



LIVABLE CITY YEAR 2017–2018
IN PARTNERSHIP WITH
CITY OF TACOMA

CITY OF TACOMA

TACOMA MALL TRANSIT STATION
AREA DEVELOPMENT FEASIBILITY AND
CATALYST SITE RECOMMENDATIONS

UNIVERSITY OF WASHINGTON TACOMA
POLITICS, PHILOSOPHY AND PUBLIC
AFFAIRS

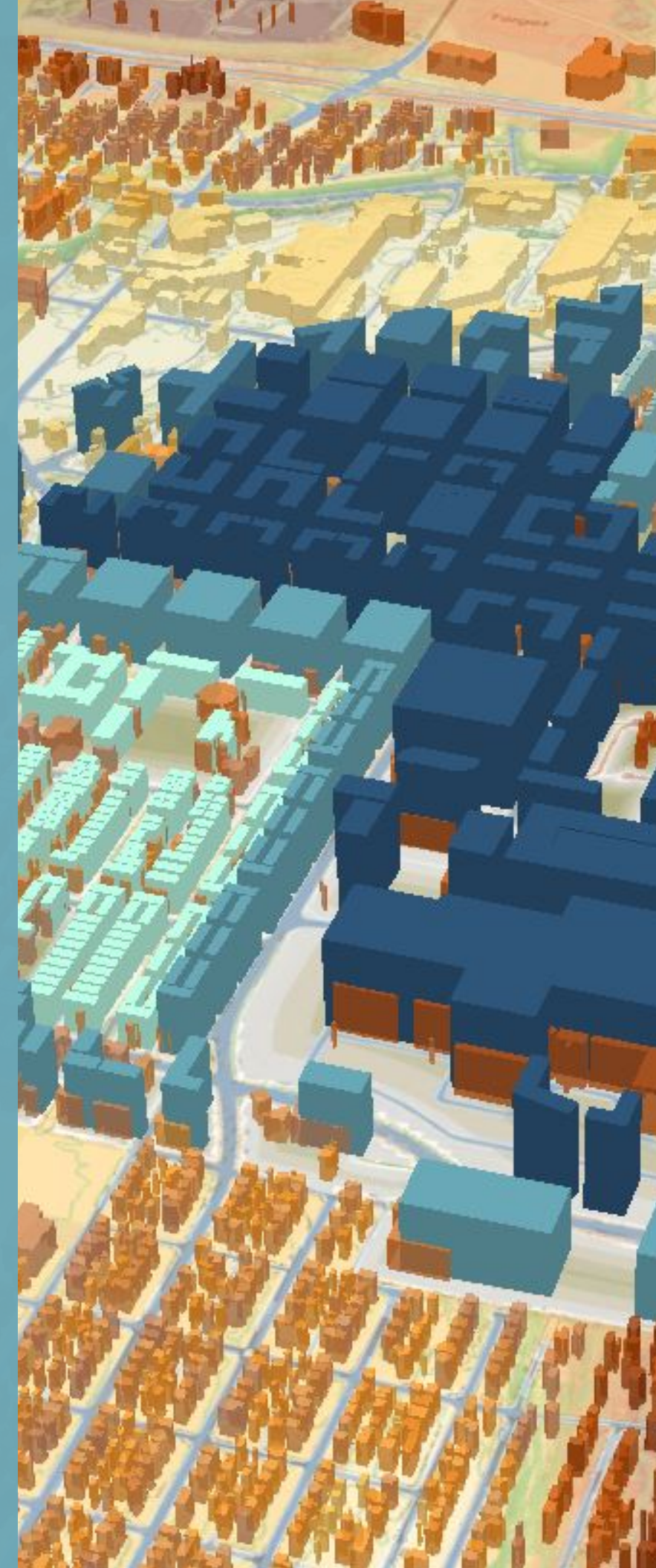
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SPRING – SUMMER 2018





LIVABLE
CITY YEAR

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ABOUT LIVABLE CITY YEAR

The University of Washington's Livable City Year (LCY) initiative enables local governments to engage UW faculty and students for one academic year to work on city-defined projects that promote local sustainability and livability goals. The program engages hundreds of students each year in high-priority projects, creating momentum on real-world challenges while enabling the students to serve and learn from communities. Partner cities benefit directly from bold and applied ideas that propel fresh thinking, improve livability for residents and invigorate city staff. Focus areas include environmental sustainability; economic viability; population health; and social equity, inclusion, and access. The program's 2017–2018 partner is the City of Tacoma; this follows a partnership with the City of Auburn in 2016–2017.

The LCY program is led by faculty directors Branden Born (Department of Urban Design and Planning), Jennifer Otten (School of Public Health) and Anne Taufen (Urban Studies Program, UW Tacoma), with support from Program Manager Teri Thomson Randall. The program was launched in 2016 in collaboration with UW Sustainability and Urban@UW, with foundational support from the Association of Washington Cities, the College of Built Environments, the Department of Urban Design and Planning, and Undergraduate Academic Affairs.

LCY is modeled after the University of Oregon's Sustainable City Year Program, and is a member of the Educational Partnerships for Innovation in Communities Network (EPIC-N), the collection of institutions that have successfully adopted this new model for community innovation and change.

For more information, contact the program at uwlcy@uw.edu.



ABOUT TACOMA

The third largest city in the state of Washington, Tacoma is a diverse, progressive, international gateway to the Pacific Rim. The port city of nearly 210,000 people has evolved considerably over the last two decades, propelled by significant development including the University of Washington Tacoma, the Tacoma Link light rail system, the restored urban waterfront of the Thea Foss Waterway, the expansions of both the MultiCare and CHI Franciscan health systems, and a significant influx of foreign direct investment in its downtown core.

Washington State's highest density of art and history museums are found in Tacoma, which is home to a flourishing creative community of writers, artists, musicians, photographers, filmmakers, chefs, entrepreneurs, and business owners who each add their unique flair to the city's vibrant commercial landscape. The iconic Tacoma Dome has endured as a high-demand venue for some of the largest names in the entertainment industry.


A magnet for families looking for affordable single-family homes in the Puget Sound area, Tacoma also draws those seeking a more urban downtown setting with competitively priced condos and apartments that feature panoramic mountain and water views. The city's natural beauty and proximity to the Puget Sound and Mount Rainier draws hikers, runners, bicyclists, and maritime enthusiasts to the area, while its lively social scene is infused with energy by thousands of students attending the University of Washington Tacoma and other academic institutions.


The City of Tacoma's strategic plan, Tacoma 2025, was adopted in January 2015 following unprecedented public participation and contribution. The plan articulates the City's core values of opportunity, equity, partnerships, and accountability, and expresses the City's deep commitment to apply these values in all of its decisions and programming. Each Livable City Year project ties into the principles and focus areas of this strategic plan. The City of Tacoma is proud of its 2017–2018 Livable City Year partnership with the University of Washington and of the opportunity this brings to its residents.





TACOMA 2025 STRATEGIC PLAN


The Tacoma Mall Transit Station Area Development Feasibility and Catalyst Site Recommendations project supports the Livability, Economy and Workforce, and Equity and Accessibility goals of the Tacoma 2025 Strategic Plan and was sponsored by the City's Planning and Development Services and Public Works Department.

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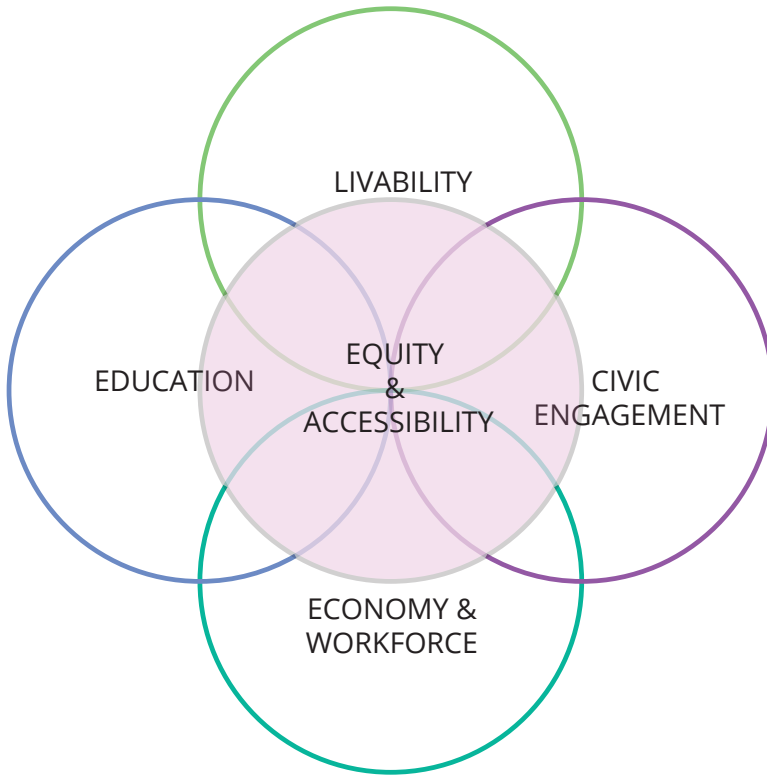
Goal #1 Livability
The City of Tacoma will be a city of choice in the region known for connected neighborhoods, accessible and efficient transportation transit options, and vibrant arts and culture. Residents will be healthy and have access to services and community amenities while maintaining affordability.
- 

Goal #2 Economy and Workforce
By 2025, Tacoma will be a growing economy where Tacoma residents can find livable wage jobs in key industry areas. Tacoma will be a place of choice for employers, professionals, and new graduates.
- 

Goal #3 Education
Tacoma will lead the region in educational attainment amongst youth and adults. In addition to producing more graduates from high school and college, more college graduates will find employment in the region. Lifelong learning and access to education will be prioritized and valued.
- 

Goal #4 Civic Engagement
Tacoma residents will be engaged participants in making Tacoma a well-run city. The leadership of the city, both elected and volunteer, will reflect the diversity of the city and residents and will fully participate in community decision-making.
- 

Goal #5 Equity and Accessibility
Tacoma will ensure that all residents are treated equitably and have access to services, facilities, and financial stability. Disaggregated data will be used to make decisions, direct funding, and develop strategies to address disparate outcomes.



RESOURCES

Tacoma 2025 Strategic Plan: https://www.cityoftacoma.org/tacoma_2025

Department of Planning and Development Services:
https://www.cityoftacoma.org/government/city_departments/planning_and_development_services/

Department of Public Works:
https://www.cityoftacoma.org/government/city_departments/public_works

Livable City Year: <https://www.washington.edu/livable-city-year/>

University of Washington Tacoma School of Interdisciplinary Arts and Sciences: <http://www.tacoma.uw.edu/sias-home>

This report was prepared in partnership with the University of Washington Tacoma (UWT) and the City of Tacoma. The UWT faculty lead on the project was Dr. Justin Beaudoin, Assistant Professor of Economics in the School of Interdisciplinary Arts and Sciences. UWT students Lucas Forrest, Brandon Francis and Joshua Haley worked on the project. The City of Tacoma project lead was Elliott Barnett.

The Tacoma Mall Neighborhood Subarea Plan identifies several potential benefits of relocating the existing Tacoma Mall Transit Center (TMTC), highlighted by an increase in transit ridership and transit-oriented development (TOD) opportunities around the transit center location. Specifically, the Subarea Plan contains a recommendation to consider relocating the current transit center to a more central location within the Subarea in order to improve access to a larger share of the Subarea's commercial properties (i.e., shops, restaurants, consumer services) and higher density residential units without arriving exclusively by car. The overall intent of this potential relocation is to increase transit ridership, and to catalyze economic growth in the neighborhood, with an emphasis on TOD and on the livability improvements it would entail. This study aims to complement a more comprehensive future transit center relocation study by conducting a preliminary analysis of the market-related impacts of the potential transit center relocation, highlighting the effect on property values of dwellings in the vicinity of potential transit center sites.

We conduct an original case study of a recently relocated transit center at the Vancouver Mall in Vancouver, Washington to estimate the effects of this relocation on property values in the surrounding area. The estimates are then applied to the Tacoma Mall neighborhood to provide an initial estimate of some of the potential benefits that the relocation would entail. Our results suggest that the market value of the benefits of the new transit center that are captured by property values are of a significant magnitude when compared to the likely costs of the relocation project. Dwellings within a 15-minute walk of the Vancouver Mall Transit Center increased by 5-13% following the relocation of the transit center and the beginning of bus rapid transit service; a similar effect in Tacoma would entail a benefit of \$42-69 million based on current dwelling values in the vicinity of the TMTC.

The Puget Sound Regional Council's (PSRC) Regional Centers Market Study Summary Report classifies the Tacoma Mall region as an "Emerging Center" and notes that these areas have seen "robust trends in job

This study should be considered in conjunction with the Tacoma Mall Neighborhood Subarea Plan to stimulate discussion about transit's role in the economic development and livability of the area.

creation and population growth." (Puget Sound Regional Council 2016). The report also highlights the importance of reduced transportation costs, increased zoning capacity, and improved walkability as important contributors to regional population and employment growth. Our findings are consistent with this conclusion and support the vision outlined in the Subarea Plan in terms of the underlying transportation and land use strategies necessary to spur regional growth.

This study should be considered in conjunction with the Tacoma Mall Neighborhood Subarea Plan to stimulate discussion about transit's role in the economic development and livability of the area], and to provide some guidance to future discussions about the proposed relocation of the TMTC. Ideally, a comprehensive cost-benefit analysis would be undertaken to facilitate the decision as to whether to relocate the transit center. There are many short-, medium-, and long-run projects that would complement relocating the transit center, and many other factors that should be further studied in the future to provide a more precise estimate of the aggregate benefits of relocation. These factors include modelling the effect on commuting levels and mode shares that the relocation and transit service level changes would have, the effect of parking facilities, co-development scenarios through public-private partnerships, and so forth.

Economic theory and the empirical evidence in Vancouver, Washington suggest that residential property values would increase following the TMTC relocation, and the magnitude of this property value increase implies that the social benefits of the relocation quite possibly outweigh the costs. This increase in property values (along with zoning changes) is also likely to spur transit-oriented development and to increase the value of commercial properties as well, which would be an additional benefit to those estimated in the analysis presented here.

A PRELIMINARY STUDY ABOUT THE POTENTIAL RELOCATION OF THE TACOMA MALL TRANSIT CENTER

This is a preliminary study intended to inform a discussion about the potential relocation of the Tacoma Mall Transit Center (TMTTC). The Tacoma Mall Neighborhood Subarea Plan identifies several potential benefits of relocating the existing center, highlighted by an increase in transit ridership and transit-oriented development (TOD) opportunities around the transit center location (for further details, see Chapter 6 and Table T-2, in particular). Specifically, the Subarea Plan contains a recommendation to consider relocating the current transit center to a more central location within the Subarea (see Figure 1 below) in order to improve access to a larger share of the Subarea's commercial properties (i.e., shops, restaurants, and consumer services) and to higher density residential units without arriving exclusively by car. The overall intent of this potential relocation is to increase transit ridership, and to catalyze economic growth in the neighborhood, with an emphasis on TOD and the livability improvements. This study aims to complement a more comprehensive future transit center relocation study by conducting a preliminary analysis of the market-related impacts of the potential transit center relocation, highlighting the effect on property values of dwellings in the vicinity of potential transit center sites.

Methods

What are the market-related impacts of transit centers on local property values due to improvements in accessibility and TOD? Targeting this question, we conduct an original case study of a recently relocated transit center at the Vancouver Mall in Vancouver, Washington to estimate the effects of this relocation on property values in the surrounding area. The estimates are then applied to the Tacoma Mall neighborhood to provide an initial estimate of some of the potential benefits that the relocation would entail. Our results suggest that the market value of the benefits of the new transit center that are captured by property values are of a significant magnitude when compared to the likely costs of the relocation project. The initial results should be supported with a more detailed study, but the relocation recommendation appears viable according to this study.

Findings

The findings of this study are intended to complement previous, ongoing, and future studies, such as the "Tacoma Mall Subarea Plan: Multifamily and Mixed Use Development Feasibility Analysis (Technical Report)." A comprehensive repository of related studies and links to further information can be found at the following link: <http://www.tacomamallneighborhood.com/library.html>.

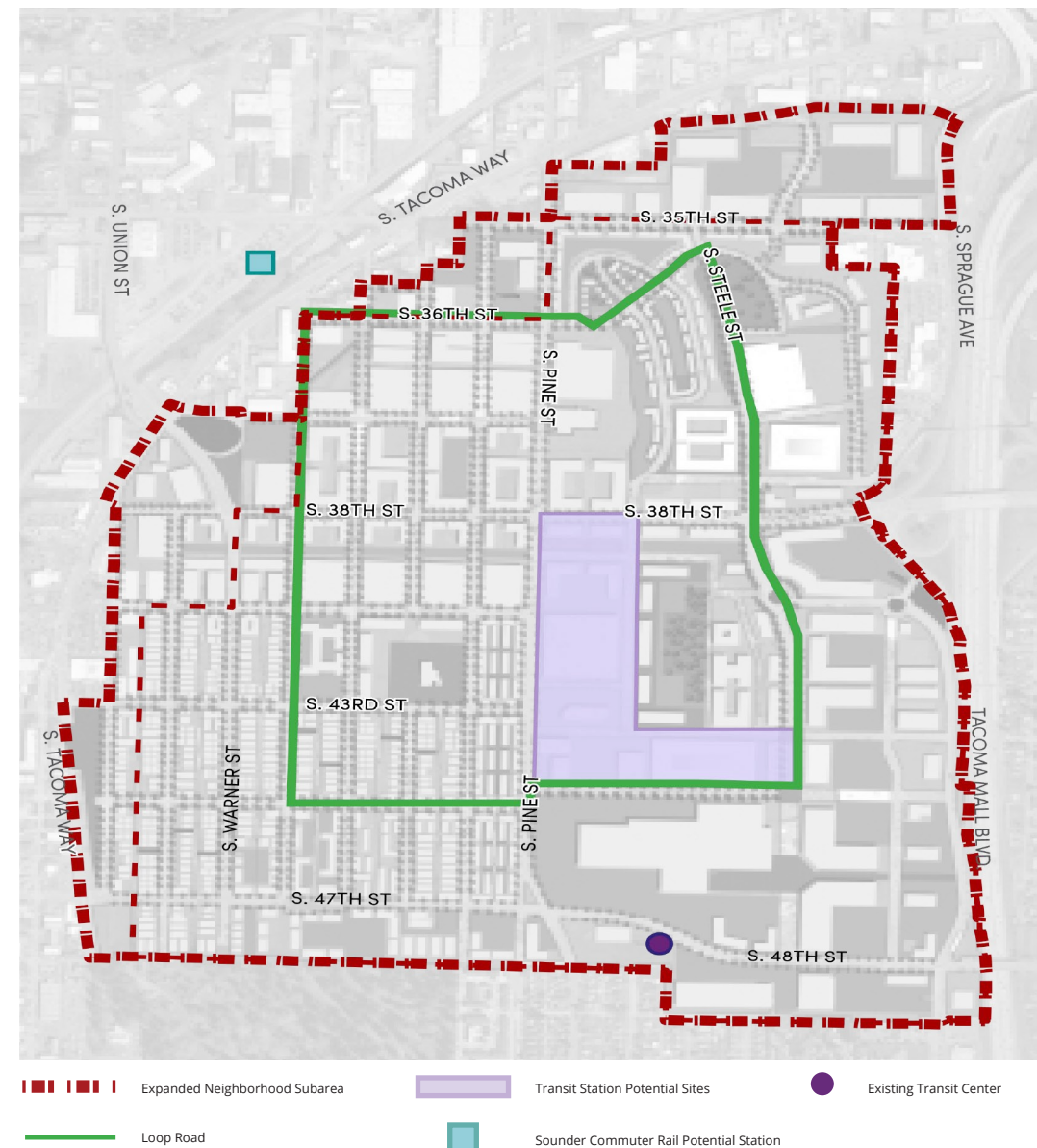
Property value increases represent the combined value of multiple beneficial effects of enhanced accessibility and livability that follow transit service improvements.

It should be emphasized that while this is not a holistic evaluation of the proposed relocation, we provide a preliminary estimate of the effect of relocating the Tacoma Mall Transit Center on land values. This is an important consideration, as this likely contains a significant percentage of the total benefits of the project that would be part of a broader cost-benefit analysis of the relocation, and it affirms that the relocation proposal is worth studying in greater depth. Property value increases represent the combined value of multiple beneficial effects of enhanced accessibility and livability that follow transit service improvements.

HOW THIS STUDY RELATES TO THE TACOMA MALL NEIGHBORHOOD SUBAREA PLAN

The City of Tacoma's Subarea Plan and Environmental Impact Statement relates to a 575-acre Regional Growth Center (RGC), which expands on the current 485-acre Tacoma Mall RGC. The overarching objective is to foster growth in employment and in the housing stock, through a combination of planning and policies that will support a livable, walkable, and transit-ready urban neighborhood. The PSRC Regional Centers Market Study Summary Report classifies the Tacoma Mall region as an "Emerging Center" and notes that these areas have seen "robust trends in job creation and population growth more in line with the regional average" (Puget Sound Regional Council 2016, 12). The report also highlights the importance of reduced transportation costs, increased zoning capacity, and improved walkability as important contributors to regional population and employment growth. The Regional Centers Market Study Summary Report highlights the importance of reduced transportation costs, increased zoning capacity, and improved walkability as important contributors to regional growth. As such, the Subarea Plan is designed to support the overall benefits that RGC status can entail by considering the interacting effects of policies and investments related to transportation and land use.

Figure 1. Tacoma Mall Subarea and Transit Center Location



Key proposed actions, taken from the Tacoma Mall Neighborhood Subarea Plan

- 90-acre expansion of the RGC and rezoning to allow for mixed-use development
- Zoning and design standard changes to better ensure the desired urban form, facilitate effective transitions, and improve the pedestrian environment
- Area-wide green storm water strategy and 25-percent tree canopy target
- Area-wide transportation strategy including capital investments, expanded transit service, and connectivity requirements with major development
- Parks and open space strategy to support urban form, livability, and environmental goals
- Promotion of housing options, complete neighborhood amenities, and a vibrant local culture
- Coordinated provision of infrastructure and services, and streamlined City environmental review
- An action plan for collaborative implementation by the City, public partners, and the community

The plan's vision is to provide the conditions that would direct growth to make the Tacoma Mall RGC the second densest neighborhood in Tacoma, after the downtown core.

The Regional Centers Market Study Summary Report highlights the importance of reduced transportation costs, increased zoning capacity, and improved walkability as important contributors to regional growth.

The plan’s vision is to provide the conditions that would support and direct growth and development and make the Tacoma Mall RGC the second densest neighborhood in Tacoma, after its downtown core. This would be done by encouraging high density, mixed-use development, “... supported by high transportation connectivity and transit...” (Tacoma Mall Neighborhood Subarea Plan 2018, 1-19). There are ambitious growth targets of increasing the population living in the area from 4,650 to 13,537, and of the number of people working in the area from 9,749 to 18,134. To accommodate this growth, the vision for commuting mode shares are shown in Table 1:

Table 1: Tacoma Subarea Plan Commuting Targets

	Single Occupant Vehicle (SOV)	High Occupancy Vehicle (HOV)	Bike/Walk	Transit
Current	72%	8%	4%	5%
Goal	52%	9%	12%	9%

Chapter 6 of the Tacoma Mall Neighborhood Subarea Plan (“Transportation”) has 31 transportation-specific actions, including Action T-12, to “[r]elocate the existing Tacoma Mall Transit Station to a central location within the Subarea in order to improve access, increase ridership, and spur transit-oriented development” (Tacoma Mall Neighborhood Subarea Plan 2018, T-16).

The five transportation-specific goals of the Subarea Plan

- T-1: Build a transportation network that supports and reinforces the land use, urban design, economic development, environmental, livability and public health goals of the Subarea Plan.
- T-2: Build a complete and connected transportation network for the Tacoma Mall Neighborhood.
- T-3: Promote transportation mode shift by enhancing transit, bicycle and pedestrian options, implementing Transportation Demand Management (TDM) measures and implementing access management measures.

- T-4: Make fiscally responsible, cost-effective investments that serve multiple objectives, improve safety, protect the environment, and make the system more equitable.
- T-5: Proactively and collaboratively implement the Subarea Plan transportation actions concurrent with growth.

The current neighborhoods in the Tacoma Mall RGC are summarized in figure 2.

Figure 2. Current Neighborhoods in the Tacoma Mall Regional Growth Center: Four Neighborhood Quadrants

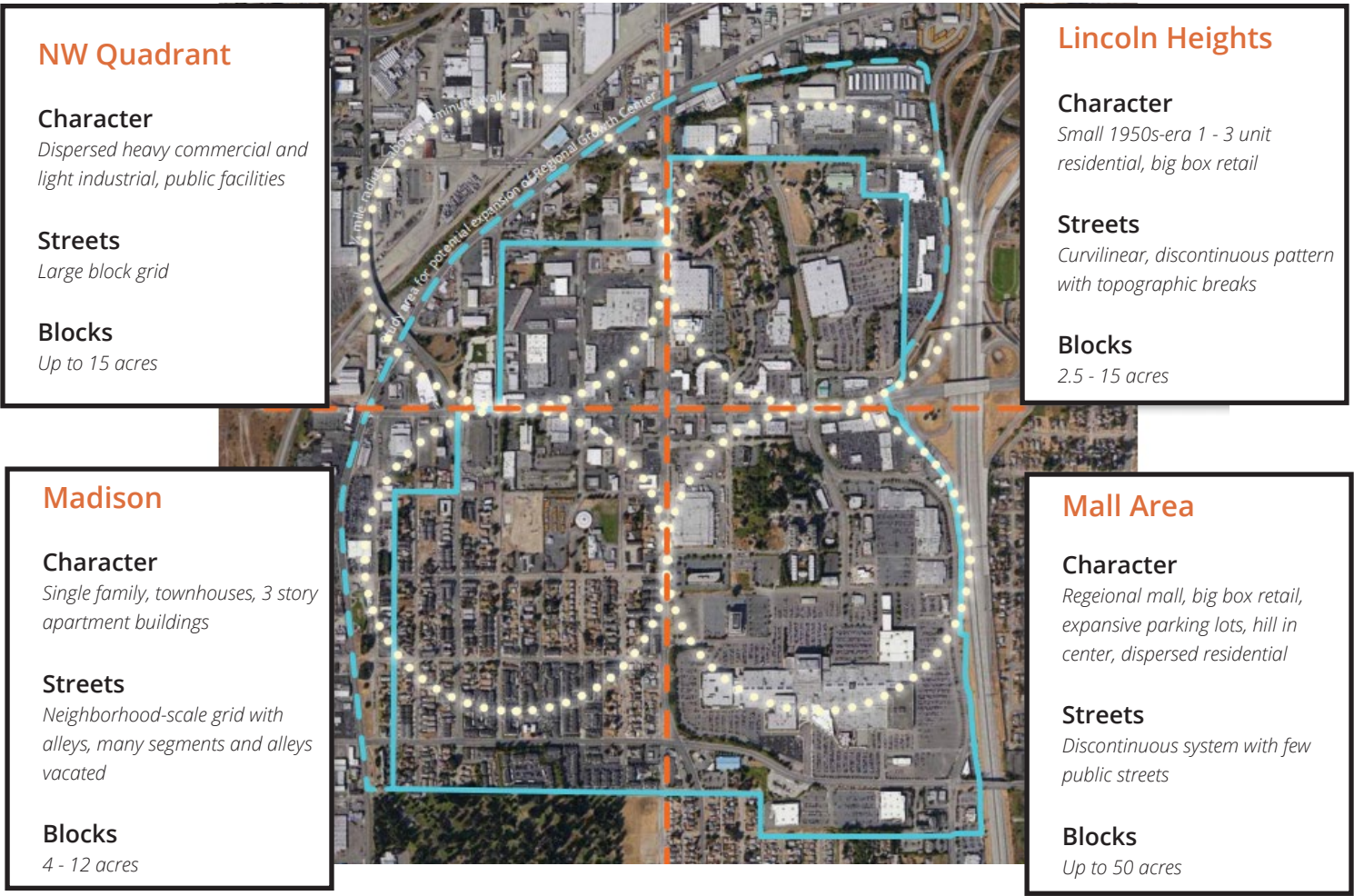
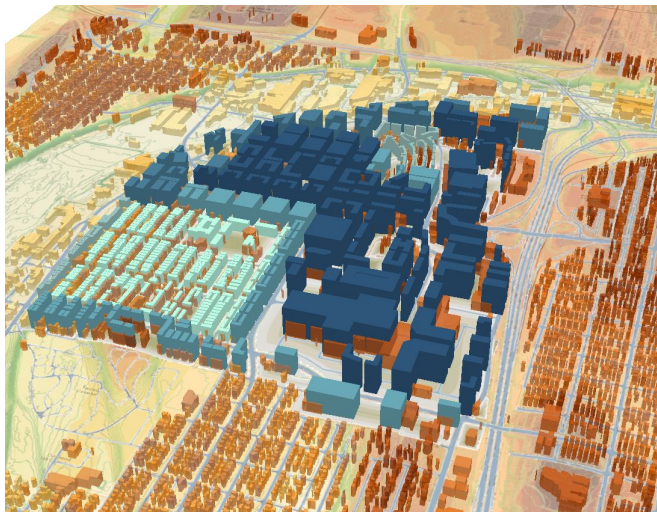


Figure 3. Rendering of Future Land Uses in the Tacoma Mall Regional Growth Center



Improved transit in the area is expected to boost demand for housing nearby and increase land values.

Figure 4. Envisioned 38th Street Corridor



POTENTIAL RELOCATION OF TACOMA MALL TRANSIT CENTER

The transit center relocation— in conjunction with other transportation, housing, and environmental actions—would contribute positively to each of the aforementioned five goals (T1-T5). It is more complex to assess whether the relocation project is the most efficient use of scarce investment and operational funds, and this study aims to shed some light on this consideration.

The Puget Sound Regional Council (PSRC) developed the “Regional Centers Market Study (Summary Report),” which identified a gap between current market conditions and the conditions believed necessary to support extensive development of multi-family and mixed-use projects. It is worth emphasizing the complementary and bi-directional relationship between transit investment and land use development. Improved transit in the area is expected to boost demand for housing nearby and, thus, increase land values; this demand will be increased further if commercial and residential land is developed around the transit system and if the types of housing and neighborhood characteristics developed appeal to transit users and facilitate the use of transit. In other words, transit accessibility enhancements and multifamily/mixed-use projects are expected to be mutually reinforcing in achieving the growth and development objectives for the Tacoma Mall Neighborhood Subarea.

To summarize, this study should be considered in conjunction with the Tacoma Mall Neighborhood Subarea Plan to stimulate discussion about transit’s role in the economic development and livability of the area, and to provide some guidance to future discussions about the proposed relocation of the

This study aims to shed light on whether the relocation project is the most efficient use of scarce investment and operational funds.

TMTC. Ideally, a comprehensive cost-benefit analysis would be undertaken to facilitate the decision as to whether to relocate the transit center. There are many short-, medium-, and long-run projects that would complement the transit center relocation (for instance, an I-5 Direct Access Ramp and a Loop Road), but our study diverges from these, potentially important, considerations. The actions of the Subarea Plan – if taken together – would have a cumulative effect, which is not being measured in this study.

There are many other factors that should be further studied in the future to provide a more precise estimate of the aggregate benefits of relocation, including modelling the effect on commuting levels and mode shares that the relocation and transit service level changes would have, and the effect of parking facilities and co-development scenarios through public-private partnerships. The TMTC relocation is one part of a broader plan, and while it is a complex topic, with multiple relevant and important policy implications, this study provides an objective assessment of one specific aspect of this broader vision.

COST-BENEFIT ANALYSIS

Ideally, in deciding whether to relocate the transit center, a comprehensive cost-benefit analysis would be undertaken whereby all of the effects attributable to the relocation would be quantified and compared (Transportation Research Board 2002).

Examples of relevant potential costs of the relocation include:

- Upgraded/expanded roadways and parking surfaces and related infrastructure
- Transit and land use planning resources and transaction costs related to the legal/political process
- Increased transit supply operating costs and subsidies required for expanded service (if applicable)
- Construction: land, labor, materials
- Externalities associated with the construction process: travel delays/detours, noise, pollution

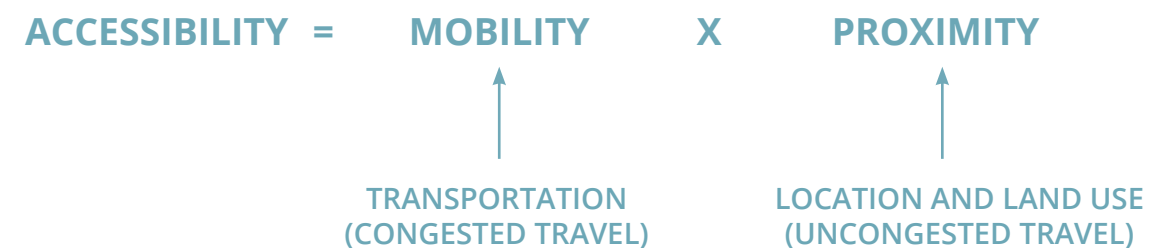
Examples of relevant potential benefits of the relocation include:

- Increased transit ridership and decreased car travel
 - Reduced roadway congestion
 - Improved air quality
 - Reduction in accidents
- Enhanced “livability” associated with transit-oriented development
 - Benefits of agglomeration for local businesses if new complementary businesses are attracted to the region
 - Benefits to consumers of increased options for goods and services
 - Health and safety benefits: pedestrian/bicycle and “car free” zones
- Increased tax revenue due to added economic activity and increased property values
- Re-claimed land from existing transit site for an alternative use (e.g., green space, housing, other commercial uses)
- Efficient provision of infrastructure and services with “smart growth” concentrated in the RGC

There are many empirical and theoretical challenges associated with conducting an appropriate cost-benefit analysis of such a project, both in terms of the uncertainty of quantifying and monetizing various costs and benefits, and in terms of identifying which costs and benefits to include in the analysis.

From a transportation standpoint, the primary concern is typically that of accessibility; does a change in transportation (policy, investment, service levels) make it easier to get between an origin and a destination? As illustrated in Figure 5, accessibility can be viewed as having two components that interact with one another: mobility and proximity.

Figure 5. Accessibility Decomposition



UNDERSTANDING KEY TERMS: MOBILITY AND PROXIMITY

Mobility relates to the level of congestion between an origin and a destination; for example, how long does it take you to commute from home to work during peak travel times? It is debatable whether transit improvements affect the level of congestion (Beaudoin and Lin Lawell 2018), though it is less likely that this benefit will arise in the case of modest transit service improvements such as those that would accompany the TMTC relocation. Proximity relates to the connectivity between various origins and destinations; for example, how close is your home to your work location? This aspect is more likely to be affected by the TMTC relocation, especially in conjunction with the discussed TOD and zoning changes.

MARKET FORCES

According to economic theory, market forces should lead to dwellings increasing in value if they are nearby improved transit stations/centers, especially if the transit service is frequent, reliable, and offers direct connections to both regional and local connections (e.g., light rail, bus rapid transit, Intercity express bus). The benefits are capitalized into property values and should equal the present discounted value (PDV) of the stream of future benefits due to improved accessibility (total travel time savings) and to the livability benefits associated with TOD and economic agglomeration. Existing research suggests that the land value increases likely capture the majority of the potential benefits for the TMTC relocation.

EFFECTS OF PUBLIC TRANSIT SYSTEMS ON LAND VALUES

The existing research on the effects of public transit systems on land values is summarized in Higgins and Kanaroglou (2016). In reviewing this literature, the most notable and relevant findings were the following:

- 1. There is a significant heterogeneity of empirical results, with a very wide range of findings, due to studies taking place across cities with very different characteristics and transit projects of varying scope and scale.
- 2. There are external validity issues that make it challenging to translate the previous empirical findings to the local project; most of the studies have focused on light and heavy rail stations, and have not focused on transit centers adjacent to malls. These studies also tended to occur in large cities with a higher level of established economic activity.
- 3. Many of the studies were conducted several years ago and employed questionable identification of the causal effect of transit service, including measures of distances that relate more directly to a “bird’s eye” measure of proximity, rather than reflecting the true accessibility of the dwelling to the transit center.

A review by Nelson, et al. (2009) of studies of transit systems completed from 1993-2003 found price premiums for housing located within a ¼ and ½ mile radius of rail transit stations of 6% to 45% and of premiums for commercial property of 8% to 40%. It should be noted that these were larger, more developed cities than Tacoma: Philadelphia, Boston, Portland, San Diego, Chicago, Dallas, and San Jose. These studies generally found that the property value uplift was restricted to properties within ½ mile from the stations. After reviewing the literature, we concluded that the existing results were unlikely to provide relevant and precise information that could be directly applied to the scenario in Tacoma.



The area that surrounds the Tacoma Mall (pictured) stands to transform to become a transit hub as well as one of the densest parts of Tacoma. TACOMA MALL SUBAREA PLAN

A PROJECT COMPARABLE TO TMTC RELOCATION

To produce a credible estimation of the effects of the TMTC relocation, we searched for a case study from a city that was sufficiently similar to Tacoma so that we could be more comfortable in comparing and translating impacts across cities and across time, allowing us to address the issue of external validity to the extent possible.

For our case study, we focused on the recently constructed bus rapid transit (BRT) line in Vancouver, Washington. Based on a combination of socioeconomic and transportation factors, Vancouver and Tacoma are similar in many respects. Appendix 1 documents the similarities and differences between Vancouver and Tacoma across these dimensions. In particular, Vancouver developed a transit center nearby its mall, which mirrors the proposed station in Tacoma.

C-TRAN (Clark County's public transit agency) developed the Vancouver Mall Transit Center (VMTC) in Vancouver, Washington as part of a \$53 million BRT line, which began operations on January 8, 2017. This BRT line is referred to as "The Vine," and serves a six-mile corridor, from downtown Vancouver to the Vancouver Mall. Notably, The Vine is the first BRT line in the Vancouver/Portland Metro Area. Figure 6 provides a map of The Vine and its relation to the VMTC.

C-TRAN developed a long-term plan (referred to as "C-TRAN 2030") in 2010, and the specific planning for The Vine began in 2011. The construction began in 2015. The VMTC itself took approximately six months to construct.

An existing facility on the north side of the mall was demolished, and the new facility was built on the south side of the mall. The new site required purchasing right-of-way from the Washington State Department of Transportation (WSDOT), building a significant retaining wall, and adjusting the ring road around the mall. Overall, the project cost approximately \$5.6

To produce a credible estimation of the effects of the TMTC relocation, we searched for a case study from a city that was sufficiently similar to Tacoma.

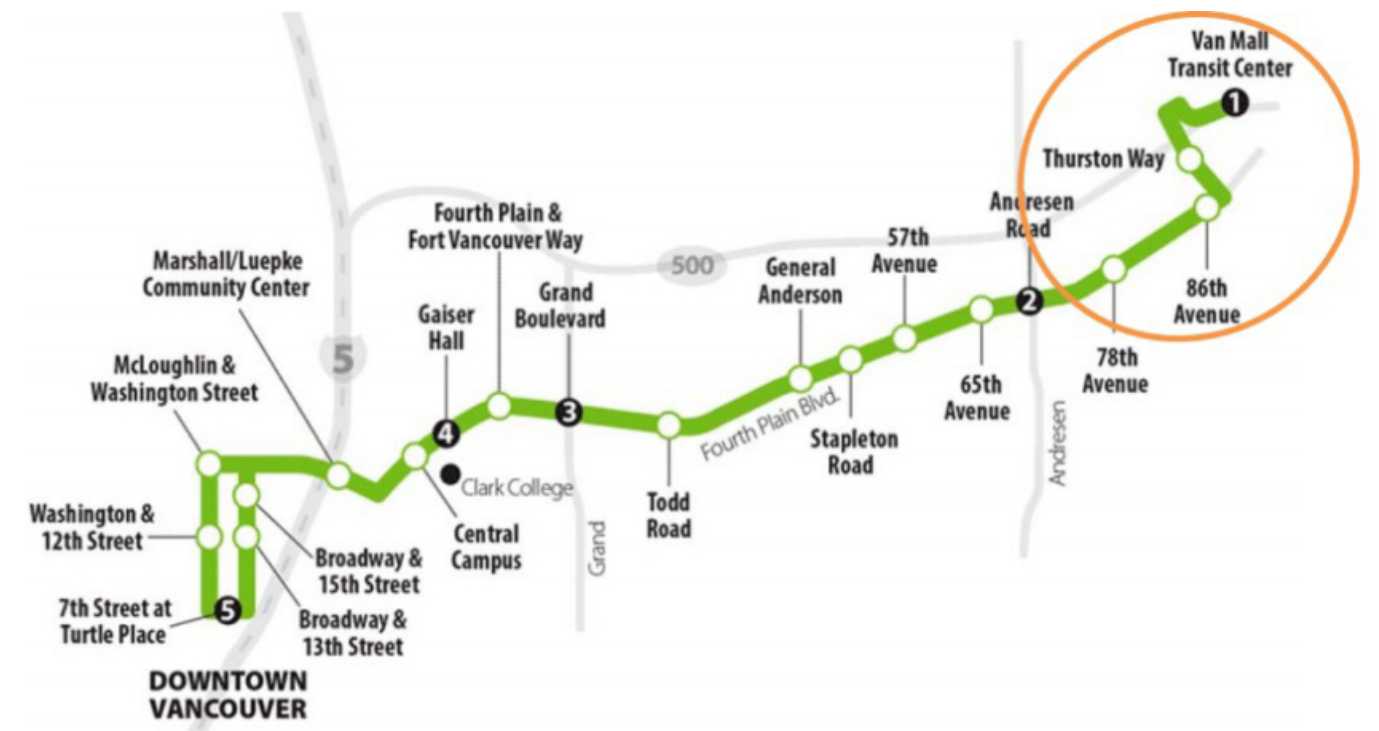
Outcomes of The Vine

Following the initial operations of The Vine, C-TRAN reported the following outcomes:

- 45% increase in transit ridership
- 12% reduction in travel times
- 89% reduction in late departures
- 72% increase in vehicle capacity

These outcomes are notable, considering the preceding years of decreasing ridership from 2014-2017. C-TRAN total ridership for fixed routes in 2015 bottomed out at 5.8 million and then began to climb back up, surpassing six million in recent years. Land development experienced rapid gains, with developers pointing to The Vine as a major contributing factor. More recently, C-TRAN has developed another multi-faceted goal as part of the 2030 vision that will expand The Vine. By 2021, C-TRAN's internal ridership projections exceed 10 million annually. Construction on the Mill Plain Boulevard BRT expansion project is forecasted to begin between 2021 and 2022.

Figure 6. Route Map of "The Vine" BRT Line in Vancouver, Washington



million. It should be noted that since the land was already owned by the mall, it had “zero” cost (however, this would be an inappropriate valuation in a proper cost-benefit analysis). The costs included \$2.2 million for building the station and for doing the site work (including fiber work), \$400,000 for the operators’ relief building/comfort station, \$1.0 million for a covered walkway to the mall entrance (a condition required by the mall), \$860,000 for modifying the ring road that circles the mall and \$930,000 for miscellaneous expenses (e.g., site security, flaggers, temporary facilities, and street cleaning).

There are 34 stations along the line, including each direction of travel separately. The VMTC site covers 1.25 acres and serves eight routes, including The Vine. C-TRAN is the only transit agency that uses the site.

The VMTC has the following components and amenities:

- Two BRT bays (to accommodate ten 60-foot hybrid powered articulated buses)
- Six non-BRT bays for local fixed routes
- Level boarding islands, providing easy access to buses for those using a wheelchair or other mobility device
- Drop-off locations (for bus and carpool services)
- Off-board fare collection (e.g., Hopcard transit pass readers and ticket vending machines)
- Real-time (“Next bus in X minutes”) information displays
- On-board bike racks

Figure 7. Ground-Level View of Vancouver Mall Transit Center



In 2012, the majority of residents were opposed to the BRT project, and convincing voters took several years. The least controversial element of the project was the VMTC, as the criticism was focused on the BRT line itself. The mall route was viewed as accommodating a significant portion of the population.

COMPARING VMTC PROJECT TO POTENTIAL RELOCATION OF TMTC

By way of comparison, an initial description of a new TMTC has an estimated cost of \$28 million, including design, acquisition of right-of-way and construction (Table T-2 in the Tacoma Subarea Plan includes a list of projects, including an outline of the new TMTC). This high-level estimate is based on an assumed new transit center with six bus bays, shelter, layover space, and various passenger amenities. The Tacoma Mall Neighborhood Subarea Plan recommends seeking partnerships with the Tacoma Mall or other land owners to share costs and achieve common goals. Figure 7 illustrates the VMTC, which is aesthetically and operationally similar to the potential TMTC. Figure 8 shows the location of the VMTC in relation to the mall, surrounding parking lots, and the road network. Figure 9 provides an overview of the existing zoning designations surrounding the VMTC. The vicinity is characterized by a mixture of commercial/mixed-use and both high- and low-density residential land uses, which is similar across the two malls. The Tacoma Mall Neighborhood Subarea Plan envisions increased population and employment density that would be accommodated and fueled by revised zoning in the Tacoma Mall RGC; Figure 10 illustrates the proposed zoning in the neighborhood.

Figures 11 and 12 are aerial illustrations of the land use in the region surrounding the Vancouver and Tacoma malls, respectively. There are broad similarities in terms of the density and land use patterns of the two cities; notably, both malls have immediate freeway access. Figures 13 and 14 show the regional location of Vancouver and Tacoma, respectively. Interestingly, the two cities have both experienced an inflow of residents from a nearby larger city with rapidly increasing housing costs (Tacoma is approximately 35 miles from Seattle, while Vancouver is roughly 10 miles from Portland). The ratio of Tacoma’s population compared to Seattle’s is nearly identical to that of Vancouver’s population compared to Portland’s. Tacoma’s population per square mile is slightly higher than Vancouver’s: 3,990.2 versus 3,482.7.

Figure 8. Aerial View of Vancouver Mall Transit Center



Figure 9. Aerial View of Vancouver Mall Transit Center

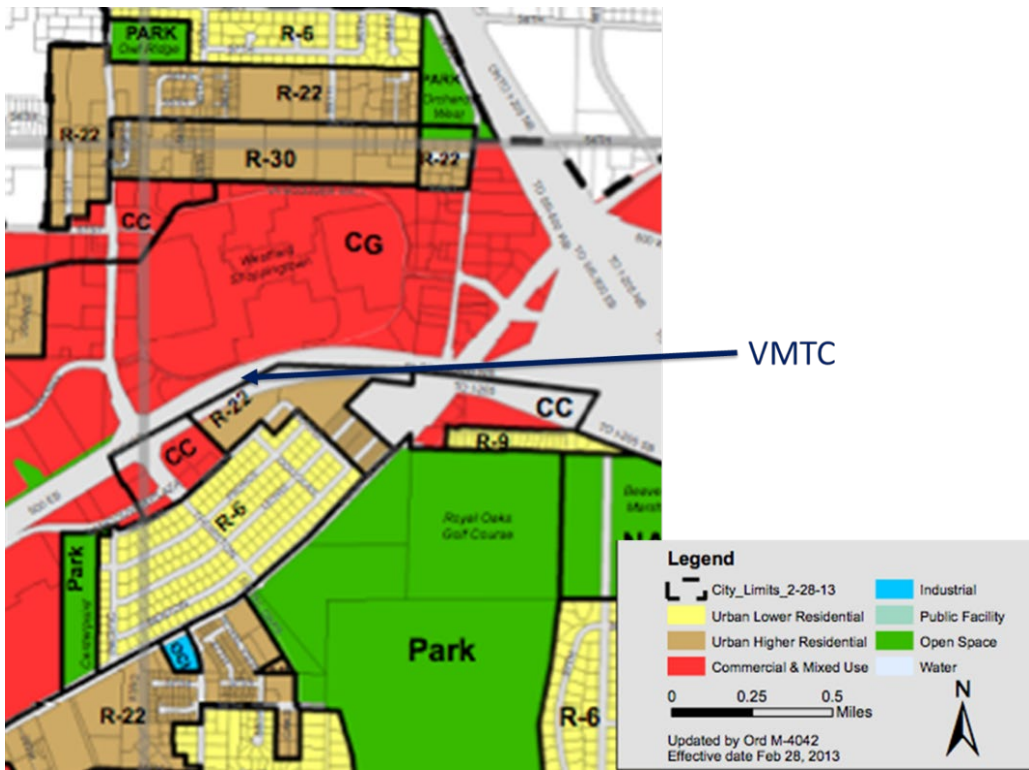


Figure 10. Proposed Zoning for Tacoma Mall Regional Growth Center

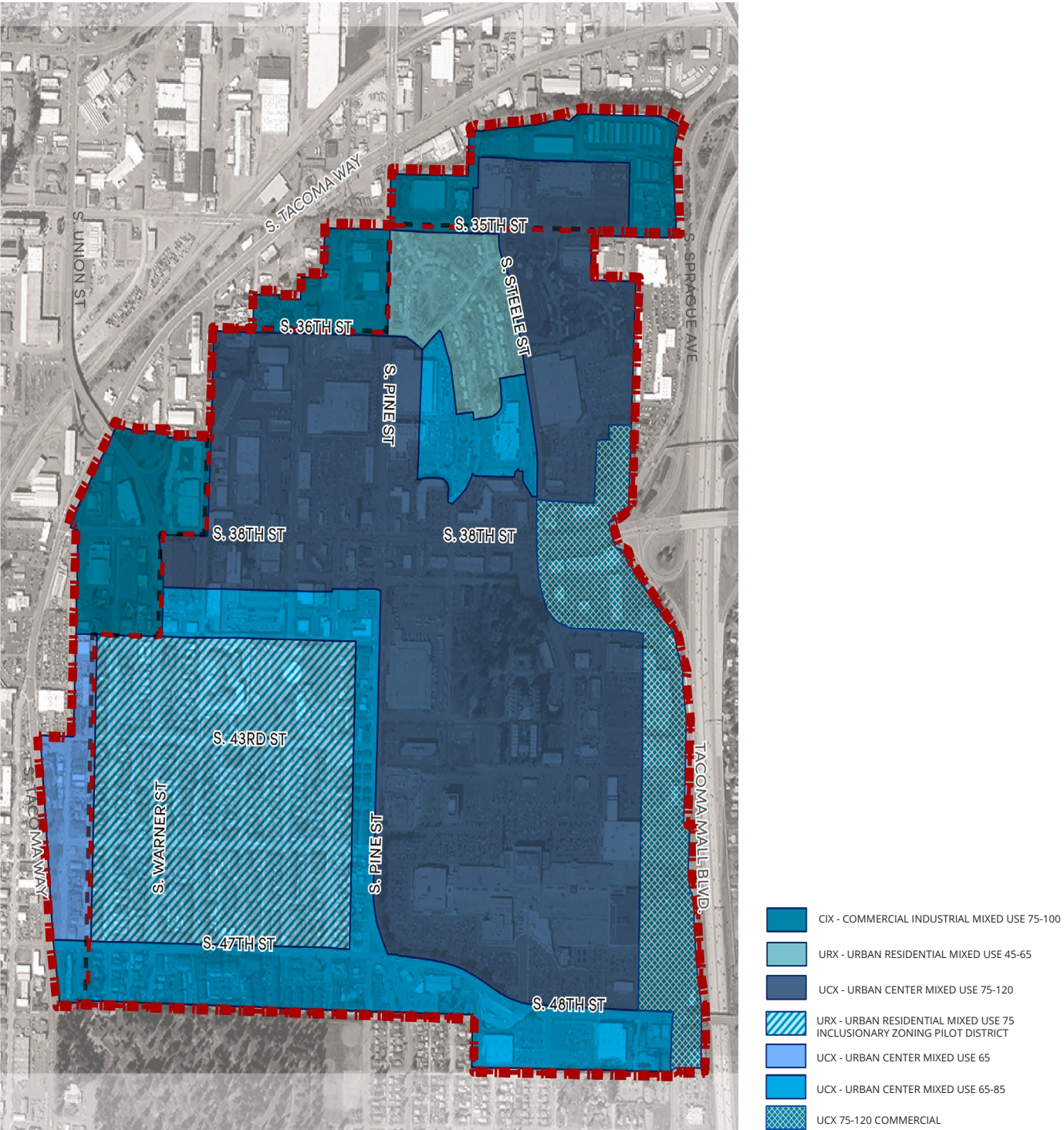


Figure 11. Geography of Surrounding Area - Vancouver Mall Transit Center



Figure 13. Road Network and Vancouver Mall Transit Center

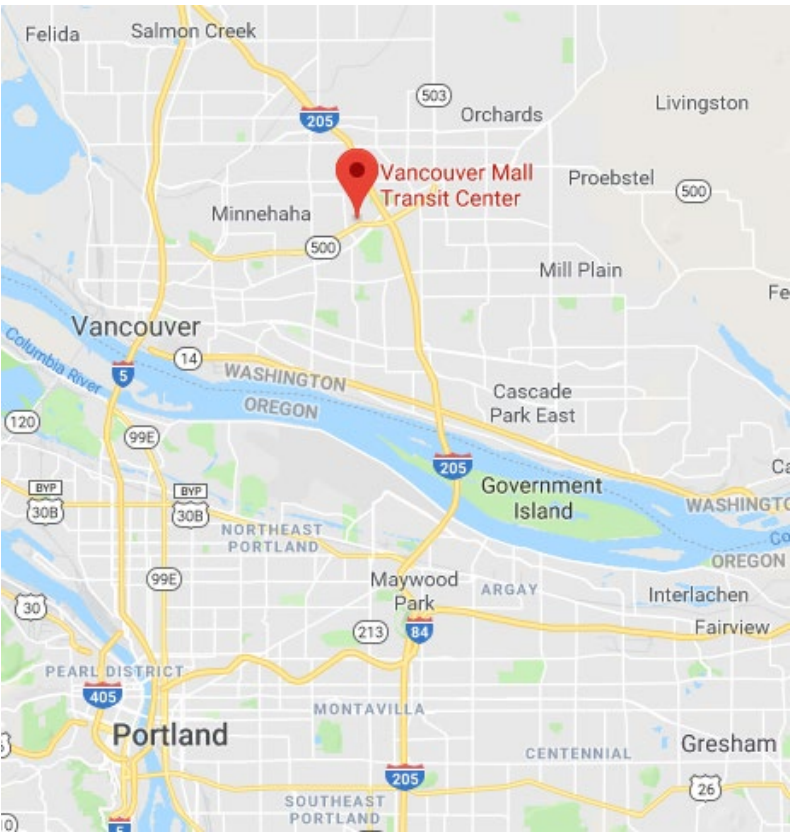


Figure 12. Geography of Surrounding Area - Tacoma Mall Transit Center



Figure 14. Road Network and Tacoma Mall Transit Center



Figures 15-19 compare several characteristics of the census tracts surrounding the Vancouver and Tacoma malls. The two cities have very similar shares of commuters that bike and walk (approximately 4%) and have typically had similar levels of transit commuters (though the proportion has been slightly higher in Tacoma in recent years). Tacoma has experienced slightly greater population growth in the region around its mall; this is associated with much higher growth in rental rates in Tacoma, which is also linked to there being a higher rate of new housing supply in Vancouver.

Average number of weekday boardings at existing Tacoma Mall Transit Station

- 2016: 1,691
- 2017: 1,836
- 2018: 1,572

These values are very similar to the level of ridership experienced at the Vancouver Mall Transit Center. The typical months used for reporting by C-TRAN are March and October; In March and October of 2018, average daily boardings at the VMTC were 1,462 and 1,429, respectively.

Vancouver vs. Tacoma

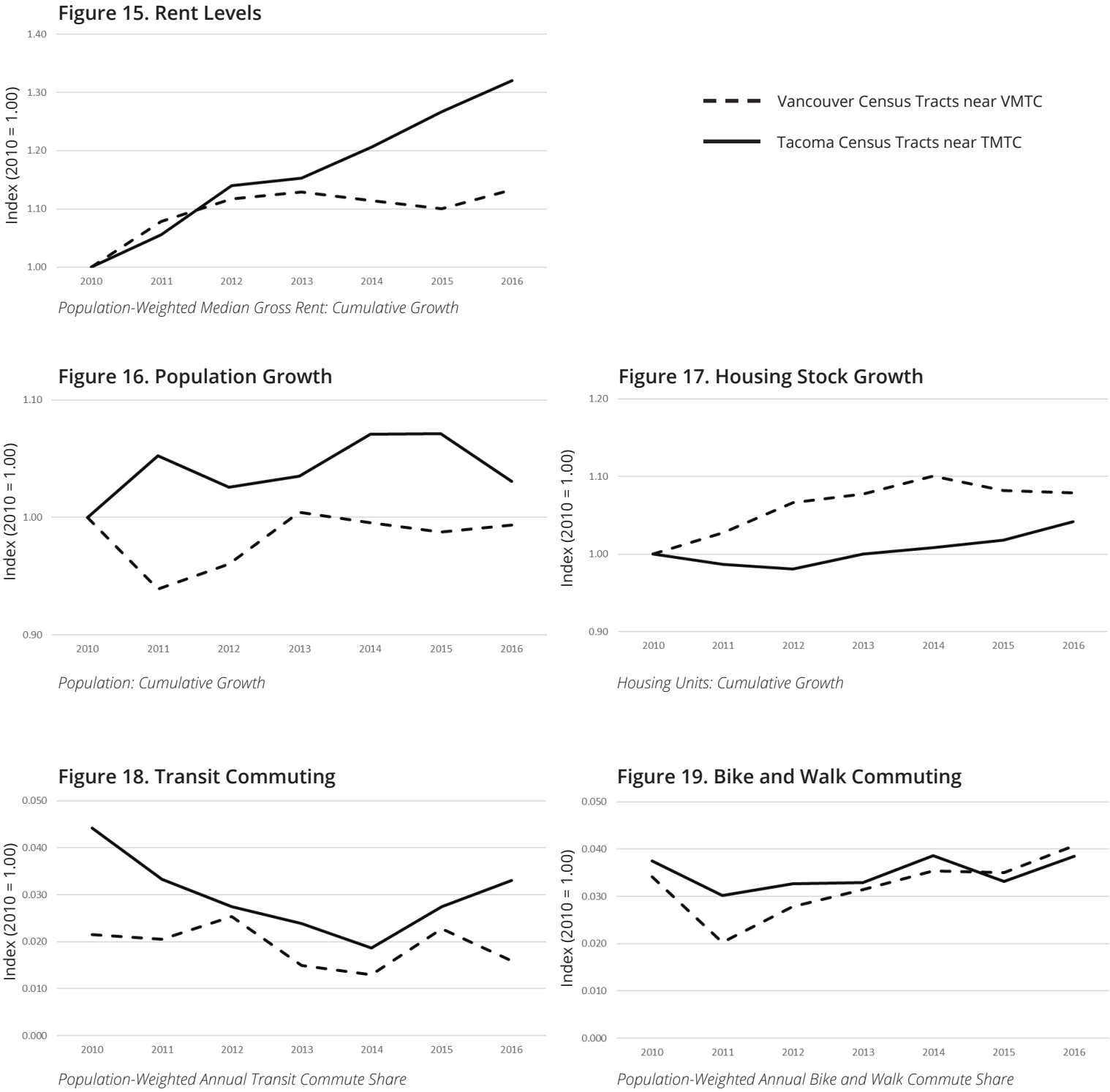


Table 2 provides a further comparison of the census tracts. Again, there are many similarities across the two cities, with the most notable differences being that incomes are slightly higher in Vancouver, there are more vacant dwellings in Tacoma, and the housing stock in Tacoma is older than that of Vancouver.

Broadly speaking, Tacoma and Vancouver are highly comparable from a socioeconomic and geographic standpoint, and the proposed TMTC relocation project mirrors much of the VMTC. Taken together, these aspects address the potential concerns related to external validity and support the choice of the VMTC as a case study.

Broadly speaking, Tacoma and Vancouver are highly comparable from a socioeconomic and geographic standpoint, and the proposed TMTC relocation project mirrors much of the VMTC.



Vancouver Mall with Mount Hood in the distance. VISIT VANCOUVER USA

Table 2. Comparison of Mall Census Tracts

	Tacoma Mall (Census Tract: 626.00)	Vancouver Mall (Census Tract: 411.08)
2018 Estimated Median Family Income	\$48,632	\$55,906
2015 Median Family Income	\$46,488	\$50,201
2015 Median Household Income	\$35,202	\$41,225
% Below Poverty Line	19.0%	9.3%
Minority %	48.33	18.07
Persons per Housing Unit	1.96	1.92
% Units Owner-Occupied	23.9%	33.0%
% Units Renter-Occupied	62.0%	63.6%
% Units Vacant	14.2%	3.4%
% Units with 1-4 Families	57.5%	54.0%
Median House Age	46 years	20 years

Our dataset includes a refined sample of every market value transaction of residential property in Clark County Washington from January, 2012 to August, 2018. Transactions from 2012-2017 were obtained from the Clark County Assessor’s Office and 2018 transactions were obtained from Redfin.com.

The dataset covers 10 cities, 20 zip codes, 104 census tracts, 294 Clark County assessor neighborhoods, and 10 school districts. As Table 3 shows, there are 44,787 dwelling transactions included in the analysis.

Table 4 indicates that approximately 68% of the dwellings were sold in the City of Vancouver.

Table 3. Dwelling Transactions per Year

Year	# of Transactions
2012	4,389
2013	5,890
2014	5,727
2015	7,094
2016	8,369
2017	7,575
2018	5,743
Total	44,787

Table 4. Dwelling Transactions by City

City	# of Transactions
Amboy	183
Battle Ground	3,753
Brush Prairie	691
Camas	3,531
La Center	782
Ridgefield	2,395
Vancouver	30,280
Washougal	2,394
Woodland	186
Yacolt	592
Total	44,787

Details about the dwellings’ structure and location were compiled from the Clark County Assessor’s Office. The following structural attributes that affect the market value of a dwelling were included in the analysis:

- Type of dwelling: 1.5 finished, 2 story, bi-level (split entry), ranch, split
- Style of dwelling: conventional, condo (excluding land ownership), townhouse (including land ownership), mobile home
- Quality of dwelling
- Age of dwelling
- Dwelling size
- Lot size
- Number of bedrooms
- Number of bathrooms: full, three-quarter, half
- Number of fireplaces

As Table 5 shows, the majority of dwellings were single-family homes (“conventional”), though approximately 11% of transactions related to multi-family homes (“townhouse” and “condo”).

Table 5. Number of Transactions by Dwelling Type

Year	# of Transactions
Conventional	39,048
Townhouse (includes land ownership)	2,673
Condo (excludes land ownership)	2,390
Mobile home	676
Total	44,787

The following locational attributes that affect the market value of a dwelling were also included in the analysis:

- School district
- City
- Census tract
- Zip code
- Whether the dwelling is located in the Clark County Public Transit Benefit Area
- Zoning: single-family, multi-family, low-density, medium-density, high-density, and mixed-use

Market forces reflecting seasonality and the state of the real estate market at the macro- and micro-levels that were included as controls in the analysis:

- Year of transaction
- Month of transaction
- Annual trend at the zip code level

Google Maps was utilized to compute measures of accessibility for each dwelling. Measures of distance (in miles) and time (in minutes) were determined for both walking and driving from each dwelling to the following locations:

- Vancouver Mall Transit Center (VMTC)
- The central business district in downtown Vancouver
- The other two non-Mall transit centers in Vancouver: Fisher’s Landing Transit Center and 99th Street Transit Center

Tables 6 and 7 summarize the relative accessibility for the dwellings to the VMTC for walking and driving, respectively.

Table 8 summarizes the zoning classification for the dwellings that were sold between 2012 and 2018 nearest the VMTC. High density zoning is the most common in this vicinity.

Table 6. Dwelling Transactions by Walking Time to Vancouver Mall Transit Center

Dwelling Walking Time to VMTC	# of Transactions
< 10 minutes	36
10 – 15 minutes	280
15 – 20 minutes	256
20 – 25 minutes	359
25 – 30 minutes	431
> 30 minutes	43,425
Total	44,787

Table 7. Dwelling Transactions by Driving Distance to Vancouver Mall Transit Center

Dwelling Driving Distance to VMTC	# of Transactions
< 0.4 miles	26
0.4 – 0.6 miles	33
0.6 – 0.8 miles	237
0.8 – 1 miles	147
1 – 1.2 miles	245
> 1.2 miles	44,099
Total	44,787

Table 8. Zoning Classifications for Dwellings Near Vancouver Mall Transit Center

	Single family	Multi-family	Low density	Medium density	High density	Mixed use	Total
Within 15-minute walk to VMTC	0	0	25	0	186	0	211
Within 30-minute walk to VMTC	101	0	308	2	844	1	1256

Each individual dwelling that is sold in the market can be viewed as a bundle of attributes that buyers care about. In this study, we are interested in the effect that one particular attribute has on the market value of the house – transit accessibility improvements. How much are buyers willing to pay for a dwelling near a new transit center, and how does this valuation vary with the distance to the center?

Hedonic analysis is an approach used by urban economists to estimate the value of each particular attribute of a dwelling. To be more specific, the value of a dwelling is determined by structural characteristics, such as the size, age, and style of the dwelling; locational characteristics, such as the quality of the school district, nearby amenities such as public parks, libraries, and grocery stores; and individual and market characteristics, such as population growth, housing development, and income levels. The challenge is that many of these attributes are positively correlated with one another; for example, high quality dwellings tend to be in areas with highly rated school districts. This makes it difficult to separately identify the effect of each attribute on the price of the dwelling. However, since we observe these attributes directly – with many possible combinations – statistical analysis allows us to estimate the effect of each attribute and to provide implicit values of each attribute using the revealed preferences that buyers exhibit in the market.

In this study, we model the price of the dwelling as being a function of structural attributes of the house, the location of the house, and market forces that vary over time. Our model allows us to estimate the effects of accessibility to the VMTC before and after The Vine opening in 2017 by comparing how market values vary for dwellings of different distances to the VMTC.

Figure 20 indicates that prior to the VMTC opening in 2017, Vancouver dwellings in census tracts away from and adjacent to the VMTC experienced very similar growth in prices (from 2012 to 2016, prices in both tract groups increased by 40%), but following the VMTC opening, nearby dwellings experienced greater growth in prices. Figure 21 shows that there was a large

How much are buyers willing to pay for a dwelling near a new transit center, and how does this valuation vary with the distance to the center?

There was a large initial increase in the value of nearby dwellings when VMTC construction began in 2015 and this relative increase returned when the VMTC became operational.

Figure 20. Price Trends for Dwellings near Vancouver Mall Transit Center vs. Other Dwellings in Vancouver

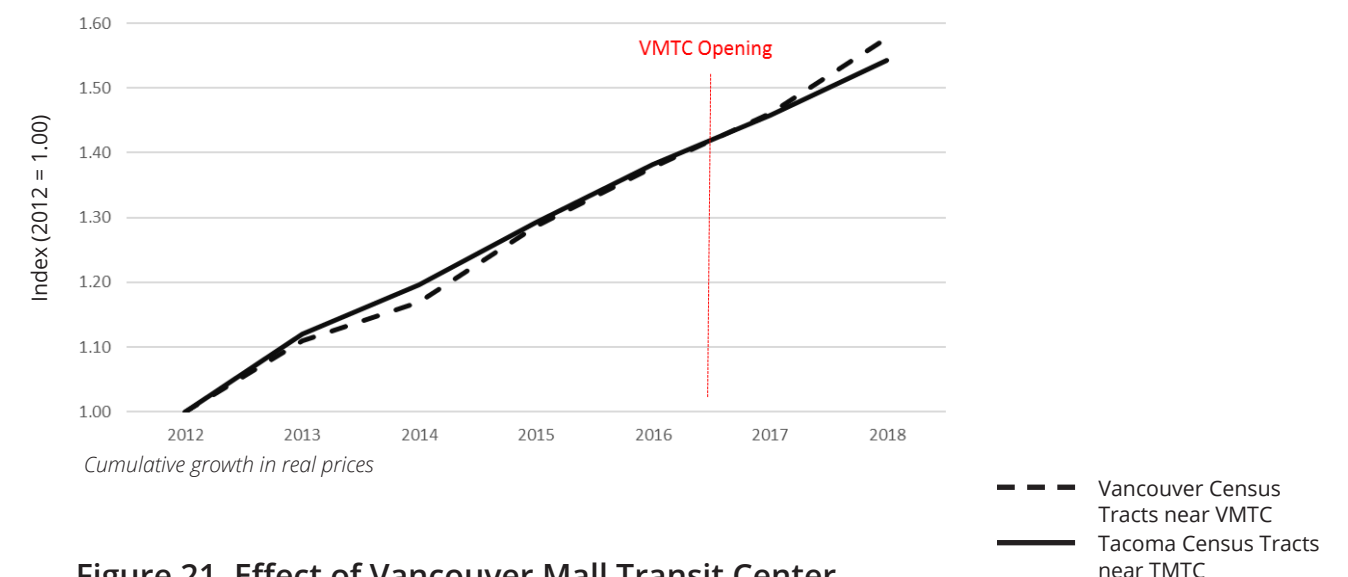


Figure 21. Effect of Vancouver Mall Transit Center Opening on Nearby Dwelling Values

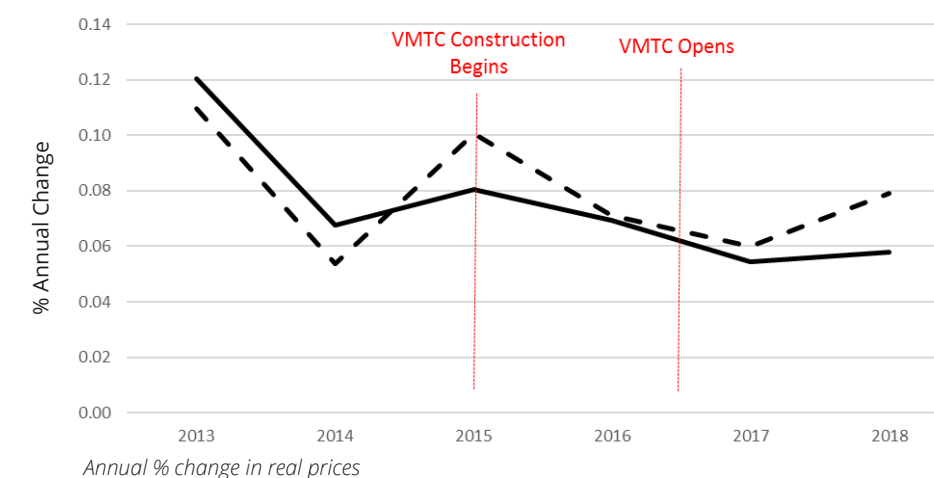


Figure 22. Dwelling Driving Distance from Vancouver Mall Transit Center

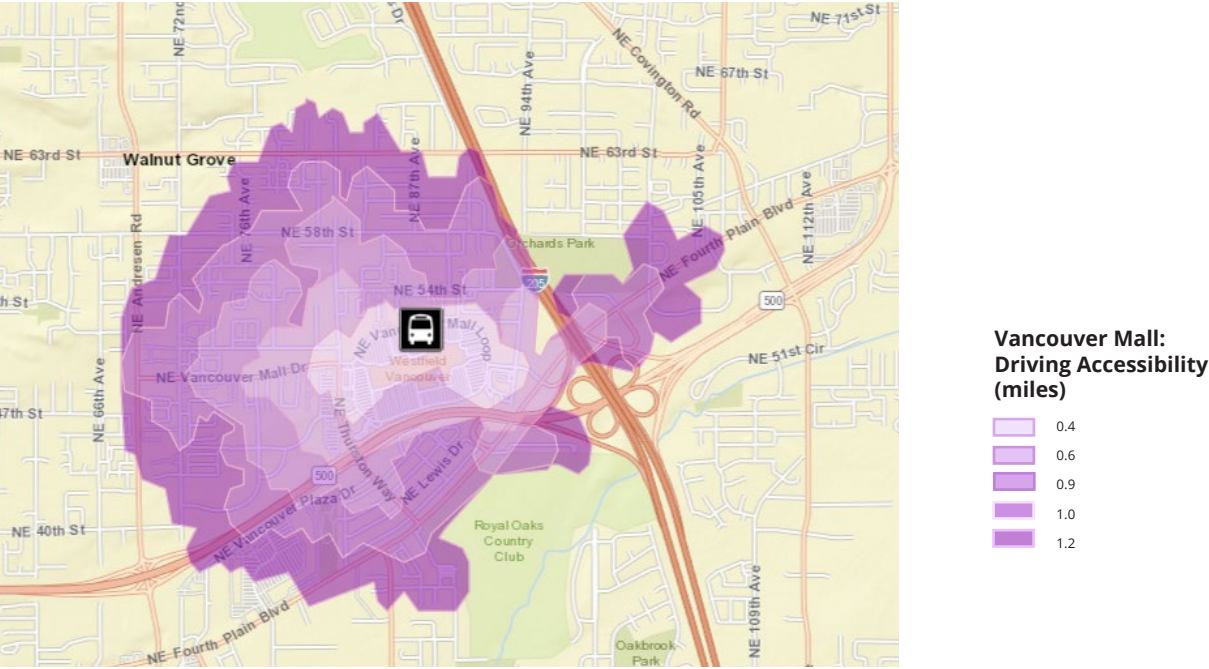
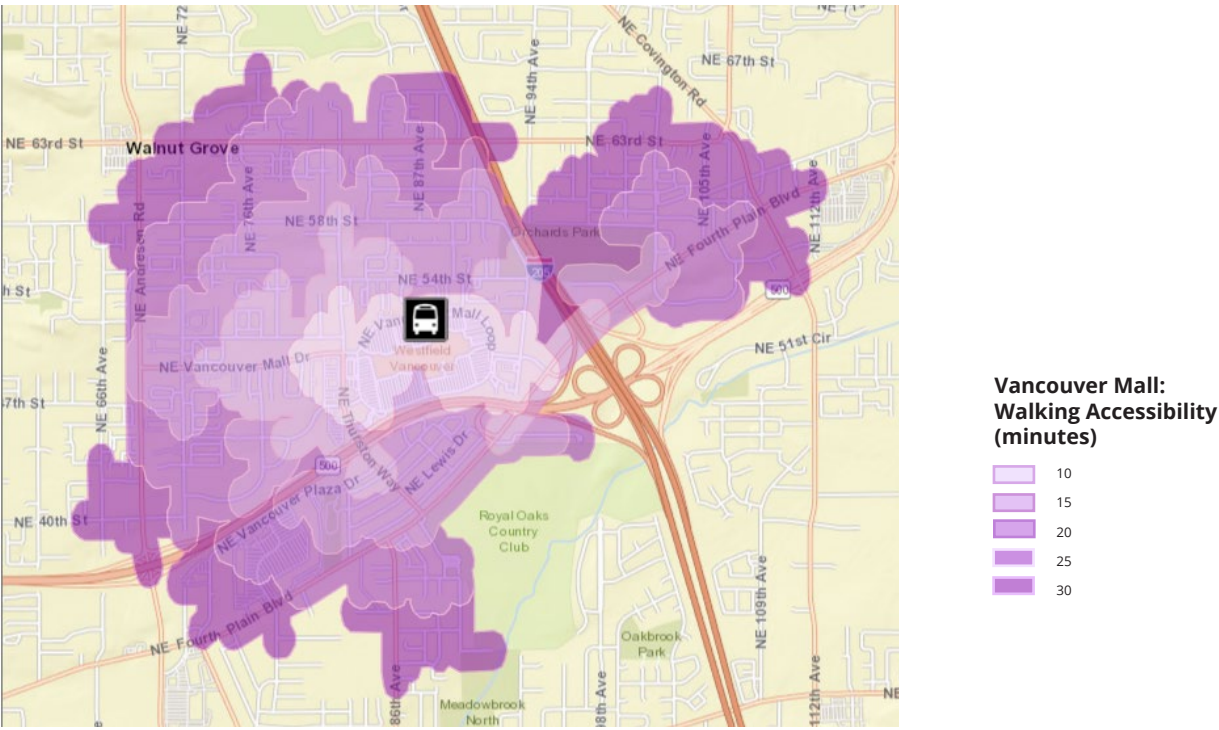


Figure 23. Dwelling Walk Time from Vancouver Mall Transit Center



initial increase in the value of nearby dwellings when VMTC construction began in 2015 and that this relative increase returned when the VMTC became operational.

Figures 22 and 23 depict the dwellings in Vancouver in terms of accessibility to the VMTC for driving and walking, respectively.

The main results of the statistical analysis are summarized in Tables 9 and 10 (the full results of one of the regression models is provided in Appendix 2 as a reference). Table 9 is based on the walking distance of the dwelling to the VMTC. Dwellings within 10 minutes of the VMTC increased by approximately 11% following The Vine opening in 2017 (with a 95% confidence interval of 8.5-13%), while dwellings between 10-15 minutes from the VMTC increased by 7% (with a 95% confidence interval of 5-9%). Dwellings more than 15 minutes from the VMTC were unaffected by the VMTC opening. Interestingly, many transit agencies (including Pierce Transit in Tacoma) use walking distance of 15 minutes as a demarcation of the catchment area for transit service.

Table 9. Percent Increase in Property Value due to The Vine Opening, by Dwelling Walk Time to VMTC

Walking Time from Vancouver Mall	Lower Bound	Mean	Upper Bound
0 - 10 minutes	8.49%	10.66%	12.87%
10 - 15 minutes	5.18%	7.07%	9.00%

Table 10. Percent Increase in Property Value due to The Vine Opening, by Dwelling Driving Distance to VMTC

Driving Distance from Vancouver Mall	Lower Bound	Mean	Upper Bound
0 - 0.4 miles	2.96%	4.99%	7.06%
0.4 - 0.6 miles	8.69%	11.50%	14.39%
0.6 - 0.8 miles	6.95%	9.05%	11.20%

Figure 24. Dwelling Driving Distance from Tacoma Mall Transit Center

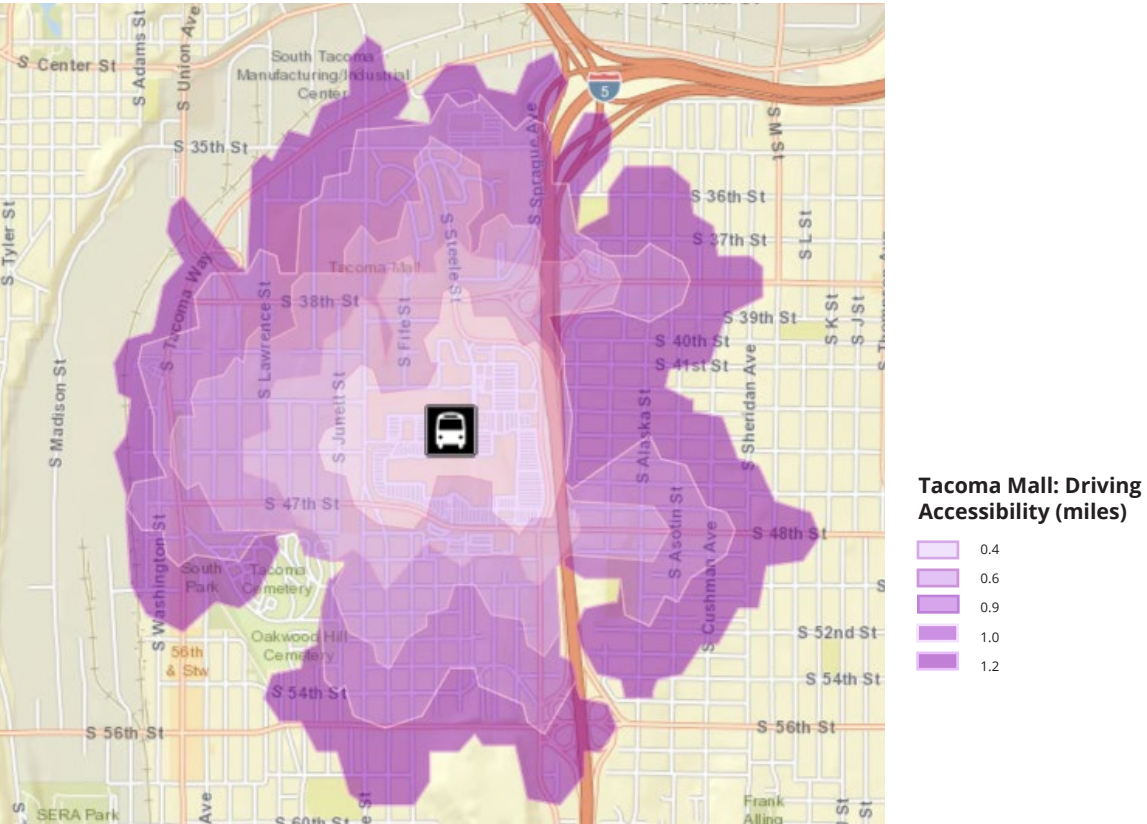


Figure 25. Dwelling Walk Time from Tacoma Mall Transit Center

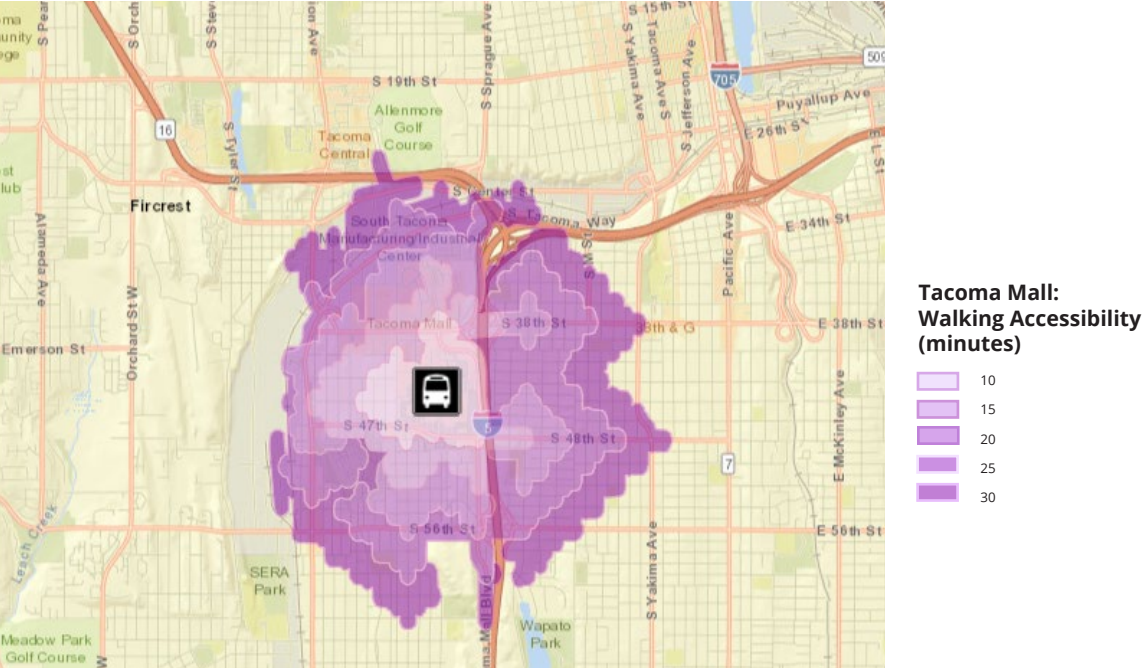


Table 10 is based on the driving distance from the VMTC. Dwellings adjacent to the VMTC (i.e. less than 0.4 miles) increased on average by 5%, while dwellings from 0.4 - 0.6 miles away increased by 11.5%, and dwellings from 0.6 - 0.8 miles away increased by 9%. Confidence intervals of 95% are represented by the lower and upper bounds, as in Table 9. Dwellings farther than 0.8 miles were unaffected by the project.

We then use these results to simulate the effect of similar property value increases around the Tacoma Mall. Figures 24 and 25 illustrate the dwellings in Tacoma for different degrees of accessibility by driving and walking, respectively. Tables 11 and 12 summarize the current aggregate market value of the dwellings in Tacoma for the relevant areas that would be affected by the property value increase.

Our final estimates are then generated by multiplying the property value increases in Tables 9 and 10 by the baseline property values in Tables 11 and 12, for each of the affected areas of accessibility. The results of our model using walking accessibility are shown in Table 13. We estimate that aggregate property values in the vicinity of the Tacoma Mall would increase by \$55 million, with a range from \$41.6 million to \$68.6 million to account for statistical uncertainty.

Table 11. Current Property Values in Vicinity of Tacoma Mall, by Driving Distance

Driving Distance from Tacoma Mall	2018		
	# of Dwellings	Average Value	Total Value
0 - 0.4 miles	444	\$301,339	\$133,794,516
0.4 - 0.6 miles	649	\$268,667	\$174,364,883
0.6 - 0.8 miles	1383	\$275,496	\$381,010,968

Table 12. Current Property Values in Vicinity of Tacoma Mall, by Walk Time

Walking Time from Tacoma Mall	2018		
	# of Dwellings	Average Value	Total Value
0 - 10 minutes	670	\$291,723	\$133,794,516
10 - 15 minutes	1739	\$277,650	\$174,364,883

The results of our study indicate that TMTC relocation has the potential to be economically viable.

Similarly, the results of our model using driving accessibility are shown in Table 14, where we estimate that property values would increase by \$61.2 million, with a range from \$45.6 million to \$77.2 million.

The estimates in Table 13 and Table 14 assume that the same rate of growth experienced in Vancouver would also be experienced in Tacoma. The value represents the market valuation of the net benefits of increased transit accessibility. This would include travel time savings, benefits of observed or anticipated livability improvements in the region, expectations of future property value increases, and so forth.

It should be emphasized that these values are estimates based on the similarities between Vancouver and Tacoma and on the two mall transit centers. There are numerous factors that would affect the actual increase in property values for Tacoma; would the increase be higher or lower than the values summarized in Tables 9 and 10?

However, even if the realized property value increases in Tacoma were half of those observed in Vancouver, this would still imply a benefit in the range of \$20-38 million. Compared to the preliminary cost estimates put forward for the TMTC relocation of \$28 million, this suggests that the TMTC relocation recommendation warrants further study. The results of our study indicate that it has the potential to be an economically viable project.

Figure 13. Estimated Effect of Improved Transit Center on Current Property Values in Vicinity of Tacoma Mall, by Walk Time

Walking Time from Tacoma Mall	Lower Bound (\$ million)	Mean (\$ million)	Upper Bound (\$ million)
0 - 10 minutes	16.6	20.8	25.2
10 - 15 minutes	25.0	34.1	43.5
Total Benefit (\$ million)	41.6	55.0	68.6

Figure 14. Estimated Effect of Improved Transit Center on Current Property Values in Vicinity of Tacoma Mall, by Driving Distance

Driving Distance from Tacoma Mall	Lower Bound (\$ million)	Mean (\$ million)	Upper Bound (\$ million)
0 - 0.4 miles	4.0	6.7	9.4
0.4 - 0.6 miles	15.2	20.1	25.1
0.6 - 0.8 miles	26.5	34.5	42.7
Total Benefit (\$ million)	45.6	61.2	77.2

We estimate that aggregate property values in the vicinity of the Tacoma Mall would increase by \$55 million.

Would Land Valuation Increases in Tacoma be Higher or Lower than in Vancouver?

Examples of some factors that would suggest that the effect on property values would be lower in Tacoma than in Vancouver include:

- The VMTC was connected to The Vine BRT line, whereas the TMTC would (at least initially) not connect to bus rapid transit service.
- Future BRT investment is planned in the region, which would further increase the benefit of access to the VMTC.
- Tacoma is relatively farther away from Seattle than Vancouver is from Portland, so the benefit of improved transit accessibility may be lower.

Similarly, examples of some factors that would suggest that the effect on property values would be higher in Tacoma than in Vancouver include:

- The TMTC relocation is part of the broader Subarea Plan with a multitude of complementary policy changes; this may lead to a greater demand for housing in the area if growth is catalyzed as envisioned.
- Tacoma baseline income levels and property values are lower than in Vancouver, which suggests a higher growth rate potential.
- Per capita transit ridership in the region is higher in Tacoma than in Vancouver, which may indicate that the benefits of improved transit accessibility would be higher in Tacoma.

Economic theory and the empirical evidence in Vancouver, Washington suggest that residential property values would increase following the TMTC relocation, and the magnitude of this property value increase implies that the social benefits of the relocation quite possibly outweigh the costs.



Tacoma Mall rendering of ground level activity. TACOMA MALL SUBAREA PLAN

Economic theory and the empirical evidence in Vancouver, Washington suggest that residential property values would increase following the TMTC relocation, and the magnitude of this property value increase implies that the social benefits of the relocation quite possibly outweigh the costs. This increase in property values (along with zoning changes) is also likely to spur transit-oriented development and to increase the value of commercial properties as well, which would be a further benefit to those estimated in the analysis presented here.

Many previous studies have found a positive association between transit investments and localized growth and development, especially in the case of rail projects. While there is much less evidence that BRT would also catalyze TOD, our study contributes to the literature by providing evidence that BRT is also likely to generate localized growth and development.

It should be reiterated that a comprehensive cost-benefit analysis of the TMTC relocation should be undertaken in order to make a fully informed decision. There are several possible benefits not examined here, such as the long-term effect of changes on transit ridership and walking/biking commuting. The estimated benefits are also based on the existing housing stock and we do not directly account for future growth in the region.

This study focuses exclusively on the impact of the Tacoma Mall Transit Center on nearby residential land values, due to the importance of this impact and to the availability of relevant and reliable data to generate estimates of its value. Further study should focus on estimating other potential benefits not included in this study, as well as documenting the social costs of the proposal. It may also be of interest to consider the equity of the potential impact on property values and the distributional consequences; while increased property values are a signal of the underlying

Further study should focus on estimating other potential benefits not included in this study, as well as documenting the social costs of the proposal.

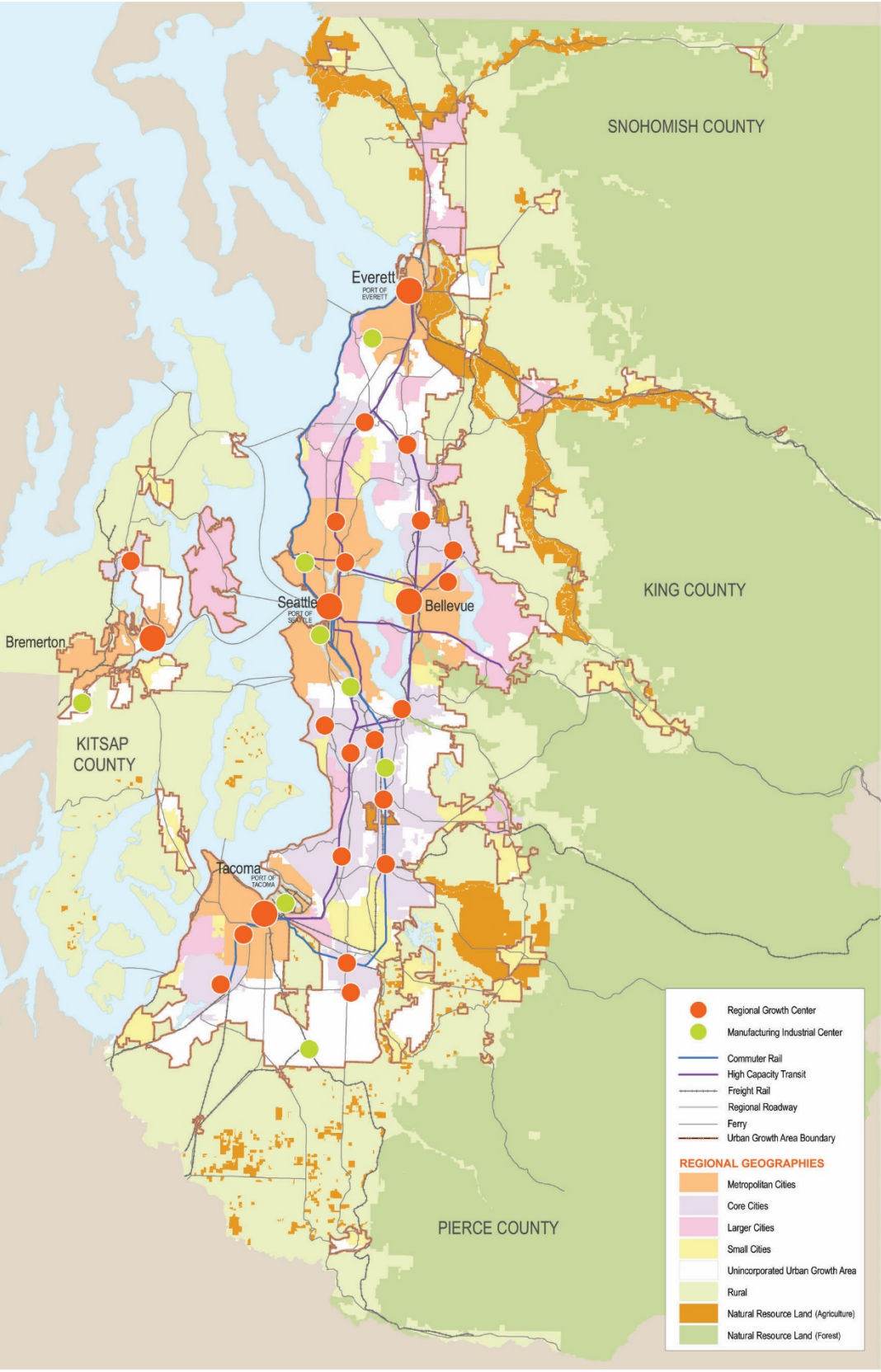
Figure 26. Sound Transit 3 Plan Map



improved quality of life of the region, and are beneficial for current landowners, there are many lower-income individuals that would be adversely impacted by higher property values and increased rent prices. Given the proportion of lower-income individuals that utilize public transit, this is a potentially important consideration when thinking about the broader context of the Tacoma Mall Neighborhood Subarea Plan.

As part of Sound Transit 3 (ST3), a future study will focus on the potential introduction of a high-capacity transit extension from the Tacoma Dome to the Tacoma Mall (see Figure 26). Along these lines, Figure 27 situates the Tacoma Mall RGC within the broader context of the Puget Sound Regional Council's VISION 2040 Plan. Our findings suggest that improved transit access in the vicinity of the Tacoma Mall can have significant benefits that are reflected in land value uplift – particularly if the TMTC relocation is accompanied by high-capacity transit improvements in the future. The relocation of TMTC, and potential expansion of transit services to accompany this growth, should be further studied by the City of Tacoma and by affected transit agencies, with an emphasis on the aforementioned ST3 study.

Figure 27. Puget Sound Regional Council's VISION 2040 Plan



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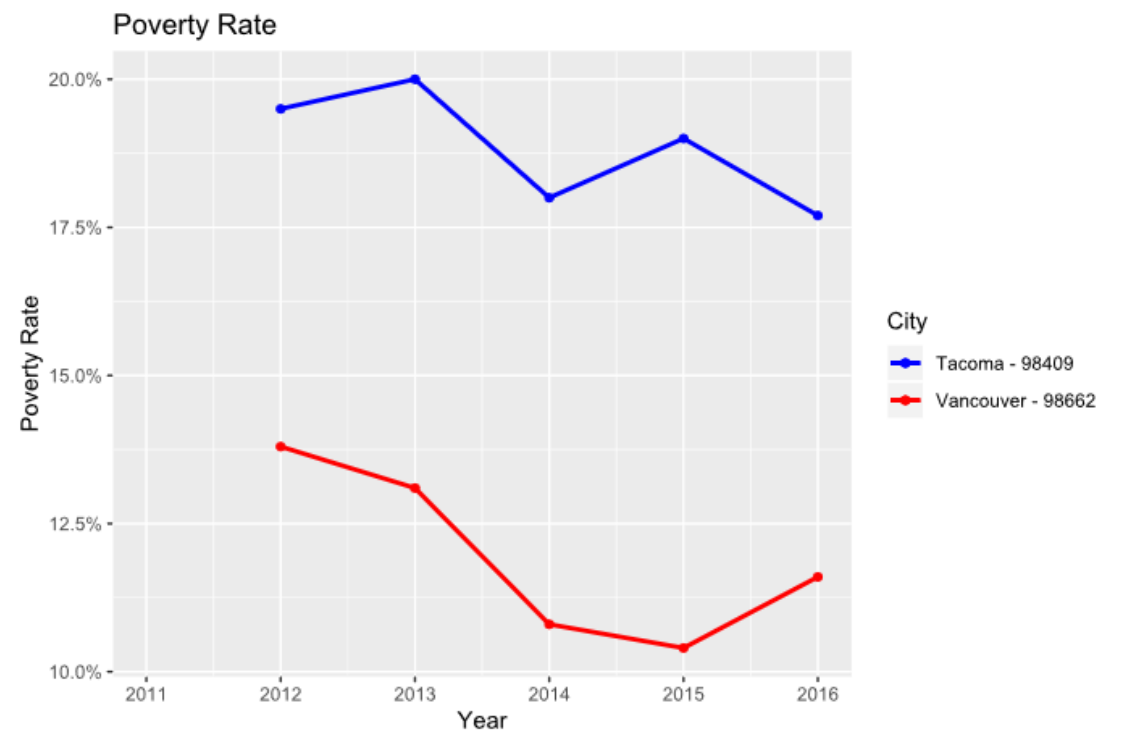
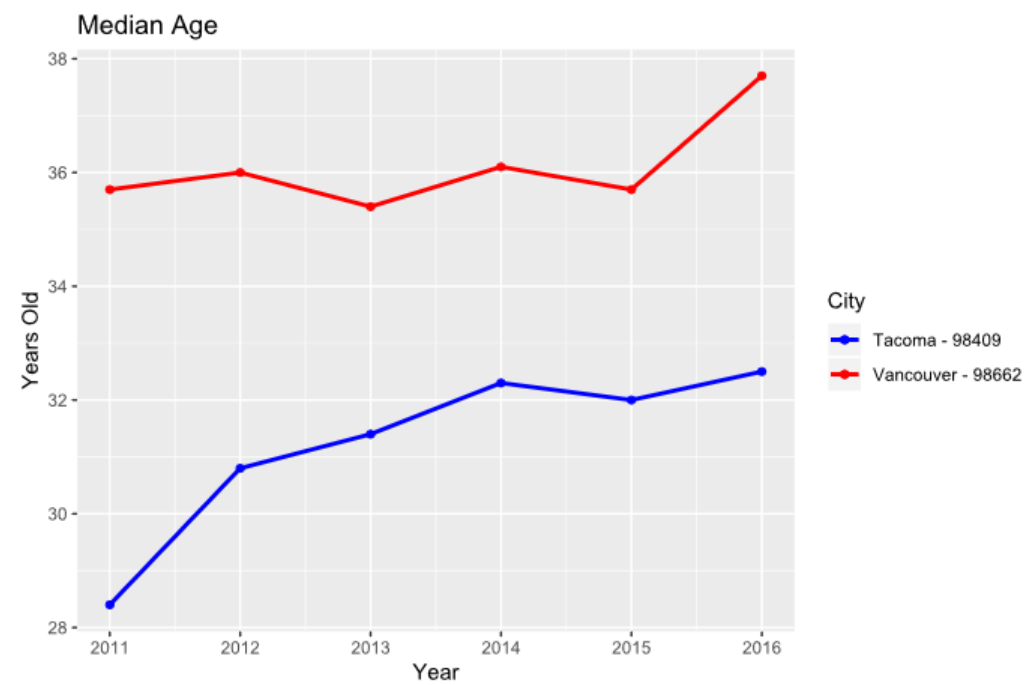
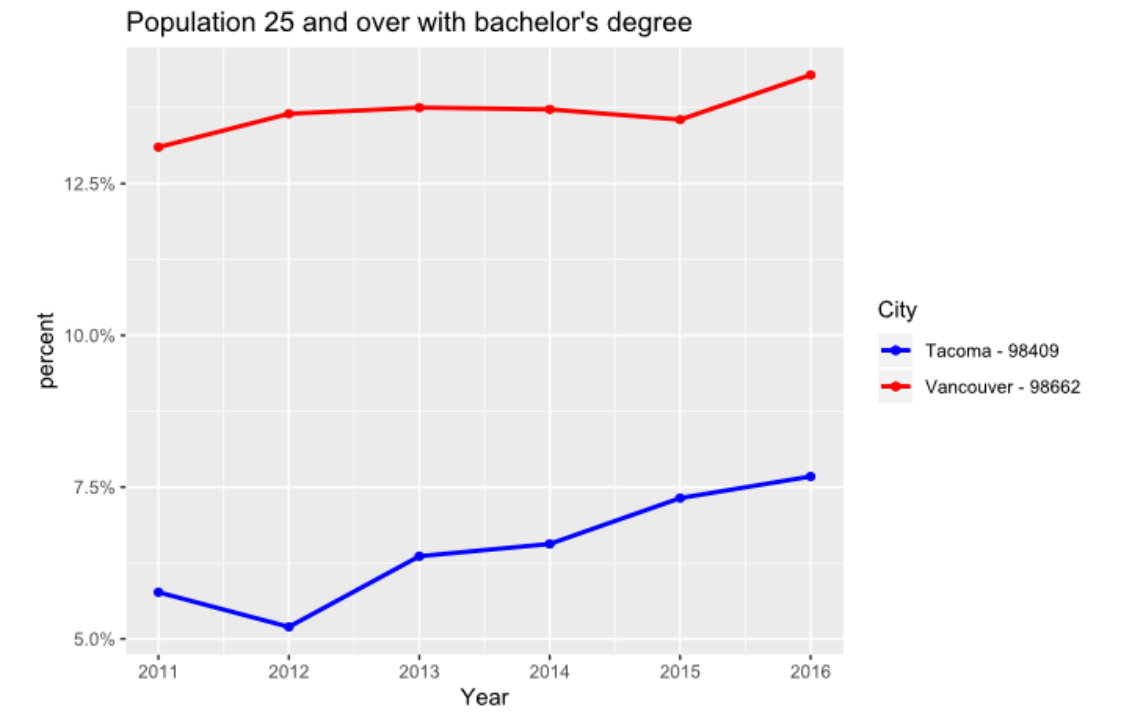
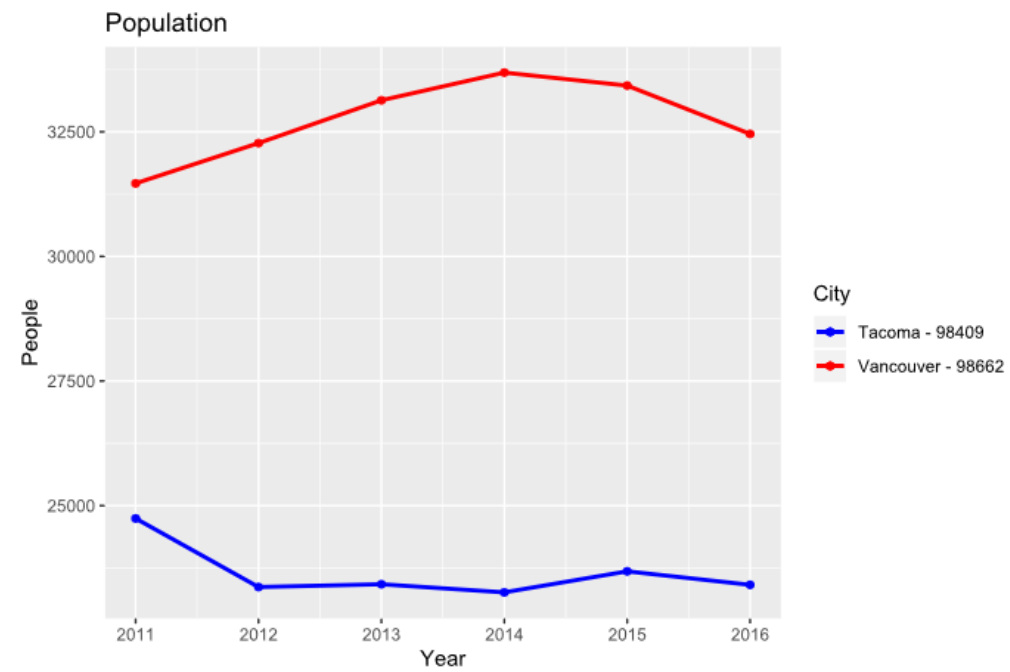
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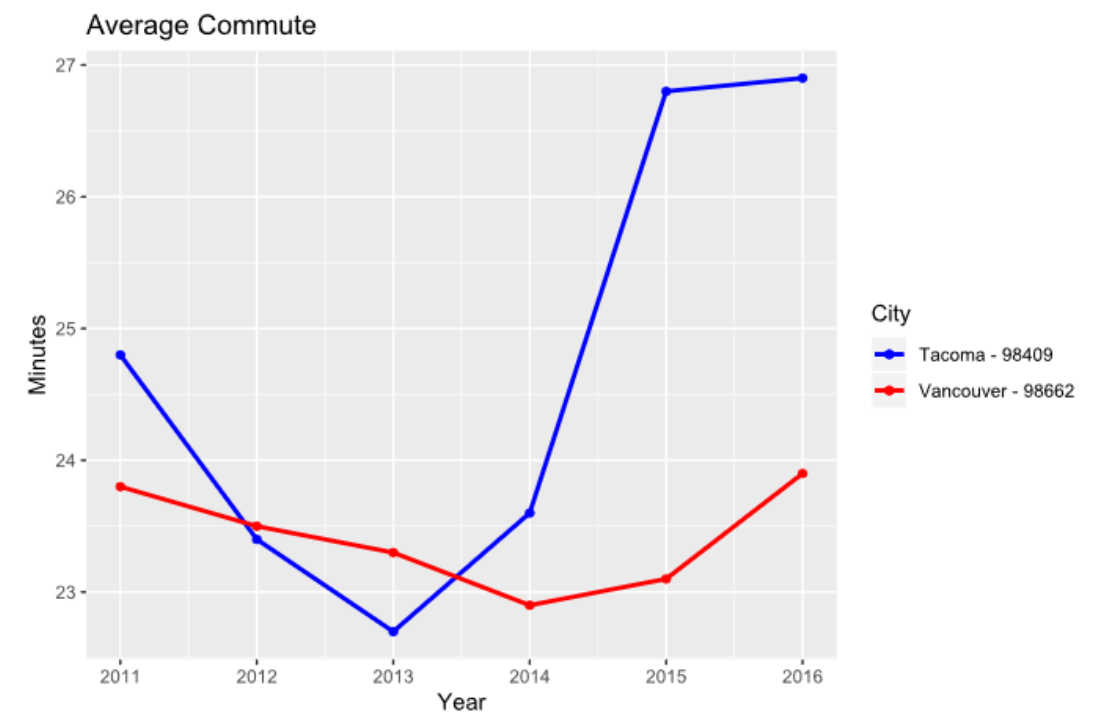
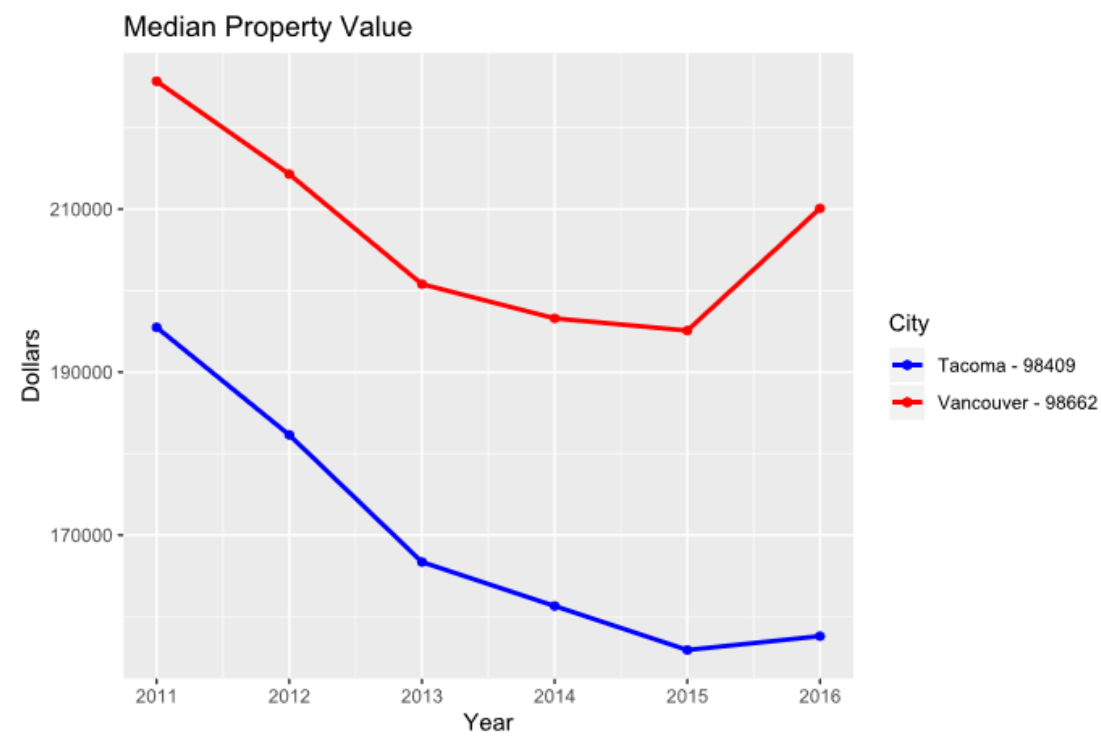
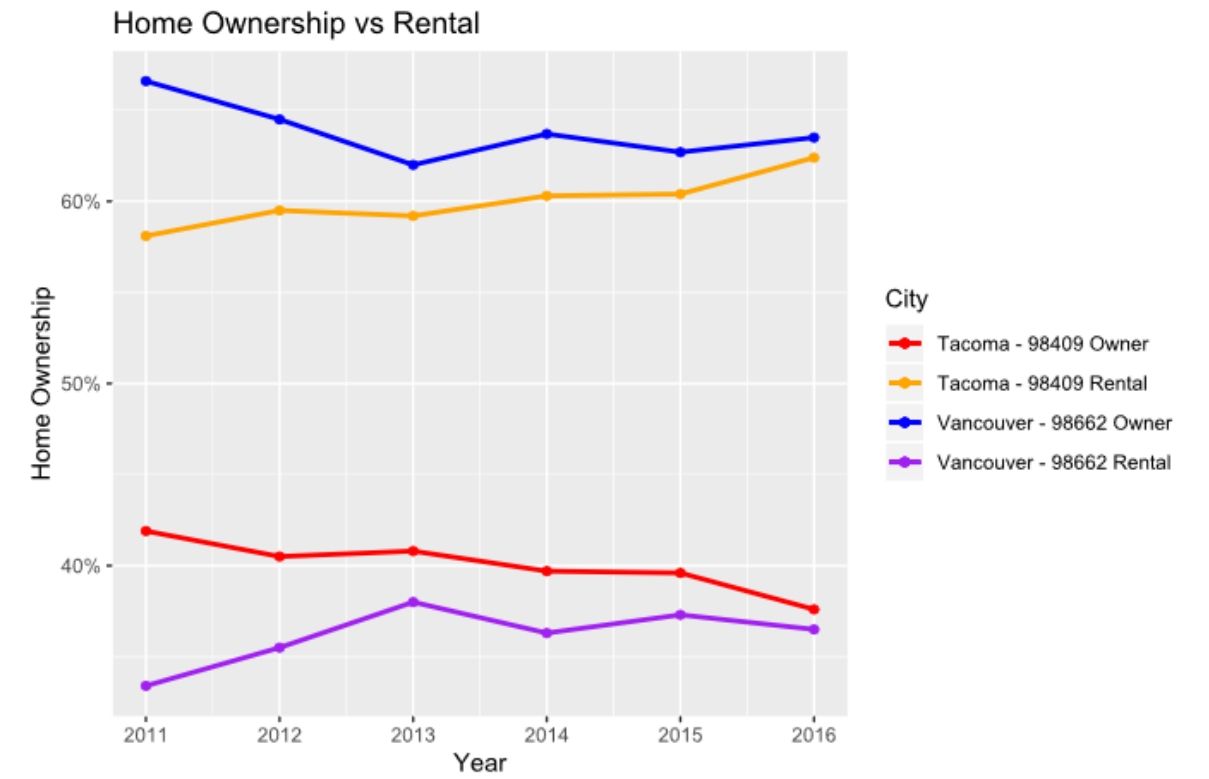
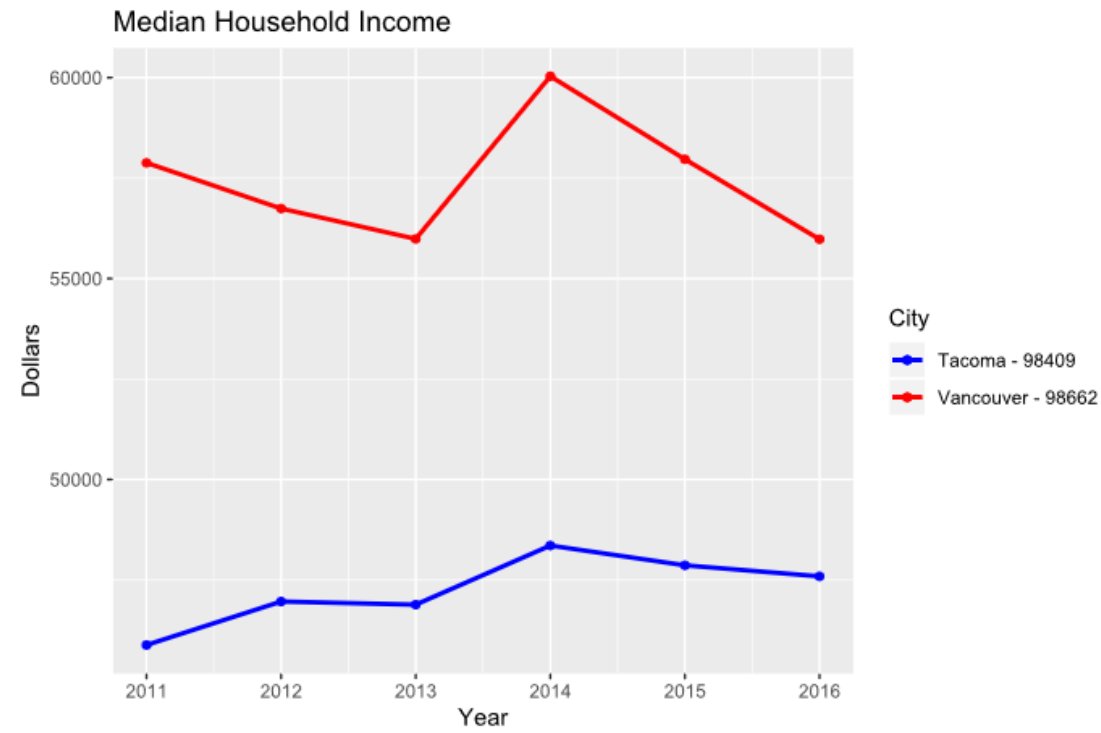
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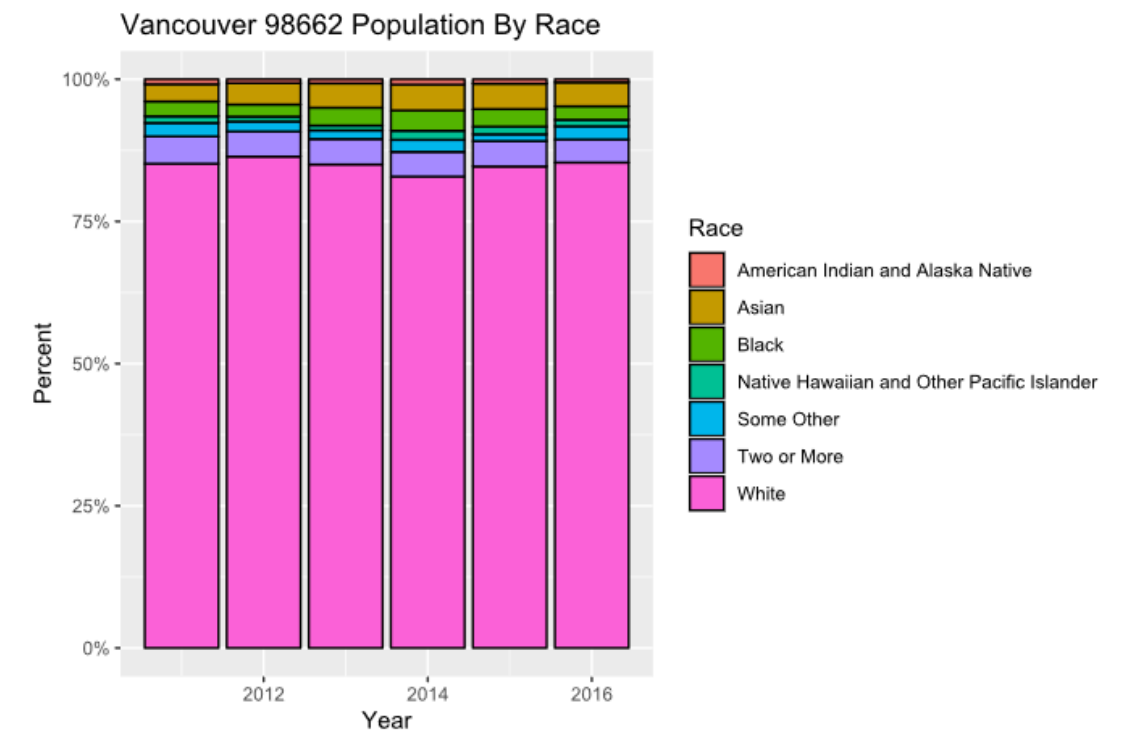
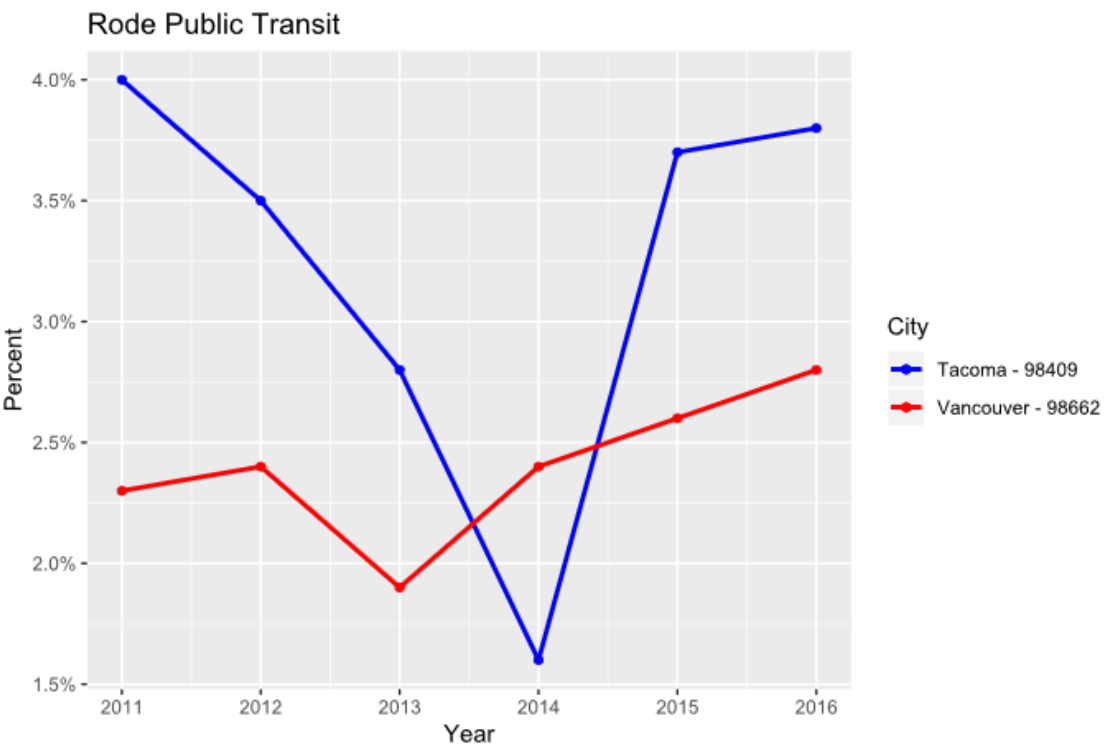
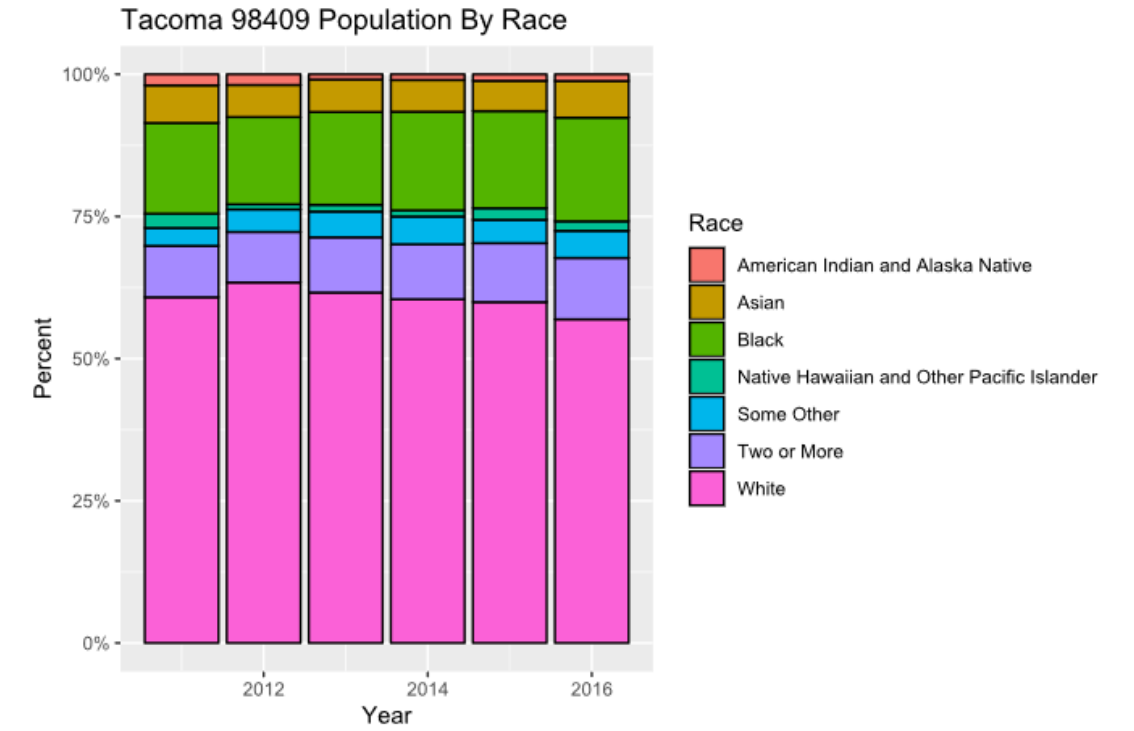
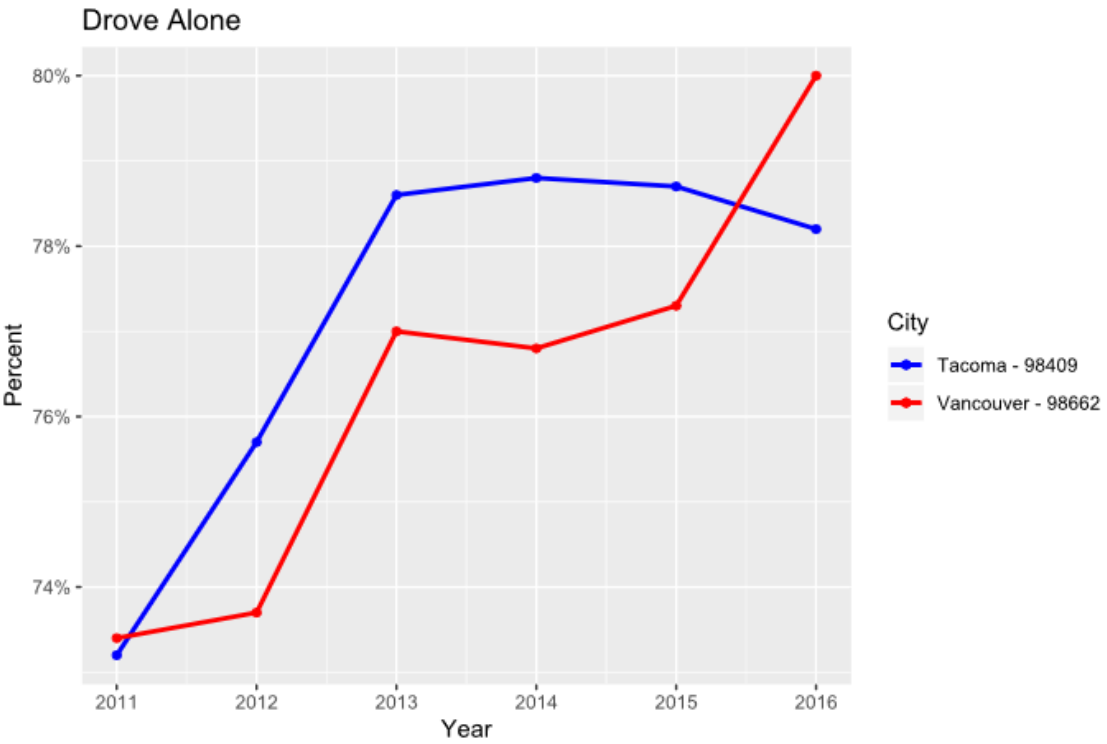
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Appendix A: Comparison of Tacoma and Vancouver (Mall Location Zip Codes)

This appendix provides a further comparison of Vancouver and Tacoma, based on census data for the zip codes immediately surrounding the two malls.







Appendix B: Regression Results

The following table provides a sample of the full results of one of the models that was used (stratifying dwellings by 10-minute intervals of walking time to the Vancouver Mall Transit Center). The estimates of primary interest are the shaded rows, while the other rows indicate control variables. The coefficient estimates are approximately the percentage change of the dwelling sale price for a one unit change in the associated variable.

Model: 10 minute walk bins							
Dependent variable	log of real price (\$2018)						
Number of observations	44,787						
R ²	0.8392						
Independent Variable	Coefficient		Standard Error	t-statistic	P-value	95% Confidence Interval	
Constant	11.7998	***	0.0727	162.28	0.000	11.6556	11.9440
1.5 finished	-0.0191	**	0.0070	-2.74	0.007	-0.0330	-0.0053
2 story	-0.0657	***	0.0079	-8.32	0.000	-0.0814	-0.0501
Bi-level (split entry)	0.0261	*	0.0112	2.33	0.022	0.0039	0.0484
Split	-0.0051		0.0137	-0.37	0.711	-0.0323	0.0221
Condo	-0.3582	***	0.0296	-12.12	0.000	-0.4169	-0.2996
Mobile home	-0.6307	***	0.0481	-13.12	0.000	-0.7261	-0.5354
Townhouse	-0.1198	***	0.0101	-11.89	0.000	-0.1398	-0.0998
Dwelling quality (Scale = 1-17)	0.0630	***	0.0030	20.75	0.000	0.0570	0.0690
Dwelling age (years)	-0.0011	***	0.0002	-5.45	0.000	-0.0014	-0.0007
Dwelling size (100 ft²)	0.0160	***	0.0009	17.81	0.000	0.0142	0.0178
Lot size (1000 ft²)	0.0004	***	0.0001	6.98	0.000	0.0003	0.0006
Bedrooms	0.0171	***	0.0030	5.65	0.000	0.0111	0.0231
Full bathrooms	0.0636	***	0.0049	12.85	0.000	0.0537	0.0734
Three-quarter bathrooms	0.0567	***	0.0059	9.61	0.000	0.0450	0.0684
Half bathrooms	0.0404	***	0.0049	8.31	0.000	0.0308	0.0501
Fireplaces	0.0229	***	0.0033	6.85	0.000	0.0163	0.0295
Year = 2012	-0.3887	***	0.0151	-25.71	0.000	-0.4187	-0.3587
Year = 2013	-0.2864	***	0.0165	-17.37	0.000	-0.3191	-0.2537
Year = 2014	-0.2576	***	0.0331	-7.78	0.000	-0.3233	-0.1920
Year = 2015	-0.1556	***	0.0164	-9.50	0.000	-0.1881	-0.1231
Year = 2016	-0.1000	***	0.0225	-4.44	0.000	-0.1447	-0.0553
Year = 2017	-0.0356	*	0.0137	-2.59	0.011	-0.0628	-0.0083
Month = Feb	0.0075		0.0051	1.48	0.141	-0.0026	0.0176
Month = Mar	0.0289	***	0.0046	6.33	0.000	0.0198	0.0379
Month = Apr	0.0419	***	0.0049	8.60	0.000	0.0322	0.0516
Month = May	0.0589	***	0.0048	12.35	0.000	0.0495	0.0684

Month = June	0.0718	***	0.0048	15.03	0.000	0.0623	0.0812
Month = July	0.0791	***	0.0051	15.51	0.000	0.0690	0.0893
Month = Aug	0.0855	***	0.0049	17.51	0.000	0.0758	0.0952
Month = Sept	0.0834	***	0.0054	15.43	0.000	0.0727	0.0941
Month = Oct	0.0838	***	0.0051	16.38	0.000	0.0737	0.0940
Month = Nov	0.0818	***	0.0049	16.59	0.000	0.0720	0.0916
Month = Dec	0.0933	***	0.0048	19.28	0.000	0.0837	0.1029
Zone: multi-family	-0.0690	***	0.0184	-3.74	0.000	-0.1056	-0.0324
Zone: low density	-0.0243		0.0141	-1.72	0.089	-0.0523	0.0037
Zone: medium density	-0.0102		0.0148	-0.69	0.492	-0.0395	0.0191
Zone: high density	-0.0947	***	0.0173	-5.47	0.000	-0.1290	-0.0603
Zone: mixed use	0.0482		0.1128	0.43	0.670	-0.1755	0.2720
Clark County Public Transit Benefit Area?	-0.1142	***	0.0213	-5.37	0.000	-0.1564	-0.0720
Driving distance to downtown Vancouver (miles)	0.0072		0.0038	1.91	0.059	-0.0003	0.0147
Walk time to nearest transit center (non-mall), minutes	0.0007	*	0.0003	2.20	0.030	0.0001	0.0013
Walk time to nearest transit center (non-mall), minutes squared	0.0000	***	0.0000	-4.16	0.000	0.0000	0.0000
School district dummies?	Yes						
Census tract dummies?	Yes						
Zip code dummies?	Yes						
Zip code annual trend dummies?	Yes						
City dummies?	Yes						
VMTC: 0-10 min walk	0.0018		0.0310	0.06	0.954	-0.0597	0.0634
VMTC: 10-20 min walk	-0.0102		0.0231	-0.44	0.661	-0.0561	0.0357
VMTC: 20-30 min walk	0.0539	***	0.0147	3.67	0.000	0.0248	0.0829
VMTC: 30-40 min walk	0.0050		0.0136	0.37	0.714	-0.0219	0.0319
(Effect of Vine) VMTC: 0-10 min walk	0.0985	***	0.0109	9.02	0.000	0.0768	0.1201
(Effect of Vine) VMTC: 10-20 min walk	0.0493	***	0.0131	3.76	0.000	0.0233	0.0753
(Effect of Vine) VMTC: 20-30 min walk	-0.0145		0.0119	-1.22	0.224	-0.0381	0.0090
(Effect of Vine) VMTC: 30-40 min walk	-0.0124		0.0093	-1.34	0.185	-0.0308	0.0060
Significance: * 5% ** 1 % *** 0.1%							
Note: robust standard errors clustered at census tract level							