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LANE TRANSIT DISTRICT
BOARD OF DIRECTORS
WORK SESSION

Wednesday, May 15, 2019
4:00 – 5:00 p.m.

LTD Board Room
3500 E. 17th Avenue, Eugene
(Off Glenwood Blvd. in Glenwood)

No public testimony will be heard at this meeting.

AGENDA

Time		ITEM	Page
4:00 p.m.	I.	CALL TO ORDER	
4:01 p.m.	II.	ROLL CALL	
		❒ Carl Yeh (President) ❒ Kate Reid (Vice President) ❒ Joshua Skov (Secretary) ❒ Don Nordin (Treasurer) ❒ Caitlin Vargas ❒ Steven Yett ❒ Emily Secord	
4:02 p.m.	III.	PRELIMINARY REMARKS FROM THE BOARD PRESIDENT	
4:03 p.m.	IV.	COMMENTS FROM THE GENERAL MANAGER *This agenda item provides an opportunity for the general manager to formally communicate with the Board on any current topics or items that may need consideration.*	
4:04 p.m.	V.	ANNOUNCEMENTS AND ADDITIONS TO AGENDA *This agenda item provides a formal opportunity for the Board president to announce additions to the agenda, and also for Board members to make announcements.*	
	VI.	ITEMS FOR INFORMATION	
4:05 p.m.		A. STRATEGIC BUSINESS PLAN [Aurora Jackson] **Action Needed:** Discussion *Staff will provide an overview of the status of the Districts Strategic Business Plan.*	
4:35 p.m.		B. SUSTAINABLE CITY YEAR PROGRAM (SCYP) PARTNERSHIP [Tom Schwetz] **Action Needed:** None. Information Only *Staff will provide an overview of the SCYP partnership.*	2
5:00 p.m.	VII.	ADJOURNMENT	

The facility used for this meeting is wheelchair accessible. To request a reasonable accommodation or interpreter, including alternative formats of printed materials, please contact LTD's Administration office no later than 48 hours prior to the meeting at 541-682-5555 (voice) or 7-1-1 (TTY through Oregon Relay).

AGENDA ITEM SUMMARY

DATE OF MEETING: May 15, 2019

ITEM TITLE: SUSTAINABLE CITY YEAR PROGRAM (SCYP) PARTNERSHIP

PRESENTER: Tom Schwetz, Director of Planning and Development
Jennifer Zankowski, Senior Development Planner
Megan Banks, University of Oregon (UO) SYCP Manager
Katie Fields, UO SCYP Graduate Employee

DIRECTOR: Tom Schwetz, Director of Planning and Development

ACTION REQUESTED: Information and Discussion

PURPOSE: Present information about the SCYP LTD-UO partnership for the 2019-2020 school year and introduce program staff from Lane Transit District (LTD) and the University of Oregon (UO).

The presentation will be focused on the program itself. At a future date, the Board, upon recommendation from the Finance Committee, will be asked to approve the master agreement between LTD and the UO for this partnership.

HISTORY:

- SCYP is a massively scaled university-community partnership program that matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals.
- LTD was a collaborating partner with the City of Springfield as part of this program during the 2012-2013 school year. Projects included a communication assessment for the West 11th EmX expansion project, and a study of strategies to better connect bikes to transit in Springfield.
- LTD and the UO began discussions in 2018 about a future partnership.
    - *"LTD's riders and taxpayers have been the beneficiary of the good work SCI and its SCYP have provided to our agency in the past," said Aurora Jackson, LTD's general manager. "We believe SCYP will provide valuable and timely information about several LTD priority projects that will contribute to decisions made concerning the future of transit locally and throughout the industry."*
- The LTD Board will be asked to approve the expenditure of general fund resources in its Fiscal Year 2019-2020 budget for this partnership.
- LTD applied for and was selected for the 2019-2020 SCYP in March 2019.
    - If approved, the master agreement between LTD and the UO would commit up to $250,000 in LTD's general fund resources in Fiscal Year 2019-2020 to this partnership.

A presentation will be provided to explain this topic in further detail.

CONSIDERATIONS:

- The program will focus on LTD's priority projects and goals, and stands to further develop LTD's relationship with the UO and other community partners.
- Other agencies, such as the City of Eugene, City of Springfield, Peace Health Rides, Lane Council of Governments, and others have expressed interest in collaborating with LTD in this partnership.
- The collaborative nature of this program provides the opportunity for SPC, Board members, and other LTD stakeholders to contribute ideas and participate in the program's projects.

ALTERNATIVES: Information and Discussion only.

NEXT STEPS:

- The Finance Committee will be asked to consider the Master Agreement between LTD and UO for this partnership and recommend approval to the Board.
- The Board will be asked to approve the master agreement.
- If approved, LTD-UO class match-making would commence and an SCYP kick-off event would be planned to start the 2019-2020 school year.

SUPPORTING DOCUMENTATION:

1) LTD's SCYP Application

PROPOSED MOTION: N/A

2019-2020 SUSTAINABLE CITY YEAR PROGRAM

Lane Transit District

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ABOUT LANE TRANSIT DISTRICT

BACKGROUND

Lane Transit District (LTD) began in 1970 with 18 buses and two vans, and it has grown and changed along with the community. It was created by the legislature under the laws of the State of Oregon that allowed the formation of transit districts as special taxing entities. The boundaries of Lane Transit District fall entirely within Lane County, encompassing approximately 482 square miles. LTD serves the Eugene-Springfield metropolitan area; the incorporated cities of Coburg, Creswell, Cottage Grove, Lowell, Veneta, and Junction City; and the unincorporated area along Highway 126 between Springfield and the McKenzie Bridge Ranger Station.

LTD serves a population base of approximately 311,000 with a fleet of 105 buses in revenue service that travel more than 3.9 million miles annually. Passenger boardings were approximately 10.2 million for FY18. In FY18, LTD provided more than 295,000 revenue hours of fixed-route service. LTD also operates RideSource, a paratransit service for people with disabilities, and Point2point, a transportation options programs to promote sustainable travel county wide.

LTD is governed by a Board of Directors composed of seven members, each appointed by the governor of Oregon and confirmed by the Oregon State Senate. Each Board member represents a subdistrict of LTD's service area. The Board is responsible for development of District policies and hires and directs the activities of the general manager. The general manager, in turn, directs the daily activities of the District and is responsible for the overall management of the District and its employees.

In 2017, the state legislature passed House Bill 2017 (HB 2017). Section 122 of HB 2017 known as “Keep Oregon Moving” empowers the District to impose an employee state payroll tax of one- tenth of one percent effective July 1, 2018. The funds collected provide a dedicated source of funding to expand public transportation services through the Statewide Transportation Improvement Fund (STIF).

VISION, MISSION & VALUES

LTD’s mission statement calls on the organization to enhance the community’s quality of life by:

- Delivering reliable, responsive and accessible public transportation services
- Offering innovative services that reduce dependency on the automobile
- Providing progressive leadership for the community’s transportation needs

At Lane Transit District we are driven by the people we serve, providing independence to those in our community. A community is at its best when we have access to the places and services that are important to us all. Every year, millions of riders depend on us to get to work, go to school, and make it to medical appointments, or for a stress-free ride to the game.

We believe in providing people with the independence to achieve their goals, creating a more vibrant, sustainable, and equitable community.

How we do it:

- We serve the community with respect.
- We continuously question if there's a better way.
- We collaborate internally and externally.
- We care for our employees, customers, and business partners.
- We plan for a sustainable future.

What we do:

- We provide reliable transit services that address the needs of the community.
- We provide a viable alternative to the automobile through high-quality transportation options, programs, and services.
- We provide leadership in the development of the region's transportation system.
- We practice safety and maintain safe and accessible vehicles, services, and facilities.
- We practice sound fiscal and sustainability management.

SUSTAINABILITY

LTD has a long standing commitment to our community and is taking steps to do business in a sustainable manner. Public transit is an important part of a holistic community sustainability program because of its ability to take cars off of the road and move more people more efficiently on buses and with other active modes, thereby reducing local air pollution and the emissions that cause climate change while improving human health. LTD is building on this through several initiatives that make up its sustainability program:

Investing in Cleaner Technology

After providing the best possible service, LTD understands that its next biggest opportunity is related to investing in cleaner, less polluting vehicles. LTD has a long history of investing in cleaner technology and fuels. In the mid-2000s LTD began investing in cleaner diesel hybrid buses and now they make up more than 50% of our bus fleet. Additionally, in February 2019, LTD put its first all-electric bus into revenue service. LTD has secured the necessary funding to add at least 10 more all-electric zero tailpipe emissions buses to our fleet in the coming years. In Fall 2019, LTD will also begin a project to study and methodically evaluate all the market-ready bus technologies and fuels available to us for use in our existing operations to determine what is the most cost-effective and sustainable technology to continue to invest in as we replace our fleet over time.

Measuring and Managing our Impacts

LTD understands that what gets measured, gets managed. A big part of our ongoing sustainability efforts have focused on understanding the other impacts and opportunities associated with LTD's operations. In 2010, LTD voluntarily signed on to the American Public Transportation Association's Sustainability Commitment. This commitment helps transit agencies begin to bring sustainability to the forefront of everyday practices by managing employee awareness, resource consumption, and internal prioritization of sustainability initiatives. Since its enrollment, LTD has achieved a Silver Level medal of recognition for its efforts in tracking and reducing energy, water, waste and greenhouse gas emissions. In 2017, LTD conducted a comprehensive waste audit of all our facilities to determine where we could improve our recycling program and used the results to inform a company-wide education campaign. In 2018, LTD worked with Oregon State University Energy Efficiency / Industrial Assessment Center to conduct an energy audit of our facilities. LTD then implemented the project identified to save the most energy, cooling upgrades associated with our server room, in 2019.

LTD is conducting its first comprehensive greenhouse gas inventory of its operations in 2019 and hopes to develop a climate action plan after sharing the results with our Board of Directors.

Engaging our Employees & Partnering with our Community

For many years, LTD has had an active Green Team, made up of employees dedicated to improving the organization's sustainability performance. In 2018, LTD took this commitment to sustainability further by creating its first paid position entirely focused on improving organization-wide sustainability practices. Kelly Hoell became LTD's first Sustainability Program Manager in August 2018. Her role is focused on developing a long-term fleet transition plan towards cleaner technology and fuels, managing LTD's internal Green Dream Team and engaging LTD staff, and partnering with external agencies on sustainability initiatives. In 2017 and 2018, LTD added a sustainability module to its annual all-employee training program. The Green Dream Team meets monthly and has focused on several projects including: improving employee participation in utilizing active transportation modes, especially as part of the annual Business Commute Challenge and the Oregon Drive Less Challenges, development of an employee volunteer program where employees can give back to the community by volunteering their time to non-profit sustainability focused organizations, and improving recycling rates among staff by providing employee education, improved signage, and container consistency.

PLANNING THAT MEETS THE COMMUNITY'S NEEDS

In planning for the future, it is often easier to see the *North Star* you want to be headed toward than it is to take the next steps on that journey. In the short run, we are faced with a tremendous momentum that comes from how we have been operating in the past, how we have come to understand our relationship to the environment around us. This orientation can yield success in the short run. However, a successful past is only an opportunity to build the future, not a guarantee of future success. Future success relies on structuring an ongoing strategic conversation with key partners, engaging the community in establishing those next steps.

LTD understands that the biggest opportunity it has to impact the sustainability of our service district is to provide the most useful and utilized services possible. From its wide-ranging programs including fixed-route, EmX bus rapid transit, Ridesource, Vanpool, Group Pass Program and many others, LTD provides a viable alternative to the automobile through high-quality transportation options, programs, and services. LTD is currently building on these programs with several future-focused projects. Two projects currently underway include:

- **Transit Tomorrow**: This project is taking a deep look at LTD's current bus system and is asking two important questions: How can LTD help people get to where they are going? And, what shape should LTD's services take in the future? This project will combine technical analysis and broad-based community input to answer these questions and to develop a public transit network for the future.

- **MovingAhead**: The City of Eugene and LTD are working together with regional partners and the community to add new infrastructure features to some of our most important streets. This project, called MovingAhead, is focused on better connecting people to jobs, schools, shopping, recreation, and other activities by considering a range of transportation investments along key corridors to improve safety and livability for everyone.

CONTACT INFORMATION & AGENCY PARTNERS

SCYP PROGRAM LEAD:

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SCYP Program Manager
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(541) 682-6135

PARTNERING AGENCIES:

City of Eugene, Planning & Development

City of Eugene, Public Works

City of Creswell, Planning & Land Use

Lane Council of Governments (LCOG)

Oregon Department of Transportation (ODOT)

PeaceHealth Rides

South Lane Wheels

CONTEXT FOR PROJECTS

THE CHALLENGES AHEAD – AN OVERVIEW

In 2011, LTD staff prepared a document entitled "Adapting to the Future of Mobility". Serving as the contextual background for the development of LTD's first Long-Range Transit Plan, this scenario-driven narrative identified a number of uncertainties that could impact the region's goals for transit (goals related to environment, economy, and social equity), and thus affect LTD's strategic planning effort. To illustrate how dramatically our context can change in a long-range timeframe (30-40 years), we described how the world had changed over the 40 years since LTD's inception:

> 'At the time of Lane Transit District's creation in 1970, the United States was engaged in the Vietnam War as part of a broader struggle against communism. The Kent State shootings of war protesters sent violent shockwaves through society, causing President Nixon's Special Counsel to remark, "This is a nation at war with itself." And this was just one more eruption of violence on the heels of the Civil Rights Movement, a struggle which saw race riots, police brutality, and assassinations. Scarcely anyone alive in 1970 would have imagined that only 40 years later the United States would have its first African-American president, and communism would be seen as a failed experiment by all but a few isolated regimes.'

Based on surveys of community leaders, and LTD directors and managers; we identified numerous strategic questions and choices that would be facing the region and LTD over the coming years in preparing for the long run. For example:

- How might growing oil demand impact transportation and will transit agencies be able to keep up with fuel costs?
- Will people continue driving single occupancy vehicles?
- How would colder winters impact Lane Transit District when planning routes, buying buses, and training drivers?
- How would a changing climate impact transit demand?
- How might a population surge in the coming decades impact the local economy and provision of services such as transit?
- Will higher education continue to drive economic growth in the region in the future?
- What impact might the increasing federal debt have on the country's ability to support other programs, such as transportation, environmental protection, or education?

These questions reflect the broader community's thinking about the future at the time. While they only represent a few factors which may prove important in the coming decades to LTD, the purpose of these questions was to provoke divergent thinking on what might be important, or even crucial, to the continued operation and relevance of Lane Transit District in a variety of contexts.

While these questions remain important, in the eight years since these questions were first expressed, many of them have been brought into clearer focus. A great deal of analysis and exploration has been completed around questions related to climate change and transit (for example, the Lane Livability Consortium work on climate scenarios). However, one of the two key uncertainties facing LTD that were identified in our 2011 effort was the "adaptive capacity" of LTD and its partners to cope with change and to adapt effectively. This ability to adapt can mean proactively managing existing systems and structures to ensure their resilience

against external forces, as well as the ability to transform those systems and structures when a changed context means they are no longer suitable. Particularly in the context of addressing the local impacts of global warming, the adaptive capacity of LTD and its partners remains a key uncertainty.

The second key uncertainty identified in our 2011 efforts was "Mobility Markets", which refers to issues beyond just the variety of demands for transportation and the ways in which those demands might be met. The uncertainty around Mobility Markets also included the broader geographic and social context in which that interactions take place. Examples identified in 2011 included:

- Uncertainty around what might happen to travel choice if the "20-minute neighborhood" concept were widely embraced in the region over the next 25 years?
- Ways that providers can meet new mobility demands include both the various modes of travel (auto, bus, bike, etc.) as well as the different ways in which one might access those modes (the use of information tools providing traveler information on 'next bus' or 'best route').
- Examples of new markets are multiple. They can include car sharing, bike sharing, and "slug lines," where commuters pair up with drivers who need an additional passenger to satisfy minimum high-occupancy lane requirements.
- Different technologies can change the nature of the market, such as online shopping reducing household trips while maintaining access to goods and services.
- Finally, integrating different modes at points of transfer and the land uses that surround those multi-modal connections represent another way of overcoming barriers to alternative transportation use, and can facilitate increased use of alternatives to the auto.

In this context, the roles of technology and data in facilitating mobility choices have grown exponentially over the last eight years. The strategic planning consultant McKinsey and Company recently noted that "Mobility is about to become cheaper, more convenient, a better experience, safer, and cleaner—not 50 or even 25 years from now, but perhaps within a dozen." They describe the mobility transformation as "mobility's Second Great Inflection Point" because "it has the potential to be as profound as the one that put horses to pasture and revolutionized industries and societies worldwide."

THE SUSTAINABLE CITY YEAR PROGRAM CAN PLAY A VITAL ROLE

It is in the above context that LTD and its partners seek to engage the Sustainable City Year Program in a critical strategic conversation. The focal questions facing LTD's strategic planning effort are threefold:

- What are the key uncertainties facing LTD and its regional partners over the next 20 to 30 years?
- What roles can and should LTD play in the emerging mobility landscape?
- What strategic choices will need to be made by LTD and its partners over the next 3 to 5 years to successfully adapt to the challenges ahead?

The projects described below are all intended to address one or more of these focal questions. In this way, the outcomes of these individual projects will serve collectively as a new foundation for LTD's strategic planning effort. In addition, several of these projects are intended to help inform LTD's decision-making and implementation of changes over the next 3 to 5 years.

POTENTIAL PROJECTS

SCENARIO PLANNING & THE CHANGING MOBIILTY LANDSCAPE

Background

Scenario planning has been described as a way of rehearsing the future to avoid surprises by breaking through the "illusion of certainty." According to an experienced participant: "The purpose of the exercise is not to come up with a forecast, because you know it will be wrong. Instead, it's to draw a circle around multiple possibilities and think about whether you are prepared to face the range of futures that might unfold. It also helps you think about how you might be a catalyst for moving the world a little bit in the direction you want it to go." (from Garvin, David A., and Lynne Levesque. "A Note on Scenario Planning." Harvard Business School Background Note 306-003, November 2005. (Revised July 2006.))

Scenarios differ from predictions based on straight-line extrapolations from the past; instead they deal with two worlds, the world of facts and the world of perceptions. They explore facts but they aim at perceptions inside the heads of decision-makers. Their purpose is to gather and transform information of strategic significance into fresh perceptions.

In 2011, LTD staff used a scenario planning process to inform the development of LTD's first Long-Range Transit Plan and identify a number of uncertainties that could impact the region's goals for transit (goals related to environment, economy, and social equity), and thus affect LTD's strategic planning effort. Since that time a great deal of analysis and exploration has advanced related to climate change, transit, and mobility, and technological advances are continuing the change the way we problem solve. LTD would like to engage in a new scenario planning process to help inform LTD and its partners' adaptive capacity to cope with change, adapt effectively and make strategic choices to successfully navigate the challenges ahead.

Project Lead

Tom Schwetz, Director of Planning & Development – Lane Transit District

Projects & Possible Deliverables

Scenario planning is a multi-step process:

- Step 1: How should we get started? Using the 2011 process as a reference, develop a scope for a scenario planning process and identify who should be involved.

- Step 2: Where are we now? – Establish baseline analysis. Identify factors and trends that affect the state, region, community and LTD/its partners.
  - Conduct a literature review of the key forces and trends that influence transportation and explore how these multiple trends interact, and their potential implications to transportation agencies. Key forces can include: government and politics, economics and finance, technology, environment and energy and demographic and societal factors.

- Step 3: Who are we and where do we want to go? Establish future goals and aspirations based on values of the state, region, community and LTD/its partners.
  - Review planning documents to better understand the guiding principles and future goals.

- Step 4: What could the future look like? Create baseline and alternative scenarios.

- Using the 2011 scenario planning study as a baseline, develop interview questions and conduct a new community assessment through interviews with interviews with Community Leaders and LTD Directors.

- Step 5: What impact scenarios have? Assess scenario impacts, influences, and effects. The next step is to explore the key uncertainties by mapping out the impact of the possible futures. Answer the following questions about what you learned through the literature reviews and interview responses of possible futures…
  - How likely are they to occur?
  - How impactful would they be?

- Step 6: How will we reach of desired future? Identify strategic actions that could be taken -- consider how these actions would impact investment choices and policy implications. What performance measures should be used to assess progress?
  - Review the Long-Range Transit Plan -

DECISION-MAKING FOR THE MULTIMODAL FUTURE

Background

As known and unknown modes enter the marketplace, decisions need to be made about parameters and rules within which these modes should operate (safety, travel impacts), equitable distribution of resources and mobility, and whether investments should be made to accommodate these modes at all. At the present time, cities around the U.S. are currently considering if and how to respond to emerging dockless and electric scooters and bikes. Social media is brimming with different examples of these types of mini mobility vehicles – they are touted as being more flexible than modes that limit a user to the location of docks, they are electric to get you to where you want fast and extend the distance you can go, and they are branded as the next "cool" thing. On the other side of the spectrum, where these modes are being operated, emergency rooms are seeing an increasing incidents of serious head injury from these vehicles, pedestrians/scooter conflicts pose a safety risk on sidewalks, law enforcement is challenged with intoxicated/impaired users, and dockless vehicles are being left in places that create sidewalk /bus stop clutter and impact ADA accessibility.

Project Lead

Development Planning Staff – Lane Transit District
Transportation Planning Staff - City of Eugene

Projects & Possible Deliverables

- How do communities choose which new advancements help achieve strategic objectives and should be considered for incorporation and which advancements result in a deviation? What are the lessons learned from other communities that are experimenting with new mobility options?

- Who needs to be at the decision-making table? What are the roles of LTD, cities, and other transportation agencies in deciding if and how new modes are deployed?

- Mobility innovation is largely being driven by the private sector – these companies often have different goals than public sector agencies. How can communities better work with the private sector

to ensure that their interests and values are protected (safety, equity, efficient use of public funds, etc.)? What does an effective public-private partnership policy look like?

- New Mobility Pilots – Pilots could be an effective way to test ideas before agreeing to full deployment of a new mode. What are the best management practices for planning for, executing and evaluating a mobility pilot project? How do you design pilot that can be scaled and what are the scalability factors after the pilot? What are the best ways to measure effectiveness of a pilot? How does the community decide if a pilot is appropriate for wider deployment?

STAGES OF CHANGE – STRATEGIES FOR TRANSPORATION BEHAVIOR CHANGE

Background

Point2point, formerly Commuter Solutions, was started by Lane Transit District in 1995 with regional partner agencies including Lane County, Central Lane Metropolitan Planning Organization (MPO), City of Eugene, City of Springfield, City of Coburg, and the Oregon Department of Transportation (ODOT) in order to help reduce reliance on single-occupancy vehicles (SOVs) and to help lower congestion in the Lane metropolitan area. This program serves as the Lane MPO Regional Transportation Options Program. This effort supports LTD's mission of providing transportation mobility options and choices for the traveling public. Point2Point works towards these goal by managing a variety of programs including: employer programs, ridesharing/carpooling/ vanpooling, outreach and community transportation education, school programs, campaign and challenges, the *SmartTrips* program, congestion mitigation, Lane County services, and conducts research.

Project Lead

Theresa Brand, Point2Point Manager – Lane Transit District
Point2Point Staff – Lane Transit District
Transportation Planning Staff - City of Eugene
I-105 Construction Management Team - ODOT

Projects & Possible Deliverables

- Point2point, with support from ODOT and regional partners, works on congestion mitigation strategies during construction disruption events and communicates with the general public, employers and schools on alternate options for travel during closures or extended delays. Study congestion mitigation strategies used in other cities for long-term/short-term disruptions. What are the best strategies to alleviate congestion through alternate transportation options? What are the most effective ways to communicate upcoming construction and alternate options? How often? What media(s) work best?
    - Test case: ODOT is planning construction projects on the I-105 ramps and bridge over the Willamette River that will be phased over the next couple of years (construction is anticipated to be complete in 2021). These are critically needed improvements but will impact travel across the river. Plan and test a communication strategy to alert travelers about transportation impacts and transportation alternatives to access their destinations.

- LTD would like to know where downtown commuters are coming from, the modes they take, and the routes they use to gain a better understanding of the area's travel shed. Interview 3 or 4 employers of different sizes in the region (e.g. City of Eugene, Lane County, LCOG, software, downtown business association members, federal building employees) to find out what neighborhoods employees are

coming from, the mode(s) they use and the routes they take under normal circumstance and during congestion.

- Driving downtown can present challenges when parking is not readily available, construction or events create traffic congestion. Some prefer not to drive for altruistic reasons – they want a greener lifestyle. Park & Rides provide options for travelers to use transit to access downtown. Evaluate the use of the existing Park & Rides in LTD's network – what amenities exist and the Park & Ride, what are the surrounding land uses, how many people use them, what time of day, what days of the week?
    - Planning for new Park & Rides – Review Park & Ride Plans developed by other transit agencies. What steps were taken to develop these plans? What processes/criteria were used to identify where new Park & Rides would be most effective in the future? Based in this learning, where do new Park & Rides make sense within LTD's network?

- Short Message Service (SMS) Messaging Pilot – LTD would like to know more about what prompts people to change their behavior related to transportation. This project focuses specifically on SMS campaigns and how they could be used to change behavior around transportation. How do you plan an SMS campaign? What software and tolls are used? What messaging is most effect at driving people to an action?
    - Look at examples of effective SMS campaigns – what makes them work?
    - Develop idea of promotions, outreach, and incentives to get travelers to opt into the system.
    - Consider how to segment travelers according to their geographical travel patterns.
    - Plan a campaign that could be deployed and tested for a local event such as the business commute challenge or Oregon Drive Less, for emergency situations like snow and ice, or for high travel events such as Track & Field meets

- Explore strategies to engage underrepresented communities regarding the Safe Routes to School program, active transportation options and LTD's new Student Transit Pass Program. What models work well in other communities in assisting with family travel planning? What are the best practice and tools/techniques to reach underrepresented communities? Explore other creative ways to target school travel.

- Research and propose a loyalty/rewards program - Loyalty and rewards programs can be effective at changing behavior by offering a "carrot" or making participation in a program fun, possibly competitive, community-building. Research other loyalty/rewards programs – private companies/other public agencies -- which programs are successful and why? What does it take to make these program happen? How can they be replicated here? What types of programs appeal most to students, parents, other demographic groups?
    - LTD plans to introduce an account-based electronic fare collection system and the State of Oregon is promoting a rideshare platform called *RideAmigos* – in what ways can these tool be leveraged to increase participation through loyalty/rewards/gamification?
    - Mini Neighborhood Campaign -- test an incentive program in a geographic area. An ideal location would be where disrupters – changes in neighborhoods – are occurring.

- Smart phones and tablets are often the primary tools to access online content. LTD's Point2Point employer page (https://www.ltd.org/p2p-for-businesses/) could be more effective if it were optimized to be more mobile-friendly and scalable to more devices. What would a mobile-friendly interface look like for LTD website content?

- University of Oregon transportation habits intervention for new students – What tools and strategies are effective to enhance new students' understanding of transportation choice? What are the best ways of communicating to new students? What would motivate students to choose alternatives to driving and what are the current barriers that need to be overcome?
  - Southern Oregon University has developed a program like this – review their program and conduct interviews with their program administrator to understand more about planning and administering a program.
  - Develop a program for incoming freshman students, focusing on student housing locations – on and off campus – to help them become more informed travels.

- Transportation Options Program Outreach – LTD would like to explore creative and interactive ways to display materials and enhance engagement. Research the tools and outreach techniques that are most effective around the country to interact with patrons regarding transportation habits.

TRANSPORTATION HUBS OF THE FUTURE – URBAN DESIGN

Background

LTD currently operates a system of fixed-route transit for the region as well as services to provide mobility for people who are unable to use the bus/EmX due to a disability. Users interface with the service at stops, stations and park-and rides. These stops/stations/park-and rides must be designed to allow safe and efficient ingress/egress of transit vehicles and safe and comfortable access for transit users. The existing infrastructure best accommodates users that walk, bike or use a mobility device and to a lesser extent drive (park-and rides). However, other current transportation modes (e.g. bike-share, TNCs) and future modes (e.g. autonomous vehicles, micro-transit), could extend access to frequent (15 minute or better) fixed-route transit beyond the normal walkshed/bikeshed. As demands for mobility change, the need for and design of the future transportation infrastructure may look different.

Project Lead

Facilities Management Staff – Lane Transit District
Transportation Planning & Urban Design Staff - City of Eugene

Projects & Possible Deliverables

- What are the design considerations for a future that is multimodal? Design mobility hubs at different scales and develop design templates, best practices, prototypes for mobility hubs (i.e. downtown station, outlying station, EmX station, and park and ride lot).
  - What kinds of modes should be accommodated at mobility hubs of different scales/sizes? Examples of what a mobility hub could include: bus stops/stations, bike share, dockless mobility, car sharing, kiss and ride, TNC pickup and drop off.
  - Consider how these hubs interface with roadways, sidewalks, bike facilities, dedicated ROW for transit, other public ROWs (e.g. utilities)
  - What amenities should be considered for these mobility hubs?

- Explore options for public-private partnerships – are there opportunities to integrate commercial/community uses?
- In developing a design, consider materials, energy needs (renewable?), landscaping, and cost.

FINANCIAL SUSTAINABILITY

Background

LTD's ability to sustain itself over the long-term and perpetuate its ability to fulfill its mission of providing the people in our community the independence to achieve their goals, and creating a more vibrant, sustainable and equitable community heavily depends on our short- and long-term financial sustainability.

LTD's primary source of operational funding is a payroll tax. As the name implies, this funding source is sensitive to changes in the economy which can cause increases and reductions in the payroll tax receipts based on changes in employment and wage rates. As a result, changes in the economy can have dramatic effects on service levels. For example, LTD had to implement an 18% reduction in its service in the middle of the last recession.

LTD's existing financial system and modeling currently utilizes the antiquated Tyler Eden ERP system and spreadsheets for all analysis and reporting. Resource constraints have precluded the development of predictive models that take advantage of new and emerging technologies. A huge opportunity exists for efficient, effective and more transparent use of public funds through the creation of dynamic, predictive models, implementation of grant tracking best practices and use of data visualization for reporting and informing the public.

Project Lead

Christina Shew, Finance Manager/Chief Financial Officer – Lane Transit District
Cheryl Munkus, Internal Auditor, Executive Office – Lane Transit District

Projects & Possible Deliverables

Delivery of one of more of the below projects would have a significant impact on LTD's long-term planning, efficient use of public funds and financial sustainability.

- Develop an effective business model that accurately predicts the future in a dynamic environment with changing assumptions, including, but not limited to changing resources, costs of service delivery and overhead, economic changes, infrastructure investments and technology. The business modeling tool should utilize assumptions, leading indicators, trends, statistics, etc. to accurately provide a 10-year financial picture and aid in decision-making for operations, infrastructure investments, etc.

- Develop a dynamic model that anticipates payroll tax risks based on economic factors and leading indicators. This model should include statistical, trend and other inputs (e.g. building permits, withholding taxes, etc.) to accurately predict payroll tax receipts and to proactively identify tax remit errors.

- Develop a new financial information web-based tool that improves public financial information transparency using data visualization and emerging technologies to make financial information more public-friendly. The new tool should increase efficiencies to deliver financial results for reporting.

- Identify best management practices in grant management through interviews with transit agencies that have a successful grant management programs. Deliver a research paper inclusive of and recommendations for implementing best practices for grant management (Federal, State and local) that increase efficiencies, ensures grant requirements are met, maintains accurate grant status and simplifies grant reporting, inclusive of but not limited to expenditures, in-kind support, etc.

PUBLIC INVOLVEMENT ASSESSMENT

Background

The evolution of media has made it easier for information to be shared. Increasingly, community members are asking for an earlier and more meaningful role in public policy development and decision-making. The desire for a more impactful role has increased expectations for public involvement. Agency staff must balance needs for technical analyses and public involvement within project schedules and regulatory requirements to determine the best use of available resources. Decision-makers must consider the policy implications and the positions of their constituencies. All the while, community members try to assess which public involvement opportunities provide access for the most significant input. Competing needs and inconsistent approaches can frustrate the best efforts and undermine important ongoing relationships with the public. An effective public involvement strategy should foster cooperation among these parties and support each in their distinct roles.

LTD strives to provide opportunity for high-quality interaction that fosters in-depth dialogue with community representatives, stakeholders, and the general public. We seek to engage diverse populations, with special consideration given to communities who may be underrepresented in traditional planning processes. Public involvement strategies should support two-way communication that not only assists LTD planning, but also educates people in the community of services available to them.

The purpose of the public involvement assessment is to provide LTD insight on how to more effectively involve the public at the various stages of planning, policy-making and project development and implementation. It should: evaluate and consider ways to improve current practices; develop recommended guidelines for future public involvement programs and activities; and recommend strategies to ensure coordination and consistency across the agency.

Project Lead

Jennifer Zankowski, Senior Development Planner – Lane Transit District
Public Affairs Staff – Lane Transit District
Transportation Planning, Planning & Development and Public Works Staff, City of Eugene

Projects & Possible Deliverables

- Review other public involvement need assessment conducted in other communities and design and conduct public involvement assessment surveys/interviews. The purpose is to identify recommendations (both what LTD does well and should continue doing, are where there are opportunities for improvement to enhance the quality, coordination, and consistency of public involvement practices across departments and with agency partners.
    - Engage key staff members who conduct public involvement activities at LTD as well as community stakeholders/agencies who are recognized by their peers as having a high-level of experience in public involvement activities with LTD.

- Help LTD learn more about their existing and potential riders and how to best reach them -- Characterize LTD's target market and sub-market demographics -- who they are? How do they consume media and access information? How do they prefer to engage in a decision-making process? What are their expectation for on-going communication and participation? The purpose of this analysis is to seek equitable public engagement processes, and to identify best practices for soliciting meaningful feedback from LTD's market demographics.
    - Markets of interest include traditionally underrepresented populations (low-income, minority, non-English speakers, persons with disability, elderly populations), high school students, college students, daily commuters.

- Selecting the best public involvement strategy for a particular engagement is largely focused on who we are engaging, the level of decision-making authority these stakeholders have in the process, and the outcome that the effort is seeking to achieve. However…. on the LTD side, these choices impact budget, staffing and schedule, and on the stakeholder side these choices impact perceptions of transparency and collaboration. Conduct a cost/benefit analysis of different outreach strategies to help LTD better align public involvement resources with the desired outcomes of an engagement.

- Using Technology and Multimedia in Our Public Outreach Toolbox – stakeholders increasingly expect to receive information and provide meaning feedback in engaging ways and in a media format that is easy to use, familiar and which can be used at a time that is convenient for their lifestyle. Organizations are exploring technology and multimedia tools and techniques to meet these demands. LTD would like to know what new tools are available to both share information (one-way communication) and gather feedback from and/or dialogue with stakeholders (two-way communication). What are requirements for their use? Are there examples of these tools being successfully used in other communities?

- Assist LTD in the development of a district-wide outreach framework that guides public engagement strategies, establishes outreach targets, and outlines an evaluation process (see City of Eugene's Public Participation Guidelines). The guidelines should include best practices and innovative approaches to sharing information about planning projects, public engagement opportunities, service changes, etc.

BUS STOPS – LTD's GATEWAY TO THE COMMUNITY

Background

The Introduction of the report *From Sorry to Superb: Everything You Need to Know about Great Bus Stops* (Transit Center, 2018) says it best….

"Bus stops are the front door to American public transit systems: they are where half of transit riders wait for service, they are a visual representation of transit service in every region in the country, and they can and do serve all transit riders. Great bus stops are comfortable places to wait, surrounded by safe and accessible walking conditions – and they are important drivers of bus ridership and customer satisfaction. Great bus stops result from collaboration; careful design and placement; and continuous funding, maintenance, and improvement."

Jarrett Walker and Associates, on behalf of LTD conducted a pilot pedestrian network analysis (PNA) in 2018-2019 to identify areas where pedestrian infrastructure improvements would most effectively: address the needs of seniors, people with disabilities, the economically disadvantaged, and school children; make existing transit

customers' walking trips safer, more direct, and comfortable; improve pedestrian safety and comfort through design and operations; attract new transit and walking trips; and leverage other public and private investments. The analysis used a site selection methodology to select eight (8) high priority sites within the LTD's metropolitan network (this iteration of the effort excluded rural routes). LTD would like to further the efforts of the PNA by exploring the possible approaches and considerations for creating great bus stops within its network.

Project Lead

Hart Migdal, Development Planner - Lane Transit District
Urban Design and Neighbor Planning Staff - City of Eugene

Projects & Possible Deliverables

- Engaging the public in the PNA – the efforts of the PNA focused on eight priority areas and the data collection and analysis was conducted by transportation professionals. The report concluded with observations and recommendations for improvements. The next step would be to engage users of these eight high priority areas to help LTD and the City to share the findings, confirm that the findings are consistent with the needs of users, identify to additional needs, and help prioritize improvements. Develop an engagement strategy to achieve this goal.

- The PNA focused on the highest priorities areas within LTD's metropolitan network. Apply the methodology and lessons-learned from this process and public engagement to expand the pedestrian network analysis to other key areas within LTD's network. The following data was collected mapped and photographed as part of the PNA. Are there other criteria that should be explored?
  - Intersections (number of lanes being crossed, unprotected left-turns, crossing distance, signal crossing time, presence of lighting, presence of shade, presence of curb ramps/angle of ramps, tactile pads on ramps)
  - Sidewalks (posted speed limit, presence of sidewalk, sidewalk condition, sidewalk width, ADA ramps, landscape buffer, bike lane, street lights, presence of shade, on-street parking, number of commercial/residential driveways mid-block)
  - Bus Stops - Level of use (number of stops in area, routes served); Signage (is schedule posted, is map posted); Amenities (seating, covered waiting area, trash can, lighting, shade/trees, paved)

- *Bus stops are the front door to American public transit systems…* The National Association of City Transportation Officials (NACTO) principles for great bus stops tell us to treat bus stops as gateways to our system and remind us that universal design is equitable design. What do these guiding principles mean for the design of bus stops? LTD deploys a spectrum of bus stop types (from a pole with route number to stops with shelters and seating – these decisions currently get made based on needs (ridership/frequency of service), available public right-of-way, maintenance requirements, and available resources. Explore the design elements make a bus stop a gateway, and consider how these elements can be universally applied to different bus stop typologies.

- *Great bus stops are comfortable places to wait*…. What factors make a bus stop comfortable?
  - A rider's perception of safety? Stop amenities, such as shelters, lighting, and seating? Signage/information such as when the bus will arrive, or how to use the route? Design and conduct an intercept survey to learn more about riders' perceptions of safety and comfort.

- How does high ridership (lots of people at a stop) and/or transit frequency (how often a bus comes) factor in? Are there high priority locations within the LTD system that could benefit from a greater emphasis on bus stop comfort?
- What does comfort mean for people with disabilities, older people, and children? What does comfort mean for a daily commuter versus an occasional user?

- *Great bus stops result from collaboration…*Explore the partnership opportunities to improving and maintaining bus stops/access points to bus stops. What roles could other agencies play? Community and/or business associations? The private sector? How can LTD collaborate with other transportation providers (e.g. bike share, TNCs, micro transit) to encourage and complement transit use? What types of collaborations are successful in other communities?

- *Great bus stops result from continuous funding, maintenance, and improvement…*Explore strategies and partnership opportunities to ensure resources are available to improve and maintain bus stops. What are the potential cost-sharing models? Labor-sharing models? What are the possible models for on-going funding? Is there a role for advertising? What are the pros/cons as experienced in other communities?

- *Great bus stops are important drivers of bus ridership and customer satisfaction…* Explore what LTD riders think about the existing bus stops? What are the factors that contribute to these opinions? Develop a questionnaire and conduct surveys to help LTD better understand the ridership perspective on these relationships. What are the key takeaways? What are the difference between those that use stops with signed poles only versus stops with shelters and seating?

BIKE SHARE – MAKING CONNECTIONS

Background

In 2014, LTD and the City of Eugene collaborated on a study to evaluate the feasibility of bike share in Eugene to complement the University of Oregon's plans to launch a four-station bike share system on campus. Since that time, the PeaceHealth Rides program has launched and is experiencing both benefits and challenges. Some of the major benefits that bike share offers the community include:

- Providing an additional transportation option that, in combination with other transportation options, presents an opportunity to reduce dependence of automobile transportation;
- Enhancing existing transit services by providing a first-mile/last-mile option and an opportunity to relieve already over capacity transit services;
- Introducing new riders to the benefits of bicycling and spurring further investment in bicycling facilities; and
- Building on the community's reputation as a forward-thinking, bicycle-friendly community and using bike share as an amenity for potential employers, residents and visitors.

Some of the major challenges include:

- Ensuring that sufficient funding is available to support capital, expansion, and on-going operations as most bike-share systems are not economically self-sustaining from membership and usage fees alone;
- Understanding local policies that may limit the placement of stations.

Project Lead

Andrew Martin, Development Planner – Lane Transit District
Lindsey Hayward, Manager - PeaceHealth Rides
Reed Dunbar, Bicycle Coordinator - City of Eugene

Projects & Possible Deliverables

- How is bike-sharing being used now?
  - ** If U of O has access to PeaceHealth Rides GPS data ** analyze how the bike-share program is currently being used, what routes do they use, where people are going from/to, and are they using bike-share to get to transit?
  - ** If U of O does not have access to PeaceHealth Rides GPS data ** Conduct user intercept surveys to learn more about how the bicycles are used are where riders go. What are the factors that would make bike-share an attractive option for first-mile/last-mile travel? Dockless modes? Station placement? Cost? What are the characteristics/lessons-learned from other cities where bike-share is actively used to provide first-mile/last-mile travel?

- Expansion of bike-share services – What locations in the metro area make the most sense for bike share expansion? What are the characteristics (land use, number of and ratio of jobs/households, time of day of high activity, presence of bike lanes/trails, etc.) for an ideal bike-share station? Which LTD stops/EmX stations would make sense for co-location with bike share?

- There are communities within LTD's service area that have infrequent or limited fixed-route transit service (e.g. Bethel neighborhood, Springfield, communities on the edge of Eugene's urban growth boundary, small cities such as Cottage Grove, etc.). Based on the experience of other communities, what factors would make bike-share a viable alternative to enhance mobility in these communities?

SMALL CITY MOBILITY

Background

LTD fixed-route services are most "useful" in areas with characteristics that facilitate high ridership (land use density, closer proximity of destinations, linear routes, etc.) but are less effective in providing mobility for the outlying small cities in LTD's service area. LTD currently provides some level of service to connect outlying communities to jobs and services in the Eugene-Springfield metropolitan area. In comparison to urban routes, outlying routes travel longer distances, are less frequent and carry less ridership and are therefore more expensive to operate (LTD's rural routes account for 8% of overall service costs, but only 3% of overall ridership). These characteristics mean that is it less practical to increase frequency of fixed-route service to outlying cities – this service can only effectively address a portion of the mobility demand. Yet, mobility needs are increasing in these communities as people are choosing outlying communities for reasons such as the

desire for more affordable housing options and desire for a less urban lifestyle. These characteristics mean other mobility alternatives are needed to fill in the gaps.

Project Lead

Jeramy Card, Transit Service Planner – Lane Transit District
Maddie Phillips, Planner – City of Creswell
Ruth Linoz, Executive Director - South Lane Wheels, Inc.
Planning Staff - Lane Council of Governments

Projects & Possible Deliverables

- Conduct a literature review and analyze Census database resources to define the overarching types of mobility needs that small town communities have. Connections to the metropolitan area? Connections within the community? Connections to nearby destinations?

- Use the literature review to design and conduct a survey of small city residents – Where are people going on a regular basis (commute/day-to-day business) and on occasion? How they get to these locations now? What role could transit, bike-share, other modes take in providing mobility for these trips?

- Look at different business models for different modes (fixed-route; deviated fixed-route; bike-share; connector to other small communities (e.g. Creswell to Cottage Grove)? Who organization is best suited to manage rural mobility? Balance what the market is looking for with the realities of transportation operations? What are other small communities doing to provide mobility?

- If we move towards mobility-on-demand type services, how do we provide services for non-technology/smart phone users?

- What types of service models could provide mobility, access to amenities, and be economically viable?
  - What are the infrastructure needs for different modes?
  - What are the operating and maintenance considerations?
  - What are the policy implications for allowing other modes to operate?
  - Conduct a cost-benefit analysis of possible mobility solutions.

BIG EVENT TRANSPORTATION PLANNING

Background

In August 2021, Eugene will be the host of the International Association of Athletics Federation (IAFF) World Championships *Oregon21* – this international track and field competition will be world's largest sporting event in 2021. Eugene has a long history of hosting world-class track and field events and is fondly known as *TrackTown USA*, which makes the community the perfect place to host the World Championships for the first time in the United States.

Oregon21 will be held August 6, through 15, 2021 and will attract approximately 2,000 athletes and 3,000 members of the media from 214 countries. In total, the event is expected to attract approximately 55,000 spectators and visitors; many of which will be coming from outside of Oregon. While most of the sporting activities will be focused at Hayward Field at the University of Oregon, IAAF staff, athletes and team officials,

members of the media and spectators will be lodging, shopping, dining, and recreating throughout the community, and the larger region.

Project Lead

Jennifer Zankowski, Senior Development Planner – Lane Transit District
Transit Service Planning Team – Lane Transit District
Transportation Planning, Urban Design Team – City of Eugene

Projects & Possible Deliverables

- The large but temporary influx of people to the Eugene area will require creative approaches to plan for mobility needs and develop communication strategies to inform residents and visitors about how to get around during the event.
    - Explore how other communities develop mobility plans for large events? What mobility strategies work best? What modes do event goers find most useful? What are the safety and management considerations (e.g. helmets for scooter use, need for additional bike parking, etc.)? Which approaches make most sense for *Oregon21*?
    - Explore creative and effective ways to get the word out about mobility changes (e.g. temporary road closures, designated pedestrian-only zones, etc.) and mobility options during the event. These communication strategies should consider all parties that would be impacted – local residents, delivery services, pass-through travelers, as well as visitors. These strategies should also consider that not all visitors speak English so infographics, colors, symbols may be important.

- As the event is temporary, *Oregon21* also presents an opportunity to "test" transportation and planning strategies. Other cities have used special events to test strategies on public right-of-way that would normally be much more difficult to try – ideas such as pedestrian-only promenades, dedicated lanes for AV shuttles/transit/mobility on demand, dedicated bike tracks, pop-up parks, etc. are just some concepts that have been tested. What are the considerations for implementing a short-term pilot? What have other cities learned that could inform strategies for this community?

FLEET REPLACEMENT & CLIMATE ACTION PLANNING

Background

LTD seeks to reduce its greenhouse gas emissions in accordance with state and local goals. In 2007, the State of Oregon set ambitious greenhouse gas reduction goals seeking to achieve greenhouse gas levels that are 10 percent below 1990 levels by 2020, and to achieve greenhouse gas levels that are at least 75 percent below 1990 levels by 2050. Similarly, in 2014 the Eugene City Council took national leadership on climate action by adopting the Climate Recovery Ordinance, updated in 2016, to include some of the strongest greenhouse gas emission reduction goals in the nation. Under the Climate Recovery Ordinance, the City of Eugene has four goals – two focused on the community as a whole and two focused on city government operations.

Community Goals seek to reduce community fossil fuel use by 50 percent of 2010 levels by 2030 and to reduce total community greenhouse gas emissions to an amount that is no more than the city of Eugene's average share of a global atmospheric greenhouse gas level of 350 parts per million (ppm), which was estimated in 2016 to require an annual average emission reduction level of 7.6 percent.

City Operation Goals seek to make all City of Eugene owned facilities and operations carbon neutral by 2020, meaning no net release of greenhouse gas emissions and to reduce the City of Eugene's use of fossil fuels by 50 percent compared to 2010 usage.

LTD has conducted a greenhouse gas inventory of its operations in 2019 and understands that its owned vehicles make up its largest source of emissions. LTD also understands that its service is a greenhouse gas reduction strategy for the entire community. And, LTD seeks to understand best practices in development of a transit-focused climate action plan.

Project Lead

Kelly Hoell, Senior Development Planner – Lane Transit District
Kelly Clarke, Senior Transportation Planner – LCOG/MPO
Office of Sustainability - City of Eugene

Projects & Possible Deliverables

- Development of a Long-term Fleet Replacement Plan - LTD seeks to understand what vehicles it should look to invest in to be able to continue to offer the same or better levels of service while also seeking to reduce lifecycle vehicle costs including fuel and maintenance costs, and reduce environmental impacts such as local air pollution and greenhouse gas emissions.
    - What studies or plans have other transit agencies developed to identify near- and long-term fleet investments?
    - What is the state of the market for various bus technologies and low-carbon fuels? (i.e. battery-electric buses, hydrogen fuel cell buses, compressed natural gas buses, liquefied natural gas buses, biodiesel, renewable diesel, etc.)
    - What kinds of state legislation could help LTD to make lower-emission vehicles less expensive or easier to deploy?

- Development of a Climate Action Plan for LTD - LTD seeks to understand what approaches other transit agencies have developed in planning to reduce greenhouse gas emissions over time from all areas of transit operations.
    - What levels of GHG reductions have other transit agencies been able to achieve with their plans?
    - What guidance documents for climate action planning exist from resource agencies (example: APTA, The Climate Registry, FTA, etc.)
    - What approaches to climate action planning have other transit agencies or local government agencies taken?

SCYP LETTERS OF SUPPORT

Sustainable City Year Program

2017-18 TRIMET

Design, Engineering, and Planning Projects

Project	Outcome
A Front Porch for Marquam Hill & OHSU Design Studio	Developed proposals to provide access to institutions and amenities on Marquam Hill and the area from the southwest waterfront to Oregon Health and Science University.
Integrating Transit and Technology	Product design students designed a variety of multi-modal transit apps to broaden and improve TriMet users' experiences.
Bridgeport Village Transit Opportunities	Created concepts for sustainable transportation integration into future Bridgeport Village shopping center development.
Walkability and Placemaking in the City of Tigard	Generated concepts for connectivity, outreach, neighborhood identity, and affordable housing in the city of Tigard.
Barbur Boulevard: Designing a Model Civic Corridor	Developed concepts that blend the idea of Main Street as the "connective tissue" that enhances the assets, character, and heritage of adjacent Barbur Boulevard neighborhoods.
Active Transportation for Portland Neighborhoods (PSU)	Developed active transportation plans for the Barbur Boulevard/19th Avenue and Baylor/Clinton MAX station project areas.
Paid Parking Strategies (PSU)	Examined the implications of implementing a metered parking program in the city of Tigard.
Southwest Barbur Boulevard Stormwater Facilities (PSU)	Assessed existing conditions, collected data, and reviewed alternatives to determine preferred stormwater facilities on Barbur Boulevard.
Destination Tigard: Sustainable Urban Design Studio and Seminar	Developed urban design and city identity concepts for potential downtown Tigard station areas. Recommendations included a redesign of Hall Boulevard, smaller blocks, Fanno Creek improvements, and new public places.
Green Infrastructure and Transit Projects as Habitat Corridors	Generated plans and graphics demonstrating the benefits of integrating green infrastructure and transit-focused projects into urban ecology management.
Civic Ecology and Urban Design in Tigard (PSU)	Created an urban design vision for the future development of central Tigard including areas affected by the proposed light rail expansion project.
68th Avenue Station and Red Rock Creek Design Studio	Highlighted the area's transit-oriented redevelopment potential to energize the new station, and proposed several recommendations.

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SCYP Sustainable City Year Program

SCI Sustainable Cities Initiative

UNIVERSITY OF OREGON

Sustainable City Year Program

2017-18 TRIMET

Business and Economic Development Projects

Project	Outcome
New Mobility Ecosystem	Studied the future of urban transport and potential impacts of emerging technologies on the urban mobility ecosystem.
Autonomous Vehicle Budget and Revenue Implications	Examined how transportation revenue in the Portland Metro Area would be affected by the adoption of autonomous vehicles as the primary transportation source.
Tigard Transit Station Real Estate Development Potential	Used financial modeling to assess real estate investments and generated financial analyses of real estate developments in downtown Tigard.
Clean Energy Solutions: TriMet Community Solar	Examined the viability of TriMet as an anchor tenant for a community solar project using the community solar pathway being developed by the Oregon Public Utility Commission.

Law, Historic Preservation, and Journalism Projects

Project	Outcome
Autonomous Vehicle Federal Policy Implications	Researched federal autonomous vehicle policy development and related legal cases that may have implications at the local level.
Preserving South Portland	Explored repurposing the Marquam Hill synagogue and produced design concepts and strategies for historic preservation.
Community Profiles and Stories	Produced and managed creative projects conveying the Southwest Corridor project opportunities and constraints through videography.
Multi-modal Transit App Video	Created a video describing the development and process of creating a multi-modal transit app and the potential uses for TriMet.

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SCYP Sustainable City Year Program

SCI Sustainable Cities Initiative

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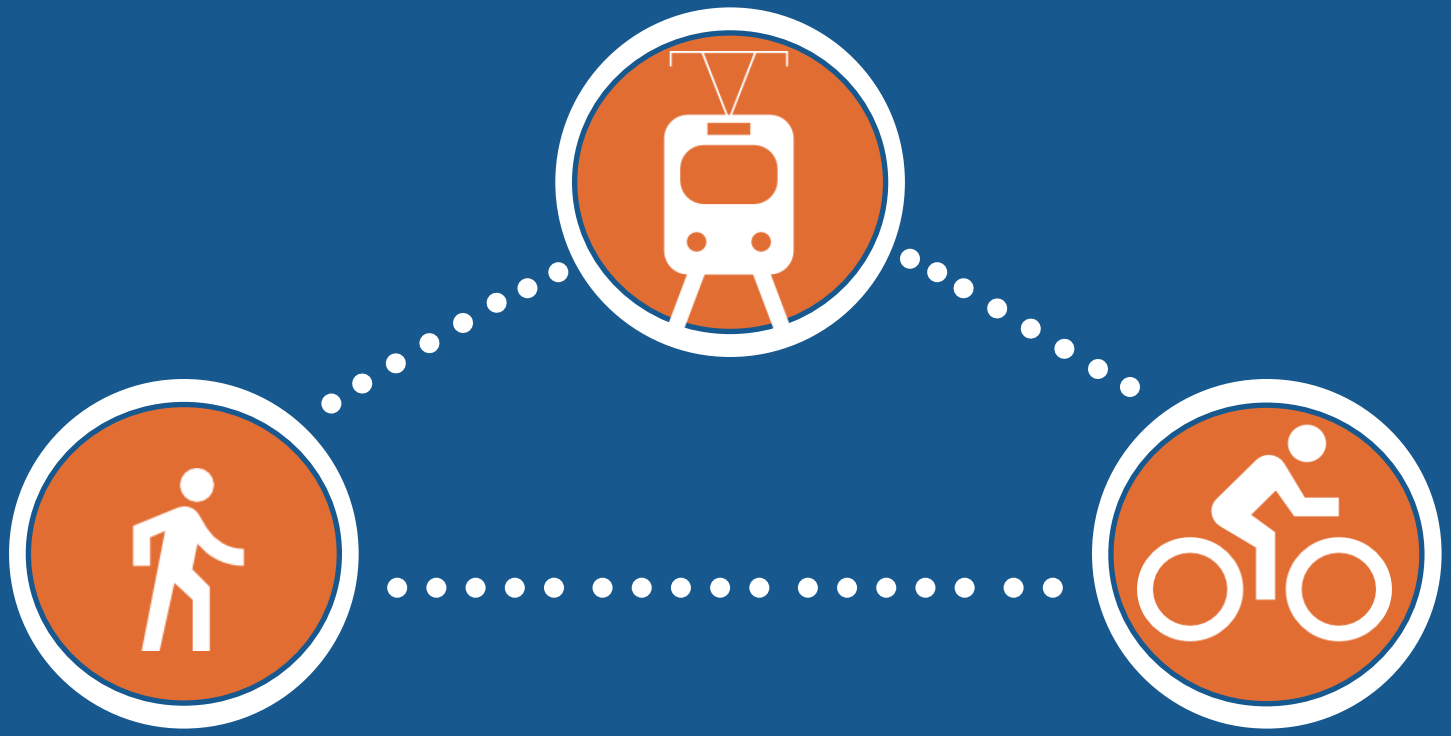
Sustainable City Year Program: Final Report

Opportunities for a Sustainable SW Corridor



Fall 2018

TRIMET

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Acknowledgments

TriMet would like to thank our partners at the University of Oregon and Portland State University who connected our agency with the bright young minds of their student bodies and instructed them throughout the Sustainable City Year Program (SCYP).

TriMet also thanks project partner staff who dedicated their time to helping SCYP students understand the priorities, concerns, and unique conditions of their respective organizations, disciplines, and jurisdictions.

Most of all TriMet extends a special thank you to the hundereds of students who worked tirelessly to help the agency envision a more sustainable future for the Southwest Corridor.

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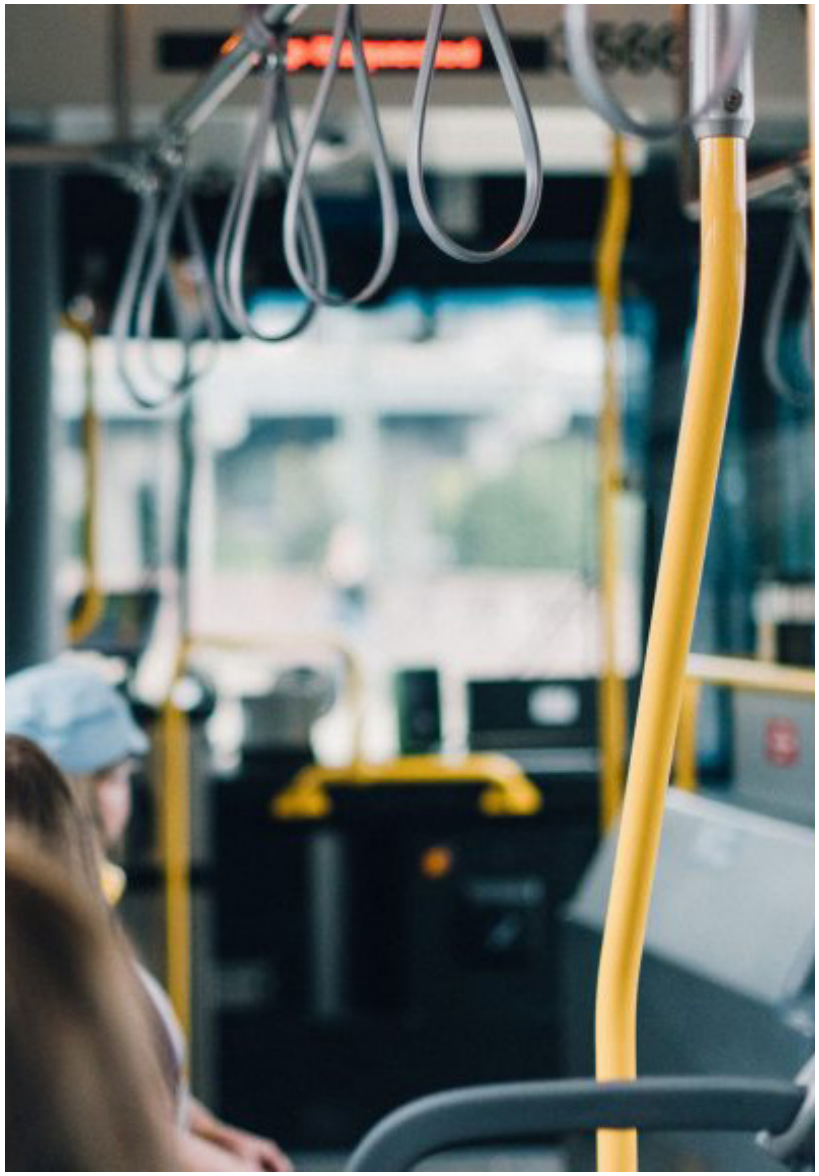
Stevens, Taylor
Stillman, Chrissy
Stolp, Isaiah
Stone, Emma
Stone, Jill
Strother-Blood, Jack
Sund, Nick
Tadei, Aaron
Tamang, Tshewang
Tariku, Samrah
Telomen, Chris
Templeton, Clarke
Thomas, Natalie
Tran, Aileen
Urban, Eric
Urbanovich, Katya
Vachiraadisorn, Michael
Waggoner, Brieanna
Walsh, Travis
Wandke, Paoa
White, Kelly
Whitney, Jenna
Whitney, Jess
Wierda, Tygue
Willeke, Jamie
Williams, Hillary
Winner, Megan
Womack, Alix
Wunderler-Selby, Althea
Xie, Qingyang
Ye, Yang
Young, Lauren
Zagorec-Mark, Ethan
Ziegler, Amanda

About TriMet
&
The Southwest Corridor

About TriMet

Led by General Manger Doug Kelsey, TriMet builds, operates and maintains the regional transit network in the tri-county region of Portland, Oregon. With 89 bus lines, five MAX lines, LIFT paratransit services and WES commuter rail service, TriMet provides more than 100 million rides annually and carries 45 percent of rush hour commuters going to the downtown Portland area. In 2016, TriMet ranked 11th in total system ridership, while ranking 24th in population (9th per capita).

These transportation options connect people with their community, while easing traffic congestion and reducing air pollution -- making the region a better place to live.



What Sustainability Means to Us

While sustainability can be defined in many ways, TriMet looks to fulfill its mission by providing quality transit service, constructing community and earth-friendly projects and incorporating sustainable principles into our daily operations. Collaboration with the Sustainable City Year Program (SCYP) on the Southwest Corridor Project will help us nourish the evolution of our regional projects as multi-faceted amenities that inform urban places and maximize the quality of our investments. The project's sustainability initiatives will benefit the region:

Transportation Systems to improve mobility. Great cities create congestion, but congestion does not create livable cities. Multimodal systems that support pedestrians, bicycles, autos, freight and high capacity transit are essential to well-designed cities.

Urban Ecology to create a sense of place. Good cities celebrate people, the spaces they share and the connections between them. To be truly sustainable, projects must observe a region's history and embrace the core values of all its citizens.

Economic Systems to sustain and expand the economic vitality of our region, and provide equal access and opportunity for all.

Landscape Ecology to support landscape diversity for the benefit of local species. In ecology, everything is related. When our local ecosystems are healthy, we are healthy.

Energy Systems to expand the presence of renewable energies within our cities. Localized, efficient point source energy production offsets energy usage to make energy distribution more economical, and helps reduce a city's carbon footprint.

History of the Orange Line

Through decades of building transit infrastructure, TriMet has learned the importance of leveraging large transit and modal access projects to move people and build sustainable cities. TriMet's most recent project, the MAX Orange Line, is a vital element in the region's strategy to manage growth, provide transit to under-served communities and deliver the environmental, social and economic objectives of the region. Opened in 2015, the 7.3-mile light rail line extends service from downtown Portland to Northern Clackamas County. During project design, an industry leading approach to sustainable design was employed. The project's Sustainability Plan combined dozens of identified sustainable strategies with an extensive community engagement process to build upon the existing assets of the communities and neighborhoods through which the Orange Line travels, setting a new standard in sustainable design.

Key sustainable practices on the Orange Line included

- Point source energy production
- Regenerative energy storage
- Energy efficiency
- Electric vehicle charging stations
- Use of locally sourced, low maintenance and resilient materials
- Recycling and reuse of removed materials
- Urban creek revitalization
- Habitat restoration
- Stormwater treatment facilities, including bioswales, eco-roofs and a first-in-the-nation eco-track segment

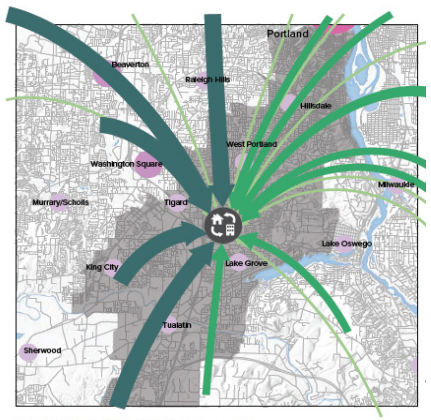
Lesson Learned for SW Corridor

The Portland-Milwaukee Light Rail Possibilities Project generated a wide range of sustainability opportunities for the Orange Line. The SCYP partnership captures the spirit of the Possibilities Project by harnessing the powers of student innovation and University of Oregon resources. This blend of tested agency best practices and university innovation evolves how transit projects apply the principles of sustainability. It highlights opportunities to add value during project development, building a foundation of sustainability within the project.

A Need for High-Capacity Transit Along the SW Corridor

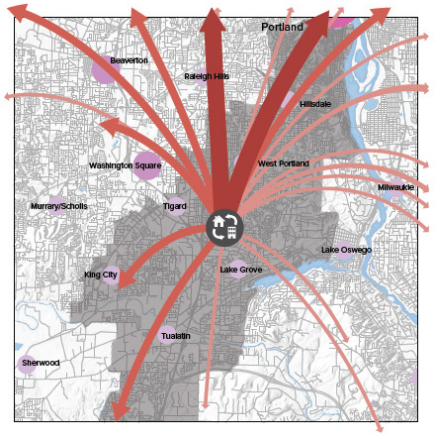
SW Corridor Travel Patterns

AM Inflow = 84,000



Source: Zone to zone flows - 2011 US Census LEHD

AM Outflow = 47,000



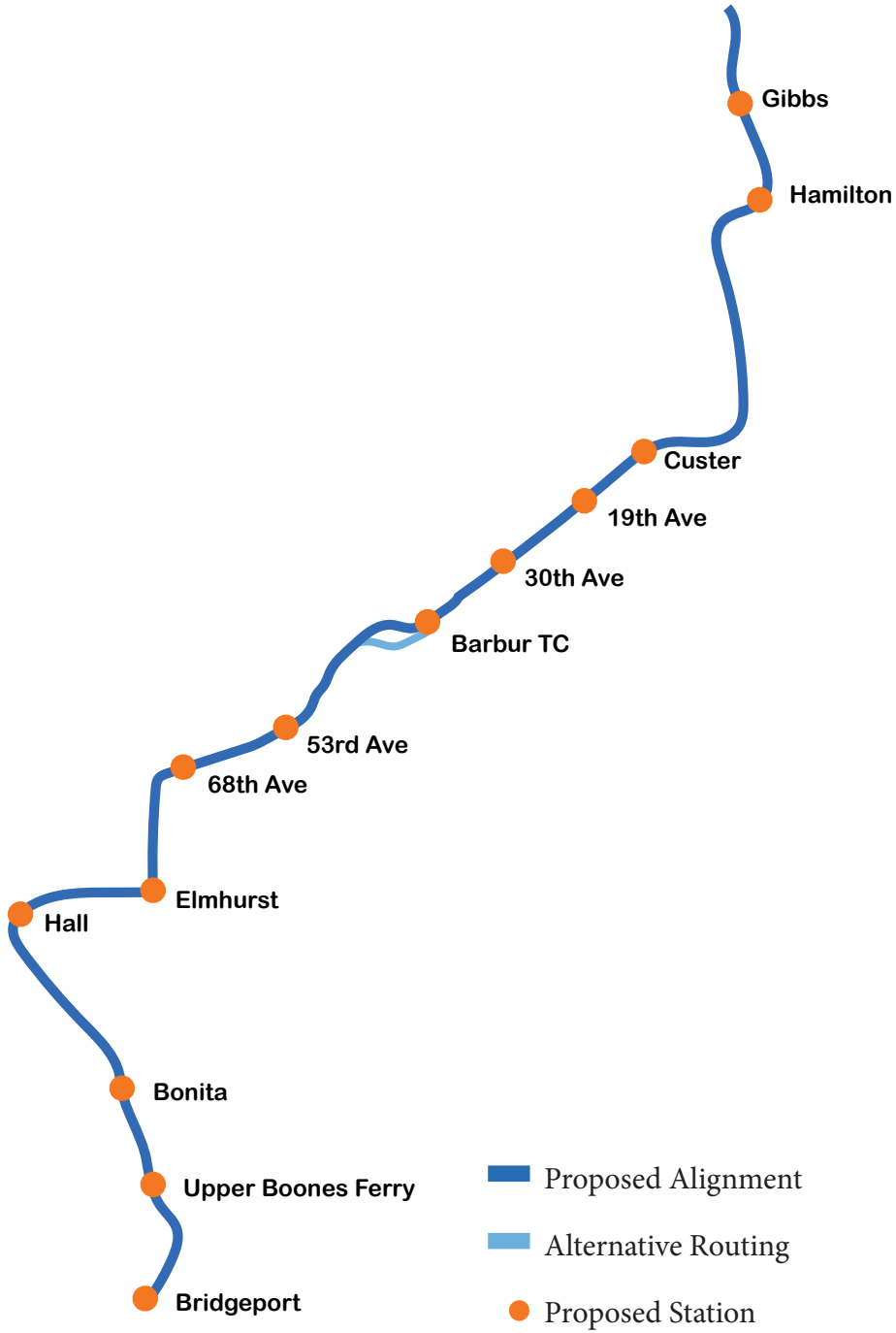
About SW Corridor Light Rail Transit

In August 2011, the Portland Metro Council established the Southwest Corridor Steering Committee, with partners engaging in a collaborative approach to develop the Southwest Corridor Plan and a Shared Investment Strategy to align local, regional, and state policies and investments in the corridor. TriMet and 10 partner agencies engaged in a consensus-driven, community-based development and placemaking planning effort. Partners included the cities of Beaverton, Durham, King City, Portland, Sherwood, Tigard, and Tualatin; Washington County, the Oregon Department of Transportation, and Metro. The Southwest Corridor study area – from downtown Portland to Bridgeport Village in Tualatin – contains 11 percent of the region's population, and is expected to grow by about 75,000 residents and 60,000 jobs from 2010 to 2040. In addition, the corridor provides 26 percent of the region's employment. The five colleges and universities in the corridor serve over 45,000 students, and some of the region's largest shopping destinations lie within the corridor.

Through this process, light rail transit (LRT) emerged as the preferred high-capacity transit investment for the Southwest Corridor. Project partners have since worked to refine the package of potential LRT alignments and associated roadway, bicycle and pedestrian projects. Engagement with SCYP was designed to advance the thinking and engagement of all partners around these topics, explore new ideas and identify opportunities.

In June 2018, the SWC project team published the project's Draft Environmental Impact Statement (DEIS) for public comment and Federal Transit Administration (FTA) review. Guided by technical review and public engagement, the Southwest Corridor Steering Committee voted to adopt the staff recommended alignment as the Locally Preferred Alternative. Since this adoption, TriMet and Metro have been working with regional partners as local jurisdictions vote to approve the Locally Preferred Alternative alignment. With the LPA adopted by project partners in fall 2018, a new steering committee will be formed by TriMet to advise the project team on subsequent decisions.

Locally Preferred Alternative

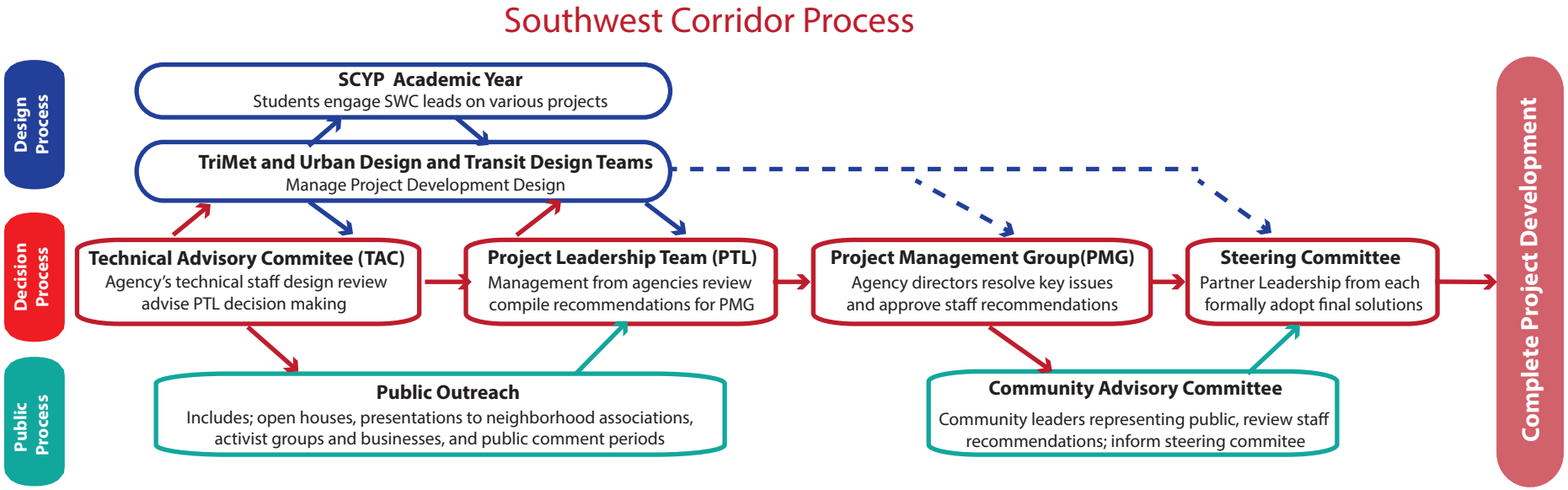


Milestones Ahead:

- At the time of this report's compilation, the Southwest Corridor project team is working on revisions to the DEIS with hopes of publishing the Final Environmental Impact Statement (FEIS) at 30 percent design completion in Early 2020. Once the FEIS is published, TriMet may apply and enter into the FTA's two-year project development window.

- In fall 2018 TriMet will advance design efforts for the integration of the Southwest Corridor's future MAX line into its surrounding environment. The urban design team's scope of work will include (but is not limited to) tasks related to streetscape improvements, station area planning, bike/pedestrian connectivity enhancements, and more.

- Early 2019 is the anticipated formal shift of stakeholder and partner coordination management from Metro to TriMet. Partner meeting ownership, community event organizing and project branding will fall within TriMet's scope.



Land Use Districts

South Portland

Located just south of Downtown and north of the I-405 bridge, the SW Corridor LRT's point of origin will serve as the line's urban gateway into Portland's City Center. The area is a walkable, bike-friendly, destination-dense, and transit-rich environment of varying scale development. With a brief last mile journey towards downtown, residents, commuters and visitors of the area alike will enjoy access to city center's melting pot of businesses, higher educational facilities, job centers, greenspace and public spacethat ties these elements together.

Stations:

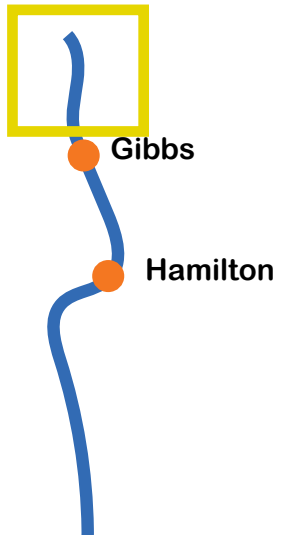
. Green Line tie-in

Major Structures, Utilities, and Assets:

. I-405 Bridge
. Downtown
. Dense transit, pedestrian and bicycle network

Opportunities & Challenges:

. Downtown connection
. Future shared-transitway for buses entering Transit Mall
. Connectivity to Portland State University



Lair Hill

Lair Hill sits on the Northern edge of the South Portland neighborhood between I-405 (to the north), SW Barbur Blvd. (to the south and west), and SW Naito (on the east). Today, the neighborhood is primarily comprised of mid-high price point single-family housing. Prior to extensive displacement during the development and implementation of the South Auditorium Urban Renewal Plan (the late 1950's), street widening projects, and the installation of I-405, Lair Hill provided affordable housing and a sense of tight-knit community for Italian and Jewish immigrants during the formative half of the 20th century, and later, African Americans during mid-century population shifts. Remnants of this neighborhood's past can be found in historic homes and religious facilities.

Stations:

. Gibbs St.
. Hamilton St.

Major Structures, Utilities, and Assets:

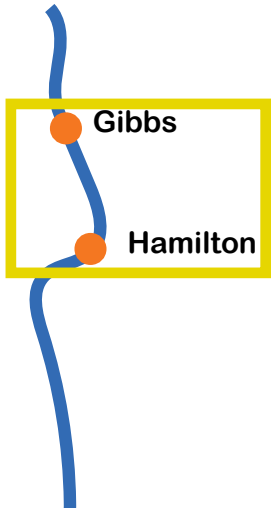
. I-405 Bridge

. Ross Island bridgehead

Opportunities & Challenges:

. Historic & pedestrian districts
. Pedestrian connection to waterfront
. Grade challenges of connecting to OHSU
. Mitigating impact
. Geotechnical challenges
. Joint development

Conceptual rendering of Oregon Health and Science University (OHSU) connection by ZGF



The Woods

The wooded segment of the SW Corridor line runs adjacent to a large-acreage greenbelt that includes Marquam Nature Park, Terwilliger Parkway, and George Himes Park. This expansive natural area is home to deciduous and pine forests and a diversity of animal species. Beyond the ecological functionality of the habitat, nearby trails serve hikers, runners and dog walkers. With no stops in this zone, riders will experience quick travel times and relaxing views through this portion of the corridor.

Stations:

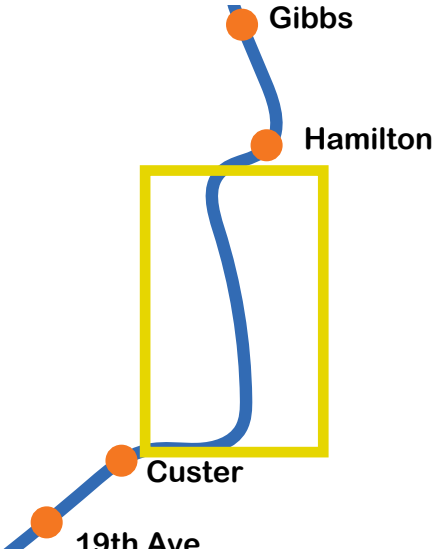
. N/A

Major Structures, Utilities, and Assets:

. Viaducts
. Capitol Hwy overpass
. Stormwater utility
. Terwilliger Parkway
. Habitat corridor

Opportunities & Challenges:

. Minimizing impact to surrounding ecosystem
. Grade challenges
. Shared transit way
. Crossroads/I-5 flyover



Historic Barbur

Prior to the construction of I-5, Barbur Blvd (W99) served as Portland's primary inlet for Southern Oregonians and interstate travelers. Key commercial nodes exist along this portion of the alignment, including those at: 13th, 19th and 30th Avenues, and West Portland Town Center.

Conceptual rendering of Barbur Blvd by ZGF

Stations:

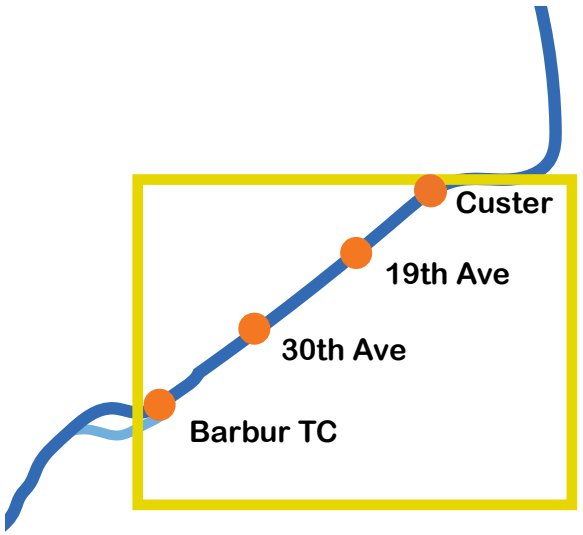
. Custer St.
. 19th Ave.
. 30th Ave.
. Barbur Transit Center

Major Structures, Utilities, and Assets:

. Multnomah Ave. & 26th Ave.
. ODOT water quality facility
. Historic signage

Opportunities & Challenges:

. West Portland Town Center TOD
. Enhance bike/ped facilities
. Riparian habitat improvements



Far Southwest

The "Far Southwest" area of the SW Corridor's alignment serves Portland Community College's (PCC) Sylvania campus, and the surrounding neighborhood. To enhance first and last mile connectivity from the 53rd Avenue station to PCC Sylvania, TriMet is considering the deployment of an autonomous shuttle circulator service between the campus and light rail station.

Stations:

. 53rd Ave.

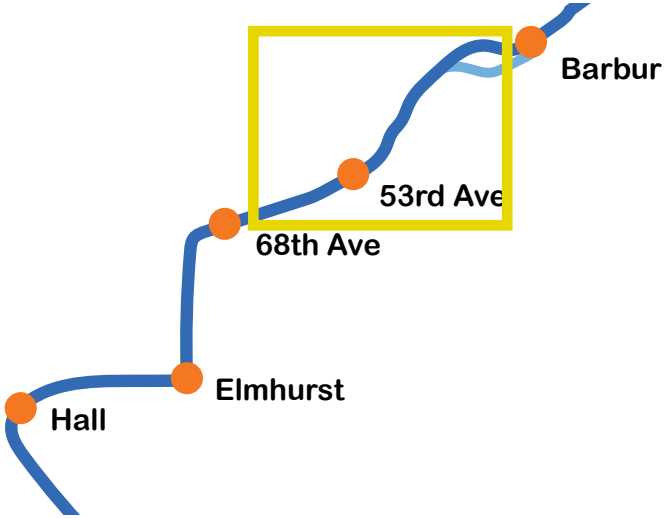
Major Structures/Utilities:

. I-5 flyover
. Systems building

Opportunities & Challenges:

. Natural area connection
. Student/employee connectivity
. PCC Sylvania autonomous shuttle

Conceptual rendering of 53rd Ave Station connection to PCC Sylvania by ZGF



Tigard Triangle

The "Triangle" is a triangular portion of town segmented from the rest of Tigard by freeways on three sides. Historically, the area has experienced poor bike and pedestrian connectivity within and between neighborhoods. It is also notable that this area is home to affordable commercial and residential spaces.

Conceptual rendering of boarding/alighting in the Tigard Triangle by ZGF

Stations:

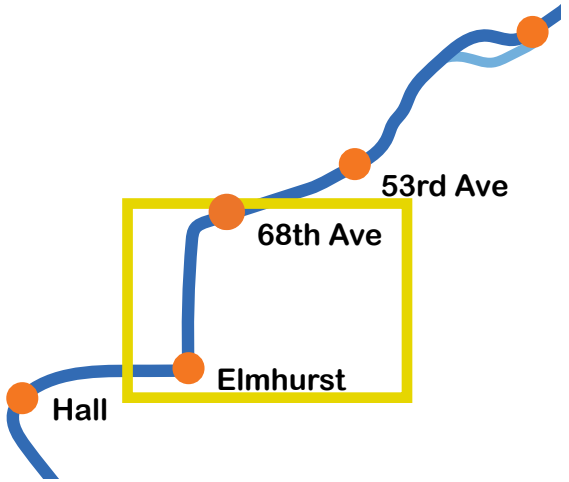
. 68th Ave.
. Elmhurst

Major Structures/Utilities:

. Highway 217
. Red Rock Creek

Opportunities & Challenges:

. Community development
. Transit oriented-development
. Riparian restoration
. Connecting planned affordable housing
. Mobility hub design
. Promote housing affordability



Downtown Tigard

Downtown Tigard is home to a diversity of locally-owned businesses ranging from small boutique shops to restaurants with light industrial uses and Tigard's civic campus just to the south. The city's extensive plans to improve bicycle and pedestrian connectivity will play a key role in connecting transit riders to the light rail station.

Conceptual rendering of East of Hall station by ZGF

Stations:

. Tigard Transit Center

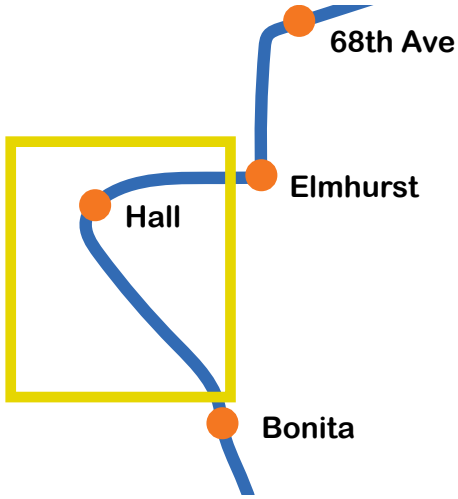
Major Structures/Utilities:

. HWY 217 overpass

. Red Rock Creek

Opportunities & Challenges:

. Stormwater and floodplain mitigation at operations and maintenance facility
. Limiting property impacts
. Improving bike/ped connectivity
. Wetland enhancements



Rail Road to I-5 Right of Way

This portion of the alignment runs adjacent to I-5 with proposed stations at Bonita and Upper Boones Ferry. In this section of the alignment LRT will also run along a portion of the existing rail corridor. This district is heavily vegetated and contains environmentally sensitive riparian habitat. There are proposed rail crossings over Fanno Creek tributaries within this portion of the alignment at 72nd Ave. and Bull Creek.

TriMet WES Line

Stations:

. Bonita
. Upper Boones Ferry

Major Structures/Utilities:

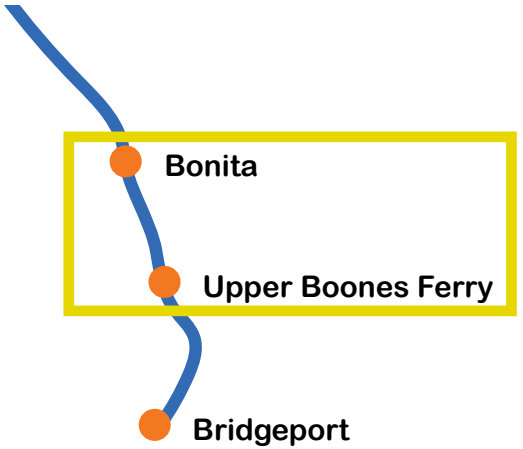
. Bonita overpass
. Bonita/UBF underpass

Challenges:

. I-5 as a barrier to bicycle and pedestrian access

Opportunities:

. Habitat improvements
. Railroad corridor



Bridgeport Village

Bridgeport Village is both a major employment center and major destination center with 75 retail stores, 12 restaurants, a large movie theater and community events programming. As the southern terminus, Bridgeport Park & Ride will serve as a major connection point for existing and future transit commuters who live, work, or recreate within the SW Corridor.

Conceptual rendering of Bridgeport Terminus by ZGF

Stations:

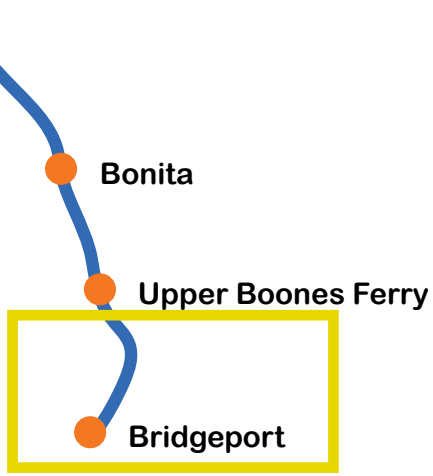
. Bridgeport Village Park & Ride

Major Structures/Utilities:

. Stormwater
. I-5 on-ramps and off-ramps

Opportunities & Challenges:

. Transit-oriented development
. Mobility hub design
. Mitigating impact to community serving businesses



Welcome to the Sustainable City Year Program

What is SCYP?

About SCYP

The Sustainable City Year Program (SCYP) was a year-long partnership between SCI, TriMet and a handful of other stakeholders in which students and faculty in courses from across the University of Oregon collaborate with a public entity on sustainability and livability projects. SCYP faculty and students worked in collaboration with TriMet staff through a variety of studio projects and service-learning courses to provide students with real world projects to investigate. Students bring energy, enthusiasm and innovative approaches to difficult, persistent problems. SCYP's primary value derives from collaborations resulting in on-the-ground impact and expanded conversations for a community ready to transition to a more sustainable and livable future.

About SCI

The Sustainable Cities Initiative (SCI) is a cross-disciplinary organization at the University of Oregon that promotes education, service, public outreach, and research on the design and development of sustainable cities. They hope to redefine higher education for the public good and catalyze community change toward sustainability. Their work addresses sustainability at multiple scales and emerges from the conviction that creating the sustainable city cannot happen within any single discipline. SCI is grounded in cross-disciplinary engagement as the key strategy for improving community sustainability. SCI's work connects student energy, faculty experience and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About the SCYP Final Report

This document aims to draw from the recommendations found in the SCYP student reports to identify and distill key opportunities for the integration of sustainable policy and design into the SW Corridor LRT Project. The project team and associated consultants may use this document as a compliment to the Conceptual Design Report. However, the student work described in this report is not intended for direct adoption or application to the Southwest Corridor LRT project. The integration of any student ideas outlined in this report will be dependent on feasibility, the availability of funding, stakeholder support, public-private partnership discussions, adequate right-of-way, future technology constraints and more. In this sense, the following chapters of the SCYP Final Report can be thought of as a menu of ideas for the urban design team and transit engineering team. The possibilities presented will include broad corridor-wide themes capable of establishing consistency throughout the project and smaller-scale recommendations tailoring these broader themes to fit the unique context of each project segment and character zone, allowing the SW Corridor LRT project to better integrate into surrounding neighborhoods and environmental contexts.

Why Student Engagement?

TriMet Specific Benefits

SCYP allowed project partners to collaborate outside the standard stakeholder engagement process, culminating in more casual conversation and freeflowing brainstorming.

Partnering with the Sustainable Cities Initiative allowed TriMet to turn a relatively small capital investment into 50,000 hours of forward thinking work and hands-on learning.

Allocating projects to a diverse body of students allowed TriMet to receive undergraduate and graduate work products from 12 academic specialties ranging from law to landscape architecture.

Collaborating with local students has given TriMet the opportunity to inform students on span of benefits and opportunities associated with a career in transit.

Broader Social Benefits

The SCYP partnership enabled TriMet to support public education -- particularly as it relates to transit. Student participants gained a better understanding of the planning and design process, as well as the numerous functions of a transit agency.

In addition to supplementing public education, SCYP contributed to the development of tomorrow's workforce. Participating students received the opportunity to engage in hands-on learning, networking and skill development. Additionally, students across disciplines learned to integrate sustainability principles into their areas of academic interest.

Youth engagement is effective in developing an informed and civicly-minded public. Ideally students affiliated with SCYP gained knowledge on transportation topics relevant to their lives, accomplished in voicing their ideas/opinions, and given an opportunity to be heard by TriMet and other regional partners.

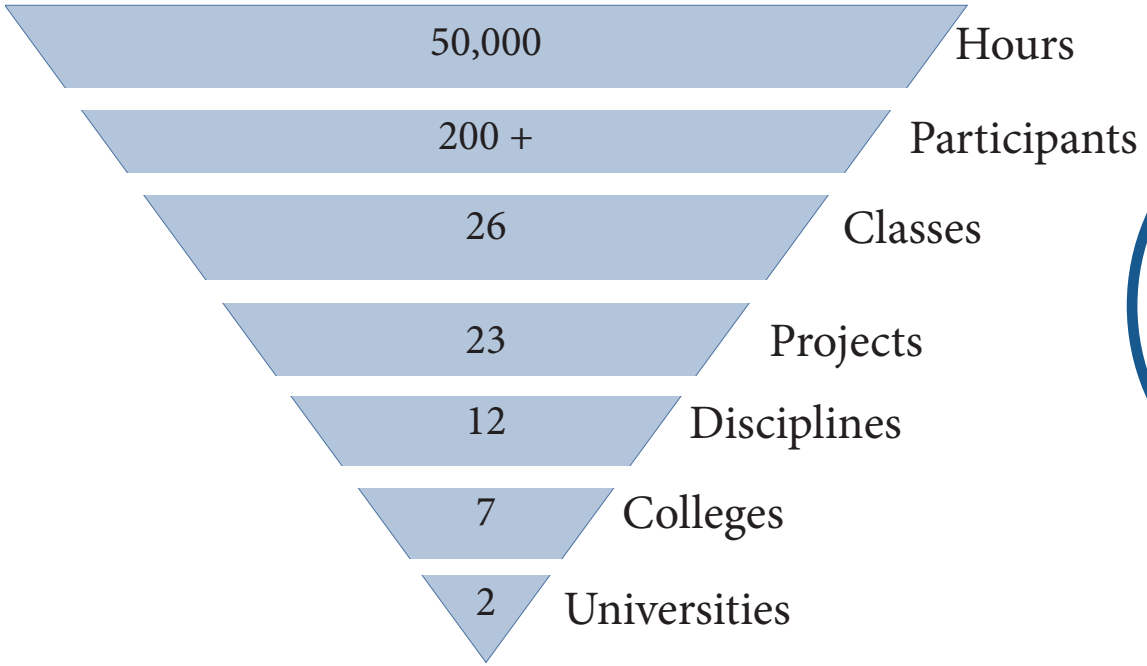
In-depth community engagement allows for more informed planning, design, and decision making processes for TriMet and other public organizations.

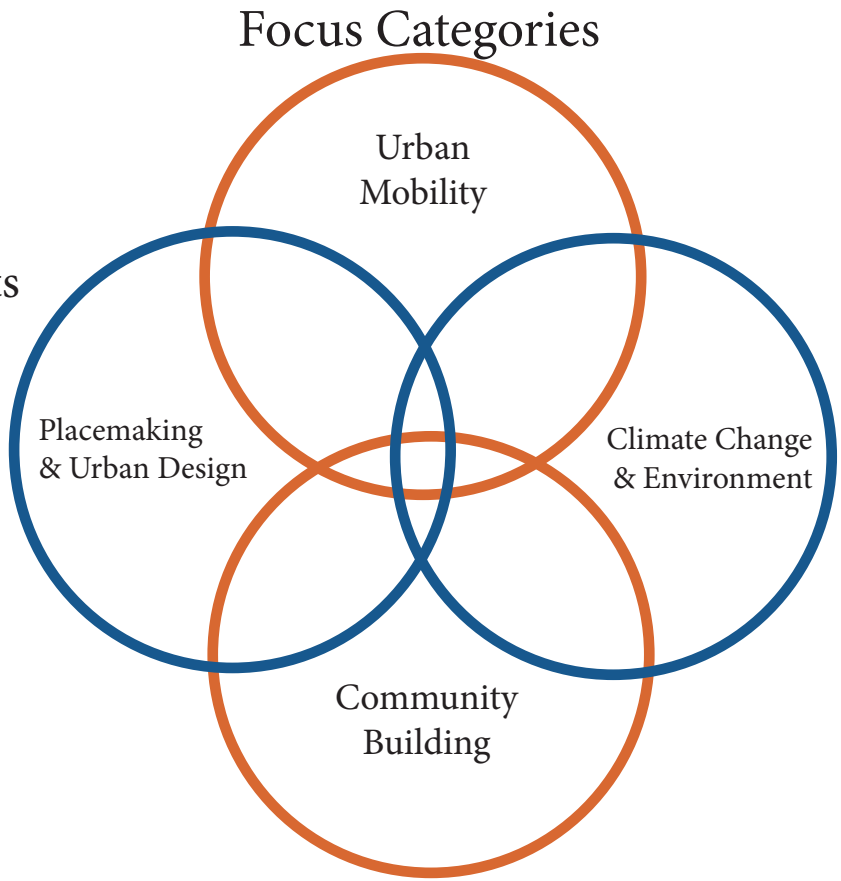
Key SCYP Stats

By the end of the 2017-18 academic year, the process resulted in 24 projects across 26 classes that engaged over 200 students across 12 disciplines in seven schools and colleges from University of Oregon and Portland State University.

The disciplines included: Law, Business, Architecture, Landscape Architecture, Planning, Urban Design, Real Estate Development, Ecology, Journalism, Engineering, Historic Preservation, and Product Design. Students provided approximately 50,000 hours of study addressing issues related to the SW Corridor project. Reports summarizing the efforts of each project were completed by students hired by SCYP.

Across all the engaged courses, over 400 ideas were presented. At the end of each term, final reports were given to TriMet that capture original project objectives, the processes and framework students operated within, and all proposed ideas and key recommendations generated by students. With this compilation, common themes emerged that best inform project staff on how efforts addressed the project goals and objectives.





Project Categories

Urban Mobility: relates to both the physical and technological aspects of moving people between places to relieve congestion and diversify mobility choices, provide active transportation to promote healthy lifestyles and implements technology to disseminate information, improve efficiency, and increase access to urban amenities.

Placemaking and Urban Design: relates to historical preservation, stimulating economic development, achieving adopted land use visions, providing essential amenities for neighborhoods, and delivering the core values of each community to expand our region's community and cultural resources.

Climate Change and Environment: relates to the preservation and restoration of natural features and habitat diversity, improving water quality, and installing renewable energies to reduce the impacts of the project on the environment and expand green spaces within the region.

Public Outreach: relates to engagement of neighborhood businesses and residents to identify core values and patterns, create guiding principles, and deliver conceptual design guidelines that celebrate and enlarge our cultural resources.

SCYP Reports Reflected SWC Priorities

Urban Mobility

AV Revenue Implications for Portland, Tigard, and Tualatin

Implications of Federal AV Legislation for Local & State Governments

Active Transportation Proposals for Portland Neighborhoods

TriMet Transit App

Sustainable Transportation in Tualatin

City of Tigard Paid Parking Policy

New Urban Mobility Ecosystem

Placemaking and Urban Design

Tigard Transit Center Development Potential

Urban Design & Land Use Concepts for Downtown Tigard

A Front Porch for OHSU and Marquam Hill

Tigard TOD & Urban Design Strategies

Barbur Boulevard: A Model Civic Corridor

68th and Red Rock Creek Station

Climate Change and Environment

SW Barbur Blvd Stormwater Capstone

Integrating Green Infrastructure & Urban Ecology in Regional Transit Corridors

Clean Energy Solutions: Community Solar

Powering the SW Corridor

Community Building

Preserving South Portland

Rider Profile Video

Business Profile Video

SCYP Overview Video

System Wide Considerations

* The following summaries highlight applied student research, but are not intended for adoption as-is or direct application to the SWC project.

Multimodal Network Connectivity

Transit Opportunities

Students envisioned service expansions of rubber-tire transit services to compliment LRT station placement. The SCYP process identified the opportunity for:

. Microtransit service connecting Barbur Transit Center to PCC Sylvania

. Express transit service connecting Tualatin to the proposed LRT terminus at Bridgeport Village

Walkability Opportunities

Students envisioned a SW Corridor with enhanced pedestrian connectivity. The SCYP process identified the opportunity for:

. Sidewalk infill

. Reduction of vehicle speed in pedestrian-dense environments

. Intersection treatments geared toward reducing pedestrian crossing distances and visually highlighting modal conflict points

Bikeability Opportunities

Students envisioned a SW Corridor with more complete regional bike network connectivity. The SCYP process identified the opportunity for:

. Protected bike facilities along Barbur Blvd.

. Greater bike access to WES

. Infill of dedicated bike facilities in low to mid density contexts

. Leveraging the installation of bikeshare stations to expand bike network accessibility to non-owners

Shared Mobility Solutions

Microtransit

Microtransit is a shuttle service that can be on-demand in real-time or fixed route service updated frequently to meet market needs. Companies can vary by fleet type (buses or vans), route structure (fixed or dynamic), and, more recently, fleet ownership. Microtransit is distinguished from private shuttles because, in addition to being available to the public, of its ability to automate routing, billing, customer feedback and reservations. SCYP students briefly described a mobility system akin to microtransit as a potential solution to first and last mile connectivity issues in suburban contexts, such as Tualatin.

Bikeshare

Bike sharing is a system of bicycles that is available to users to access as needed for point-to-point or round-trip trips, traditionally to station kiosks in dense urban areas. Docked bikeshare systems are generally unattended and offered through public-private partnership. Advances in bikeshare locking technology have allowed for dockless, free-floating bikes, lockable anywhere within a geographic region. This model is becoming increasingly popular; vendor companies are often fully privately owned and operated.

SCYP students envisioned a future bikeshare network that works in tandem with TriMet's system to provide seamless first and last mile solutions for riders. The adoption/expansion of bikeshare in suburban contexts was one key action item identified through the SCYP process. Students conceptualized a hypothetical "BikeTualatin" system,which proposed the integration of shareable bikes into station and station-area planning. The app platform for their BikeTualatin system included ideas for community development programing, including: mileage boards, community health challenges, and promotions at local businesses.

Carshare

Car Sharing programs allow people to access a shared fleet of vehicles on as-needed, per-hour or per-mile basis for point-to-point or round-trip trips. Car Sharing programs reduce the need for businesses or households to own vehicles, and they also reduce personal transportation costs and vehicle miles traveled (VMT). SCYP students conceptualized the integration of carshare dedicated storage spaces to be an important action item in facilitating shared-mobility network expansion. Carshare services could partially meet first and last mile connectivity demand between light rail stations, employment centers and neighborhoods.

Van/carpool

Providing residents of the Portland metro area with the platform, assistance and tools necessary to coordinate shared rides is essential in reducing the time, effort and social network barriers of entry to carpool commuting. Vanpool platforms and services coordinate carpooling between commuters traveling from similar points of origin to similar destinations, allowing commuters from unaffiliated organizations to connect, schedule pick-up and drop-off, plan travel routes and (in certain cases) utilize dedicated vanpool vehicles. SCYP students did not do a deep dive into the subject of vanpool, but conceptualized it as a new mobility topic for further thought.

E-Scooters

Scooter share is a system of electric scooters whereby customers use an app to rent and ride to their destination and then park the scooter in a similar fashion to parking a bike. SCYP students envisioned the integration of electric scooter share into Portland's transportation ecosystem. PBOT recently launched an e-scooter share pilot program. Under the City of Portland's pilot, e-scooters are legal to ride with a helmet both on-street and within dedicated bike facilities. Data collection and resident feedback will assist the City in assessing the feasibility of permanent scooter-share deployment. Preliminary results of the city's scooter user survey show that locals and tourists are both using electric scooters to replace automotive trips (both by personal vehicle and by transportation network companies such as Uber or Lyft).

Rideshare

Transportation Network Companies (TNCs), such as Uber or Lyft, match drivers with riders in real-time through mobile apps. These platforms typically operate through a network of third-party contractor drivers using non-commercial vehicles. They typically offer several ride types, such as private ride (along the lines of a traditional taxi), and pooled-ride/fare splitting (in which multiple users with origins and destinations along a similar route can hail the same driver in real time). SCYP students advocated for the integration of established TNC pick-up and drop-off zones into station and station area planning to promote efficient boarding/alighting, as well as prevent obstruction to general traffic. Use of these zones could be chargeable to either the TNC or ridesharing the zone via geofencing.

Emerging Technology Topics

Renewable Energy

In pursuit of agency sustainability goals, TriMet is seeking opportunities to supplement, if not replace, traditional energy consumption with renewable energy sources. SYCP students identified solar as the most promising on-site renewable power generation option. According to their proposal, installing solar panels on the roofs of all stations and Park & Rides could generate up to 44% of all station energy demand. In addition to power generated from the installment of on-site solar technology and TriMet's use of regenerative braking technology (which harnesses and stores heat energy generated as trains brake), a power purchase agreement with a PGE approved energy supplier could cover TriMet's remaining demand for renewable energy. Under a power purchase agreement (PPA) TriMet would purchase the necessary amount of energy from an off-site solar, wind, or hydro-power generation facility through PGE. This energy could be purchased from one or more existing facilities if they have sufficient capacity to accommodate TriMet's demand and/or co-fund the development of new renewable generation facilities.

* See Station Subsection for additional details

PPA Case Studies

At its most basic level, this concept is used to describe the generation of a new renewable power supply through the construction of a renewable energy infrastructure as a partnership between the developer and energy buyer. SCYP students identified two particular case studies of importance:

Metro System — Santiago, Chile
Santiago, Chile, has a subway system comprised of 64 miles of track and more than 100 stations. It is the city's largest energy consumer. Starting in 2017, Metro de Santiago agreed to a 15-year power purchase agreement to source 60 percent of its total energy from solar and wind projects installed in Chile's Atacama Desert. The power will reach the metro through Santiago's central grid. Additionally, academics believe adding photovoltaic (PV) solar panels to both the subway's stations and the ground adjacent to above-ground tracks can inject power directly to the train system, bypassing the central grid.

BART — SF Bay Area
Bay Area Rapid Transit (BART), under California Senate Bill 502, signed two 20-year renewable PPAs to increase the proportion of renewables in its energy portfolio. One agreement is with Recurrent Energy, involving the construction of a new 45-megawatt solar farm in Kern County (~300 miles from San Francisco) that is expected to be fully online by 2021 and provide power to BART. At present, BART consumes around 400,000 megawatt-hours per year.

Emerging Technology Topics

The Legal Landscape of Autonomous Vehicles (AV)

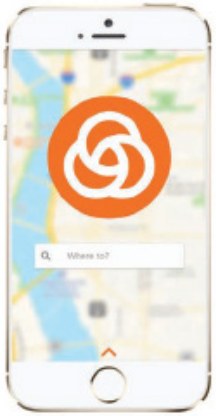
SCYP-affiliated law students played a major role in informing TriMet and other regional transportation stakeholders on the current status of federal legislation on autonomous vehicles. Their research focused on pending Senate Bill 1885, AV START (American Vision for Safer Transportation through Advancement of Revolutionary Technologies) – the companion bill to the House of Representatives' SELF DRIVE Act. This act provides the United States Department of Transportation (USDOT) with authority to establish rules governing autonomous vehicles. The development of the aforementioned regulations will be informed by the new High Automated Vehicle Technical Committee which will produce a Safety Standard Report to be signed off by the Director of Transportation. This report will include sections on system safety, data recording, cybersecurity, human-machine interface, crashworthiness, capabilities, post-crash behavior, account for applicable laws, and autonomous function. The language of the legislation could potentially preempt local officials from imposing AV regulations regarding these nine study areas of focus. The AV START Act would also culminate in the establishment of a Highly Automated Vehicle (HAV) Data Access Advisory Committee that would report every two years on issues related to the ownership and sharing of data collected by autonomous vehicles.

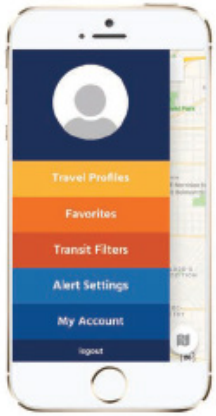
Even if the federal government opted to preempt state, regional, and local transportation officials from regulating autonomous vehicles, SCYP students pointed out that state and local policy may be able to indirectly influence the behavior of autonomous vehicles through their authority to regulate transportation network companies. TNCs (this is assuming that autonomous rides will predominantly be delivered through on-demand ride-hailing services). In the State of Oregon local municipalities have the authority to regulate for-hire transportation services. Additionally, the City of Portland has held preexisting data-sharing agreements with Uber and Lyft that could be grandfathered in under new federal legislation. Through this type of agreement mechanism and the underlying distinction between data collected by an autonomous vehicle and data collected by a smartphone app, it may be possible to catch data points related to autonomous TNC trips.

Emerging Technology Topics: Apps

Multi-modal App Development

As mobility options continue to evolve and expand, the topic of seamless multi-modal commuting continues to arise. Creating a unified payment platform capable of serving commuters as they transition between modes is a critical step in achieving this goal. An integrated smartphone app could serve transit, bikeshare, TNC trips, carshare, electric scooters and more – making first and last mile travel via shared mobility models easier than ever! SCYP students conceptualized and produced mock-ups of a multi-modal app that could also host a number of incentive features, such as: gamification, contests/challenges, and/or business promotions. It could also contribute to community building through the advertisement of local events and businesses.





App Mock-ups

Key Features

Multi-modal Integration: TriMet is interested in exploring the possibility of becoming a multi-modal mobility broker within the Portland metro region. Hosting a multi-modal app that connects transit riders with first and last mile pedestrian and bicycle travel information could be one of the agency's early steps in the direction of seamless multimodal travel facilitation.

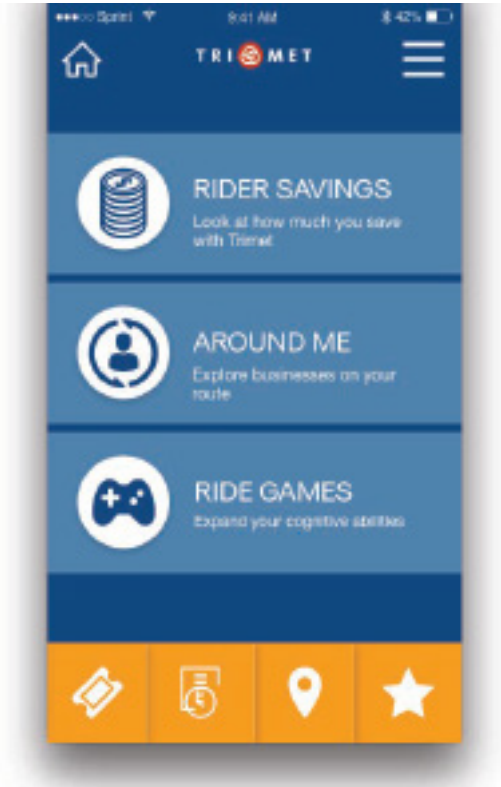
Trip Planning & Realtime Updates: SCYP students recommended that multi-modal trip planning ability should be programmed into TriMet's app for user convenience, as well as, the promotion of sustainable first and last mile travel behaviors.

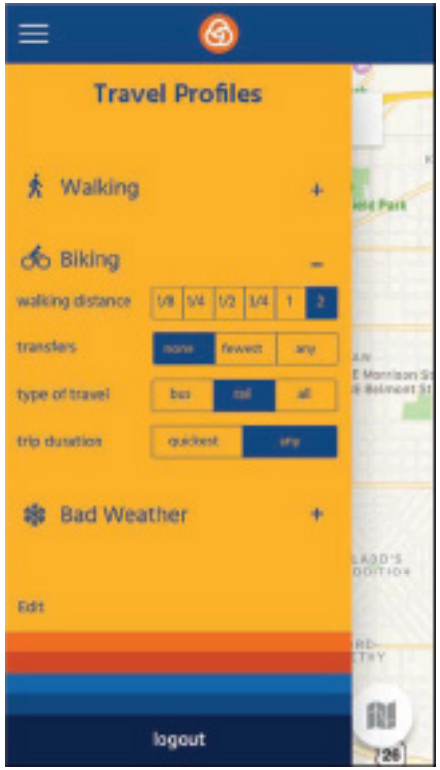
Payment Ability: Integrating payment ability into TriMet's multi-modal app would substantially streamline user experience. SCYP students imagined a platform where riders could purchase and save 2.5 hr, 1-day, 7-day, 14-day and 30-day transit passes.

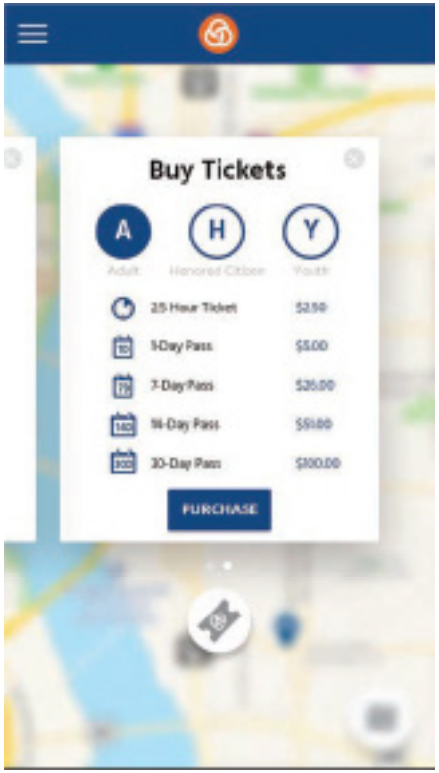
Gamification/Challenges & Incentives: TriMet's app could feature leaderboards, challenges, and games for riders to introduce an added component of fun and incentive to commuters. Riders who meet benchmark and milestone numbers/achievements could receive free or discounted transit passes or discounts and local businesses.

Community Events Calendar: SCYP students suggested the app could also feature a community events calendar with transit travel recommendations to promote community interaction/identity and mitigate special event generated congestion.

Student Designed App Mock-Ups







Transportation Funding & Revenue

In the emerging new mobility landscape it's important to consider how new transportation models and technologies will affect long-established revenue sources – and ultimately the ability for local and regional municipalities to fund transportation improvements. Often labeled "disruptive technology" new transportation models (such as autonomous driving systems, electric vehicles, or TNCs) could impact traditional transportation funding sources ranging from paid parking fees to gas tax revenue. SCYP students designed tax/fee funding packages that could be used as alternative and/or supplementary revenue options to counterbalance the impact of new technologies. Switching to use-based revenue models as well as electricity-based fuel taxes could potentially be important steps in ensuring electric autonomous vehicles contribute revenue toward transportation network improvements. Identified possibilities include:

Vehicle Miles Traveled Tax:

A tax on the number of miles a vehicle travels correlates more closely with a particular driver's contribution to congestion. This tax could be placed strictly on autonomous vehicles or all private vehicles.

Electric Charging Station Fees:

Generating revenue from the transfer of electricity from a vehicle charging station to an electric vehicle will become an increasingly important funding stream as EV make up an exceedingly large portion of the Portland metro area's fleetshare. SCYP students identified the possibility of franchising electric charging infrastructure to minimize maintenance costs and collecting franchising fees from owner/operators to fund the installation of more EV charging sites.

Mobile Business Tax:

Implementing a tax on the goods and service of "mobile" businesses would generate revenue from business that heavily utilize transportation infrastructure, including TNC services and package delivery.

Curb Access Fee:

If demand for TNC service continues to grow, as is projected, the installment of established drop-off zones may be important for preserving traffic flow. TNC use of these zones could be priced (using geofencing) to recoup revenue lost from the re-purposing of on-street parking.

Advertisement Revenue Tax:

Implementing a tax on on-board advertising in anticipation of TNC "marketainment" videos/audio in driverless TNC vehicles could provide substantial tax revenue for the infrastructure upgrades autonomous ride-share will require.

Bridge Toll:

Implementing a $2 toll on the Southbound lanes of major bridges within the City of Portland would generate user-based funding for much needed infrastructure upgrades to these critical regional connection points. Tolls could fluctuate with peak or real-time demand variability.

Parking Fee:

Expanding paid parking to both disincentivize single occupancy vehicle (SOV) travel behavior, as well as, accurately reflect the market value of car storage. Parking strategies could include flat fees, subsidies for transit riders and/or variable demand pricing.

Public Engagement Opportunity: Tigard Youth

Strategy

SCYP students suggested the Southwest Corridor team conduct extensive outreach to Latinix high school students in Tigard. Implementing a program similar to Y-Plan or Adelante Mujeres would engage, educate, and contribute to the professional growth of marginalized youth populations while simultaneously generating project feedback, establishing community ownership of the project through the planning/design process, and ultimately culminating in a more informed resident base with clearly defined preferences. Students engaged under the proposed program would receive extracurricular instruction in urban planning, participate in research to understand the local context and transportation/land-use issues at hand, and brainstorm solutions they believe would be in the best interest of their community.

Partnership Possibility: Y-Plan

UC Berkley's Y-Plan is a nationally deployed educational strategy/program that provides high school students with the instruction and tools necessary to engage civic projects within their community. Their five-module process helps students identify challenges in their community, understand the project context, create a vision for change, present their ideas, and compile their recommendations into an action plan.

Partnership Possibility: Adelante Mujeres

Adelante Mujeres is an Oregon based non-profit centered on the mission of empowering Latinas through the provision of education, mentorship, and professional development. Most recently, the organization collaborated with Washington County via their Civic Leaders Project to provide Latinas training on the topics of civil rights, power analysis, environmental justice, community organizing, and more!

Street Scale Opportunities

* The following summaries highlight applied student research, but are not intended for adoption as-is or direct application to the SWC project.

Character Enhancements

Overview

SCYP students sought to reimagine Barbur as a "civic corridor", as a civic corridor, a reimagined Barbur would honor the corridor's history as an icon mid-20th century gateway to Portland, while making key character enhancements to improve the functionality, aesthetics and overall livability of the corridor. The students' reimagined civic corridor, however, does not strictly cater to the needs of motorist. The SCYP process brought to light a plethora of options that would create an enjoyable urban space for pedestrians, bicyclists and transit.

- **Public Art:** Students believe the installation of sculptures, aesthetic/educational wayfinding and decorative street furnishings would foster a cohesive sense of community identity.
- **Pedestrian spaces:** Creating public plazas, parks and enhanced pedestrian walkways would provide residents and visitors alike with places to rest, recreate and socialize.
- **Preservation of existing character elements:** The SWC project team has the opportunity to capitalize on and enhance existing historic resources within the corridor through urban design and public art.
- **Landscaping:** Landscape architecture's benefit is multi-fold. Creating green public spaces holds benefits for the social and emotional wellness residents and riders in addition to its benefits for the wellness of our urban ecosystems.

Downtown Tigard Station Area concept

Key Student Identified Character Projects

Public Art:

- One student proposal identified the possibility of installing a sculpture garde near Taylors Ferry Rd. to enhance community character and stimulate pedestrian activity within the station area
- Architecture students tasked with envisioning the OHSU connection site conceptualized an artistic and educational repurposing of the space, including an underground walkway that could highlight the natural hydrolic and geological cycles of the Marquam Hill area

Preservation of character elements:

- Historic preservation students balanced the preservation of architecturally significant building facades with the need for housing densification by recommending the development of context appropriate infill, as well as, internal building conversions (i.e. large single family homes being internally converted to duplexes, triplexes, or quadplexes)
- Students concentrating on the Fred Meyer area identified the iconic and historic mid-century business signage within the station area of paramount importance to the character of Barbur Boulevard

Pedestrian Spaces:

- A majority of student groups included recommendations for the installation of both public plaza space and spaces for pedestrians to pause and rest, including: benches, street tree shading, educational wayfinding displays, landscaping, and public art
- A number of proposals spoke to the importance of installing ample and enhanced pedestrian facilities along waterways (particularly Fanno Creek, Stephans Creek and Red Rock Creek) to connect residents with their natural environment

Enhanced Landscaping:

- A multitude of student groups advocated for the removal of invasive plant species on and around the corridor to improve ecosystem health and create room for the planting of native drought resistant species that are capable of thriving and enhancing pedestrian comfort year-round
- One student group envisioned existing retention walls in active pedestrian areas being transformed into “green walls” for vine plant species.

Low-Stress Bike Facilities

Overview

SCYP students emphasized the importance of designing and constructing bike facilities that improve both safety and the perception of safety the corridor. Additionally, the students believe connectivity benefits make expanding the geographic reach of the region's bike network to be of extreme importance in facilitating sustainable first and last mile commuting behavior.

Student redesign of 72nd Ave right-turn

- **Install Safer Bike Facilities:** Utilize striped buffers, grade separation, landscaped buffers, ballards and protected intersection design to separate bicyclists from faster moving vehicular traffic.
- **Expand Bike Facility Network:** Install more dedicated bike facilities. Incorporate bikeshare into suburban bike networks.
- **Deploy Traffic Calming Measures:** Reduce the speed of vehicular traffic to create a more comfortable environment for walking and biking.
- **Visually Highlight Bike/Car Conflict Points:** Highlight conflict points with pavement treatments such as sharrows and green bike lanes with dashing at vehicular cross-over points.
- **Reduce Driveway and Intersection Conflicts:** Mitigate modal conflict through driveway consolidation and protected intersection design.

Samples of proposed BikeTualatin app

Key Student Identified Bike Projects

Safer Bike Facilities:

- One active transportation planning lab recommended the installment of 5' side-running bike lanes on all arterials within the project area with a minimum of 6' landscaped buffers separating cyclists from general traffic
- Planning students encouraged the installment of one-way climbing lanes and downhill sharrows in steep and constrained right of way (ROW) contexts

Traffic Calming:

- SCYP students encouraged city transportation officials to lower speed limits comprehensively in the interest of creating a more comfortable environment for bicyclists
- Some planning students advocated for the repurposing of general travel lanes to accommodate wider bike lanes and sidewalks
- One project renvisioned the portion of Hall Blvd adjacent to the station area as a "living street" woonerf design

Driveway Consolidation:

- Students identified the opportunity for driveway consolidation to minimize right hook bike/car conflict around the 19th Ave station

Network Expansion:

- A multitude of projects identified a greater need for dedicated bike facilities within suburban contexts (particularly within the Tigard Triangle and Tualatin)
- Students highlighted the opportunity for SW Corridor bike improvements to also enhance connectivity to WES

Highlight Conflict Points:

- Install sharrows on local/collector streets with speeding issues to visually communicate to drivers that they should be watching for bikes
- Paint bike lanes green and dash cross-over points for vehicular traffic to draw attention to modal conflict points

Intersection Treatment:

- Planning students suggested protected intersection design might be an appropriate and effective tool for mitigating right hook conflicts between bicycles and cars at high volume and high crash intersections

Comfortable Ped Environment

Overview

SCYP students understood and emphasized that travelers of all modes, from transit riders to motorists, spend a majority of their waking hours as stand alone pedestrians. The students believe that creating a safe and enjoyable pedestrian environment is essential for stimulating transit ridership and activating station areas, as well as promoting quality of life for residents and commuters along the corridor.

Pedestrian plaza design proposal

- **Sidewalk Network Expansion & Infill:** With 55% of Barbur lacking sidewalks on both sides of the street, students recommended extensive sidewalk infill efforts to facilitate first and last mile connections.
- **Crossing Treatments:** Marking crosswalks, minimizing crossing distance, constructing Z crossings over light rail tracks and installing RRFB near schools were all identified by students as action items for improving pedestrian safety within the project area.
- **Enhanced Street Amenities:** Installing benches, shelters, street trees, public restrooms, park space and more would provide pedestrians with a "cause for a pause" along the corridor.
- **Creating Destinations:** Activating future MAX station areas and creating enjoyable public space also hinges on the development of destinations, including: retail and office space, housing, public park, trails, art displays and more.

Pedestrian walkway proposal along Ash Ave

Station Area Opportunities

* The following summaries highlight applied student research, but are not intended for adoption as-is or direct application to the SWC project.

What Placemaking Means to SCYP Students

SCYP students defined placemaking as a series of strategies aimed at creating dynamic and public oriented space. A successful place is an area where social mixing is easy, encouraged and does not take extra effort. Normal barriers to participation are removed as much as possible, and it is easy to interact with other people and the environment.

- As defined in a planning context, placemaking is the action of working with a community to create engaging space utilizing public input and involvement.

- It can take many forms, and often does. Public art, park space, plazas and purpose build space are all a form of placemaking.

- It is not restricted exclusively to open or plaza space. Any area that has people present is a candidate for placemaking.

- Streets and streetscapes, retail and restaurant spaces, educational institutions, and municipal or public buildings are all candidates for placemaking.

In many ways, the concept of placemaking is a return to the original urban form prior to the industrial age. It brings people back into public space as the focus of activity and amenities and de-emphasizes modern more impersonal modes of transport and commerce. Placemaking as a practice is truly the art of community engagement. A successful place needs to take the desires of resident populations and projected future populations into account. Placemaking goes far beyond the physical: function must always outweigh form. A place can be constructed from the ground up, and it can also be created using what already exists. In each, however, maintaining robust, inclusive and constant public engagement and participation is paramount.

Downtown Tigard

Student Placemaking Strategies

Designing Urban Magnets

Students defined an urban magnet as a purpose built space centered on a particular activity or user group engaged in an activity visibly and enthusiastically. A public market, some student groups proposed, can act as an urban magnet. Other places such as parks, music spaces, retail or food areas, or other event space, can function as urban magnets. The space and size can vary, but people are the key to activating a magnetic environment. The idea is simply that people draw in more people. In this way, urban magnets act as a catalyst for increased activity in the public realm. Students identified six elements that make an "urban magnet":

1. An activity based subculture. The foundation being the activity and the group of people engaged in it.

2. Specialty retail that relates to the activity or group(s) involved.

3. Production space related to the activity.

4. Employment centers and opportunities. These can take many forms but are required to drive area employment and an influx of people.

5. Programmed community events. Pop up events and regular community events are key to keeping excitement and involvement high.

6. Urban form and design that facilitates easy gathering and mixing.

Creative Placemaking

The goal of creative placemaking is to revitalize a community by creative initiatives that animate places and spark economic growth. Effective creative placemaking works as a community development tool that fully engages community and allows them to "reimagine the possibilities of disused spaces." Reactivating disused space through creative placemaking "presents unique opportunities for public conversation around patterns of urban development, neglect, and reinvention, among local residents who are directly effected by these trends." Students identified three creative placemaking tools TriMet and partner agencies can utilize, including: activating public space, the installation of enhanced wayfinding, and community branding communication and outreach efforts. Creative placemaking has the ability to address several different areas of a community. Four different areas creative placemaking addresses are:

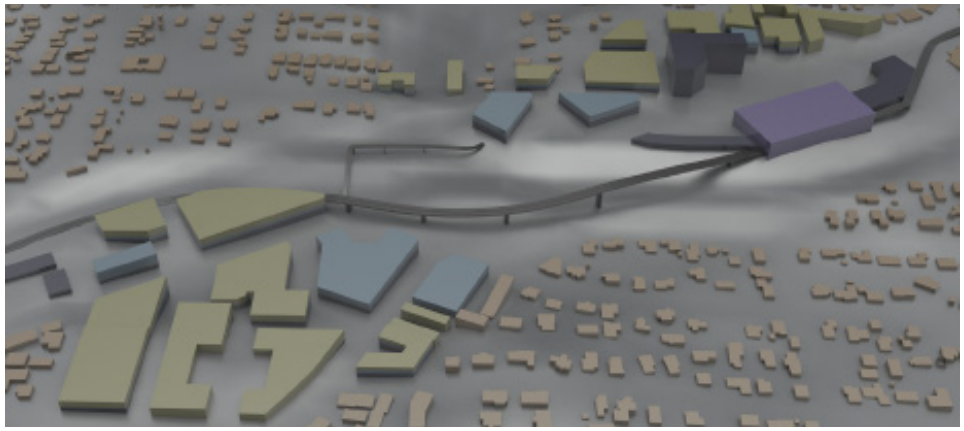
1. Fostering a common sense of town/city identity through mutually valued space and art

2. Meaningful collaboration with community members and local businesses

3. Creating a welcoming main street atmosphere

4. Preservation of existing community cultural resources

Why Mixed-use Development?



Students envisioned what West Portland Town Center might look like in 2050

Live . Work . Play Design

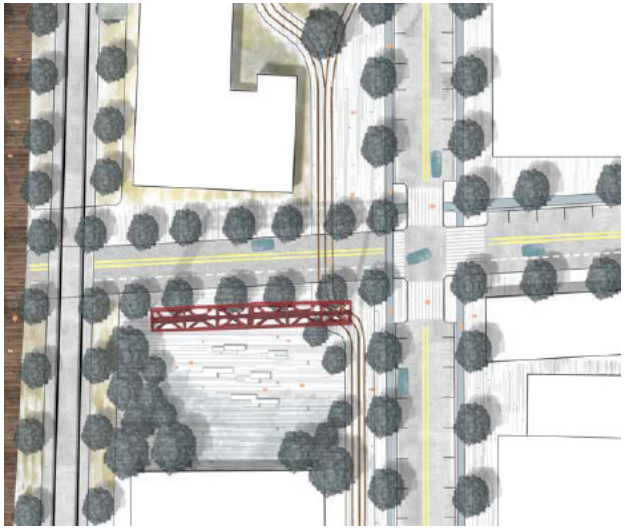
Repeatedly throughout the SCYP process the Southwest Corridor project team heard students express the belief that creating dense mixed-use station areas was vital to both activating stations with prospective riders and enhancing quality of life in surrounding communities. Mixed-use development aides in the creation of walkable, bikeable, and transit accessible communities where residents have the opportunity to live, work and recreate within a single neighborhood.

Environmental Benefits

The cohabitation of retail, office space, housing, and more within a single dense station area maximizes the vehicle miles traveled (VMT) reduction benefits of light rail by consolidating trip generating uses into a single transit-accessible trip. Similarly, the densification of housing units and work space holds benefits for the reduction of carbon emissions related to large single-family or single-tenant developments.

Downtown Tigard Station Area Concepts

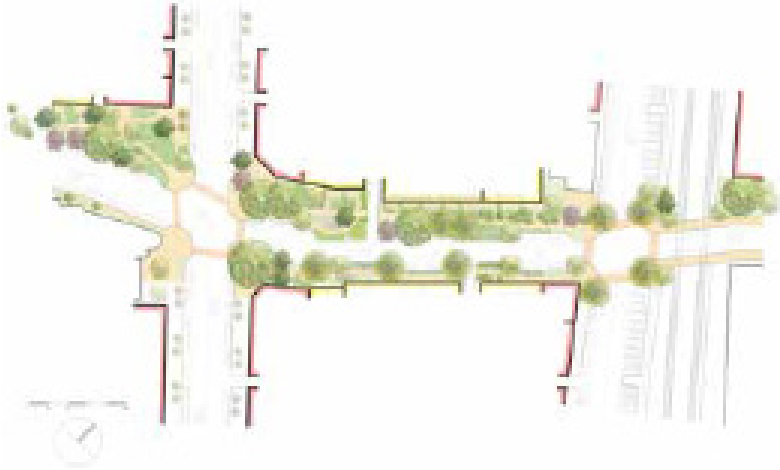
Reimagining of Ash Ave.



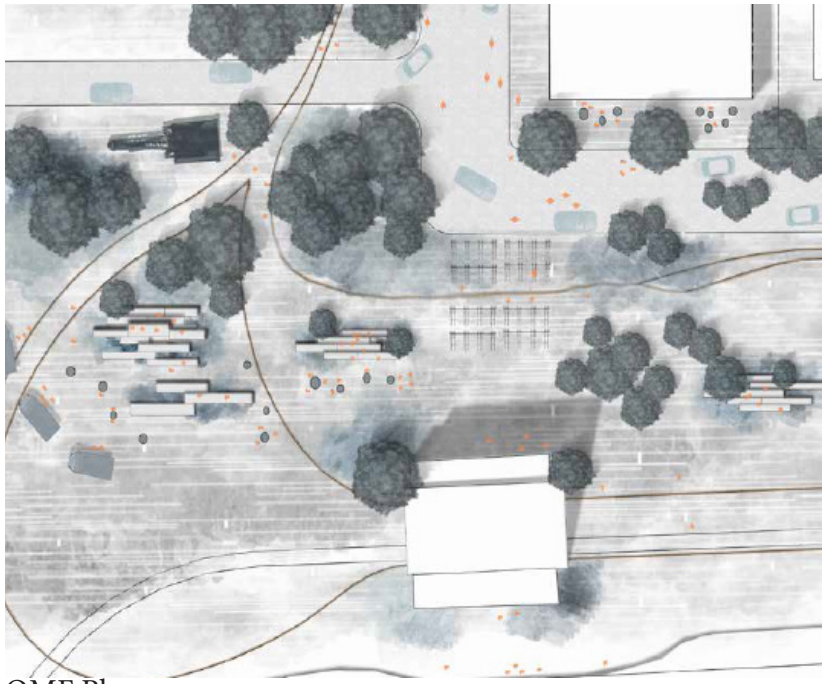
Hall Plaza

Downtown Tigard Redevelopment Concept

Civic Plaza at Burnham Street and Hall Boulevard



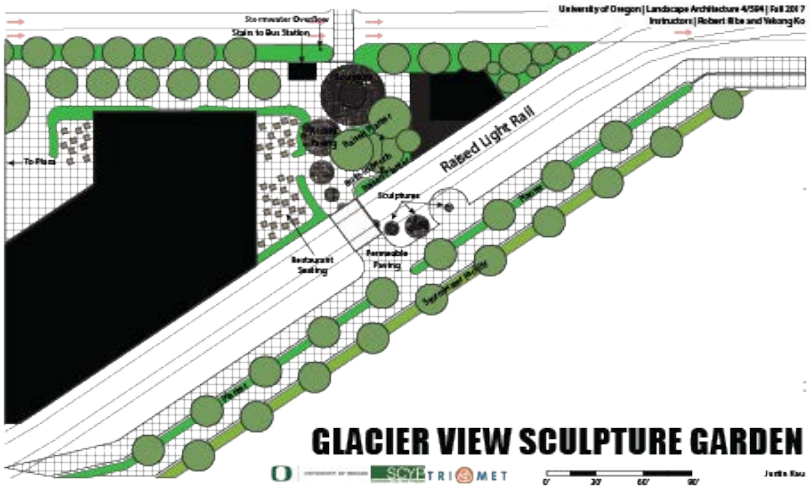
Site plan along Ash Avenue, a “green finger” that brings natural elements of Fanno Creek into the city center.

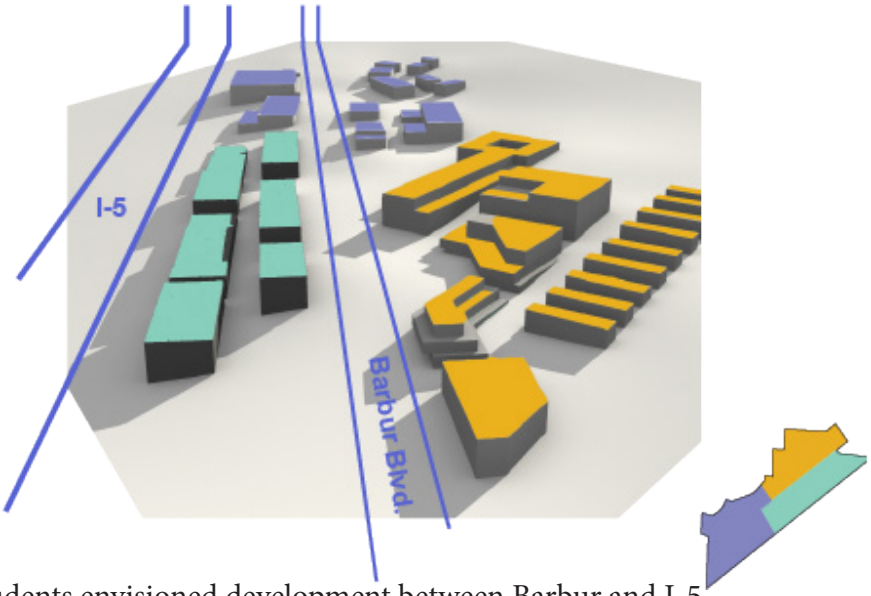


OMF Plaza

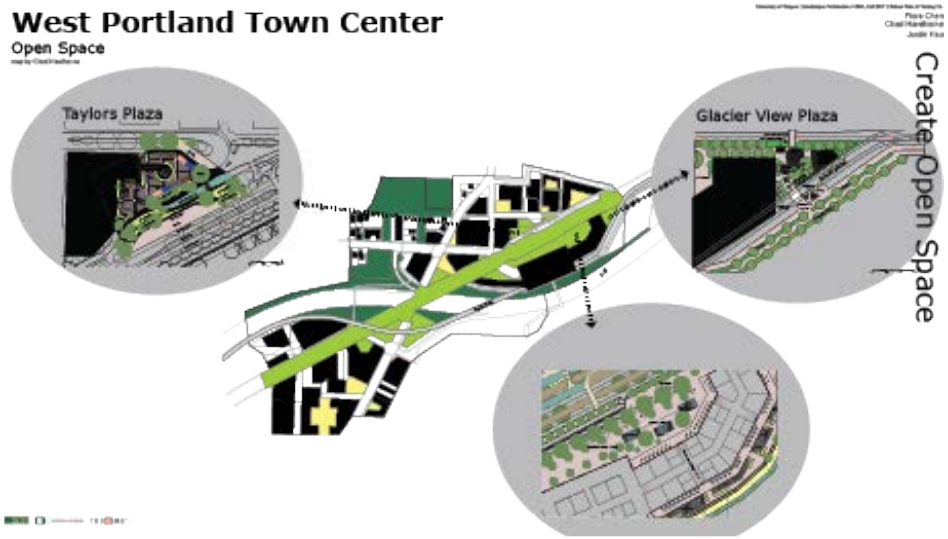
“Maintenance Theater” at OMF site

Historic Barbur Station Area Concepts





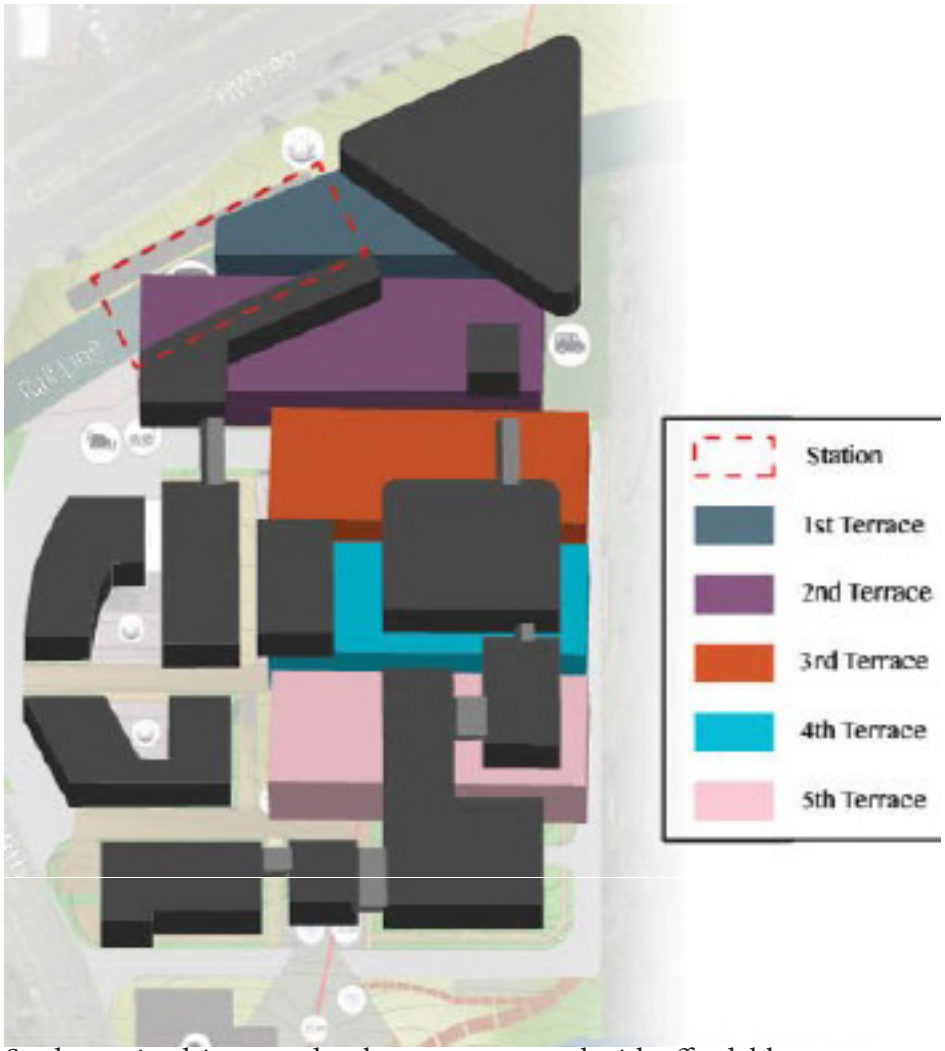
Students envisioned development between Barbur and I-5



"Revitalization of Taylors Ferry" student design

The Importance of Preserving Housing Affordability

The cost of constructing housing is the largest barrier to creating affordable units. Private developers, incentivized toward generating surplus capital, will only set aside so many below-market units before the project becomes economically infeasible. Units that are market rate and above are a logical choice for developers who want to see the fastest return from their heavy investment. We propose that the most cost effective strategy may to be preserve already built affordable units that have long lapsed in their purpose of paying off development costs. The United States Department of Housing and Urban Development (HUD) has approximated that preserving existing units typically costs between one-half and two-thirds the price of new construction. Naturally occurring affordable housing as already permeated the housing market in Tigard and is a valuable resource for low income families. In the context of the SWC project area, the Tigard Triangle and adjacent neighborhoods are disproportionately low income renters.



Student mixed-income development proposal with affordable housing on "1st Terrace"

Key Student Recommendations for Enhancing Affordability

Inclusive Development

SCYP students encourage public entities to enter into inclusionary zoning agreements with for-profit developers to include a portion of income-restricted units in market-rate projects.

The Triangle Plan targets direct cash-equivalent subsidies as a possible tool for leveraging growth where financial gaps exist. These might include "development impact fee waivers, public construction of infrastructure (such as utilities or streetscapes), or direct cash subsidies to developers (e.g. grants or forgivable loans through an urban renewal district)." Like the aforementioned strategy, these financial tools are meant to attract developers who do not want to risk investing in an unprofitable area.

Accessory Dwelling Units

Accessory dwelling units (ADUs) are secondary dwelling units that occupy the same lot as a primary dwelling or residence. These micro-residences can be spatially detached from the primary house (in the form of "tiny homes", mobile homes, or guest houses) or spatially attached to the primary home (typically as a basement-level apartment or "granny flat"). ADUs generally have their own kitchen (with appropriate hookups), a bedroom and a bathroom. These attributes catagorically make them seperate units from the primary residence. Zoning codes often preclude ADUs from single-family residential lots on these grounds.

Students believe that easing restrictions on the construction of ADUs in suburban contexts would stimulate an increase in housing supply, decrease in cost of living and promote efficient land use patterns through compact infill. Allowing homeowners to construct and lease out ADUs on single-family lots would also create an additional income stream for residents who have the desire and ability to invest in housing development.

Community Land Trust Model

Community land trusts (CLT) are an innovative model for land ownership that decouples the ownership of land from the improvements on it. If the city rewrites their code pertaining to the sale and donation of land, property acquisition could be a promising approach to preserve and promote affordability, now and in the future. The utilization of community land trusts can secure that all residents will have a stable place to call home by preventing and mitigating displacement, and offers the benefits of financial and social mobility, and, physical connectivity, that will come with the expansion of the light rail and urban redevelopment. efforts.

Naturally occurring affordable housing already exists in the Triangle-Downtown area, and is serving the needs of various low income households. Given the depth of the region's affordability crisis and the level of demand for reasonably priced units, market-based strategies are not enough. The CLT model for preserving affordability will prevent market driven displacement for present community members and for future residents as well.

The Urban Land Conservancy (ULC) in Denver offers a unique example of how CLTs, in partnership with the city, can foster equitable communities that ensure that all residents share in the benefits of mobility and connectivity that mass transit brings. Denver initiated its FasTracks program in 2004 with the goal of creating multi-modal, regional public transit network. Because the city estimated that 110,000 households would seek out housing near the proposed transit lines, with a high proportion of low income households not likely to be addressed by private development, an emphasis on equitable transit-oriented development (TOD) was an early concern.

ULC is a local nonprofit whose mission is to "[acquire, preserve, and develop] real estate to under-served areas for long term community benefit ... by making sound real estate investments that include land banking and land trusts." In partnership with Enterprise Community Partners, the city and County of Denver, and private investors, they created the country's first TOD Fund–"a $15 million loan fund to enable the purchase and holding of land near planned transit sites for up to five years." In addition to creating 455 affordable units, they have preserved 214 affordable units through community land trusts.

Jody Apartments was a 62-unit garden-style apartment 300 feet from the proposed Sheridan station on the West Rail line. In anticipation of future appreciation of property value, Urban Land Conservancy acquired the apartments, rehabilitated them, and created a CLT by leasing the apartments to another local nonprofit, NEWSED, with a 99-year ground lease. In accordance with the ULC's mission, this purchase was made in anticipation of future market forces; the purchase was made in 2007 and the light rail was not completed until 2013. Of these 62 units, 52 units are permanently affordable, and 12 of those are maintained as affordable for below 30% median household income for the area.

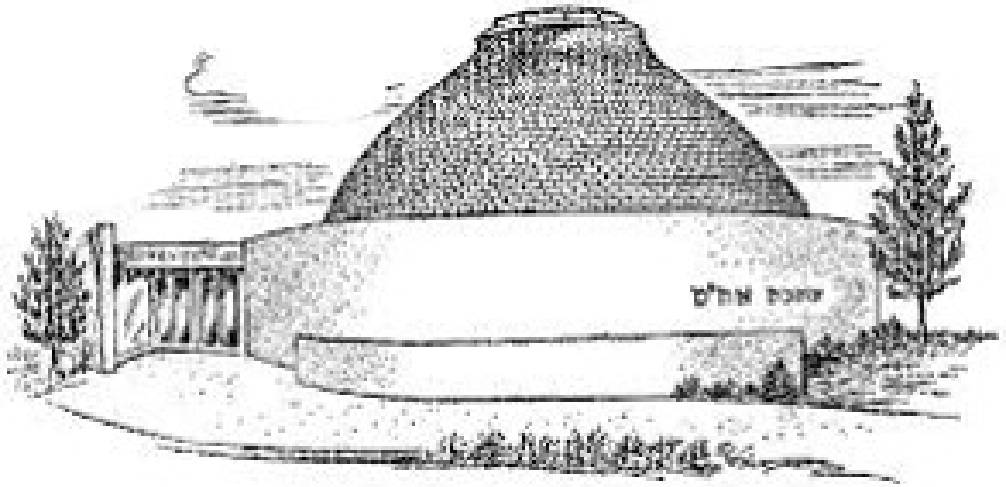
In Hickey's comparative case study of CLTs in Atlanta, Denver, and the Twin Cities, he concludes that "without CLTs, each region lacks adequate mechanisms for ensuring that affordable living options will be in place after its transit system is built out, and for addressing the potential displacement of lower income households in transit neighborhoods."

Recommendations for Preserving Historic Resources

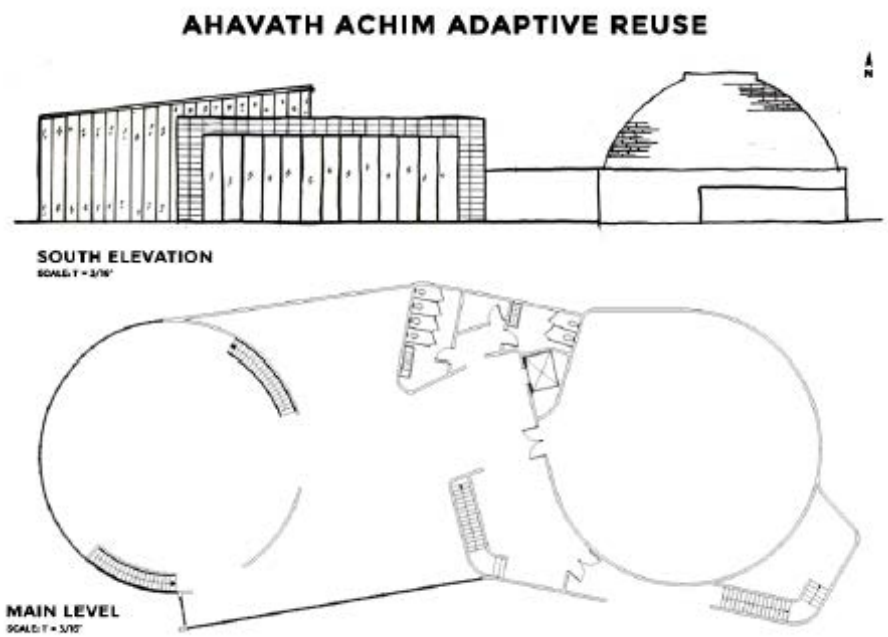
South Portland Historic District

The South Portland Historic District is an irregularly-shaped triangle situated between Marquam Hill and the Willamette River. It is bounded on the west by Barbur Boulevard and to the north by Arthur Street. The southeast boundary line follows Hood Avenue to Pennoyer Street on the south side. The 31-block area encompasses 284 structures, with 111 primary-contributing buildings (1876-1900) and 75 secondary-contributing buildings (1901-1926). The period of significance begins with the oldest resources within the district and ends with the completion of the Ross Island Bridge. The district is significant for its historic associations as an early immigrant community in Portland and its architectural merit. The character of the South Portland Historic District can best be described as a "narrow mixed bag," with a select few characteristics uniting this small neighborhood.

With a period of significance between 1876 to 1926, the district is primarily composed of Queen Anne, Italianate, Craftsman Bungalow, Georgian, Colonial, and 20th Century vernacular single-family dwellings. The scale of the buildings is also critical; at a maximum, all residential and commercial buildings within the district remain under four stories tall. The majority of historic single-family dwellings remain either one, two, or two and a half stories high, some raised with garages underneath. Neighborhood cohesion is also stressed. Residents describe the neighborhood as a very walkable community, with porches, community gardens and houses situated on plot's edge bridging the gap between private residences and public spaces. Residents also consider their neighborhood "an island," surrounded by hills and water and literally and figuratively enclosed within transportation arteries and overshadowed by the ever-expanding downtown Portland.



- **Architecturally Appropriate Infill:** Designing infill development to match the historic character of the neighborhood is one opportunity to densify housing in the area that preserves and enhances the architectural significance of Lair Hill.
- **Internal Building Conversions:** Internally converting large single-family dwellings into duplexes, triplexes and quadplexes was identified as one opportunity for densifying housing stock in the area without compromising character.
- **Adaptive Reuse of Synagogue:** Repurposing the recently-purchased synagogue site as an immigration museum and international marketplace was identified as one possibility for celebrating the history of Jewish and Italian immigrants of Portland.
- **Knit Neighborhood Together:** Students identified Naito as a schism in the character and identity of the Lair Hill area. Providing more pedestrian crossings was identified as one opportunity to tie the neighborhood together more cohesively.



Immigration museum proposed footprint

LRT station with green tower & pedestrian bridge to OHSU

Ecological walkway

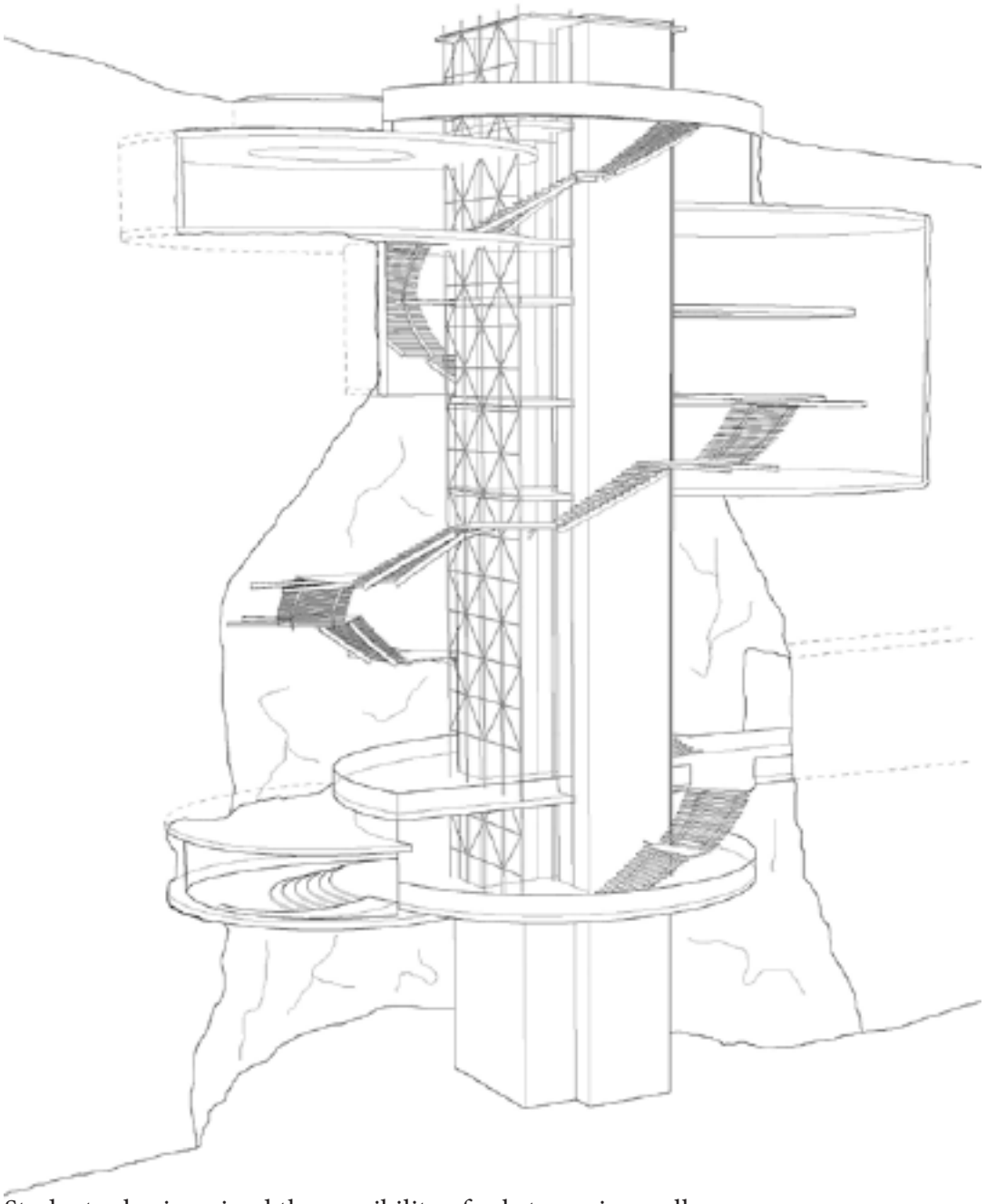
Adaptive Reuse Student Imaginings

Greenhouse style tower

Students recommended programing adjacent buildings for healthful activities

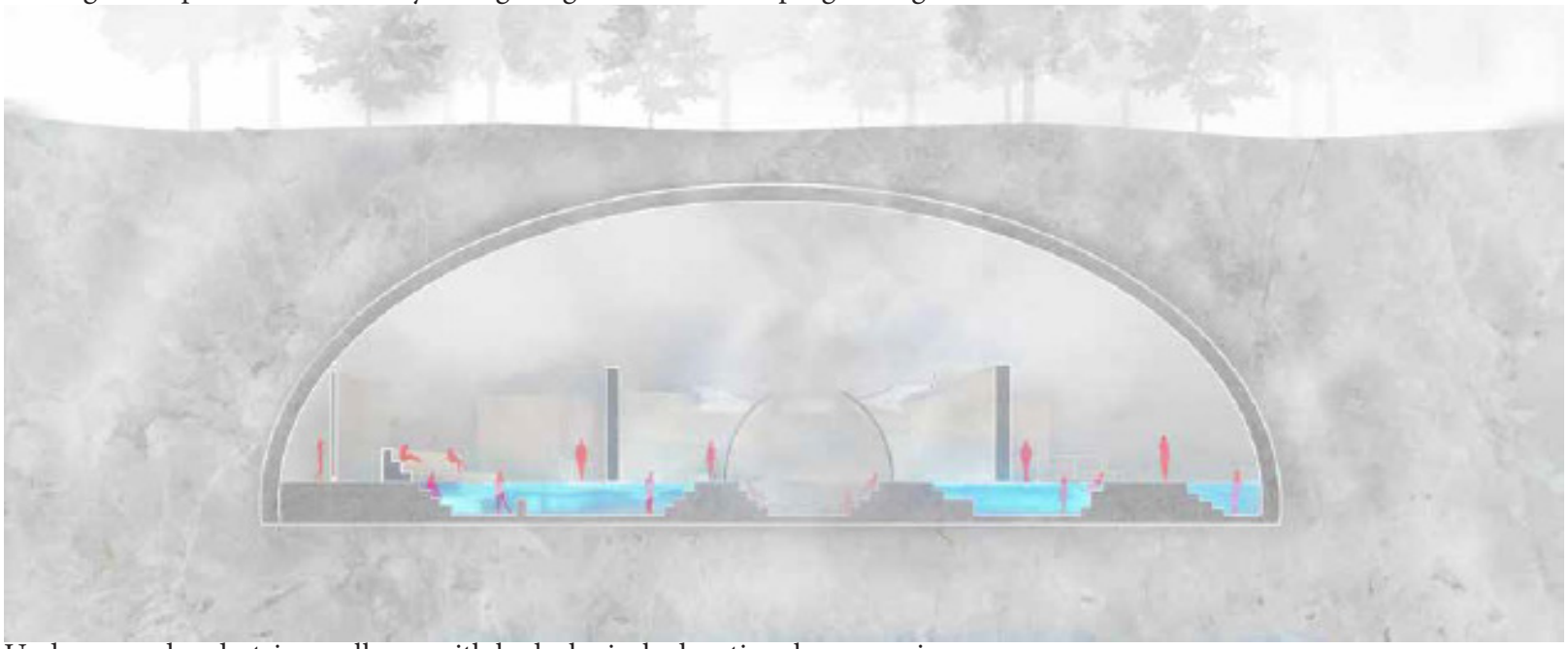
Cycling hub design concept

Italian Renaissance garden style pedestrian connection to OHSU



Students also imagined the possibility of sub-terranian walkways

Underground pedestrian walkway with geological educational programing



Underground pedestrian walkway with hydrological educational programing

Stormwater Mitigation Priority Sites

Student design of roadside stormwater basin

Fanno Creek

Adjacent to Downtown Tigard, the Fanno Creek floodplain presents a unique challenge and opportunity for the Southwest Corridor LRT project team. The proposed site of Tigard's downtown MAX station and the planned operations and maintenance facility rests on the edge of Fanno Creek, with the Southwestern portion of the site susceptible to flooding during moderate to sever rain events.

SCYP students focusing on this portion of the alignment advocated for the installation of an on-site bio retention pond to store, treat and slow infiltration of stormwater. Additionally, the possibility of re-routing stormwater overflow from Fanno Creek to Red Rock Creek was posed for further feasibility analysis. The students also emphasized the importance of incorporating green stormwater infrastructure (including swales, landscaping strips, and street trees) into the surrounding station area to manage the amount and quality of runoff heading towards the creek.

Red Rock Creek

Red Rock Creek flows through the Tigard Triangle and Eastern Tigard. Expansive areas of impervious surface related to commercial/industrial use, as well as, the area's three major highways compromise the absorbtion rate and quality of stormwater run-off. Additionally, the up-stream portions of Red Rock Creek flow through steep topography that facilitates more extreme soil erosion conditions. These eroded sediments have historically flowed down-stream and settled in areas that obstruct the function of culverts and natural wetlands. SCYP students identified grade treatments and the construction of stepping features as possibly solutions to the issue of erosion and soil settlement patterns within Red Rock Creek.

Stephans Creek

South of downtown Portland was chosen for student study to address the issues of stormwater from Barbur Boulevard and I-5 impacting Stephens Creek. The stormwater that flows into Stephens Creek has a high level of pollutants from the highways, and it flows into the creek at higher velocities and for longer durations than what is presently supported by the stream. This is due to inadequate management at receiving facilities upstream. As a result, there is an increase in erosion and sediment levels in the creek.

The stormwater management at this location is unique and challenging due to the steep slopes of the land surrounding Stephens Creek and the amount of runoff that accumulates. Therefore, the stormwater runoff from Barbur Boulevard will first need to be infiltrated to the maximum extent possible at facilities located along the boulevard before overflow stormwater is piped or channeled into Stephens Creek, where it will be treated at additional facilities.

Student Preferred Stormwater Management Options

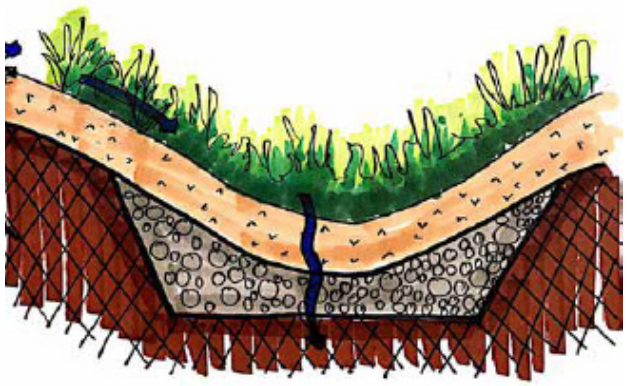
Planters

Planters would be an option between sidewalks and roadway along Barbur Boulevard to help collect, retain and convey stormwater to an authorized discharge. Planters are landscaped reservoirs used to collect, filter and infiltrate stormwater by allowing pollutants to settle and filter out as water percolates through vegetation, growing mediums, and gravel. Depending on the site's condition, planters can be designed for partial or total infiltration of stormwater. Excess stormwater can be conveyed to an approved discharge location by a perforated pipe at the bottom of the planter. Because lined planters can be constructed immediately next to buildings, they are ideal for sites with setback requirements, poorly draining soils, steep slopes or other constructability constraints.

Planters are widely-applicable for various soil infiltration rates. If the tested infiltration is less than two inches per hour, the planter must be designed as a partial infiltration facility with an overflow to an approved discharge. Setbacks for planters must be five feet from property lines and 10 feet from foundations. There are no setback requirements for lined planters. The minimum width of planters is 30 inches. The maximum longitudinal slope is six percent, but multiple planters can be placed with check dams between them to reduce slopes. The growing medium for planters is a sandy loam mixed with a compost/soil blend and must be at least 18 inches deep. This is to allow for fast infiltration rates through the medium to help with pollution reduction. Vegetation in planters cannot block the line of view of traffic and cannot require mowing due to the small size.

Basins

Infiltration basins are shallow, vegetated depressions that are used to collect and hold stormwater runoff, which allow pollutants to settle and filter out. Inlet pipes or sheet flow convey the stormwater into the basin, where it is stored until it can infiltrate into the ground. Basins can often provide complete on-site infiltration for small storm events and, if adequate space and soil infiltration rates are available, they can also be sized to infiltrate larger storm events. If the area or soil infiltration is not available for complete on-site infiltration, then an overflow pipe can be installed to discharge to another location. Setbacks for basins are five feet from the property line and 10 feet from the building foundation. The minimum width is nine feet for basins. Vegetation must be planted with a minimum growing medium of 18 inches for right-of-way areas and must not block line-of-site.



Student design of stormwater basin

Ponds

Ponds are broken into three main categories: wet pond, extended wet pond and dry detention pond. Wet ponds are designed to hold a permanent pool of water. Water from storm events runs into one end of the pool, which displaces the detained water held in the pond. Pollutants are removed through gravitational settling and biological processes.

Extended wet ponds, like wet ponds, are designed to hold a permanent pool of water but include additional storage above the permanent pool that fills during storm events. Water is released slowly after the storm event over a duration of time. The permanent pool is sized to provide pollutant reduction through the same process as a wet pond while the area above the permanent storage is designed to meet flow control requirements.

Dry detention ponds are basins that fill during storm events and are designed to slowly release water for a number of hours. Ponds restrict flow rates exiting the pond in order to reduce erosion and flooding of receiving streams or systems.

Additional facilities are required to meet pollution reduction requirements unless the bottom flow path of the pond was designed as a swale and meets the design criteria. Detention ponds are appropriate for sites with infiltration rates less than two inches per hour. Setbacks are required for property lines, septic tanks, slopes, and wells. Surrounding slopes must not exceed ten percent. Wet and extended wet detention ponds should be designed for drainage areas between five and 150 acres to help avoid problems associated with long periods of stagnant water.

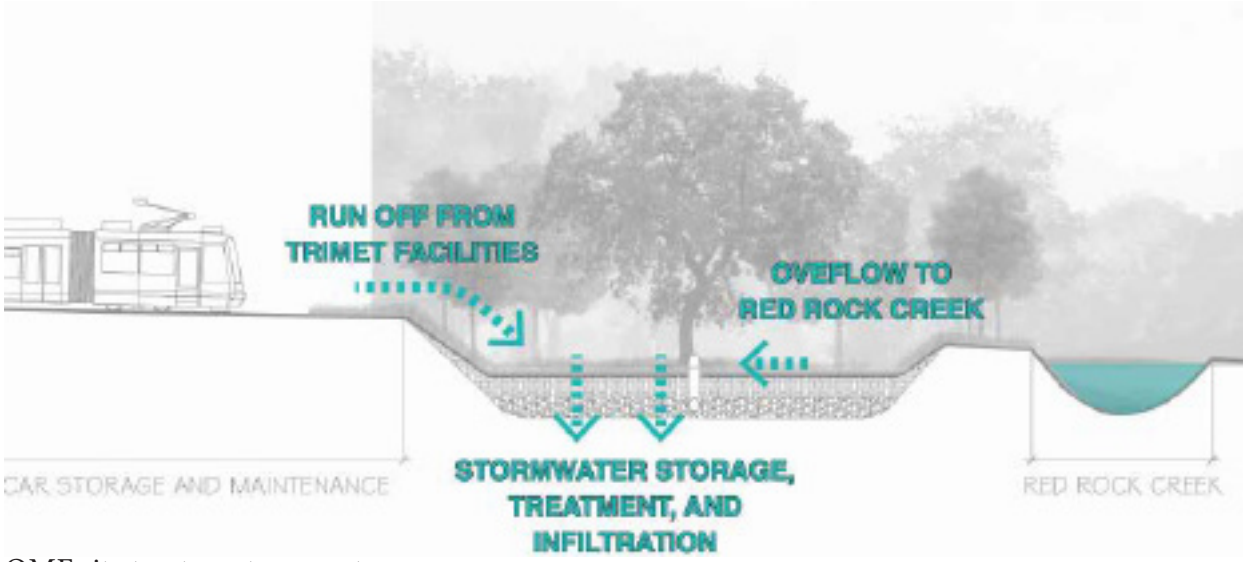
Stormwater Student Imaginings

53rd Ave Station stormwater treatment

50th Ave Station stormwater management proposal

Students advocated for the installment of landscaped roundabouts in Tigard for stormwater treatment

Ecotracks



OMF site treatment concept

Greenroof weather shelter

OMF site treatment concept

Station Opportunities

* The following summaries highlight applied student research, but are not intended for adoption as-is or direct application to the SWC project.

Mobility Hubs

Mobility hubs are sites that consolidate traditional and new mobility models in the interest of providing a wide array of first-and-last mile travel options for transit trips. In many mid to low density land-use contexts the inability or inconvenience of getting to a transit station is a barrier of entry to bus or light rail transportation. Mobility hubs create the conditions for a seamless multimodal commute. SCYP students identified the Downtown Tigard LRT station as one candidate site for mobility hub installation. The Bridgeport village terminus and Barbur Transit Center are also being examined as candidate sites for mobility hubs.

Hamburg, Germany

- **Dedicated Transit Facilities:** Mobility hub design centers on high-volume transit stations that generally offer a mix of transit models, possibly including: local and regional, standard service, BRT service, and rail service.
- **TNC Pick-up/Drop-off:** Incorporating dedicated pick-up and drop-off zones for TNC and AV riders both encourages the use of TNC service as a first-and-last mile connector to transit and improves the flow of general vehicle traffic and on-street transit.
- **Bikeshare:** Providing riders with easy access to docked and/or dockless bikeshare system(s) facilitates active and sustainable first-and-last mile travel choices. Additionally, integrating bikeshare into mobility hubs would enable those who don't own bicycles.
- **Future Mobility Models:** Early envisionings of what mobility hubs on the Southwest Corridor might look like need to stay flexible and adaptive to technologies and business models that may emerge before the estimated start of service in 2027.

Resiliency Hubs

Including natural hazard preparedness measures at Tigard Transit Center and Bridgeport Village Park & Ride would increase community resilience in the event of a power outage or disaster. These resiliency hub stations could serve as a gathering point for members of the community post-disaster to receive news, charge electronic devices and receive aid. TriMet can partner with city governments to incorporate these resilient stations into their emergency management plans, and arrange for city volunteers and first responders to staff them in the event of a natural disaster.

Orange Line solar roof weather shelter

- **Solar Panels & Batteries:** Harvesting and storing solar power on-site would cover 100% of platform energy needs and up to 44% of Park & Ride energy needs on a day-to-day basis.
- **Power Outlets:** In the event of an emergency, publicly accessible power outlets would enable members of the community to tap into TriMet's on-site power generation and storage to charge their essential communication and medical devices.
- **Emergency Messaging On-screen:** Utilize TriMet's real-time update screens to display post-disaster news and instructions on receiving aid.
- **Radio Capability:** Building radio capability into the boarding platform area would allow community members seeking shelter and first responders on-site to receive and transmit information.

Park & Ride Opportunities

* The following summaries highlight applied student research, but are not intended for adoption as-is or direct application to the SWC project.

Comfort and Design

Student literature review research found that BART parking facility users preferred stations that are well lit and have good visibility; have nearby amenities like water, toilets, and snacks; and have real time availability monitoring. They additionally found that a lack of available parking likely reduces transit ridership, and that real time information about parking availability and transit arrivals would likely increase transit ridership. SCYP students provided four best-practices guidelines for Park & Ride provision:

- Position parking away from the platform. This is high value real estate that can be used for other development.
- Share the parking with other businesses or social centers that will use it during off-peak commuting hours.
- Build a structure for better use of the land and charge for parking to offset the additional construction cost.
- Wrap the perimeter with mixed uses to hide the parking inside.

Greenwall Park & Ride rendering

Park and Ride Pricing

Why Price Parking?

Parking fees allow transit providers to regulate demand, influence other mode choices and recover some of the cost of construction and operation. Much has been written about the challenges of subsidized parking. Methods have been developed to actively manage occupancy for on-street parking with demand-based pricing in San Francisco and Los Angeles. The context of these strategies— short-term, urban, and on-street—is different than a suburban Park and Ride facility. However, the goal of optimizing occupancy is the same. Uncertainty of parking availability is a significant factor in a driver's decision to use Park & Ride, and officials at Chicago's Metro see potential users get discouraged when lots are over 85% full. Parking can spill over into the surrounding neighborhoods when a Park & Ride facility is over 95% full. For these reasons, mid-line transit stations should be designed for 80% occupancy and end-of-line stations 75% occupancy. Setting the ideal parking price is important to manage demand. Payments should be fast and easy for drivers to process; smart cards or other quick transaction technologies may encourage more transit users. When enforced, residential permits and metered parking in the surrounding area are necessary for managing spillover. Enforcement is necessary to ensure compliance with parking fees and intended facility use. Enforcement techniques include on-site staff, cameras, and license plate readers.

Potential Models

TriMet Exclusive Parking

The facility could be reserved for transit users. This would require a gating system with Hop FastPass integration so transit users could be identified. TriMet could decide whether to charge these users a fee for using the facility, allow them to use the card simply for identification, or to initiate their transit trip. After parking, users would use the transit system as normal. The benefit of this solution is that it guarantees access to transit users. The downside is that it would likely result in underutilization on weekends and evenings.

Shared Use Parking

In this scenario, TriMet could charge for parking for transit riders and general purpose traffic. This facility would behave similarly to parking garages throughout the region: users would approach the gate, take a ticket, park, and pay either before or while leaving later in the day. The benefit of this solution is that it provides access to downtown Tigard shoppers and employees while allowing some cost recovery for TriMet. The downside is that it would limit access and raise costs for transit users. Given TriMet projections, allowing equal access to non-transit users may severely limit the facility's capability as a Park & Ride.

Transit Priority During AM Peak Only

During the morning rush hour, the facility would be reserved for transit users. If, by a specified time, the facility is at capacity, it remains restricted to transit users only. Alternatively, if the facility is under some capacity threshold, for example 85%, the facility can open to other users like a standard parking garage. As with other solutions, Hop Fastpass could be integrated to ensure only transit users are utilizing the facility during the restricted time. If fare was taken at the garage entrance, it would prevent anyone with a Hop card from parking without actually using the transit system.

Appendix

* The following summaries highlight applied student research, but are not intended for adoption as-is or direct application to the SWC project.

Appendix Item A: Urban Mobility Recommendations

TriMet Transit App Fall 2017 PD486	. Recommended App Features: . Transit features: daily trip planner, multi-modalism (including transit, bikeshare, TNC and carshare), in app ticketing geo-location, travel profiles, real-time updates and personal user analytics . Community features: discover mode, rewards program, gamification and partnerships with local businesses
New Urban Mobility Ecosystem Fall 2017 IE 641	. Reduce barriers to entry into the TriMet System for Customers via TriMet App . Cross system payment method - transit, bikeshare and TNC . App features: . Event integration . Payment integration . Integration with other transportation apps . multimodalism . Regional transportation app . Real-time data and notifications . Data collection (dependent on privacy constraints/preferences) . Integrated service/ordering platforms (order coffee/donuts ahead of time for pick-up) . Potentially a marketing opportunity for mobility hub based businesses and TOD . Transportation partnerships . Ride-sourcing . Perhaps partner with a TNC company to provide paratransit service . Consider subsidizing TNC trips in areas underserved by transit . Consider subsidizing trips that connect to transit centers . Bikeshare systems . Identified best practices: . 10-13 bikeshare stations per square km . 10-30 bikes per 1,000 residents within coverage area . Place stations 1,000 ft apart . Comfortable, durable (with chain guards), attractive bikes with GPS and RFID tracking abilities . Install bike-friendly transportation infrastructure . Incorporate dockless stations with geo-fenced parking zones . Mobile payment . Regional installation . Promotions aimed at increasing ridership . Partnerships with major employers to set up carpool/vanpool . Partner with new mobility providers to establish cross-system payment method . Per mile tax on AV travel . Congestion tax and electronic road pricing . Park & Ride paid parking . Parking reduction

New Urban Mobility Ecosystem (Continued from previous page)	. Performed competitor analysis of new mobility models versus transit: . Personally Owned carshare model (such as Turo or Getaround) . Not competitive with transit commuting . Rental prices too high for day to day needs . Better serves individuals seeking recreational trips outside of the metro area and those moving . Traditional car rental companies . Not cost-competitive with transit and does not seek to serve the same market . Ridesourcing (Uber, Lyft and Taxi) . Students believe TNC service is both a competitor and complement to TriMet . Not cost competitive with transit for mid to long distance trips . Transit providers should track the trends of Lyft Shuttle/Uberpool to see if these new TNC service models change that . Commercially owned carshare model . Students believe carshare is a complement to public transit rather than competitor . Argue that providing carshare options near transit stops will increase the flexibility of multimodal trips, thus encouraging transit use
	. AV START (American Vision for Safer Transportation Through Advancement of Revolutionary Technologies) . Passed October 2017 . Provides USDOT with authority to establish rules governing autonomous vehicles . Must be informed by two sources: . Safety standard report produced by Director of Transportation specifying safety standards that are required of human operators . The new Highly Automated Vehicle Technical Committee (comprised of multiple stakeholders that report every 5 years) would establishe uniform standard of automation levels (for levels 3 through 5 with 5 being fully automated) . The Nelson Amendment . Each manufacture must produce safety evaluation reports for each new HAV or automated driving system. Reports must include following elements: system safety, data recording, cybersecurity, human-machine interface, crashworthiness, capabilities, post crash behaviors and account for applicable laws and automation function . Prohibits state and local authorities from regulation in the aforementioned nine categories . The language of this clause potentially prohibits the ability of state and local authorities from using autonomous vehicle data collection for congestion mitigation and transportation planning . States that have already implemented legislation regarding sale/repair/distribution of HAV tech may continue to do so . The Inhofe Amendment would establish a HAV Data Access Advisory Committee reporting to the Senate and House, which would examine issues related to ownership and sharing of autonomous vehicle data (reports every 2 years) . Imposes restrictions on federal departments and agencies (doesn't mention state and local) . Local governments may retain some level of AV data collection authority through their authority to regulate TNCs . In SF's 2017 attempt to seize data from Uber and Lyft, the city attorney issued subpoenas to insure Uber and Lyft aren't violating state laws (most specifically to ensure equality of access, public safety, and or creating public nuisance) . NY's Taxi and Limousine Commission (TLC) requires all for-hire vehicles (FHV) to maintain trip records that are subject to inspection (includes point of origin, date, time, fare, tolls and end of shift reading) -- this commission now regulates TNCs as well

Implications of Federal Autonomous Vehicle Legislation for Local and State Governments (Continued from previous page)	. Portland has the authority to regulate vehicles for hire vested by the State of Oregon . Codified under Chapter 16.40 Private for Hire Transportation Regulations of the City Code and Charter . Additionally, Portland has prior data-sharing agreements with Uber and Lyft including a monthly confidential report by Uber that contains pick-up and drop-off locations, date and approximate time stamps, wait times, wait times for wheelchair accessible requests (formulated during a pilot program in 2015). The agreement mandated the collection and report out of type of ride (wheelchair accessible or not), trip origin zip code, trip destination zip code, date and approximate time stamps, duration and pick-up and drop-off locations. . S.1885 focuses on data recording by the vehicle, thus data pulled from smartphone apps might not apply
City of Tigard Paid Parking Policy Winter 2018 USP 544	. Park & Ride urban design considerations: lighting, personal care amenities (access to restrooms, water, snacks) and real-time updates . Position parking away from station platform to preserve high value real estate . Shared parking (consider on-peak versus off-peak demand by balancing use of surrounding buildings) . Build structured parking rather than surface parking for space savings . Wrap perimeter of garages with mixed uses to hide parking . Kiss and ride installation . Consider first and last mile modes of travel (bikes, motorcycles, vanpools and carpools) . Consider implementing neighborhood/employment center permit program . Variable pricing meters to reflect parking demand at various times of day . Greater enforcement of 2 hour zones . Priced street parking . Strategic shared parking agreements at underutilized lots . Improve accessibility of other modes (wayfinding, ped connectivity, bikeshare, shuttles and circulators, enhanced transit connectivity and frequency, bike safety and infrastructure, improved bike storage, discount programs at local-businesses for non-motorized commuters and public education on alternative modes) . Argues Park & Ride facilities will need to be paid once City of Tigard enhances TDM strategy to keep non-riders from filling lot . One option suggest standard general use parking garage . Recommends reserveing Park & Ride parking for transit users (achievable through HOP pass scanners integrated into the gating system) . Another option would be implementing transit exclusive parking during AM peak and general use parking throughout the day
Sustainable Transportation in the City of Tualatin Fall 2017 Planning, Public Policy, and Management	Ped Recommendations: Improvements to 72nd Avenue . Two ped crossing in place: however South crossing is the natural entrance . Redesign for improvement: remove WB right turn on Lower Boones Ferry Road (addresses high speed merging issue), ped bumpout, repurpose right turn lane into protected bike lane, install HAWK signal Bike Recommendations: Infrastructure connections . Restripe SW Herman RD and SW Tualatin RD to include 2 general vehicle lanes and a 2-way cycle track . Would connect to Fanno Creek Trail . Connect Bridgeport to Tualatin River Greenway Trail . Bike boxes at select intersections (collision reduction tactic at high crash intersections) . Widened bike lanes on Nyberg Street . High-vis green bike lane paint . Enhanced lighting & wayfinding & bike parking . Connect Bridgeport to Tualatin Road via Tualatin Commons . Connect high-density areas to Westside Express Service (exponential bike network expansion for Tualatin) . Emphasis on Herman Road and SW Tualatin RD

Sustainable Transportation in the City of Tualatin (Continued from previous page)	. Painted blue roadway line to visually connect bike infrastructure network . Painted sharrows on 57th Ave . Traffic calming . Public bike repair stations for cyclists . Tech for cyclists: BikeTualatin App (linked to incentives program and social media) -- distance tracker, card to scan at popular parking stations and stations would include bikeshare Transit Recommendations: . Design Park & Rides with pedestrian environment enhancements . BRT system installation to connect Tualatin Common (119th & Herman) with Bridgeport (also connecting MAX to WES), including: . Dedicated BAT lanes . Off-board payment . High-capacity buses . Signal prioritization for buses . Future potential for AV shuttles providing this connection
Walkability and Placemaking in Tigard Fall 2017 Planning, Public Policy, and Management	. Install circulator shuttle service connecting key destinations in the Triangle: transit hubs, public market and downtown . Trail system recommendations/best practices . Avoid/minimize impacts to sensitive areas . Avoid tree removal through careful trail routing . Avoid impacts to bodies of water/wetlands . Maintain or establish recommended buffers . Use boardwalks or bog bridges to cross wet areas . Install designated wildlife crossings . Prohibit bicycle use in sensitive areas (suggests building "gates or other structures" to physically limit their use) . Minimize trail impact through strategic routing and narrowing in sensitive contexts . Site trails in areas that have already been disturbed by human impact . Enforce trail boundaries through the installation of thorny plant species and boulders . Remove weeds and non-native species within 10 feet of either side of trail . Plant taller native shrubs to create buffers and screen the trail from sensitive habitat areas . Provide spur trails and viewing blinds to provide visual access at key locations to minimize impacts to wildlife . Use appropriate trail construction techniques to minimize impacts to habitat . Use Metro's Green Trails recommendations for preventing erosion and providing bioswales . Focus trail connectivity on low to moderate income housing and mixed-use/mixed-income housing

Walkability and Placemaking in Tigard (Continued from previous page)	. Recommends the installation of a 1.5 mile elevated trail that would be functional during limited storm events once Tigard reconnects Red Rock Creek with its floodplain . Trail system should serve the Triangle as well: . Facilitate pedestrian/bike crossing of I-5 to PCC Sylvania (to draw student population into the Triangle as a shopping and dwelling destination) . Facilitate pedestrian crossing of HWY 217 to the Fanno Creek Trailway . Advocates for complete street design: with bikes lanes on all through streets within the Tigard Triangle
Autonomous Vehicle Revenue Implications for Portland, Tigard and Tualatin Fall 2017 School of Planning, Public Policy, and Management	.Portland: Recommends adopting VMT tax, increased registration fees, bridge tolls and carshare fees . Also suggests Portland could examine increased fuel tax, increased heavy vehicle tax, user fee for curb access and an AV specific VMT tax . Tigard: Recommends adopting VMT tax, AV specific registration fee, vehicle maintenance fee (to stimulate fleet turnover to more modern fuel-efficient vehicles), rideshare licensing fee, parking fee and an electric utility charge (to replace funds lost from gas tax as fleet electrification advances) . Also suggests Tigard examine increased gas tax, franchise fee for electric charging stations and TNC vehicle registration fee . Tualatin: Recommends gps data fee, AV registration fee, regional on-ramp/off-ramp fee, VMT tax, mobile business fee, charging station fee, drop-off zone fee, an automated vehicle development charge, VMT tax, on-board advertisement tax and congestion pricing
Active Transportation Proposals for Portland Neighborhoods Fall 2017 Bicycle and Pedestrian Planning Lab	. Barbur and 19th Station Integration . Goals . Prioritize safety of bicyclists and pedestrians . Improved connectivity to LRT station for all roadway users . Community engagement in generating solutions . Station level recommendations: . Extensive wayfinding (particularly in relation to SW Trails, Multnomah Village and nearby schools) . Comfortable rider amenities at stations: seating and weather shelters . Z-crossings . Bike parking and public “fix-it” stations . Partnerships with residents, neighborhood associations and employers along Barbur to create active commuting incentives program

Active Transportation Proposals for Portland Neighborhoods (Continued from previous page)	. Regional connectivity recommendations . 19th street: bike lane extension from termination at Spring Garden Street to Barbur and sidewalk infill adjacent to commercial parking lots . Capitol Hill Road: up-hill climbing bike lanes, down-hill sharrows and sidewalks along Safeway should be extended throughout the length of Capital Hill Rd to Bertha . Troy Street: bike sharrows and sidewalks connecting to Multnomah Village . Spring Garden Street and Dolph Street: up-hill climbing bike lane, down-hill sharrows and sidewalks . Widening of Barbur's overpass at Multnomah to accommodate safe bike and pedestrian facilities . 24th Street bike sharrows and sidewalk infill . Bike/ped overpass of I-5 connecting station area to Burlingame neighborhood . 30th Avenue bike sharrows and sidewalks to provide business access from Barbur and Multnomah . A redesigned Barbur Blvd should incorporate buffered bike lanes and sidewalks . Intersection level recommendations . 19th street and Spring Garden flashing school speed zone sign . Troy Street and Capitol Hill Road RRFB crossing . Dolph Street and 30th Street RRFB crossing . Barbur and Moss street crosswalk improvement: shorten and mark crossing . Barbur and 24th Street crosswalk improvement: mark crosswalks and infill sidewalks on the northern side of Barbur . Policy level recommendations . Reducing traffic speeds and increasing enforcement . Reducing general travel lanes from two in each direction to one in each direction to accommodate wider bike lanes/buffers, wider sidewalks and business access transit (BAT) lanes . Work with local businesses and residents to create a transportation management association (TMA) . Baylor/Clinton Station . Arterial recommendations: 5' bike lanes, 6' landscaped buffers between bikes/cars, 8-12' sidewalks, 11' general travel lanes and 10' turn lanes . Recommendations for streets served by rubber-tire transit: 9' sidewalks and 4-6' buffers separating cars/bikes/pedestrians (doubles as landscaping strip and furnishing zone for transit stops) . Recommendations for streets served by light rail: 9' sidewalks, 4-5' landscaped buffers separating bikes/peds/cars 12' general travel lanes, 12' shared vehicle/light rail travel lane and 10' (5' each way) bi-directional cycle track . "Primary" collector streets: recommends bollard protected 6' side-running bike lanes, 10' sidewalks, 10' general travel lanes, 5' landscaped planters, and an 8' street parking zone . Local streets w/o sidewalks: 6' striped (i.e. not grade-separated) "pedestrian lanes" in absence of sidewalks with a 2' striped buffer and 12' shared travel lanes for bikes and cars . "Secondary" collector streets: suggests replacing four-way stops with mini traffic circles with marked crosswalks and sharrows, 10' landscaped median in suitable areas, 10' shared lane with sharrows, 8' on-street parking zones 2' buffer between parking and travel lane and 10' sidewalks . Proposes light rail, bike and ped bridge over Red Rock Creek

Active Transportation Proposals for Portland Neighborhoods (Continued from previous page)	. Policies and programs . Deploy complete streets design principles throughout the corridor . Designate SW Clinton and 70th as a Bike & Ride . Organize first/last mile shuttle service with major employers . Implement bike parking requirements/minimums for all new development within SWC bikeshed . Require sidewalk installation/widening with all new development . Market-price parking within the station area . Continue the deployment of TriMet's art policy . Maintain street trees well
Preserving South Portland Winter 2018 AAAP 410/510	SW Naito acts as a schism . Utilize pedestrian crossings to reconnect the neighborhood and create a more cohesive sense of community

Appendix Item B: Placemaking & Urban Design Recommendations

Preserving South Portland Winter 2018 AAAP 410/510	. South Portland Historic District: Queen Anne, Italianate, Craftsman Bungalow, Georgian, Colonial and 20th Century vernacular single family dwellings of architectural/historic significance . 31 block area, 284 structures and 111 primary-contributing buildings . Use "smart density" strategies to densify Lari Hill's housing stock without compromising its architectural/historical integrity . Develop architecturally appropriate infill and ADUs hat blend with the surrounding context . South Waterfront Development Project . Character enhancements to Zidell Yards . SW 1st prime for increase of small businesses . Recommends establishing a main street district and main street revitalization strategy . Realignment of Ross Island Bridge ramps could have adaptive reuse potential (much like NY Green Loop) . Bridgehead redevelopment could reintroduce up to four acres of land to neighborhood
Urban Design and Land Use Concepts for Downtown Tigard Spring 2018 USP 475/575	. Student-developed urban design "principles": . Mixed-use development at all scales . Prioritize pedestrian travel . "Green Fingers" park/greenspace system . Linear greenspace system that threads through a community -- expanding to linear parks in unconstrained areas and condensing to planting strips in constrained sections . Design principles: . Plantings: non-invasive, low maintenance/drought resistant, edible, design for low-impact and high-impact activities . Water systems: drainage, pervious pavements, bioswales, design on-site stormwater capture . Seating: seating on every block and street trees to provide shading at benches . Community: One or more community/resident designed garden(s) and/or artspace(s) installed in each "finger" . Transportation: bike parking on every block, EV stations in Fanno Creek District . Private realm: cohesive with private realm, supports "eyes on the street" human scaled design . Traffic calming on Hall near station to enhance pedestrian environment . Envisions Hall Blvd station as a mobility hub . Urban design should invite/encourage social and recreational activities . Small block design to enhance pedestrian environment . Triple bottom line . Diverse housing types (mix of pricepoints, sizes, configurations, etc) . Design for all needs at all stages of life

Urban Design and Land Use Concepts for Downtown Tigard (Continued from previous page)	. Proposes "descriptive zoning" system in which developments are approved via meeting a zone's vision . Zone districts envisioned for Tigard: . Civic Heart: "known for mobility exchange, and civic activity; less programmed; space for civic forum" . Village: "highest density; mixed-use, commerce + living" . This district would house the smallest block sizes in the interest of promoting pedestrian travel patterns . Envisions shared street woonerf design . Old Town: "smaller scale; elements of preservation; edge shields village; rooted sense of place" . Envisions Commercial Street becoming a second main street . Fanno Creek District: "peripheral mixed-use with residential emphasis; less dense than village; exchange with natural areas" . Red Rock District: "peripheral mixed-use with residential emphasis; less dense than village; exchange with natural areas" . Focus density toward SW Hall Blvd: mostly high density mixed-use residential and commercial . Create co-working spaces, environmental and technology focused industry along highway corridor . Improve connectivity of greenspace network through Red Rock Creek restoration and parks expansion . Innovation District: "dense working area,specifically start-ups and maker places; small live-work places" . Agro-Eco-Industrial: "hub of production; supports cyclical economies" . Full-cycle: "composts and recycles all types of waste"
Tigard Transit Center Development Potential Spring 2018 ARCH 407/507	. Students found that public subsidies for private development may be necessary early on in Downtown Tigard's densification to achieve financially feasible mixed-use mid to high density projects -- one team suggested $4 million in subsidies and $1 million in grants for their proposal, another conceptualized the donation or long-term lease of land to minimize project cost/financial risk . Residential and commercial rents (as they exist today) do not comfortably support large scale development . Desired uses identified: . Structured parking . Mixed-use office . Mixed-use residential . Condos . Retail . Plaza/water feature development . Hotel

Tigard Transit Center Development Potential (Continued from previous page)	. Mixed-use development design concepts: . Six story maximum . Zero foot first story setback . Additional setbacks for floors above three stories . Parking behind buildings . Enhanced transparency on ground floor . Lower parking requirements to maximize space utilization and promote affordability . Develop commercial space that fills a niche market (students postulate an organic grocer)
Walkability and Placemaking in Tigard Fall 2017 Planning, Public Policy, and Management	. Make changes to Tigard's ADU policy to enhance the density and affordability of development . Allow detached units . Remove parking requirements . Pursue a Community Land Trust model (decoupling of ownership of land from the improvements on it) to pursue affordability and redefine protocol regarding sale/donation of public land . Public surplus property doesn't need to be sold to the highest bidder . It could be donated or sold below market rate to promote affordable development . Preserve naturally occurring affordable housing . New construction costs are passed onto consumers, making the preservation of existing housing stock important to maintaining affordability . Emergency housing support . Housing inspection program (to hold landlords accountable to building codes) . Rent assistance . Implement inclusionary zoning to increase affordable housing stock . Consider allowable density and height limit exemptions/revisions to stimulate an increase in housing supply . Offer permit waivers, fee waivers, and/or tax abatements to affordable housing developments . Focus development in areas with existing infrastructure (to reduce infrastructure-related cost of development that might be bucked to the consumer) . Prioritize mixed-use and mixed-income development . Aim to retrofit underutilized structures and infill underutilized parcels . Concentrate on TOD and multimodal accessibility . Baylor/Clinton area was identified as underutilized land with TOD potential . Beveland Street (near the Southern end of the Triangle) was identified as prime site for mixed-use infill . Placemaking in Downtown Tigard . Pursue "Creative Placemaking" and "Identity through Place" (Arts and Culture) . Activate public space through temporary creative placemaking and pop-ups . Proposes plaza adjacent to Yen's Chinese Restaurant parking lot to house food carts, music performances and community events

Walkability and Placemaking in Tigard (Continued from previous page)	. Create cohesive community branding via CORE (Characterization, Objective, Relationship, Environment) Story Framework . Step 1: clearly define the existing condition and goals of downtown . Step 2: conduct extensive public outreach (Downtown walking tour, fireside chats with mayor or city manager, planner in the park events). . Step 3: populate CORE story framework with data obtained from public outreach . Step 4: use CORE output to create narrative for downtown . What is the CORE story framework . Character: refers to the physical character of the community (streets, buildings, signage, lighting, homes, yards, parks and natural environment) . How downtown presents itself . Objective: the experience that downtown intends to provide and the role that downtown plays in the city as whole . Relationship: forge connection with residents and build new commercial markets . Environment: context of the city . Install creative and educational wayfinding to enhance the character of Tigard and educate residents on ongoing environmental restoration projects . Develop Triangle Public Market to serve as a social and economic catalyst for the development of community identity and development in Tigard . Could help eliminate barriers to small-scale business and local entrepreneurship . Pilot pop-ups to test this concept . Could be an adaptive reuse development on a former big-box site . Extensively engage a community visioning committee . Install SNAP, WIC or Double-Up Food Bucks approved vendor(s) . Could serve as a business incubator . Develop local task force on arts and innovation . Involve youth/students in design of community space . Advocates for park installation at: . Red Rock Creek Corridor . Intersection of SW Dartmouth and SW 74th Ave . Intersection of SW Baylor St and SW 69th Ave . Intersection of SW Elmhurst St and SW 69th Ave . Intersection of SW Franklin St and SW 67th Ave . Corridor south of SW 68th Parkway
Barbur Boulevard: Designing a Model Civic Corridor for the 21st Century Fall 2017 Landscape Architecture Studio	. Study Area 1: “Custer Node” urban design goals and recommendations 1 . Community-centered planning (Live, Work, Play Design) . Incorporate parks and/or plazas into each “building cluster or district” . Create interactive and engaging features within public space . Incentivize mixed-use development across spatial scales . Emphasize accessibility to amenities . Maintain open streetscape visibility

Barbur Boulevard: Designing a Model Civic Corridor for the 21st Century (Continued from previous page)	. Keep development at pedestrian scale . Install public murals that reflect community identity 2 . Enhance pedestrian and cyclist experience . Widen sidewalks along storefronts . Minimize building setbacks . Shift parking and commercial loading to the rear of businesses . Consolidate parking to underground and structured facilities . Facilitate smooth transition between modes by designing for seamless multimodal commute . Integrate pedestrian pathways throughout neighborhoods to increase connectivity within and between various "districts" along Barbur Blvd 3 . Foster community identity through celebration of natural features . Reconnect green spaces on either side of I-5 . Co-locate pathways and trails with streams and green stormwater management infrastructure . Daylight streams in feasible locations . Preserve greenspace buffers for future daylighting, riparian function and habitat . Install visually interesting stormwater facilities that interact with topographic changes . Prioritize stormwater retention and filtration . Integrate natural/environmental character of the area into architecture and landscape architecture of new developments . Reflect ravine theme in urban design/art . Phase 1: 0-10 years after LRT start of construction . Stream daylighting project . Development of dense multi-family housing . Mixed-use redevelopment of Fred Meyer area . Greenspace between Barbur and I-5 planted to provide noise buffer . Phase 2: 10-30 years after LRT start of construction . Big box shell converted into commercial mixed-use . Further multi-family infill to create cohesive environment . Phase 3: 30-50 years after LRT start of construction . Up-zone surrounding area . Natural riparian areas conserved and enhanced . Cross-section/Streetscape recommendations (all options widen design from DEIS) . 7-10' sidewalks, 3-10' bioswales/treeplanters, 6-7' bikelanes, 28' center-running LRT footprint, 12' 3" - 21.5' station platforms and 10' travel lanes (two in each direction) . Install 48' stormwater retention swale with public art feature(s) in center on SW Custer . Incorporate kiss and ride pullouts into station area design . 15' "pedestrian promenade" abutting Fred Meyer's parking lot . Install a plaza that would function as pop-up market space and year-round food court . Remove sidewalk of freeway side Barbur in this section -- no businesses or homes to access

Barbur Boulevard: Designing a Model Civic Corridor for the 21st Century (Continued from previous page)	. Advocates for grade separated center running bidirectional cycle track . Construct a public plaza at the SW corner of Fred Meyer's site . Incorporate ample seating, kiss-and-ride, flex space for foodcarts/popups, overhang for shading, playspace, wide steps that double as seating (top step flush with sidewalk) and a boardwalk ped bridge over a daylight/rerouted Stephen's Creek . Study Area 2: "Northeast Corridor" urban design goals and recommendations . Goal 1: Reduce traffic conflict while improving safety and access for all forms of transportation . Widen and buffer sidewalks and bikelanes . Goal 2: Create distinct mid-density development that enhances the overall corridor . Encourage mixed-use development with multi-family residential and commercial opportunities . Goal 3: Improve the quality of air, water and land resources . Plant street trees and other visually unobstructive vegetation . Filter stormwater onsite . Smaller commercial lots transformed into active open space park with basketball court , bleachers and a buried stormwater retention basin . Proposed large-scale redevelopment of parcels by single developer . Evans street rerouted in hopes of providing better access to the new development . To maximize developable area SW Moss street is closed . TNC drop-off zone . Open space added after SW 17th Street is closed to Barbur and existing retaining wall is extended to create small plaza at Barbur level . Also provides gateway to the residential community up the hill . SW Troy Street is extended to Multnomah to provide more access for drivers entering and exiting the development area . Sub-terranian parking . Install "garden wall" retaining wall with artistic landscaped winding ADA ramp . Integrate ample plaza space . Sunken stormwater basin with plexiglass cover at the heart of plaza (pedestrians can walk over) . Study Area 3: "19th Avenue Node" . Goal 1: Increase pedestrian and bicycle safety . Widen sidewalks along arterials and adjacent roads with frequent crosswalks . Add protected and/or buffered bike lanes (utilize greenspace/planters as separation) . Minimize bike/car modal conflict . Goal 2: Easy and efficient access to buildings from Barbur and LRT platform . Minimize setbacks along Barbur . Goal 3: Maximize circulation to and from Barbur and surrounding neighborhoods . Goal 4: Create opportunity of economic growth . Up-zone surrounding area . Goal 5: Create an area that is easy and enjoyable to live in . Maximize convenience for residents and visitors . Landscaped buffers between cars and bikes, as well as, between bikes and pedestrians . Recommends: 7-12' sidewalks, 4-6' planters, 11' travel lanes (two in each direction, 5-7' bike lanes, 28th footprint for LRT, 12' retention swale and 15' station platform . Design of the park should be reminiscent of the geometry of Barbur Blvd meeting 19th Ave

Barbur Boulevard: Designing a Model Civic Corridor for the 21st Century (Continued from previous page)	. Includes descending terraces that provide steps/seating around a larger open plaza (including seating/tables, public art, grass lawn, flexible event space and overhangs for shading/weather protection) at the lowest elevation . Top terrace would feature a café with covered outdoor seating . Study Area 4: "Tryon Crossing" . New parking structure added to account for lost parking spaces related to daylighting of stream along the corridor . Tryon Creek Stream Restoration should include play areas and community gathering space . Redesign of stormwater management system . Preserve Original Pancake House and Budget Lodge Hotel due to historic structure . Proposes an intersection exchange that eliminates highway ramps . Redesign intersection to change geometry of triangular block . Daylight the headwater of Tryon Creek and install boardwalk path to buffer development from 100-year storm events . Underground parking serving mixed-use development . Install mid-block crossings . Study Area 5: "30th Ave Node" . Goal 1: Design a variety of outdoor spaces for people to interact passively and actively . Incorporate public restrooms . Design paved public spaces with benches and planters . Install patches of public greenspace to enhance urban design and permeability . Enhanced lighting for 24/7 access . Goal 2: Create safe access for bicyclists, pedestrians, and light rail commuters . Strategically install crosswalks to enhance pedestrian safety and provide access to businesses and employment centers . Goal 3: Use public art and place-making details . Install a variety of sculptural features at each transit station . Create space for community banners/signs promoting local events . Utilize unique and subtle wayfinding features (unique paving patters, building materials, shapes of planters or styles of benches) . Incorporate TNC drop-off zone . Shift parking/vehicular access to the back of businesses via installation of new road . Remove one lane of vehicular traffic to accommodate larger boarding platform and planters . Widen sidewalks to as much as 20' in less constrained sections . Flip the orientation of existing gas station to accommodate wider cross-section while still serving drivers . Advocates for raised center-running bike facilities . Outfit Barbur with silva cell system to increase soil quality and encourage the health of tree allees . Study Area 6: "Southwest Corridor" . Goal 1: Create opportunities for a variety of transportation modes . Design safe and usable bike lanes and pedestrian crossings

Barbur Boulevard: Designing a Model Civic Corridor for the 21st Century (Continued from previous page)	. Goal 2: Increase connectivity between Barbur and adjacent urban centers . Redesign arterials for pedestrian comfort . Expand network of public and private open space . Goal 3: Capture, treat, and recirculate stormwater onsite . Integrate stormwater facilities into streetscape . Reduce amount of impermeable surfaces . Consolidate driveways (reflection of reduced parking) . Straighten Taylors Ferry and Alice St to create better geometry for redevelopment . Widened sidewalks and vegetated buffers . Recommends: protected bidirectional side-running bike lanes (with 7' lanes each direction), 11' travel lanes (two going each direction), 55-14' stormwater swales, 10-19' sidewalks and 3-4' planters . Study Area 7: "West Portland Town Center" . Goal 1: Refocus transportation emphasis . Design a bike/ped centric town center . Slow automobile traffic . Increase pedestrian and bicyclist comfort and perception of safety . Goal 2: Create vibrant town center . Provide space for a diversity of jobs . Install public amenities . Foster cohesive community identity . Goal 3: Promote open space . Connect green infrastructure . Incorporate stormwater management . Create open space parks of varying scale . Proposes existing buildings across from and to the west of Barbur Transit Center be redeveloped for mixed-use residential and commercial purposes . Incorporate public plazas into station area design: . Glacier View Plaza/Sculpture Garden on the NE side of Barbur Transit Center . Includes: Café and outdoor seating, accent paving, raised planters with built in benches and sculptures . Taylor's Plaza across Barbur from BTC . Includes: space for food trucks, elevated walkway with looping ramp to glass elevator of proposed hotel, café/outdoor seating and outdoor mega chess set
A Front Porch for OHSU and Marquam Hill Winter/Spring 2018 ARCH 486/586	. Enhanced wayfinding . Design concepts: . "Marquam Hill Discovery Park" . Elevated pedestrian bridge connecting synagogue site to higher elevation development . Childcare facility nestled into a public plaza (with a focus on nature and history of the area) . "Southwest Cycle Hub" . Intended to bring the community together with food, drinks and bicycles . Architecturally interesting development adjacent to synagogue

A Front Porch for OHSU and Marquam Hill (Continued from previous page)	. "A Farmstead" . Architecture reminiscent of a greenhouse/barn . Suggested programming: sustainable urban farming, vertical gardens, farm to table restaurants . "The Walk" . Elevated boardwalk-like pedestrian bridge . Repurposes the synagogue as an immigration museum . "The Transition" . Design seeks to explore urban biodiversity in a dynamic public space . Plaza space with extensive landscape architecture . Proposes underground exhibition space with market/food hall above . "Wellness Tower" . Tower serves as a pass through for patients/employees of OHSU's Health and Wellness Center . Incorporate wellness and fitness classes into the buildings programming . "Renaissance System" . Inspired by Italian Renaissance gardens -- looping walkways up Marquam Hill . "Living Machine" . Inspired by hydrological cycles . Space programming includes "Living Filter Education Center" meant to educate visitors about sustainable stormwater management . "Hydrological Sensorium" . Inspired by the "journey of water" . Proposes underground walkway that would educate pedestrians about hydrological cycles . "Geology" . Features underground tunnel system designed to educate visitors about geology and geologic processes . "Triple-Bottom Line" . Features tower next to synagogue that appears to include housing . "History" . Creates civic pavillion at Terwilliger Parkway . Install park weather shelter that could double as a transit hub . Would include enhanced wayfinding and educational displays educating the public on Olmsted's Terwilliger plan
Destination: Tigard TOD and Urban Design Strategies Spring 2018 Arch 584/407/507	. Proposal 1: "Catalytic Parallel" . To encourage integration and success of Hall Station implement series of trails to facilitate local and regional connections . Design concept creates three separate zones: one for live, one for work and one for play . Suggests the industrial character of TriMet's future OMF can inform the urban design of the station and station area . Proposal 2: "Fanno Fingers" . A series of "green fingers" branch out from Fanno Creek and weave throughout downtown Tigard . Interlock with proposed plaza space along Hall and Commercial intersection . MAX station plaza design concept: front porch of the city

Destination: Tigard TOD and Urban Design Strategies (Continued from previous page)	. Proposal 3: "ECH2O" . Weave together nature and the city via Fanno Creek . Advocates for the development of: town homes, mixed use housing, mixed use office, grocer, small-scale retail and transit center . Wetland creation/enhancement between OMF and Fanno Creek . Include monitoring vault and under drain . Heat island mitigation: green roofs, street trees, white roofs and white streets . Waterway restoration: remove fish barriers, bioswale installation, reforestation and revegetation . Create micro-habitats throughout the installation of tree canopy, shrubs/grasses and bulb-outs with vegetation . Increase permeability via porous sidewalks and swales . Proposal 4: "Belt Blocks" . Meant to create a walkable station area district . Includes: civic plaza, ecological park, transit station and pedestrian oriented streets . Infill development would occur between new walkable district and Downtown . Split Hall Blvd into two separate streets: existing Hall becomes a slower street for bike/ped activity and retail and the newly developed Hall Blvd serves vehicles . "Old Hall" Blvd would be meant for meandering, shopping, eating, festivals/markets and enjoying outdoor space . "New Hall" Blvd would incorporate: permeable paving, street furnishing and at-grade woonerf design . Proposes underground LRT station at OMF site . Encourages the installment of an Eco Park, community garden, splash pad, event space and Civic Plaza within station area . Phasing . Phase One: realignment of Hall, installation of a civic plaza, conversion of Old Hall into a living street, mixed use infill between Old Hall and New Hall, relocation of Tigards civic campus . Phase Two: sheltered MAX station, transit center, structured park and ride, retail space development, eco park, business incubator and boutique hotel . Phase Three: development of a business garden south of the station . Phase four: mixed-use affordable housing development on the north side of old Hall . Proposal 5: "Urban Forest" . Staggered side street trees along Ash Ave . Install community garden off of Ash Ave . Install a "Makers Alley" . Densify street network/reduce block size . Expand pedestrian infrastructure network . Particularly create a clear/comfortable North-South pedestrian connection from Downtown Tigard to Fanno Creek

Destination: Tigard TOD and Urban Design Strategies (Continued from previous page)	. Proposal 6: Industrial (RE)vitalization . Prioritize light industrial programing: makers spaces and fabricators (particularly on parcels adjacent to WES tracks) . To honor the industrial/logging history of Tigard . Design central bike/ped "spine" from Main Street to LRT station along WES tracks . Widen path through open areas . Incorporate the OMF site into overall station area design scheme . Proposes configuring site & incorporating building transparency in such a way that riders and residents can watch LRT vehicle maintenance . Construct plaza south of Hall to act as a gateway for the station area . Proposal 7: Connecting Corridors . Install park at the intersection of Commercial and Ash with space for food carts, seating and a community garden . Install park adjacent to Hall . Connect Ash Park to Hall Park via a boardwalk style pedestrian connection

Appendix Item C: Climate Change & Environment Recommendations

Preserving South Portland Winter 2018 AAAP 410/510	. Enhance the energy efficiency of existing historic buildings via weatherproofing and renewable energy upgrades . New construction should be designed for net-zero energy/resource consumption: on-site renewable energy production + sustainable landscaping features (i.e. rainwater collection, rain gardens and native species planting)
Integrating Green Infrastructure and Urban Ecology in Regional Transit Corridors Spring 2018 LA 459/559	. Woods segment design concept revolves around providing for uninhibited migratory behavior for insects, small tree-dwelling mammals, and riparian-dwelling creatures: . Creating a canopy connection over the corridor (via median trees) would limit interaction between tree-dwelling animals and traffic . Create overland and stream crossing connection to facilitate natural migratory patterns . Daylight streams and avoid disruptive stormwater treatments (such as culverts) . Install "vegetated basins" to create habitat for insects, buffer natural environment from the roadway and perform stormwater treatment . Primary stormwater management strategies: . Install Ecotracks . Roadside stormwater basins . 13th Ave Station Design Concept Options: . Stormwater basin with parks design and programing at the center of station area . Station green-roof . Roadside stormwater basins along Barbur and adjacent/feeder streets . Ecotrack installation . Design greenspace/stormwater infrastructure to double as community space . 53th Ave Station Design Concept Options: . Focus on slowing waterflow on the slope descending from PCC Sylvania . Desire to improve hillside soil quality and decrease erosion on 53rd . Integrate educational wayfinding informing students and trail goers about stormwater management techniques and habitat . Install stormwater platers along 53rd that feeds into a large swale at the bottom of the hill along Barbur . Rain garden adjacent to station . Tigard Triangle Stormwater Design Concepts: . Aims to filter runoff into Fanno Creek and stabilize steep slope . Focuses on roundabout installation to simultaneously provide greenspace, enhance stormwater functionality and slow travel speeds . Retrofit parking structure adjacent to existing station with green walls/roofs . OMF Facility Station Design Concepts: . Developing a "necklace" of ponds and hills . Install grassy swale at the southern edge of the site to act as a "last line of defense" as runoff enters into Fanno Creek

TriMet Southwest Barbur Boulevard Stormwater Capstone Project Winter/Spring 2018 CE 484	. Preferred stormwater management alternatives: . Stormwater treatment planters . Detention pond designed to detain 25-year rain event with over flow capacity for 100-year storm event
Powering the SW Corridor Spring 2018 Business Capstone	. Rooftop solar at all stations . Station type 1: Standard Platform . Station type 2: Park & Ride (includes EV charging stations) . Station type 3: Resilient Park & Ride . Battery storage and resilience features (charging, radio and information on displays) at Tigard Transit Center and Bridgeport Park & Ride . Enter into power purchase agreement with an approved PGE ESS . Strategic partnerships . Bulk purchase renewably sourced energy from off-site provider to advance toward net-zero project goals . Install regenerative braking technology and excess energy battery storage on vehicles
Walkability and Placemaking in Tigard Fall 2017 Planning, Public Policy, and Management	. Trail Planning in Tigard: . Restore and expand Red Rock Creek natural area for environmental and recreational enhancement . Develop existing underutilized natural areas into park space with user amenities (picnic tables, shelters, restrooms and play areas) in the Southern and Eastern portions of the Triangle . Recognize Red Rock Creek as a cultural and economic resource (invest in restoration and trail development) . Address flooding, sewer line exposure and invasive species issues . Students propose a trail that runs/follows the full length of Red Rock Creek through Tigard with safe and accessible ped/bike crossings . Suggests the City of Tigard create a creek restoration master plan for the Triangle area . Propose starting Phase 1 at the most upstream portion of the Triangle (where the creek flows beneath I-5 into 5 acres of wooded area) . Creek incising has created vertical banks that contribute to downstream flooding, erosion, sedimentation and decreased water quality . Propose grade control creek management, potentially including: creek realignments, rock structures, concrete weirs and log jams) . Phase 2 would address the are through the 8-acre woodland between 68th and 72nd . This area threatens a nearby sewer line, exacerbates sedimentation downstream and compromises riparian habitat . Recommends adding streambed fill and structural grade controls to reconnect the creek to its floodplain

Walkability and Placemaking in Tigard (Continued from previous page)	. Phase 3 would address the creek as it flows South of SW 72nd Ave through a narrow riparian corridor (is piped underground for about 300 feet) . Proposes grade controls leading up to piped section (since water flow speeds up once in the pipe) . Consider daylighting stream and planting native vegetation for slow and water quality benefits . Phase 4 would concentrate on the section of the waterway that flows between the Regal Cinemas parking lot toward SW Dartmouth Street . Runoff has caused serious erosion which is blocking a culvert downstream . Supports the Tigard Stormwater Management Plan's suggestion for 500 feet of new structural grade controls . Phase 5 addresses restoration of two wetlands (on Red Rock Creek downstream of SW Dartmouth Street on either side of HWY 217 -- present opportunity to store sediment and slow water flow . Suggests 3.5 feet of excavation, construction of an inflow channel, an outlet channel that limits waterflow rates and an emergency spillway . Encourages the design and construction of low-impact development . Stephens Creek partial daylighting concept plan: . Existing Custer Creek culvert is retained to regulate above-ground flow and storm overflow underground culvert along existing SW Custer Dr . Culvert outfall feature where the creek exits . Streamside path connects Stephens Creek Natural Area to Custer Station via a functionally-restored riparian corridor . Architecture abutting this area should be topographically responsive and allow for vertical variety, as well as, flood clearance . Install terraced wetlands to retain and remediate stormwater from Custer and Stephans Creek (South of Stephens Creek Retention Pond) . Top tier: partial infill to dissipate energy and create habitat variety . 2nd-4th tier: biremediation plants to mimic functional wetland communities and in correspondence with varying pooling heights . Interpretive wetland overlook anchors daylight streamside path . Install floating bridge over retention pond to adjust with storm loads . ADA accessible bridges and paths . Install an "Overlook Park" above the piped portion of the creek with a line of trees following the natural path the creek's historic channel

Clean Energy Solutions: Community Solar Winter 2018 MGMT 608	. Recommends TriMet adopt an "Owner and Subscriber model" regarding clean energy . TriMet would install renewable energy harvesting infrastructure along the corridor and co-own the infrastructure with a tax equity investor, investing businesses and individual investors . The owning entities would then sell energy to subscribing energy consumers (which could include households, local businesses and TriMet)
A Front Porch for OHSU and Marquam Hill Winter/Spring 2018 ARCH 486/586	. Action items to conserve the existing ecology of Forest Park: . Address fish and wildlife circulation barriers (such as roads, culverts and fences) . "Forestation succession planning" for replacing older trees . Buffer streams from roads/development with vegetation . Increase channel complexity to create fish habitat . Preserve and expand white oak range . Manage public access to fish and wildlife habitat . Protect and enhance headwater streams and riparian habitat . Protect and improve water quality . Remove invasive plant species (particularly English Ivy)

Appendix Item D: Community Building Recommendations

Walkability and Placemaking in Tigard Fall 2017 Planning, Public Policy, and Management	. Community Engagement . Empower Hispanic/Latino community (historically marginalized) . Leverage student population as an outreach resource . Partnerships with Y Plan and/or Adelante Mujeres (or create stand alone programs such as a planning internship for high school youth) . Establish Special Resident Advisory Board for the Triangle . Engagement strategy . Utilize targeted pop-up space activation and storefront activation . Employ community branding outreach . Install creative wayfinding
Preserving South Portland Winter 2018 AAAP 410/510	. Adaptive reuse of Ahavath Achim Synagogue as an immigration museum/marketplace . Identified work items for building restoration: . Repair stucco exterior . Repair and clean dome tiling . Repair and clean stained glass skylight . Repair basement stucco exterior . Repurpose basement landing to a small garden with seating . Install elevator for ADA access . Remove basement kitchen . Most important building characteristics identified for preservation: . Iconic red-tile dome . Interior acoustics . Stained glass . Building addition proposed: second circular structure connected via rectangular add-on . Rectangular area proposed to host rotating exhibits . New circular structure proposed to host interactive exhibit mirroring the journey of immigration . Class conceptualized exhibit beginning in "dark, cold, claustrophobic, and uncomfortable" basement space representing the historic journey immigrants to the US experienced and transition to a lighter, busier and stimulating mid-level representing arrival to a new country before ending at the top level gallery space with art that represents the thriving of immigrants in America . Flexible space programing of historic synagogue . Exhibits could rotate to tell a diversity of stories . Flexible upper-level exhibits would allow for community use during Jewish high-holidays . Acoustics of the building would lend itself to community lectures, meetings and performances . Installation of International Market Hall just South of site . Will help activate area and museum with lunch/dinner foot traffic . Partially remove parking to install greenspace and amphitheater

Community Profile Videos Spring 2018 Product Design Studio	. Edwards' family video . Documents benefits the SW Corridor LRT extension will hold for one local family. The Edwards' family offers their unique perspective on the benefits of light rail service over bus service on Barbur for transit reliant riders and wheelchair users . Empire Battery video . Documents the logistical and emotional impact the possibility of relocation has had on the family-owned Empire Batteries and T3 Properties . Files can be found in folder: W:\CP_Projects\5624-SW Corridor\DEV\DPS\Data_Analysis\SCYP\SPRING projects\Final Reports\S6 SCYP & product design Profiles