

Introduction

One of the significant features of the complete system of streets is the introduction of the streetcar as a new mode. During the charrette, the idea of instituting a modern streetcar circulator service to improve connectivity within the Strip District and with Downtown was developed and tested. The streetcar is a key circulation provision within the neighborhood. This type of service enhances connectivity to destinations, takes cars off the streets, and enables efficient use of satellite parking. The four primary benefits of a streetcar in the Strip District are as follows:

- A district circulator – Providing easy, convenient service for residents, shoppers, tourists and workers, offering people quicker access to all parts of the Strip District;
- A pedestrian accelerator – Making the pedestrian the first class rider allowing pedestrians to get off and on every block or two;
- A development generator - Helping accelerate and realize the Strip District's future development potential; and
- A parking optimizer - Allowing access to future satellite parking to support the Strip District's future success.

Initiating Service

There are short- and long-term aspects to a successful streetcar/circulator system. Based on streetcar planning and implementation experience, the City should “start short/start smart”. That means develop an initial, high-impact alignment that yields early success – for ridership and economic development stimulus. This start short/start smart strategy is also designed to be a more reasonable initial cost. To develop a viable initial segment, the intent is to keep the length down to a manageable distance, since operational complexity and costs increase with length. Selection of an initial segment with logical terminus points was done considering the following:

- “Stand-alone” viability of the initial segment;
- Proximity of possible storage and maintenance sites; and
- Ease of incorporating potential extensions into the future.

The ability to connect the Strip District and Downtown is seen as important, if not critical, to the success of the initial streetcar phase. Doing so provides mutually reciprocal benefits. The Strip District's “market” gets expanded to include the Convention Center, the Cultural District and direct access to the “T” at the Wood Street station. Future satellite parking in the Strip District could be a resource for Downtown employees. The Wood Street “T” stop is natural terminus point for the line and could foster ridership from the Downtown core into the Strip District. At the opposite end, 31st Street was selected as a good terminus point for the initial segment, since it gives access to the emerging transitional development in the Upper Strip, while at the same time keeping the initial segment to a manageable distance.

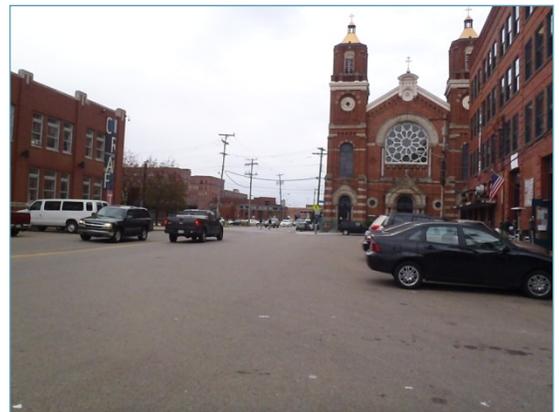
Candidate Alignment for the Strip District

Several alternatives for possible streetcar routes were examined and evaluated. Each of the longitudinal streets in the Strip District (Liberty, Penn, Smallman, and Railroad) was considered in whole or in part, for single or double-track operation. Alternatives also included the concept of “couplets” with tracks running one-way streets one block apart. Each alternative was considered and discounted or selected for the following reasons:

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- **Liberty Avenue:** Liberty Avenue within the Strip District is an established commuter and transit street with several Port Authority bus routes providing service. However, Liberty's location at the uphill "edge" of the Strip District makes its neighborhood accessibility less desirable. Likewise, the high auto traffic and narrow or non-existent sidewalks are fatal flaws for streetcar operations.
- **Penn Avenue:** The one-way portion (16th to 31st) presents an operational challenge. Additionally, the congestion through the commercial core of the neighborhood (18th to 23rd) presents an operational problem. The section below 15th Street is viable, and traveling straight through the Penn/11th intersection is preferable to the S-curve operation necessitated by using Smallman and 11th to Penn into Downtown. While the Design Team is not recommending future extensions, access into the heart of Lawrenceville, Penn Avenue would better accommodate the streetcar than Smallman.
- **Smallman Street:** Smallman Street represents the geographic "middle" of the Strip District; it is approximately equidistant from the Allegheny River and the east side of Liberty Avenue. This makes Smallman Street desirable from an "access to the streetcar" standpoint. It serves the core of the existing neighborhood, while being close enough to stimulate growth in the new opportunity areas shown and discussed in the Framework Plan. Operationally there are no significant negatives with Smallman except in the area of 11th Street (the transition into Downtown is awkward), and perhaps traveling under the 16th Street Bridge. But overall the route is viable and desirable as a streetcar street. Although it is beyond the recommended initial terminus, Smallman beyond 31st Street is less viable for the streetcar and a more difficult connection into Lawrenceville.
- **Railroad Street:** While Railroad Street provides access to economic development opportunity areas along the river, it is not as close to the heart of the current pedestrian activity area occurring on Penn Avenue. However, it is highly problematic and difficult for streetcar tracks to cross or interact with the freight railroad tracks that traverse Railroad Street. The configuration of the Allegheny Valley Railroad (AVRR) and Railroad Street north of 21st Street renders this alignment un-viable, assuming the continued operation of the AVRR. Accordingly, it was removed from consideration.



View of Smallman Street near 21st Street



View of Smallman Street passing under the 16th Street bridge

While there was an option to extend "Railroad Street" south of 21st to 11th, through the proposed office and residential redevelopment site, the concept of retaining the streetcar on Smallman was stronger. Again, Smallman Street's central location gives easy and uniform access to the entire Strip District.



Candidate Routing within Downtown

For operational ease and because there is minimal space Downtown to store a train while reversing direction, some form of a one-way loop is desirable for the Streetcar. The tight grid of streets limits the options for loops since sufficient turning clearance (which is non-existent in Downtown) is required through intersections. In addition, a priority is to minimize impacts on parking and sidewalks. Accordingly, two loop routes were considered:

- **Riverfront Loop:** This routing enters Downtown using 11th Street and the 10th Street Bypass, transitioning to Fort Duquesne Boulevard as far as 7th Street. It turns down 7th Street to Liberty Avenue at the Wood Street “T” station, then returns to the Strip District via Liberty Avenue, 10th Street, and Penn Avenue.

Advantages of this routing would include serving the Convention Center, Wood Street “T” stop, the Cultural District, as well as an additional opportunity for a signature stop at the foot of the Seventh Street (Andy Warhol) Bridge, providing easy connectivity to all of the locations on the near North Shore. Disadvantages include the increased operational complexity and traffic implications inherent in traversing the intersections at Smallman/11th, 10th/Fort Duquesne, and 9th and 7th Streets.

- **Penn/Liberty Loop:** This routing enters Downtown using Penn Avenue as far as 7th Street, and down 7th Street to Liberty Avenue at the Wood Street “T” station. It then returns to the Strip District via Liberty Avenue, 10th Street, and Penn Avenue.

Advantages of this routing would include serving the Convention Center, Wood Street “T” stop, and the Cultural District. Although not directly serving the North Shore area, the foot of the bridge is only one block away from a potential stop at Penn and 7th. Furthermore, this routing is shorter, simpler, and avoids some of the complex traffic interactions along the riverfront.

Plan Features

Because both parking and travel lanes are important features along Smallman Street and Penn Avenue, the designated use of the public rights-of-way must be balanced. The following recommendations are also shown in Figures 1 and 2:

Line Routing – The intent of the streetcar line is to be visible and clear in its direction and accessibility. That is one of the strong reasons it is centered on Smallman from 15th to 31st Streets.

- A streetcar line would be developed to connect the Strip District and Downtown, with Smallman as the central line location. It begins at or around Smallman and 31st Street and runs south through the heart of the Strip District to 15th Street. In this area the streetcar would operate as a two-way, double-track line in the travel lanes of Smallman Street. As streetcar does not use exclusive right-of-way, the tracks would operate in the current travel lanes.
- At 15th Street, the streetcar would operate as a two-way, double track line between Smallman Street and Penn Avenue.
- From 15th to 10th Streets, the streetcar would operate as a two-way, double-track line in the travel lanes of Penn Avenue. As streetcar does not use exclusive right-of-way, the tracks would operate in the current travel lanes.
- Once Downtown, the streetcar would operate as a one-way loop using Penn Avenue, 7th Street, Liberty Avenue, and 10th Street back to Penn Avenue. Again, a streetcar does not use exclusive right-of-way, the tracks would operate in the current travel lanes.



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Stops – Streetcars are scaled to the neighborhood and they have “stops”, not stations. This normally is expressed as a shelter with amenities such as a shelter with a bench, lean bar, trash can, off-board ticket machine and lighting. Typically streetcars stop every 900 ft.-1200 ft., and in the Strip District’s case that is every two the three blocks, given the block lengths.

- There are potential stops in the vicinity of:
 - Smallman and 31st Street, Smallman and 29th Street, Smallman and 27th Street, Smallman and 25th Street, and Smallman and 23rd Street;
 - Smallman and 20th/21st Streets and Smallman and 18th Street;
 - Smallman and 15th Street where it transitions to Penn and 11th/12th, adjacent to the bus terminal Penn and 10th Street at the Convention Center – inbound;
 - Penn and 9th Street – inbound;
 - Penn and 7th Street – inbound;
 - Liberty and Wood Street “T” - outbound; and
 - 10th Street between Liberty and Penn – outbound.
- Generally stops are located on the far side of intersections.
- The exact location and configuration of stops would be determined in later planning efforts.

Parking – As stated earlier, the streetcar is a parking optimizer, and that is for on- and off-street parking. With the streetcar running in the travel lane, on-street parking is preserved. Likewise, it can service parking garages to help drivers complete the “last mile of their trip”.

- Most existing on-street parking would be retained. At stop locations, only about two to three parking spaces would be replaced with a sidewalk “bump-out” to accommodate the stop.
- Satellite parking facilities – both public and private - will be developed in the Strip District and served by the streetcar line. This approach reinforces the streetcar’s role as a district circulator and parking optimizer.

Operational Assumptions – Although more detailed planning work would be needed to determine the specific vehicles selected, the operating parameters (time of day and frequency), and fare to be charged, for the initial route selection purposes the following assumptions were made:

- Modern, low-floor, ADA-compliant streetcar (such as those used in Portland and elsewhere) would be used with electric overhead wire technology. Emerging off-wire technology continues to evolve and might be considered if cost-effective.
- Service would run from 5 AM until Midnight, with possible later extensions on Friday and Saturday nights, to be determined.
- Service would run approximately every 7½-10 minutes during the bulk of the day, and every 15 minutes at night.
- Average speed (with stops) would be approximately 10 mph which is consistent with other streetcar systems in the US. It would require slightly less than 30 minutes to complete a round-trip.
- A fleet of four vehicles is assumed to be in service for the initial segment.



Plan Benefits

The streetcar plays a feature role in the Strip District's complete system of streets. Additionally, it will help the Strip maintain its current market position, while facilitating growth that is happening *now*, and will continue to do so in the future. The summary of the benefits can be characterized as:

- Providing improved connectivity between Strip District and Downtown, and within Strip District itself;
- Maintaining most of existing parking while providing opportunity to reduce parking needs in Heart of the Strip;
- Offering an opportunity for residents to have car-free or car-reduced living;
- Stimulating and enhancing economic development in opportunity areas;
- Maximizing the efficient use of new satellite parking facilities along the line. In addition to visitors to the Strip District, this would be particularly beneficial for Strip District employees;
- Minimizing traffic impacts; and
- Relieving some bus traffic and stopping on Liberty Avenue.

Ridership Considerations

As part of identifying a recommended alignment and configuration for a streetcar, consideration was given to the route's ability to generate ridership. The streetcar, as envisioned, functions as a connector and a "circulator"; as such, it is less concerned with providing fast commuter-type trips. The frequent stops enhance neighborhood connectivity and access to (and from) these stops to points in the neighborhood. For this reason, access at each potential stop to the largest array of locations within a reasonable (five-minute walk time) is the most significant driver of ridership, and accordingly, a critical part of the alignment decision.

Smallman Street through the Strip District is generally the geographic center of the Strip District, being basically equidistant from the Allegheny River and the Norfolk Southern railroad tracks, and both within five minutes' walk. By locating a streetcar on this axis, the opportunity to pull riders from all parts of the Strip District maximizes. From an access point of view, the best ridership opportunity can therefore be expected when aligned on Smallman. Reasons to deviate from this alignment would include physical or operational considerations (such as the desire to avoid the difficult Smallman/11th intersection), or to better serve a key destination (e.g. Penn Station and the Bus Terminal).

Another key consideration with streetcars is the potential for them to stimulate (or further stimulate) development. The lower Strip (nearest Downtown) has significant development plans underway, and the streetcar would be poised to take advantage of this additional market. At the same time, the Upper Strip (nearest the Lawrenceville neighborhood) has a number of development opportunities and the streetcar may very well be a key element in the success of such projects. Ridership on the streetcar can generally be described in two ways 1) the riders who are already making trips in the market (and at present are using some other mode to make the trip) and 2) the riders who are induced to make new trips because the streetcar makes them more appealing and feasible.

It is important to note that the streetcar has a significant opportunity to "divert" existing transit riders who today (or in the streetcar-less future) use Port Authority buses to get to and from the Strip District. The Port Authority's bus routes, which serve the Strip District, all travel to/from Downtown through the Strip District (primarily on Liberty Avenue) to/from other locations (e.g. Lawrenceville, Bloomfield, points beyond, etc.). Some of the riders on these routes (those who are traveling within the Strip District or to/from Downtown) may find the streetcar between Downtown and the Strip District more suitable for their trip. While it is not the streetcar's intent to "cannibalize" Port



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Authority's ridership on these routes, it does provide the opportunity for Port Authority to fine-tune those routes and serve them more efficiently. One consequence of this is that it may be possible to reduce the stops on existing bus routes along Liberty Avenue to one or two key locations (since riders would have another viable option in the Streetcar 1-2 blocks away), improving Port Authority's service and traffic performance on Liberty Avenue at the same time.

Although more detailed examination of route, operating assumptions, and such will be necessary, a preliminary ridership analysis suggests that ridership on the order of 2,900-3,000 riders per average day would be expected. Some of this figure includes riders brought by development which is not yet in place. It is likely that (depending on economic and development conditions at the time) in the opening year, ridership could range from 2,000 to 2,500 per day once some initial "familiarization" period has occurred. It is estimated that approximately 500 of these trips are "induced" trips which would not have occurred before; the best example of this type of trip is lunchtime/errand trips for office workers Downtown. Because it is now possible to get some distance using the streetcar, workers have the potential to lunch or shop and then return within the typical "lunch hour". Experience has shown in other cities (and, in fact, in Pittsburgh using the "T" Subway), that some number of people may elect to travel on a vehicle to lunch instead of "eating in their building".

The remaining trips can be expected to be "diverted" onto the streetcar from whatever other mode commuters or visitors may have used. It is a reasonable estimate that approximately 200 of these trips could come from existing transit riders on Port Authority buses, and the remainder could be diverted from walk trips or drive trips. More detailed analysis of the walk travel patterns within the Strip District is warranted to investigate this diversion further.

Figure 1: Proposed Streetcar Typical Section

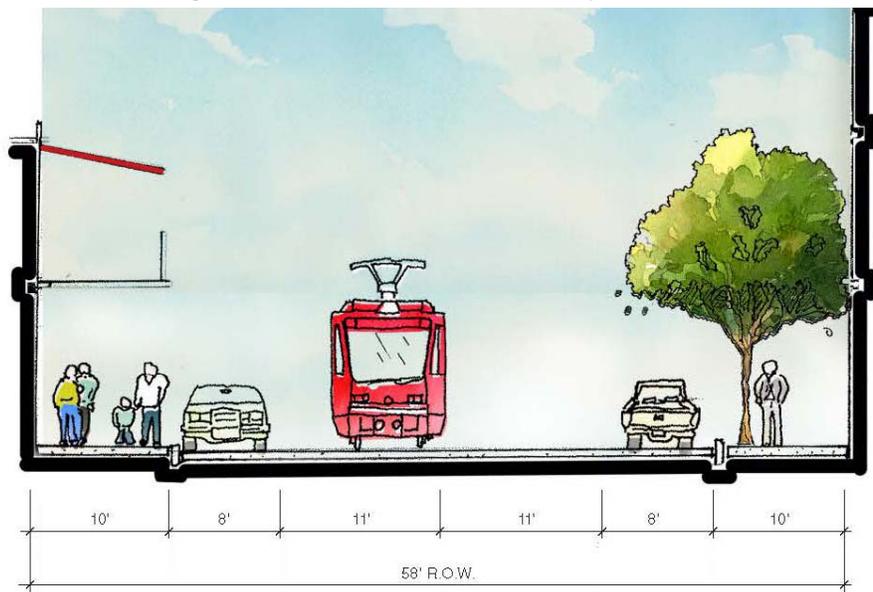
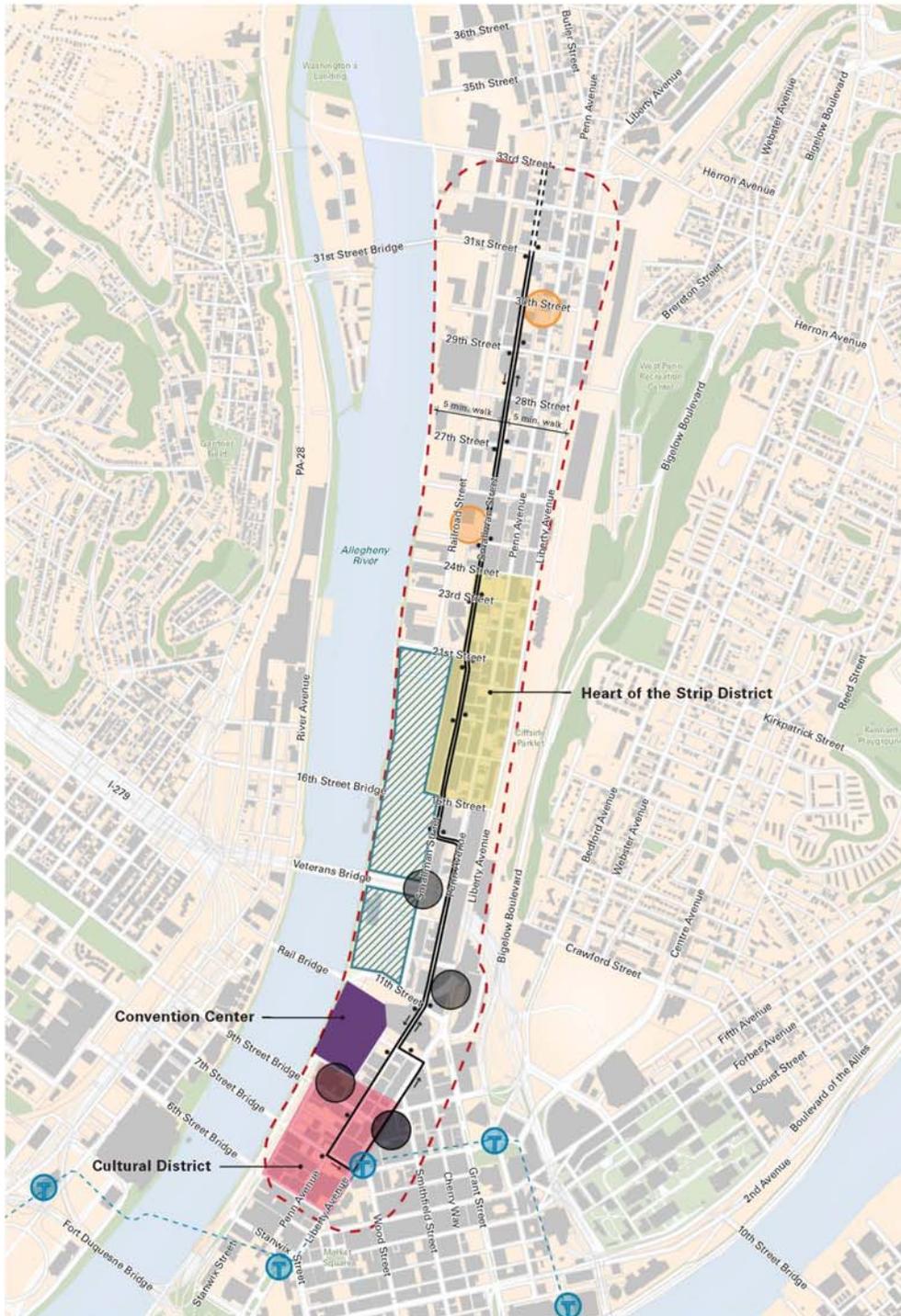




Figure 2: Proposed Transit Way Plan



STREETCAR ALIGNMENT AND PEDESTRIAN SHED



Transit Way

- STREETCAR ALIGNMENT
- CONCEPTUAL STREETCAR STOP
- 5-MINUTE WALKSHED
- CURRENT DEVELOPMENT PROPOSALS
- PARKING RESOURCES
- CONCEPTUAL SATELLITE PARKING OPPORTUNITIES
- 'T' STATION
- 'T' LINE



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