Redwood City Broadway Streetcar/Urban Circulator Study
Summary Report

Introduction

This study explores the feasibility of a streetcar/urban circulator project to link the Downtown Transit Center with the Downtown and the Broadway corridor and to enhance overall mobility in this important area of the City. Streetcars have demonstrated their ability to serve an important transportation function and to enhance and renew urban environments in cities throughout the country.

Background

Redwood City has been proactive about investing in its downtown area over the last two decades with a multifaceted approach. For example, Redwood City was one of the first cities in the Bay Area to bring a multiplex cinema into the heart of downtown to catalyze economic growth and revitalization. Redwood City also pioneered the use of demand-based parking pricing to manage parking and encourage visitors to come to the downtown. Form-based development standards and streamlined environmental review process from the Downtown Precise Plan\(^1\) have helped to catalyze development, resulting in numerous new office, residential, and mixed-use developments.

An important asset in the downtown is the Transit Center which currently serves Caltrain and SamTrans buses. This complex is one of the largest regional transit hubs on the Peninsula and provides the city with a high-level of regional transit service. However, transit riders run into the classic first mile-last mile dilemma – how to get to-and-from the Transit Center to the areas beyond immediate walking distance.

The Broadway corridor represents a major opportunity for reuse and new development, but its eastern end is beyond a reasonable walking distance for most. Its west end is anchored by the Transit Center and its east end by the Stanford Medical office complex and the new Stanford in Redwood City administrative campus.

\(^1\) Available online at https://www.redwoodcity.org/departments/community-development-department/planning-housing/planning-services/general-plan-precise-plans/downtown-precise-plan
History

The idea of a streetcar or urban circulator (short-distance, high-frequency bus service) to provide transit service in the Broadway corridor first surfaced during development of the City’s General Plan in 2010. Key milestones since then include:

- 2010: General Plan discusses a streetcar network using the Broadway, Middlefield and Seaport corridors (see Figure 1)
- 2013: Stanford in Redwood City Precise Plan references a streetcar line in the median of Broadway and the project could provide funding for a streetcar as a community benefit
- 2016: The City obtains a Caltrans grant to study the feasibility of a streetcar/urban circulator in the Broadway corridor

Goals

The primary goal of the Streetcar/Circulator Plan is to connect major employment hubs and surrounding neighborhoods to the Downtown and Transit Center, taking advantage of exciting new developments in the Broadway corridor by furthering City’s ability to add jobs and housing through improved accessibility and mobility of employees, visitors and residents, resulting in:
1. Increased use of public transportation and ease of travel
2. Enhancing the City center as an important local and regional hub for business, entertainment, cultural resources, medical needs, and government
3. New economic and social benefits
4. Reduced vehicle miles of travel and Greenhouse Gas (GHG) emissions

**Study Description**

The City designed the study to explore the feasibility of a streetcar or urban circulator system in the Broadway corridor (see Figure 2). The Broadway corridor was selected because it would connect existing and future high-density neighborhoods to each other and to major activity centers such as Downtown and the Caltrain Station. Specifically, the study was intended to develop the following information for the downtown streetcar corridor alternatives:

- **Alignments/Cross-sections:** Identify potential alignments and cross-sectional alternatives
- **Transit Connections:** Define opportunities for connections to Caltrain and SamTrans services, as well as privately operated shuttles
- **Maintenance and Storage:** Identify a location for maintenance and storage of vehicles close to the established route
- **Ridership Estimates:** Use land use, population, and employment forecasts to develop the potential range of ridership
- **Transportation:** Review the potential interfaces and interactions with vehicle circulation, pedestrian/bicycle circulation, and parking
- **Capital & Operating Costs:** Estimate the capital costs of construction and implementation, as well as the annual costs to operate and maintain the system
- **Social and Environmental Benefits:** Assess the potential benefits that the improved mobility would offer in terms of access to the regional and local transit network as well as reductions in vehicle miles of travel (VMT) and GHG emissions
- **Economic Benefits:** Assess the ability to stimulate economic and land use development activity
- **Funding:** Explore the options that would be available to fund the system considering both public and privately based sources of money
- **Ownership and Operations:** Identify and evaluate the options for ownership and for operations, considering both public and private entities
Figure 2: Project Study Area for Streetcar and Urban Circulator Alternatives
Public and Stakeholder Holder Outreach

Outreach and public involvement were an important element in the streetcar and urban circulator study. The City had a number of planning studies occurring in the same time frame including the:

- Downtown Transit Center Redesign Study
- El Camino Real Corridor Plan
- Citywide Transportation Plan (RWCmoves) and Travel Demand Management (TDM) Plan

To avoid confusing the public and to make it easier for people to participate, some of the public meetings and events were consolidated.

Public Meetings

Three meetings were held:

- **November 16, 2017 5 - 8 p.m.** workshop in conjunction with outreach for RWCmoves at the PAL Building
- **November 29, 2017 5 - 8 p.m.** workshop in conjunction with outreach for RWCmoves at Redwood Shores Library
- **December 9, 2017 10 a.m. - 1 p.m.** workshop in conjunction with outreach for RWCmoves at Kennedy Middle School

An online survey was conducted that focused mostly on the Downtown Transit Center Redesign Project, while it also included questions about the streetcar. Generally, at all the events the idea of a streetcar or urban circulator was well received.

However, some respondents questioned whether a streetcar would be an effective use of funds and when asked which mode they would prefer using to get to and from the Transit Center.
Center, 26 percent indicated buses or shuttles, compared to 12 percent for a streetcar. This result could be because the survey indicated that the streetcar would run between the Transit Center and Chestnut Street but did not describe a route for buses or shuttles. Interest in a bus or shuttle specifically connecting the Transit Center and Chestnut Street was not tested.

**Stakeholder Meetings**

Meetings with key stakeholder groups were also held periodically during the study with three groups:

- **Partner Agencies**: meetings with technical planning, operations and engineering staff from Caltrain and SamTrans

- **Employers, Developers and Businesses**: meeting with major employment centers near to the study corridor, including Kaiser Permanente and Stanford in Redwood City

- **Special Downtown Interest Groups**: meetings with Downtown businesses and groups that organize major events in the Downtown

These groups were also supportive of the concept of a streetcar/urban circulator and the benefits that it would bring to the City. Some key issues that came up were:

- Would the streetcar be as fast and frequent as current employer shuttles (like the Marguerite Shuttle supporting Stanford employees)?

- Would the streetcar interfere with the numerous events that close Broadway in front of Courthouse Square?

- Would the streetcar interfere with traffic circulation, bicycling, and/or remove parking?

- Options for who might own and operate the streetcar/urban circulator

- Coordination with the Dumbarton Transportation Corridor project being managed by SamTrans revealed that the addition of a Dumbarton rail operation in Redwood City would likely require relocation of the Transit Center north of Broadway.

All these concerns and factors were taken into account in the preparation of this study.
Existing Conditions

An existing conditions analysis evaluated the current transit and traffic operations, surrounding land uses, demographics and other relevant characteristics along the corridor and in the Project Study Area.

Traffic Operations and Roadway Characteristics

- The lane widths for most of the streets under consideration are sufficient and compatible with the inclusion of a streetcar or urban circulator, although Broadway in the downtown has only one lane in each direction.

- In many locations, a small reduction in on-street parking would result from implementation of a streetcar.

- Current conditions along potential corridor intersections generally meet the City's traffic level of service standards, with the exception of the Woodside Road (SR-84)/Broadway intersection, which has a level of service F during peak periods. It was also observed that Broadway in the downtown area becomes congested at times.

Transit Service

- The Redwood City Streetcar corridor would connect to Caltrain service at the Transit Center. The station is served by 36 trains in each direction on weekdays and 18 per direction on weekends.

- Six (6) SamTrans bus routes and three (3) free public shuttles travel within or serve the Project Study Area. SamTrans service frequency is between 15 and 60 minutes and shuttles run during the peak commute hours. Private employer shuttles also serve the area including a Kaiser Permanente campus shuttle which will go to the Transit Center on request (per the Kaiser
Permanente website) and the Stanford in Redwood City Marguerite Shuttle that connects the campus with the Downtown Transit Center.

Demographics, Travel Characteristics and Auto Ownership

- Figure 4 shows the transit commute mode share by Census block group in the Project Study Area.

- Taking transit to work is most common in the downtown area. A large portion of the remaining Project Study Area has a 10 to 15 percent transit mode share, which is consistent with the city average.

- More than 15 percent of households in the downtown area do not have a vehicle available for their use. The percent of zero-vehicle households by Census block group is shown in Figure 5.
Figure 4: Percent Taking Transit to Work by Census Block Group
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Figure 5: Percent of Households with Zero Vehicles by Census Block Group
Land Use

A detailed study of existing and planned land uses in the Project Study Area was conducted using county data and aerial photographs. Selected findings are detailed here, and the Project Study Area land uses are mapped in Figure 6.

- Office uses are the most prominent existing land use within the Project Study Area, occupying approximately 15 percent of the land area.

- Industrial uses account for 11 percent of land in the Project Study Area and are generally located along Broadway between Woodside Road and Douglas Avenue.
Figure 6: Project Study Area Existing Land Uses
The Broadway corridor's urban form varies considerably throughout the Study Area:

- In downtown, the general intensity and pedestrian orientation of development is highly supportive of alternative modes of transportation such as a streetcar, and a streetcar could contribute to the already vibrant streetscape.

- Between downtown and Douglas Avenue, the lower density and intensity of the existing buildings and poor pedestrian orientation of urban form is less supportive of a streetcar. However, applicable zoning districts facilitate transit-oriented redevelopment by permitting greater building heights and non-residential intensities, incentivizing mixed-use, and requiring new development to be pedestrian oriented.

- Near the Stanford in Redwood City Plan Area, there are greater opportunities to incorporate the streetcar into new development. The Stanford in Redwood City campus is already under construction, though plans considered the possibility of a future streetcar. For other future development along the Broadway corridor, the challenge will be to ensure quality buildout of the public realm, such that a successful pedestrian and transit-oriented environment is created to balance larger building masses.

Real Estate Market Conditions

- Recent trends in the Bay Area and nationwide have pointed to a revived interest in redeveloping dense, walkable, and transit friendly downtown commercial corridors such the Broadway corridor and Project Study Area.

- The Project Study Area is home to a robust and high-demand real estate market for both residential and commercial land uses. As it stands, there is more than 1.4 million square feet of office space within the Project Study Area’s development pipeline as well as 1,900 housing units. The largest residential project in the area is a 471-unit complex located at 525 Middlefield Road (Indigo), which was recently built and is now fully occupied.

- Proposed and recently completed office and residential development in the Project Study Area will increase the demand for retail sales. Retail demand for eating and drinking establishments will be bolstered by the influx of workers in the area, a population group that contributes sizably to retail sales of this category. The presence of a streetcar connecting existing and proposed residential and office development to Redwood City’s downtown retail and entertainment district will likely further benefit Redwood City’s retail market.
Housing appears to have very strong market potential to drive redevelopment in the Project Study Area in the near term with immediate opportunities for residential mixed-use projects. Redwood City has seen a multitude of new multi-family projects including within the Project Study Area. In the last two years, two major multi-family projects, combined for about 340 units, have come onto the market along the Project Study Area. Furthermore, additional for-sale multi-family condos, both market rate and affordable housing developments, are planned in the area.

A well designed and operated streetcar/urban circulator in Redwood City would likely enhance the value of properties located within a reasonable proximity to its station areas and incentivize additional development.

Other Transportation Projects

- As part of the grant and concurrent with the Redwood City Streetcar Study, the Downtown Transit Center Redesign Study was conducted to evaluate the potential for station area improvements to better integrate the Transit Center with the downtown and improve transit connections.

- A potential new rail connection to the East Bay along the Dumbarton Rail Corridor is being considered as part of the Dumbarton Corridor Transportation Plan, which would increase high-capacity transit service in Redwood City. The implementation of Dumbarton rail may require moving the Transit Center to the north of Broadway.

- Redwood City is also studying the feasibility of constructing a Ferry Terminal from the terminus of Seaport Boulevard to add access from Redwood City to San Francisco and other parts of the Bay Area via public and private ferry services. The downtown streetcar would not serve this terminal directly, but the proposed long-term streetcar network includes a connection to a potential ferry terminal area.

- Improvements to the US-101/Woodside Road (SR-84) Interchange are currently in the design phase and include improvements to the congested Woodside Road (SR-84)/Broadway intersection.
Alternatives, Development, and Evaluation

Following the existing conditions analysis, options for implementing the streetcar were developed. This included considering alternate modal options and various route options.

Mode Alternatives

Although this study was initiated to evaluate implementing a streetcar in Redwood City, alternate modes were considered to provide a cost and feasibility comparison. In addition to a fixed streetcar route, a bus or shuttle “urban circulator” was identified as a comparable and feasible alternative. This section describes the basic features of these two options.

Streetcar

A streetcar is a fixed-route light rail service characterized by low-floor vehicles, overhead power, and exclusive right-of-way (ROW) where possible. Streetcar systems are intended to serve areas with medium-high land use density and high levels of transit uses and walkability. Stations are typically relatively close together (two to three blocks) and speeds are relatively low (15 to 25 miles per hour). Minimum frequency is typically every 15 minutes. Streetcar systems require construction of the trackway and also require a connected area with facilities for storage and maintenance.

Urban Circulator

An urban circulator is a rubber-tired bus service, characterized by low-floor, low-emission vehicles with transit priority treatments where possible and high-visibility stations. Electric and/or autonomous transit vehicles could be used. Service characteristics would be similar to the streetcar in terms of frequency and travel speeds. Since a bus system does not require a trackway, it could be implemented at a much lower cost than a streetcar. A bus service could also be more flexible, as the route would not be determined by the infrastructure. Bus-only lanes and other transit preferential treatments could help to reduce traffic related delays.
Route Alternatives

The Broadway Streetcar would connect from Second Avenue near the Stanford in Redwood City development near Douglas and Broadway to the downtown Transit Center. The streetcar would run along Broadway from Second Avenue to Maple Street (the “common segment”), but in downtown there are multiple alternative alignments to reach the Transit Center.

Along the common segment, the streetcar would run on the outer sides of the street except for a center median terminus at Second Avenue. There would be four intermediate stops along this segment.

The downtown segment of the streetcar could take one of many different paths from the Broadway corridor to the Transit Center. Six initial alternatives were developed to show the range of alignment options for the streetcar. The streetcar alternatives either continue straight along Broadway or take Marshall Street, then either end at the Marshall/Broadway intersection, turn south on Winslow to stub end in front of the existing transit plaza, or make a loop. A seventh alternative represents an extended route that would only be feasible for an urban circulator. The urban circulator route was designed to take advantage of the flexibility of this mode by maximizing the destinations reached by the circulator, but the actual route may change based on road conditions and new development.

Evaluation Criteria

To evaluate the route alternatives, criteria were developed based on key feasibility and effectiveness measures. For each criterion described below, a quantitative or qualitative analysis was made to compare the route alternatives and a numeric score was assigned.

Key Planning Considerations

- Connection to Transit Center (existing and future)
- Compatibility with special events on Broadway
- Relationship to existing and planned development
- Speed and travel times
- Ridership potential
- Safety
- Reliability
- Environmental impacts

Key Engineering Considerations

- Turnaround/terminus configuration
- Street cross-sections
- Maintenance facility location
- Conflicts with utilities
- Costs (capital and operating)
- Interface with traffic, bicycles, pedestrians and parking
Evaluation Findings

The alternatives were compared based on the scores within each evaluation criterion. The findings of the evaluation are summarized below. The top scoring alternatives were selected for further analysis and are described in the next section.

Overall Findings

- Ridership and costs would not be dramatically different for any of the streetcar alternatives
- Utility conflicts do not appear to be dramatically different between alternatives nor do they pose a major concern
- The Downtown Transit Center Redesign Study revealed a possibility that the Caltrain station platform could be moved north of Broadway in the future to accommodate Dumbarton rail, so ideally alternatives should be able to directly connect to both the existing and the future platform location
- A streetcar maintenance facility on the City-owned maintenance yard property would work well because it is directly along the common segment of the streetcar route
- In general, alternatives with one-way loops were found to be potentially confusing and less convenient, and to have longer travel times, than those with direct point-to-point service

Broadway Options

- Conflicts with major downtown events which close Broadway are a serious concern
- Broadway is narrow and sometimes congested for vehicles and pedestrians in the downtown, a potential source of delay and concern for pedestrian safety
- A portion of Broadway is within the historic core of the downtown and appropriate for a streetcar in terms of land use and walkability. The historic nature may cause additional challenges for construction.

Marshall Street Options

- No conflicts with special events
- Not as walkable as Broadway, but potential for land use changes with new development
- Less conflicts with traffic and parking than on Broadway

Shortlisted Alternatives

After the evaluation process was complete, three high-performing alternatives were shortlisted for further consideration:
Streetcar Broadway Direct (Alternative 1A)

Streetcar Broadway-Marshall Direct (Alternative 3B)

Urban Circulator (Alternative 8)

Streetcar Broadway-Marshall Direct Alternative (3B) was the highest ranked, but the Streetcar Broadway Direct Alternative (1A) was retained as well because of its service to the historic core of Downtown. The Urban Circulator Alternative performed well and is cost effective, but would likely have lower ridership and economic benefits than the streetcar options. Further engineering and cost evaluations were performed for these shortlisted alternatives, but a single preferred alternative will not be selected until funding and institutional considerations are better defined, additional community outreach is conducted, and environmental impacts are considered in more detail. Moving forward with multiple options also allows for flexibility given the potential for changes to development patterns and activity in downtown.

The three shortlisted alternatives are described in detail and shown on a diagram below. Because the implementation of Dumbarton rail may require moving the Transit Center to the north of Broadway, the alternatives include a second terminus alignment to serve the potential future Transit Center location.
Figure 7: Streetcar Eastern Segment – Common to All Streetcar Alternatives
After the common segment between Second Avenue and Maple Street, the route would transition to center-running for the remainder of Broadway to Arguello Street. A stub end terminus on the west end would be located at Broadway and Arguello Street, or on Arguello at Bradford Street if the Transit Center is moved to the north.
After the common segment on Broadway, this alignment would travel along Spring Street and Marshall Street to Winslow Street, then south along Winslow Street around the curve to Hamilton Street. The west end terminus would be a stub-end station on Winslow Street. If the Transit Center is moved north of Broadway, the route would continue along Marshall Street rather than turning on Winslow Street, then turn right to terminate on Arguello Street.
Rubber tire vehicles (like buses or shuttles) have more route flexibility than streetcars, so all the same alignments considered for the streetcar are viable. In addition, a circulator route providing broader coverage of the Downtown and surrounding areas was considered as shown in the map. Routes could also vary during the day, commute versus midday for example, and during special events.
Ridership

A sketch planning process that took into account the existing and planned future land use densities and the number of employees and residents in the Project Study Area was used to estimate ridership. The results were validated by looking at the magnitude of the ridership attracted by other streetcar systems around the country. This validation process resulted in the low- and high-end values shown in Table 1.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>One-Way Travel Time (minutes)</th>
<th>Daily Ridership*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streetcar Broadway Direct (1A)</td>
<td>13</td>
<td>2,200 – 3,900</td>
</tr>
<tr>
<td>Streetcar Broadway-Marshall Direct (3B)</td>
<td>13</td>
<td>2,200 – 3,900</td>
</tr>
<tr>
<td>Urban Circulator (8)</td>
<td>18</td>
<td>1,900 – 3,400</td>
</tr>
</tbody>
</table>

* Ridership estimate range represents low- and high-end values developed in the ridership analysis.

Costs

The potential capital and operating costs for the program were estimated for the two streetcar alignments and the urban circulator alternative. Table 2 shows the results of this analysis.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Capital Cost ($millions)*</th>
<th>Annual Operating Cost ($millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streetcar Broadway Direct (1A)</td>
<td>E-$152.5</td>
<td>$1.9</td>
</tr>
<tr>
<td></td>
<td>N-$156.2</td>
<td></td>
</tr>
<tr>
<td>Streetcar Broadway-Marshall Direct (3B)</td>
<td>E-$158.5</td>
<td>$1.9</td>
</tr>
<tr>
<td></td>
<td>N-$155.9</td>
<td></td>
</tr>
<tr>
<td>Urban Circulator (8)</td>
<td>$14.0-$22.0**</td>
<td>$1.2</td>
</tr>
</tbody>
</table>

* Cost range relates to whether the terminus is at the existing Transit Center (E) or a new Transit Center (N) north of Broadway.

** Cost range relates to the number and quality of the transit stops provided.

The capital and operating costs would be similar for the two streetcar alignments but would be much lower for the urban circulator alternative.

Alternatives Comparison

Figure 11 provides a summary comparison of the three final alternatives. Overall their performance was relatively similar, with the exception that the urban circulator would be significantly less costly but would also likely have lower ridership than a streetcar.

The streetcar/urban circulator will attract new transit riders and increase transit use by others resulting in reduced vehicle miles of travel (VMT). Ridership is estimated at 2,200
to 3,900 passengers per day. Many of the riders on the streetcar/urban circulator system will be persons who would have driven in a car for some or all of their trip. Others will be persons who would have walked, used an existing form of transit, or ridesharing such as a taxi or TNC vehicle. Data from the C/CAG countywide transportation model indicates that on average employees in the county travel 16.7 miles per day commuting. If new transit riders (persons using transit for their entire commute trip) were to represent 25% of the potential streetcar/urban circulator ridership, this indicates a potential VMT savings of 9,200 to 16,300 miles per day.
**Figure 11: Summary Comparison of Alternatives**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Cost</th>
<th>Ridership</th>
<th>Travel Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>~$4M Capital Cost</td>
<td>~2,200 to 3,900 daily riders</td>
<td>~13 Min One-Way</td>
</tr>
<tr>
<td>Broadway to Winslow/Marshall (1A)</td>
<td>1 – high cost</td>
<td>1 – low expected ridership</td>
<td>1 – high project travel time</td>
</tr>
<tr>
<td></td>
<td>5 – low cost</td>
<td>5 – high expected ridership</td>
<td>5 – low project travel time</td>
</tr>
<tr>
<td>Broadway-Marshall-Winslow Direct (3B)</td>
<td>3 Direct route is short</td>
<td>5 Downtown &amp; Caltrain Ridership</td>
<td>4 Short route with few turns but many pedestrian crossings</td>
</tr>
<tr>
<td></td>
<td>2 Slightly longer route</td>
<td>5 Downtown &amp; Caltrain Ridership</td>
<td>5 Slightly longer route, but few turns and pedestrian crossings</td>
</tr>
<tr>
<td>Downtown Circulator Shuttle (8)</td>
<td>5 Bus option is lowest cost</td>
<td>2 Larger service area than streetcar alternatives, but bus may be less popular</td>
<td>1 Longer route, many turns, and large number of intersections to cross through</td>
</tr>
</tbody>
</table>
Implementation Considerations

Funding Assessment

There are a number of options for funding the streetcar/urban circulator project. Most successful streetcar/circulator projects involve a combination of public and private sources. Federal and state sources have large amounts of money available for new transit infrastructure, but competition for existing federal and state funding is intense and being able to show a strong local match of private and local funding is essential. To secure local funding from the SMCTA and/or MTC, the City will need to work hard to gain support for the project at the technical and political levels.

Phasing the project, such as starting with a bus based urban circulator to build up transit ridership, and then leveraging the success of the initial system to develop support for a more capital-intensive streetcar project, is a viable approach to gaining the interest of the funding agencies.

Funding for ongoing operations and maintenance can be the most challenging, as existing transit operators (Caltrain and SamTrans) currently struggle to fund their programs. A business improvement district, such as the Redwood City Improvement Association (RCIA), can be an effective way of securing private funding for both capital costs and operations. A levy collected by a Transportation Management Association (TMA), which is a partnership of employers and businesses, is also another approach.

The most promising funding sources are listed below by source.

Public - Federal
- FTA Small Starts
- FHWA Funds
- USDOT – TIGER Grants
- USDOT – Urban Circulator Grants

Public - State
- Transit and Intercity Rail Capital Program (TIRCP)
- Road Repair and Accountability Act of 2017 (SB1)
- Transit Development Act (TDA)*

Local
- San Mateo County Measures A and W*
- Regional Measure 3*
- City Sales Tax or Tax Assessments*
- Benefit Assessment District*
- Enhanced Infrastructure Finance Districts (EIFD)*
- Special Transit Impact Fee Zone*

Private
- Redwood City Improvement Association (RCIA)*
- Transportation Management Association Member Levy*
- Direct Contributions*
The most promising funding opportunities are discussed below.

- **Federal Transit Administration Funds (FTA):** Capital Improvement Grant (CIG) funds could cover as much as 50% of the capital costs. The City would need to demonstrate to the FTA that the project would meet FTA thresholds for cost effectiveness, mobility, environmental benefits, and congestion relief (i.e., the project would need to receive a medium rating for each of these categories in order to qualify for a Small Starts Grant). Based upon the results of this study the project should perform reasonably well in these categories.

- **Other Federal Funds:** The City will need to work with the Metropolitan Transportation Commission to see if there is the potential for federal formula (FTA and FHWA) funds to be programmed in the future for the Streetcar. Most likely any availability would beyond the current Transportation Improvement Plan (TIP) period and would be in competition with other regional projects that may be more defined and have local matching funds identified.

- **State Funds:** There are two examples of California streetcar projects recently receiving TIRCP Grants (OCTA $25.5M and Sacramento $30M). The City should meet with the Caltrans Division of Rail to identify what elements of the streetcar project would be eligible for funding under the TIRCP program and estimate the costs for these elements.

- **Local Funds:** The passage of Measure W, the one-half cent transportation sales tax in San Mateo County in 2018, provides new funding for regional transit connection projects. At this time, a strategic plan is being prepared to determine how these funds will be assigned to projects. The City should participate in this process to advocate for the eligibility of a streetcar/urban circulator project in the funding program.

- **Private Funding:** In order to implement benefit-based assessments on property owners, there will need to be completed Transportation Impact Fee (TIF) and/or land benefit assessment district feasibility studies to identify the potential range of benefits and revenue that could be generated.

- **Private Operating Funds:** Property owners in the Project Study Area are already spending money to operate their own shuttle services. The City should explore with them and the other major property interests the conditions under which they would be
willing to contribute to a streetcar/urban circulator system in-lieu of spending the money on their own shuttles. The initial meeting with these stakeholders conducted as part of this study suggested that there are concerns to be overcome, but there may be potential for generating operating funds with this approach.

- **Technology Demonstrations:** Transportation technologies are advancing quickly, and the developers of these technologies are looking for ways to showcase and prove the worth of their products. Transportation agencies such as MTC and Caltrans also have interest in supporting tests of new technologies such as autonomous transit shuttle vehicles. This could be a source of funding for an initial urban circulator project.

It is important to note that not all of these funding sources can be used to cover costs of operation and maintenance. Finding a sustainable source of operating funds can be the most challenging element of project implementation.

### Ownership and Operations

Implementing a streetcar or urban circulator would require identifying institutions to own and operate the new transit service. Ownership, or project delivery, encompasses the planning, design, construction, and financing of the project. The owner is also the public face of the streetcar or urban circulator system. Operations include day-to-day operation, routine maintenance, and major repairs. These two functions, ownership and operations, may be handled by the same entity or split between two entities.

Streetcar and urban circulator systems around the country were reviewed in a best practices analysis for both ownership and service operations. The findings were as follows:

- **Ownership:** most streetcar systems are owned by the city, though the sources of the funding for the project may influence the ownership structure. For example, in public/private partnerships, in which a private company or business association helps to fund the project, a non-profit corporation is a common ownership option.

- **Operations:** cities don’t generally have the expertise to be an operator. A common option to correct for this is for the city to own the system, but contract out the operation to a public operator or a private company.

The possible entities that could own a new transit service were identified and evaluated as shown in Table 3.
### Table 3: Ownership Options

<table>
<thead>
<tr>
<th>Owner/Lead Entity</th>
<th>Actions Needed to Implement</th>
<th>Additional Issues</th>
</tr>
</thead>
</table>
| City of Redwood City                                                             | ▪ In accordance with the Transit Development Act, approval by MTC and SamTrans is required in order for the City to become a transit operator  
▪ An agreement with a transit operator, if it is not the City, generally would need agreements with local or regional transit providers on use of facilities, joint planning | ▪ Takes funds from other existing transit uses (TDA)  
▪ City has no experience operating transit |
| SamTrans                                                                         | ▪ MOU with city for use of facilities and right of way, joint planning would be needed  
▪ Would likely also act as operator                                                   | ▪ Takes funds from other existing transit uses. SamTrans has no streetcar operating experience  
▪ Has an expensive cost structure compared to private operators                      |
| Non-Profit Organization (business association or Transportation Management Association - TMA) | ▪ Establish non-profit entity  
▪ MOU with city and possibly the local or regional transit provider for use of facilities and right of way  
▪ Agreement with operator (Emery-Go-Round bus service in Emeryville is an example) | ▪ Difficult to assure long term financing  
▪ Private businesses may prefer to operate their own shuttles |
| Private Operator                                                                 | ▪ Agreement with City and possibly the local or regional transit provider for use of facilities and right of way  
▪ Would likely also act as operator                                                   | ▪ Need financial terms such that the operator is assured to cover costs and earn a profit |
| Peninsula Corridor Joint Powers Board (Caltrain)                                  | ▪ MOU with city and possibly the local or regional transit provider for use of facilities and right of way  
▪ Approval of Caltrain board                                                          | ▪ Takes funds from other existing transit uses  
▪ Caltrain has no streetcar operating experience                                      |
Economic Benefits

A variety of case studies suggest that a streetcar or urban circulator can potentially increase housing and commercial development and provide other economic benefits. Transit has been shown to encourage both residential and commercial development as the nearby area becomes more convenient and attractive for residents and workers. As the area increases in density, additional economic benefits may benefit the area as a whole, as well as providing additional services for lower income groups. The ability to facilitate growth is dependent on land availability, infill opportunities and city planning policies.

- **Real Estate Development:** Based on the case studies, a Redwood City streetcar/urban circulator can potentially increase the supply of housing units and commercial square feet by between 5 and 10 percent relative to baseline trends.

- **Property Value:** Existing properties may experience a one-time increase in property value once the transit line is introduced as the land becomes more valuable. To the extent that a streetcar/urban circulator can increase accessibility and foot-traffic, the real estate market value of existing properties will improve. This benefit tends to be greater when the investment involves a fixed infrastructure investment such as a streetcar as compared to a bus system which may be viewed as lacking permanency. In particular, assuming existing properties experience a 5 to 10 percent increase in market value, assessed values would increase by about 3 to 6 percent.

- **Retail Sales:** Businesses in the study area may also reap increases to their annual sales as a result of the added foot-traffic brought by the streetcar/urban circulator. In total, retail sales can reach between $230.1 million and $241.0 million (5 to 10 percent above the No Build scenario).

- **Tax Revenues:** The combined effect of increased development, property appreciation, and business activity can have an appreciable impact on Redwood City’s General Fund revenues. Property taxes, transient occupancy taxes, and sales taxes are all expected to increase, resulting in an additional 3 to 7 percent in tax revenues.

- **Other Benefits:** A streetcar/urban circulator in serving Downtown Redwood City could also provide a range of benefits stemming from improved pedestrian accessibility, urban design, place-making and related considerations that, although difficult to quantify in economic terms, are nevertheless significant.

While there is very little research on the relative benefits of streetcars versus urban circulator type systems, it is likely...
that the benefits of a bus-based option would be less than those of a streetcar. The main reason for this is that real-estate investors and businesses are more likely to be willing to commit their funds when they view the transportation investments in the area to be permanent and long term in nature, which would be characteristic of a streetcar, but not so much for a bus-based system. The magnitude of the difference, however, is hard to quantify.

While a successful streetcar project would result in tangible economic and financial benefits to the City, special actions would be needed to be able to channel some of these benefits so that they could help offset the costs of the transit project. Typically, this could be done by special taxes or fees, or by benefit-based property or business assessment as discussed in the funding section.

### Best Practices

This study included research on the best practices for implementing either a streetcar or bus-based urban circulator system. A summary of the findings is provided here.

#### Streetcars

Cities that have implemented streetcars typically experience the following:

- Increased transit ridership
- Economic benefits
- Increased density of development
- Improved mobility and transit accessibility

The magnitude of these benefits varies greatly from one city to the next. Not all streetcars are successful. Success factors include:
Land use mix and density: Mix of housing, employment, and retail. Visitor attractions are often a key factor.

Connections to regional transit: Caltrain is a good example.

Station accessibility: The area needs to be walkable and destinations easily reached without having to cross barriers such as major highways.

Travel time savings: The service needs to be faster than walking and competitive with shuttle bus speeds.

Comfort and convenience: Stations need to be attractive and secure, service needs to be frequent and cover most of the day.

Cost Factors: Streetcar systems are capital intensive by nature, but it is important to avoid problems which would unduly increase the costs, such as conflicts with utilities, major bridges or structures and right of way acquisition. Successful systems have low fares or are free which is essential when the distances covered are relatively short.

Successful streetcar systems include: Portland, Seattle, Tucson and Detroit.

Urban Circulators
Cities that have implemented urban circulator projects can experience similar benefits to streetcars. Examples are:

- Emery Go-Round: Multiple routes link Emeryville to BART

Emery Go-Round Shuttle Service

- Oakland Broadway Shuttle: Connects City Center with Uptown and Jack London Square
- Walnut Creek Downtown Shuttle: Connects downtown with BART
- Santa Barbara Electric Bus Shuttle: Links the downtown retail core with the beach area
Los Angeles DASH Shuttle system: Multiple shuttles operating in the many districts of downtown Los Angeles.

Benefits, however, tend to be lower with urban circulators, but costs are also lower, and implementation is easier than for streetcars. A circulator type project can be a good way to test the demand prior to investing in a streetcar. Also, new technologies, such as all-electric buses, and the use of self-driving, autonomous transit vehicles can enhance the image of a bus-based system.

Summary of Findings

Through the existing conditions, alternatives analysis, funding, and institutional analyses, the feasibility of a streetcar in Downtown Redwood City has been evaluated. The following findings summarize the results:

- A streetcar/urban circulator is a technically viable option for enhancing mobility in the Broadway corridor.
- It would yield benefits in terms of ridership (2,200 to 3,900 passengers per day), increasing density of population/employment, reduced VMT (estimated savings of 9,200 to 16,300 miles per day), and improved economic performance.
- Finding funding for a streetcar is a big reach, requiring collaboration of public and private interests and strong support for the project. However, as discussed in the funding section of this report, there are viable sources of funding available at the federal, state and local levels. There are also opportunities for private sector participation in terms of direct contributions or indirect fees and assessments based upon the economic benefits that the streetcar/urban circulator would provide.
- In the near term, an urban circulator could be an alternative to a streetcar, providing:
  - A more implementable approach to providing transit in the corridor
  - Flexibility to address commute period versus midday and evening needs, as well as needs during special events
  - An opportunity to showcase new technologies such as all-electric buses, autonomous vehicle features, and dynamic routing strategies
  - An opportunity to test the level of transit demand in the Broadway corridor before making a larger investment in a streetcar.
Next Steps

▪ The first step would be to use this feasibility study as a vehicle to gauge the level of interest at the local, county, and regional levels for the project.

▪ This would involve continuing the discussions with the public and private stakeholders that have participated in this study, and taking steps to identify and secure funding for the project.

▪ Discussions should be held with the SMCTA, MTC and Caltrans to determine their level of interest and support and their requirements for funding.

▪ When a decision has been made to continue with the project, the next step would be to conduct the necessary environmental and preliminary design studies.