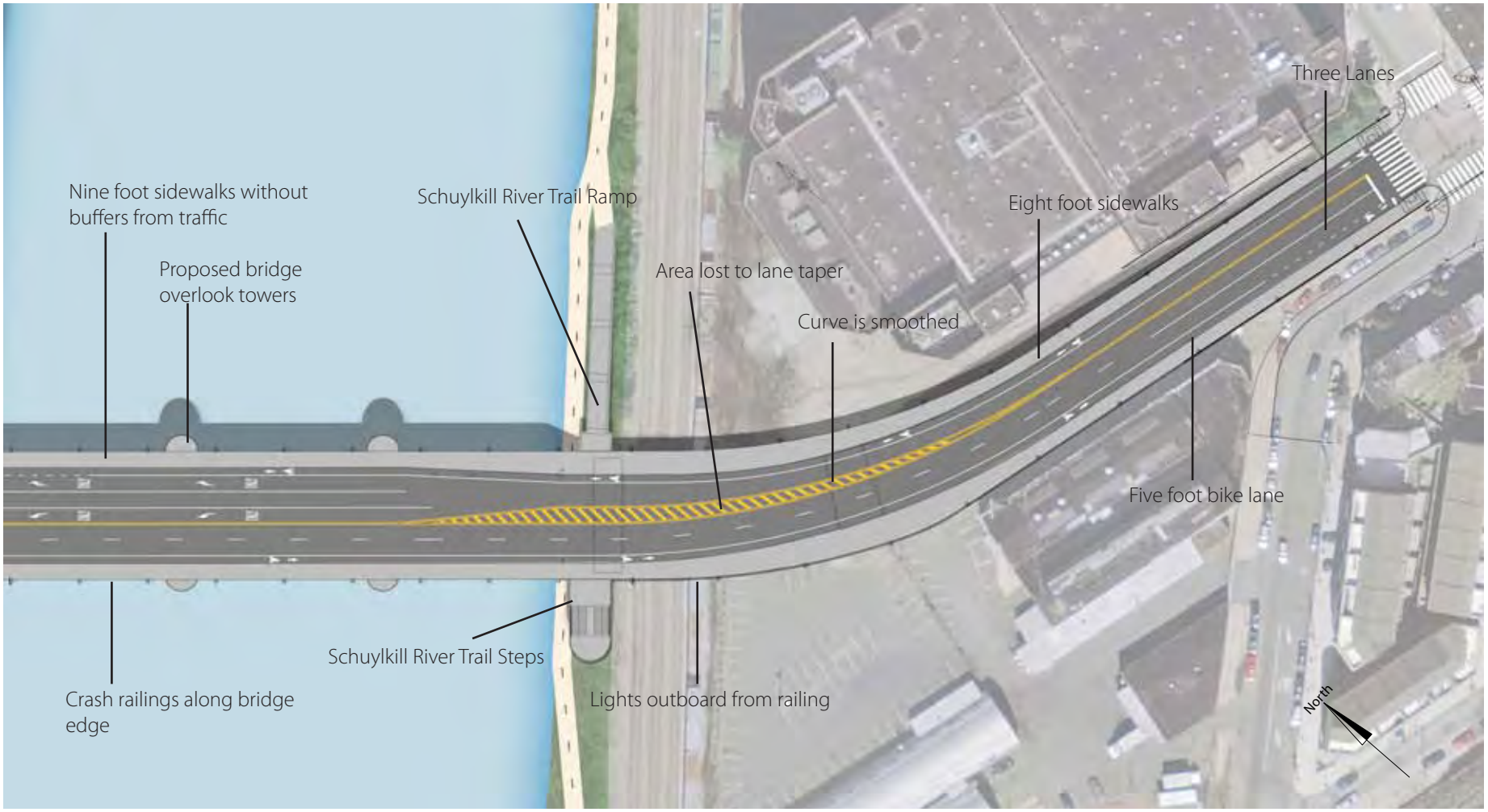


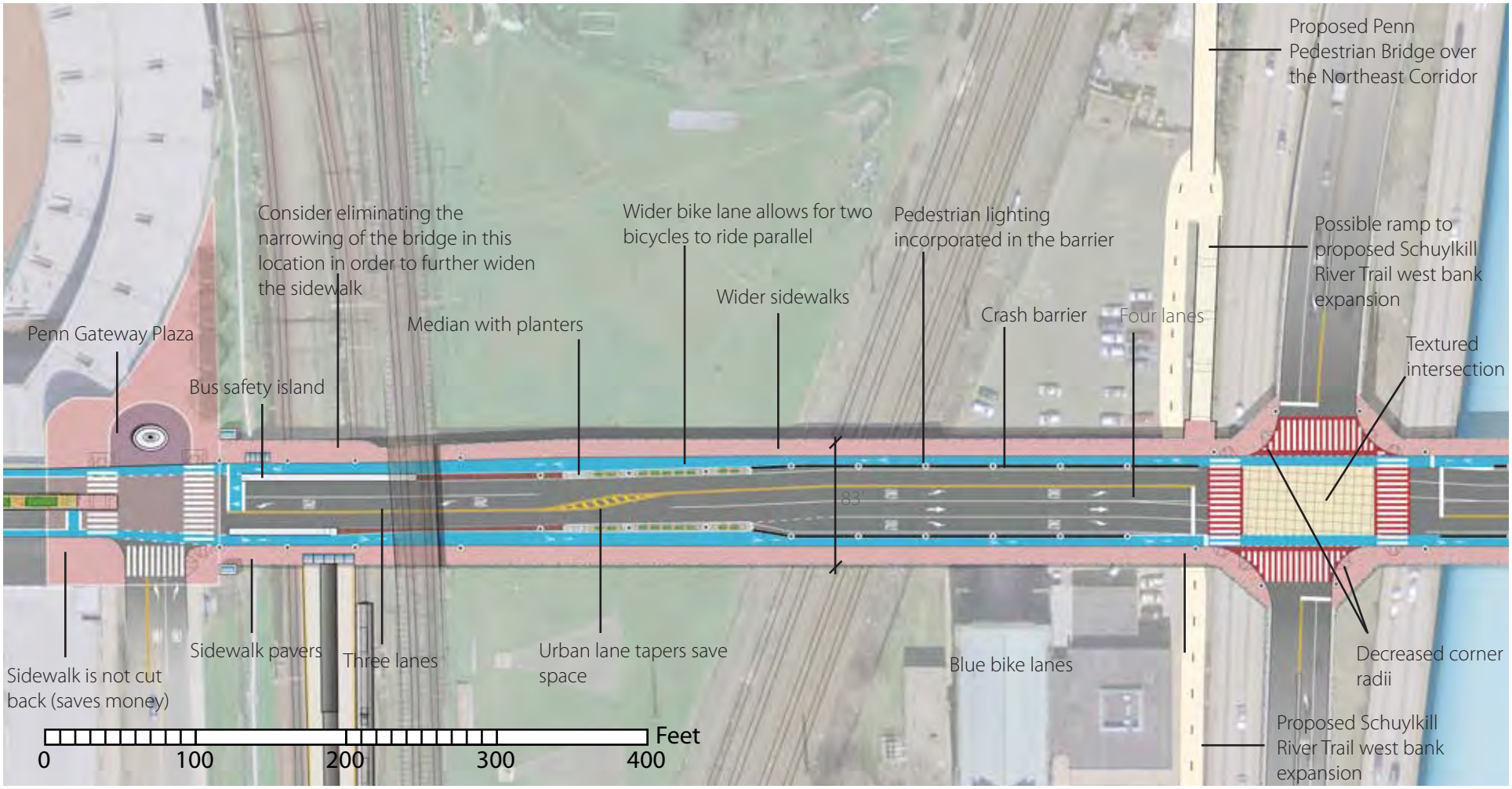


Current Design Proposal

The new bridge is wider and has more travel lanes, creating a high-speed connection to the expressway ramps. Very generous curb radii at the ramp intersections are will speed traffic. Sidewalks are generally about the same width. New bike lanes are added that are five feet wide. The sharp curve on the old bridge is eliminated.

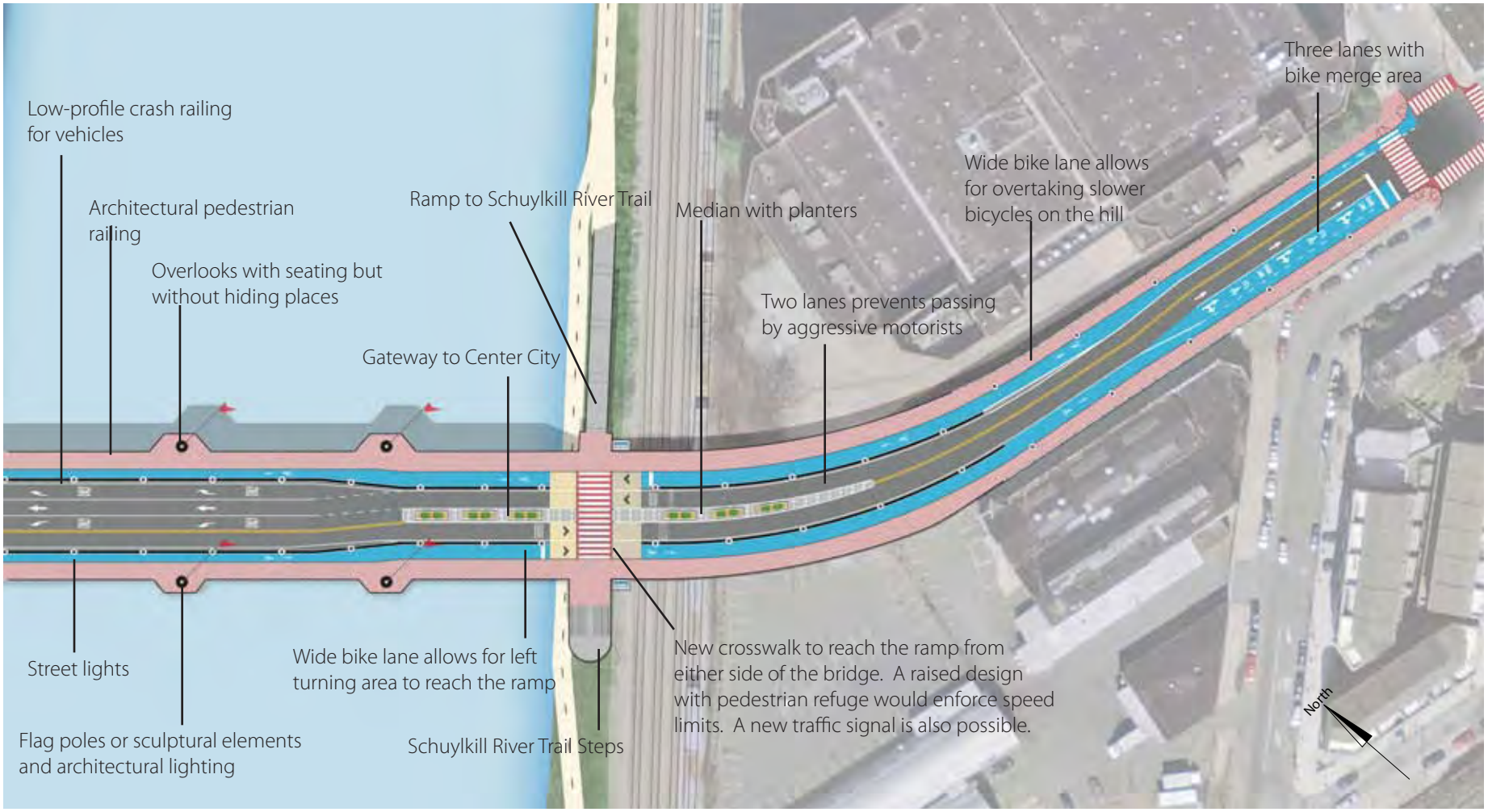
CURRENT DESIGN

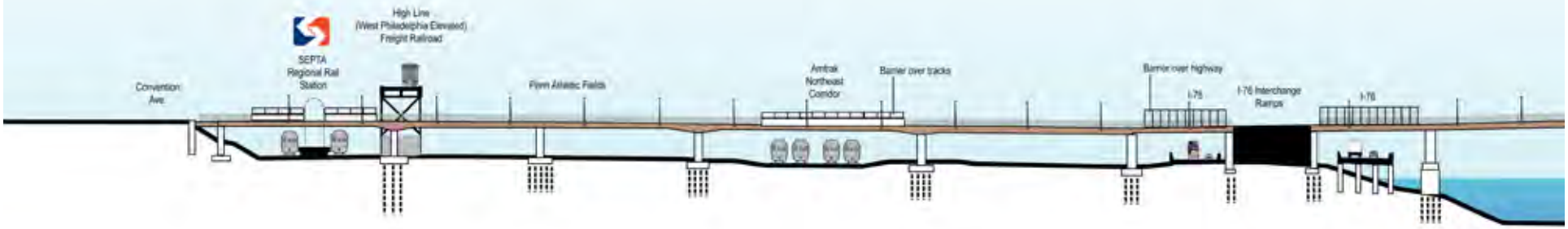




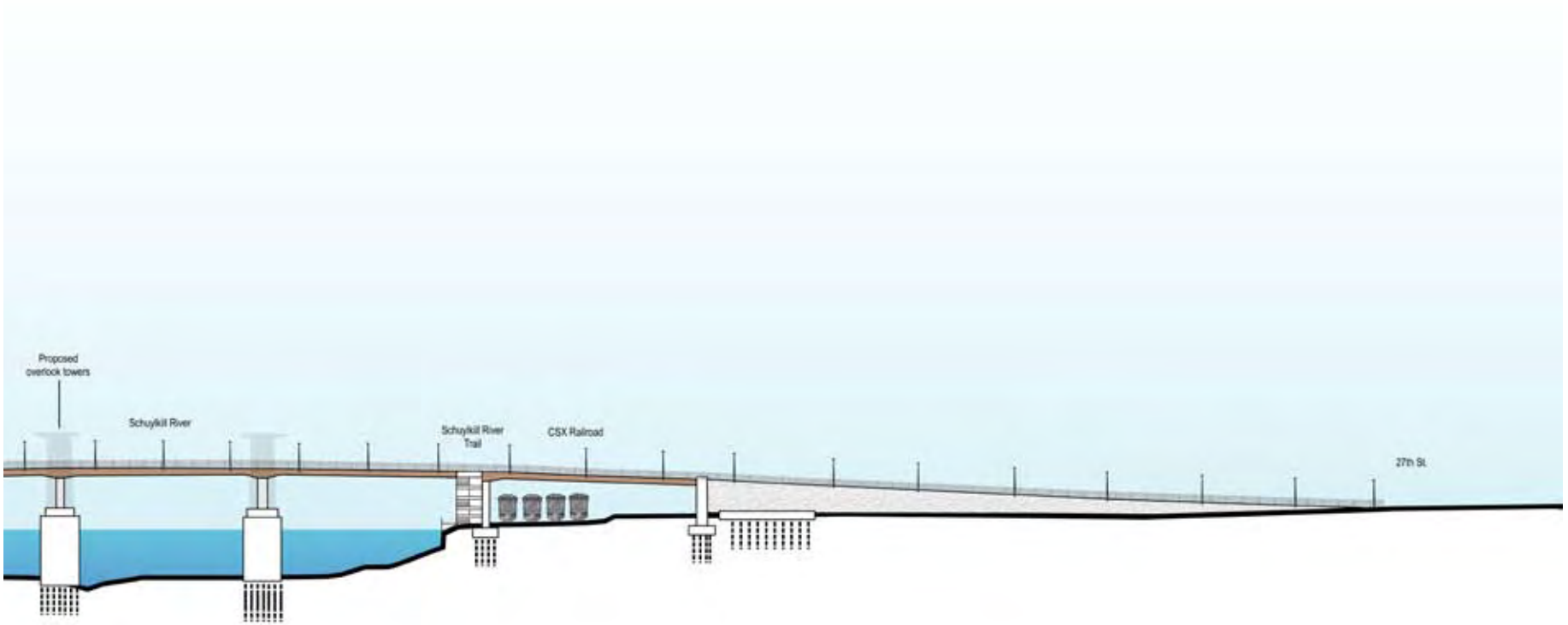
Community Recommendations and Proposed Solutions:

The Coalition recommends widening sidewalks and bike lanes by keeping the number of lanes closer to the existing bridge. Sidewalks and bike lanes are buffered from traffic in some locations by barriers, railings, and planted medians. A new crosswalk at the Schuylkill River Trail allows access to the ramp from either side of the bridge. New connections to Penn's River Fields promote better access.


Low-profile crash railing for vehicles
Architectural pedestrian railing
Overlooks with seating but without hiding places
Ramp to Schuylkill River Trail
Median with planters
Gateway to Center City
Two lanes prevents passing by aggressive motorists
Wide bike lane allows for overtaking slower bicycles on the hill
Three lanes with bike merge area
Street lights
Flag poles or sculptural elements and architectural lighting
Wide bike lane allows for left turning area to reach the ramp
Schuylkill River Trail Steps
New crosswalk to reach the ramp from either side of the bridge. A raised design with pedestrian refuge would enforce speed limits. A new traffic signal is also possible.
North

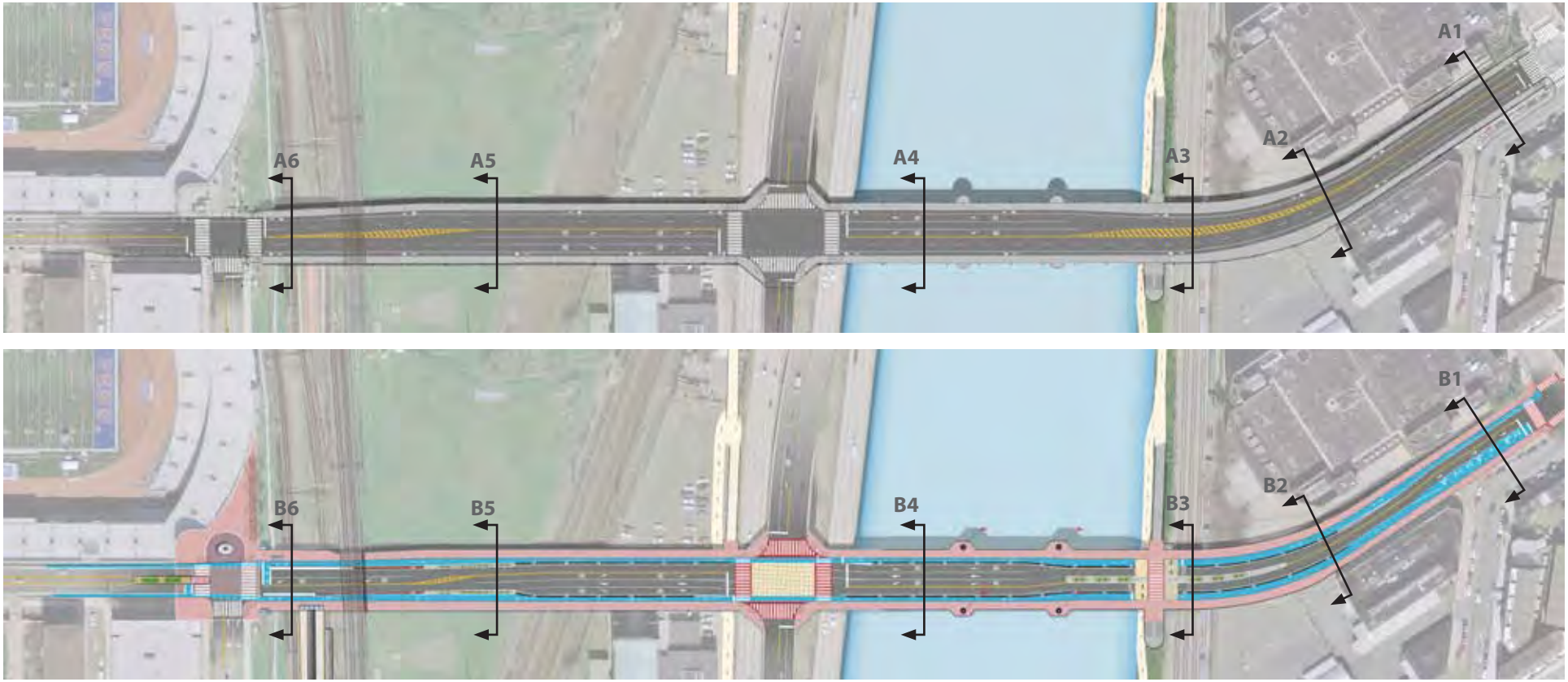

High Line
(West Philadelphia Elevated)
Freight Railroad
SEPTA
Regional Rail
Station
Convention
Ave
Penn Athletic Fields
Amtrak
Northeast
Corridor
Barrier over tracks
Barrier over highway
I-76
I-76 Interchange
Ramps
I-76

CURRENT DESIGN- ELEVATION



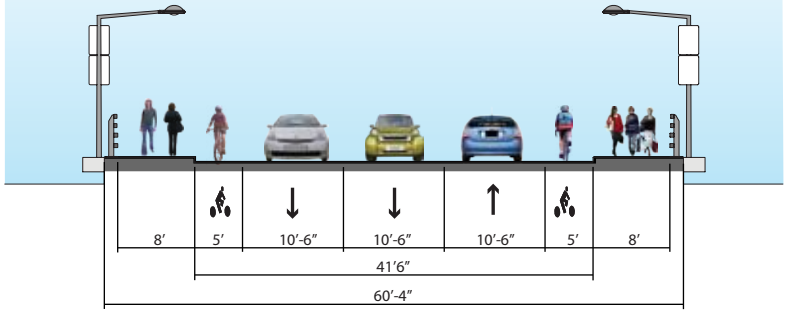
Section Comparisons

This portion of the report provides graphical section drawings of the currently proposed bridge design and a design concept developed based on the charrette .



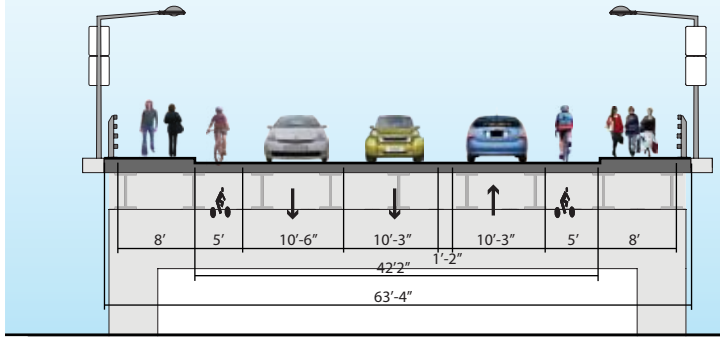
A1

Current Design



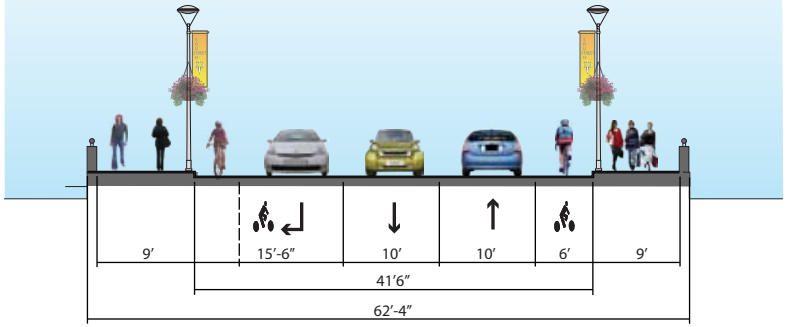
B1

Current Design



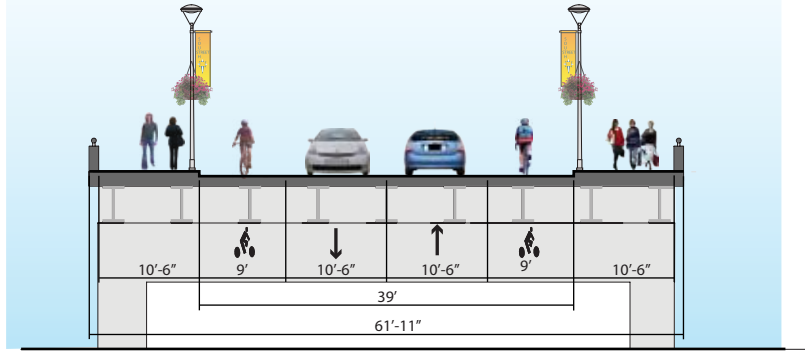
A2

Community Design

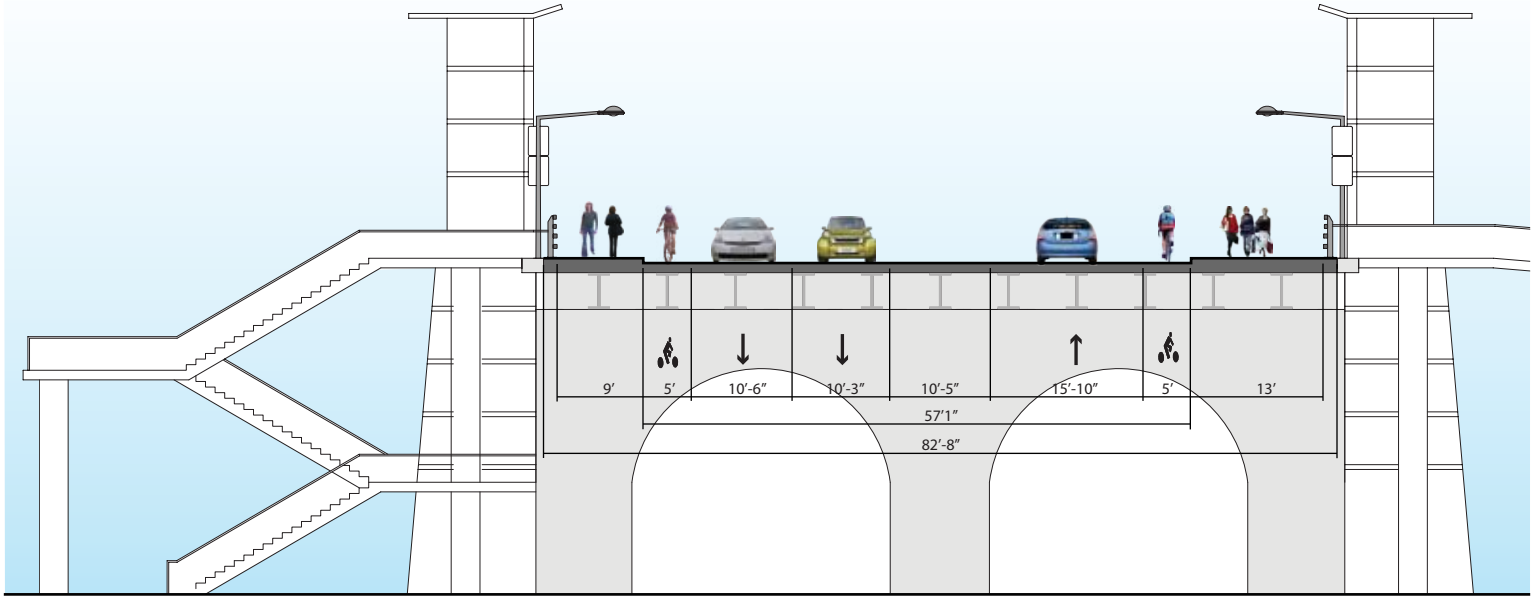


B2

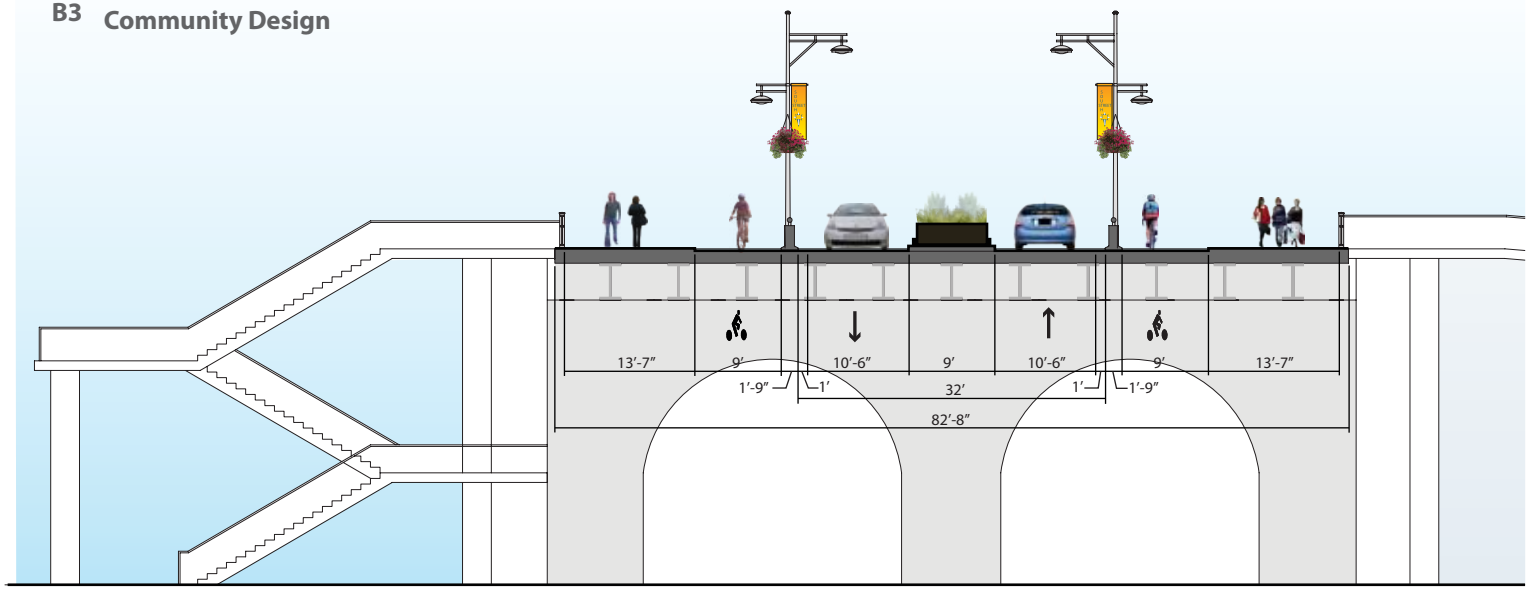
Community Design



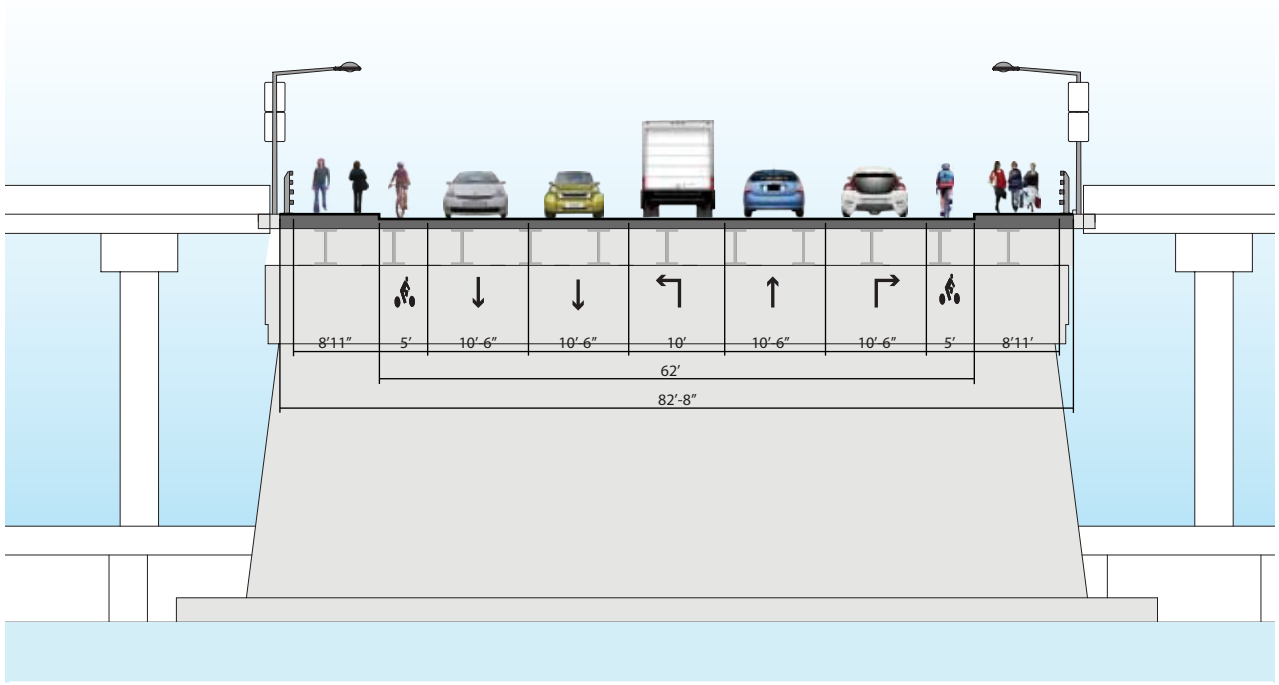
A3 Current Design



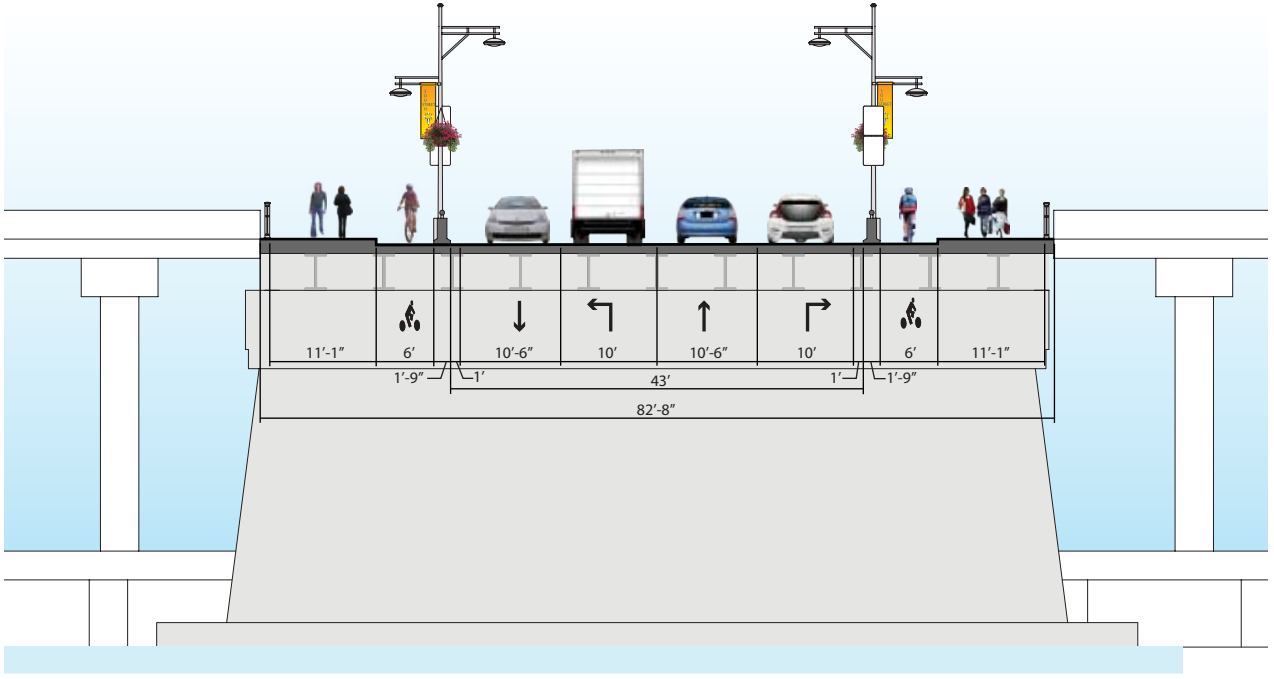
B3 Community Design



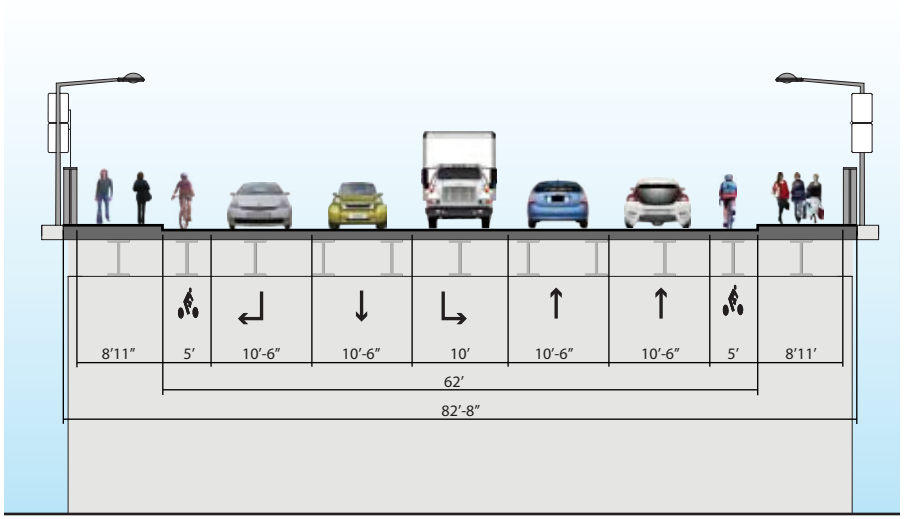
A4 Current Design



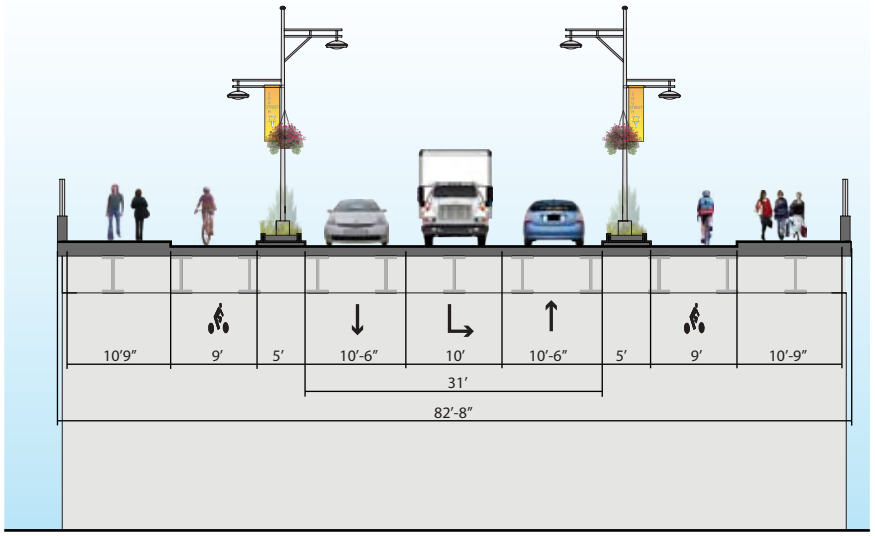
B4 Community Design



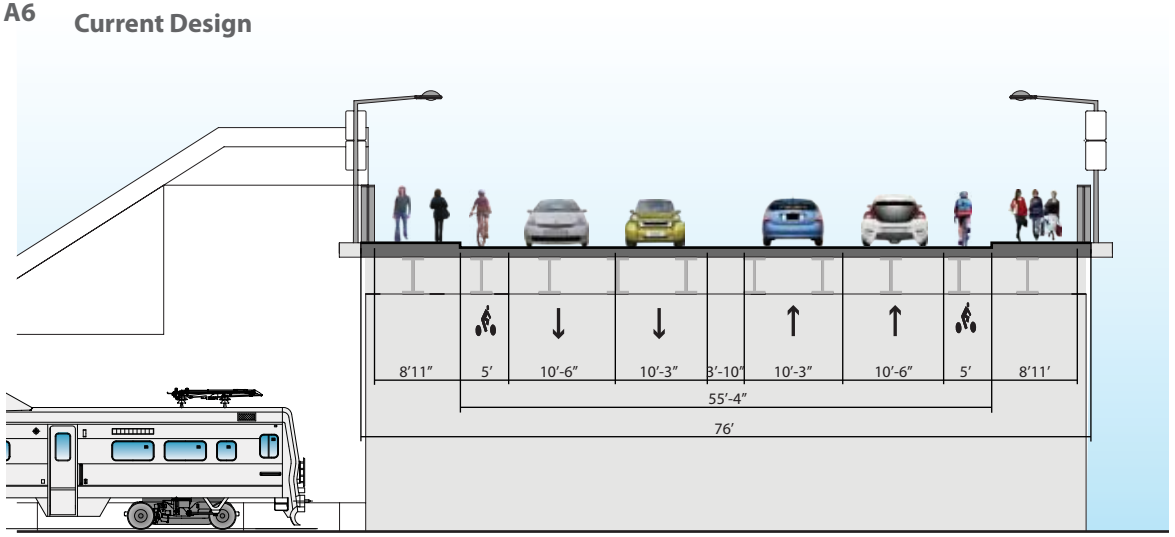
A5 Current Design



B5 Community Design



A6 Current Design



B6 Community Design