

CULTURE CONNECTOR RIDERSHIP FORECAST & SPECIAL MARKETS ASSESSMENT



Seattle
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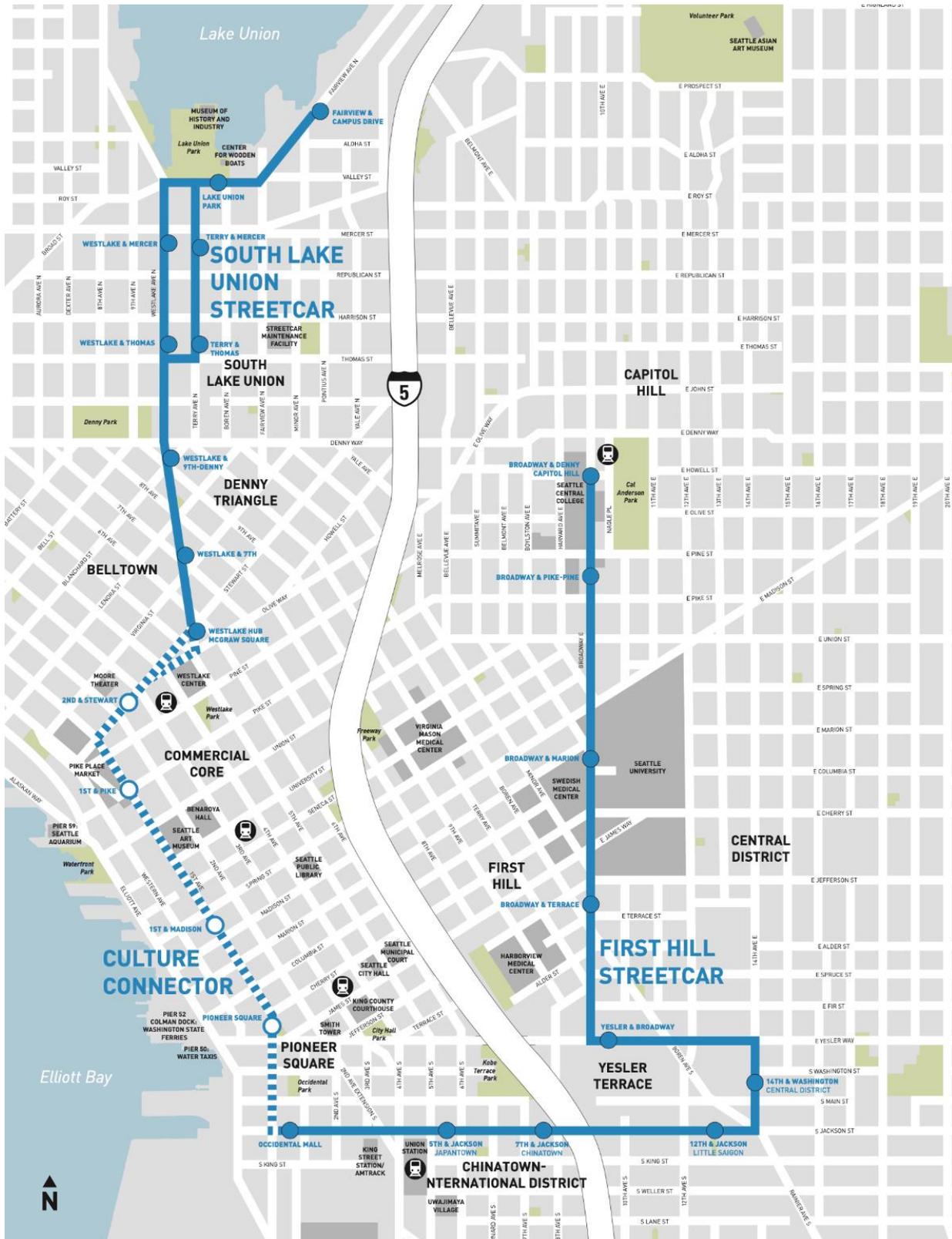
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1. INTRODUCTION

The Culture Connector project would connect the First Hill Streetcar, which currently terminates at Occidental Mall in Pioneer Square with the South Lake Union Streetcar at Westlake and Olive in Downtown Seattle. The new streetcar segment would serve downtown Seattle along First Avenue and Stewart Street and connect many of Seattle's prominent destinations and cultural uses in the downtown core. The Culture Connector project would provide more direct access to the waterfront and West Edge neighborhood, running farther west in downtown Seattle than most existing transit service. A map of the planned Culture Connector project and stations is shown in Figure 1.

Figure 1 Culture Connector Route and Stations



Source: City of Seattle, 2023

2. CULTURE CONNECTOR RIDERSHIP PROJECTIONS

The Federal Transit Administration (FTA) has developed a ridership forecasting tool called the Simplified Trips-on-Project Software (STOPS). This model is designed to develop potential ridership of transit projects using available census data, existing ridership and schedule information along with Metropolitan Planning Organization forecasts of household/population and employment. The model is typically run for a No-Build and Build scenario to quantify the ridership and benefits of a proposed transit improvement. STOPS quantifies the number of riders a project will result in (trips on project) and estimates changes in VMT based on new trips that are attracted to the proposed improvement that would divert people away from driving. The STOPS model uses census worker flows to represent work and non-work trip patterns and represents service on the transit network using General Transit Feed Specification (GTFS) data from local transit providers. The STOPS model has been calibrated and validated against current ridership on fixed-guideway systems nationally.

One of the earliest versions of STOPS (version 1.51) was used for detailed ridership forecasts for the Center City Connector Transit Study in 2014. FTA has used information from LRT, BRT and bus systems across the country to revise and recalibrate STOPS over the past ten years since the original version was released to ensure it reflects transit ridership more accurately for different modes and trip purposes. The current working version of the model from 2019 (version 2.52) has incorporated these changes and is reflective of pre-pandemic conditions. FTA will eventually require the STOPS model to be calibrated to post-pandemic conditions, but until more reliable transit ridership is collected by agencies across the country, project sponsors are continuing to calibrate to pre-pandemic conditions in the STOPS model. FTA provided post-pandemic recommendations for STOPS modeling on recent FTA-eligible SDOT projects to use the 2019 model with recent ridership data to approximate current conditions.

2.1 Model Assumptions and Methodology

An existing STOPS model developed for previous FTA-eligible SDOT projects was the starting point for the Culture Connector ridership forecasting effort. The calibrated model was used to predict project ridership in 2019 and future ridership for the project in 2045. For the current year estimates, the STOPS model included Fall 2019 GTFS and ridership data from transit providers in the region, including King County Metro, Sound Transit, Community Transit, Pierce Transit, and Washington State Ferries along with 2019 population, employment, and auto travel times from the Puget Sound Regional Council (PSRC). Background 2045 assumptions included auto travel time, population, and employment projections that PSRC developed as a part of their 2050 Regional Transportation Plan efforts, as well as a future transit system expected to be implemented by 2045 which includes service plans and projects from Metro Connects and the Sound Transit 3 Plan.

Travel time assumptions were developed using recent operating estimates from King County Metro with an average speed of 6 miles-per-hour including dwell time. The estimates stop-to-stop travel times were compared to travel time assumptions used for modeling the center city segment of the streetcar and to 2019 GTFS data that reflects schedule time points at existing streetcar stations on the First Hill and South Lake Union streetcar lines. A majority of the Culture Connector segment was assumed to operate in dedicated right-of-way at slightly higher speeds than shared right of way portions of the line and some additional delay at congested locations along the streetcar system. Estimated travel times included some travel time delays for peak commute periods based on observed trends from SDOT staff involved in streetcar operations. The future streetcar system with the Culture Connector segment in service is assumed to operate as a single line with 8-minute all-day frequencies.

2.1.1 Limitations

There are some limitations to this modeling effort. FTA reporting instructions for the past two years have required a pre-pandemic year 2019 base calibration. New reporting instructions as of May 2023 now also require a post-pandemic forecast (2022 or 2023) be completed using the 2019 base calibration as a starting point. As noted above, the STOPS model was estimated using data from around the country that was based on pre-pandemic conditions, including Census data and trip patterns that were consistent with actual transit behavior on which the model was developed. Until new Census data is available that accounts for changes in how people commute, and new on-board surveys can be collected locally and nationally to re-calibrate the STOPS model, the pre-pandemic calibrated STOPS model provides the most accurate estimate of general changes in ridership trends between a No Build and Build (with Culture Connector in service) for this forecasting effort. If the City advances the Culture Connector project or any other future streetcar environmental or FTA related efforts (such as preparing a Capital Investment Grant (CIG) Application) it would be necessary to updated ridership forecasts consistent with new FTA reporting instructions.

Another limitation with the STOPS model and most travel demand model is that the forecasts reflect average weekday conditions. Therefore, this and other models do not capture a number of key transit markets like tourism/visitors and special events unless that data is reflected in the underlying ridership count information. In the case of the Culture Connector, details around special markets are summarized below in a separate section.

2.2 Ridership Forecast

The modeled ridership was compared to observed Fall 2019 ridership to validate opening year forecasts for 2019 and then forecasts were completed for 2045 based on anticipated changes in land use and the background roadway and transit networks as described in Section 2.1.

2.2.1 Model Validation

The validation of the STOPS model results was done to ensure the model was properly reflecting the observed ridership in 2019 before using it to produce ridership estimate for both the current and future year conditions with the Culture Connector. Modeled 2019 ridership from the STOPS model on existing streetcar service differed from observed 2019 ridership by less than 2.5% for both the First Hill and South Lake Union streetcar lines.

As part of the validation process, a fixed guideway factor of 0.3 was determined to most accurately reflect the observed ridership count data. The fixed guideway factor is a variable in the STOPS model that the user can adjust to reflect a “premium” that attracts riders beyond what would be predicted simply based on characteristics the model explicitly responds to, such as runtimes and headways. A fixed guideway factor of 0 represents standard bus operations; a fixed guideway factor of 1 represents full fixed guideway operations, such as a light rail line. A fixed guideline factor of 0.3 is an appropriate factor to use for this type of transit service and would be coordinated with FTA as part of any future FTA-related effort for this project if it is advanced for consideration in the CIG process.

2.2.2 Culture Connector STOPS Forecasts

The results of STOPS modeling for a Fall Weekday in the 2019 existing year and the future year ridership are presented in Table 1. The ridership is evaluated for an existing year to provide information on what the potential ridership might be if a project was put in place under existing conditions to understand ridership potential absent major system and land use changes that occur in horizon years.

Table 1 Summary of STOPS Daily Ridership Forecasts for 2019 and 2045

	2019 Existing Year Daily Trips	2045 Horizon Year Daily Trips	Daily Ridership Change (between 2019 & 2045)
Project Trips (Culture Connector Only)	6,090 Trips	14,580 Trips	+140%
Total Streetcar System Trips (South Lake Union to Capitol Hill)	11,440 Trips	27,690 Trips	+142%
RapidRide Average Ridership (A, B, C, D, E and F Lines)	10,700 Trips (observed count)	13,900 Trips	+27%

Source: Parametrix, 2023

The STOPS forecast shows substantial potential for ridership both on the Culture Connector segment and along entire line from South Lake Union to Capitol Hill. Forecast 2019 ridership on the full streetcar line from South Lake Union to Capitol Hill exceeded average RapidRide (Lines A through F) ridership counts from Fall 2019. Ridership on the Culture Connector streetcar is forecast to grow at a much faster rate than RapidRide ridership, with more connecting riders on new service lines and some ridership shifting between bus and light rail as Sound Transit expands the Link Light Rail system. The annual ridership on the streetcar system in and on the Culture Connector project in 2019 and 2045 based on an annualization factor is shown in Table 2 below.

Table 2 Summary of STOPS Annual Ridership Forecasts for 2019 and 2045

	2019 Existing Year Annual Trips	2045 Horizon Year Annual Trips	Annual Ridership Change (between 2019 & 2045)
Project Trips (Culture Connector Only)	2 Million Trips	4.7 Million Trips	+140%
Total Streetcar System Trips (South Lake Union to Capitol Hill)	3.7 Million Trips	8.9 Million Trips	+142%

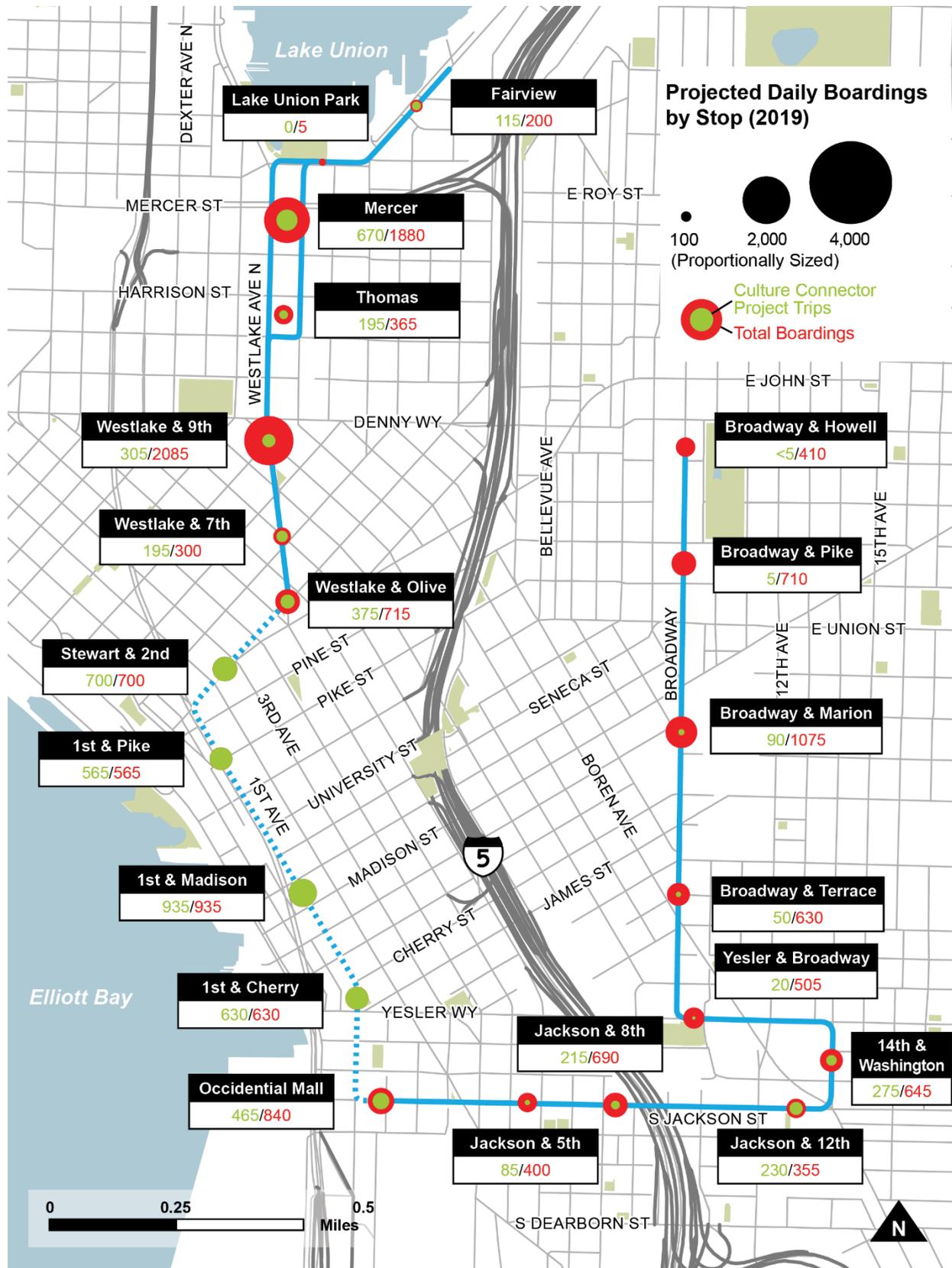
Source: Parametrix, 2023

Forecast project ridership and total boardings by stop are shown for existing and new streetcar station pairs for 2019 in Figure 2 and for 2045 in Figure 3. The share of boardings on the Culture Connector project compared to overall streetcar system ridership in 2019 is shown in Figure 4 and the forecast share of boardings on the Culture Connector project in 2045 Figure 5.

Forecast 2019 ridership shows potential for new streetcar ridership between Westlake & Olive and Occidental Mall. Ridership growth as a result of the project was higher on the South Lake Union line, with more modest additional ridership along the S Jackson Street corridor. This indicates that more riders on the Culture Connector line would be coming from South Lake Union and some riders from Chinatown-International District and the Central District would use the Culture Connector line downtown.

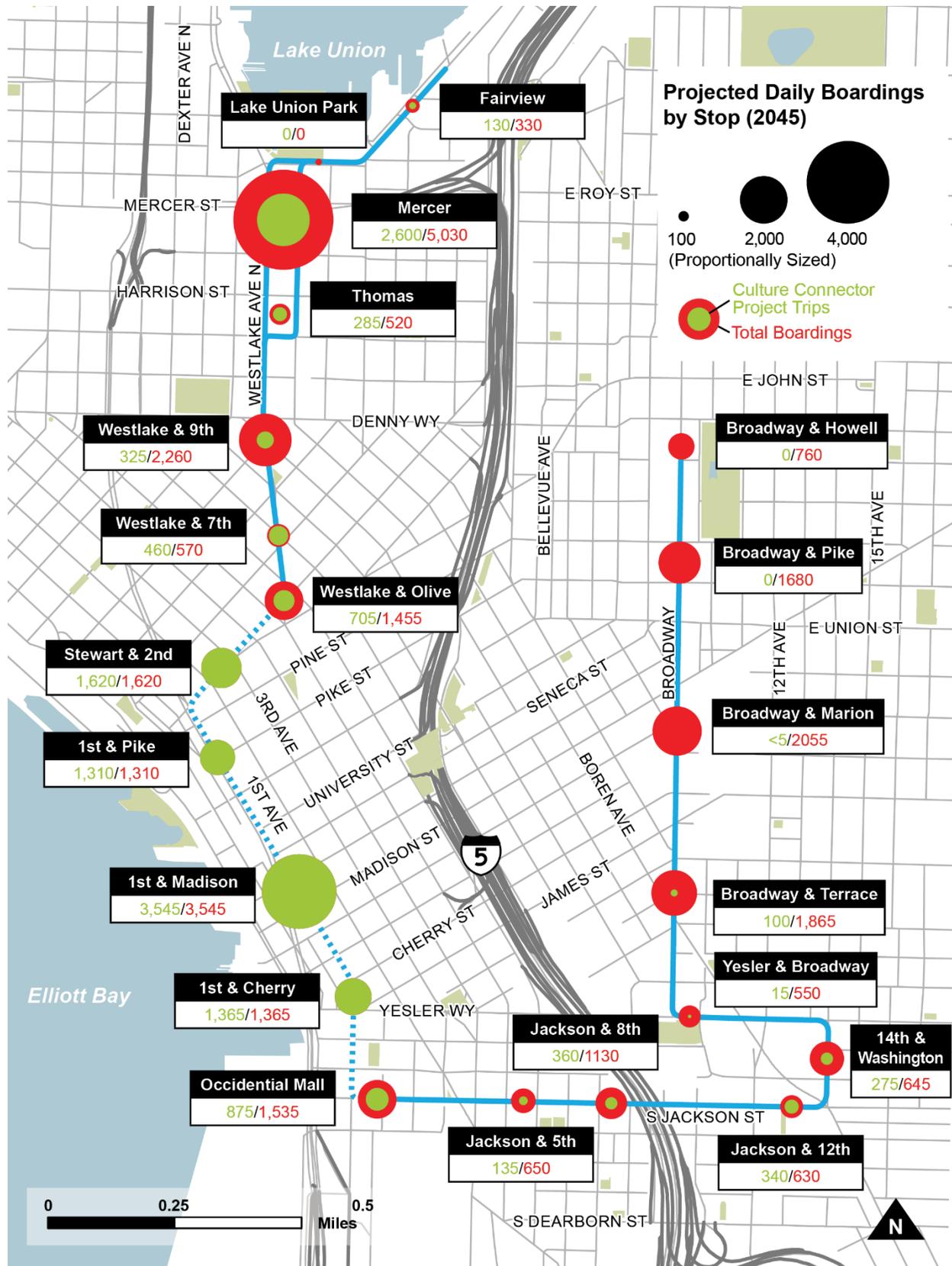
By 2045, the Culture Connector project forecasts strong potential for overall growth along the streetcar system, particularly at the First Ave & Madison stop and at the Mercer stops along Westlake and Terry Avenues. Growth in ridership at these stops is due to the transfer connections created by the project between South Lake Union and RapidRide G Line and Washington State Ferries.

Figure 2 Forecast 2019 Stop Boardings along the Streetcar System



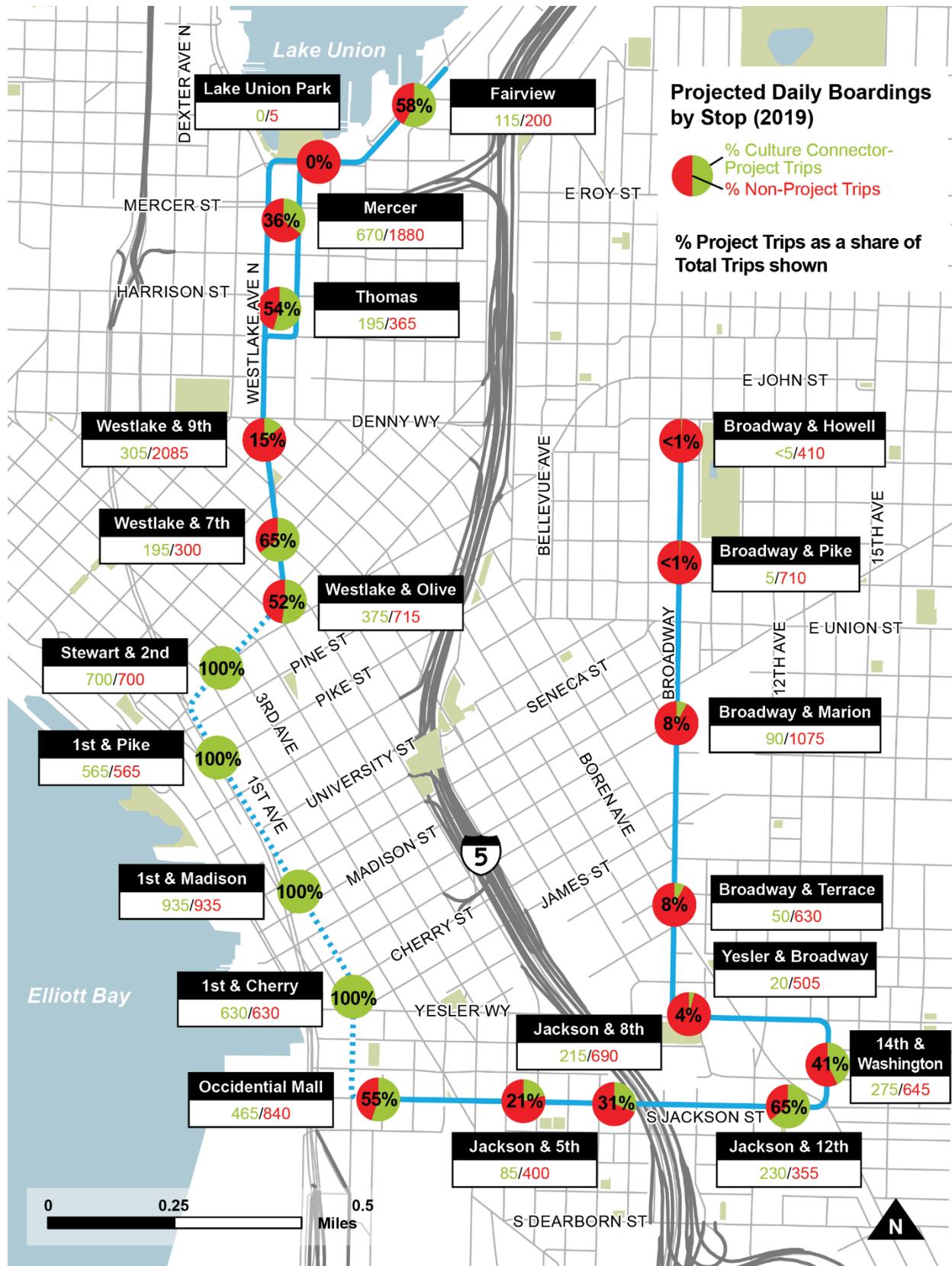
Source: Parametrix, 2023

Figure 3 Forecast 2045 Stop Boardings along the Streetcar System



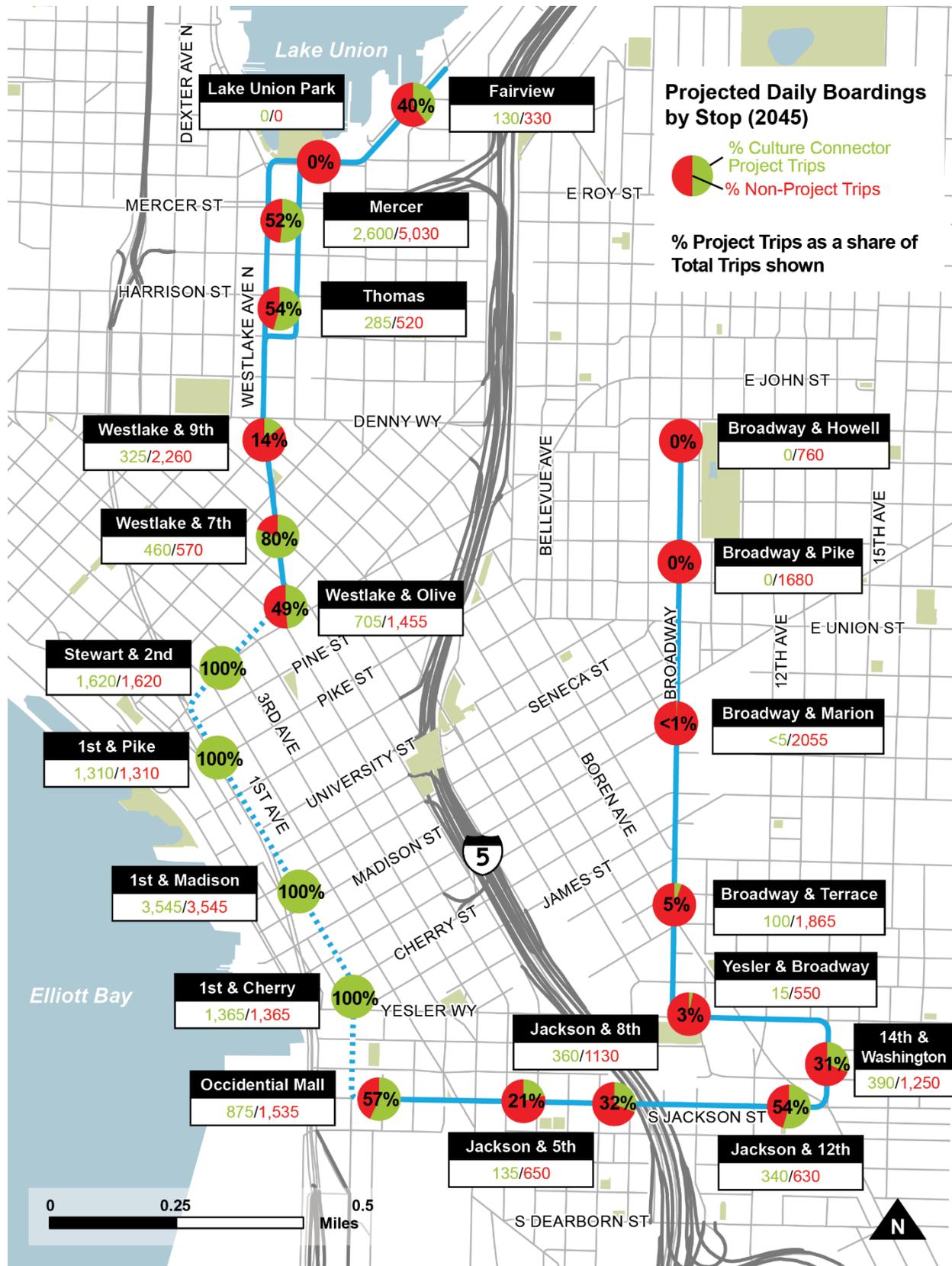
Source: Parametrix, 2023

Figure 4 Culture Connector (Project) Riders as a Percent of Total Stop Boardings in 2019



Source: Parametrix, 2023

Figure 5 Culture Connector (Project) Riders as a Percent of Total Stop Boardings in 2045



Source: Parametrix, 2023

3. SPECIAL MARKETS ASSESSMENT

As described in Section 2, the STOPS model forecasts a typical weekday and, unless the ridership count data used in the STOPS model includes special event and visitor ridership, the model does not capture this potential ridership. Therefore, this section describes the potential additional ridership on the Culture Connector streetcar system with these special markets (special events and visitor ridership). The detailed assessment of special events and visitor ridership potential is attached as Appendix A.

3.1 Special Event Market Analysis

Lumen Field and T-Mobile Park host special events regularly throughout the year from early spring through the winter. In 2022, there were a total of 81 Mariners home games, 9 Seahawks Home Games, 11 Reign home games, and 17 Sounders home games and 5 concerts at the stadiums. As part of transportation management reporting for Lumen Field and T-Mobile Park, the facilities surveyed attendees at randomly selected games throughout the 2022 season to collect data on travel behavior including travel mode. The mode share for both facilities and 2021 and 2022 is summarized in Table 3 below.

Table 3 Summary of 2021-2022 Transit Mode Share at T-Mobile Park and Lumen Field

Facility	2022 Average Attendance	Event Type	2021 Bus & Rail Transit	2022 Bus & Rail Transit
Lumen Field	68,800	Seahawks Game	51%	51%
Lumen Field	33,600	Sounders Game	N/A	52%
T-Mobile Park	28,600	Mariners Game	22%	30%

Note: Streetcar was included in T-Mobile Park surveys, but not in Lumen Field surveys and is included in "other" for Seahawks and Sounders games. Sounders game data only reported for 2022.

Source: Lumen Field, 2023; T-Mobile Park, 2023.

Comparable venues in Seattle also showed a sizable transit mode share for event attendees with between 15% and 22% of Climate Pledge Arena event attendees in the 2021-2022 season taking transit and 45% of University of Washington football game attendees taking transit in 2022. Transit ridership to the stadiums and other facilities in Seattle was overall higher than was observed post-COVID event travel in Oakland and Minneapolis. 2022 transit mode share at Lumen Field and T-Mobile Park are higher than pre-COVID historic data for a wide range of comparable national venues from 2004 to 2011.

Analysis of 2022 transit ridership data from Sound Transit and King County Metro showed a reliable increase in ridership associated with sporting and non-sporting events on Link Light Rail and the First Hill Streetcar. There were also increases on some King County Metro Bus routes, especially those within similar or shorter walking distance of the stadiums such as the C Line and Routes 21, 101/102, and 131/132. Based on the analysis of observed ridership associated with events at the stadiums along the existing First Hill Streetcar line and nearby transit services, the Culture Connector could draw an additional 7% - 15% of its average daily ridership during special events. That potential for additional ridership varies by the type of event as shown in Table 4.

Table 4 Potential Additional Ridership on the Culture Connector by Event Type

Event Type	Venue	Range of Potential Ridership Increase
Seahawks Game	Lumen Field	10% - 15%
Sounders Game	Lumen Field	7% - 12%
Stadium Concert	Lumen Field	5% - 15%
Mariners Game	T-Mobile Park	8% - 13%
Stadium Concert	T-Mobile Park	7% - 13%

Source: Parametrix, 2023

3.2 Visitor and Tourism Market Analysis

Some visitor travel is included in STOPS modeling because transit ridership on existing services includes some tourism-related and non-work travel. Ridership projections are less likely to capture visitor travel by transit at the height of tourism season during the summer, and there are non-work and visitor trips on typical Fall weekdays and weekends that could be served by the Culture Connector. The evaluation of visitor and tourism markets Replica, a transportation and land use data platform that brings together a range of travel data including origins and destinations, trip purpose, travel mode, trip distance and duration and demographics. Analysis of potential visitor trips used two approaches:

- **Local Visitor Approach:** Analysis of trips in the culture connector study area limited to non-work trip purposes most likely to capture local visitors including lodging, dining, recreation and shopping.
- **Out-of-Region Visitor Approach:** Analysis of trips by visitors as defined by Replica from outside of the Northwest.

An estimated 16,800 daily Saturday trips and 17,300 daily weekday trips over 0.5 miles in distance were entirely within the census block groups within one quarter mile of the Culture Connector route, but only 8% to 10% of those trips were served by transit. Approximately 1,200 daily visitor trips within the study area were over one-half mile in distance on weekdays and Saturdays, but only 4% - 5% of these longer distance visitor trips were made by transit. These trips are entirely in and around downtown near the Culture Connector route and could be served by the planned streetcar route and stations. For visitors in particular, the Culture Connector could be more visible, intuitive and predictable transit option to use with its service along First Avenue serving the Pioneer Square, Pike Place Market and Elliott Bay/Waterfront areas, compared to the Downtown Seattle Transit Tunnel or Third Avenue bus corridor.

The Culture Connector could attract up to an additional 8% of daily ridership from downtown visitors. Out-of-region visitors made up an average of 6.5% along the routes frequented by visitors in fall 2022 based on Replica transit travel data. The observed number of downtown visitors from the Downtown Seattle Association in summer 2022 and fall 2022 were used to estimate potential transit ridership in summer 2022. With nearly 25% more visitors downtown, the peak summer season, visitor ridership is estimated at approximately 8%. This number is comparable to the low-range visitor ridership estimate of 10% from the previous 2014 Center City Streetcar Special Markets analysis that relied on surveys from the South Lake Union Streetcar (11%) and the former Waterfront Streetcar Line (8%).

3.3 Data Limitations and Uncertainties

Concerts are generally more variable in terms of attendance and audience demographics. The number of concert dates at either Lumen Field or T-Mobile Park in 2022 were limited, making concert-related ridership difficult to assess. Replica is a tool for analysis of larger trends in travel behaviors near the Culture Connector corridor, with data limited to Fall 2022, and has higher margins of error for finer grained analysis of travel between specific origins and destinations.

Although tourism and event attendance show promising signs of recovery in 2022 and 2023, conditions may not always support additional transit ridership from special events and leisure travel. The emergence of new COVID variants and other emerging challenges, such as smoke events from North American wildfires, may continue to effect travel and event attendance.

APPENDIX A: SPECIAL MARKETS ASSESSMENT



Seattle
Department of
Transportation

October, 2023

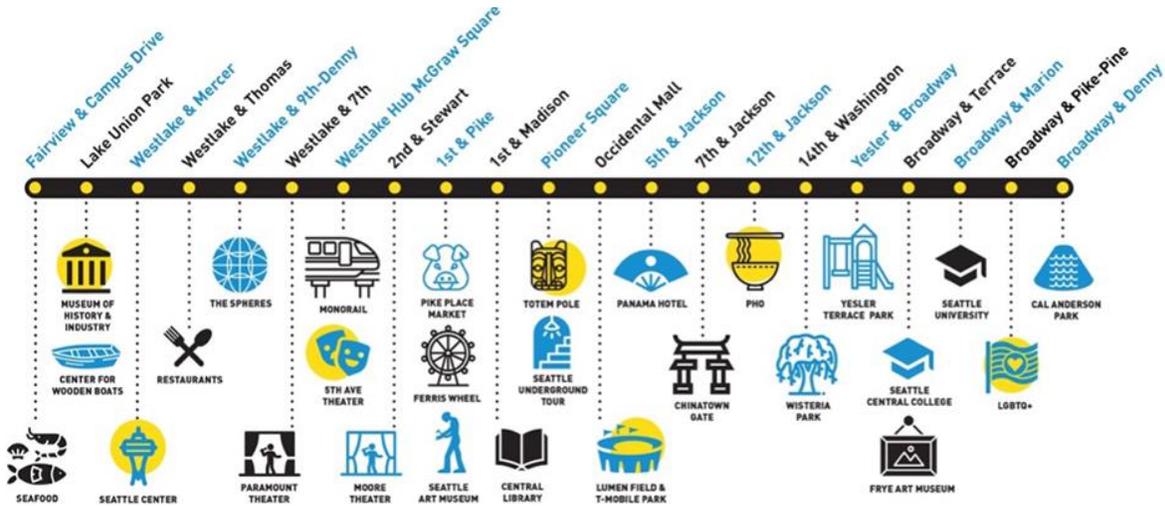
1. BACKGROUND AND PURPOSE

The Federal Transit Administration (FTA) Simplified Trips-on-Project Software (STOPS) model forecasts the number of transit trips on the potential project based on current and future population and employment estimates. The model does not explicitly account for visitors using transit or special events in forecast project ridership, both of which are likely to increase ridership on the Culture Connector through Central Seattle.

This analysis is intended to bridge the gap between STOPS modeling to forecast present and future ridership on the planned Culture Connector streetcar line and potential transit ridership related to tourism and special events. With data from local agencies and similar cities and contexts from across the United States, this memorandum estimates potential additional ridership for a range of special events. Using seasonal trends in transit ridership and Replica data from Fall 2022, the analysis of visitor-oriented transit services and potential ridership examines non-work and visitor travel patterns that could be served by the Culture Connector.

The Culture Connector project would connect the end of the First Hill Streetcar in Pioneer Square with the South Lake Union Streetcar at Westlake & Olive, serving Downtown Seattle along First Avenue and Stewart Street. The Culture Connector includes four stops between the Westlake & Olive and Occidental Mall at Pioneer Square (1st Ave & Cherry Street), 1st & Madison, 1st & Pike, and 2nd & Stewart. The streetcar would connect many of Seattle’s prominent destinations and cultural uses in the downtown core and Pioneer Square with more direct access to the waterfront and the West Edge neighborhood. Stops and destinations along the Culture Connector are shown in Figure A-1 **Error! Reference source not found.** and streetcar route and stations are shown in Figure A-2.

Figure A-1 Destinations along the Seattle Streetcar System and Culture Connector Route



Source: City of Seattle, 2023

The most recent available data was collected from major sporting and event facilities in Seattle for 2021 and 2022 events. Event-related and seasonal ridership data for 2022 was gathered from local transit agencies including King County Metro and Sound Transit, as well as from peer agencies to provide national context. In 2021 and 2022, transit ridership was suppressed in the region and across the U.S. due to the impacts of the COVID-19 pandemic. Many cities and transit agencies, including City of Seattle, King County Metro, and Sound Transit are experiencing increases in transit ridership in 2023 and expect continued growth in the coming years.

2. SPECIAL EVENTS MARKET ANALYSIS

This section draws on transit and mode share data from venues and transit agencies in the local market and across the U.S. to estimate ridership potential with a connected streetcar system between South Lake Union and First Hill for special events at T-Mobile Park and Lumen Field. Both facilities are within a half mile of the future Culture Connector alignment and Occidental Mall station at the terminus of the existing First Hill Streetcar.

2.1 Transit Ridership at Stadiums Nationally

Many contemporary stadium developments across the country are planned around transit access, and special events can contribute to transit ridership near stadium and arena facilities. Nationally, transit agencies advertise easy connections to special events, and major facilities often encourage use of modes other than driving to mitigate impacts on nearby communities. Both Lumen Field and T-Mobile Park as well as other major sporting event facilities in Seattle have implemented Transportation Management Programs (TMPs) with goals for transit mode share.

The FTA New Starts Working Group collected data on transit mode share to major events at comparable facilities across the U.S. While FTA has not regularly collected similar data in recent years, transit mode share prior to 2012 is presented in the table below for reference. Facility names have been updated to reflect current naming rights agreements as of July 2023. This historical data on transit mode share is shown in Table A-1.

Table A-1 Transit Mode Share for Comparable Facilities Nationally

City	State	Agency	Facility	Events	Year	Transit Mode Share
Portland	OR	TriMet	Rose Garden Arena	Trail Blazers Basketball Games	2004	33%
Portland	OR	TriMet	Providence Park	Timbers Soccer Matches	2011	44%
St. Louis	MO	Metro Link	Busch Stadium; The Dome at America's Center; Enterprise Center	Cardinals, Rams, and Blues Games	2011	33.3%
Minneapolis	MN	Metro Transit	Target Field	Twins MLB Games	2011	13%

City	State	Agency	Facility	Events	Year	Transit Mode Share
Minneapolis	MN	Metro Transit	Mall of America	Vikings NFL Games	2011	11%
Phoenix	AZ	Valley Metro	Chase Field; Footprint Center; Desert Financial Arena	Diamondbacks Games, Suns Games, Arizona State University Athletics	N/A	10.7%
Phoenix	AZ	Valley Metro	Arizona Financial Theater	Concerts	N/A	10.1%
Phoenix, Tempe	AZ	Valley Metro	Fall Frenzy (Tempe); Artlink (Phoenix); Fiesta Bowl Block Party (Tempe)	Festivals	N/A	17%
Dallas	TX	DART	American Airlines Center	Concerts, Basketball Games, Hockey Games	2010-2011	14.9%
San Diego	CA	MTS	SDCCU Stadium	Football Games	2008-2011	23.2%
San Diego	CA	MTS	Petco Park	Baseball Games	2008-2011	13.3%
Cleveland	OH	Cleveland	Progressive Field	Baseball Games	2006	6-10%
Cleveland	OH	Cleveland	Rocket Mortgage FieldHouse	Hockey and Basketball Games, Concerts	2006	6-10%
Denver	CO	RTD	Coors Field	Baseball Games	2006	7-10%
Denver	CO	RTD	Ball Arena	Baseball and Hockey Games, Concerts	2006	7-10%
Oakland	CA	BART	Oakland Coliseum	A's Baseball Games	2011	17%
Oakland	CA	BART	Oakland Coliseum	Warriors NBA Games	2010-2011	23%
Oakland	CA	BART	Oakland Coliseum	Raiders NFL Games	2010-2011	13%
Charlotte	NC	CATS	Spectrum Center	NBA Games	N/A	7.9%
Charlotte	NC	CATS	Spectrum Center	Hockey	N/A	5.7%
Charlotte	NC	CATS	Spectrum Center	CIAA Basketball Tournament	N/A	3.7%
Charlotte	NC	CATS	Bank of America Stadium	College and NFL Football Games, Hockey	N/A	11.8%
San Francisco	CA	SFMTA	Oracle Park	Football Games	2006	20%

Source: FTA New Starts Working Group

Recent transit ridership data from comparable facilities across the U.S. was collected from available ridership data from agencies serving similar facilities, including BART in the Bay Area and Metro Transit in the Minneapolis-Saint Paul Metro Area. Table A-2 shows the average 2022 transit ridership for events at venues in peer cities at the nearest station to the facility. Event-related ridership for both BART and Metro Transit has not recovered to pre-COVID levels, and data from these agencies show a notably lower transit mode share compared to Lumen Field and T-Mobile Park.

Table A-2 Average Event Related Ridership at Stadium Facilities

Facility	Transit System	Station	2022 Average Additional Event Ridership	2022 Transit Mode Share
Target Field	Metro Transit	Target Field	1,800	4%
US Bank Stadium	Metro Transit	US Bank Stadium	14,300	11%
Oakland-Alameda County Coliseum	Bay Area Rapid Transit (BART)	Coliseum	1,100 (offs only)	11%

Source: Metro Transit (Minneapolis-Saint Paul), Bay Area Rapid Transit

2.2 Transit Ridership to Facilities in Seattle

2.2.1 Transit Ridership at Lumen Field and T-Mobile Park

Recent Event-Related Transit Ridership

T-Mobile Park and Lumen Field both maintain annual TMPs and conduct annual travel surveys of event attendees. Both facilities surveyed attendees at randomly selected games throughout the 2021 and 2022 seasons to collect data on travel mode, people per vehicle, and parking locations. The observed mode share for T-Mobile Park and Lumen Field is shown in Table A-3 and Table A-4 below.

Table A-3 2021-2022 Mode Share for Lumen Field Attendees

Mode	2021 Seahawks Games	2022 Seahawks Games	2022 Sounders Games
Public Bus	8%	7%	12%
Link Light Rail	29%	28%	40%
Sounder Rail	14%	16%	0%
Ferry/Water Taxi	6%	8%	8%
Walk/Bike	11%	12%	13%
Scooter/Bikeshare	0%	1%	1%
Charter Bus	2%	1%	0%
Taxi/Rideshare	15%	17%	10%
Dropped Off	6%	5%	0%
Other	1%	0%	10%

Source: Lumen Field, Transportation Solutions, 2023

Table A-4 Observed 2021-2022 Mode Share for T-Mobile Park Attendees

Mode	2021 Mariners Games	2022 Mariners Games
Public Bus	3%	3%
Link Light Rail	16%	22%
Sounder Rail	1%	>0%
Ferry/Water Taxi	6%	8%
Streetcar	0%	>0%
Amtrak	>0%	>0%
Walk/Bike	10%	8%
Scooter/Bikeshare	>0%	>0%
Charter Bus	0%	>0%
Taxi/Rideshare	10%	12%
Dropped Off	2%	1%
Other	0%	>0%

Source: T-Mobile Park, Transportation Solutions, 2023

Specific breakouts by the type of transit service show the largest share of transit trips to both Lumen Field and T-Mobile Park were by Link Light Rail in 2021 and 2022. Sounder Rail accounted for between 14% and 16% of travel to Seahawks games, but only 1% of travel to Mariners Games. The First Hill Streetcar comprised under 1% of trips to T-Mobile Park in 2021 and 2022 but was not tracked separately for Lumen Field. Those trips are captured under other non-parked mode splits, which made up between 0% and 1% of trips to Seahawks games in 2021 and 2022 and comprised roughly 10% of Sounders game trips.

Potential for Event Related Ridership at Lumen Field and T-Mobile Park

Events at Lumen Field and T-Mobile Park typically draw between 10,000 and 70,000 attendees with additional transit ridership on bus, streetcar, light rail, and commuter rail around the stadiums.

Together, average event attendance and observed transit mode share at both facilities can be used to assess average additional transit ridership across all King County Metro, Sound Transit, and City of Seattle transit services. The estimated number of attendees at an average event based on attendance and observed mode share is shown in Table A-5. The share of transit trips by bus, streetcar, light rail, and commuter rail will vary based on attendees' origins, which are not reported in TMP surveys from either venue. Attendees who currently walk or bike, use transit or taxi, and ridership to access events from other central Seattle neighborhoods could be potential streetcar riders.

Table A-5 Potential Overall Ridership from 2022 Travel Mode Survey and Average Attendance

Facility	Event Type	Average Attendance	2022 Light Rail & Bus Estimate	2022 Walk & Bike Estimate	2022 Taxi, Rideshare and Drop-off Estimate
Lumen Field	Seahawks	68,832	24,091 (35%)	8,260 (12%)	15,143 (22%)
Lumen Field	Sounders	33,607	17,471 (52%)	4,369 (13%)	3,361 (10%)

T-Mobile Park	Mariners	28,590	8,577 (30%)	2,287 (8%)	3,717 (13%)
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Source: ESPN NFL Attendance 2022; Soccer Stadium Digest 2022 MLS Attendance, ESPN MLB Attendances 2022

The ridership estimates from the previous special market assessment memorandum used the share of available service in the downtown area to estimate event-related ridership. In that analysis, potential additional ridership related to events at Lumen Field and T-Mobile Park was estimated based on the share of available service the streetcar would make up before and after events with 5-minute to 7.5-minute headways. Operational assumptions for the full route from South Lake Union to Capitol Hill have since changed as have transit availability and frequencies in and around downtown. Current assumptions for the Culture Connector include a single service line operating from Broadway & E Howell to Fairview & Campus Drive that would have roughly 8-minute headways.

With a different approach to event-related ridership, this analysis reviewed current transit ridership data to evaluate the potential for additional streetcar ridership on special event days. To understand existing event-related transit ridership patterns, event day ridership data from Sound Transit and King County Metro were compared to quarterly averages of the same day type. Event days in 2022 were selected for a range of seasons, days of the week, and type of events at Lumen Field and T-Mobile Park to help estimate event-related transit ridership on existing transit services.

Light rail ridership at both the International District/Chinatown Station and the Stadium Station increased on event days compared to the average daily ridership for the quarter. Increased ridership was particularly pronounced at the Stadium Station, where daily ridership is typically lower, and the station is geared toward special events. At both stations, Lumen Field events generated more ridership, as Lumen Field has more than twice the capacity of T-Mobile Park. Average event day ridership compared to quarterly average ridership at both stations is presented in Table A-6.

Table A-6 Daily Link Light Rail Ridership on Event Days Compared to Quarterly Averages

Service	Station	Lumen Field Event Day Increase	T-Mobile Park Event Day Increase	All Event Days Average Increase
Link Light Rail	International District / Chinatown	36%	4%	25%
Link Light Rail	Stadium	100%	58%	81%

Note: All event days include days with events at both Lumen Field and T-Mobile Park, while T-Mobile Park and Lumen Field event days exclude days with events at both venues.

Source: Sound Transit

On the same event days, bus ridership showed mixed trends in daily ridership, with smaller increases in ridership along routes that serve the area around the stadiums. As traffic management efforts can close service at the Occidental Mall terminus of the streetcar and transit operations near the stadiums, some event days may not include service along entire bus lines. Local bus service to Pioneer Square and Chinatown/International District showed increases in ridership on event days, but not consistently across all routes. Bus routes that serve the stadiums more directly, with similar or shorter walking distance compared to the Occidental Mall streetcar station, showed more regular increases in ridership as seen in Table A-7. **Error! Reference source not found..**

Table A-7 Daily Bus Ridership on Frequent Routes near Lumen Field and T-Mobile Park

Route	Lumen Field Event Day Increase	T-Mobile Park Event Day Increase	All Event Days Average Increase
C Line	1%	4%	5%
Route 21	1%	11%	7%
Route 101/102	9%	0%	7%
Route 131/132	3%	6%	4%
Other Bus Lines	2%	0%	1%

Note: All event days include days with events at both Lumen Field and T-Mobile Park, while T-Mobile Park and Lumen Field event days exclude days with events at both venues.

Source: King County Metro

Other bus routes with frequent service but with stops somewhat farther from the stadiums did not show as strong or consistent increases in ridership. Some exceptions include the D Line and Routes 1, 14, and 70, which all showed an increase in ridership of 5% or more during Lumen Field event days.

Analysis of ridership on the existing First Hill Streetcar line is an indicator of what the minimum level of additional ridership could be expected on the Culture Connector streetcar system during special events. Analysis of ridership on the existing line consisted of the same dates for analysis of King County Metro and Sound Transit ridership, but also included a number of additional dates for a larger sample of Mariners, Seahawks, and Sounders games. These point to more specific event day trends in streetcar ridership. Despite some closures to the Occidental Mall station for event-related traffic management, streetcar ridership on event days was reliably higher compared to quarterly averages for comparable days.

Table A-8 Additional Daily Ridership on the First Hill Streetcar by Event Type and Venue

Event Type	Venue	Daily Ridership Increase
Seahawks Game	Lumen Field	11% (175 Trips)
Sounders Game	Lumen Field	5.5% (90 Trips)
Stadium Concert	Lumen Field	6% (variable)
Mariners Game	T-Mobile Park	6% (150 Trips)
Stadium Concert	T-Mobile Park	9% (variable)

Note: Stadium Concert events are based on a very limited sample, including dates with both a sporting event and stadium concert.

Source: King County Metro

Seahawks games generate more ridership on the First Hill Streetcar than other events, with an average of 11% additional daily riders for all home games in 2022. The average number of trips on the streetcar was only slightly higher on Seahawks game days than Mariners game days, but showed a higher percentage increase as normal Sunday transit ridership is generally lower. Based on travel patterns on Sounders game days in 2022, Sounders games reliably support higher transit ridership, with more variable ridership early and late in the soccer season.

2.2.2 Comparable Local Facilities

Mode share data collected at Climate Pledge Arena and Husky Stadium also provide a comparison for Lumen Field and T-Mobile Park. Although these facilities differ in their setting and transit connections compared to Lumen Field and T-Mobile Park, their travel survey results show general trends in transit use to special events elsewhere in Seattle.

While the total share of transit trips at Climate Pledge Arena was lower overall, the facility does not benefit from a direct connection to Link Light Rail, with a transfer at Westlake station to the Seattle Center Monorail and a short walk to the arena. The monorail accounted for 7% of transit trips to Kraken games and 4% of transit trips to other events in the 2021 – 2022 season. Climate Pledge Arena opened to the public in October 2021, and the mode of access for attendees is shifting toward more Monorail and public transit access as transit ridership recovers from the COVID-19 pandemic and patrons become more accustomed to traveling to the Arena/ Survey data for travel mode from Climate Pledge Arena from 2021 and 2022 is shown in Table A-9.

Table A-9 Additional Daily Ridership on the First Hill Streetcar by Event Type and Venue

Travel Mode	Kraken Game	Other Events
Taxi/Rideshare/Drop-off	8%	9%
Transit	15%	11%
Monorail	7%	4%
Walk	5%	5%
Bike	0.24%	0.24%

Source: Climate Pledge Arena, 2023

In 2022, transit trips to access Husky Stadium events outpaced car trips (including taxi and rideshare), with 45% of event attendees arriving by transit. Most transit trips to Husky Stadium were made by Link Light Rail, and light rail accounted for most of the growth in transit mode share to the stadium between 2021 and 2022 (University of Washington, 2021, 2022). Survey data for travel mode for Husky Stadium event attendees in 2021 and 2022 are shown in Table A-10 below.

Table A-10 Additional Daily Ridership on the First Hill Streetcar by Event Type and Venue

Travel Mode	2022	2021
Rideshare	4.9%	6.7%
Bus	9.0%	9.7%
Light Rail	36.2%	27.8%
Walk	14.4%	10.5%
Bike/Bikeshare	2.4%	1.6%

Note: Husky Stadium includes charter bus in total transit mode share.

Source: University of Washington, 2022, 2023

2.3 Conclusions

Mariners games have a consistent effect on current streetcar ridership despite the stadium’s location just over one-half mile from the Occidental Mall station, with 6% more daily ridership on game days. The lower capacity of T-Mobile Park and regularity of games during baseball season also means that baseball games are less likely to disrupt regular travel patterns.

Concerts at both T-Mobile Park and Lumen Field generated more variable ridership changes between 3% and 9% for Lumen Field stadium shows and between 5% and 13% for T-Mobile stadium shows. As concert audiences can range widely demographically, these events are likely to have more varied effects on travel behavior.

With streetcar service at Occidental Mall station extending north into downtown and connecting to the existing South Lake Union Streetcar, changes to traffic management for major events could avoid streetcar closures and help ensure reliability of the streetcar at event times. Assuming the streetcar service is not suspended at Occidental Mall station during event times, potential ridership increases would likely be higher than is reflected in current data for 2022 events.

Based on observed event-related increases in streetcar ridership in 2022, the Culture Connector could reasonably attract an additional 7% to 15% of daily riders along the route and current South Lake Union streetcar line for events at the stadiums. Potential for additional daily ridership on the Culture Connector based on current attendance trends and observed 2022 event ridership are shown in Table A-11.

Table A-11 Potential Additional Ridership on the Culture Connector by Event Type

Event Type	Venue	Potential Range of Ridership Increase
Seahawks Game	Lumen Field	10% - 15%
Sounders Game	Lumen Field	7% - 12%
Stadium Concert	Lumen Field	5% - 15%
Mariners Game	T-Mobile Park	8% - 13%
Stadium Concert	T-Mobile Park	7% - 13%

Source: Parametrix

3. VISITOR AND TOURISM MARKET ANALYSIS

This section describes analysis of potential visitor- and tourism-related streetcar ridership along the Culture Connector streetcar route and stations. This analysis is peer-based and draws on information from other cities and transit systems in the U.S. as well as research on transit ridership. There is limited data and research on transit use by visitors and tourism-oriented service in recent years. This section includes analysis available data on transit ridership data from peer agencies and historic statistics from different agencies and metropolitan areas included in previous special markets analysis for the Culture Connector from 2013.

3.1 Seattle Tourism Market

In 2020 and 2021, the COVID pandemic severely limited international and domestic travel and tourism in Seattle and throughout the U.S. Health precautions restricted dining, travel, and events throughout much of 2020 and part of 2021. The Seattle tourism sector showed significant signs of recovery starting in 2021 after statewide reopening. In 2022 that trend continued, with 33.9 million annual visitors, approximately 81% of Seattle’s pre-pandemic visitor total in 2019 (Visit Seattle, 2019, 2023).

June 2023 data from the Downtown Seattle Association’s Downtown Recovery Dashboard showed further recovery in the tourism sector with nearly three million downtown visitors, 96% of June 2019 numbers. Seattle’s hospitality industry has also shown signs of recovery, with hotel room demand surpassing 2019 levels in June 2023 and comparable to 2019 demand in July 2023 (Downtown Seattle Association, 2023). A rebound in recreational travel and Seattle’s 2023 summer events including MLB Allstar Week and the Taylor Swift Eras Tour have helped drive growth in visitors downtown. Continued growth in downtown visitors and special events could help generate additional ridership on the Culture Connector in the future.

Downtown Seattle attracted more visitors during the height of the summer tourism season from June through August both pre- and post-pandemic. In 2019, more than three million visitors came downtown in June, July, and August of that year. In 2022, the number of downtown visitors was somewhat lower compared to 2019 figures but had mostly recovered. The average number of monthly downtown visitors was higher in summer compared to fall both pre- and post-pandemic, with 22% more monthly visitors in Summer 2019 compared to Fall 2019 and 24.8% more visitors in Summer 2022 compared to Fall 2022.

Table A-12 Pre- and Post-Pandemic Downtown Monthly Visitors

Time Period	2019 Monthly Downtown Visitors	2022 Monthly Downtown Visitors	% Change
June	3,120,786	2,897,079	-7.2%
July	3,281,247	2,977,653	-9.3%
August	3,141,912	3,047,033	-3.0%
Summer Season (average)	3,181,315	2,973,922	-6.5%
September	2,750,241	2,632,435	-4.3%
October	2,529,940	2,409,911	-4.7%
November	2,541,800	2,104,310	-17.2%
Fall Season (average)	2,607,327	2,382,219	-8.6%
SUMMER v. FALL INCREASE	+22%	+24.8%	

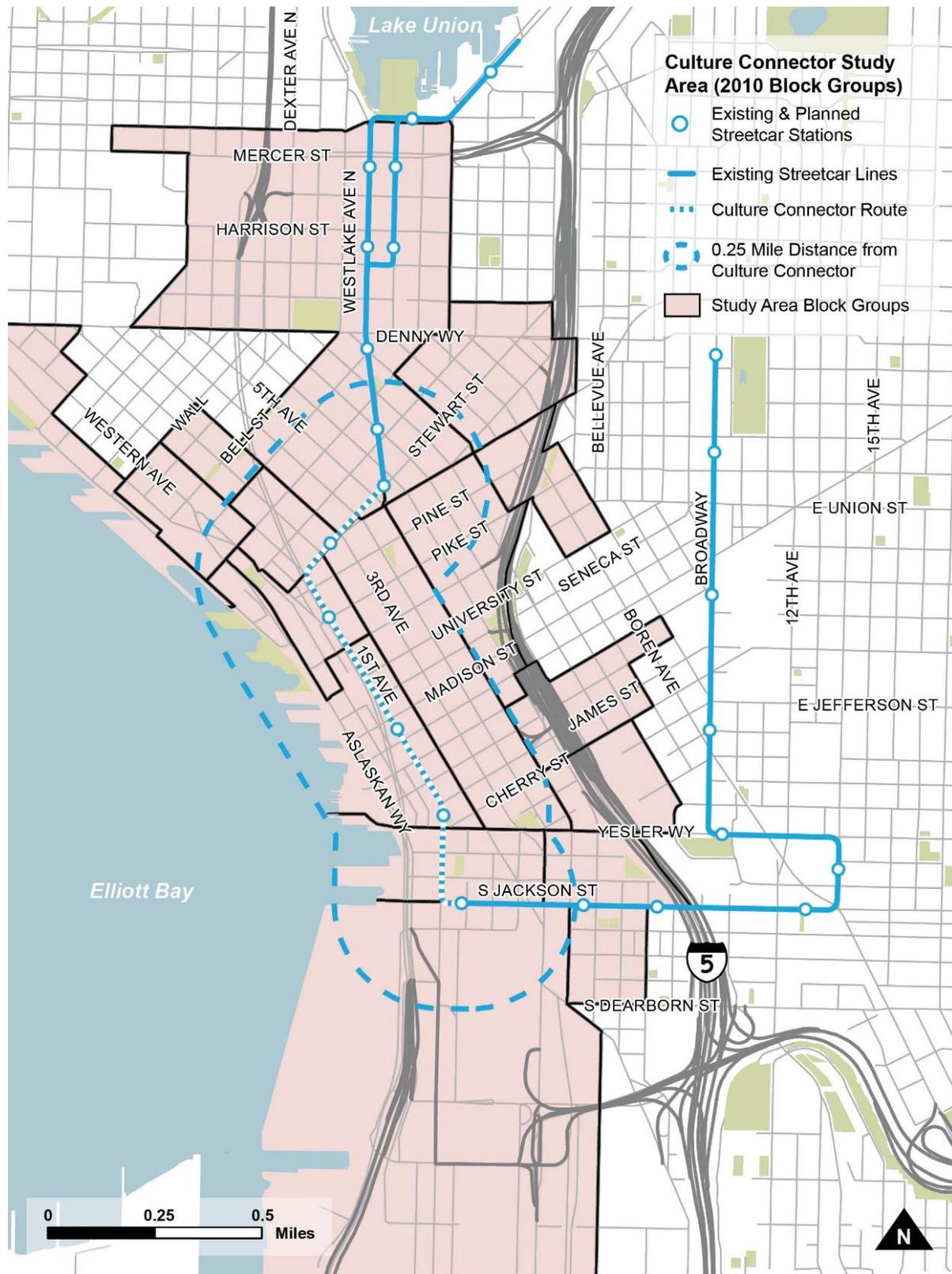
Source: Downtown Seattle Association, 2023

Consistent peaks in downtown visitors in summer show greater opportunity for potential visitor transit ridership in and around Downtown Seattle from June through August. This increase in downtown visitors in the summer includes potential streetcar riders who are currently using other transit services or modes to get around downtown.

3.2 Visitor Transit Ridership

Some visitor travel is accounted for in STOPS modeling for fall because existing ridership includes some fall visitor travel. However, ridership forecasts are not likely to capture visitor transit ridership in the summer, when there are more downtown visitors because STOPS models fall ridership. To understand visitor travel patterns, the team used Replica to display and analyze travel data within 2010 Census Block Groups within one quarter mile of the Culture Connector route. The 2010 Census Block Groups that make up the Culture Connector study area are shown in Figure A-3.

Figure A-3 Culture Connector Study Area Block Groups for Replica Analysis



Source: City of Seattle, U.S. Census Bureau

Visitor status, as defined in Replica, excludes visitors from within the region, i.e., from elsewhere in Washington, Oregon, Idaho, Montana and Wyoming. Therefore, this analysis uses two approaches: one tailored to local visitors and one for visitors from outside of the Northwest region as described below.

- **Local Visitor Approach:** Analysis of trips in the Culture Connector study area limited to non-work trip purposes most likely to capture local visitors including lodging, dining, recreation, and shopping. This approach is likely to include regular non-work trips that would be factored into STOPS modeling.
- **Out-of-Region Visitor Approach:** Analysis of trips by visitors as defined by Replica from outside of the Northwest. This approach is unlikely to capture regular non-work trips but would include background visitor transit ridership accounted for in STOPS modeling.

3.2.1 Local Visitors and Non-Work Trips

On a typical fall weekday in 2022, approximately 39,000 lodging, recreation, or shopping trips began and ended in the Culture Connector study area. On Saturdays there were approximately 29,300 trips for those purposes in the study area. The mode share for trips for dining, lodging, recreational, and shopping purposes to destinations in the study area are shown in Table A-13 **Error! Reference source not found.** below.

Table A-13 Travel Mode for Non-Work Trips Starting and Ending in the Culture Connector Study Area

Travel Mode	All Weekday Trips (Fall 2022)	Weekday Trips over 0.5 Miles (Fall 2022)	All Saturday Trips (Fall 2022)	Saturday Trips over 0.5 Miles (Fall 2022)
Walk	67.7%	42.5%	67.6%	46.4%
Car	18.2%	32.3%	14.9%	24.9%
Drop-Off	5.9%	11.5%	8.4%	15.2%
Transit	4.6%	10.2%	3.8%	8.4%
Taxi/TNC	1.2%	2.4%	2.1%	4.3%
Bike	0.6%	1.1%	0.5%	0.8%
Other	1.8%	0%	2.7%	0%

Source: Replica, Fall 2022

Relatively few trips made for dining, lodging, recreation, and shopping within the study area were made on transit. People who currently walk, bike, or ride transit along the Culture Connector corridor, or 71% to 72% of trips for these purposes, are more likely to use streetcar service through downtown. However, many of these trips covered short distances, with approximately 55% to 56% of weekday and Saturday trips under one-half mile. People driving or riding in cars through the study area made up a larger share of trips completely within the study area. This suggests that current services do not meet travel needs for non-work trips along the Culture Connector route.

There were an estimated 16,800 daily Saturday trips and 17,300 daily weekday trips to dining, lodging, recreation, and shopping within the study area that were over one-half mile in distance. The mode share for these trips over one-half mile in distance is shown in Table A-13. While

these longer non-work trips within the study area have a higher transit mode share compared to shorter trips, most of the trips over one-half mile in the study area are made on foot or by car. The Culture Connector could be an attractive alternative to people walking and, in some cases, driving or riding in cars west of the Downtown Seattle Transit Tunnel on Third Avenue or traveling east-west on the north end of downtown.

3.2.2 Out-of-Region Visitor Trips

Trips by visitors from outside the northwest near the Culture Connector route were analyzed separately, as the visitor classification in Replica excludes local visitors from within the region. On a typical fall weekday in 2022, approximately 4,700 visitor trips began and ended in the Culture Connector study area, and approximately 4,750 visitor trips began and ended in the study area on Saturdays. The mode share for visitor trips within the study area is shown in Table A-14.

Table A-14 Travel Mode for Visitor Trips Starting and Ending in the Culture Connector Study Area

Travel Mode	All Weekday Trips (Fall 2022)	Weekday Trips over 0.5 Miles (Fall 2022)	All Saturday Trips (Fall 2022)	Saturday Trips over 0.5 Miles (Fall 2022)
Walk	87.2%	75.8%	86.7%	73.8%
Car	5.2%	10.4%	3.4%	8.7%
Drop-Off	1.9%	6.1%	3.6%	7.7%
Transit	1.3%	4.4%	1.5%	4.9%
Taxi/TNC	0.9%	2.6%	1.5%	4.4%
Bike	0.3%	0.7%	0.3%	0.4%
Other	3.2%	0%	3.0%	0%

Source: Replica, Fall 2022

Approximately 29% of visitor trips were over one-half mile and these trips are more likely to be effectively served by transit. Visitors were more likely to walk longer distances, with 74% to 76% of longer distance trips in the study area made by walking. A small share of visitor trips (4% to 5%) over one-half mile within the study area were made by transit, and those trips primarily used Link Light Rail or the Seattle Center Monorail. The Culture Connector could help visitors from outside the region navigate Downtown Seattle by transit and facilitate some of these trips entirely within the Culture Connector study area.

Many of the hotels in and around Downtown Seattle are located near the current South Lake Union Streetcar and along the Culture Connector route. The route along Stewart Street and First Avenue would also serve destinations near Pike Place Market and the waterfront that are currently more difficult to access by transit. Streetcar service may be more appealing to visitors because it is visible, intuitive, and predictable compared to bus service, and visitors currently show a strong preference for fixed-guideway transit in and around downtown.

3.2.3 Estimates of Visitor Based Ridership

To estimate potential visitor ridership Replica travel data for out-of-region visitors was analyzed to assess the share of ridership on transit routes used most often by visitors that serve the downtown area. The routes serving downtown that had the most visitor ridership based on Replica data from Fall 2022 were the Link 1 Line, RapidRide C and D Lines, and routes 21, 40,

and 7. The number of daily trips by visitors on these six lines were compared to observed average daily ridership from September 2022 through November 2022 on each transit route. Visitor trips comprised an average of 6.5% of average daily ridership across all six routes in Fall 2022.

Visitor based ridership, particularly in the downtown core, varies seasonally with leisure travel to Seattle and the Pacific Northwest. Downtown Seattle Association publishes monthly estimates of the number of visitors in Downtown Seattle. A comparison of the summer 2022 average number of downtown visitors to the fall 2022 average showed that the number of visitors downtown were 25% higher in summer that year, and pre-pandemic numbers from 2019 showed a similar increase. Based on this pattern in downtown visitors, visitor-based ridership during the summer peak season was estimated at 8%.

These two estimates defined the range of ridership the Culture Connector could attract from downtown visitors at 6.5% - 8%. However, some visitor ridership is accounted for in the STOPS model because background transit data include current visitor transit trips. The estimated visitor ridership range is comparable to the low-range visitor ridership estimate of 10% from the previous 2014 Center City Streetcar Special Markets analysis that relied on surveys from the South Lake Union Streetcar (11%) and the former Waterfront Streetcar Line (8%).

3.3 Data Limitations and Uncertainties

2022 Event Data. Concert events are variable in terms of attendance and audience demographics that make potential concert-related ridership difficult to assess. Limited stadium concerts at Lumen Field and T-Mobile Park in 2022 provided a small sample to assess for ridership that may not be representative of all events. Performances that draw attendees from different demographic groups who may be coming from different places in the region or have different travel behaviors.

Replica Fall 2022 Data. Replica data approximates typical conditions using spring or fall travel patterns, which are also used for STOPS modeling. Only fall data was available at the time of analysis, and earlier years (2021) came shortly after the State's official reopening from COVID precautions. The fall season, defined as September, October, and November includes a period where there are fewer visitors downtown and travel patterns may capture fewer visitor trips in the study area. More detailed estimates of travel between block groups for visitors and residents have a high margin of error and could not be assessed with a reasonable level of certainty using Replica.

Economic downturns can cause declines in leisure travel and special events attendance. Other events such as the emergence of new COVID-19 variants and precautions to prevent the spread of COVID or other infectious diseases may affect leisure travel and event attendance over several months or even years. Smoke events related to wildfires in the northwest or elsewhere in North America may also pose a periodic challenge to special markets, with poor air quality and low visibility causing short-term declines in local travel and event attendance.

Although major sports franchises are typically large, long-term investments, major sports franchises can move to other cities. Seattle experienced this with its former NBA team the Seattle SuperSonics, which moved to Oklahoma in 2008. The loss of any major sport franchise in Seattle would negatively affect streetcar ridership.

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